

Tamil Nadu Contingency Plan

S.No	Districts
1.	Cuddalore
2.	Erode
3.	Krishnagiri
4.	Thiruvallur
5.	Thanjavur
6.	Tiruchirappalli
7.	Thoothukudi
8.	Tiruppur
9.	Vellore
10.	Dindigul
11.	Kancheepuram
12.	Karur
13.	Theni
14.	Thirunelveli
15.	Pudukkottai
16.	Thiruvarur
17.	Thiruvannamalai

State: TAMILNADU

Agriculture Contingency Plan for District: CUDDALORE

1.0. District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghat (T.N. Uplands), (120-150) semi-arid ecosystem (8.3) East Coastal (TN) Plain, hot moist semiarid ecosystem with Coastal and deltaic alluvium-derived soils with GP 120-150 days. (18.2)		
	Agro-Climatic Region (Planning Commission)	Northern coastal Tamil Nadu region (11.4)		
	Agro Climatic Zone (NARP)	North Eastern Zone, (TN-1) Cauvery delta Zone (part of Chidambaram and Kattumannarkovil) (TN-4) High altitude and hilly Zone (part) (TN-2)		
	List all the districts or part thereof falling under the NARP Zone	Villupuram , Vellore , Thiruvanamalai, Kancheepuram ,Thiruvallur		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		15 ^o 11' to 12 ^o 35'	78 ^o 38' to 80 ^o 0'	4.6 m MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, Tamil Nadu Agricultural University, Vriddhachalam, Cuddalore – 606 001 Sugarcane Research Station, Tamil Nadu Agricultural University, Cuddalore Vegetable Research Station, Tamil Nadu Agricultural University, Palur, Cuddalore District.		
Mention the KVK located in the district	TNAU- KVK, Vriddhachalam, Cuddalore – 606 001			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	410.0	2 nd week of June	4 th week of September
	NE Monsoon(Oct-Dec):	651.0	2 nd week of October	4 th week of December
	Winter (Jan- March)	3.4	--	--
	Summer (Apr-May)	160.8	2 nd week of April	4 th week of May

	Annual	1225.2		
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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)	367.8	1.4	58.6	0.6	6.0	17.7	14.6	40.0	15.0

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Sandy loam	91.7	24.9
	Sandy	32.0	8.7
	Clay loam	115.6	31.4
	Sandy clay loam	128.6	35.0
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	215.2	122.8
	Area sown more than once	49.1	
	Gross cropped area	264.4	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	150.6	72.36	
	Gross irrigated area	175.1	63.44	
	Rainfed area	64.6	27.64	
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	270	43.6	29.8
	Tanks	594	7.0	4.7
	Open wells	11263	7.6	4.37
	Bore wells	30687	85.1	58.0
	Lift irrigation	-	-	-
	Other sources	21	1.0	0.7
	Total	42835	142.6	100.0
	Pumpsets	-	-	
	Micro-irrigation	-		
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-	-	Presence of chemical constituents more than permissible limit - EC, Cl, NO3 and F
	Critical	-	-	
	Semi- critical	10	76.92	Type of water - CaCl, NaCl and Mixed type
	Safe	3	23.08	
Wastewater availability and use	Data not available			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)					
		Kharif		Rabi		Rainfed	
		Irrigated	Rainfed	Irrigated	Rainfed	Summer	Total
1	Rice	102.8	-		-		102.8
2	Sorghum/ Cholan	0.0	-		1.1		10.9
3	Maize	0.0	-		12.3		12.3
4	Blackgram	1.7	-		46.3		48.0
5	Greengram	0.7	-		3.5		4.2
6	Groundnut	10.4			5.9		16.3
7	Cotton	0.2			2.0		2.1
8	Sugarcane	38.4			-		38.4
	Horticulture crops - Fruits	Total area		Irrigated		Rainfed	
1	Cashew nut	36.9		5.4		31.5	
	Horticultural crops - Vegetables	Total area					
1	Brinjal	0.3					
2	Chillies	0.2					
3	Bhendi	0.1					
4	Tapioca	4.1					

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)	19.2	72.0	91.2		
	Crossbred cattle	55.9	190.4	246.4		
	Non descriptive Buffaloes (local low yielding)	-	-	19.7		
	Graded Buffaloes	-	-			
	Goat			241.3		
	Sheep			47.2		
	Others (Camel, Pig, Yak etc.)			25.14		
	Commercial dairy farms (Number)					
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial	92	136.9			
	Backyard	--	--			
1.10	Fisheries (Data source: Chief Planning Officer)					
	A. Capture					
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized		
	3950	248	762	248	290	
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	

B. Culture			
	Water Spread Area (ha)	Yield (t/ha)	Production (*000 tons)
i) Brackish water (Data Source: MPEDA/ Fisheries Department)			
ii) Fresh water (Data Source: Fisheries Department)			
Others			

	Major reservoir	Intensive inland fish culture & marketing	FFDA Tanks	Major irrigation tanks (perennial & long seasonal)	Seasonal tanks & other ponds	Derelict water	Aquaculture farms	Estuaries & Backwaters	Total
Estimation of Inland Fish Production (Cuddalore) (Quantity in tonnes) 2008-2009	0.7	66.9	64.2	6519.2	6328.0	217.8	1011.8	1310.4	15519.2

	Reservoir	Intensive Inland Fish Culture in major irrigation & seasonal tanks	FFDA Tanks	Short seasonal tanks & ponds	Derelict water	Aquaculture farm	Estuaries & backwaters
Inland Fisheries Culturable Water Resources (Area in	--	5986	312	12568	1000	477	8100

hectares) 2008-2009							
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	Mechanised	Motorised	Non mechanised	Shore Seine	Total
Marine Fish Production- Craft wise (Quantity in tones in Cuddalore) 2008-2009	15359.0	2555.3	5459.0	293.8	23667.1

	Number of fishing villages	No. of Fish Landing Centres		
		Major	Minor	Total
Marine Fishing villages & Landing Centres (Cuddalore)	49	2	26	28

	Number of crafts								
	Mechanised	Wooden Vallams		FRP Vallams		Wooden Catamarans		FRP Catamarans	
		With engine	Without	With	Without	With	Without	With	Without

			engine	engine	engine	engine	engine	engine	engine
Details of fishing crafts-mechanized fishing boats and country crafts	642	0	0	1111	0	0	5538	0	0

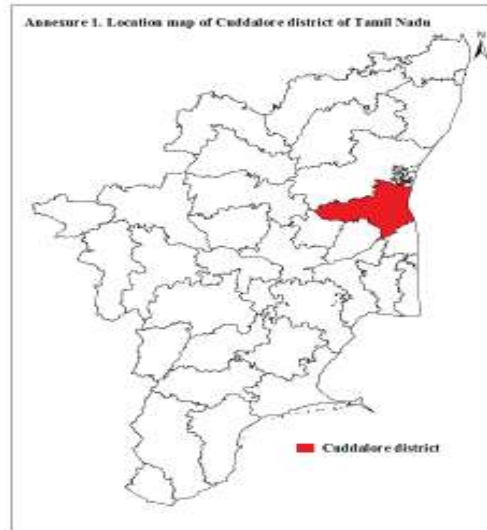
1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Cereals and millets								
	Rice	-	-	-	-	-	-	543.2	4915
	Sorghum	-	-	-	-	-	-	0.8	382
	Maize	-	-	-	-	-	-	4.2	2352
	Pulses								
	Blackgram	-	-	-	-	-	-	15.9	378
	Greengram	-	-	-	-	-	-	1.4	319
	Oilseeds								
	Groundnut	-	-	-	-	-	-	90.3	2592
	Cash crops								
	Cotton	-	-	-	-	-	-	0.4	305
	Sugarcane	-	-	-	-	-	-	4586.2	32000
	Horticultural crops								
	Cashew nut	-	-	-	-	-	-	22.2	780
	Vegetables								
	Brinjal	-	-	-	-	-	-	3.3	11180
	Chillies	-	-	-	-	-	-	0.1	530
	Bhendi	-	-	-	-	-	-	0.6	7000
	Tapioca	-	-	-	-	-	-	177.6	34360

1.12	Sowing window for 5 major crops (start and end of sowing period)	Groundnut	Cotton	maize	Sesame	Sugarcane
	Kharif- Rainfed	June – July	-	-	-	-
	Kharif-Irrigated	June – July	-	-	-	-
	Rabi- Rainfed	October - September	October - September	October - September	-	-
	Rabi-Irrigated	-	-	-	February - March	January-February

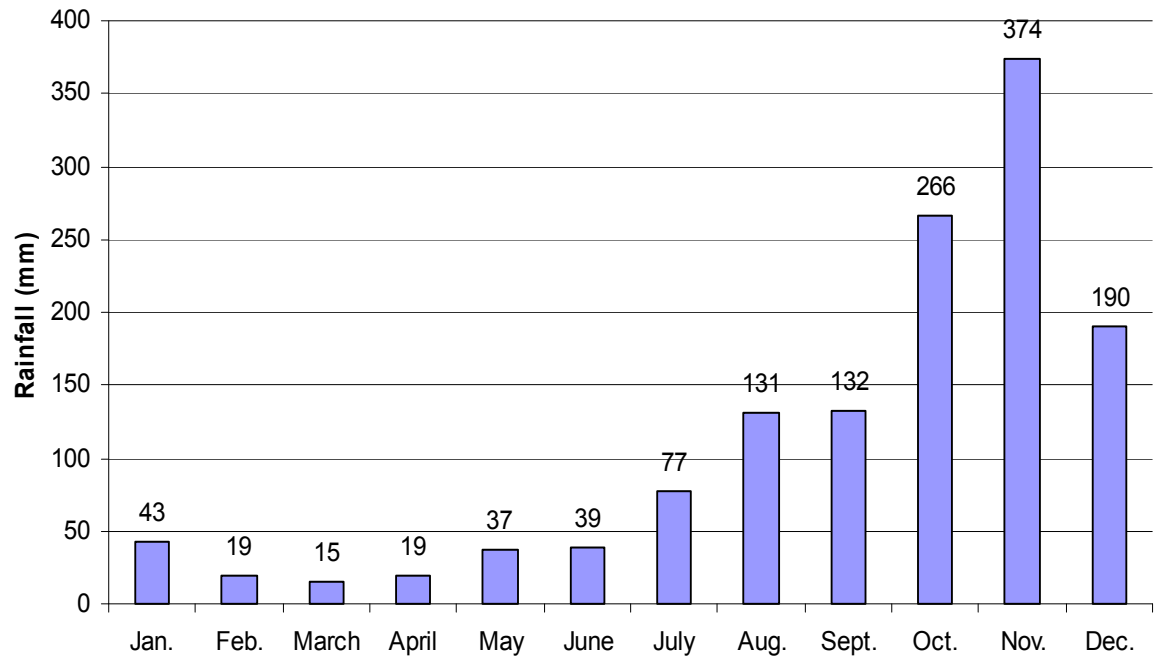
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought		√	
	Flood		√	
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water inundation			√
	Pests and diseases (specify)		√	
	Sheath blight, sheath rot and stem borer at Karunkuzhi and Kollakudi villages of Kurunjipadi block in Cuddalore District during Rabi 2010			

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

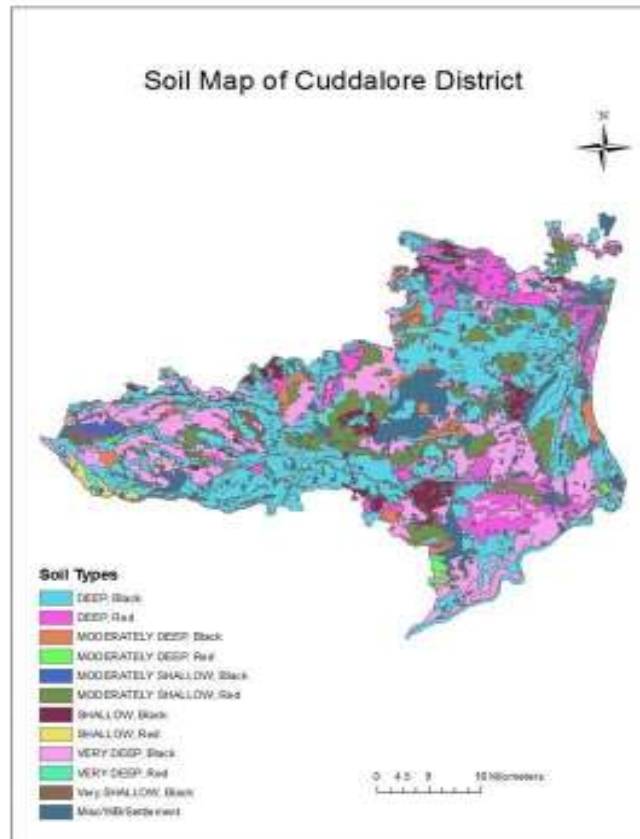
Annexure 1. Location map of Cuddalore district and the blocks



Annexure 2. Mean annual rainfall of Cuddalore district of Tamil Nadu



Annexure 3. Soil map of Cuddalore district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Kharif season		Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (Specify month) June 4 th week	Laterite and black soils	Maize/pearl millet (Jun.-Sep) Groundnut (June-Sep.)	-	-	Linkage with NFSM for supply of seeds for pulse crops
Delay by 4 weeks (Specify month) July 1st week	Laterite and black soils	Maize/Pearl Millet (Jun.-Sep)	Pearl millet Short duration variety like COCU 9	Seed pelleting Conserve soil moisture by mulching	
		Groundnut (June-Sep.)	Groundnut Short duration variety like VRI 3, TMV 7	Apply 0.5 % KCl spray at vegetative stage	
Delay by 6 weeks (Specify month) July 4 th week	Laterite and black soils	Maize/pearl millet (Jun.-Sep)	Varagu/samai	Open furrow	
		Groundnut (June-Sep.)	Fodder Sorghum / Pulses- Cowpea, Horsegram	Apply 2 % DAP for cowpea	
Delay by 8 weeks (Specify month) August 2 nd week	Laterite and black soils	Maize/pearl millet (Jun.-Sep)	As above	-	
		Groundnut (June-Sep.)			

Condition	Major Farming situation	Rabi Season	Suggested Contingency measures		
		Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (Specify month) Oct 3 rd week	Laterite and black soils	Groundnut (Oct-Feb)	No Change	-	Linkage with NFSM and RKVY for seed supply of contingency crops – Millets/Fodder sorghum
		Pulses / Gingelly (Oct.-Jan.)			
Delay by 4 weeks (Specify month) November 1st week	Laterite and black soils	Groundnut (Oct-Feb)	Sunflower Kodomillet Fodder Sorghum	Seed hardening techniques 0.5 % KCl spray at vegetative stage	
		Gingelly (Oct.-Jan.)			
Delay by 6 weeks (Specify month) November 3 rd week	Laterite and black soils	Groundnut (Oct-Feb)	Small millets, Kodomillet Dewgram	Conserve soil moisture by mulching Seed hardening techniques 0.5 % KCl spray at vegetative stage	
		Gingelly (Oct.-Jan.)			
Delay by 8 weeks (Specify month) December 1 st week	Laterite and black soils	Groundnut (Oct-Feb)	Fallow	-	
		Gingelly (Oct.-Jan.)			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Laterite and black soils	Maize/Pearl Millet (Jun- Sep)	Supplementary irrigation, if available	Intercultivation	-
		Groundnut (June - Sep.)		Make conservation furrow at 8m interval	
				Mulching with saw dust	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)					
At reproductive stage	Laterite and black soils	Maize/pearl millet (Jun.-Sep)	Maintain low plant population	-	-
		Groundnut (June-Sep.)			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought					
	NA	-	-	-	-

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Command Areas: Heavy clay	Rice (June-Sep.) - rice (Oct.-Jan.) - pulses/gingelly (Feb.-May)	No change	-	-
		• Rice (Aug.-Jan.) - pulses/sesame/cotton (Jan.-April)			
		• Maize /vegetables/pulses/sesame/green manure (June-Sep.) - rice (Aug.-Feb.) - pulses (Feb.-May)			
		• Sugarcane (Dec.-Nov.) - ratoon sugarcane (Dec.-Nov.) - rice (Dec.-May) -			
		Groundnut (June-Sep./Oct.) - 3 years rotation			
Non release of water in canals under delayed onset of monsoon in catchment	Command Areas: Heavy clay	Same as above	Gingelly / Sorghum / Maize	Short duration varieties should be preferred Adopt moisture conservation practices	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient delayed onset of monsoon	Tankfed areas : Tank alluvium (Heavy clay soils)	Rice/vegetables (Aug.-Jan.) - Gingelly/ Pulses (Feb.-May)	Rice Sesame Fodder legumes	Improved management techniques such as SRI, Direct sown crop for Paddy Short duration crops for fodder purpose Adopt moisture conservation practices in ID crops	
Insufficient groundwater recharge due to low rainfall	Well irrigated areas : Laterite, red and black soils	Rice (June-Sep.) - rice (Oct.-Jan.) - pulses/gingelly (Feb.-May)	Rice Sorghum Fodder Sorghum Greens	Adopt improved production technologies like SRI, mulching Less water requiring grain/fodder Sorghum preferable Limited irrigation and practice water saving irrigation methods such as alternate wetting and drying in paddy, skip row irrigation in Maize and Sugarcane and sprinkler irrigation in Groudnnut Alternatively go for	
		• Rice (Aug.-Jan.) - pulses/sesame/cotton (Jan.-April)			
		• Maize /vegetables/pulses/sesame/green manure (June-Sep.) - rice (Aug.-Feb.) - pulses (Feb.-May)			
		• Sugarcane (Dec.-Nov.) - ratoon sugarcane (Dec.-Nov.) - rice (Dec.-May) -			
		Groundnut (June-Sep./Oct.) - 3 years rotation			

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				millets/fodder crops and leafy vegetables with limited irrigation	
Any other condition (specify)	-	-	-	-	-

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Groundnut	-	Drain excess water	Weather based advisory to be followed for harvesting	1. Shifting of produce immediately after drying. 2. Threshing on 5 th day after harvest of groundnut crop
Cotton	Proper drainage	Drain excess water	Weather based advisory to be followed for harvesting	1. Shifting of produce Immediately after drying. 2. Harvest opened bolls immediately
Outbreak of pests and diseases due to unseasonal rains				

Groundnut	-	Timely plant protection measures are to be taken against thrips, Early leaf spot (ELS) and stem rot.		
Cotton	Timely plant protection measures are to be taken against sucking pest and stem weevil	Timely plant protection measures are to be taken against boll worms		
Horticulture				
Tapioca	Proper drainage	--		

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Rice	Drain out excess water, Gap filling and drenching with fungicide to prevent seedling rot	Drain out excess water, Weeding and top dressing	Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of earheads
Maize	Drain out excess water, Gap filling		Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of cobs
Blackgram	Drain out excess water, Gap filling and drenching with fungicide to prevent seedling rot		Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Cotton	Drain out excess water, Gap filling		Drain out excess water, Earthing up	Drain out excess water, Harvesting of bolls

Continuous submergence for more than 2 day				
Rice	Drain out excess water	Drain out excess water, Weeding and top dressing	Drain out excess water; Tying up of lodged plants	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting
Maize	Drain out excess water, Gap filling		Drain out excess water, Earthing up; Tying up of lodged plants	Drain out excess water, Harvesting and drying of cobs
Blackgram	Drain out excess water, Gap filling and drenching with fungicides		Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Cotton	Drain out excess water, Gap filling		Drain out excess water, Earthing up	Drain out excess water, Harvesting of bolls

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

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			

Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris and strengthening of pond embankments through turfing 	<ul style="list-style-type: none"> i. Shallow areas of derelict water bodies can be used for raising table sized fishes using stunted fish seeds and the culture can be done in enclosures (pens). Pens of 0.1 to 0.2ha are ideal for easy operation and economical. ii. Indian major carps and freshwater prawns are ideal species for culture. iii. Temporarily raising the height of the enclosures maybe done to prevent loss of stock in the event of sudden rise in water level due to sudden onset of rain or flooding. 	<ul style="list-style-type: none"> i. Due to severe water shortage farmers have to harvest fish in large quantities to avoid loss due to mortality. Leading to difficulties in marketing the fish farmers can be trained on the frozen storage techniques and in preparing value added products (ready to eat and processed products) ii. Adoption of short term culture of species wherein culture of species having rapid initial growth can be stocked. Eg. minor carps like silver barb (<i>Puntius gonionotus</i>) and fringe lipped carp (<i>Labeo fimbriatus</i>) can be undertaken. iii. Culture of minor carp like <i>Amblypharyngodon mola</i> can be done in shallow ponds and this being an auto breeder it spawns two or three times in a year which also ensure auto stocking.
(ii) Changes in water quality	<ul style="list-style-type: none"> i. Strictly implement in avoiding the 	<ul style="list-style-type: none"> i. Reduced water volume in the pond/ local water bodies lowers its 	

	<p>use of plastics and other non-biodegradable material along the river belts (intervention and polluting by human is a common factor)</p> <p>ii. Avoid entry of pollutants like industrial effluents, run off from agricultural land into rivers</p>	<p>buffering capacity hence every precaution has to be taken while adopting use of manures and fertilizers to avoid onset of algal blooms and eutrophication</p>	
(iii) Any other	--	<p>i. Stunting of major carp fingerlings and stocking in grow out ponds as they grow faster (three times more growth than the non stunted fingerlings)</p> <p>ii. Ornamental fish rearing utilizing gold fishes, koi carp or live bearers like mollies and guppies can be done in summer. This ensures money flow to the farmers</p> <p>Supply of fish stock in case of loss</p>	
B. Aquaculture/	Before the event	During the event	After the event

Mariculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Water depth should be at least 1m for initiating fish culture. ii. Adopt low stocking density to reduce culture duration and culture should be done only after ensuring water availability for minimum period of 3 months. iii. In low tidal amplitude areas which receives north-east monsoon it is advised not to go for summer crop because of high temperatures which will lead to stress of culturable species. 	<ul style="list-style-type: none"> i. Farmers can be advised to take up integrated farming (poultry, piggery, duckery and animal husbandry with crops) to cut down cost on expensive inputs like feed and manure. ii. Avoid fertilization and manuring on supplementary basis iii. Air breathing fish culture to be practiced (Cat fish farming) 	<ul style="list-style-type: none"> i. Prepare pond for the next crop after early harvest ii. Always keep a constant check on the onset of algal blooms which will cause mass mortality of fishes iii. Harvest fish brood stock, if any and shift to deeper safer areas like cement systems in indoor units to utilize for breeding on onset of monsoon
(ii) Impact of silt load build up in ponds / change in water quality	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris 	<ul style="list-style-type: none"> i. Feeding should be minimum to avoid organic loading 	<ul style="list-style-type: none"> i. On onset of sudden heavy rains heavy mortality will result so feeding should be controlled to avoid waste accumulation on pond bottom soil.
(iii) Any other	<ul style="list-style-type: none"> i. The physico-chemical quality of water has to be monitored regularly for its suitability for fish culture. 	<ul style="list-style-type: none"> i. Concept of Re-circulatory system can be adopted as additional water is not required thereby curtailing need for water exchange. ii. Use of aerators to overcome thermal stratification and build up of ammonia during high temperatures 	<ul style="list-style-type: none"> i. Train the farmers to breed fish in captivity and produce required amount of seed either through hormonal treatment and environment manipulation. ii. Use of cryopreserved milt supplied from research units to aid breeding and ensure

		<p>will help break the thermal stratification</p> <p>** subsidy can be provided to farmers for the aerators</p> <p>iii. Partial harvesting to reduce biomass thereby competition for space and food is reduced.</p> <p>iv. Reduced stocking densities</p>	<p>healthy stock</p> <p>(in collaboration with TANUVAS)</p>
2) Floods	Before the event	During the event	After the event
A. Capture			
Marine	<p>i. Train fisher folk on hygienic handling of fishes, short and long term preservation techniques and on preparation and packaging of value added fish products – as a small scale village activity</p> <p>ii. Establish cold chain facilities</p> <p>iii. Ensure strengthening of coastal belt by planting and maintaining the mangrove ecosystems</p> <p>** mangrove wetlands mitigate the adverse impact of storms, cyclones Tsunami in coastal areas and coastal erosion</p>	<p>i. Avoid fishing in deeper waters to avoid loss to gear, craft and human lives.</p>	<p>i. Loss incurred should be reported will be assessed by the State Fisheries Department officials and reimbursed.</p>

	<p><i>** mangroves are ideal breeding ,nursery and feeding grounds for a number of commercially important prawns, fishes and other shell fishes.</i></p> <p>iv. Ecologically sensitive areas to be earmarked such as mangroves, corals and estuaries to avoid overfishing</p> <p>v. Commercial exploitation of coral reefs and large scale removal of mangrove vegetation to be surveyed as this leads to dwindling fish harvests</p>		
Inland			
(i) Average compensation paid due to loss of human life	--- NA---		As per the norms of the State Government and implemented by the State Fisheries Department
(ii) No. of boats / nets/damaged	---NA---		
(iii) No. of houses damaged	---NA---		
(iv) Loss of stock	Sell the available fish stock as much as possible	Installation of gill net and using cast net for fishing the stock escaped through flooding	There is a possibility of onset of toxic gases in the system, hence immediate stocking of fishes should not be carried out
(v) Changes in water quality	Strengthening of bunds and embankments either through turfing and terracing to avoid water	Water should not be used for domestic purposes	There is a possibility of onset of toxic gases in the system, hence immediate stocking of fishes should not be carried out

	overflow or entry of waters from outside.		
(vi) Health and diseases	Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters		Ulcers and pox diseases in fishes will occur hence the fish stock has to be discarded or buried.
B. Aquaculture/ Mariculture in ponds	Before the event	During the event	After the event
(i) Inundation with flood water	<ul style="list-style-type: none"> i. Avoid culture of fishes requiring longer duration of culture. ii. Initiating fish culture in advance in areas frequently prone to flooding. 	Immediately harvest the stocked fishes	--
(ii) Water exchange and changes in water quality	<ul style="list-style-type: none"> i. Strengthening of bunds and embankments either through turfing and terracing 		Application of lime to stabilize pH.
(iii) Health and diseases	<ul style="list-style-type: none"> i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters 		<p>Discard diseased stock and the following measures to be practiced:</p> <ul style="list-style-type: none"> i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored		Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.

	on raised platforms to avoid loss		
(v) Infrastructure damage (pumps, aerators, huts etc)	i. Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure		As on date there has been no measure to give subsidy to the inland fish farmers for loss of fish stock or infrastructure hence the farmers are suffering a heavy loss. Therefore suggestions can be made to the Government to assess the impact of damage and the rate of compensation can be decided by the officials
(vi) Any other	Compensation to practicing inland fish farmers may be contemplated in case of cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation		
3. Cyclone / Tsunami	Before the event	During the event	After the event
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	As per prevailing Government norms		
(ii) Avg. no. of boats / nets/damaged	As per prevailing Government norms		
(iii) Avg. no. of houses damaged	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
Inland	Cyclone / Tsunami		

B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Overflow / flooding of ponds	i. Planting trees like casuarinas along coastal belt to avoid coastal erosion and inundation of sea waters.	--	
(ii) Changes in water quality (fresh water / brackish water ratio)	i. Stocking fishes which can tolerate wide salinity changes eg. Milkfish, pearl spot etc.	--	Application of lime to stabilize pH.
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters	--	Discard diseased stock and the following measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	i. The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss	--	Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure	--	-

(vi) Any other	Training programmes for stakeholders including resource users, planners and policy makers on coastal regulations, shoreline protection and environmental awareness		
4 Heat wave and cold wave	Before the event	During the event	After the event
A. Capture			
Marine			i. To conduct studies on the ecological changes to assess the density and diversity of phyto and zooplankton and other benthic macro fauna
Inland			
B. Aquaculture	Before the event	During the event	After the event
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other	<ul style="list-style-type: none"> i. Conservation of our coral reefs (natural treasures) as they are the most diversified and complex marine ecosystems ii. Conserve sea grass beds by imposing strict measures on trawling, removal for commercial purposes. 		

State: **TAMIL NADU**

Agriculture Contingency Plan for District: DINDIGUL

1.0 District Agriculture profile

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats (Tamil Nadu uplands and south eastern sahayadris) and Deccan plateau, hot semiarid eco-sub region (8.1)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills region (X)		
	Agro Climatic Zone (NARP)	Western zone (TN-3)		
	List all the districts or part thereof falling under the NARP Zone	Coimbatore, Erode, Karur, Tirchirapalli Madurai, Theni, Sivagangai		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		10 ⁰ 3' N	77 ⁰ 15' E	926 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Maize Research Station, Vagarai		
	Mention the KVK located in the district	Gandhigram Rural University KVK, Gandhigram, Dindigul Dt.		
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	218	1 st Week of June	1st week of October
	NE Monsoon(Oct-Dec):	418	2 nd week of October	1 st Week of December
	Winter (Jan- Feb)	45	-	-
	Summer (March-May)	155	-	-
	Annual	836	-	-

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)	626.7	138.9	66.1	6.9	5.9	7.4	36.2	29.8	99.1

1.4	Major Soils	Area (thousand ha)	Percent (%) of total
	Deep black soils	220.0	26.4
	Shallow red soils	168.6	26.9
	Deep red soils	127.2	20.3
	Shallow black soils	80.8	12.9
	Moderately deep black soils	54.5	8.7
	Miscellaneous	30.8	4.8
	Moderately deep red soils	20.7	3.3
1.5	Agricultural land use	Area (thousand ha)	Cropping intensity %
	Net sown area	239.0	103.3
	Area sown more than once	7.9	
	Gross cropped area	246.8	

1.6	Irrigation	Area (thousand ha)		
	Net irrigated area	99.4		
	Gross irrigated area	105.3		
	Rainfed area	139.5		
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	41	5.6	5.5
	Tanks	3104	6.5	6.4
	Open wells	94088	91.5	83.1
	Bore wells	3266	3.7	3.6
	Lift irrigation	-	-	-
	Other sources	-	0.96	0.9
	Total	-	108.7	98.9
	Pumpsets	-		
	Micro-irrigation	-		
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	10	71.0	Salinity level: 34 % good, 40% moderate and 22% poor Residual Sodium Carbonate: 93% good and 7% moderate Sodium Adsorption Ratio: 95 % good and 5% moderate
Critical	2	14.2		
Semi- critical	1	7.1		
Safe	1	7.1		
Wastewater availability and use	Data not available			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area (thousand ha)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
	Maize	6.1	11.9	17.3	12.8		48.1
	Sorghum	0.4	17.6	2.0	54		25.4
	Paddy	1.5	-	15.5	0.0	2.7	19.6
	Pulses	0.1	10.5	0.1	8.8		19.4
	Groundnut	0.6	3.7	6.5	0.3		11.0
	Horticulture crops	Total area		Irrigated		Rainfed	
	Mango	14410		1942		12468	
	Banana	4845		2441		2404	
	Citrus	5110		1144		3966	
	Sapota	1730		1719		11	
	Guava	955		850		105	
	Berikai	1024		---		1024	
	Horticultural crops - Vegetables	Total area		Irrigated		Rainfed	
	Tobacco	1197		1197		----	
	Onion	2745		2745		----	
	Potato	2672		694		1978	
	Tomato	2529		2529		-----	
	Carrot	1007		392		615	
	Drumstick	1623		1612		11	

Medicinal and Aromatic crops	Total area	Irrigated	Rainfed
Kannoli poo	447	435	12
Kanvazhi kizhangu	467	403	64
Cocoa	52	15	37
Plantation crops	Total area	Irrigated	Rainfed
Coffee	10337	47	10290
Coconut	25707		
Teak	384	269	115
Eucalyptus	111	27	84
Karuvel	86	3	83
Casuarina	76	12	64
Elavan or ulagu	309	107	202
Fodder crops	Total area	Irrigated	Rainfed
Sorghum	4099	302	3797
Feeder grass	81	22	59
Total fodder crop area	4240	382	3858
Flower crops	Total area	Irrigated	Rainfed
Arali	746	746	--
Jasmine	594	594	---
Chevanthi	493	493	---
Rose	304	304	--
Pichi	286	286	---
Crossandra	233	233	---
Mullai	208	208	---
Champangi	141	141	---
Grazing land	-	-	-
Sericulture (Mulberry)	313	309	4
Others (Specify)			

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)	
	Non descriptive Cattle (local low yielding)	15.3	30.1	45.5	
	Crossbred cattle	16.5	188.3	204.8	
	Non descriptive Buffaloes (local low yielding)			80.7	
	Graded Buffaloes				
	Goat			258.2	
	Sheep			266.4	
	Others (Camel, Pig, Yak etc.)			6.4	
	Commercial dairy farms (Number)				
1.9	Poultry	No. of farms	Total No. of birds ('number)		
	Commercial				
	Backyard		1488		
1.10	Fisheries (Data source: Chief Planning Officer)				
	A. Capture				
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs	No. of village tanks
		35		8	3104
	B. Culture				
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-	-	-	
	ii) Fresh water (Data Source: Fisheries Department)	-	-	-	
Others	-	-	-		

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('t)	Productivity (kg/ha)	Production ('t)	Productivity (kg/ha)	Production (t)	Productivity (kg/ha)	Production (mt)	Productivity (kg/ha)
1	Paddy	-	-	-	-	-	-	74.6	3800
2	Millets	-	-	-	-	-	-	175.7	2320
3	Pulses	-	-	-	-	-	-	9.1	470
4	Oilseeds	-	-	-	-	-	-	29.0	1700
5	Cotton (Bales of lint)	-	--	-	--	-	--	1986 (B)	3.0 (Bales)
6	Sugarcane (Gur)	-	-	-	-	-	-	56.3	11300
Others									
Major Horticultural crops		-	-	-	-	-	-	-	-

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Millets	Pulses	Oilseeds	Cotton	Sugarcane
	Kharif- Rainfed	-	July 1 st week to Sep 1 st week	July 1 st week to Sep 1 st week	June 3 rd week to July 3 rd week	-	-
	Kharif-Irrigated	July 2 nd week (Kharif) to August 1 st week (late Kharif)	June 1 st week to Aug 1 st week	June 1 st week to Aug 1 st week	June 3 rd week to July 3 rd week	Aug 1 st week to Sep 2 nd week	-
	Rabi- Rainfed		September 3 rd week to October 3 rd week	Dec 1 st week to Jan 1 st week	-	-	-
	Rabi-Irrigated	September 2 nd week to October 2 nd week	September 3 rd week to October 3 rd week	Dec 2 nd week to Jan 2 nd week	December 1 st week to Jan 1 st week	-	November 3 rd week to December 4 th week

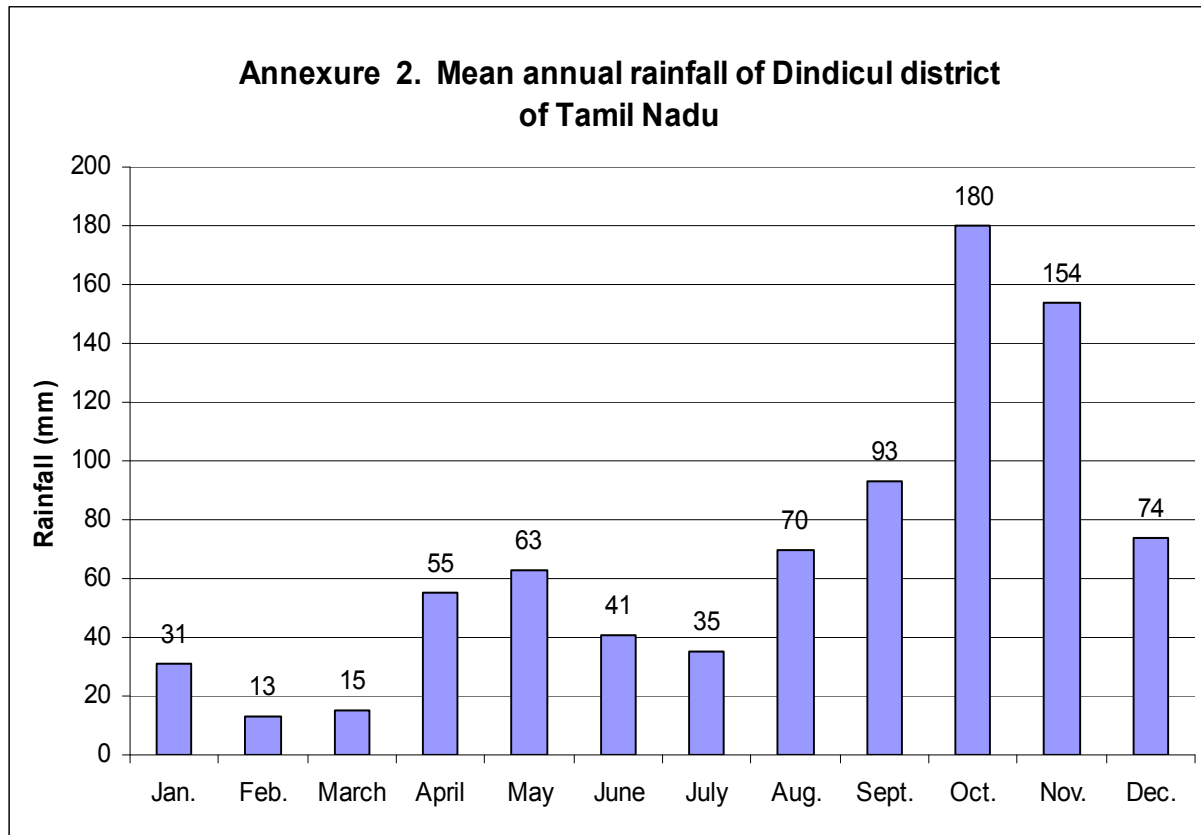
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	√	-	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and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

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

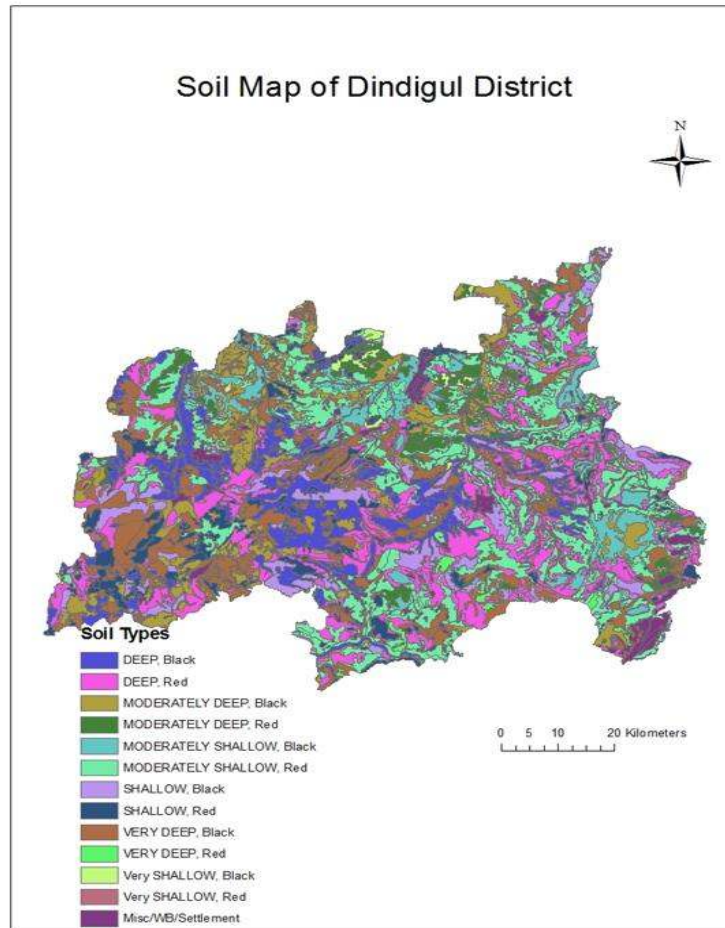
Annexure 1. Location map of Dindigul district and the blocks



Annexure 2. Mean annual rainfall of Dindicul district of Tamil Nadu



Annexure 3. Soil map of Dindigul district of Tamil Nadu



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	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Kharif season Delay by 2 weeks (June 3 rd week)	Deep red and Moderately shallow red soils	Groundnut+ Pulses	No change	Mechanical sowing with tractor drawn seed drill as the sowing window is narrow Seed treatment with Thiram or Carbendazim @2g/Kg or T.Viride @4g/kg Or <i>P.Fluorescens</i> @ 10g/kg	Through state department of agriculture
		Groundnut + Maize			
		Groundnut	TMV-7, 10, VRI-2		
		Cowpea	COCT7		
		Pigeon Pea	VBN 3,		
		Black Gram	Co 5, VBN 1,2,3		
		Maize	CoRH 1, Co 1		
Delay by 4 weeks (July 1 st week)	Deep red and Moderately shallow red soils	Groundnut+ Pulses	No change	Mechanical sowing with tractor drawn seed drill as the sowing window is narrow Seed drill sowing for pulses Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying Thinning to retain one seedling at 30 cm	Through state department of agriculture
		Groundnut + Maize			
		Groundnut	TMV-7, 10, VRI-2		
		Cowpea	COCT7		
		Pigeon Pea	VBN 3,		
		Black Gram	Co 5, VBN 1,2,3		
		Maize	CoRH 1, Co 1		
Delay by 6 weeks (July 3 rd week)	Deep red and Moderately shallow red soils	Groundnut+ Pulses	No change	2% DAP spray	Through state department of agriculture
		Groundnut + Maize			

		Groundnut	TMV-7, 10, VRI-2	Seed drill sowing for pulses	
		Pigeon Pea	VBN 3,	Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit at pre-flowering and 15days thereafter.	
		Black Gram	Co 5, VBN 1,2,3		
		Maize	CoRH 1, Co 1	Seed treatment with 3Pkts Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos	
Delay by 8 weeks (Aug 1 st week)	Deep red and Moderately shallow red soils	As Above	As Above	Seed drill sowing for pulses Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying 2% DAP spray Seed drill sowing for pulses	Through state department of agriculture
Rabi Season					
Delay by 2 weeks (Oct 4 th week)	Deep red and Moderately shallow red soils	Maize	No Change	Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit at preflowering and 15days thereafter. Seed treatment with 3Pkts Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos	Through state department of agriculture
		Redgram			
		Black gram			
		cowpea			
Delay by 4 weeks (Nov 2 nd week)	Deep red and Moderately	Maize	Co1, CoHM4, CoBC 1	Seed drill sowing for pulses	Through state department of agriculture
		Redgram	APK 1, CoPH 2 AND		

	shallow red soils		CoRG 7	Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit AT preflowering and 15days thereafter. Seed treatment with 3Pkts Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos	
		Blackgram	VBN 1,2,3&4		
		cowpea	CoCT7		
		sunflower	TCSH1, MFSH 17, Co2, Moden		
Delay by 6 weeks (Nov 4 th week)	Deep red and Moderately shallow red soils	Maize	As Above	12.5 kg MN mixture by state dept. agri 2 % DAP spray for pulses MgSO4 5% or MgSO4@ 20 kg/ha for Mg def in Cotton	Through state department of agriculture
		Redgram			
		Blackgram			
		cowpea			
Delay by 8 weeks (Nov 4 th week)	Deep red and Moderately shallow red soils	Maize	Co1, CoHM4, CoBC 1	Seed drill sowing for pulses	Through state department of agriculture
		Redgram	APK 1, CoPH 2 AND CoRG 7		
		Blackgram	VBN 1,2,3&4	Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit AT preflowering and 15days thereafter. Seed treatment with 3Pkts Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos	
		cowpea	CoCT7		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Deep red and Moderately shallow red soils	Groundnut	<ul style="list-style-type: none"> Initial drought will not affect the groundnut crop Re sowing of pulses Thinning to retain one seedling at 30 cm Crop residue mulching 	Intercultivation (soil mulching) Recommended doses of FYM 12.5 t/ha and Coirpith compost 12.5 t/ha	-
		Pigeon Pea			
Black Gram					
Maize					
Deep and very deep black soils	Deep and very deep black soils	Maize			
		Redgram			
		Black gram			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)					
At vegetative stage	Deep red and Moderately shallow red soils	Groundnut	Earthing up, apply Gypsum after receipt of rains	Intercultivation (soil mulching) Conservation Furrow	Through state department of agriculture
		Pigeon Pea			
		Black Gram			
		Maize			
	Deep and very deep black soils	Maize	1% KCl spray Kaoline spray Water spray	Recommended doses of FYM 12.5 t/ha and Coirpith compost 12.5 t/ha	
		Cowpea			
Black gram					

			Use of microirrigation systems		
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Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell) At reproductive stage	Deep red and Moderately shallow red soils	Groundnut	Life saving irrigation	—	Farm ponds through DRDA programme Farm ponds through DRDA programme
		Pigeon Pea	Weeding and Weed mulching		
		Black Gram			
		Maize			
	Deep and very deep black soils	Maize	1% Kcl spray		
		Cowpea	2% DAP spray		
		Black gram	Kaoline spray		
		Redgram	Water spray		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Terminal drought	Deep red and Moderately shallow red soils	Groundnut	Life saving irrigation using microirrigation system Harvest at physiological maturity stage	Transplanted rice (October month)	1.Farm ponds through DRDA programme 2.Threshing implements through RKVY 3.Groundnut digger and Stripper through RKVY
		Pigeon Pea			
		Black Gram			
		Maize			
	Deep and very deep	Maize			
		Cowpea			

	black soils	Black gram			
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2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Low land tube well canal irrigated red and black soil	Paddy (sub merged condition)	SRI method of rice cultivation Maize Maize: CoRH1, CoHM 4 Sugarcane – sub surface drip fertigation Chillies – drip fertigation	Limited irrigation with mulching Alternate Furrow irrigation Drip irrigation with residue mulching	Seeds through ISOPOM and NFSM
		Groundnut	Groundnut + pigeonpea (6:1) intercropping	Sprinkler irrigation with mulching	

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	Red soils	Groundnut	Sorghum, horsegram recommended	-	Through state department of agriculture

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	Not applicable				

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	Tube well red and black soil	Paddy	Maize, groundnut and vegetables (Chilli and Brinjal)	Limited irrigation Alternate Furrow irrigation Sprinkler irrigation	Seeds through Dept of horticulture, NFSM, NHM and ISOPOM

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				

Paddy	--	---	Provide Drainage	Shift to safe place dry in shade and turn frequently
Millets	Provide Drainage			Safe storage against storage pest and disease
Pulses	Drainage	Tying lodged plants	Drain out	Safe storage against storage pest and disease
Oilseeds	Provide Drainage			Shift to safer place
Cotton (Bales of lint)	-do-			Shift to safe place dry in shade and turn frequently
Sugarcane	-do-			
Horticulture				
Crop1 Chilli	Drainage	Drainage		
Heavy rainfall with high speed winds in a short span				
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Need based plant protection Integrated Pest and Disease Management for groundnut, paddy, pluses, sesame and sugarcane	Need based plant protection Integrated Pest and Disease Management for groundnut, paddy, pluses, sesame and sugarcane	-	Safe storage against storage pest and diseases
Millets				
Pulses				
Oilseeds				
Cotton (Bales of lint)				
Horticulture				

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Continuous submergence for more than 2 days	Not applicable			
Sea water inundation				

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable			
Cold wave	Not applicable			
Frost	Not applicable			

Hailstorm	Not applicable
Cyclone	Not applicable

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Establishment of fodder banks & Preparation of silage	Using unconventional feeds and tree Fodders & Development of Draught resistant grass varieties	Cultivation of Green fodders
Drinking water	Construction of check dam& Rain water Harvesting	Recycling of water	Recycling of water
Health and disease management	Deworming and vaccination against contagious diseases	Supplementation of mineral mixture And concentrate feed	Deworming and vaccination against contagious diseases
Floods			
Feed and fodder availability	Storage of dry fodders well above the ground level	Feeding with silage, concentrate and dry fodder	Creating drainage facility in the Fodder plots
Drinking water	Storage of water in the over head tanks	Using bore well water for drinking purpose	Disinfected water can be used for drinking purpose

Health and disease management	Deworming and vaccination against contagious diseases	Keeping the animals in a proper shed with hygienic environment	Deworming and vaccination against contagious diseases
Cyclone			
Feed and fodder availability	Cultivation and storage of green fodder	Usage of stored fodder	Usage of stored fodder
Drinking water	Creating permanent water source	Using bore well water for drinking purpose	Creating drainage facility in the Fodder plots
Health and disease management	Improving the immune status of animals	Keeping the animals in a proper shed with hygienic environment	Improving the immune status of animals
Heat wave and cold wave			
Shelter/environment management	Construction of concrete shed & Planting Of trees in the farm premises	Sprinkling of water over the shed and Animals in heat wave	Improving the immune status of animals
Health and disease management	Feeding with balanced diet	Providing ad libitum water	Improving the immune status of animals

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Shortage of feed ingredients	Storage of feed ingredients	Usage of Stored feed ingredients	Usage of Stored feed ingredients	
Drinking water	Collection of rain water	Usage of stored rain water	Usage of stored rain water	
Health and disease management	Deworming and	Following strict	Deworming and	

	vaccination against Specific diseases	hygienic measures in the farm	vaccination against Specific diseases	
Floods				
Shortage of feed ingredients	Storage of dry fodders well above the ground level	Feeding with silage, concentrate and dry fodder	Creating drainage facility in the Fodder plots	
Drinking water	Storage of water in the over head tanks	Using bore well water for drinking purpose	Disinfected water can be used for drinking purpose	
Health and disease management	Deworming and vaccination against Specific diseases	Following strict hygienic measures in the farm	Deworming and vaccination against Specific diseases	
Cyclone				
Shortage of feed ingredients	Storage of feed ingredients in a puca manner	Control of moisture in the feed ingredients	Preventive measures should be taken against Aflatoxins	
Drinking water	Creating permanent water source	Using bore well water for drinking purpose	Creating drainage facility in the farm	
Health and disease management	Improving the immune status of animals	Keeping the shed In a hygienic manner	Improving the immune status of animals	
Heat wave and cold wave				
Shelter/environment management	Construction of concrete shed & Planting Of trees in the farm premises	Sprinkling of water over the shed and birds in heat wave	Improving the immune status of animals	

Health and disease management	Feeding with balanced diet	Providing ad libitum water	Improving the immune status of animals	
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2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture	-		
Marine	-		
Inland	-		
(i) Shallow water depth due to insufficient rains/inflow	Harvesting large individuals Increased Stocking-density in smaller/confined areas	Harvesting large individuals Disposable of unwanted excess stock Stocking of desirable/special individuals in brood stock ponds	Proper management of the local environment
(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 feed management 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 management water quality management
(iii) Any other			
2) Floods			

A. Capture	-	-	-
Marine	-	-	-
Inland	Proper fencing to prevent escaping of fishes Increasing bundh height and improve bundh 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 bundhs Collect and preserve existing stock
(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 borewell/well water
(vi) Health and diseases	-	-	-
B. Aquaculture			
(i) Inundation with flood water	Proper fencing to prevent escaping of fishes Increasing bundh height and improve bundh 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 bundhs 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 borewell 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	Not Applicable		
A. Capture			
Marine			
(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)			
(vi) Any other			

4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> • Strengthening of pond bundh to prevent seepage • Shifting of stock to a more sheltered pond 	<ul style="list-style-type: none"> • Shifting of stock to a more sheltered pond • Improve aeration and water recycling 	<ul style="list-style-type: none"> • Shifting of stock to normal ponds to ensure proper growth
(ii) Health and Disease management	-	-	-
(iii) Any other	-	-	-

State: **TAMIL NADU**

Agriculture Contingency Plan for District: ERODE

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And Tamil Nadu Uplands D, (8.2, 8.3)	
	Agro-Climatic Region (Planning Commission)	Southern plateau and hilly region (X)	
	Agro Climatic Zone (NARP)	North-Western Zone (TN-2), Western Zone (TN-3)	
	List all the districts or part thereof falling under the NARP Zone	Erode, Thirupur, Coimbatore, Dindugal, Madurai, Trichy , Salem district	
	Geographic coordinates of district	Latitude	Longitude
		11 ⁰ 20' N	77 ⁰ .43 E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ARS, Bhavanisagar 638 451,Erode District	
	Mention the KVK located in the district	MYRADA (Mysore Resettlement and Development Agency) KVK, Gobichettipalayam	
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)
	SW monsoon (June-Sep):	270	1 st Week of June
	NE Monsoon(Oct-Dec):	319	1 st week of October
	Winter (Jan- Feb)	44	-
	Summer (Apr-May)	139	-
	Annual	772	-
			Normal Cessation (specify week and month)
			4 th week of September
			4 th Week of December
			-
			-
			-

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)	816.2	228.7	81.8	0.2	1.7	1.3	7.0	102.7	102.6

1.4	Major Soils (Dominant)	Area ('000 ha)	Percent (%) of total
	Red clayey soils	142.0	17
	Lateritic soils	114.2	14
	Alluvial soils	145.2	17
	Other soil types	414.8	52
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	294.7	105.4
	Area sown more than once	16.0	
	Gross cropped area	310.7	

1.6	Irrigation	Area ('000 ha)	Percent (%)
	Net irrigated area	166.1	60
	Gross irrigated area	181.8	62
	Rainfed area	128.6	40
	Sources of Irrigation	Number	Area ('000 ha)
	Canals	13	88.0
	Tanks	21	0.3
			% area
			50.7
			0.2

Open wells	121358	66.3	5.2
Bore wells	9905	16.5	9.5
Lift irrigation	-	1.4	
Other sources	-	2.2	1.3
Total	-	173.3	66.5
Pumpsets	-	-	
Micro-irrigation	-	-	
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	3	27.8	Salinity level: 85% good , 12% moderate and 3% poor Residual Sodium Carbonate: 100% good Sodium Adsorption Ratio: 100 % good
Critical	3	38.2	
Semi- critical	5	23.0	
Safe	3	10.9	
Wastewater availability and use	Data not available		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%			

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
	Sugarcane	41.9	-	-	-	-	41.9
	Paddy	9.9	-	27.0	0.08	1.3	38.3
	Groundnut	3.6	23.1	4.4	0.2	-	31.4
	Maize	7.0	7.0	6.4	-	-	20.4
	Sesame	5.5	1.9	4.5	-	-	12.1
	Horticulture crops - Fruits	Total area ('000 ha)		Irrigated		Rainfed	
	Banana	10.4		10.4		-	

Mango	0.9	0.9	0.05
Horticultural crops - Vegetables	Total area	Irrigated	Rainfed
Onion	3.4	3.4	-
Chillies	1.1	1.1	-

Medicinal and Aromatic crops	Total area		
Kanvazhi kizhangu(<i>Gloriosa superba</i>)	0.9		
Spices and Condiments			
Turmeric	7.8		
Plantation crops	Total area		
Coconut	19.4		
Fodder crops	Total area		
Fodder Sorghum	59.5		
Total fodder crop area	59.5		
Grazing land	0.18		
Sericulture etc	1.05		

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	49.0	80.8	129.9
	Crossbred cattle	78.4	341.1	419.5
	Non descriptive Buffaloes (local low yielding)			242.4
	Graded Buffaloes			
	Goat			533.0
	Sheep			584.3
	Others (Camel, Pig, Yak etc.)			7.3
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms	Total No. of birds (number)	

	Commercial	87 – Layer farms 132 – Broiler farms	36,81,898 – Layer 34,45,416 – Broiler					
	Backyard	---	3,16,151 – Desi Birds 6,28,151 – Improved Birds					
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)			
		-	-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks		
		40.7 Ha. (Source: Fish Farmers Development Agency)		7		847		
	B. Culture							
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)		
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-		-		-		
	ii) Fresh water (Data Source: Fisheries Department)	-		-		-		

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)
	1.Sugarcane							5662523	132000
	2.Paddy	48087	4631	112207	4168	3936	3619	164230	4139

	3.Groundnut	27564	1112			20384	2820	47948	1966
	4.Maize	-						93571	5548
	5.Sesame	1829	831			6847	763	8676	797

Major Horticultural crops				
Banana		-	61452	576623
Mango		-	5424	5498
Onion		-	23282	8393
Chillies		-	1036	1048
Kanvazhi kizhangu(Glory lily)		-		
Katrashai(Aloe)		-		
Turmeric		-	61845	7213
Coconut		-	2579 *	13407 **

* in Lac nuts

** nuts / ha

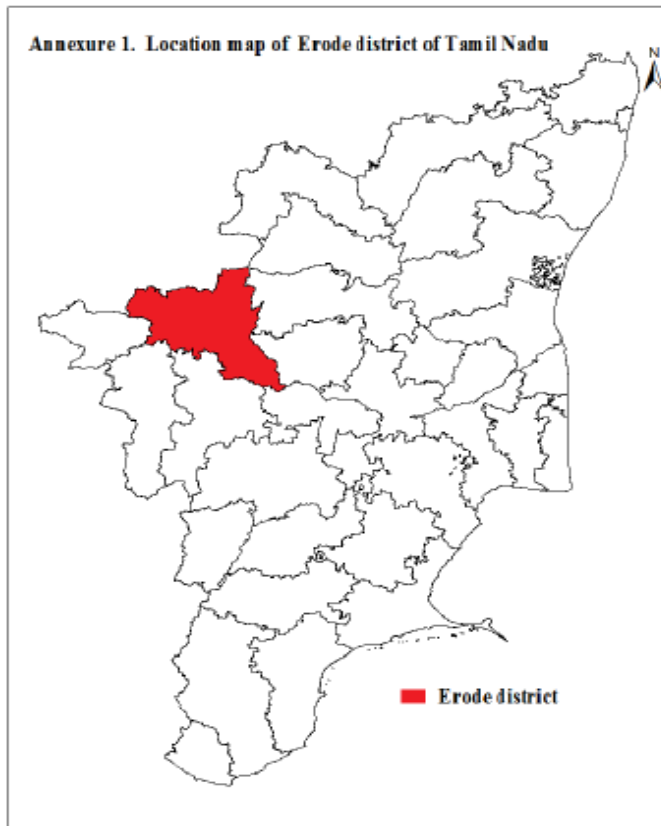
1.12	Sowing window for 5 major crops (start and end of sowing period)	Sugarcane	Paddy	Ground nut	Maize	Gingelly
	Khariif- Rainfed	-	-	1 st week of June to 4 th week of June	1 st week of July - ,2 nd week of August.	-
	Khariif-Irrigated	1 st week of June to 4 th week of September	1 st week of June to 1 st week of July and 3 rd week of August to 1 st week of September	-	1 st week of July - ,2 nd week of August and 3 rd week of September to 2 nd week of October	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	1 st week of October to 4 th week of December	1 st week of October to 1 st week of November	-		-
	Summer Irrigated	1 st week of January to 4 th week of May	1 st week of January to 4 th week of January	1 st week of December to 1 st week of January	2 nd week of January to 2 nd week of February	2 nd week of February to 2 nd week of

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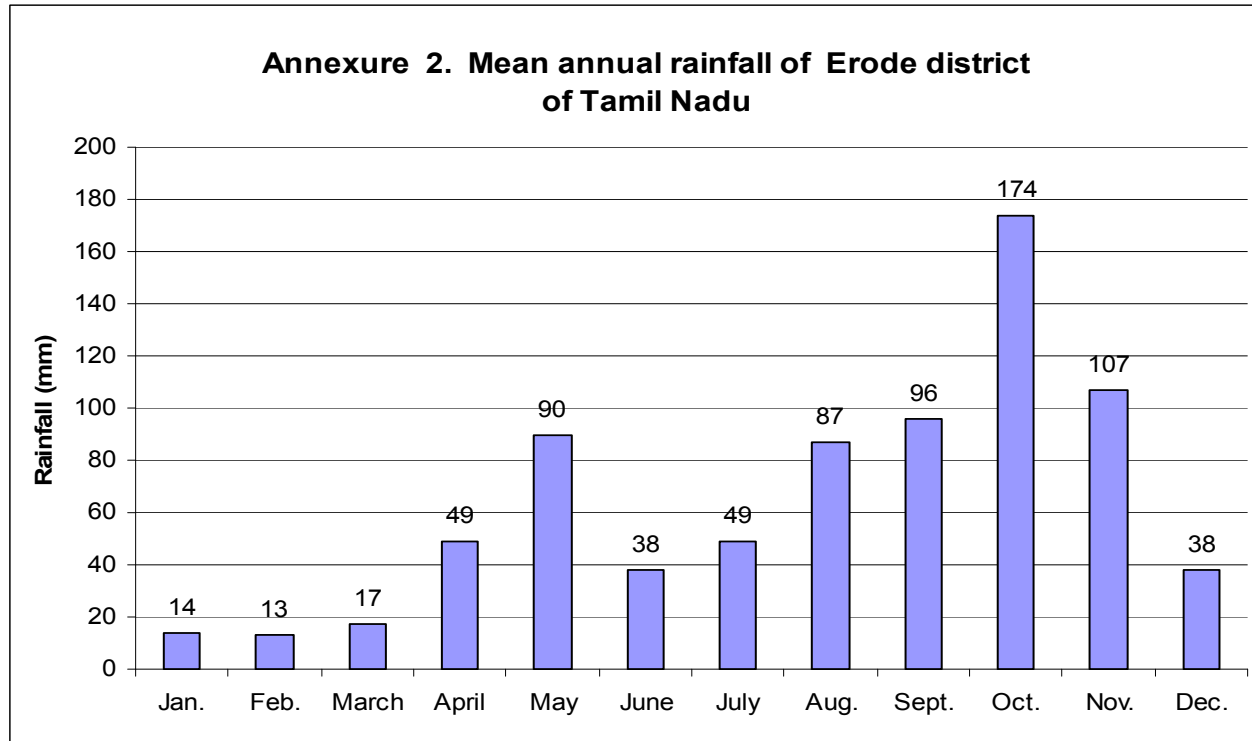
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	High intense storms	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water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

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

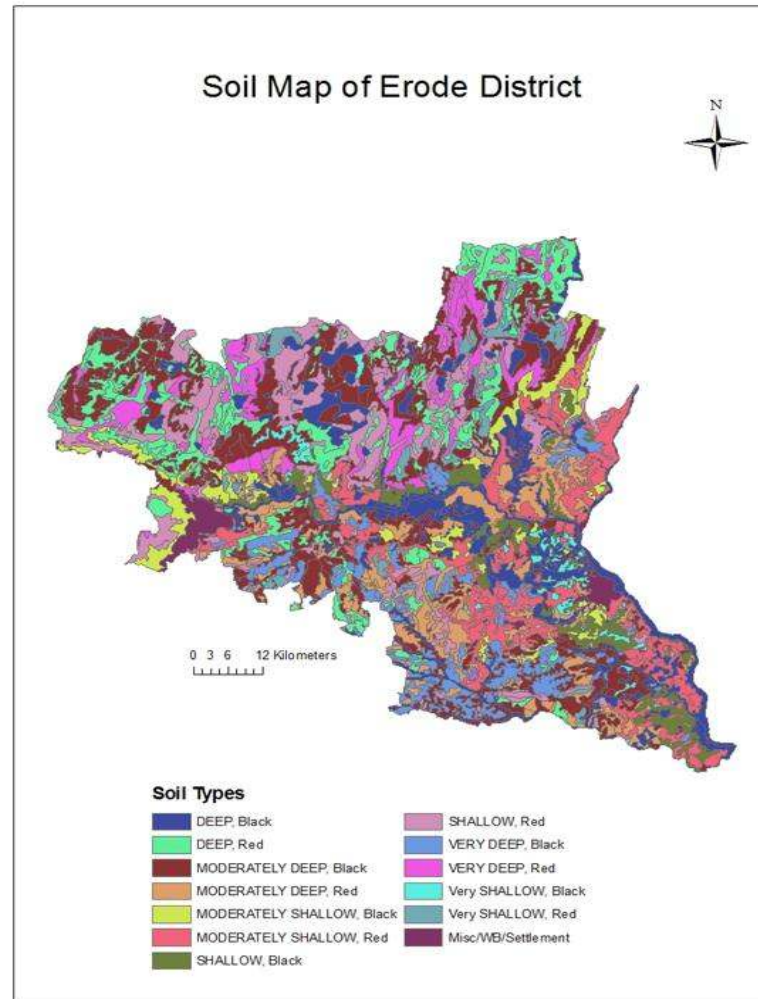
Annexure 1. Location map of Erode district and the blocks



Annexure 2. Mean annual rainfall of Erode district



Annexure 3. Soil map of Erode district of Tamil Nadu



Source: NBSS & LUP

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures	
			Change in crop/cropping system	Agronomic measures
Early season drought (delayed onset) Delay by 2 weeks June 3 rd week	Red soils	Groundnut + Pulses (Black gram/ Green gram/ Cowpea)	No change	No change
		Groundnut + Pulses (Red gram)+Castor	No change	No change
Delay by 4 weeks	Red soils	As above	As above	Seed hardening with 1 percent Potassium dihydrogen phosphate. Mechanical sowing with tractor drawn seed drills may also be used.
Delay by 6 weeks July 3 rd week	Red Soils	Groundnut + Pulses (Black gram/ Green gram/ Cowpea)	Sorghum+ Pulses (Black gram/ Green gram/ Cowpea)	-do-
		Groundnut + Pulses (Red gram)+Castor	Sorghum+ Pulses (Black gram/ Green gram/ Cowpea)	
Delay by 8 weeks August 1 st week	Red Soils	Groundnut + Pulses (Black gram/ Green gram/ Cowpea/ Redgram + Castor)	Fodder Sorghum + Pulses (Black gram/ Green gram/ Cowpea)	-do-
		Groundnut + Pulses (Black gram/ Green gram/ Cowpea/ Redgram + Castor)	Horse gram	Mechanical sowing with tractor drawn seed drills may also be used.

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
	Red Soils	Groundnut +Blackgram/ Greengram/ Cowpea intercropping system	Seed hardening with 1 percent Potassium dihydrogen phosphate.	Soil test based fertilizer application is recommended after resumption of rains.

Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil management
At vegetative stage	Red Soils	Groundnut +Blackgram/ Greengram/ Cowpea intercropping system	Stimulates groundnut crop for profuse and synchronous flowering	Mulching with available farm wastes is advised

Condition			Suggested Contingency measures	
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil management
	At reproductive stage	Red Soils	Groundnut +Blackgram/ Greengram/ Cowpea intercropping system	Supplemental irrigation with harvested rain water from farm ponds, if possible. Spraying of 0.5 to 1 per cent potassium chloride (KCl)

Condition			Suggested Contingency measures	
Terminal drought	Major Farming situation	Crop/cropping system	Crop management	Rabi Crop planning

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures	
			Crop management	Rabi Crop planning
Terminal drought	Red Soils	Groundnut +Blackgram/ Greengram/ Cowpea intercropping system	Supplemental irrigation with harvested rain water from farm ponds, if possible. Spraying of 0.5 to 1 per cent potassium chloride (KCl)	No rabi crop in rainfed alfisols.

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures	
			Change in crop/cropping system	Agronomic measures
Delayed/ limited release of water in canals due to low rainfall	1. Canal irrigated red soils and laterite soils 2. Canal irrigated black soils 3. Well irrigated red and laterite soils 4. Well irrigated black soils	Paddy – Groundnut	No change	Irrigation at critical stages of crop growth viz. sowing, flowering, peg formation and maturity in the case of Groundnut; and adopting System of Rice Intensification (SRI method) with 2.5 cm depth of irrigation at critical stages like Tillering, Panicle initiation, flowering and maturity
		Sugarcane	No change	Drip irrigation
		Turmeric	No change	-do-
		Banana	No change	-do-

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
		1.Paddy – Paddy	Groundnut / Sesame - Paddy	Irrigation at critical stages of crop growth viz. Sowing, Flowering, Peg formation and maturity in the case of Groundnut; Sowing, Flowering and maturity in the case of Sesame and adopting System of Rice Intensification (SRI method) with 2.5 cm depth of irrigation at critical stages like Tillering, Panicle initiation, flowering and maturity

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
Non release of water in canals under delayed onset of monsoon in catchment	Tail end area with red /laterite/block soils	Groundnut and Maize	Sorghum + Pulses (Cowpea / Green gram / Blackgram intercropping is recommended in case of limited water availability in the wells.	Irrigation at critical stages of crop growth namely sowing, 4to 5 leaf stage, flowering and milking stage Drip irrigation

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Red / laterite/block soils	Sorghum + Pulses (Cowpea / Green gram / Blackgram)	No change	Seed hardening with 1 percent Potassium dihydrogen phosphate. Drip irrigation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures	
			Change in crop/cropping system	Agronomic measures
Insufficient groundwater recharge due to low rainfall	Red / laterite/block soils	Fodder Sorghum	No change	Seed hardening with 1 percent Potassium dihydrogen phosphate. Drip irrigation

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Groundnut	Providing drainage facility Spray of growth retardant of 500 ppm cycocel for arresting apical dominance and thereby promoting growth of laterals	Drain excess water	Providing drainage	Stripping of Groundnut at the earliest. Mechanical drier may be used for drying the produce
Paddy	Providing drainage facility			
Sorghum	-Do-	-do-	-do-	-do-
Maize				
Horse gram				

2.3 Floods: Not applicable

2.4 Extreme events: Not applicable

2.5 Contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<ol style="list-style-type: none"> 1. Development of green fodders such as CO4, Guinea grass, Kolukattaigrass, Sorghum, cow pea, Desmanthus, and tree fodders etc.. 2. Straw & Hay making. 3. Sorghum stover preservation. 4. Creation of fodder banks at village levels based on the livestock population. 5. Silage making with available green fodder such as CO3 and Sugarcane tops. 6. Creation of fodder models for draught with Guinea grass, stylo, desmanthus, kolukkattai grass etc. 7. Conservation of green and dry fodder through chaffing. 8. Creation of tree fodder models with Subabul, Glyricidia, Agathi, Prosopis etc. 9. Fodder production with Sorghum – stylo-Sorghum on rotation basis 10. Storage of available feed ingredients in a proper manner without fungal contamination. 	<ol style="list-style-type: none"> 1. Chaffing of green and dry fodder to conserve fodder. 2. Use unconventional feedstuffs and locally available low cost feed ingredients to reduce the cost of feed. 3. Use of tree leaves are good proteinecious feed for livestock. 4. Uses of mineral mixture in the livestock feed prevent the nutritional deficiency diseases and infertility cases. 5. Enrichment of dry fodder with urea. 6. Use of silage in livestock feed. 7. Use Hay, Straw and Stover in livestock feed. 8. Concentrate feed prepared with available grains, oil cakes and rice bran. 9. Before Sun rise and after Sun set allow the animal for grazing. 	<ol style="list-style-type: none"> 1. Development of green fodders and tree fodders. 2. Use of Mineral mixture or Salt lick in the livestock feed.
Drinking water	<ol style="list-style-type: none"> 1. Make Bore Well. 2. Construct common water drough in the grazing areas of village. 	<ol style="list-style-type: none"> 1. Give plenty of chilled drinking water. 2. Use of Green fodder or Silage reduces the intake of water in livestock because it contains 60-90% of water. 3. Addition of Vitamin C or lemon in drinking water prevents heat stress. 	<ol style="list-style-type: none"> 1. Give plenty of drinking water.
Health and disease management	<ol style="list-style-type: none"> 1. Vaccinate the cattle for Foot and Mouth Disease. 2. Vaccinate the sheep against sheep pox, Blue tongue, entero toxemia etc. 3. Vaccinating the goat against PPR. 	<ol style="list-style-type: none"> 1. Keep the animals in good aeration with shadow place. 2. Provide plenty of chilled drinking water. 	<ol style="list-style-type: none"> 1. Keep the animals in good aeration with shadowy place. 2. Give plenty of chilled drinking water.

	<ul style="list-style-type: none"> 4. Deworming the livestock 4. Control of ectoparasites. 	<ul style="list-style-type: none"> 3. Use of foggers and sprinklers on the sheds, sprinkling of water on the body to reduce the heat load. 4. Advising farmers not to graze during hotter parts of the day. 5. Nutritional supplementation. 6. Control of ectoparasites prevent the livestock from Anaplasmosis, Theileriosis and Babesiosis disease. 7. Snail control measures in the water bodies. 	
Floods			
Feed and fodder availability	<ul style="list-style-type: none"> 1. Sowing the fodder crops such as fodder sorghum, fodder maize, fodder cumbu, sorghum and Desmanthus. 2. Straw & Hay making. 3. Sorghum stover preservation. 4. Silage making with available green fodder such as CO3 and Sugarcane tops. 5. Storage of available feed ingredients in a proper manner without fungal contamination. 	<ul style="list-style-type: none"> 1. Uses of mineral mixture in the livestock feed prevent the nutritional deficiency diseases and infertility cases. 2. Use of silage in livestock feed. 3. Use Hay, Straw and Stover in livestock feed. 4. Concentrate feed prepared with available grains, oil cakes and rice bran. 5. Storage of available feed ingredients properly without fungal contamination. 	<ul style="list-style-type: none"> 1. Proper storage of feed ingredients, concentrate feed and dry foddors in to avoid fungal contamination. 2. Store the available green foddors in the form of hay and silage.
Drinking water	<ul style="list-style-type: none"> 1. Construct the rain water storage tank. 2. Construct the wall around the well prevent the germs and dust mixed with well water during rainfall. 	<ul style="list-style-type: none"> 1. Use of bore well water is better than well water. 2. Well water and canal water will be used after chlorination and disinfection. 	<ul style="list-style-type: none"> 1. Use of bore well water is better than well water. 2. Well water and canal water will be used after chlorination and disinfection.
Health and disease management	<ul style="list-style-type: none"> 1. Vaccinate the Cattle against Foot and Mouth Disease. 2. Vaccinate the Sheep against Blue Tongue Disease. 3. Vaccinate the Goat against Enterotoxaemia and PPR. 4. Deworming the livestock's. 	<ul style="list-style-type: none"> 1. Keep the animals in good aeration with shadowy place. 2. Provide clean water and feed. 3. Control of ectoparasites prevent the livestock's from Anaplasmosis, Theileriosis and Babesiosis disease. 4. Prevent the entry of rain water in the livestock shed. 	<ul style="list-style-type: none"> 1. Deworming the livestock's. 2. Provide clean water and feed. 3. Control of ectoparasites prevent the livestock's from Anaplasmosis, Theileriosis and Babesiosis disease.
Cyclone			

Feed and fodder availability	<ol style="list-style-type: none"> 1. Sowing the fodder crops such as fodder sorghum, fodder maize, fodder cumbu, sorghum and Desmanthus. 2. Straw & Hay making. 3. Sorghum stover preservation. 4. Silage making with available green fodder such as CO3 and Sugarcane tops. 5. Storage of available feed ingredients in a proper manner without fungal contamination. 	<ol style="list-style-type: none"> 1. Use of silage in livestock feed. 2. Use Hay, Straw and Stover in livestock feed. 3. Concentrate feed prepared with available grains, oil cakes and rice bran. 4. Storage of available feed ingredients in a proper manner without fungal contamination. 	<ol style="list-style-type: none"> 1. Dry the feed ingredients, concentrate feed and dry fodders in sunlight to avoid fungal contamination. 2. Store the available green fodders in the form of hay and silage.
Drinking water	<ol style="list-style-type: none"> 1. Construct the rain water storage tank. 2. Construct the wall around the well prevent the germs and dust mixed with well water during rainfall. 	<ol style="list-style-type: none"> 1. Use of bore well water is better than well water. 2. Well water and canal water will be used after chlorination and disinfection. 	<ol style="list-style-type: none"> 1. Use of bore well water is better than well water. 2. Well water and canal water will be used after chlorination and disinfection.
Health and disease management	<ol style="list-style-type: none"> 1. Vaccinate the Cattle against Foot and Mouth Disease. 2. Vaccinate the Sheep against Blue Tongue Disease. 3. Vaccinate the Goat against Enterotoxaemia and PPR. 4. Deworming the livestock's. 	<ol style="list-style-type: none"> 1. Keep the animals in good aeration with shadowy place. 2. Provide clean water and feed. 3. Control of ectoparasites prevent the livestock's from Anaplasmosis, Theileriosis and Babesiosis disease. 	<ol style="list-style-type: none"> 1. Deworming the livestock's. 2. Provide clean water and feed. 3. Control of ectoparasites prevent the livestock's from Anaplasmosis, Theileriosis and Babesiosis disease.
Heat wave and cold wave	NA		

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Shortage of feed ingredients	Store the available feed ingredients required for the preparation of poultry feed.	<ul style="list-style-type: none"> • Use unconventional feedstuffs to reduce the cost of feed. 	<ul style="list-style-type: none"> • Nutritional supplementation. 	
Drinking water	<ul style="list-style-type: none"> • Arrangement for ample 	<ul style="list-style-type: none"> • Supply of cool potable water to poultry. 	<ul style="list-style-type: none"> • Use bore well water . 	

	potable drinking water to meet the ensuing drought situation.	<ul style="list-style-type: none"> • Water sanitation. 		
Health and disease management	<ul style="list-style-type: none"> • Vaccination against Ranikhet disease • Deworming of poultry • Provision of foggers and sprinklers to reduce heat load • Supplementation of vitamins and minerals 	<ul style="list-style-type: none"> • Effective fly control programme. • Prevention and control of Coccidiosis in poultry • Summer management of poultry- use of foggers and sprinklers • Continuous supply of cool potable water • Supplementation of vitamins and minerals • Feeding during cooler parts of the day • Mixing water in the concentrate mash and feeding 	<ul style="list-style-type: none"> • Nutritional supplementation of poultry. • Vaccination against Ranikhet disease 	
Floods				
Shortage of feed ingredients	<ul style="list-style-type: none"> • Store the unconventional feedstuffs without fungal contamination. 	Use available feed ingredients with unconventional feedstuffs for poultry feed preparation.	<ul style="list-style-type: none"> • Use unconventional feedstuffs. 	
Drinking water	<ul style="list-style-type: none"> • Construct the borewell. 	<ul style="list-style-type: none"> • Use of bore well water is better than well water. • Well water and canal water will be used after chlorination and sanitation. • Automatic drinkers used 	<ul style="list-style-type: none"> • Use of bore well water is better than well water. • Well water and canal water will be used after chlorination and sanitation. 	
Health and disease management	<ul style="list-style-type: none"> • Vaccinate the birds against Ranikhet and Infectious Bursal Disease regularly. • Deworming the birds. 	<ul style="list-style-type: none"> • Keep the birds in good aeration with shadowy place. • Provide clean water and feed. • Control of ectoparasites. 	<ul style="list-style-type: none"> • Deworming the birds. • Provide clean water and feed. • Control of ectoparasites. 	
Cyclone				
Shortage of feed ingredients	<ul style="list-style-type: none"> • Store the unconventional feedstuffs without fungal contamination. 	Use available feed ingredients with unconventional feedstuffs for poultry feed preparation.	<ul style="list-style-type: none"> • Use unconventional feedstuffs. 	

Drinking water	<ul style="list-style-type: none"> Construct the borewell. 	<ul style="list-style-type: none"> Use of bore well water is better than well water. Well water and canal water will be used after chlorination and sanitation. 	<ul style="list-style-type: none"> Use of bore well water is better than well water. Well water and canal water will be used after chlorination and sanitation. 	
Health and disease management	<ul style="list-style-type: none"> Vaccinate the birds against Ranikhet and Infectious Bursal Disease regularly. Deworming the birds. 	<ul style="list-style-type: none"> Keep the birds in good aeration with shadowy place. Provide clean water and feed. Control of flies & ectoparasites. 	<ul style="list-style-type: none"> Deworming the birds. Provide clean water and feed. Control of ectoparasites. 	
Heat wave and cold wave				
Shelter/environment management	<ul style="list-style-type: none"> Tree Plantation around the poultry Shed. Spray Bleaching powder and disinfect around the poultry farm. 	<ul style="list-style-type: none"> During heat wave fogger used to control the heat stress in poultry. 	<ul style="list-style-type: none"> 1% butox will be sprayed in the poultry shed during sunlight time to prevent the ectoparasites. 	
Health and disease management	<ul style="list-style-type: none"> Vaccinate the birds. Construct the wall around the well prevent the germs and dust mixed with well water during rainfall. Deworming the animals. 	<ul style="list-style-type: none"> Vitamin C Supplementation. Prevent the entry of other birds and outsiders. 	<ul style="list-style-type: none"> Vaccinate the birds. Deworm the birds. 	

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine		-	

Inland	-		
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> • Harvesting large individuals • Increased Stocking-density in smaller/confined areas 	<ul style="list-style-type: none"> • Harvesting large individuals • Disposable of unwanted excess stock • Stocking of desirable/special individuals in brood stock ponds 	<ul style="list-style-type: none"> • Proper management of the local environment
(ii) Changes in water quality	Negligible changes in water quality	Negligible changes in water quality	Negligible changes in water quality
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • Harvesting of the stock • Transferring of smaller fishes to artificial ponds (if available) for tiding over the drought 	<ul style="list-style-type: none"> • Steps to improve the quality of stocked fishes, via feed management water quality management
(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • Steps to improve the quality of stocked fishes, via feed management water quality management
2) Floods			
A. Capture	-	-	-
Marine	-	-	-
Inland	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • In extreme conditions, controlled draining of flooded ponds • Thinning of stock by harvesting of larger individuals 	<ul style="list-style-type: none"> • Repair damaged bundhs • Collect and preserve existing stock
(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	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Flood water can bring parasites, and increased turbidity – repair/correct drainage to improve quick drainage of flood waters 	<ul style="list-style-type: none"> • Turbid waters may be flushed off with fresh borewell/well water
(vi) Health and diseases	-		

	-		
B. Aquaculture			
(i) Inundation with flood water	<ul style="list-style-type: none"> • Proper fencing to prevent escaping of fishes • Increasing bundh height and improve bundh strength • Improve land drainage to allow easy and quick flow of flood waters 	<ul style="list-style-type: none"> • In extreme conditions, controlled draining of flooded ponds • Thinning of stock by harvesting of larger individuals 	<ul style="list-style-type: none"> • Repair damaged bundhs • Collect and preserve existing stock
(ii) Water continuation and changes in water quality	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Water can become turbid due to flood waters, reduce stock to prevent mortality 	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Harvesting of stock • Shift reserve of brood stock to ponds at elevated levels 	<ul style="list-style-type: none"> • Selling remaining stock and inundated equipment immediately to minimize losses
(v) Infrastructure damage (pumps, aerators, huts etc)	<ul style="list-style-type: none"> • Dismantling of pumps, aerators and other equipment and shifting to safer zones 	<ul style="list-style-type: none"> • Salvaging of inundated pumps, aerators and other equipment and shifting to safer zones 	<ul style="list-style-type: none"> • Selling remaining stock and inundated equipment immediately to minimize losses
3. Cyclone / Tsunami	-NA-		
4. Heat wave and cold wave	- NA-		

State: TAMILNADU

Agriculture Contingency Plan of District: KANCHEEPURAM

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghat TN Uplands ecosubregion (8.3) Eastern Ghats and Tamil Nadu Uplands ecosubregion (18.2)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains and Hills Region (XI)		
	Agro Climatic Zone (NARP)	North Eastern Zone (TN-1)		
	List all the districts or part thereof falling under the NARP Zone	Thiruvallur, Villupuram, Cuddalore, Thiruvannamalai and Vellore		
	Geographic coordinates of district Hqs	Latitude	Longitude	Altitude
		10 ⁰ 20' N	79 ⁰ 15' E	-
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Rice Research Station, Tirur, Tiruvallur District		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Tirur, Tiruvallur District		
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	462	1 st Week of June	4 th week of October
	NE Monsoon (Oct-Dec):	697	1 st week of October	4 th Week of December
	Winter (Jan- March)	49	-	-
	Summer (Apr-May)	120	-	-
	Annual	1420	-	-

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)	443.2	23.9	146.5	18.3	10.7	12.9	10.9	34.9	56.5

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Deep black soils	84.0	19.0
	Moderately deep black soils	62.4	14.1
	Moderately deep red soils	57.1	12.9
	Deep red soils	53.1	12.0
	Very deep black soils	39.8	9.0
	Shallow black soils	27.1	6.1
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	140.0	106.4
	Area sown more than once	9.0	
	Gross cropped area	149.0	

1.6	Irrigation	Area ('000 ha)	Percent (%)		
	Net irrigated area	130.7	95.1		
	Gross irrigated area	139.6	95.4		
	Rainfed area	9.3	4.6		
	Sources of Irrigation	Number	Area ('000 ha)	% area	
	Canals	20	0.1	0.1	
	Tanks	1942	57.0	46.6	
	Open wells	63411	56.0	42.8	
	Bore wells	12249	9.1	7.4	
	Lift irrigation				
	Other sources		0	0	
	Total		122.3	100.0	
	Pumpsets				
	Micro-irrigation				
	Groundwater availability and use	No. of blocks	% area	Quality of water	
	Over exploited	02	15.3	Salinity level: 70 % good and 25% moderate Residual Sodium Carbonate: 90% good and 5% moderate Sodium Adsorption Ratio:98 % good and 2% moderate	
	Critical	02	15.3		
	Semi- critical	07	53.8		
	Safe	02	15.4		
Wastewater availability and use	Data not available				
*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)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Paddy	18.1	0.4	59.8	0.7	12.4	91.4
2	Groundnut	4.6	1.3	15.3	0.7		21.9
3	Sugarcane	1.5		3.3			4.8
4	Black gram	-	0.2	0.2	0.4	0.4	0.6
5	Green gram		0.1	-			0.1
	Others						
	Horticulture crops - Fruits	Total area ('000 ha)					
1	Mango	2.4					
2	Banana	0.3					
3	Water melon	1.6					
4	Guava	0.2					
5.	Citrus	0.2					
	Horticultural crops - Vegetables	Total area ('000 ha)					
	1. Brinjal	0.1					
	2. Bhendi	0.1					
	Flowers						

	Medicinal and Aromatic crops	-
	Plantation crops	-
	Fodder crops	-
	Total fodder crop area	-
	Grazing land	18.3
	Sericulture etc	-
	Others (Specify)	-

1.8	Livestock	Male	Female	Total			
	Non descriptive Cattle (local low yielding)	111.0	231.3	342.4			
	Crossbred cattle	59.2	219.9	279.2			
	Non descriptive Buffaloes (local low yielding)	-	-	154.4			
	Graded Buffaloes	-	-				
	Goat			389.1			
	Sheep			308.3			
	Others (Camel, Pig, Yak etc.)			5.47			
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial	-	353.8				
	Backyard	-	-				
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		14610	7	2250	7546	Shore Seines-56 Boat seine-459 Long line-1059 Others-1036 Total-2610	-
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks(FFDA tanks)		
	63ha		3263ha		749ha		

B. Culture			
	Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	5424	0.162	877.518
ii) Fresh water (Data Source: Fisheries Department)	9596	1.22	11707.62
Others			

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	58.4	4008	197.3	3714	71.6	3747	327.3	3778
2	Black gram	-	-	-	-	-	-	1.2	739
3	Sugarcane	-	-	-	-	-	-	59.2	99000
4	Groundnut	-	-	-	-	-	-	77.1	2997
5	Green gram	-	-	-	-	-	-	234.0	586
Others		-	-	-	-	-	-		
Major Horticultural crops									
1	Mango	-	-	-	-	-	-	13.4	5216
2	Banana	-	-	-	-	-	-	14.4	47741
3	Guava	-	-	-	-	-	-	232.6	13603
4	Citrus (Lemon)	-	-	-	-	-	-	376.0	2986

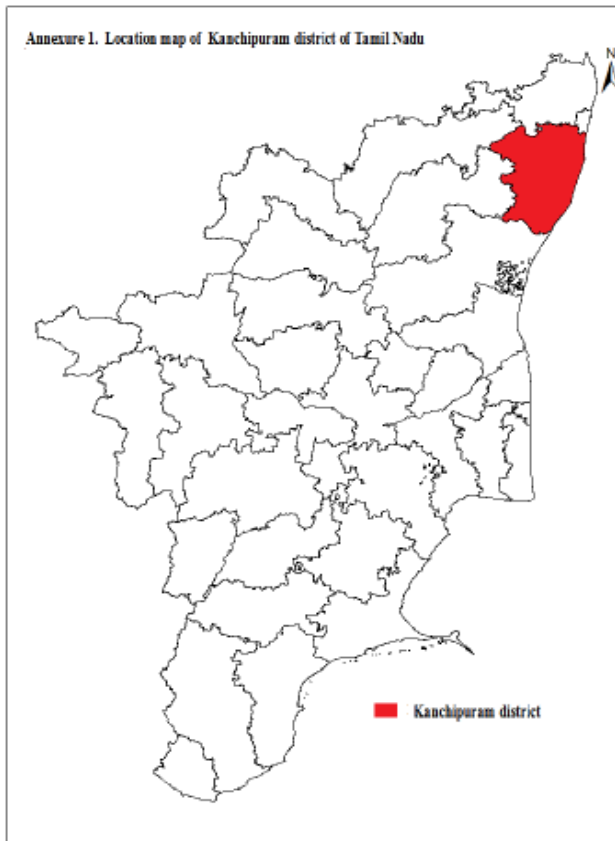
1.12	Sowing window for 5 major crops (start and end of sowing period)	Crop 1 (specify): Paddy	Black gram	Groundnut	Sugarcane	Greengram
	Kharif- Rainfed	1 st week of June-July	-	1 st week to 4 th week of August	-	-
	Kharif-Irrigated	1 st week of April to 4	-	-	-	-

		th week of May				
	Rabi- Rainfed	1 st week of August 4 th week of November	1 st week of October to 4 th week of January	-	-	1 st week of October to 1 st week to 4 th week of January
	Rabi-Irrigated	1 st week to 4 th week of December	1 st week of December to 4 th week of January	1 st week to 4 th week of December	1 st week of December to 4 th week of January	1 st week of December to 1 st week to 4 th week of January

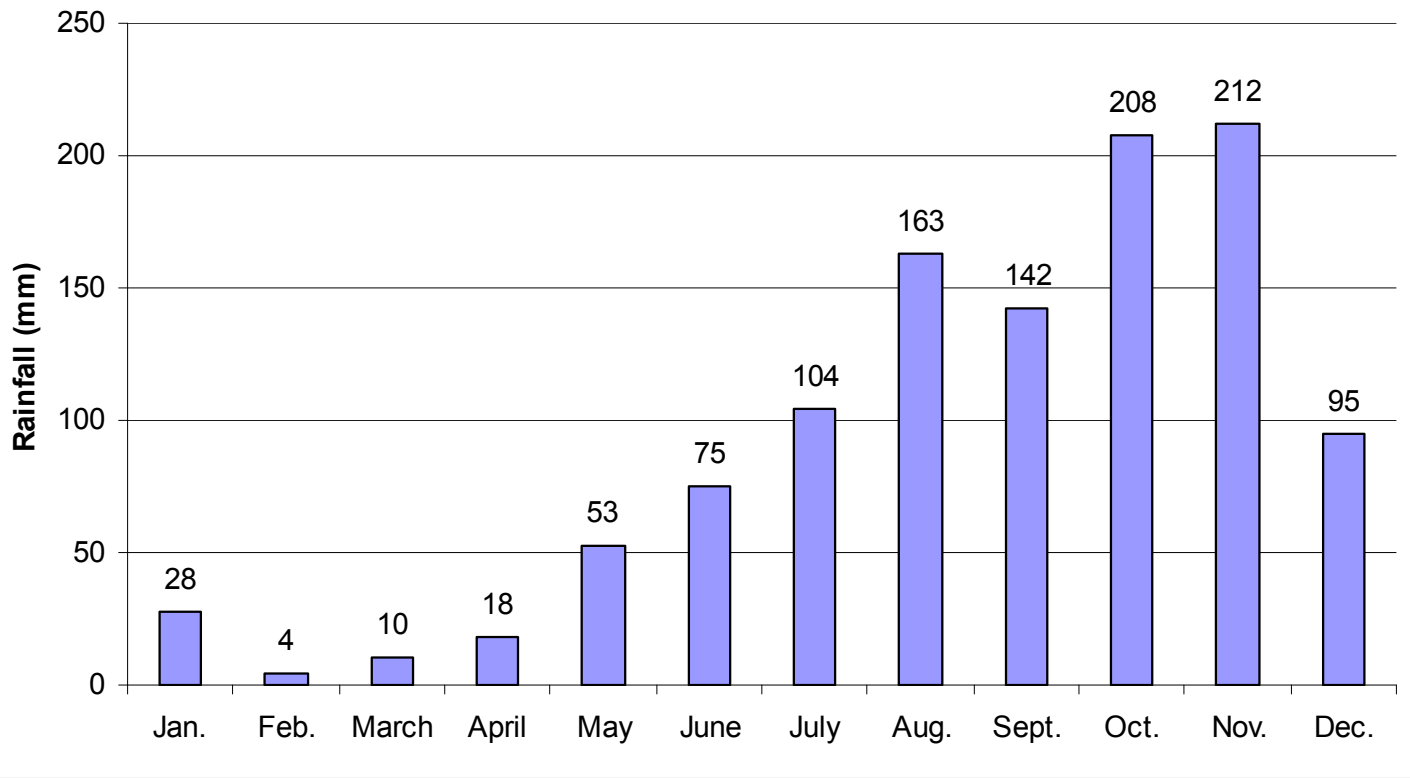
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	√	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and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

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

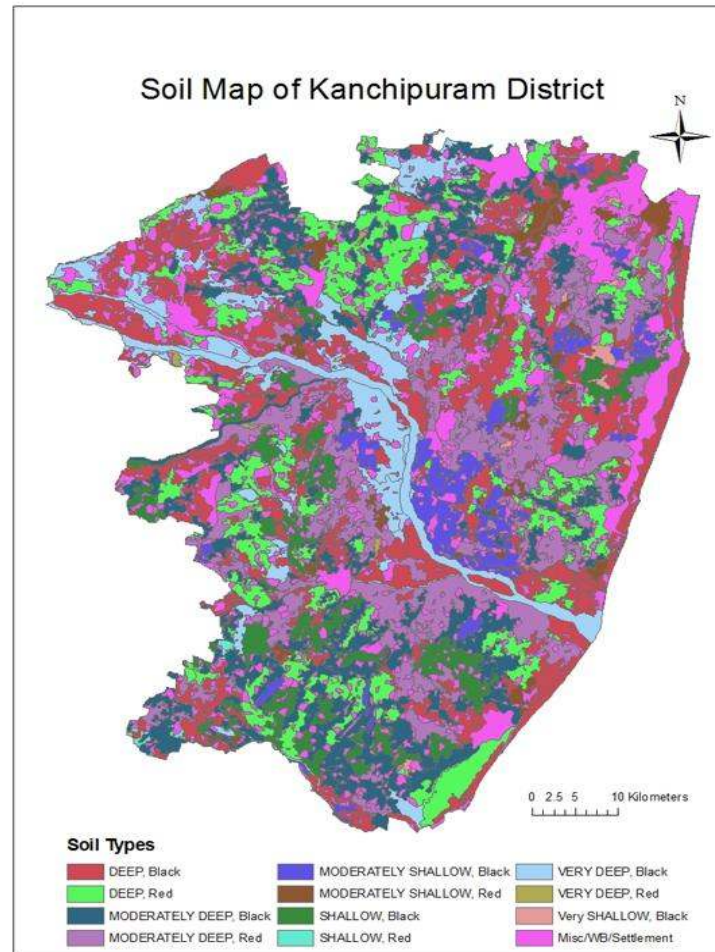
Annexure 1. Location map of Kancheepuram district and the blocks



Annexure 2. Mean annual rainfall of Kanchipuram district of Tamil Nadu



Annexure 3. Soil map of Kancheepuram district of Tamil Nadu



Source: NBBSSLUP

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks (June 3 rd week)	Red and black soils	Pearl millet (June-Sep) Groundnut (Oct – Feb) Gingelly(June-Sep)-Groundnut (Oct-Feb) Groundnut (June-Sep)-Pulses (Dec-Mar) Groundnut (June-Sep) – Ragi (Nov-Feb) Groundnut (June-Sep)-Gingelly (Dec-Mar)	No change in cropping system	--	--

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks (July 1st week)	Red and black soils	Pearl millet (June-Sep) Groundnut (Oct – Feb) Gingelly(June-Sep)-G.Nut (Oct-Feb) Groundnut (June-Sep)-Pulses (Dec-Mar) Groundnut (June-Sep) – Ragi (Nov-Feb) Groundnut (June-Sep)-Gingelly (Dec-Mar)	Maize+Pulses (July-Dec) – Pulses (Jan-April)	Making field free f weeds Strengthen the field bunds for <i>in situ</i> moisture conservation	--

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks (July 3 rd week)	Lateritic, red and black soils	Pearl millet (June-Sep) G.Nut (Oct – Feb) Gingelly(June-Sep)-G.Nut (Oct-Feb) G.Nut (June-Sep)-Pulses (dec-Mar) G.Nut (June-Sep) – Ragi (Nov-Feb) G.Nut (June-Sep)-Gingelly (Dec-Mar)	Pure crop of Pearl millet ICMV – 221/ green gram COGG 912 Horse gram, pearl millet/pulses	1.Pearl millet are cut for fodder 45 and 65 days and left for grains if rains are continued 2. Thinning of crops 3.Top dressing of Urea	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks (August 1 st week)	Lateritic, red and black soils	Pearl millet (June-Sep) G.Nut (Oct – Feb) Gingelly(June-Sep)-G.Nut (Oct-Feb) G.Nut (June-Sep)-Pulses (dec-Mar) G.Nut (June-Sep) – Ragi (Nov-Feb)	Green manure/fodder sorghum	Thicker sowing of fodder sorghum or green manure for insitu cultivation	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Lateritic, red and black soils	Pearl millet G.Nut Gingelly-G.Nut G.Nut -Pulses G.Nut – Ragi	1. Thinning and gap filling the existing crop 2.Re sowing Groundnut: TMV-2, JL-24, VRI-2 Sesame: TMV-3,	Intercultivation Conservation Furrow thinning	Supply of inter cultural implements

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell) At vegetative stage	Lateritic, red and black soils	Pearl millet G.Nut Gingelly-G.Nut G.Nut -Pulses G.Nut – Ragi	- Thinning, Grazing leaf tips, postponement of top dressing Life saving irrigation	Intercultivation (soil mulching) Conservation Furrow	Supply of inter cultural implements Awareness creation on construction of Farm ponds
	Lateritic, red and black soils	Pearl millet G.Nut Gingelly-G.Nut G.Nut -Pulses G.Nut – Ragi	Earthing up, apply Gypsum after receipt of rains Life saving irrigation Spraying of anti transpirants	Intercultivation (soil mulching) Conservation Furrow Mulching	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)					
At reproductive stage	Lateritic, red and black soils	Pearl millet Groundnut Gingelly-G.Nut Groundnut -Pulses Groundnut – Ragi	Thinning Life saving irrigation Weeding and Weed mulching Spray urea @ 20 gm/litre of water in 35,45 and 65 days after sowing for better yield	---	Awareness creation on rain water harvesting Construction of percolation ponds

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought					
	Lateritic, red and black soils	Pearl millet Groundnut Gingelly- Groundnut Groundnut -Pulses Groundnut – Ragi	Life saving irrigation through mobile sprinkler Harvest at physiological maturity stage	Tied ridges to conserve rainwater during kharif for regular sowing of rabi	

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	Tankfed areas- Heavy clay and laterite soils	Paddy (sub merged condition)	Paddy	Adoption of Rajarajan 1000 method of cultivation to save water	1.Seeds through NFSM
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	-	-	-	-	-
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	Heavy clay and laterite soils	Paddy	Black gram	Fields should be properly leveled	
		-	-	Irrigation at critical stages i.e one at sowing,flowering and pod formation	
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	Heavy clay black soils and laterite red soils	Paddy	Maize and vegetables(lab lab, cluster beab and Brinjal)	1.Limited irrigation 2. Alternate Furrow irrigation 3. Drip irrigation	
			Pulses	Irrigation at critical stages i.e one at sowing,flowering and pod formation	
Any other condition (specify) Well irrigated areas	Laterite, red and black soils	Sugarcane	Vegetables/sunflower/maize/green manure Vegetables/maize/sunfl	Irrigation at critical stages Sprinkler irrigation for vegetables Drip irrigation with micro sprinklers	To be linked up with micro irrigation project

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
			ower/groundnut	Drip irrigation with fertigation Wider inter row Intercultivation Intercropping	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Paddy	Drain out the excess water	Drain out the excess water	Drain out the excess water Harvesting at physiological maturity stage Drain out the excess water	Shift to safer place, use mechanical drier Shift to safe place dry in shade and turn frequently
Groundnut				
Blackgram				
Sugarcane				
Heavy rainfall with high speed winds in a short span				
Paddy	Drain out the excess water and tying of lodged plants	Drain out the excess water	Drain out the excess water	Shift to safe place dry in shade and turn frequently
Groundnut	do			
Greengram				
Sugarcane	Drain out the excess water tying of lodged plants			Shift to safe place
Gingelly	Drain out the excess water	Shift to safe place dry in shade and turn frequently		
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Integrated nutrient management, Alternate wetting and drying, Submergence of water during critical periods not more than 2.5 cm	Set up light trap	Spray carbendazim+ thiram to manage grain discolouration	Dry the grains to 12% moisture level and store
Plant Hoppers, Sheath blight Grain discolouration				
Groundnut		Need based Integrated Pest	-	

Greengram	management practices			
Sugarcane				

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Paddy	Drainage, Appropriate Plant protection management for thrips	Drainage, Appropriate Plant protection management	Drainage, Appropriate Plant protection management	Drain out excess water
Groundnut	Drainage Appropriate Plant protection management	Drainage Appropriate Plant protection management leaf folder, gall midge & stem borer moth catches Incidence of BPH		
Continuous submergence for more than 2 days				
Paddy	Drain out excess water			
Groundnut				
Sugarcane				
Greengram				
Blackgram				
Sea water inundation				
Paddy	Soil amendments application			
Condition	Suggested contingency measure			
Transient water logging/ partial inundation	Seedling / nursery stage			
Paddy	Drainage, Appropriate Plant protection management for Thrips			
Groundnut	Drainage Appropriate Plant protection management			
Continuous submergence for more than 2 days				
Paddy	Drain out excess water			
Groundnut				

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave			NA	
Cold wave			NA	
Frost			NA	
Hailstorm			NA	
Cyclone			NA	

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Cultivation of drought resistant vegetation Preservation of fodders (silage and hay) according to the prediction of drought	Use of tree leaves and shrubs, Agro industrial by products Use of NPN compounds as protein source along with molasses	Analyze the shortage and loses and make necessary arrangement to overcome it in future.
Drinking water	Creation of reservoir like tanks, lake, etc.	Make availability through borewells	Analyze the shortage and loses and make necessary arrangement to overcome it in future.
Health and disease management	Vaccinate them according to the vaccination schedule	Avoid vaccination in case of debilitated animals	Vaccinate them according to the vaccination schedule
Floods			
Feed and fodder availability	Predict the occurrence according to the previous history and announce this through	Utilize the preserved fodders and other unconventional feeds and	Analyze the difficulties faced and avoid them in next occurrence

	radio, TV and newspaper. Preserve the fodders as silage and hay.	fodders	
Drinking water	Creation of reservoir like tanks, lake, etc.	Ensure adequate supply of drinking water	Analyze the shortage and loses and make necessary arrangement to overcome it in future.
Health and disease management	Vaccinate them according to the vaccination schedule with care since there is a increase risk of disease outbreak	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule
Cyclone			
Feed and fodder availability	Preserve the fodders as silage and hay.	Utilize the preserved fodder . Follow the safety procedures recommended by local authorities. Listen for updates on your radio / TV / Newspaper Don't allow them for grazing until the cyclone has passed	Assess the damage. Listen radio, TV, Newspaper about the recovery assistance. Contact your insurance agent to get any recovery. Monitoring of animals with a veterinary doctor is necessary
Drinking water	Creation of reservoir like tanks, lake, etc.	Ensure adequate supply of drinking water	Analyze the shortage & loses and make necessary arrangements to overcome it in future
Health and disease management	Vaccinate them according to the vaccination schedule with care since there is a increase risk of disease outbreak	Vaccinate them according to the vaccination schedule with care since there is a increased risk of disease outbreak	Vaccinate them according to the vaccination schedule with care since there is a increased risk of disease outbreak Disinfection of infected areas with dettol, pheynol, lyzol etc. & other antiseptic solutions
Heat wave and cold wave	NA		

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Predict the occurrence based on previous data. Preserve the feed ingredients	Ensure adequate feed using available feed ingredients	Analyze the extent of loss and shortage of feed and make necessary arrangements to overcome it in next time	
Drinking water	Creation of water harvesting structures etc.	Make availability through borewells	Analyze the shortage and losses and make necessary arrangement to overcome it in future.	
Health and disease management	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule	
Floods				
Shortage of feed ingredients	Predict the occurrence according to the previous history and announce this through radio, TV and newspaper. Preserve the feed ingredients	Utilize the preserved feed ingredients and also unconventional feeds Listen for updates on your radio / TV / Newspaper	Analyze the difficulties, problems and shortage of feed ingredients and make necessary arrangement to avoid it in future	
Drinking water	Creations of water harvesting structures	Ensure the supply of adequate drinking water	Analyze the shortage or problems and make necessary arrangement to avoid it in future.	
Health and disease management	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule	
Cyclone				
Shortage of feed ingredients	Predict the occurrence according to the previous history and announce this	Utilize the preserved feed ingredients and also	Analyze the difficulties, problems and shortage of feed ingredients and	

	through radio, TV and newspaper. Preserve the feed ingredients	unconventional feeds. Listen for updates on your radio / TV / Newspaper	make necessary arrangement to avoid it in future	
Drinking water	Creation of water harvesting structures	Ensure the supply of adequate drinking water	Analyze the shortage or problems and make necessary arrangement to avoid it in future.	
Health and disease management	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule	Vaccinate them according to the vaccination schedule Disinfection of infected areas with dettol, pheynol, lyzol etc. & other antiseptic solutions with disinfectants	
Heat wave and cold wave	NA			

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
Marine	<ul style="list-style-type: none"> Try to have solar ponds to get potable water Ensure drinking water facility for humans and cattle Preserve food, fuel and fodder 	<ul style="list-style-type: none"> Use water prudently with least wastage Use the resources and prevention mechanisms to avoid shortage 	<ul style="list-style-type: none"> Record the quality and quantity loss of human and cattle Take stock of the situation for future predictions
Changes in sea surface temperature	<ul style="list-style-type: none"> Provide refuges and sanctuaries 	Fishing grounds are affected due to: <ul style="list-style-type: none"> More frequent algal blooms Alter local ecosystem with changes in competitors, predators and invasive species Potential loss of species or shift in composition 	<ul style="list-style-type: none"> Sea ranching for the lost species Improve fisheries management through habitat restoration

		of fish stocks Coastal planning to restore coastal eco systems	
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> • Make adequate water harvesting facility • Provide refuges and sanctuaries 	<ul style="list-style-type: none"> • Keep the fish stock at minimal level • Use polythene layered ponds and cover to avoid percolation & evaporation 	Recoup the broodstock and take efforts to procure stock material
(ii) Changes in water quality	Keep stock of aerators and reserve ponds atleast to maintain broodstock	<ul style="list-style-type: none"> • Have adequate filter mechanisms. • Keep operations at lowest possible side 	Assess water quality
(iii) Any other Higher inland water temperature	<ul style="list-style-type: none"> • Reduce fish stocks 	<ul style="list-style-type: none"> • Lower water quality causing more disease and fish mortality can be avoided by reducing the fish stock. 	Plan for the minimal water levels in inland water bodies with other water users
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> • Try to have buffer ponds to meet exigencies • Have adequate flushing facility to safeguard broodstock 	<ul style="list-style-type: none"> • Harvest the fishes as and when emergency arises • Keep stock at minimum with only essential stock 	Record events unique to that place for future safeguards
(ii) Impact of salt load build up in ponds / change in water quality	Initiate harvest if prices are likely to fall	Harvest the fishes and prawn and make arrangements with storage facility to store the maximum possible produces by different processing methods	Sell the stored produce and processed produce
(iii) Any other	Plan for use of water with agricultural, industrial and domestic users in water scarce area to avoid conflicts	Shortened growing seasons, reduced harvest and a narrower choice of species for culture. Hence plan for fish species with short duration of culture	<ul style="list-style-type: none"> • Plan for keeping stock of stunted fingerlings to reduce the crop period. • Plan for alternative livelihood to local fishers • Integrate pond aquaculture with traditional crops and livestock to reduce farmer's vulnerability to drought to boost overall production and profit
2) Floods	Before the event^a	During the event	After the event
A. Capture			
Marine			
Rising sea level	<ul style="list-style-type: none"> • Provide adequate shelter in inland and take stock of community stay facility and life saving devices to guard human & cattle life • Take adequate measure against epidemics 	<ul style="list-style-type: none"> • Engage all possible life saving machinery to save human and cattle life. • Keep people far away from water bodies • Loss of coastal eco systems such as mangrove forests 	<ul style="list-style-type: none"> • Take stock of situation • Pay feed, medicine engage people from voluntary organization to ensure victims getting relief measures early • Enhancement of wild catch through improved traditional gear

		<ul style="list-style-type: none"> • Reduced stock for capture fisheries • Damage to fishing gear, higher risk to fishers • Damage to coral reefs that serve as breeding habitats and help protect the shore from wave action 	
Inland			
(i) Average compensation paid due to loss of human life	NA		
(ii) No. of boats / nets/damaged	NA		
(iii) No. of houses damaged	NA		
(iv) Loss of stock	<ul style="list-style-type: none"> • Repair of dykes or embankments of aquaculture facilities • Ensure bunds, canals are freed flowing to avoid breach of bunds 	<ul style="list-style-type: none"> • Keep the fish stock at minimal level • Keep operations at lowest possible side 	<ul style="list-style-type: none"> • Try to shift the stock to place of better water quality • Repair the breached bunds and other on war footing • Fishermen dependent on fisheries from rivers for their livelihood need to provided with fishing equipments like nets and boats for continuing their livelihood activity
(v) Changes in water quality	<ul style="list-style-type: none"> • Repair of dykes or embankments of freshwater bodies • Ensure bunds, canals are freed flowing to avoid breach of bunds 	Assess water quality	Take stock, assess water quality
(vi) Health and diseases	Store adequate medicine and cleansers to meet emergencies	Application of lime to reduce fish mortality due to disease and change in water quality	Rapid removal moribund or dead animals from water, followed by sterile or landfill disposal
B. Aquaculture			
(i) Inundation with flood water	<ul style="list-style-type: none"> • Plan for short culture periods and minimal capital investments to reduce stock loss and associated cost • Repair of dykes or embankments of aquaculture facilities • Ensure bunds, canals are freed flowing to avoid breach of bunds 	<ul style="list-style-type: none"> • Introduction of disease and predators into aquaculture facilities • Try to safeguard by netting various entry and exit points 	<ul style="list-style-type: none"> • Monitor and assess risk for promotion of aquaculture • Repair of dykes or embankments of aquaculture facilities for initiating culture operations
(ii) Water continuation and changes in water quality		Application of lime to reduce fish mortality due to disease and change in water quality	Take stock, assess water quality
(iii) Health and diseases	Store adequate medicine and cleansers to meet emergencies	Eradicate the disease where possible	Rapid removal moribund or dead animals from water, followed by sterile or landfill disposal

(iv) Loss of stock and inputs (feed, chemicals etc)			<ul style="list-style-type: none"> Fingerlings of Indian major crops should be stocked Sizeable quantities of chemicals, Mahua oil cake, lime, bleaching powder will be required for preparation of various confined water bodies for fish culture operation High quantity of fingerlings will be required for post flood stocking of water bodies. These fingerlings supply can be provided by various government and private hatcheries or from their own farms
(v) Infrastructure damage (pumps, aerators, huts etc)			Document the loss and report to Department of Fisheries for necessary claims
(vi) Any other			
3. Cyclone / Tsunami	Before the event^a	During the event	After the event
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	Try to have end-to-end Tsunami warning system	<ul style="list-style-type: none"> Habitat loss like destruction of reef areas and other inshore vulnerable habitats Decreases biodiversity with a shift in species dominance 	<ul style="list-style-type: none"> Provide adequate assistance or relief to fisher folk Reestablishment of species and habitats Fishermen dependent on fishing for their livelihood need to be provided with fishing equipments like nets and boats for continuing their livelihood activity
(ii) Avg. no. of boats / nets/damaged	-	-	
(iii) Avg. no. of houses damaged	-	-	
Inland	-	--	
B. Aquaculture	-	-	
(i) Overflow / flooding of ponds	-	-	<ul style="list-style-type: none"> Monitor and assess risk for promotion of aquaculture Repair of dykes or embankments of aquaculture facilities for initiating culture operations
(ii) Changes in water quality (fresh water / brackish water ratio)	-	-	Take stock, assess water quality

(iii) Health and diseases	-	-	Rapid removal moribund or dead animals from water, followed by sterile or landfill disposal
(iv) Loss of stock and inputs (feed, chemicals etc)	-	-	Document the loss and report to Department of Fisheries for necessary claims
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	
(vi) Any other	Increasing knowledge and the coordination of information is essential to improve the prediction and preparation for hazards		
4. Heat wave and cold wave	NA		

State: TAMILNADU

Agriculture Contingency Plan District: KARUR

1.0 District Agriculture profile

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghat (TN uplands) ecosubregion (8.3).		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)		
	Agro Climatic Zone (NARP)	Western zone (TN-3)		
	List all the districts or part thereof falling under the NARP Zone	Periyar and Coimbatore districts, Thiruchengodu of Namakkal district Karur district and northern parts of Madurai district.		
	Geographic coordinates of district Hqs	Latitude	Longitude	Altitude
		10 ⁰ 32' N	77 ⁰ 45' E	122 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Maize Research Station, P.O: Vagarai, Dist:Dindigul		
Mention the KVK located in the district	Saraswathi KVK, Puzhuderu Village, Puzhuderu (Po), Thogamalai block, Karur District			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	192	1 st week of June	1 st week of October
	NE Monsoon(Oct-Dec):	300	2 nd week of October	4 th week of December
	Winter (Jan- March)	26	-	-
	Summer (Apr-May)	115	-	-
	Annual	635	-	-

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)	289.6	6.2	37.5	10.8	67.4	1.3	2.8	25.3	43.5	
1.4	Major Soils	Area ('000 ha)					Percent (%) of total				
	Deep black soils	80.0					27.6				
	Deep red soils	46.0					16.0				
	Shallow red soils	44.0					15.3				
	Shallow black soils	41.0					14.2				
	Moderately deep black soils	30.0					10.3				
	Moderately deep red soils	18.0					6.2				
1.5	Agricultural land use	Area ('000 ha)					Cropping intensity %				
	Net sown area	94.4					101.8				
	Area sown more than once	1.7									
	Gross cropped area	96.1									

1.6	Irrigation	Area (000'ha)	Percent (%)		
	Net irrigated area	48.1	51.7		
	Gross irrigated area	49.7	52.5		
	Rainfed area	46.3	38.4		
	Sources of Irrigation	Number	Area (000'ha)	% area	
	Canals	23	15.8	31.7	
	Tanks	266	0.1	0.1	
	Open wells	47230	31.2	62.4	
	Bore wells	192	4.8	9.6	
	Lift irrigation	6623	0.3	0.7	
	Other sources	-	-	-	
	Total	54334	52.7	103.5	
	Pumpsets	49282	43.3	86.6	
	Micro-irrigation	-	-	-	
	Groundwater availability and use	No. of blocks	% area	Quality of water	
	Over exploited	2	27.3	Data not available	
	Critical	0	0.0		
Semi- critical	5	50.1			
Safe	1	18.6			
Wastewater availability and use	Data not available	-			
*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	Sorghum	1.2	23.1	0.5	0.1	--	24.9
2	Paddy	-	-	14.9	-	--	14.9
3	Sunflower	3.8	0.1	3.9	-	--	7.8
4	Gingelly	0.1	7.0	0.2	0.2	--	7.4
5	Ground nut	2.2	1.8	2.1	0.1	--	6.2
6	Pulses	0.1	4.5	0.1	1.6	--	6.1
7	Sugarcane						6.0
Horticulture crops - Fruits		Total area		Irrigated		Rainfed	
1	Banana	5.0		5.0		-	
2	Tapioca	2.8		2.9		-	
3	Mango	0.6		0.5		0.1	
Horticultural crops - Vegetables		Total area		Irrigated		Rainfed	
1	Chillies	0.8		0.8		-	
Horticultural crops -Flowers		-		-			
1	Jasmine	0.1		0.1		-	
2	Kaanthal	0.3		0.2		0.1	
Medicinal and Aromatic crops		Total area		Irrigated		Rainfed	
1	Betal vine	0.2		0.2		-	
Plantation crops		Total area		Irrigated		Rainfed	
1	Coconut	5.2		5.2		-	
Fodder crops		Total area		Irrigated		Rainfed	
1	Sorghum	6.0		0.1		5.9	
	Total fodder crop area	6.1		0.2		5.9	
	Grazing land	10.8		-		-	
	Sericulture etc	0.3		-		-	
	Others (non-food crops) Korai	1.6		1.6		-	

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)			
	Non descriptive Cattle (local low yielding)	10.2	26.2	36.4			
	Crossbred cattle	7.1	77.6	84.7			
	Non descriptive Buffaloes (local low yielding)	-	-	55.5			
	Graded Buffaloes	-	-				
	Goat			166.7			
	Sheep			302.4			
	Others (Pigs)			10.21			
	Others (Horses & Ponies)						
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds (number)				
	Commercial		498470				
	Backyard						
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		1764					
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)						

	ii) Fresh water (Data Source: Fisheries Department)			
	Others			

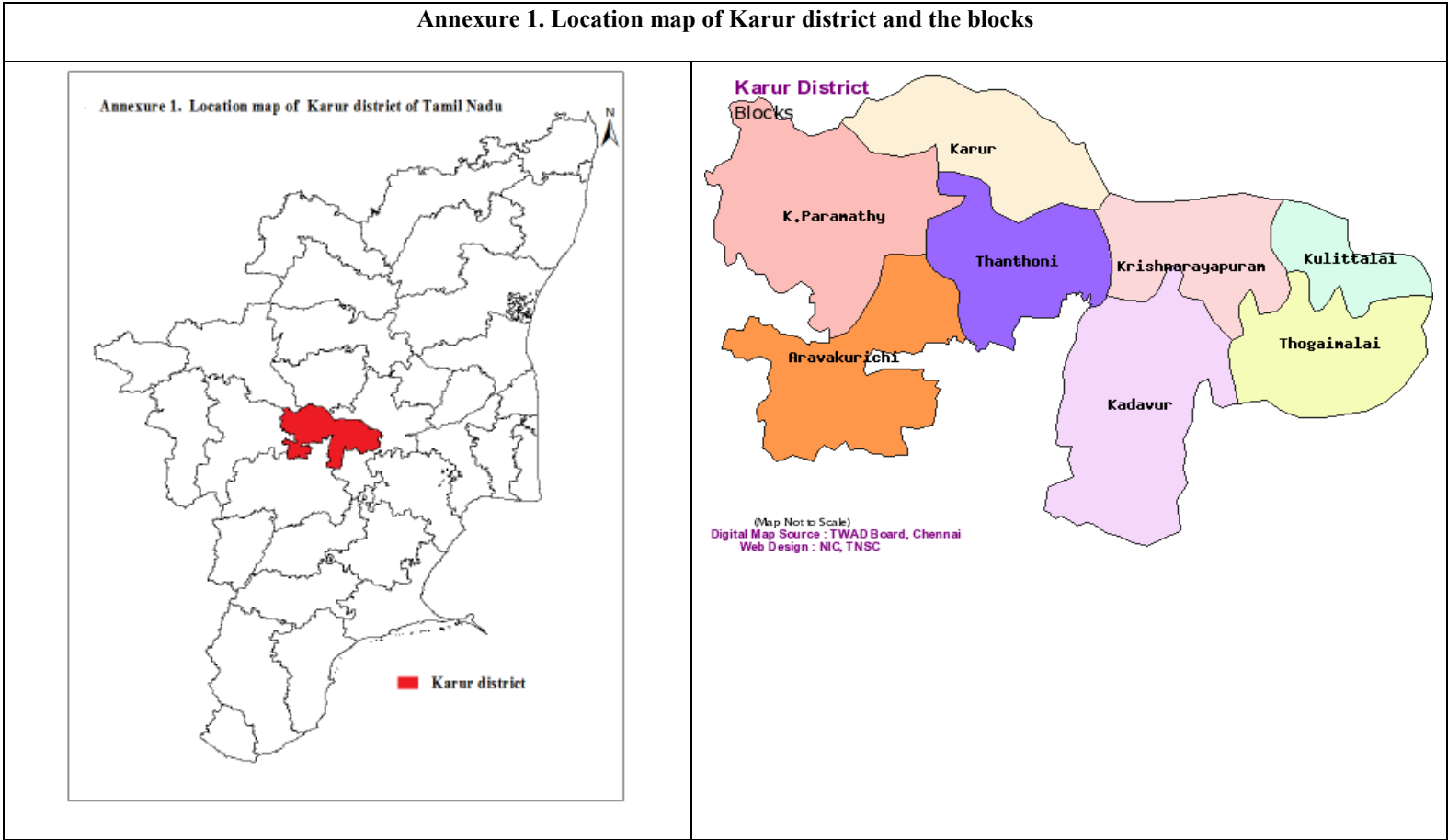
1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	-	-	45592	3068	0.0	0.0	45.592	3068
2	Sorghum	-	-	-	-	-	-	11.555	463
3	Sunflower	-	-	-	-	-	-	6.498	1257
4	Gingelly	-	-	-	-	-	-	1.922	265
5	Ground nut	-	-	-	-	-	-	13.846	2215
Others	Sugarcane	-	-	-	-	-	-	655.744	96
Major Horticultural crops									
1	Banana	-	-	-	-	-	-	194.376	41989
2	Mango	-	-	-	-	-	-	2.336	4166
3	Coconut	-	-	-	-	-	-	0.402	9599
4	Tapioca	-	-	-	-	-	-	102.904	41358
5	Chillies	-	-	-	-	-	-	0.359	521

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Sorghum	Groundnut	Sunflower	Sugarcane
	Kharif- Rainfed	-	1 st week June to 1 st week July	1 st week of July to 1 st week of August	2 nd week of June to 1 st week of July	-
	Kharif-Irrigated	2 nd week of June to 2 nd week of July	2 nd week of April to 1 st week of May	1 st week of December to 1 st week of Jan, 2 nd week of May-1 st week of June	1 st week of December to 1 st week of January 2 nd week of April to 1 st week of May	2 nd week of April to 1 st week of May, 1 st week of December to 1 st week of January
	Rabi- Rainfed	-	2 nd week of September to 1 st week of October	-	1 st week of October to 1 st week of November	-
	Rabi-Irrigated	2 nd week of August to 1 st week of September	1 st week of January to 1 st week of February	-	-	-

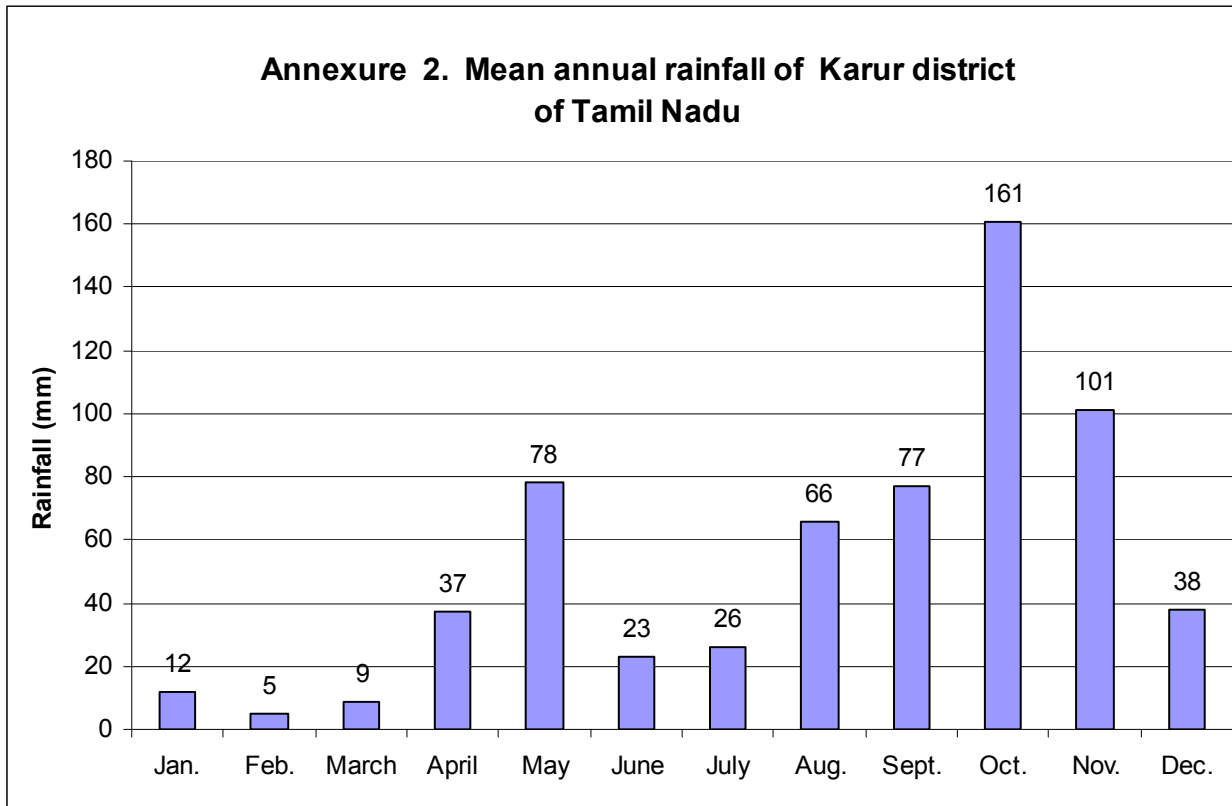
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	✓	-	-
	Flood	-	✓	-
	Cyclone	-	-	✓
	Hail storm	-	-	✓
	Heat wave	-	-	✓
	Cold wave	-	-	✓
	Frost	-	-	✓
	Sea water inundation	-	-	✓
	Pests and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

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

Annexure 1. Location map of Karur district and the blocks

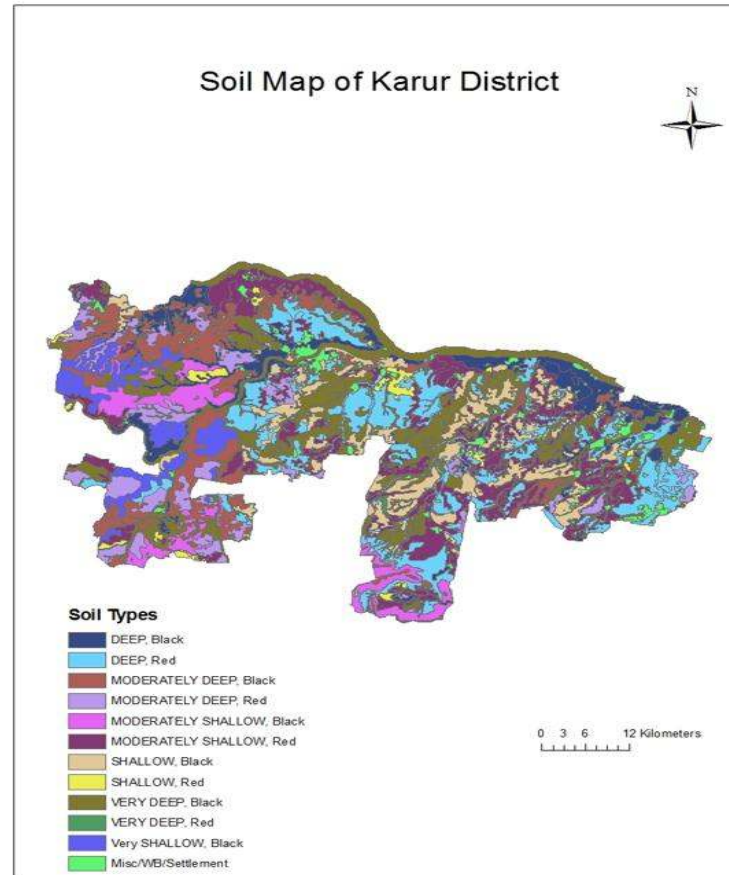


Annexure 2. Mean annual rainfall of Karur district of Tamil Nadu



Annexure 3. Soil Map of Karur district in Tamil Nadu

Source: NBSSLUP



2.0 Strategies for weather related contingencies

2.1 Drought: Kharif season

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks June 3 rd week	Red soils	Groundnut + Pigeon pea (6 :1 ratio) Ground nut (sole crop)	No change	1. Mechanical sowing with tractor drawn seed drill as the sowing window is narrow	Hiring Seed drills from the Dept. of Agrl. Eng. Supply of seeds through ISOPOM project Supply of biofertilizers and other inputs through State Department of Agriculture
Delay by 4 weeks July 1 st week		Groundnut + Pigeon pea (6 :1 ratio) Ground nut (sole crop)	No change	1. Deep tillage to conserve soil moisture 2. Mechanical sowing with tractor drawn seed drill 3. Application of composted coir pith @ 10 t ha ⁻¹ to conserve soil moisture. 4. Seed hardening with 1 % KH ₂ PO ₄ (Soak the seeds in solution for 24 hours and decant the solution. Shade dry the seeds and sowing)	
Delay by 6 weeks (July 3 rd week)	Red soils	Groundnut + Pigeon pea (6 :1 ratio) Ground nut (sole crop)	Groundnut + Pigeon pea Red gram (Co(RG) 7) 12 :1 ratio Sorghum + Red gram (mixed) Sorghum: Co 26, Co (S) 28 Red gram: Co(RG) 7)	1. Mechanical sowing with tractor drawn seed drill 2. Adopt wider spacing of 45 x 10 cm. 3. Use of short duration cultivars like VRI 2, TMV 7. 4. Conservation of soil moisture through straw/black polythene mulching. 5. Spraying of B and K to increase drought tolerance.	Hiring Seed drills from the Dept. of Agrl. Eng. Supply of seeds through ISOPOM project

Delay by 8 weeks (Aug 1 st week)		Groundnut + Pigeon pea (6 :1 ratio) Ground nut (sole crop)	Groundnut + Pigeon pea Inter cropping (VRI 2, TMV 7, ALR 3, TMV 10) Red gram (Co(RG) 7) 12 :1 ratio Sorghum + Red gram (mixed) Sorghum: Co 26, Co (S) 28 Red gram: Co(RG) 7)	<ol style="list-style-type: none"> 1. Select early maturing cultivars. 2. Soak the seeds in 2% potassium dihydrogen phosphate for six hours and shade dry the seeds for 5 hours. 3. Additional dose of 20 kg N under excessive rain during vegetative phase. 4. Supplemental irrigation during pod filling stage 5. Application of mulch to improve the soil moisture status. 6. Sorghum crop will be grown for fodder purpose. 	
September 1 st week		Groundnut + Pigeon pea (6 :1 ratio) Ground nut (sole crop) VRI 2, TMV 10	Sorghum as a sole crop for fodder (Co 26, Co (S) 28) Horse gram as a sole crop (Co 1, Paiyur 1 and 2)	<ol style="list-style-type: none"> 1. Crops grown for fodder purpose with some soil moisture conservation practices. 2. Sow the horse gram by broad casting 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Red soils	Groundnut + Pigeon pea (12 :1 ratio) Sorghum + Red gram (mixed)	Reduce plant population by thinning and use biomass as mulch.	Resort to bed-furrow system and adopt alternate row irrigation. Apply stored water through micro irrigation practices (sprinkler).	Hiring inter cultural implements from the Dept. of Agrl. Eng.
			Re sowing in between the existing or relay cropping		
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period) At vegetative stage		Groundnut + Pigeon pea (12 :1 ratio) Sorghum + Red gram (mixed)	Reduce the plant population to the extent of 25 to 40 per cent. Postponement of top dressing	Inter cultivation to control weeds and use of soil mulch.	Hiring inter cultural implements from the Dept. of Agrl. Eng. Farm ponds through IWSP programme
			Spraying of 0.5 % KCl to mitigate water stress. Spray kaoline @ 6 % will reduce the transpirational loss of water.	Efficient use of stored water for life saving irrigation (micro sprinkler or sprinkler)	

Mid season drought (long dry spell) At reproductive stage	Red soils	Groundnut + Pigeon pea (12 :1 ratio) Sorghum + Red gram (mixed)	Foliar spray of 2 % DAP plus 1 % KCl during flowering and pod formation stages Spraying antitranspirant like kaoline Harvest for fodder purpose	Life saving irrigation Weeding and Weed mulching	Farm ponds through IWSM programme
Terminal drought		Groundnut + Pigeon pea (12 :1 ratio) Sorghum + Red gram (mixed)	Harvest Pigeonpea for vegetable purpose Harvest groundnut at physiological maturity stage (or) harvest for fodder purpose	Life saving supplemental irrigation (or) Plan for Rabi crop Sunflower, Horsegram (Sep-October month)	Groundnut harvester and decorticator implements through the Dept. of Agrl. Eng.

2.1 Drought: Rabi season

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. 4 th week	Red soils	Groundnut + Pigeon pea (6: 1 ratio) Ground nut (sole crop)	No change in cropping system	Mechanical sowing with tractor drawn seed drill as the sowing window is narrow	Hiring Seed drills from the Dept. of Agrl. Eng. Supply of seeds through ISOPOM project
Delay by 4 weeks Nov. 2 nd week	Red soils	Groundnut + Pigeon pea (6: 1 ratio) Ground nut (sole crop)		Deep tillage to conserve soil moisture Mechanical sowing with tractor drawn seed drill Application of composted coir pith @ 10 t ha ⁻¹ to conserve soil moisture. Seed hardening with 1 % KH ₂ PO ₄ (Soak the seeds in solution for 24 hours and decant the solution. Shade dry the seeds and sowing)	

Delay by 6 weeks Nov. 4 th week		Groundnut + Pigeon pea (6: 1 ratio) Ground nut (sole crop)	Groundnut + Pigeon pea Inter cropping (VRI 2, TMV 7, ALR 3, TMV 10) Red gram (Co (RG) 7) 12: 1 ratio Sorghum + Red gram (mixed) Sorghum: Co 26, Co (S) 28 Red gram: Co (RG) 7)	Mechanical sowing with tractor drawn seed drill Adopt wider spacing of 45X10 cm. Use of short duration cultivars like VRI 2, TMV 7. Soak the seeds in 2% potassium dihydrogen phosphate for six hours and shades dry the seeds for 5 hours. Conservation of soil moisture through straw/black polythene mulching. Supplemental irrigation during pod filling stage Spraying of B and K to increase drought tolerance.	Hiring Seed drills from the Dept. of Agrl. Eng. Supply of seeds through ISOPOM project
Delay by 8 weeks Dec. 2 nd week		Groundnut + Pigeon pea (6: 1 ratio) Ground nut (sole crop)	Sorghum (sole crop) Sorghum: Co 26, Co (S) 28	Sorghum crop will be grown for fodder purpose.	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Red soils	Groundnut + Pigeon pea (12: 1 ratio) Sorghum + Red gram (mixed)	1. Reduce plant population by thinning and use biomass as mulch. 2. Re sowing in between the existing or relay cropping	1. Resort to bed-furrow system and adopt alternate row irrigation. 2. Apply stored water through micro irrigation practices (sprinkler).	Hiring inter cultural implements from the Dept. of Agrl. Eng.
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period) At vegetative stage			1. Reduce the plant population to the extent of 25 to 40 per cent. 2. Postponement of top dressing 3. Spraying of 0.5 % KCl to mitigate water stress. 4. Spray kaoline @ 6 % will reduce the transpiration loss of water.	1. Inter cultivation to control weeds and use of soil mulch. 2. Efficient use of stored water for life saving irrigation (micro sprinkler or sprinkler)	Hiring inter cultural implements from the Dept. of Agrl. Eng. Farm ponds through IWSM programme

Mid season drought (long dry spell) At reproductive stage			1. Foliar spray of 2 % DAP plus 1 % KCl during flowering and pod formation stages 2. Spraying antitranspirant like kaolin 3. Could be harvested for fodder purpose	1. Life saving irrigation 2. Weeding and Weed mulching	Farm ponds through IWSM programme
Terminal drought			1. Pigeon pea harvested for vegetable purpose 2. Harvest the groundnut crop at physiological maturity stage (or) Harvest it for fodder purpose	1. Life saving supplemental irrigation (or) Plan for Rabi crop Sunflower, Horse gram (Sep-October month)	Groundnut harvester and decorticator implements through the Dept. of Agrl. Eng.

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop /cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Canal water irrigated low lands /Bore well water irrigated low lands with alluvial soils	Paddy Paddy – Pulses Paddy – Oil seeds Paddy - Banana	Paddy Sunflower	Paddy 1. Direct seeding of sprouted seeds in line with recommended NPK 2. Use of cyclic submergence and drying to save water 3. Bunch planting (4-5 seedlings/hill) Deep planting. Sunflower 1. Drip irrigation 2. Urea and K spray @ 2.5 % at 15 days interval.	Supply of seeds through ISOPOM project Hiring drum seeder from the Dept. of Agrl. Eng. Supply of accessories for drip irrigation through precision farming
Non release of water in canals under delayed onset of monsoon in catchment	Canal water irrigated low lands with alluvial soils	Paddy	Raise paddy as rainfed crop then convert to low land crop after the water is released Sorghum, pulses, and gingelly are recommended as rainfed crops.	Crops are grown with available soil moisture	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop /cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Canal water irrigated low lands with alluvial soils	Paddy	Sorghum and gingelly are recommended as rainfed crops.	Crops are grown with available soil moisture	
Insufficient groundwater recharge due to low rainfall	Bore well water irrigated red and brown soils	Paddy	Sunflower Sorghum as rainfed crop Gingelly	1. Light life saving irrigation 2. Micro irrigation (Drip/sprinkler)system 3. Available water may be applied economically by following alternate skip furrow method. 4. Intercultural operations to break soil capillaries for checking surface moisture loss.	1. Supply of accessories for drip irrigation through precision farming

2.2 Unusual rains (untimely, unseasonal etc)

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Ground nut + pigeon pea	1. Providing adequate Drainage 2. Apply plant protection measures against leaf minor, thrips and stem rot	1. Drainage 2. Spray of 40 ppm NAA for controlling excessive fall of flowers 3. Foliar spray of 0.5 % ZnSO ₄ + 1.0 % urea	1. Providing adequate Drainage 2. Harvesting at physiological maturity stage 3. Harvest the pigeon pea for vegetable purpose	1. Reduce the moisture content of the produce to the desired level using mechanical drier
Sorghum + pigeon pea	1. Providing adequate Drainage	1. Providing adequate Drainage 2. Apply plant protection measures against downy mildew, stem rot etc.	1. Providing adequate Drainage 2. Harvesting at physiological maturity stage 3. Harvest the pigeon pea for vegetable purpose	1. Reduce the moisture content of the produce to the desired level using mechanical drier

Pulses	-do -	1. Drainage 2. Spray of 40 ppm NAA for controlling excessive fall of flowers 3. Foliar spray of 0.5 % ZnSO ₄ + 1.0 % urea	1. Drain out 2. Harvest for vegetable purpose	1. Reduce the moisture content of the produce to the desired level using mechanical drier 2. Safe storage against storage pest and disease
Sunflower	1. Providing adequate Drainage 2. Apply plant protection measures against cut worms, hairy and tobacco caterpillar	1. Drainage 2. Spray of 40 ppm NAA for controlling excessive fall of flowers 3. Foliar spray of 0.5 % ZnSO ₄ + 1.0 % urea 4. Plant protection against capitulum borer, downy mildew	1. Providing adequate drainage 2. Harvesting at physiological maturity stage	1. Reduce the moisture content of the produce to the desired level using mechanical drier
Paddy	Providing adequate drainage	1. Providing adequate Drainage 2. Apply 20 % of the recommended N as top dressing	1. Providing adequate drainage 2. Harvesting at physiological maturity stage	1. Reduce the moisture content of the produce to the desired level using mechanical drier
Horticulture				
Banana	Provide drainage Harvest at physiological maturity stage	Provide drainage Harvest at physiological maturity stage	1. Providing adequate drainage 2. Proper staking	Market immediately
Tapioca	- do -	-do -	1. Providing adequate drainage 2. Harvesting at physiological maturity stage	- do-
Heavy rainfall with high speed winds in a short span				
Paddy	Drainage	1. Drainage 2. Apply 20 % of the recommended N as top dressing	Drainage	1. Reduce the moisture content of the produce to the desired level using mechanical drier
Horticulture				
Banana	Drainage Protect the plants against lodging with bamboo sticks	Drainage Protect the plants against lodging with bamboo sticks	Drainage Protect the plant and bunch against lodging with bamboo sticks Use of Bunch cover	1. Market immediately

Outbreak of pests and diseases due to unseasonal rains				
Sorghum + pigeon pea	Need based plant protection IPDM for pluses	Need based plant protection IPDM for pluses in	Need based plant protection IPDM for pluses in	Safe storage against storage pest and diseases
Groundnut + pigeon pea				
Sunflower				
Pulses				
Paddy				
Horticulture				
Banana	Need based plant protection IPDM for pluses	Need based plant protection IPDM for pluses	Need based plant protection IPDM for pluses	Safe storage against storage pest and diseases
Tapioca				

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Paddy	Provide drainage Re - sowing	Provide drainage Re-transplanting in damaged fields Apply 20 % of recommended N as top dressing Foliar spray of 100 ppm salicylic acid	Provide drainage If the crop is lodged harvest it for straw purpose otherwise harvest at physiological maturity stage	Reduce the moisture content using mechanical drier
Ground nut + Red gram	-do-	-do -	Provide drainage Harvest at physiological maturity stage	
Sorghum+Red gram	-do-	Provide drainage Harvest at physiological maturity stage Apply 20 % of recommended N as top dressing	Provide drainage If the crop is lodged harvest it for straw purpose otherwise harvest at physiological maturity stage	
Sunflower	-do-	-do-	- do -	

Pulses	Drainage Re-planting in damaged fields	Provide drainage Harvest at physiological maturity stage Apply 20 % of recommended N as top dressing Foliar spray of 100 ppm salicylic acid	Provide drainage Harvest at physiological maturity stage	
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Horticulture				
Banana	Provide drainage strengthening of field bunds Re-planting	Provide drainage Apply 20 % of recommended N as top dressing	Provide drainage	Market immediately after harvest
Tapioca	Drainage Strengthening of field bunds Re-planting	Drainage Apply 20 % of recommended N as top dressing	Provide drainage Harvest at physiological maturity stage	Market immediately after harvest
Continuous submergence for more than 2 days				
Paddy	Provide drainage Re-planting/sowing Raising community nursery	Provide drainage Apply 20 % of recommended N as top dressing	Provide drainage Harvest at physiological maturity stage	Drainage Reduce moisture content using mechanical drier
Groundnut + Red gram				
Sorghum + Red gram				
Sunflower				
Pulses				
Horticulture	Provide drainage	Provide drainage Apply 20 % of recommended N as top dressing	-do-	Provide drainage
Banana				
Tapioca				

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	- Not applicable -			
Cold wave				
Frost				
Hailstorm	- Not applicable			
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<ol style="list-style-type: none"> 1. Sowing of cereals (Sorghum) and leguminous crops during North-East monsoon under dry land system for dry fodder production. 2. Harvesting of fodder crops and Hay making during the months of January and February for use in summer months/drought season. 3. Ensiling and enrichment of surplus green grasses and sugarcane tops. 4. Create awareness on establishment of pasture with drought resistant fodder Varieties like Guinea grass, stylo, kolukkattai grass, Acacia trees, etc. 5. Creation of tree fodder models with Subabul, Glyricidia, Agathi, etc for tree fodder production during summer. 6. Encouraging farmers to cultivate short-term fodder crops like sunhemp. 7. Keeping sufficient stock of mineral mixture. 	<ol style="list-style-type: none"> 1. Chaffing of green and dry fodder to avoid wastage. 2. Use of unconventional and locally available cheap feed ingredients for feeding of livestock. 3. Enrichment of dry fodder with urea, Salt and molasses. 4. Continuous supplementation of Minerals to prevent infertility. 5. Advising the farmers to feed Balanced ration during summer months. 6. Feeding of chaffed and salt sprinkled crop residues. 7. Supplementation of tree fodder 	<ol style="list-style-type: none"> 1. Motivate the farmers to produce adequate quantity of improved fodder varieties like Co-4, Co FS-29, Fodder maize, fodder cowpea, etc. in under irrigation system 2. Adequate Mineral supplementation to livestock. 3. Storing crop residues after sprinkling 2% sodium chloride solution. 4. Motivation of farmers to cultivate 20% of their dry land with fodder varieties before the onset of monsoon. 5. Farmers should be advised to breed their cows during

	<p>8. Popularization of the use of chaff cutters to avoid green fodder wastage.</p> <p>9. Educate the farmers about the proper method of hay making in order to avoid spoilage.</p> <p>10. Conservation of crop residues for summer feeding.</p>	<p>with the available grass fodder.</p> <p>8. Feeding livestock with locally available cheaper brewery waste.</p> <p>9. Using of ensiled grasses and sugarcane tops during the drought period.</p> <p>10. Culling/disposal of unproductive animals To conserve feed and fodder.</p> <p>11. Promote Azola cultivation for protein supplementation.</p>	<p>July-August-September so that the peak milk production does not coincide with peak summer.</p>
Drinking water	<p>1. Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>2. Establishment of community watering holes at common grazing areas.</p> <p>3. To avoid water scarcity during the drought season, digging of bore wells may be done in dry areas.</p>	<p>1. Adequate supply of drinking water.</p> <p>2. Filling of community water tank on daily basis.</p>	<p>Water shed management practices shall be promoted to conserve the rain water.</p>
Health and disease management	<p>Cattle:-</p> <ul style="list-style-type: none"> ❖ FMD vaccination (Entire district) ❖ Anthrax vaccination in endemic areas of the district (Aravakurichi and Krishnarayapuram blocks) <p>Sheep & Goat:-</p> <ul style="list-style-type: none"> ❖ FMD vaccination (Entire district) ❖ Anthrax vaccination in endemic areas of the district (Aravakurichi and Krishnarayapuram blocks) ❖ PPR vaccination. <p>Other measures:-</p> <ol style="list-style-type: none"> 1. Deworming of all livestock. 2. Control of ectoparasites. 3. Improvement of other sanitary measures. 4. Awareness creation campaigns can be arranged. 5. The Animal husbandry department may be informed to store sufficient quantities of required vaccines corresponding to the animal population of the district. 	<ol style="list-style-type: none"> 1. Reporting the outbreak to local veterinarian. <ol style="list-style-type: none"> a. Reporting to the local veterinarian in case of sudden death in livestock. b. Proper disposal of the carcasses only after post-mortem examination by the local veterinarian. 2. Reporting to the district ADIU and VUTRC for disease confirmation. 3. Entering the data and information in the electronic media at the NIC Centre at the district Collectorate. 4. Preparation of disease investigation report and sending collected specimens to CRL and CUL. 5. Isolation and treatment of affected animals. 6. Deployment of vaccination squad for performing ring vaccination. 7. Preventing movement of livestock in the 	<ol style="list-style-type: none"> 1. Keeping vigil on the disease outbreak.

		<p>affected area.</p> <p>8. Sending regular reports to the Directorate of Animal Husbandry.</p> <p>9. Adequate Nutritional supplementation during the drought period</p>	
Floods			
Feed and fodder availability	Establish proper fodder storage facilities to avoid wastage of fodder through wetting during the rainy season.	. Supplementation of concentrates during the rains along with dry fodder.	Cultivation of fodder crops. 2. Feeding unchaffed crop residues to the young pasture grazing cows.
Drinking water	-	Care should be taken to provide clean and potable water to livestock.	Keeping vigil on the disease outbreak.
Health and disease management	<p>Cattle:-</p> <ul style="list-style-type: none"> ❖ FMD vaccination (Entire district) ❖ Anthrax vaccination in endemic areas of the district (Aravakurichi and Krishnarayapuram blocks) <p>Sheep & Goat:-</p> <ul style="list-style-type: none"> ❖ FMD vaccination (Entire district) ❖ Anthrax vaccination in endemic areas of the district (Aravakurichi and Krishnarayapuram blocks) ❖ PPR vaccination. <p>Other measures:-</p> <ol style="list-style-type: none"> 1. Deworming of all livestock. 2. The Animal husbandry department may be informed to store sufficient quantities of required vaccines corresponding to the animal population of the district. 3. Take steps to avoid stagnation of water in low lying areas and livestock sheds for pest control. 	<p>. Reporting the outbreak to local veterinarian.</p> <p>a. Reporting to the local veterinarian in case of sudden death in livestock.</p> <p>b. Proper disposal of the carcasses only after post-mortem examination by the local veterinarian.</p> <p>2. Reporting to the district ADIU and VUTRC for disease confirmation.</p> <p>3. Entering the data and information in the electronic media at the NIC Centre at the district Collectorate.</p> <p>4. Preparation of disease investigation report and sending collected specimens to CRL and CUL.</p> <p>5. Isolation and treatment of affected animals.</p> <p>6. Deployment of vaccination squad for performing ring vaccination (8 k.m. radius).</p> <p>7. Preventing movement of livestock in the affected area.</p> <p>8. Animal should be housed in better</p>	

		protected shelters.	
Cyclone	NA		
Heat wave and cold wave	NA		

2.5.2 Poultry

Condition	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Procurement of good quality feed ingredients and proper storage	Adequate feeding of poultry with balanced ration.	Nutritional supplementation along with regular adequate feeding.	-
Drinking water	Arrangements shall be made for availability of ample potable drinking water during the drought season.	1. Supply of cool potable water to poultry. 2. Providing anti-stress B-Complex and C Vitamins in drinking water.	-	-
Health and disease management	1. Assessment of RD titre and vaccination against RD and IBD. 2. Deworming of poultry. 3. Provision of foggers and sprinklers to reduce heat load. 4. Supplementation of vitamins and minerals. 5. Proper planning and disposal of batch between September to January to avoid mortality	1. Feeding during early mornings and in the evenings. 2. Increasing the height of deep litter. 3. Reducing the number of birds per shed. 4. Provision of ceiling fan @ one per 1000 sq.ft. 5. Prevention and control of Coccidiosis in poultry. 6. Summer management of poultry- use of foggers and sprinklers 7. Continuous supply of cool potable water.	1. Nutritional supplementation of poultry. 2. Preparation of road map for increasing the feed ingredients production. 3. Ensuring enough stock of ingredients in the future. Disease Outbreak: 1. No poultry should be introduced in the area for	Regular updating of farmers about the weather reports, available by linkage with the local meteorological survey centre of the district. Linked to the regular vaccination programmes of the Department of Animal Husbandry.

	<p>during the summer.</p> <p>6. Provision of cooler environment in the farm premises by tree plantation.</p>	<p>8. Supplementation of vitamins and minerals.</p> <p>9. Feeding during cooler time of the day.</p> <p>10. Feeding of balanced ration.</p> <p>11. Avoiding vaccination and debeaking during summer.</p> <p>12. Storing the feed only for short duration to avoid loss of vitamins.</p> <p>13. Avoiding having stock of layers between 21 to 36 weeks of age.</p> <p>Disease Outbreak:</p> <p>1. Reporting the outbreak to the local veterinarian.</p> <p>2. Preparing FIR and intimation to the DAH, RJDAH and ADAH.</p> <p>3. Data entry in the NIC Centre of the Collectorate and transmitting to the State Head Quarters.</p> <p>4. Deployment of disease investigation teams, collection of samples, dispatch to CRL and CUL.</p> <p>5. Vaccination of birds.</p> <p>6. Isolation and treatment affected stock.</p> <p>7. Proper disposal of dead birds.</p> <p>8. Regular reporting to the DAH.</p>	<p>next 3 months.</p> <p>2. Compensation for forceful culling.</p> <p>3. Sending the disease outbreak annual and completion report.</p>	
Floods				
Shortage of feed ingredients	1. Forecasting the forthcoming cyclone and informing the farmers to store the required feed materials as stock to meet out the event.	1. Providing Vitamin C and B-Complex in water.	1. Providing Vitamin C and B-Complex in water.	
Drinking water	1. Forecasting the forthcoming cyclone and informing the farmers to keep their water sources clean and make sure the availability of warm potable water to the birds.	1. Providing Vitamin C and B-Complex in water.	1. Providing Vitamin C and B-Complex in water.	

Health and disease management	<ol style="list-style-type: none"> 1. Vaccination against Ranikhet disease and IBD 2. Deworming of poultry 3. Supplementation of vitamins and minerals. 	<p>Disease Outbreak:</p> <ol style="list-style-type: none"> 1. Reporting the outbreak to the local veterinarian. 2. Preparing FIR and intimation to the DAH, RJDAH and ADAH. 3. Data entry in the NIC Centre of the Collectorate and transmitting to the State Head Quarters. 4. Deployment of disease investigation teams, collection of samples, dispatch to CRL and CUL. 5. Vaccination of birds. 6. Isolation and treatment affected stock. 7. Proper disposal of dead birds. 8. Regular reporting to the DAH. 	<p>Disease Outbreak:</p> <ol style="list-style-type: none"> 1. No poultry should be introduced in the area for next 3 months. 2. Compensation for forceful culling. 3. Sending the disease outbreak annual and completion report. 	<p>TANUVAS Agro Meteorological Advisory Centre, Namakkal.</p> <p>Linked to the regular vaccination programmes of the Department of Animal Husbandry.</p>
Cyclone	NA			
Heat wave and cold wave	NA			

State: TAMILNADU

Agriculture Contingency Plan for District: KRISHNAGIRI

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And TamilNadu Uplands And D (8.1)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)		
	Agro Climatic Zone (NARP)	north-western zone (2)		
	List all the districts or part thereof falling under the NARP Zone	Krishnagiri and Dharmapuri (excluding hilly areas), Salem, Nammakkal (except Tiruchengodu Taluk) and Perambalur Taluk of Perambalur District.		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		12°31'60" N	78°13'60"E	630m MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, TNAU, Paiyur, Dharmapuri districts- 636808		
Mention the KVK located in the district	Dr. Perumal Krishi Vigyan Kendra, (ICAR), Krishnagiri			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	402	2 nd week of July	1 st week of October
	NE Monsoon(Oct-Dec):	271	3 rd week of October	2 nd week of December
	Winter (Jan- March)	27		
	Summer (Apr-May)	147		
	Annual	847		

1.3	Land use pattern of the district (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable waste land	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	514.3	202.4	42.2	8.2	4.0	9.7	24.3	35.6	9.4
1.4	Major Soils		Area ('000 ha)		Percent (%) of total					
	Deep Red		163.8		31.8					
	Very shallow Red		64.7		12.6					
	Deep Black		60.9		11.8					
	Very Deep Black		49.7		9.7					
	Moderately Shallow Red		40.9		8.0					
	Moderately Deep Black		33.5		6.5					
	Moderately Shallow Black		31.8		6.2					
1.5	Agricultural land use		Area ('000 ha)		Cropping intensity %					
	Net sown area		190.0		104.5					
	Area sown more than once		8.6							
	Gross cropped area		198.6							

1.6	Irrigation	Area ('000 ha)	Percent (%)		
	Net irrigated area	52.0	27.2		
	Gross irrigated area	54.7	30.6		
	Rainfed area	138.0	72.8		
	Sources of Irrigation	Number	Area ('000 ha)	% area (to net irrigated area)	
	Canals	-	0.8	1.6	
	Tanks	1327	7.2	15.6	
	Open wells	64690	31.1	15.4	
	Bore wells				
	Lift irrigation	-	-	-	
	Other sources	-	-	-	
	Total	-	41.0	41.9	
	Pumpsets	-	-	-	
	Micro-irrigation	-	2.50	5.05	
	Groundwater availability and use	No. of blocks	% area	Quality of water	
	Over exploited	4	28	Data not available	
	Critical	-	-		
Semi- critical	4	33.3			
Safe	2	38.6			
Wastewater availability and use	Data not available				
*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)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Finger millet	0.1	58.6	0.4	0.4		60.4
2	Horse gram				31.3		31.3
3	Paddy	15.6		12.2			27.8
4	Little millet		21.0				21.0
5	Ground nut	0.07	12.8	0.1	0.2		13.3
6	Sorghum		10.9				10.9
7	Sugarcane						3.0
	Horticulture crops - Fruits	Total area					
1	Mango	35.4					
2	Banana	2.3					
	Horticultural crops - Vegetables	Total area					
1	Tomato	3.7					
2	Cabbage	0.5					
3	Chillies	0.5					
4	Brinjal	0.3					

	Plantation crops	Total area
1	Coconut	14.5
2	Sugar cane	3.0
	Fodder crops	Total area
1	Cholam	2.2
2	Others	0.1
	Total fodder crop area	2.3
	Grazing land	8.1
	Sericulture etc	2.0
	Others (Specify)	-

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	59.1	299.5	358.6
	Crossbred cattle	13.6	136.6	150.2
	Non descriptive Buffaloes (local low yielding)	2.4	17.1	19.5
	Graded Buffaloes	0.1	1.7	1.9
	Goat	42.9	106.8	149.7
	Sheep	82.9	211.2	294.2
	Others (Camel, Pig, Yak etc.)			12.7
	Commercial dairy farms (Number)			-

1.9	Poultry	No. of farms	Total No. of birds ('000)
	Commercial		497.4
	Backyard		721.1

1.10 Fisheries						
A. Capture						
i. Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.,)
	7928	Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
			469		Total nets :5621	
ii. Inland (Data Source: Fisheries Department)	No. Farmers owned ponds		No. of Reservoirs		No. of village tanks	
	25		- 5 -		50	
B.Culture						
	Water Spread Area (ha)		Yield (t/ha0)		Production (*000 tons)	
i. Brackish water (Data Source: MPEDA/Fisheries Department)	-		-		-	
ii. Fresh water(Data Source:	2250.9		-		-	

	Fisheries Department)			
	Others			

1.11	Production and Productivity of major crops	Total	
		Production ('000 t)	Productivity (kg/ha)
1	Paddy	118.8	4264
2	Finger millet	125.8	2080
3	Horse gram	23.1	737
4	Little millet	23.1	1099
5	Ground nut	23.3	1751
6	Sorghum	21.2	1938

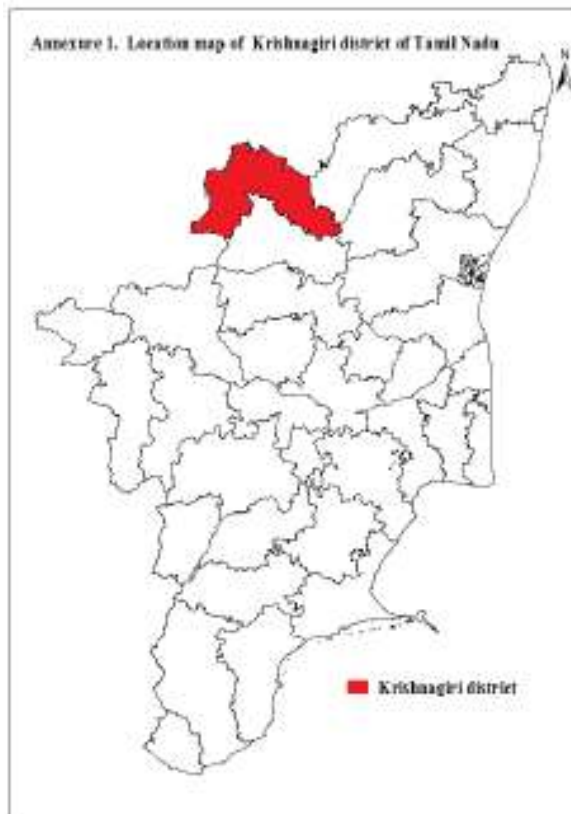
Major Horticultural crops			
1	Mango	172.0	4855
2	Tomato	48.3	13126
3	Cabbage	24.6	44926
4	Chillies	0.3	648
5	Brinjal	6.5	18202
6	Banana	10.7	49763

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Finger millet	Horse gram	Little millet	Ground nut
	Khariif- Rainfed	--	Jul- Aug	--	Jul- Aug	Jul- Aug
	Khariif-Irrigated	Jun – Jul (Early samba) Aug - Sep (Samba)	--	--	--	--
	Rabi- Rainfed	--	--	Sep- Oct	--	--
	Rabi-Irrigated	Nov - Dec	Nov - Dec	--	--	--

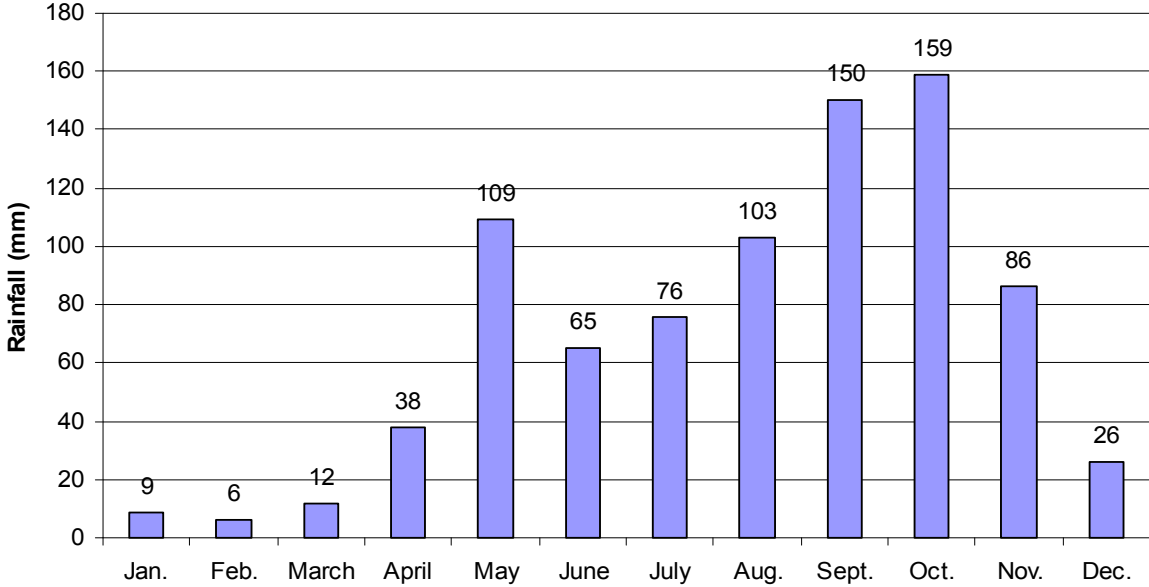
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	✓		
	Flood			✓
	High intense storms			
	Cyclone			✓
	Hail storm		✓	
	Heat wave			✓
	Cold wave			✓
	Frost			✓
	Sea water inundation			✓
	Pests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

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

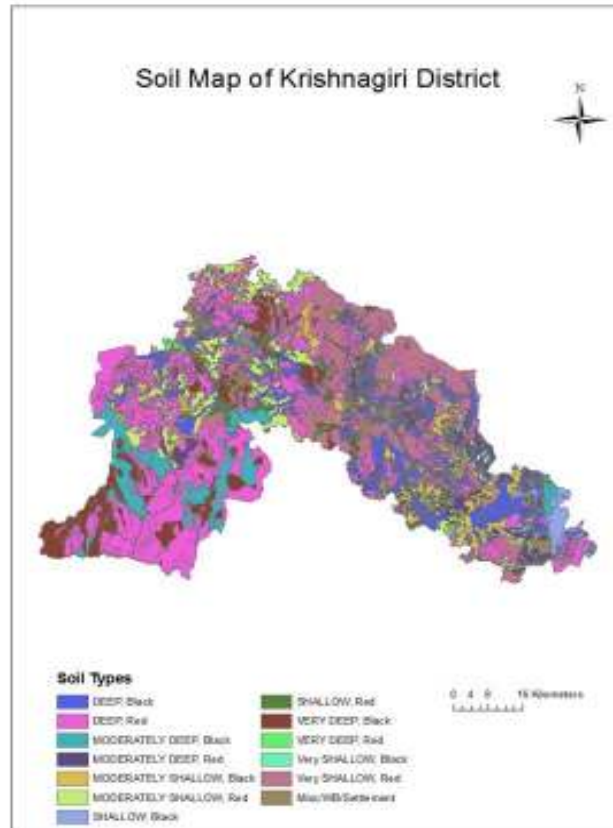
Annexure 1. Location map of Krishnagiri district and the blocks



Annexure 2. Mean annual rainfall of Krishnagiri district of Tamil Nadu



Annexure 3. Soil map of Krishnagiri district of Tamil nadu



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation (South West Monsoon)

Condition			Suggested Contingency measures		
Early season drought	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (July 4 th week)	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Sorghum + Red gram)	Change of ragi varieties from long duration (LD) to medium duration (MD). LD- Paiyur 1, GPU-28, L-5, MR-1, HR-911 MD- Paiyur 1	Raising community nursery and transplanting. Seed hardening with KH ₂ PO ₄ (2%)	
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horse gram	Varieties- Paiyur 2, Co-2 and Co-3	Seed hardening & P ₂ O ₅ enriched FYM	
Delay by 4 weeks (Aug 2 nd week)	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Sorghum + Red gram)	Change long duration varieties to short duration Indaf 9, Co-7	Seed hardening Application of Azospirillum Soil mulching with blade harrow Spray ethrel 200 ppm at 45 and 65 DAS to induce early maturity	ICDP, SVP, ATMA

Condition			Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought	Major Farming situation	Normal Crop/cropping system			
	Shallow marginal and sub marginal red non calcareous soils	Samai - Horsegram	Varieties- Paiyur 2, Co-2 and Co-3	Application of FYM Seed hardening	ICDP, SVP, ATMA
Delay by 6 weeks (Aug 4 th week)	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Redgram + Sorghum)	Change from millets to pulses (cowpea) or fodder Sorghum	Application of tank silt 80-100 t/ha as a long term measure in these soils Split application of fertilizers	-
	Shallow marginal and sub marginal red non calcareous soils	Samai Horsegram	SD-Cowpea = CoCP 6, 7 P-152 Sorghum – Co4, Paiyur 2	Seed treatment with azophos.	
Delay by 8 weeks (Sep 2 nd week)	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Red gram + Sorghum)	Skipping of I st kharif crop and raising of II nd rabi crop Horsegram	<i>Insitu</i> soil moisture conservation for rabi crop	-
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horsegram	Skipping of kharif crop and raising rabi crop Horsegram		

Rainfed situation (North East Monsoon)

Condition			Suggested Contingency measures		
Early season drought	Major Farming situation	Rabi season Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (Nov 1 st week)	Shallow marginal and sub marginal red non calcareous soils	Horse gram	No change	No change	-
Delay by 4 weeks (Nov 3 rd week)			Re sowing of Horse gram	Water conservation and management techniques	
Delay by 6 weeks (Dec 1st week)			Fodder sorghum	-	
Delay by 8 weeks (Dec 3rd week)			Fallow		

Condition			Suggested Contingency measures		
Early season	Major Farming situation	Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation

drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination / crop stand etc.)	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Red gram +Sorghum)	If very poor germination resowing may be adopted. Life saving irrigation if available can be given Foliar application of nutrients can be adopted.	Application of tank silt 80-100 t/ha as a medium term measure Application of P ₂ O ₅ enriched FYM	-
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horsegram			
Mid season drought (long dry spell) at vegetative stage	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Red gram + Sorghum)	Spraying of KCl (1%) to alleviate stress Foliar application of nutrients Reduce plant population & use biomass as mulch Spray of ethrel (200 ppm) for early maturity	In-situ soil moisture conservation techniques Soil mulching Application of azospirillum & phosphobacteria	
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horsegram			

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation
At reproductive stage	Red non calcareous soils with rolling topography	Ragi – (Lab Lab+ Red gram + Sorghum)	Foliar application 2% Urea Water conservation and	-	-

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Rabi crop planning	Remarks on Implementation
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horsegram	management practices		
Terminal drought	Red non calcareous soils with rolling topography	Ragi – (lab lab+ red gram + sorghum)	Early harvest at physiological maturity Conserving moisture for rabi crops	Sowing of rabi crop - Horsegram	
	Shallow marginal and sub marginal red non calcareous soils	Samai – Horsegram			

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Wetland paddy canal irrigated	Rice – Rice	Change of varieties from Medium duration (MD) to Short duration (SD) MD – Paiyur 1, W.Ponni, BPT5204 SD – IR42, 64, ADT 39	Practicing of SRI techniques. In case of transplanting use aged seedling of 45-60DAS, closer spacing & more seedlings / hill Nipping of tips of over grown seedlings Basal 25% of N extra to be applied	IAMWARM, ICDP, NADP, ATMA

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Wetland Paddy canal irrigated	Rice – Rice	Change from Rice (I season) to Ragi / Green manure / vegetables and raising Rice in second season (Nov – Dec)	-	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Wetland paddy tank irrigated	Rice – Ragi	Change of varieties from Medium duration to short duration SD-IR42, 64, ADT-39	SRI techniques Adopt Drum seeding in canal irrigated situation Practicing of SRI techniques. In case of transplanting use aged seedling of 45-60DAS, closer spacing & more seedlings / hill Nipping of tips of over grown seedlings Basal 25% of N extra to be applied	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Garden land paddy – well irrigated	Rice – Ragi / Vegetables	Change from MD to SD varieties transplanting 45-60 day old seedlings SD-IR 42,64,ADT-39		-

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Any other condition (specify)	-	-	-	-	-

2.2 Unusual rains (untimely, unseasonal etc) -NA

2.3 Floods : - NA

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

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1. Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			

<p>Feed and fodder availability</p>	<p>Sowing of cereals (Sorghum) and leguminous crops (Lucerne, Horsegram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Fodder production with Sorghum – stylo- Sorghum on rotation basis.</p> <p>Harvesting of crop residues especially Paddy, Groundnut and sugarcane tops and hay making during the months of January and February for use in summer months/drought season.</p> <p>Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February</p> <p>Create awareness on establishment of pasture with drought resistant fodder Varieties like Guinea grass, stylo, kolukkattai grass, Acacia trees, etc.</p> <p>Creation of tree fodder models with Subabul, Glyricidia, Agathi, etc for tree fodder production during summer.</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp.</p> <p>Keeping sufficient stock of mineral mixture.</p> <p>Popularization of the use of chaff cutters to avoid fodder wastage.</p> <p>Educate the farmers about the proper method of hay making in order to avoid spoilage.</p> <p>Conservation of crop residues for summer feeding.</p> <p>Promote Azola cultivation at backyard</p> <p>Capacity building and preparedness of the stakeholders and official staff for the unexpected events</p>	<p>Harvest and use biomass of dried up crops (Sorghum/groundnut/paddy/maize/ Blackgram) material as fodder</p> <p>Chaffing of green and dry fodder to avoid wastage</p> <p>Use of unconventional and locally available cheap feed ingredients for feeding of livestock.</p> <p>Enrichment of dry fodder with urea, Salt and molasses.</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Transport of dry fodder bales from the fodder grid at DLF, Hosur to the drought affected villages</p> <p>Advising the farmers to feed balanced ration during summer months.</p> <p>Feeding of chaffed and salt sprinkled crop residues.</p> <p>Supplementation of tree fodder with the available grass fodder.</p> <p>Feeding livestock with locally available cheaper brewery waste.</p> <p>Using of ensiled grasses and sugarcane tops during the drought period.</p> <p>Promotion of cultivation of Horse gram as contingent crop and harvesting it at vegetative phase as fodder</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals during severe drought</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive & breeding stock) during severe drought</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands & supporting them with assisting infrastructures like seeds, money manure.</p> <p>Supply of quality seeds of COFS 29, Stylo and fodder slips of Co3, Co4, guinea grass well before monsoon</p> <p>The technique of over – seeding the dryland sorghum on cultivation with Stylosanthes hamata be popularized</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>
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<p>Drinking water</p>	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
<p>Health and disease management</p>	<p>March: Anthrax– Thally block</p> <p>April FMD – Hosur</p> <p>May FMD- Kelamangalam, Hosur Anthrax- Uthangarai</p> <p>June FMD- Kelamangalam Anthrax- Hosur, Uthangarai</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures.</p> <p>Procure and stock multivitamins & area specific</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

	mineral mixture		
Floods	NA		
Cyclone	NA		
Heat wave and cold wave	NA		

2.5.2. Poultry

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	NA		

Cyclone	NA
Heat wave and cold wave	NA

2.5.3 Fisheries - NA

State: TAMILNADU

Agriculture Contingency Plan for District: PUDUKKOTTAI

1.0 District Agriculture profile

1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And TamilNadu Uplands (8.3)		
	Agro-Climatic Region (Planning Commission)	Central plateau of Tamil Nadu (XI)		
	Agro Climatic Zone (NARP)	Cauvery Delta Zone (TN-4) and Southern Zone (TN-5)		
	List all the districts or part thereof falling under the NARP Zone	Ramanathapuram, Tirunelveli, Dindugal, Natham, Melur, Thirumangalam, Madurai, South and North of Madurai district, Pudukkottai district excluding Aranthangi taluk		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		10 ^o 23' N	78 ^o 50' E	100 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	National Pulses Research Centre, Vamban		
	Mention the KVK located in the district	KVK, Vamban, Vamban Colony, Pudukkottai- 622 303.		
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	351.9	2 nd week of June	1 st week of October
	NE Monsoon(Oct-Dec):	394.1	3 rd week of October	2 nd week of December
	Winter (Jan- Feb)	52.2	-	-
	Summer (Mar-May)	124.6	-	-
	Annual	922.8	-	-

1.3	Land use pattern of the	Geographical area ('000 ha)	Forest area	Land under non-	Permanent pastures	Cultivable wasteland	Land under Misc. tree	Barren and uncultivable	Current fallows	Other fallows
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	district (latest statistics)			agricultural use			crops and groves	land		
	Area ('000ha)	466.3	23.5	129.8	5.1	10.2	28.4	9.9	16.3	91.4

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Black Soils	205.1	44
	Deep Red Soils	139.9	30
	Red Sandy Soils	121.2	26
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	156.3	101.4
	Area sown more than once	2.2	
	Gross cropped area	158.5	

Area under major field crops & horticulture etc.

1.6	Irrigation	Area ('000 ha)	Percent (%)
	Net irrigated area	107.5	65.1
	Gross irrigated area	109.4	69.9
	Rainfed area	48.8	34.9
	Sources of Irrigation	Number	Area ('000 ha) % area
	Canals	28	8.7 8.3
	Ponds/Tanks	5451	65.7 62.7

Open wells	164		
Tube wells/ Bore wells	11755	22.8	21.7
Supplemental Irrigation wells	2436		
Total	19834	104.9	100.0
Pump sets	3141		
Other Sources	4235		
Groundwater availability and use	No of blocks	% area	Quality of water
Over exploited	-		83% good 7% medium saline 5% saline 3% medium alkaline 2% highly alkaline
Critical	-		
Semi- critical	1	7.7	
Safe	12	92.3	
Wastewater availability and use	Data not available		

1.7		Major Field Crops cultivated	Area ('000 ha)						
			<i>Kharif</i>		<i>Rabi</i>		Summer	Total	
			<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		<i>Irrigated</i>	<i>Rainfed</i>
1	Paddy		0.5	0.001	85.7	9.7	0.03	86.6	9.76
2	Blackgram		0.1	0.3	0.18	0.002	-	0.03	0.03
3	Groundnut		3.4	12.9	1.91	1.06	-	5.36	13.9
4	Maize		3.2	0.006	0.01	0.06	-	3.43	0.006
5	Sugarcane		2.5	-	4.73(Ratoon)	-	-	7.29	
	Others								
	Horticulture crops - Fruits		Total area						
1	Banana		3.6						

	2	Mango	2.2
	3	Guava	0.1
	4	Jack	0.1
	5	Sappota	0.05
		Horticultural crops - Vegetables	Total area
	1	Vegetable	218.1
	2	Flowers	241.1

		Medicinal and Aromatic crops	Total area
	1	Chillies	621
	2	Coriander	68
	3	Turmeric	14
	4	Jasmine	208
		Plantation crops	Total area
	1	Coconut	6916.1
	2	Cocoa	190
		Fodder crops	Total area
	1	Cholam	8.14
	2	Suba grass	0.03
	3	Feeder grass	0.1
		Total fodder crop area	8.3
		Grazing land	4269.9
		Sericulture etc	-
		Others (Specify) Cashew	8434.8

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)			
	Non descriptive Cattle (local low yielding)	166.4	256.0	422.5			
	Crossbred cattle	66.9	192.6	259.6			
	Non descriptive Buffaloes (local low yielding)			83.9			
	Graded Buffaloes						
	Goat			498.9			
	Sheep			794.5			
	Others (Camel, Pig, Yak etc.)			2.8			
Commercial dairy farms (Number)			50				
1.9	Poultry	No. of farms	Total No. of birds (number)				
	Commercial	10	15,000				
	Backyard		4,72,311				
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)	
		51621					
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		321		----		5457	
B. Culture							
		Water Spread Area (ha)		Yield (t/ha)		Production (tons)	

i) Brackish water (Data Source: MPEDA/ Fisheries Department)	169	1	169
ii) Fresh water (Data Source: Fisheries Department)	280	2	560
Others			

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production (tonnes)	Productivity (kg/ha)
1	Paddy	-	-	-	-	-	-	270295	3051
2	Black gram	-	-	-	-	-	-	12829	970
3	Ground nut	-	-	-	-	-	-	23889	1693
4	Maize	-	-	-	-	-	-	60575	6837
5	Sugarcane	-	-	-	-	-	-	668855	125000
	Major Horticultural crops								
1	Banana	-	-	-	-	-	-	52590	30000
2	Mango	-	-	-	-	-	-	45040	20000
3	Guava	-	-	-	-	-	-	4662	18000
4	Jackfruit	-	-	-	-	-	-	1750	25000
5	Sappota	-	-	-	-	-	-	2540	20000

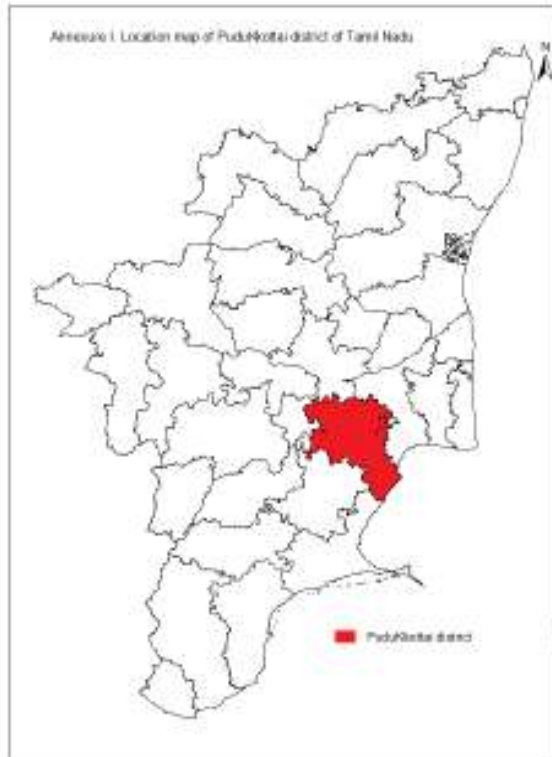
1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Blackgram	Ground nut	Maize	Sugarcane
	Kharif-Irrigated	1 st week of June – 4 th week of July	1 st week to 4 th week of July	1 st week of June – 4 th week of July	1 st week of February – 4 th week of March	1 st week of December to 4 th week of April

	Kharij- Rainfed	1 st week of August – 4 th week of September	1 st week to 4 th week of August	1 st week of August. - 4 th week of October	-	-
	Rabi-Irrigated	1 st to 4 th week of week of November.	1 st week of February.- 4 th week of March	1 st to 4 th week of April	-	-
	Rabi- Rainfed	1 st week of December- 4 th week of January	1 st week to 4 th week of January	1 st week of December- 4 th week of January	1 st to 4 th week of September	-

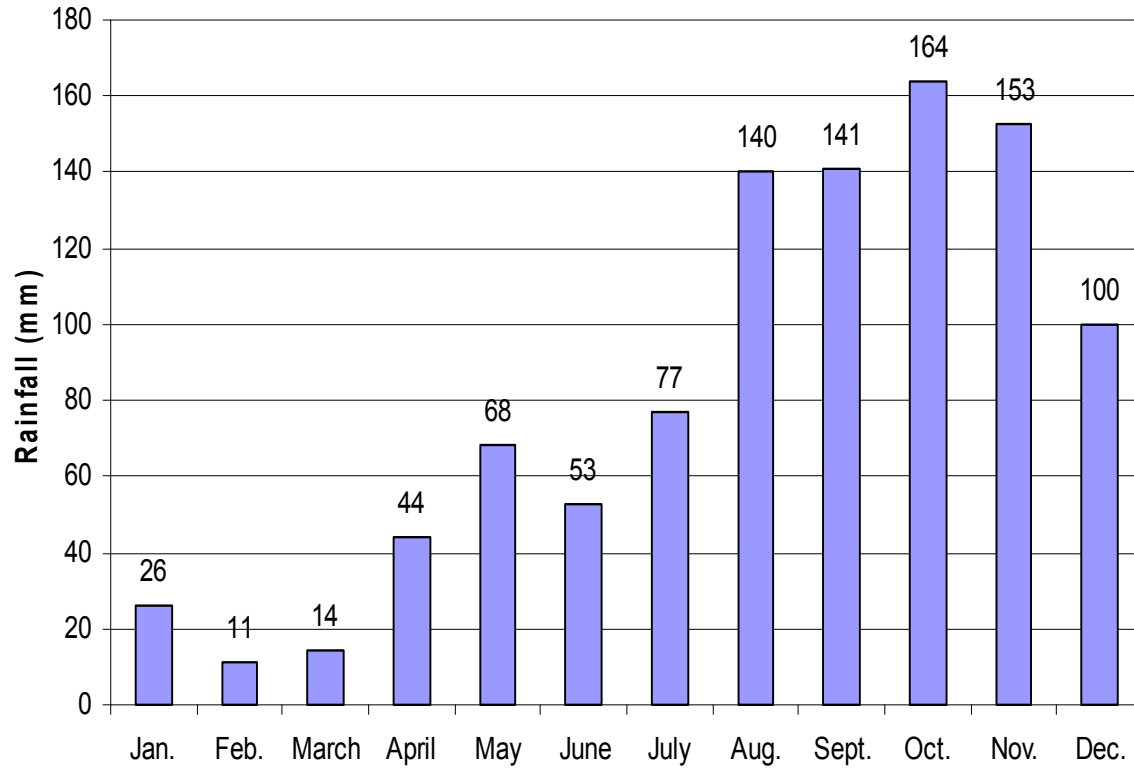
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	High intense storms	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water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

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

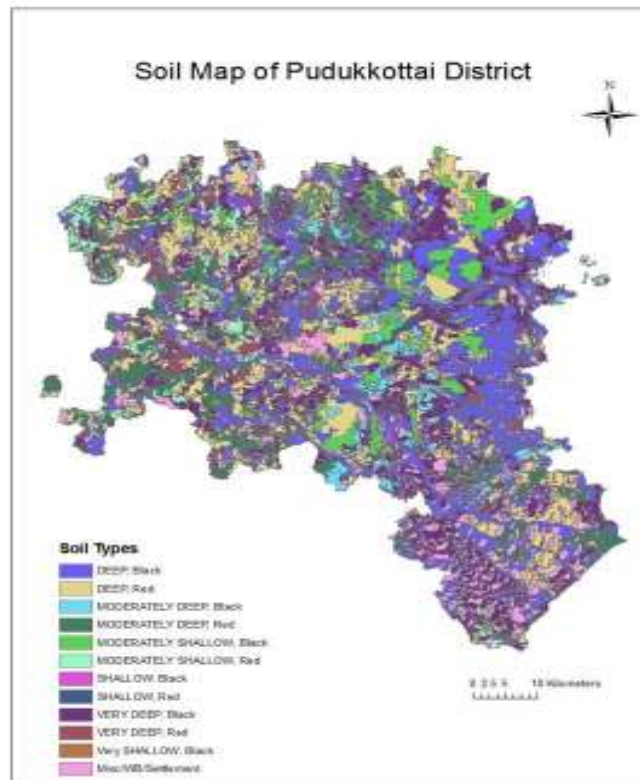
Annexure 1. Location map of Pudukkottai district and the blocks



**Annexure 2. Mean annual rainfall of Pudukkottai district
of Tamil Nadu**



Annexure 3. Soil map of Pudukkottai district of Tamil Nadu



Source: NBSS & LUP

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed by 2 weeks (July II Fort Night)	Black soil, Red Sandy soil		No Change	No Change	No Change
	Laterite and red soils	Groundnut + Redgram (5 : 1)	Groundnut (VRI 2, TMV 7)	*Enriched FYM. * Sowing behind country plough * Tractor drawn seed drill to be provided to cover large area in a short period	(ISOPOM oilseeds) * Distribution of certified seeds * Gypsum @ 50% cost. * Seed village * Seed drills
Delayed by 4 weeks (2 nd week of July)	Laterite and red soils	Groundnut + Cowpea	Groundnut (VRI 2, TMV 7) Cowpea CoCP 7	* Intercropping with CoCP 7 and Mixed sowing of Bajra - to control Leaf minor *Border cropping of Castor TMV-5	
Delayed by 6 weeks (4 th week of July)	Laterite and red soils	* Maize (Rainfed) * Castor as pure crop	*Introduction of maize *High yielding castor	* Tractor drawn seed drill * Seed priming	

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
Delayed by 8 weeks (2 nd week of August)		Fallow	Minor millets such as varagu, cowpea	* Potash application using high yielding cowpea CoCp-6	* Seeds subsidy under ICDP * Seed distribution through NADP – Pulses subsidy scheme
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^d	Remarks on Implementation^e
	Red Sandy Soils	Pigeonpea + Maize	Using polybag nursery techniques for Pigeonpea	-	-
	Laterite and red soils	Groundnut + Redgram	Does not affect the crop growth and yield.	Weeding thereby disturbs top soil which act as cushion for sub soil moisture from sunlight	* Gardenland weeder – star type to meet out labour shortage and to cover larger area in quick time

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 sandy soils	Pigeonpea + Maize	Applying planofix to avoid flower droppings 2% KCl spray	Mulching with organic amendments	-
	Laterite and red soils	Groundnut + Redgram	water spray twice in a week to meet out the transpiration loss	Broad bed deep furrow system – at the time of sowing.	* As soon as rainfall received, Gypsum distribution at 50%

Condition			Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system			subsidy * 2% DAP spray
At Reproductive stage	Laterite and red soils	Groundnut + Redgram	Topping in Redgram Irrigation through Mobile sprinkler from nearby water resources	-	ISOPOM scheme
Terminal drought				Short duration Castor as relay crop	ISOPOM scheme (Oilseeds)

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Black soil, Red Sandy soil	Rice-Rice-Pulse Rice-Rice-Maize Rice-Rice-Gingelly Rice-Cotton	Direct sown short duration rice (September-December) Groundnut, Gingelly (December-March), Maize-ragi	*Wider Spacing (SRI cultivation of Rice). *Line sowing of Pulses/Maize. *DAP spray for Pulses	-
Non release of water in canals	Black soil, Red Sandy soil	Rice-Rice-Pulse Rice-Rice-Maize	Maize-ragi Clusterbean,	*Wider Spacing (SRI cultivation of Rice).	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
under delayed onset of monsoon in catchment		Rice-Rice-Gingelly Rice-Cotton	Fodder maize/fodder cowpea	*Line sowing of Pulses/Maize. *DAP spray for Pulses	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon		Paddy	Maize can be introduced	High yielding maize hybrids with drainage channels	ISOPOM
Insufficient groundwater recharge due to low rainfall	Tube well irrigation	Paddy	Aerobic Rice, Maize and vegetables (Tomato, Chilli and Brinjal) Direct sown rice	Limited irrigation Alternate Furrow irrigation Drip irrigation	NFSM (Paddy and Pulses)
	Red soil s				

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Paddy	Provide drainage	Provide drainage	Provide drainage	tarpaulin
Black gram	-do-	-do-	-do-	-do-
Ground nut				
Maize				
Sugarcane				
Horticulture				
Banana				
Mango				

Guava				
Jack				
Sapota				
Heavy rainfall with high speed winds in a short span				
Outbreak of pests and diseases due to unseasonal rains				
	Need based plant protection IPDM for pluses	Need based plant protection IPDM for pluses in		Safe storage against storage pest and diseases

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Paddy	SRI nursery / raised bed nursery	Drainage	Foliar application of N & K	Drainage Harvest at physiological maturity Salt solution spray to block the germination of grains
Horticulture				
Continuous submergence for more than 2 days				
Paddy	Wet seeding using Drum Seeder	Not affected	* Drain the excess water * Foliar application of N & K	Provision of Tarpaulin to save the leftout grains and thrashing floors

Horticulture				
Sea water inundation	-NA-			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	NA			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<ol style="list-style-type: none"> 1. Popularization of the use of chaff cutters. 2. Ensiling and enrichment of fodder grasses and sugarcane tops. 3. Fodder production with Sorghum – stylo- Sorghum on rotation basis. 4. Keeping sufficient stock of mineral mixture. 5. Curbing the sale of crop residues from the district. 6. Conservation of green and dry fodder through chaffing. 7. Creation of tree fodder models with Subabul, Glyricidia, Agathi, Prosopis etc. 8. Creation of fodder models for draught with Guinea grass, stylo, desmanthus, kolukkattai grass etc. 	<ol style="list-style-type: none"> 1. Use of unconventional and locally available cheap feed ingredients for feeding livestock. 2. Advising the farmers to feed Concentrates during cooler parts of the day. 3. Advising farmers not to allow the animals for grazing during hotter parts of the day. 4. Supplementation with tree fodder. 5. Continuous supplementation of Minerals to prevent infertility. 6. Sprinkling of water on the body to reduce the heat load. 7. Enrichment of dry fodder with urea and molasses. 8. Feeding of ensiled sugarcane tops @ not more than 10kg per cow per day 9. Feeding brewery waste wherever 	<ol style="list-style-type: none"> 1. Supply of quality seeds of COFS 29, Stylo and fodder slips of Co3, Co4, guinea grass well before monsoon and motivating the farmers to cultivate 20% of their land holding. 2. Motivating farmers to produce fodder seeds and slips. 3. Use of salt licks for goats, calves etc. 4. Storing crop residues after sprinkling 2% sodium chloride solution. 5. Mineral supplementation for heifers and cows. 6. Feeding ad libitum green fodder including legumes.

		available.	
Drinking water	Formation of community water tanks in grazing areas and in veterinary institutions.	<ol style="list-style-type: none"> 1. Treatment of Water with Sanitizers. 2. Daily filling of community water tank to avoid microbial load. 3. Provision of look warm water to the young animals. 	Provision of wholesome water to all animals irrespective of age
Health and disease management	<p>Precaution notice and vaccination during November</p> <p>February:</p> <ol style="list-style-type: none"> 1. Sheep pox – Kundrandarkovil block 2. FMD <ul style="list-style-type: none"> June – Annavasal block Aug&Dec – Karambakkudi block Sep&Oct – Aranthangi block Nov – Thiruvarankulam block 3. Blue tongue <ul style="list-style-type: none"> Dec – Viralimalai block 4. B.Q <ul style="list-style-type: none"> Nov. – Karambakkudi block 	<ol style="list-style-type: none"> 1. Visiting the diseases outbreak areas 2. Gathering information about mortality pattern 3. Reporting the outbreak to local veterinarian. 4. Ensuring proper disposal of the carcasses 5. Isolation and treatment of affected animals. 6. Deployment of vaccination squad for performing ring vaccination (8 k.m. radius) if necessary. 7. Preparation of disease investigation report and sending collected specimens to CRL and CUL for further diagnosis. 	<ol style="list-style-type: none"> 1. Sending disease outbreak annual and completion report. 2. Keeping vigil on the disease outbreak. <p>General:</p> <ol style="list-style-type: none"> 1. Nutritional supplementation 2. Breeding management
Floods			
Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone			
Feed and fodder availability	1. Provision of temporary shelter to all livestock		<ol style="list-style-type: none"> 1. Cultivating fodder crops in wet lands. 2. Feeding unchaffed crop residues to the young

	2. Conservation of crop residues from wetting during rains. Supplementation of concentrates		pasture grazing cows.
Drinking water			
Health and disease management	February: 1. Sheep pox – Kundrandarkovil block 2. FMD June – Annavasal block Aug&Dec – Karambakkudi block Sep&Oct – Aranthangi block Nov – Thiruvrankulam block 3. Blue tongue Dec – Viralimalai block 4. B.Q Nov. – Karambakkudi block	1. Visiting the diseases outbreak areas 2. Gathering information about mortality pattern 3. Reporting the outbreak to local veterinarian. 4. Ensuring proper disposal of the carcasses 5. Isolation and treatment of affected animals. 6. Deployment of vaccination squad for performing ring vaccination (8 k.m. radius) if necessary. 7. Preparation of disease investigation report and sending collected specimens to CRL and CUL for further diagnosis.	1. Sending disease outbreak annual and completion report. 2. Keeping vigil on the disease outbreak. General: 1. Nutritional supplementation 2. Breeding management
Heat wave and cold wave			
Shelter/environment management	..	1. Splashing of water over the animals body 2. Provision of wallowing for buffaloes and pigs 3. False ceiling under roof 4. Providing concentrates to the animals during cooler parts of the day.	..
Health and disease management	February: 1. Sheep pox – Kundrandarkovil block 2. FMD June – Annavasal block	1. Visiting the diseases outbreak areas 2. Gathering information about mortality pattern 3. Reporting the outbreak to local	1. Sending disease outbreak annual and completion report. 2. Keeping vigil on the disease outbreak.

	<p>Aug&Dec – Karambakkudi block Sep&Oct – Aranthangi block Nov – Thiruvankulam block</p> <p>3. Blue tongue Dec – Viralmalai block</p> <p>4. B.Q Nov. – Karambakkudi block</p>	<p>veterinarian.</p> <p>4. Ensuring proper disposal of the carcasses</p> <p>5. Isolation and treatment of affected animals.</p> <p>6. Deployment of vaccination squad for performing ring vaccination (8 k.m. radius) if necessary.</p> <p>7. Preparation of disease investigation report and sending collected specimens to CRL and CUL for further diagnosis.</p>	<p>General:</p> <p>1. Nutritional supplementation</p> <p>2. Breeding management</p>
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2.5.2 Poultry

Drought	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Shortage of feed ingredients	Procurement and storage of feed ingredients	Nutritional supplementation of poultry	Nutritional supplementation of poultry	-
Drinking water	Ensuring ample supply of potable water to poultry	<ol style="list-style-type: none"> 1. Supply of cool potable water to poultry. 2. Water sanitation. 3. Filling overhead tanks with water in the afternoons. 4. Providing B-Complex and Vitamin C in water. 		
Health and disease management	<ol style="list-style-type: none"> 1. Vaccination against Ranikhet disease and IBD. 2. Deworming of poultry. 3. Provision of foggers and sprinklers to 	<ol style="list-style-type: none"> 1. Feeding during early mornings and in the evenings. 2. Maintenance of correct stocking ratio 3. Prevention and control of Coccidiosis in poultry. 	<ol style="list-style-type: none"> 1. Nutritional supplementation of poultry. 2. Preparation of road map for increasing the feed ingredients production. 3. Ensuring enough stock of 	<p>TANUVAS Agro Meteorological Advisory Centre, Namakkal.</p> <p>Linked to the regular vaccination programmes of the Department</p>

	<p>reduce heat load.</p> <p>4. Supplementation of vitamins and minerals.</p> <p>5. Planning to avoid laying period from 15th April to 15th June.</p> <p>6. Avoiding purchase of chicks between October to January.</p>	<p>4. Summer management of poultry- use of foggers and sprinklers</p> <p>5. Continuous supply of cool potable water.</p> <p>6. Supplementation of vitamins and minerals.</p> <p>7. Feeding during cooler parts of the day.</p> <p>8. Avoiding vaccination and debeaking.</p> <p>9. Reducing the energy density of ration and increasing the lysine, methionine and Vitamin C in the ration.</p> <p>10. Mobilizing the feed ingredients from adjacent districts.</p> <p>Disease Outbreak:</p> <p>1. Visiting poultry farm to investigate the diseases</p> <p>2. Collection of sample and despatch to CUL for further diagnosis</p> <p>3. Isolation and treatment affected flock.</p> <p>4. Proper disposal of dead birds.</p>	<p>ingredients in the future.</p> <p>Disease Outbreak:</p> <p>1. No poultry should be introduced in the area for next 3 months.</p> <p>2. Compensation for forceful culling.</p> <p>3. Sending the disease outbreak annual and completion report.</p>	<p>of Animal Husbandry.</p>
Floods				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Cyclone				

Shortage of feed ingredients	1. Forecasting the forthcoming cyclone and informing the farmers to keep the required feed as stock to meet during the event.	1. Providing sanitized water	1. Providing sanitized water	
Drinking water	1. Forecasting the forthcoming cyclone and informing the farmers to provide warm potable water to the birds.	1. Providing sanitized water	1. Providing sanitized water	
Health and disease management	<ol style="list-style-type: none"> 1. Vaccination against Ranikhet disease and IBD 2. Deworming of poultry 3. Supplementation of vitamins and minerals. 	<p>Disease Outbreak:</p> <ol style="list-style-type: none"> 1. Visiting poultry farm to investigate the diseases 2. Collection of sample and despatch to CUL for further diagnosis 3. Isolation and treatment affected flock. 4. Proper disposal of dead birds. 	<p>Disease Outbreak:</p> <ol style="list-style-type: none"> 1. No poultry should be introduced in the area for next 3 months. 2. Compensation for forceful culling. 3. Sending the disease outbreak annual and completion report. 	<p>TANUVAS Agro Meteorological Advisory Centre, Namkal.</p> <p>Linked to the regular vaccination programmes of the Department of Animal Husbandry.</p>
Heat wave and cold wave				
Shelter/environment management	...	<ol style="list-style-type: none"> 1. Provision of foggers and sprinklers 2. Reducing the energy density of ration and increasing the lysine, methionine and Vitamin C in the ration. 3. Avoiding potassium chloride and sodium bicarbonate at the required level
Health and disease management		Avoiding the outbreak of RD, Fly control measures to avoid drop in egg production		

2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture	NA		
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Safe disposal of the stock	Emergency harvest/Water supply from other sources (bore well)	Pond drying till bottom cracking
(ii) Impact of salt load build up in ponds / change in water quality	Increase in salinity		Reclamation of soil
2) Floods			
A. Capture			
Marine	Prevention of fishing	Safely return back to the shore/Staying in cyclone shelter	Return to fishing
Inland			
(i) Average compensation paid due to loss of human life	NA		
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Raising the bunds	Damage and loss	Strengthening the bunds

(ii) Water continuation and changes in water quality	Emergency harvest		Water quality testing and corrective measures
(iii) Health and diseases	Emergency harvest		Preparation of pond following sanitation measures
(iv) Loss of stock and inputs (feed, chemicals etc)	Disposal of the stock to a safe place		Proper storage construction to keep the stock and inputs
(v) Infrastructure damage (pumps, aerators, huts etc)	Safe removal of valuables to other place		Replacement/repairing the infrastructure
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine	Prevention of fishing	Safely return back to the shore/Staying in cyclone shelter	Rehabilitation of affected area

State: TAMIL NADU

Agriculture Contingency Plan of District: THANJAVUR

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And TamilNadu Uplands And D (8.3)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains And Hills Region (XI)		
	Agro Climatic Zone (NARP)	Cauvery Delta Zone (TN-4)		
	List all the districts or part thereof falling under the NARP Zone	Thanjavur, Thiruvarur, Nagapattinam, Trichy, Ariyalur, Cuddalore and Pudukottai		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		10° 08'	78° 48'	59 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Soil and Water Management Research Institute, Kattuthottam, Thanjavur, Tamil Nadu. PIN: 613 501 Tamil Nadu Rice Research Institute, Aduthurai, Thanjavur, Tamil Nadu. PIN: 612 101		
Mention the KVK located in the district	Bhaktavasalam Memorial Trust KVK, Maniyeripatti (PO), Sengipatti (Via), Thanjavur District			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	329	2 nd week of June	4 th week of September
	NE Monsoon(Oct-Dec):	462	3 rd week of October	4 th week of December
	Winter (Jan- March)	61		
	Summer (Apr-May)	87		
	Annual	938		

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)	339.7	3.4	81.5	1.2	13.2	4.7	2.1	10.1	28.1

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Very Deep Red Soils	124.5	36.7
	Deep B Soils		
	Moderately Deep Black Soils	39.1	11.5
	Moderately Deep Red Soils	19.3	5.7
	Deep Red Soils	12.8	3.8
	Very Shallow Black Soils	12.9	3.8
	Shallow Back Soils	7.8	2.3
	Moderately Shallow B Soils		
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity (%)
	Net sown area	194.1	129.9
	Area sown more than once	58.0	
	Gross cropped area	252.1	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	166.9		
	Gross irrigated area	207.5		
	Rainfed area	27.2		
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals		129.8	77.3
	Tanks	428	0.3	0.1
	Open wells	2515	1.0	0.6
	Bore wells/Tube wells	8983	36.6	21.8
	Other sources			
	Total		167.6	100.0
	Pumpsets			
	Micro-irrigation			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	2	14.3	
	Critical	2	14.3	
	Semi- critical	5	35.7	
	Safe	5	35.7	
	Wastewater availability and use			
over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)*					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
1	Rice	209.	-	126.2	-	3.0	150.2
2	Pulses	0.7	0.8	6.2	32.4	-	40.2
3	Groundnut	2.9	1.3	7.6	4.0		15.9
4	Gingelly	0.2	0.2	1.7	10.6		12.8
5	Sugarcane	8.5	-	6.9	-	-	15.5
	Horticulture crops - Fruits	Total area					
1	Banana	4.200					
	Horticultural crops - Vegetables	Total area					
1	Brinjal	0.166					
	Plantation crops	Total area					
1	Coconut	30.3					
	Fodder crops	Total area					
1	Total fodder crop area	NA					
	Grazing land						
	Sericulture etc						
	Others (Specify)						

1.8	Livestock *	Number ('000)					
		Male ('000)	Female ('000)	Total ('000)			
	Cattle	174.4	272.3	446.7			
	Buffaloes total	-	-	28.1			
	Commercial dairy farms	-	-				
	Goat			432.0			
	Sheep			51.7			
	Others (Camel, Pig, Yak etc.)			4.78			
1.9	Poultry *						
	Commercial						
	Backyard						
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		31842					30
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		500		----		2340	
	B. Culture						
			Water Spread Area (ha)	Yield (t/ha)	Production (tons)		

i) Brackish water (Data Source: MPEDA/ Fisheries Department)	1199	1	1199
ii) Fresh water (Data Source: Fisheries Department)	400	2.7	591
Others			

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Rice	83.315	3252	400.30	3128	8.816	3342	492.429	3138
2	Pulses	-	-	-	-	-	-	5.645	-
3	Groundnut	-	-	-	-	-	-	18.347	1936
4	Sesame	-	-	-	-	-	-	2.939	421
5	Sugarcane	-	-	-	-	-	-	1713788 cane	107 (t/ha)

	Major Horticultural crops	-	-	-	-	-	-	Production ('000 t)	Productivity (kg/ha)
1	Banana	-	-	-	-	-	-	197.3	43682
2	Brinjal	-	-	-	-	-	-	1.9	10922
3	Coconut	-	-	-	-	-	-	4605 (lakh nuts)	15202 (nuts/ha)

1.12	Sowing window for 5 major crops (start & end of sowing period)	Crop 1: Rice	Crop 2: Black gram	Crop 3: Sesame	Crop 4: Groundnut	Crop 5: Maize
	Kharif- Rainfed	NA				
	Kharif-Irrigated	3 rd Week of May to	-	-	-	4 th week of May to

		1 st week of June				1 st week of June
	Rabi- Rainfed	NA				
	Rabi-Irrigated	3 rd Week of Oct to 1 st week of November	3 rd Week to 4 th week of January	3 rd Week to 4 th week of January	3 rd Week to 4 th week of January	-

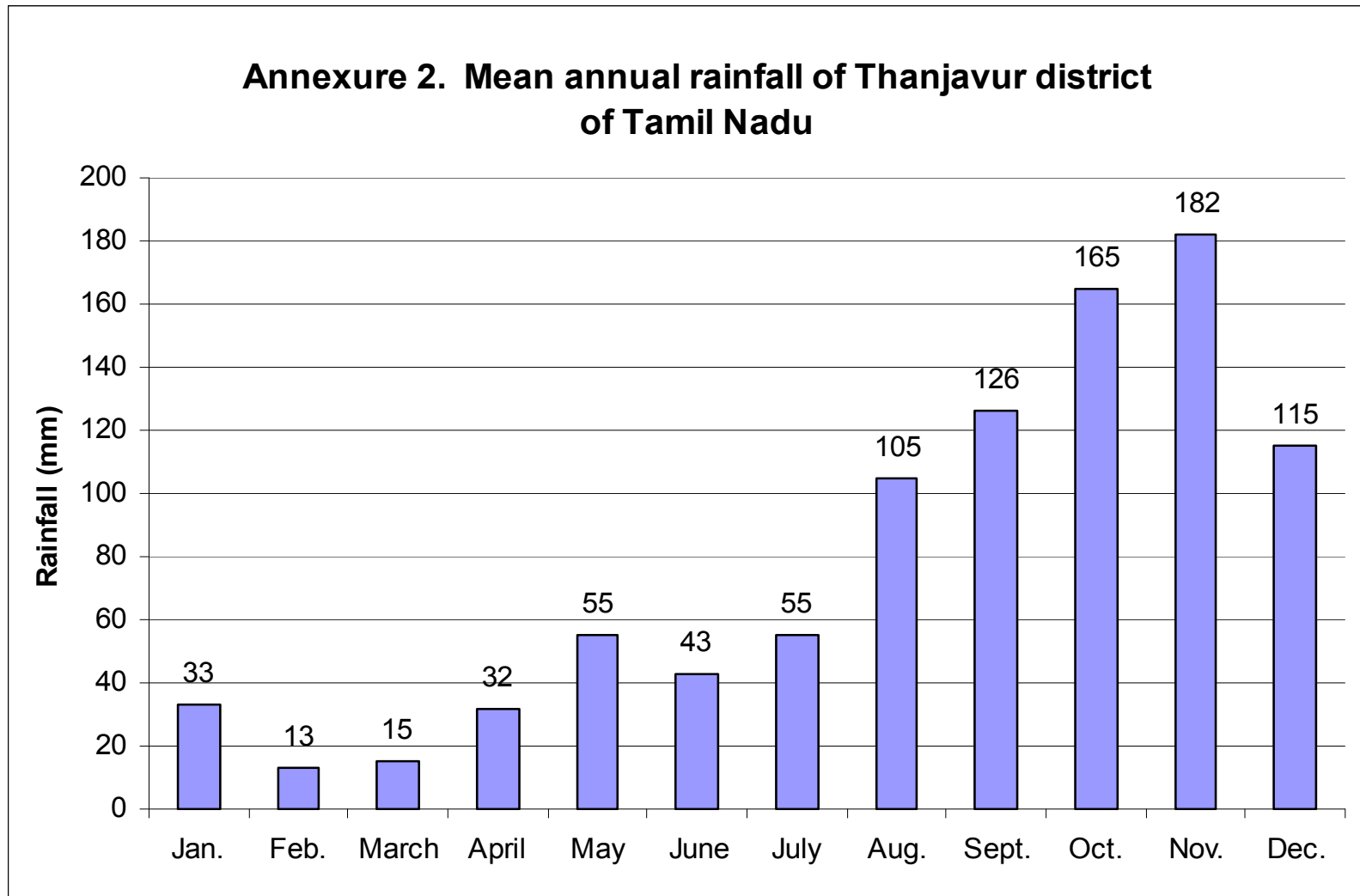
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought			
	Flood	✓	-	
	Cyclone		✓	
	Hail storm			✓
	Heat wave			-
	Cold wave			✓
	Sea water inundation			✓
	Pests and diseases (specify)	✓		-
	Rice	False smut disease (2009-10) Severe in CO 43 variety, Moderate in BPT variety		
	Pulses	Yellow Mosaic Virus in Black gram		

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

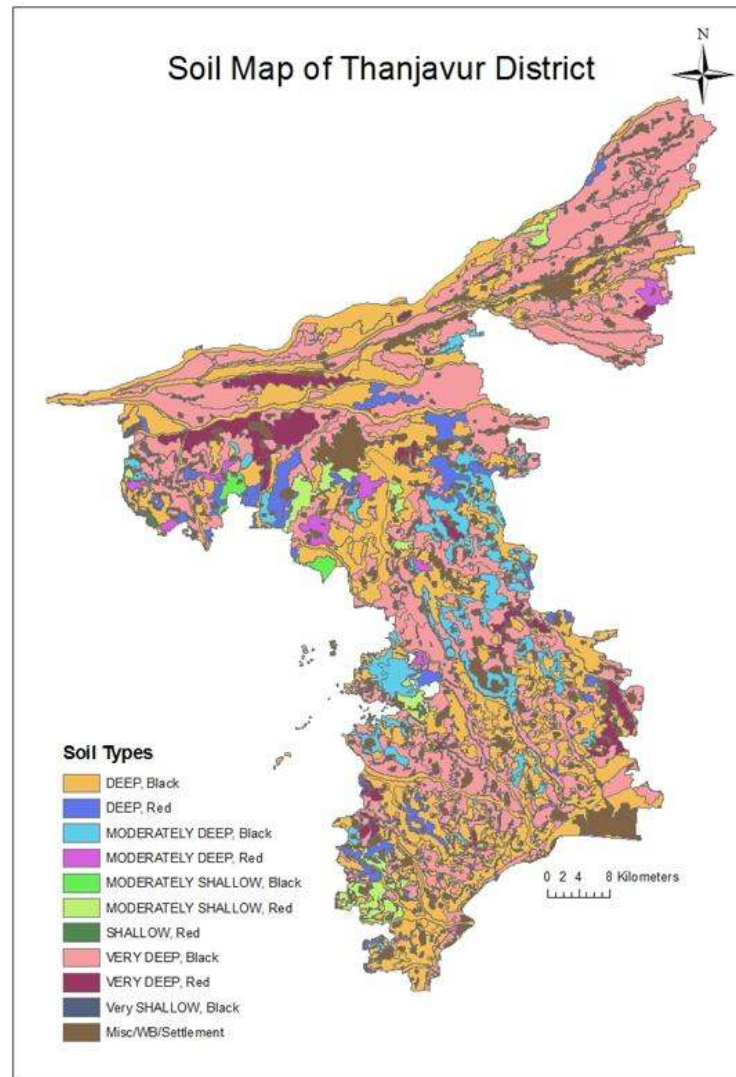
Annexure 1. Location map of Thanjavur district and the blocks



Annexure 2. Mean annual rainfall of Thanjavur district



ANNEXURE 3. SOIL MAP OF THANJAVUR DISTRICT



Source; NBSSLUP

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation – Not applicable for Thanjavur district as it is predominant irrigated area

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 , 4, 6 and 8 weeks			NA		

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	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
			NA		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At vegetative stage			NA		
At reproductive stage					

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
			NA		

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop /cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Old delta Rice based farming system clay soil	Rice (Jun-Sep)- Rice (Oct-Jan)- Pulses/gingerly (Feb-May)	Maize/Vegetables/Gingerly/Green manure crops (Jun-Sep)-Rice (Oct-Feb)-Pulses/ Sunflower/ Cotton (Feb-May)	Rice: Raise community nursery, use Short duration varieties, (ADT 36, 37, 43, ADT (R) 48) Adopt SRI method of planting/Adopt Drum seeder/Adopt Semi dry rice ADT(R) 48 Apply ZnSO ₄ @ 25 kg/ha along with 50 kg dry sand before transplanting	-
	New delta Rice based farming system	Rice (SD)-Rice (MD)- Pulse/Sesamum	Maize-rice -pulse(summer irrigated)	Maize Hybrids : COMH 5, Kargil, SPIC Application of DoA micronutrient mixture @ 12.5 kg/ha with sand Seed treatment with VAM @ 10 g/kg of seed Management of shoot fly through seed treatment with	-

Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop /cropping system	Agronomic measures
Sandy clay loam soil	Rice -Fallow-Pulse(Summer Irrigated)	Pulse-rice-fallow-pulse	<p>Imidacloprid 70 WS 10 g/kg of seed, Set up low cost TNAU fish meal trap 12/ha till the crop is 30 days old, Spray Endosulfan 35 EC 500 ml/ha.</p> <p>Rice Use short duration variety Raise community nursery, SRI method of planting Mechanization ZnSO4 application @ 25 kg/ha with 50 kg dry sand before transplanting Gypsum application @ 500 kg/ha at last ploughing Management of sucking pest by using neem based products Adoption of IPDM practices ie.,</p> <ol style="list-style-type: none"> 1. Seed treatment with <i>Pseudomonas fluorescens</i> @ 10 g/kg of seed. 2. Pest and disease management in nursery by spraying Neem Seed Kernel Extract @ 5% or neem oil @ 2%. 3. Release of both <i>Trichogramma chilonis</i> for leaf folder and <i>T.japonicum</i> for stem borer thrice @ 5 cc/ha at weekly interval when the moth activity is noticed <p>Disease management</p> <ol style="list-style-type: none"> 1. Spray <i>P. fluorescens</i> @0.2% 1 kg in 500 litre of water for 1 ha for Blast 2. Spray NSKE @ 5% or neem oil @ 3% or carbendazim @ 250 g/ha for leaf spot 3. Spray neem oil @ 3% or streptomycin sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Rice based farming system Sandy clay loam and clay soil	Rice-Rice-Pulse/Oilseed	Rice (samba) – RF pulse Rice (samba) Sesamum Pulse/Groundnut/Maize-Rice-RF pulse/Sesamum/Groundnut	<p>Rice Use Long duration varieties ADT 44, White ponni, CO 43</p> <p>False smut Disease management seed treatment with <i>P. fluorescens</i> @ 10 g/kg of seed Seedling dip with <i>P. fluorescens</i> @ 1 kg/ac Spray <i>P. fluorescens</i> at 45 & 60 th day @ 1 kg/ac Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac</p> <p>Blackgram: Varieties ADT 3, 5 Seed treatment for Blackgram: The blackgram seeds are fortified with 0.5% Zn So₄ for 3 hours (350 ml of 0.5 % Zn So₄ solution is required to soak one kg of seed) followed by sequential coating with polykote / polymer @ 3g / kg + 5 ml of water + Dimethoate @ 4ml/kg + Trichoderma viride @ 4 g/kg + <i>Rhizobium</i> @ 20g/kg + Azophos @ 120g/ kg. Application of Pendimethalin @ 2lit/ha on 3 DAS for weed management Foliar spray of TNAU Pulse wonder @ 2.25 kg/ac</p> <p>Pest and disease management <i>Management of armyworm</i></p> <ol style="list-style-type: none"> 1. Use light trap or pheromone trap @12/ha 2. Grow castor along borders 3. Spray NPV at 1.5 x 10¹² POB/ha with teepol @ 1ml/l <p><i>Management of Yellow Mosaic Virus</i></p> <ol style="list-style-type: none"> 1. Rogue out infected plants 2. Protct against white fly <p><i>Management of root rot</i></p> <ol style="list-style-type: none"> 1 Seed treatment with <i>T. viride</i> @ 4 g or <i>P. fluorescens</i> @ 10 g/kg of seed. 2. Neem cake application @ 150 kg/ha or soil application of <i>P. fluorescens</i> @ 2.5 kg/ha with 50 kg sand/FYM 	TNAU Pulse wonder is available in Department of crop Physiology, TNAU, Coimbatore. Rate: Rs. 100/kg. For designer seed treatment polymer or polykote is available in Coimbatore.

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				Gingelly SVPR 1, 2 TMV 7 Basal Application of MnSO ₄ @ 5 kg/ha Leaf webber management by spraying neem formulation @ 0.03% or neem seed kernel extract @ 5% or neem oil @ 2% Root rot management by soil application of P. fluroescens @ 2.5 kg/ha with 50 kg sand or FYM or carbendazim @ 1 g/lit.	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon			NA		

Condition	Major Farming situation	Crop/cropping system	Change in crop /cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Rice based farming system- Sandy clay loam and clay soil	Vegetables (Jun-Sep)-Rice (Aug-Dec)-/Rice (Oct-Feb)-Groundnut (Dec-Mar)	Groundnut/sunflower/Maize/Vegetables-Rice-Pulse/Oilseeds	<p>Groundnut Gypsum application @ 400 kg/ha on 40 & 70th day Basal application of ZnSO₄ @ 25 kg/ha Application of DoA micronutrient mixture @ 12.5 kg/ha Foliar spray of DAP @ 2.5 kg, Ammonium sulphate @ 1 kg and Borax @ 0.5 kg per ha on 25 and 35 th DAS. Foliar spray of TNAU Groundnut rich @ 2.20 kg/ac at peak flowering and pod development stages Polythene film Mulching – use 7 micron polythene @ 50 kg/ha Weed management – application of Alachlor @ 20 kg/ha on 20 DAS Irrigation at pegging, flowering and pod development stage Root rot management by seed treatment with thiram @ 4 g/kg of seed, soil application of P. fluroescens @ 2.5 kg/ha with 50 kg sand or FYM</p> <p>Sunflower Application of sulphur @ 20 kg/ha Spray borax @ 0.2% to capitulum at ray floret opening stage for seed setting and filling Keep bee hives @ 5/ha for seed setting. Alternaria leaf spot and rust management by spraying mancozeb @ 1000 g/ha</p>	Groundnut Micro-nutrient mixture can be sourced from TNAU, Coimbatore

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stag	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	Drain out excess water Provide drainage channels	Drain out excess water	Drain out excess water Harvesting at physiological maturity stage	Shift to safer place. Proper drying of the produce
Pulse (Black gram, Green gram)	Drain out excess water	Drain out excess water Foliar spray of Pulse wonder @ 2.25 kg/ac at flowering stage	Drain out excess water Harvesting at physiological maturity stage	Shift to safe place dry in shade and turn frequently
Sesamum	Drain out excess water	Drain out excess water Foliar spray of TNAU Groundnut rich @ 2.20 kg/ac at peak flowering and pod development stages	-	Safe storage against storage pest and disease
Groundnut	Drain out excess water	Drain out excess water	Drain out excess water	Safe storage against storage pest and disease
Sugarcane	Drain out excess water Propping	Drain out excess water Foliar spray of Sugarcane booster application @ 2, 3 & 4 kg/ac at 45, 60 and 75 th day after planting	-	-
Horticulture				
Banana	Drain out excess water Select sword suckers Earthing up on 2, 3 & 5 Topping at 2 & 4 th month of planting	-	-	-
Heavy rainfall with high speed winds in a short span				
Rice	Drain out excess water Broad bed furrow formation.	Drain out excess water	Drain out excess water Harvesting at physiological maturity stage	Shift to safer place.
Horticulture				
Banana	Propping	Wire between trees for wind support Wind break with high pole trees		

Outbreak of pests and diseases due to unseasonal rains				
Rice	<p>Adoption of IPDM practices i.e.,</p> <ul style="list-style-type: none"> ➤ Seed treatment with <i>Pseudomonas fluorescens</i> @ 10 g/kg of seed. ➤ Pest and disease management in nursery by spraying Neem Seed Kernel Extract @ 5% or neem oil @ 2%. ➤ Release of both <i>Trichogramma chilonis</i> for leaf folder and <i>T.japonicum</i> for stem borer thrice @ 5 cc/ha at weekly interval when the moth activity is noticed ➤ Spray Monocrotophos 36 SL @ 1000 ml/ha or profenophos 50 EC @ 1000 ml/ha ➤ Spray <i>P. fluorescens</i> @ 0.2% 1 kg in 500 litre of water for 1 ha for Blast ➤ spray NSKE @ 5% or neem oil @ 3% or carbendazim @ 250 g/ha for leaf spot ➤ spray neem oil @ 3% or carbendazim @ 250 g/ha ➤ spray neem oil @ 3% or streptomycin sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight ➤ False smut management ➤ seed treatment with <i>P. fluorescens</i> @ 10 g/kg of seed ➤ Seedling dip with <i>P.fluorescens</i> @ 1 kg/ac ➤ Spray <i>P.fluorescens</i> at 45 & 60 th day @ 1 kg/ac ➤ Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac 			Safe storage against storage pest and diseases
Pulse – Black gram and Green gram	<p>Pest and disease management</p> <p><i>Management of armyworm</i></p> <ul style="list-style-type: none"> ➤ by using light trap or pheromone trap @12/ha ➤ grow castor along borders ➤ spray NPV at 1.5×10^{12} POB/ha with teepol @ 1ml/l <p><i>Management of Pod borer</i></p> <ul style="list-style-type: none"> ➤ spray Endosulfan 35 EC @ 1l/ha or monocrotophos 36 SL @ 500 ml/ha <p>Management of Yellow Mosaic Virus</p> <ul style="list-style-type: none"> ➤ Rogue out infected plants ➤ Spray monocrotophos @ 500 ml or methyl demeton @ 500 ml/ha. <p>Management of root rot</p> <ul style="list-style-type: none"> ➤ Seed treatment with <i>T. viride</i> @ 4 g or <i>P. fluorescens</i> @ 10 g/kg of seed. ➤ Neem cake application @ 150 kg/ha or soil application of <i>P.fluorescens</i> @ 2.5 kg/ha with 50 kg sand/FYM 			
Horticulture	<p>Banana disease management</p> <ul style="list-style-type: none"> ➤ Spray carbendazim @ 1g/lit for sigatoka leaf spot ➤ Spray monocrotophos @ 1 ml/lit or methyl demeton @ 2 ml/lit for bunchy top ➤ For management of bunchy top – Injection (with TNAU Banana Injector) of monocrotophos 36 SC 1ml/plant at 45 days interval from 3rd month till flowering. 			

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	Drain out excess water Raised bed nursery Use sprouted seeds for direct seeding Use short duration varieties especially ADT 36, 37	Drain out excess water Foliar spray of 2 kg urea with 1 kg ZnSO ₄ in 200 l of water in 1 acre Drain out excess water. Application of P.flouescens @ 1 kg with 20 kg sand/FYM for overall disease resistance Spray or Imidacloprid 17.8 SL @ 100 ml/ac for green leaf hopper Spray neem oil @ 3% or streptomycin Sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight Seed treatment with P. flouescens @ 10 g/kg of seed or Seedling dip with P.flouescens @ 1 kg/ac for false smut	Drain out excess water Foliar spray with 2% DAP Top dressing with 50 kg ammonium sulphate alone or 22 kg urea with 18 kg gypsum and 17 kg MOP. Spray monocrotophos @ 400 ml/ac for case worm. Spray endosulfan @ 400 ml/ac for Gall midge. Spray Chlorpyriphos @ 400 ml/ac for leaf folder Spray endosulfan @ 400 ml/ac for stem borer Spray P.flouescens at 45 & 60 th day @ 1 kg/ac or Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac	
Sugarcane		Propping Drain out excess water Detrashing & Removal of buds Application of 80 kg urea with 16 kg neem cake and 25 kg potash for 1 acre Spray azadirachtin 1% 400 ml/ac or monocrotophos @ 800 ml/ac for white fly.		
Banana		Propping Application of 65 g urea and 175 g potash for poovan variety Application of 90 g urea and 175 g potash for rasthali variety Application of 90 g urea and 215 g potash for nendran variety Application of 90 g urea and 160 g potash for other varieties Spray carbendazim @ 1g/lit for sigatoka leaf spot	Application of Emison @ 0.1% (1 g/lit) @ 1-1.5 lit/tree.	

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not Applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				
Rice	<p>Drain out excess water</p> <p>Raised bed nursery</p> <p>Use sprouted seeds for direct seeding</p> <p>Use short duration varieties especially ADT 36, 37</p>	<p>Drain out excess water</p> <p>Foliar spray of 2 kg urea with 1 kg ZnSO₄ in 200 l of water in 1 acre</p> <p>Drain out excess water.</p> <p>Application of P.flouescens @ 1 kg with 20 kg sand/FYM for overall disease resistance</p> <p>Spray monocrotophos 36 WSC @ 400 ml/ac or Imidacloprid 17.8 SL @ 100 ml/ac for green leaf hopper</p> <p>Spray neem oil @ 3% or streptomycin Sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight</p> <p>Seed treatment with P. fluroscens @ 10 g/kg of seed or Seedling dip with P.flouescens @ 1 kg/ac for false smut</p>	<p>Drain out excess water</p> <p>Foliar spary with 2% DAP</p> <p>Top dressing with 50 kg ammonium sulphate alone or 22 kg urea with 18 kg gypsum and 17 kg MOP.</p> <p>Spray monocrotophos @ 400 ml/ac for case worm.</p> <p>Spray endosulfan @ 400 ml/ac for Gall midge.</p> <p>Spray monocrotophos @ 400 ml/ac or chlorpyriphos @ 400 ml/ac for leaf folder</p> <p>Spray endosulfan @ 400 ml/ac for stem borer Spray P.flouescens at 45 & 60 th day @ 1 kg/ac or</p> <p>Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac</p>	<p>Implementation of Weather based crop insurance by department of Agriculture</p>
Sugarcane		<p>Drain out excess water</p> <p>Propping Make deep trench for drainage</p> <p>Detrashing & Removal of buds</p> <p>Application of 80 kg urea with 16 kg neem cake and 25 kg potash for 1 acre</p> <p>Spray azadirachtin 1% monocrotophos @ 800 ml/ac for white fly.</p>		<p>Implementation of Weather based crop insurance by department of Agriculture</p>
Banana		<p>Propping</p> <p>Application of 65 g urea and 175 g potash for poovan variety</p>	<p>Application of Emison @ 0.1% (1 g/lit) @ 1-1.5 lit/tree.</p>	<p>Implementation of Weather based crop insurance by department of Agriculture</p>

		Application of 90 g urea and 175 g potash for rasthali variety Application of 90 g urea and 215 g potash for nendran variety Application of 90 g urea and 160 g potash for other varieties Spray carbendazim @ 1g/lit for sigatoka leaf spot		
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2.5 Contingent strategies for Livestock, Poultry & Fisheries:

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	Establishment of grain and fodder banks at Taluk level	Block level officers to be entrusted with distribution of feed and fodder materials	Reviewing the number of feed and fodder banks and their ability to cope with the emergency in relation to feed and fodder availability and planning for more such feed and fodder banks in strategic areas
Drinking water	Creating filter points exclusively for supply of water In strategic areas Conservation of rain water in rain shed areas	Mobilization of water for drinking to affected areas from exclusive filter points at block level	Cleaning and desilting of water bodies in rain shed areas and cleansing the filter points for aquifer recharge
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients, minerals and trace elements	Ring vaccination in adjoining areas in case of outbreak to prevent further spread of disease Supply of essential nutrients, minerals and trace elements	Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements
Floods			
Feed and fodder availability	Establishment of feed banks in	Mobilization of feed at the existing fodder	Replenishment of feed banks with good

	elevated areas not known to be affected by floods	bank from block level authorities	quality grains and crop residues
Drinking water	Establishment of filter points in elevated areas	Mobilization of water from filter points exclusively maintained for the purpose from block level authorities	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients, minerals and trace elements Sanitary measurement to be taken Provision of safe shelter Farm disaster kit containing temporary animal identification tags, handling equipment, first aid kit should be kept in a place known to the community	Mobilization of affected animals and provision of vaccine and medication Stranded animals should be rescued to safer places Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements
Cyclone			
Feed and fodder availability	Establishment of feed banks in safe areas not known to be affected by cyclone	Mobilization of feed from the existing fodder bank	Replenishment of feed banks with good quality grains and crop residues
Drinking water	Establishment of filter points in safe areas	Mobilization of water from filter points exclusively maintained for the purpose	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients, minerals and trace elements Sanitary measurement to be taken Provision of safe shelter Farm disaster kit containing temporary animal identification tags, handling equipment, first aid kit should be kept in a place known to	Mobilization of affected animals with vaccine and medication Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements

	the community		
Heat wave and cold wave			
Shelter/environment management	-	-	-
Health and disease management	-	-	-

^s based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/ linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Feed ingredients	Establishment of grain/feed banks at block levels	Mobilization of feed resources from block level	Replenishment of feed resources	-
Drinking water	Establishment of filter points for supply of water	Mobilization of water for drinking from filter points	Cleaning and desilting water bodies and cleansing the filter points for aquifer recharge	-
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients, minerals and trace elements	Ring vaccination in adjoining areas in case of outbreak to prevent further spread of disease Supply of essential nutrients, minerals and trace elements	Serological survey to assess the immunity against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements	-
Floods				
Feed ingredients	Establishment of feed and water banks in elevated areas not known to be affected by floods	Mobilization of feed from the existing fodder bank	Replenishment of feed banks with good quality grains and crop residues	-
Drinking water	Establishment of filter points in elevated areas	Mobilization of water from filter points exclusively maintained for the purpose	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points	-

Health and disease management	Preventive vaccination against endemic diseases Supply of essential minerals and trace elements Provision of temporary shelters in high areas Sanitary measurement to be taken	Mobilization of affected animals with vaccine and medication Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements	-
Cyclone				
Shortage of feed ingredients	Establishment of feed banks in safe areas not known to be affected by cyclone	Mobilization of feed from the existing fodder bank	Replenishment of feed banks with good quality grains and crop residues	-
Drinking water	Establishment of filter points in safe areas	Mobilization of water from filter points exclusively maintained for the purpose	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points	-
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients, minerals and trace elements Provision of temporary shelters in high areas Sanitary measurement to be taken	Mobilization of affected animals with vaccine and medication Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements	-
Heat wave and cold wave				
Shelter/environment management	-	-	-	-
Health and disease management	-	-	-	-

^a based on forewarning wherever available

2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Collective water shed management. Construction of water harvesting/recharging structure. Or Safe disposal of the stock	Optimal utilization of water without exchange/Water recycling. /Water supply from other sources (bore well)/ Emergency harvest	Pond drying till bottom cracking
(ii) Impact of salt load build up in ponds / change in water quality	Increase in salinity		Reclamation of soil
(iii) Any other			
2) Floods			
A. Capture			
Marine	Construction of cyclone shelters. Going for Short term fishing holiday	Safely return back to the shore/Staying in cyclone shelter	Return back to fishing
Inland			
(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			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Creation of shelter belts/bio shields Raising the bunds. Making net fencing along the bundles and in inlet/outlets.	Damage and loss	Strengthening the bunds
(ii) Water continuation and changes in water quality	Proper disinfection & sanitation measures to be followed. Emergency harvest. Reduction or suspension of feeding.		Water quality testing and corrective measures
(iii) Health and diseases	Emergency harvest		Preparation of pond following sanitation measures
(iv) Loss of stock and inputs (feed, chemicals etc)	Disposal of the stock to a safe place		Proper storage construction to keep the stock and inputs
(v) Infrastructure damage (pumps, aerators, huts etc)	Safe removal of valuables to other place		Replacement/repairing the infrastructure
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine	Cancellation of fishing trips. Successful attempts to protect fishing boats, gears and infrastructure in the shore. Construction of cyclone shelters and fish jetties. Installation of storm warning systems including radio relay stations, shore-to-boat and boat-to-boat communication networks; supply of life-saving appliances; establishment of an effective search and rescue capability, and provision of training and technical advice on sea safety	Safely return back to the shore/Staying in cyclone shelter	Short term, Medium term and long term rehabilitation of affected area

^a based on forewarning wherever available

State: TAMILNADU

Agriculture Contingency Plan for District: Theni

1.0 District Agriculture Profile											
1.1	Agro-Climatic/Ecological Zone										
	Agro Ecological Region / Sub Region (ICAR)			Eastern Ghats And Tamil Nadu Uplands And D (8.1)							
	Agro-Climatic Region (Planning Commission)			West Coast Plains And Ghat Region (XII)							
	Agro Climatic Zone (NARP)			SOUTHERN ZONE , HIGH ALTITUDE AND HILLY ZONE (5,7)							
	List all the district or part thereof failing under NARP Zone			Theni							
	Geographic coordinates of district			Latitude	Longitude			Altitude			
				9 ^o 30 - 10 ^o 30	77 ^o 00 - 78 ^o 30			--			
	Name and address of concerned ZRS / ZARS / RARS / RRS / RRTTS			Horticultural College and Research Institute, Periyakulam – 625 604, Tamil Nadu							
Mention the KVK located in the district			CENDECT (Pvt) KVK, Kamatchipuram - 625 520. Theni District, Tamil Nadu								
1.2	Rainfall			Average (mm)		Normal onset (specify week and month)			Normal Cessation (specify week and month)		
	South West Monsoon (June-Sep)			170.8		1 st week of June			1 st week of October		
	North East Monsoon (Oct-Dec)			382.4		2 nd week of October			4 th week of December		
	Winter (Jan-Feb)			53.9		-			-		
	Summer (Mar-May)			222.7		-			-		
	Annual			829.8							
1.3	Land use pattern of the district (latest statistics)		Geographical area	Forest area	Non-agri use	Permanent pastures	Cultivable wasteland	Misc tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)		324.2	103.7	24.1	0.3	2.9	1.6	43.3	3.3	32.7

1.4	Major soils	Area ('000 ha)		Percent (%) of total
	1. Red soils	174.2		53.7
	2. Black soils	129.6		40.0
	3. Others	20.4		6.3
1.5	Agricultural land use	Area ('000 ha)		Cropping intensity (%)
	Net sown area	112.9		106.1
	Area sown more than once	6.9		
	Gross cropped area	119.8		
1.6	Irrigation	Area ('000 ha)		Percent (%) of total
	Net irrigated area	57.9		47.0
	Gross irrigated area	64.6		54.2
	Rainfed area	55.0		53.0
	Sources of irrigation	Number	Area (ha)	% area
	Canals	107	11.1	18.9
	Tanks	20	1.3	2.1
	Tube wells	7102	7.7	13.0
	Lift irrigation	--	-	
	Other sources	--	29.0	44.9
	Total		49.6	80.9
	Pump sets	--		
	Micro-irrigation	--		
	Groundwater availability and use	No of blocks	% area	Quality of water
	Over exploited (> 100%)	5	62.5	76% Good 22% medium saline 2% saline
	Critical (90 - 100%)	3	37.8	
Semi-critical (70 - 90%)	-			
Safe (< 70%)	-			
Wastewater availability and use	Data not available			

Area under major field crops & horticulture crops

1.7	Major Crops cultivated		Area ('000 ha) during 2006-07						
	Field Crops		Kharif		Rabi		Summer		Total
			Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	
1	Millets		2.8	8.5	4.8	8.4	-	-	24.5
2	Paddy		5.6	-	9.6	-	0.2	-	14.7
3	Sugarcane		-	-	-	-	-	-	9.1
4	Pulses		0.1	4.8	0.1	2.3	-	-	7.2
5	Cotton		0.5	0.1	1.0	0.3	-	-	1.9
6	Maize		-	-	-	-	-	-	-
	Horticulture Crops		Total						
1	Mango		8.8						
2	Banana		4.1						
3	Grapes		2.0						
4	Coconut		15.3						
5	Vegetables		5.3						
6	Cardamom		1.5						

1.8	Livestock		Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)		10.4	14.3	24.7		
	Crossbred cattle		5.4	106.5	112.0		
	Non descriptive Buffaloes (local low yielding)				5.3		
	Graded Buffaloes						
	Goat				109.3		
	Sheep				87.4		
	Others (Camel, Pig, Yak etc.)				21.5		
	Commercial dairy farms (Number)		No. of farms	Total No. of birds ('000)			
1.9	Poultry						
	Commercial				1259.8		
	Backyard						
1.10 Capture							
District	Marine (Data Source : Fisheries Department)	No. of Fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-Mechanized	Mechanized (Trawl nets, Gill nets)	Non-Mechanized (Shore Seines stake & trap nets)	
		No. Farmer Owned Ponds	No. of Reservoirs		No. of Village tanks		
		-	2		-		
A. Culture							
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)			
	Brackish Water (Data Source: MPEDA / Fisheries Department)	--	--	--			
	Fresh Water (Data Source : Fisheries Department)	6387	--	13260.4			
	Others	--	--	--			

* Information for 1.8, 1.9, 1.10 will be provided by Veterinary University (TANUVAS), Chennai

Production and Productivity of major field crops & horticulture crops

1.11	Production and Productivity of Major Crops	Average of five years ending 2006-07							
	Field Crops	Kharif		Rabi		Summer		Total / average	
		Production ('000T)	Productivity (Kg/ha)	Production ('000T)	Productivity (Kg/ha)	Production ('000T)	Productivity (Kg/ha)	Production ('000T)	Productivity (Kg/ha)
1	Paddy	20.143	4381	39.198	4267	2.014	4134	61.355	4305
2	Millets	-	-	-	-	-	-	45.593	4233
3	Pulses	-	-	-	-	-	-	4.363	601.80
4	Cotton	-	278	-	532	-	-	5141 (bales)	480
5	Sugarcane	-	-	-	-	-	-	915.975	115000
6	Maize	-	-	-	-	-	-	-	-
	Horticulture Crops	Irrigated		Rainfed		Total			
		Production ('000T)	Productivity (Kg/ha)	Production ('000T)	Productivity (Kg/ha)	Production ('000T)		Productivity (Kg/ha)	
1	Mango	-	-	-	-	89.386		12980	
2	Banana	-	-	-	-	146.487		53584	
3	Grapes	64.597	32090	-	-	64.597		32090	
4	Coconut	-	-	-	-	3949 lakh nuts		16970 (nuts)	
5	Vegetables	-	-	-	-	38.672		20793	
6	Cardamom	-	-	0.139	96	0.139		96	

1.12	Sowing window for 5 major crops	Paddy	Vegetables	Pulses/Milletts	Cotton	Sugarcane / Banana
	Kharif rainfed	---	--	June 3 rd week to July 2 nd week	---	--
	Kharif irrigated	June 1 st week – 2 nd week	July 2 nd week – 3 rd week (Chillies)	--	--	--
	Rabi rainfed	--	--	Oct. 2 rd week to Nov. 2 nd week	--	--
	Rabi irrigated	Oct 2 nd week – 3 rd week	---	--	--	--
	Summer Irrigated	--	--	April 1st week – 4 th week	February 2 nd week – 4 th week	February 2 nd week – 4 th week

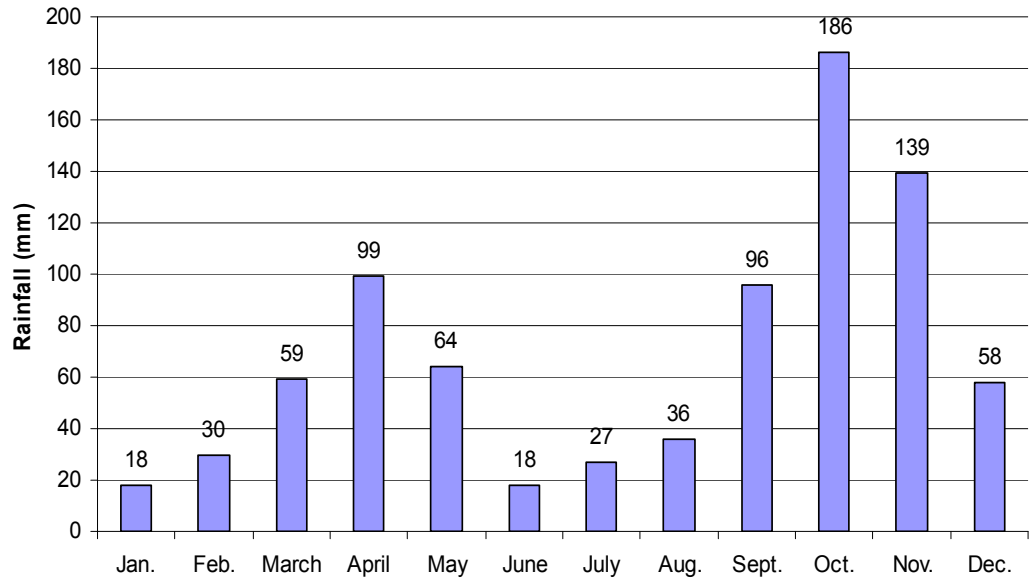
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	occasional	Never
	Drought		√	
	Flood		√	
	Cyclone		√	
	Hail storm			
	Heat wave			
	Cold wave			
	Frost			
	Sea water intrusion			
	Pests and diseases (specify)		<u>Rice</u> : Blast, BLB <u>Black gram</u> : YMV	
Others (Fog)		√		

1.14	Maps of the district	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

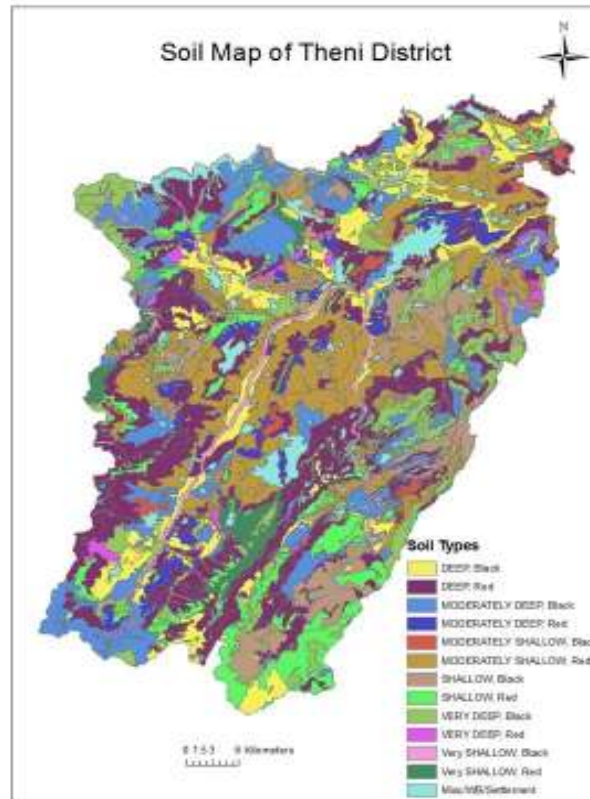
Annexure 1. Location map of Theni district and the blocks



Annexure 2. Mean annual rainfall of Theni district of Tamil Nadu



Annexure 3. Soil Map of Theni district of Tamil Nadu



2.0 Strategies for weather related contingencies

2.1. Drought :

2.1.1 Ranifed Situations :

Condition	Kharif Season		Suggested contingency measures		
Early season drought (Delayed onset)	Major Farming situations	Normal Crop / cropping systems	Change in crop/cropping system	Agronomic measures	Remarks on implementation
Kharif season Delay by 2 weeks (3 rd week of June)	Red soils	Pulses/ Sorghum	No change	Mechanical sowing with tractor drawn seed drill Seed treatment with Thiram or <i>Carbendazim</i> @2g/Kg or <i>T.Viride</i> @4g/kg or <i>P.Fluorescens</i> @ 10g/kg	Linkages with NFSM for seed supply of pulse crops
	Black soils	Pulses/ Maize	No change		
Delay by 4 weeks (1 st week of July)	Red soils	Pulses/ Sorghum	Short duration pulses Black gram: VBN 1,2,3, Co5	Seed drill sowing for pulses Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying 2% DAP spray	
	Black soils	Pulses/ Maize	Red gram : CoRG 7, Co6 Cowpea: CoCT7		
Delay by 6 weeks (3 rd week of July)	Red soils	Pulses/ Fodder Sorghum	Short duration pulses Black gram: VBN 1,2,3, Co5	Seed drill sowing for pulses Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit AT preflowering and 15days thereafter. Seed treatment with 3pkts Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos 2% DAP spray	
	Black soils	Pulses /Fodder Maize	Red gram : CoRG 7, Co6 Cowpea: CoCT7		
Delay by 8 weeks (1 st week of August)	Red soils	Fodder Maize/Ffodder Sorghum	Short duration varieties	--	
	Black soils				

Condition	Rabi season		Suggested contingency measures		
Early season drought (Delayed onset)	Major Farming situations	Crop / cropping systems	Change in crop/cropping system	Agronomic measure	Remarks on implementation
Rabi season Delay by 2 weeks (4 th week of October)	Red soils	Pulses (Redgram)	No change	Mechanical sowing with tractor drawn seed drill Seed treatment with Thiram or Carbendazim @2g/Kg or T.Viride @4g/kg or <i>P.Fluorescens</i> @ 10g/kg	Linkage with NFSM/RDVY ofr supply of seeds (p Redgram and Cowpea)
	Black soils	Maize	No change		
Delay by 4 weeks (2 nd week of Nov.)	Red soils	Pulses (Redgram) Cowpea	Short duration Red gram : CoRG 7, Co6, Cowpea: CoCT7	Seed drill sowing for pulses Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying	
	Black soils	Maize			
Delay by 6 weeks (4 th week of Nov.)	Red soils	Pulses (Green gram/Black gram/ Cowpea)	Short duration pulses Black gram: VBN 1,2,3, Co5, Co6 Cowpea: CoCT7	Seed drill sowing for pulses Crop residue mulching Spray NAA 40 mg/lit or salicylic acid @ 100mg/lit AT preflowering and 15days thereafter. Azospirillum+ 3Pkts Phosphobacteria or 6 Azophos Seed treatment with 3pkts	
	Black soils	Maize			
Delay by 8 weeks (1 st week of Dec.)	Red soils	Fodder Maize/ Fodder Sorghum	Short duration varieties	--	
	Black soils				

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Low land tube well canal irrigated red and black soil	Paddy (sub merged condition) Chillies	SRI method of rice cultivation Maize Maize: CoRH1, CoHM 4 Sugarcane – sub surface drip fertigation Sorghum, Horsegram	Limited irrigation with mulching Alternate Furrow irrigation Drip irrigation with residue mulching Sprinkler irrigation with mulching	Seeds through ISOPOM and NFSM

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Red soils	Vegetable areas	Sorghum, Horsegram recommended	-	Seeds through NFSM

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon			NA		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Tube well red and black soil	Paddy	Maize, Groundnut and vegetables (Chilli and Brinjal)	1.Limited irrigation 2. Alternate Furrow irrigation 3. Sprinkler irrigation	1.Seeds through Dept of Horticulture, NFSM, NHM and ISOPOM

2.2 Unusual rains (Untimely, unseasonal etc) - NA

2.3 Floods - NA

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

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	NA			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries*

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	Establishment of fodder banks & Preparation of silage	Using unconventional feeds and tree Fodders & Development of Draught resistant grass varieties	Cultivation of Green fodders
Drinking water	Construction of check dam& Rain water Harvesting	Recycling of water	Recycling of water
Health and disease management	Deworming and vaccination against contagious diseases	Supplementation of mineral mixture And concentrate feed	Deworming and vaccination against contagious diseases
Floods			
Feed and fodder availability	Storage of dry fodders well above the ground level	Feeding with silage, concentrate and dry fodder	Creating drainage facility in the Fodder plots
Drinking water	Storage of water in the over head tanks	Using bore well water for drinking purpose	Disinfected water can be used for drinking purpose
Health and disease management	Deworming and vaccination against contagious diseases	Keeping the animals in a proper shed with hygienic environment	Deworming and vaccination against contagious diseases
Cyclone			
Feed and fodder availability	Cultivation and storage of green fodder	Usage of stored fodder	Usage of stored fodder
Drinking water	Creating permanent water source	Using bore well water for drinking purpose	Creating drainage facility in the Fodder plots

Health and disease management	Improving the immune status of animals	Keeping the animals in a proper shed with hygienic environment	Improving the immune status of animals
Heat wave and cold wave			
Shelter/environment management	Construction of concrete shed & Planting Of trees in the farm premises	Sprinkling of water over the shed and Animals in heat wave	Improving the immune status of animals
Health and disease management	Feeding with balanced diet	Providing ad libitum water	Improving the immune status of animals

^s based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Storage of feed ingredients	Usage of Stored feed ingredients	Usage of Stored feed ingredients	--
Drinking water	Collection of rain water	Usage of stored rain water	Usage of stored rain water	--
Health and disease management	Deworming and vaccination against Specific diseases	Following strict hygienic measures in the farm	Deworming and vaccination against Specific diseases	--
Floods				
Shortage of feed ingredients	Storage of dry fodders	Feeding with silage,	Creating drainage facility	--

	well above the ground level	concentrate and dry fodder	in the Fodder plots	
Drinking water	Storage of water in the over head tanks	Using bore well water for drinking purpose	Disinfected water can be used for drinking purpose	--
Health and disease management	Deworming and vaccination against Specific diseases	Following strict hygienic measures in the farm	Deworming and vaccination against Specific diseases	--
Cyclone				
Shortage of feed ingredients	Storage of feed ingredients in a puca manner	Control of moisture in the feed ingredients	Preventive measures should be taken against Aflatoxins	--
Drinking water	Creating permanent water source	Using bore well water for drinking purpose	Creating drainage facility in the farm	--
Health and disease management	Improving the immune status of animals	Keeping the shed In a hygienic manner	Improving the immune status of animals	--
Heat wave and cold wave				
Shelter/environment management	Construction of concrete shed & Planting Of trees in the farm premises	Sprinkling of water over the shed and birds in heat wave	Improving the immune status of animals	--
Health and disease management	Feeding with balanced diet	Providing ad libitum water	Improving the immune status of animals	--

^a based on forewarning wherever available

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	<ul style="list-style-type: none"> • Harvesting large individuals • Move and enclose Stacked into pens or in smaller/confined areas 	<ul style="list-style-type: none"> • Harvesting large individuals • Disposable of unwanted excess stock • Stocking of desirable/special individuals in brood stock ponds 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • Harvesting of the stock • Transferring of smaller fishes to artificial ponds (if available) for tiding over the drought 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • Steps to improve the quality of stocked fishes, via feed/fertilizer water quality management
(iii) Any other	--	--	--
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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • In extreme conditions, controlled draining of flooded ponds • Thinning of stock by harvesting of larger individuals 	<ul style="list-style-type: none"> • Repair damaged bunds • Collect and preserve existing stock
(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	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Flood water can bring parasites, and increased turbidity – repair/correct drainage to improve quick drainage of flood waters 	<ul style="list-style-type: none"> • Turbid waters may be flushed off with fresh bore well/well water
(vi) Health and diseases	--	--	--
B. Aquaculture			
(i) Inundation with flood water	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • In extreme conditions, controlled draining of flooded ponds • Thinning of stock by harvesting of larger individuals 	<ul style="list-style-type: none"> • Repair damaged bunds • Collect and preserve existing stock
(ii) Water continuation and changes in water quality	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Water can become turbid due to flood waters, reduce stock to prevent mortality 	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • Negligible changes 	<ul style="list-style-type: none"> • Harvesting of stock • Shift reserve of brood stock to ponds at elevated levels 	<ul style="list-style-type: none"> • Selling remaining stock and inundated equipment immediately to minimize losses
(v) Infrastructure damage (pumps, aerators, huts etc)	<ul style="list-style-type: none"> • Dismantling of pumps, aerators and other equipment and shifting to safer zones 	<ul style="list-style-type: none"> • Salvaging of inundated pumps, aerators and other equipment and shifting to safer zones 	<ul style="list-style-type: none"> • Selling remaining stock and inundated equipment immediately to minimize losses
(vi) Any other			

State: TAMIL NADU

Agriculture Contingency Plan: TIRUNELVELI

1.0 District Agriculture profile

1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And TamilNadu Uplands (8.1)		
	Agro-Climatic Region (Planning Commission)	West Coast Plains And Ghat Region East Coast Plains And Hills Region (XII, XI)		
	Agro Climatic Zone (NARP)	Southern Zone (TN-6)		
	List all the districts or part thereof falling under the NARP Zone	Ramanathnparam, Tirunelveli, Part of Anna, Madurai and Pudukottai districts		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		8° 8'to 09° 23' N	77° 09' to 77°35' E	47 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station, Aruppukkottai, Virudhunagar District		
Mention the KVK located in the district	KVK, Oormelazhagiyan, Tirunelveli District			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	92.6	1 st Week of June	4 th week of September
	NE Monsoon(Oct-Dec):	429.8	1 st week of October	2 nd Week of December
	Winter (Jan- Feb)	72.6	-	-
	Summer (Mar-May)	141.9	-	-
	Annual	736.9	-	-

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)	670.6	120.8	104.1	5.4	41.5	9.8	30.8	26.3	167.8
--	----------------	-------	-------	-------	-----	------	-----	------	------	-------

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Very Deep to deep Black soils	235	38
	Very Deep to deep Red soils	149	24
	Moderate deep /shallow Black soils	92	15
	Moderate deep/shallow Red soils	22	4
	Shallow to very shallow black soils	36	6
	Others	77	12
		615	100
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	175.1	119.1
	Area sown more than once	33.4	
	Gross cropped area	208.5	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	118.4		
	Gross irrigated area	145.7		
	Rainfed area	56.7		
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	Thamirabarani Canal fed	20.2	17.2
	Tanks	2172	47.8	40.7
	Open wells	82718	-	

Bore wells	191	0.9	0.7
Lift irrigation		-	
Other sources (Tube well)	502	0.1	0.2
Total		69.2	60.5
Pumpsets	24817		
Micro-irrigation		500	
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	4	36	Salinity level: 66 % good, 27% moderate and 7% poor Residual Sodium Carbonate: 95% good and 5% moderate Sodium Adsorption Ratio:99 % good
Critical	-	-	
Semi- critical	5	45	
Safe	10	91	
Wastewater availability and use	Data not available		
*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)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Paddy	22.5	-	64.7	-	4597	91.8
2	Black gram	0.2	3.9	0.6	12.8		17.7
3	Maize	0.3	0.0	0.2	2.3		8.7
4	Sugarcane	3.7 (Planted)		1.7 (Ratoon)			5.4
5	Cotton	2.1	0.1	3.0	1.3		4.3
6	Sorghum (Sorghum)	1.4	0.3	0.1	0.1	-	2.0
7	Bajra (Bajra)	0.0		0.1	0.5		0.6
	Horticulture crops - Fruits	Total area					
1	Banana	8.1					
2	Mango	4.6					
3	Guava	0.3					
4	Sapota	0.2					
5	Lemon	1.9					
6	Amla	1.4					
7	Citrus	17.0					
		Total area					
1	Vegetable	3.9					
2	Flowers	1.6					

	Medicinal and Aromatic crops	Total area
1	Chillies	2.0
2	Tamarind	0.1
3	Clove	0.1
4	Currey leaf	0.05
5	Senna	0.01
	Plantation crops	Total area
1	Cashew	5.0
2	Tea	0.8
3	Arecanut	0.1
4	coffee	0.03
5	Coconut	0.002
	Fodder crops	Total area
1	Sorghum	5.031
2	Subha grass	0.087
3	Giniya grass	0.002
4	Korai grass	0.009
5	Feeder grass	0.021
	Total fodder crop area	5.1
	Grazing land	
	Sericulture etc	0.022
	Others (Specify)	

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	41.1	101.7	142.9
	Crossbred cattle	89.7	271.6	361.4
	Non descriptive Buffaloes (local low yielding)			114.7
	Graded Buffaloes			
	Goat			461.3
	Sheep			1222.3
	Others (Camel, Pig, Yak etc.)			12.7
	Commercial dairy farms (Number)			

1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial		497.4				
	Backyard		721.1				
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)	
		20210	1	1191	21062	1388	3
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		Nil		12		2249	
B. Culture							
	Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)		

i) Brackish water	----	---	---
ii) Fresh water	12053	---	1187 tons
Others			

1.1 1	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	69	3898	221	4327	13.8	3757	303.5	4193
2	Sorghum (Jowar)		3926		940			5.3	3265
3	Bajra (Bajra)		3191		1414			1.4	1765
4	Ragi		3458		1362			0.8	3438
5	Maize							10.0	2682
6	Black gram							7.3	577
7	Green gram							4.2	696
8	Cotton		418		255			1706	488
9	Sugarcane							395	123000
	Major Horticultural crops								-
1	Banana							374	
2	Mango							16.1	
3	Guava							4.3	
4	Sapota							6.7	
5	Lemon							4.90	
6	Amla							20.6	
7	Onion							25.70	
8	Tomato							9.10	

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Cotton	Jowar	Maize	Bajra
	Kharif- Rainfed	-	-	1 st week of June to 4 th week of July	-	1 st week of June to 4 th week of July

	Kharif-Irrigated	1 st week of June to 4 th week of July		1 st week of May – 4 th week of July	1 st week of May – 4 th week of July	1 st week of May – 4 th week of July
	Rabi- Rainfed	-	1 st week of September to 4 th week of October	1 st week of September – 4 th week of October	1 st week of September – 4 th week of October	1 st week of September – 4 th week of October
	Rabi-Irrigated	1 st week of September to 4 th week of November	1 st week of February to 4 th week of March	February - March	1 st week of March – 4 th week of April	1 st week of March – 4 th week of April

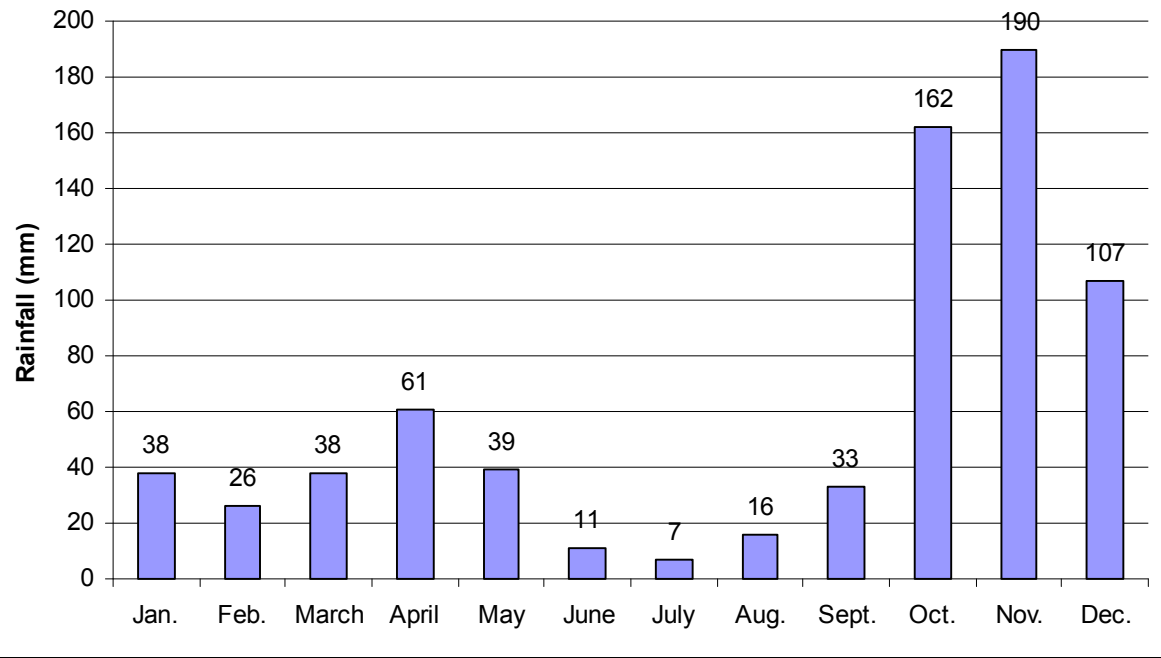
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	✓		
	Flood			✓
	High intense storms			
	Cyclone		✓	✓
	Hail storm			✓
	Heat wave			✓
	Cold wave			✓
	Frost			✓
	Sea water inundation			✓
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

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

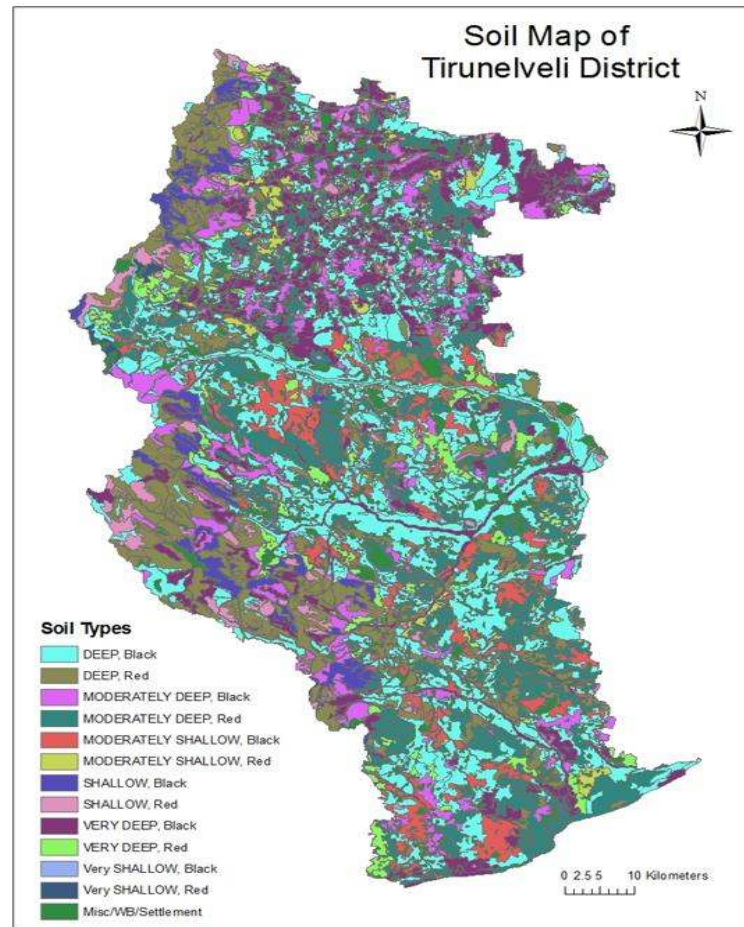
Annexure 1. Location map of Tirunelveli district and the blocks



**Annexure 2. Mean annual rainfall of Tirunelveli district
of Tamil Nadu**



Annexure 3. Soil map of Tirunelveli district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation : Kharif season (Tenkasi and Shenkottai block only)

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop /cropping system	Change in crop /cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (June 3 rd week)	Red soils	Sorghum and Bajra	No change	Dry sowing, broad bed furrow with Increased seed rate by 1.5 times. Seed hardening by soaking seeds with 2 % KH ₂ PO ₄ for 6 hours	Linkage with RKVY/other schemes for broad bed furrow implements
Delay by 4 weeks (July 1 st week)			Short duration pulses (TMV 1 Black gram) Green manure (Daincha / Sun hemp) (Crops Specify)	Seed pelleting, (ZnSO ₄ at 100 ppm) Dry sowing, broad bed furrow	
Delay by 6 and 8 weeks (July 3 rd week)			Green manures (Daincha / Sunhemp)	-	Green manure seeds obtained from Dept. of Agri.

2.1.2 Rainfed situation : Rabi season

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (October 3 rd week)	Red soils	Sorghum / Bajra / Maize	No change	Dry sowing, broad bed furrow with increased seed rate by 1.5 times. Seed hardening by soaking seeds with 2 % KH ₂ PO ₄ for 6 hours	--
		Blackgram/Greengram		Seed pelleting (ZnSO ₄ and MnSO ₄ for black gram and green gram respectively)	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)		Minor millets	No change	Dry sowing, broad bed furrow with Increased seed rate by 1.5 times. Seed hardening by soaking seeds with 2 % KH_2PO_4 for 6 hours	Linkage with Government departments for broad bed furrow implements
	Black soils	Cotton		Acid delinting of seeds, Dry sowing, broad bed furrow Foliar spray of 0.5 % ZnSO_4 and 1.0 % MgSO_4 on 45 and 60 DAS	
		Maize		Seed hardening, Dry sowing, broad bed furrow	
		Blackgram/Greengram		Seed Pelleting, (ZnSO_4 and MnSO_4 for black gram and green gram respectively) Dry sowing, broad bed furrow	
Delay by 4 weeks November 1 st week	Red soils	Sorghum / Bajra / Maize	Sorghum + Cow pea, Black gram, Green gram Bajra + Cluster bean CO4, CO6 (75-80 days duration)	Adopt paired row inter cropping system Maintain optimum population (sorghum – 100 % and cowpea – 50 %)	
		Blackgram/Greengram	Minor millets	Seed Pelleting, (ZnSO_4 and MnSO_4 for black gram and green gram respectively) Dry sowing, broad bed furrow	
	Black soils	Cotton	Gengelly / Maize / Bajra / Minor Millets	Acid delinting of seeds, Dry sowing, broad bed furrow Foliar spray of 0.5 % ZnSO_4 and 1.0 % MgSO_4 on 45 and 60 DAS	
Maize		Maize + Green gram, Black gram, lab lab	Seed hardening, Dry sowing, broad bed furrow		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)			COH3 with 100 days duration (Drought resistant variety)		
		Pulses	Sesame / Maize / Bajra		Linkage with NFSM for seed supply

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks (November 3 rd week)	Red soils	Sorghum / Bajra / Maize	Minor millets / sesame (TMV3 and Co1)	Dry sowing with Increased seed rate of 15 to 20 % in broad bed furrow Seed hardening by soaking seeds with 2 % KH ₂ PO ₄ for 6 hours	Seeds can be purchased from State Seed farm or seed corporation / Agri. Dept.
		Pulses	Minor millets / Sesame (TMV3 and Co1)	Seed hardening, Dry sowing, broad bed furrow	--
		Minor millets	Minor millets / Sesame		--
	Black soils	Cotton	Coriander + onion or Groundnut	Inter crop with Ragi or minor Millet (Row ratio Specify)	--
		Maize	Minor millets / Groundnut	--	--
		Pulses	Minor millets / Groundnut	--	--
	Delay by 8 weeks (December 1 st week)	Red soils	Sorghum / Bajra / Maize	Fodder sorghum / Bajra / Minor millets	Seed hardening, with KH ₂ PO ₄ at 2 % Dry sowing, broad bed furrow
Pulses			Sesame (TMV3 and Co1)	Seed hardening, Dry sowing, broad bed furrow	--

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)		Minor millets	-	-	--
	Black soils	Cotton	Sesame / Bajra /Minor Millets / Groundnut (TMV 7, VRI1, Co2 and Co3)	1. Delinting of cotton seeds with Conc, H ₂ SO ₄ @ 100 ml/kg 2. Foliar spray of 0.5 % ZnSO ₄ and 1.0 % MgSO ₄ on 45 and 60 DAS	--
		Maize	Gengelly / Bajra /Minor Millets / Groundnut	Seed hardening, Dry sowing, broad bed furrow	--
		Pulses	Sesame (TMV3 and Co1)	--	--

Rainfed situation Kharif (Tenkasi and Shenkottai block only)

Condition	Kharif season		Suggested Contingency measures		
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	All Red soils	Sorghum and Bajra	No change	Nursery can be raised and gap filling can be done. Apply phorate 10 G 180 g or Carbofuran 3 G 600 g mixed with 2 kg of moist sand, spread on the beds and work into the top 2 cm of soil to protect the seedlings from shootfly infestation.	Broad bed furrow implements can be obtained from Agrl. Engg. Dept.
At vegetative stage				Spray 3% Kaolin (30 g in one litre of water) during periods of stress.	
At reproductive stage				Supplemental irrigation if possible from harvested water	
Terminal drought					

Rainfed situation Rabi

Condition	Rabi		Suggested Contingency measures				
	Major Farming situation	Crop /cropping system	Crop management	Soil management	Remarks on Implementa-tion		
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	All Red soils	Sorghum / Bajra / Maize	Resowing in broad bed furrow with Increased seed rate by 1.5 times if the plant population is very low Thinning	--	Implements can be obtained from Agri. Dept.		
		Pulses		--			
	All Black soil	Minor millets	-do-				
		Cotton		Intercultivation			
		Maize	Thinning and leave only one healthy and vigorous seedling per hill on the 7 th or 8 th day of sowing.	Form ridges and furrows, 6 m long and 60 cm apart before sowing			
		Pulses	If the population is very poor re-sowing can be taken up				
	At vegetative stage	All Red soil	Sorghum / Bajra	Sow the seeds in flat bed and form furrows between crop rows during intercultivation during on third week after sowing. Apply phorate 10 G 180 g or Carbofuran 3 G 600 g mixed with 2 kg of moist sand, spread onthe beds and work into the top 2 cm of soil to protect the seedlings from shootfly infestation			Implements can be obtained from Agri. Dept.
			Maize			Ensure optimum moisture availability during the most critical phase (40 to 65 days after sowing) by conserving	

Condition	Rabi		Suggested Contingency measures		
	Major Farming situation	Crop /cropping system	Crop management	Soil management	Remarks on Implementation
Early season drought (Normal)				moisture by weed mulching and supplemental irrigation if possible	
		Pulses	Spray 2 per cent Diammonium phosphate at the time of first appearance of flowering.		
	All Black soils	Minor millets			
		Cotton	-	Intercultivation	
		Maize	-		
		Pulses	Spray 2 per cent Diammonium phosphate at the time of first appearance of flowering.		

Condition			Suggested Contingency measures		
	Major Farming situation	Crop /cropping system	Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)					
At reproductive stage	All Red soils	Sorghum / Bajra	Thinning and weeding	Soil and Weed mulching	Implements can be obtained from Agri. Dept.
		Maize		Soil and weed mulching to conserve soil moisture	
		Pulses	Spray 2 per cent Diammonium phosphate at the time of first appearance of flowering and repeat after 15 days of first spraying. Spray NAA 40 ppm twice at first appearance of flowers and after a fortnight.		

Condition	Major Farming situation	Crop /cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)	Black soil	Minor millets	Thinning, Life saving irrigation, Weeding	Weed mulching	
		Cotton	Thinning (Remove 30 % of week seedlings)	Soil and weed mulching	
		Maize	Thinning (Remove 10 % of week seedlings)	Soil and weed mulching	
		Pulses			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought	Red soils	Sorghum / Bajra	Life saving irrigation or harvest for fodder	Soil and weed mulching to conserve soil moisture	--
		Maize			
		Pulses	Life saving irrigation Weeding		
	Black soils	Minor millets	Harvest for fodder	Soil and Weed mulching	
		Cotton			
		Maize			
		Pulses			

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/ cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation

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	Low land tube well canal irrigated red and black soil	Paddy (sub merged condition)	Maize (Pioneer, Rasi, Nuzuveeds and Kaveri Hybrids)and Aerobic Rice (ASD 18, ADT 36, MDU 5)	Limited irrigation Alternate Furrow irrigation Drip irrigation (Hybrid rice)	Seeds can be sourced from Agri. Dept.

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	Red soil	Paddy	Maize	Ridges and furrow	Seeds can be sourced from Agri. Dept.
	Black soil		Ragi/Bajra	Beds and channel	
	Red soil	Maize	Ragi/Bajra		
	Black soil		Ragi/Bajra		
	Red soil	Ragi	Bajra		
	Black soil		Sesame		
	Red soil	Bajra	Green manure / Pulse		
	Black soil		Sesame		
	Red soil	Groundnut			
Black soil					

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	Red soil	Paddy	Bajra / Ragi	Beds and channel	Seeds can be sourced from Agri. Dept.
		Maize			
		Bajra / Ragi	-		
	Black soil	Paddy (Sep-Dec)	Maize/Vegetables (Sep-Dec)		
		Maize	Bajra / Ragi		
		Bajra / Ragi	-		

Condition			Suggested Contingency measures		
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	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation ⁱ
Insufficient groundwater recharge due to low rainfall	Tube well red and black soil	Paddy	Aerobic Rice, Maize and Vegetables (Tomato, Chilli and Brinjal)	1.Limited irrigation 2. Alternate Furrow irrigation 3. Drip irrigation	Seeds can be sourced from Agri. Dept.
Any other condition (specify)	Water logging in the coastal area	Paddy	Paddy with salt tolerant and long duration varieties (TRY 1, Co 43)	Nutrition through foliar application (K + Zn @ 1% and 0.5 % respectively)	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Paddy	Drainage	Drainage	Drain out excess water Harvesting at physiological maturity	Shift to safer place
Maize			Drain out Harvesting at physiological maturity stage or Harvest for fodder	Shift to safe place dry in shade and turn frequently
Ragi			Drain out Harvest for fodder purpose	Safe storage against storage pest and disease
Sorghum / Bajra			Drain out excess water	Safe storage against storage pest and disease
Groundnut / Sesame	Drainage	Drainage	Drain out excess water	Safe storage against storage pest and disease
Horticulture				
Mango	-	-	-	-
Guava	-	-	-	-
Heavy rainfall with high speed winds in a short span²				
Horticulture				
Banana, Mango, Sapota	-Drainage	Form the drainage trenches along the slope	Form the drainage trenches along the slope -	Spray copper oxy chloride @ 0.05 %

Outbreak of pests and diseases due to unseasonal rains				
Paddy (Army worm and Stem borer)	Release egg parasites	Spray systemic pesticide (Dimethoate)	Spray systemic cum contact pesticide (Chlorpyrifos)	Safe storage against storage pests and diseases
Horticulture				
Mango weevil, mango hopper	-	Spray contact pesticide with rocker sprayer	-	
Sooty mould and fruit rot	Release bio-control agents Application of Trichoderma	Spray systemic fungicide (Copper oxy chloride) with rocker prayer	Cut and remove the affected and dried portions and Apply boreaux mixture paste on the cut end.	

2.3 Floods : Not applicable for Thirunelveli district

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Continuous submergence for more than 2 days	NA			
Sea water inundation				

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	NA			
Cold wave				
Frost				
Hailstorm				

Sugarcane			Propping the matured cane	
Cyclone				
Banana			Fix the supporter	

2.5 Contingent strategies for Livestock, Poultry & Fisheries

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	<p>Assess the requirement of reserve fodder and promote conservation of dry fodder, fodder grasses and sugarcane tops.</p> <p>Promote preparation of urea molasses licks, bricks made of fodder, urea, molasses and fortification of paddy straw with urea molasses</p> <p>Manufacturing of concentrate feed at subsidised rate using damaged grains should be encouraged</p> <p>Creation of fodder banks at village levels based on the livestock population.</p> <p>Encouraging farmers to cultivate short-term fodder crops like sun hemp.</p> <p>Curbing the movement of crop residues from the district.</p> <p>Popularization of chaff cutters to reduce wastage of precious fodder sources.</p> <p>Provide transport subsidy for transporting fodder to camps from other districts</p> <p>Keeping sufficient stock of mineral</p>	<p>Feeding unconventional and locally available cheap feed ingredients and crop residues by sprinkling sodium chloride.</p> <p>Feeding urea molasses blocks, total mixed rations; Make available at least 1 compact feed block and 5 kg treated dry fodder per cow per day</p> <p>Use of salt licks for goats calves etc.</p> <p>Feeding of tree fodder should be encouraged.</p> <p>Chaffing of green and dry fodder to avoid wastage.</p> <p>Regular supplementation of Minerals to prevent infertility.</p> <p>Advising to feed concentrates during cooler parts of the day.</p> <p>Advising not to graze during hotter parts of the day.</p> <p>Supplementation of probiotics and vitamins to improve feed utilisation</p>	<p>Feeding ad libitum green fodder including legumes to restore the normal production levels. Mineral supplementation for heifers and cows should be regularised.</p> <p>Supply of quality seeds of COFS 29, AT Maize, Stylo etc. well before monsoon and motivating the farmers to cultivate maximum fodder utilising monsoon</p> <p>Motivating farmers to produce fodder seeds and slips.</p> <p>Farmers should be advised to breed their cows during July-August-September so that the peak milk production does not coincide with peak summer. Hence the feed and fodder requirements could be kept under control.</p>

	<p>mixture.</p> <p>Earmarking forest bead areas to allow for grazing animals during scarcity</p>		
Drinking water	<p>Creation of drinking water facilities in the veterinary institutions and common grazing areas in the villages</p> <p>Collection of particulars regarding availability of potable water in adverse conditions.</p>	<p>Provide clean drinking water treated with Sanitizers.</p> <p>Filling of community water tank on daily basis.</p> <p>Transportation of potable water to the needy areas.</p>	<p>Digging of bore wells and creation of water reservoirs.</p>
Health and disease management	<p>Anthrax</p> <p>Bovines</p> <p>Vaccination against Anthrax during, January, April, May, and October in Melaneellithanallur, Shengottai, Manur, Kadayanallur, Sankarankoil and Keelapavur blocks.</p> <p>Ovines</p> <p>Vaccination during February, May, June, August and November in Sankarankoil, and Manur blocks.</p> <p>Foot and Mouth Disease</p> <p>Vaccination against FMD during September and October, in Sankarankoil, Kuruvikulam, Nanguneri, Sengottai, Kalakad, Ambasamudram, Palayamkottai, Kadayam, Vallioor, Radhapuram, Pavoorchatram, Vasudevanallur and Manur blocks.</p> <p>Sheep pox</p> <p>Vaccination against sheep pox during March and April in Kadayam, Kalakad, Vallioor, Radhapuram and Manur blocks.</p>	<p>Anthrax</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and VUTRC. • Segregation of affected animals and treat them. • Incineration or deep burial of dead animals. • Disinfection with formaldehyde. • Proper hygienic measures while handling the dead or affected animals. <p>FMD</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and VUTRC. • Segregation of affected animals and treat them. • Avoiding affected animals for grazing. • Disinfection of animal sheds, equipments and surroundings with sodium carbonate. 	<p>Sending disease outbreak annual and completion report.</p> <p>Keeping vigil on the disease outbreak.</p> <p>General:</p> <p>Nutritional supplementation</p> <p>Breeding management</p>

	<p>Blue Tongue Vaccination against Blue tongue disease during October and November in Manur, Palayamkottai, Kuruvikulam, Melaneelithanallur, Sankarankoil, Kalakad, Vasudevanallur, Alankulam, Keelapavur, Kadayanallur, Nanguneri, Sengottai, Radhapuram, Cheranmahadevi, Pappakudi and Ambasamudram blocks.</p> <p>PPR Vaccination against PPR disease during October and November in Manur, Kadayanallur, Kuruvikulam and Pavorchathiram block.</p> <p>Enterotoxaemia Vaccination against Enterotoxaemia during January and September in Sankarakoil, Palayamkottai and Kuruvikulam blocks.</p> <p>Haemorrhagic septicaemia Vaccination against Haemorrhagic septicaemia during November in Sengottai blocks.</p> <p>Brucellosis Calfhood vaccination against Brucellosis in Vasudevanallur, Kadayanallur, Sengottai, Tenkasi and Ambasamudram blocks.</p>	<ul style="list-style-type: none"> • Avoid feeding calf with milk from affected animals. <p>Blue tongue</p> <ul style="list-style-type: none"> • Isolation of affected animals. • Reporting to local Veterinarian, ADIU and VUTRC. • Spraying insecticides against Culicoides. • Disinfection of animal sheds, equipments and surroundings • Avoid stagnation of water around animal houses. <p>PPR</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and VUTRC. • Segregation of affected animals and treat them. • Proper disposal of fomites. <p>General:</p> <ul style="list-style-type: none"> • Entering the data and information in the electronic media at the NIC Centre at the district Collectorate. • Preparation of disease investigation report and sending collected specimens to CRL and CUL. • Deployment of vaccination squad for performing ring vaccination (8 k.m. radius). • Preventing movement of 	
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		<p>livestock in the affected area.</p> <ul style="list-style-type: none"> • Nutritional supplementation • Summer management of livestock. • Snail control measures in the water bodies. 	
Floods			
Rescue and Rehabilitation	<p>A control room should be established in the headquarters for information exchange, co ordination of veterinary support and should be manned by Veterinary Public relations officer</p> <p>Rapid response teams with Veterinary and Para Veterinary staff should be established to reach the flooded areas for emergency treatments</p> <p>The personnel in the mobile hospitals should be adequately trained in animal rescue operations, CPR, first aid etc.</p> <p>Preparations for shifting/evacuation of livestock from flooded areas should be readied with sufficient equipments, first aid kits, portable corrals, communication gadgets etc.</p> <p>Creation of contingency fund with the officer in charge for vehicle hiring charges, rescue, rehabilitation of marooned animals and birds</p> <p>Farmers should be advised to house their livestock in elevated areas with proper drainage facilities</p> <p>Advise the farmers to bring their livestock under Insurance cover against natural calamities</p>	<p>Animals are untied and released from cages to allow them to swim, escape drowning and reach safer places</p> <p>Rescue, transport, transfer of rescued animals to temporary sheds in elevated places.</p>	<p>Flooded areas to be toured and temporary camps should be conducted to provide veterinary aid to animals</p> <p>The loss of livestock should be assessed for providing compensation to the livestock farmers</p> <p>Insurance claims could be prepared for compensating the loss of insured livestock</p> <p>Provision of interest free loans to purchase animals and replenish the livestock numbers in the district</p> <p>Mobilising the services of private organisations in the district to provide support to sustain livestock farming activity</p>
Feed and fodder availability	Farmers should be advised to protect the feed and fodder resources before	The livestock should be fed in temporary shelters with hay, silage,	Feeding ad libitum green fodder including legumes to restore the normal production levels.

	<p>the onset of monsoon</p> <p>The sources within and outside the district should be alerted of the emergency situation for the supply of dry fodder, crop residues, Urea molasses salt licks, mineral mixtures etc.</p> <p>Educating farmers to collect sufficient green fodder, tree leaves and other edible plants on receipt of flood warning</p> <p>The requirements and complete programme of catering to feed and fodder supply should be kept ready with the officer in charge of the action during floods</p>	<p>concentrate feed, Urea molasses blocks, total mixed rations brought in from other places</p>	<p>Mineral supplementation for heifers and cows should be regularised.</p> <p>Supply of quality seeds of COFS 29, AT Maize, Stylo etc. and motivating the farmers to cultivate and harvest well before onset of monsoon</p>
Drinking water	<p>The requirements of drinking water needed in the affected areas should be assessed and arrangements to be made to provide clean, sanitised water for the livestock</p>	<p>Clean chlorinated drinking water should be provided in required quantities to livestock in the temporary shelters and pens</p>	
Health and disease management	<p>Anthrax</p> <p>Bovines</p> <p>Vaccination against Anthrax during, January, April, May, and October in Melaneellithanallur, Shengottai, Manur, Kadayanallur, Sankarankoil and Keelapavur blocks.</p> <p>Ovines</p> <p>Vaccination during February, May, June, August and November in Sankarankoil, and Manur blocks.</p> <p>Foot and Mouth Disease</p> <p>Vaccination against FMD during September and October, in Sankarankoil, Kuruvikulam, Nanguneri, Sengottai, Kalakad, Ambasamudram, Palayamkottai,</p>	<p>Anthrax</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and VUTRC. • Segregation of affected animals and treat them. • Incineration or deep burial of dead animals. • Disinfection with formaldehyde. • Proper hygienic measures while handling the dead or affected animals. <p>FMD</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and 	<p>Sending disease outbreak annual and completion report.</p> <p>Keeping vigil on the disease outbreak.</p> <p>General:</p> <p>Nutritional supplementation</p> <p>Breeding management</p>

	<p>Kadayam, Vallioor, Radhapuram, Pavoorchatram, Vasudevanallur and Manur blocks.</p> <p>Sheep pox</p> <p>Vaccination against sheep pox during March and April in Kadayam, Kalakad, Vallioor, Radhapuram and Manur blocks.</p> <p>Blue Tongue</p> <p>Vaccination against Blue tongue disease during October and November in Manur, Palayamkottai, Kuruvikulam, Melaneelithanallur, Sankarankoil, Kalakad, Vasudevanallur, Alankulam, Keelapavur, Kadayanallur, Nanguneri, Sengottai, Radhapuram, Cheranmahadevi, Pappakudi and Ambasamudram blocks.</p> <p>PPR</p> <p>Vaccination against PPR disease during October and November in Manur, Kadayanallur, Kuruvikulam and Pavoorchathiram block.</p> <p>Enterotoxaemia</p> <p>Vaccination against Enterotoxaemia during January and September in Sankarakoil, Palayamkottai and Kuruvikulam blocks.</p> <p>Haemorrhagic septicaemia</p> <p>Vaccination against Haemorrhagic septicaemia during November in Sengottai blocks.</p> <p>Brucellosis</p> <p>Calfhood vaccination against Brucellosis in Vasudevanallur,</p>	<p>VUTRC.</p> <ul style="list-style-type: none"> • Segregation of affected animals and treat them. • Avoiding affected animals for grazing. • Disinfection of animal sheds, equipments and surroundings with sodium carbonate. • Avoid feeding calf with milk from affected animals. <p>Blue tongue</p> <ul style="list-style-type: none"> • Isolation of affected animals. • Reporting to local Veterinarian, ADIU and VUTRC. • Spraying insecticides against Culicoides mosquitoes • Disinfection of animal sheds, equipments and surroundings • Avoid stagnation of water around animal houses. <p>PPR</p> <ul style="list-style-type: none"> • Reporting to local Veterinarian, ADIU and VUTRC. • Segregation of affected animals and treat them. • Proper disposal of fomites. <p>General:</p> <ul style="list-style-type: none"> • Preparation of disease investigation report and sending collected specimens 	
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	Kadayanallur, Sengottai, Tenkasi and Ambasamudram blocks.	<p>to CRL and CUL.</p> <ul style="list-style-type: none"> • Deployment of vaccination squad for performing ring vaccination (8 k.m. radius). • Preventing movement of livestock in the affected area. • Regular disinfectant and insecticide spraying of livestock premises • Entering the data and information in the electronic media at the NIC Centre at the district Collectorate. 	
Cyclone			
Heat wave and cold wave			

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Feeding, Health and Disease management	<p>Vaccination against Ranikhet disease and IBD.</p> <p>Deworming</p> <p>Provision of foggers and sprinklers to reduce heat load.</p> <p>Supplementation of vitamins, minerals and antistress formula.</p> <p>Planning to avoid laying period from 15th April to</p>	<p>Feeding during cooler parts of the day (early morning and evening).</p> <p>Mixing water in the concentrate mash and feeding</p> <p>Increasing the height of deep litter.</p> <p>Reducing the number of birds per shed.</p> <p>Provision of ceiling fan</p>	<p>1. Nutritional supplementation of poultry.</p> <p>2. Preparation of road map for increasing the feed ingredients production.</p> <p>3. Ensuring enough stock of ingredients in the future.</p> <p>Disease Outbreak:</p>	<p>TANUVAS Agro Meteorological Advisory Centre, Namakkal.</p> <p>Linked to the regular vaccination programmes of the Department of Animal Husbandry.</p>

	<p>15th June.</p> <p>Avoiding purchase of chicks between October to January.</p>	<p>@ one per 1000 sq.ft.</p> <p>Anticoccidial supplementation.</p> <p>Supplementation of vitamins and minerals.</p> <p>Avoiding vaccination and debeaking.</p> <p>Reducing the energy density of ration and increasing the lysine, methionine and Vitamin C in the ration.</p> <p>Adding potassium chloride and sodium bicarbonate in the ration @ 38 g per Tonne of feed.</p> <p>Storing the feed only for short duration to avoid loss of vitamins.</p> <p>Disease Outbreak:</p> <p>Reporting the outbreak to the local veterinarian.</p> <p>Isolation and treatment affected stock.</p> <p>Proper disposal of dead birds.</p> <p>Collection of samples and send to CRL and CUL.</p>	<ol style="list-style-type: none"> 1. No poultry should be introduced in the area for next 3 months. 2. Compensation for forced culling. 3. Sending the disease outbreak annual and completion report. 	
Drinking water	<p>The requirements of drinking water needed in the affected areas should be assessed and arrangements to be made to provide clean, sanitised water</p>	<p>Continuous supply of cool potable water by increasing the number of waterers.</p> <p>Providing water with ice cubes.</p> <p>Proper water sanitation.</p>		

		Filling overhead tanks with water in the afternoons. Providing B-Complex and Vitamin C in water.		
Floods				
Rescue and Rehabilitation	<p>Preparations for shifting/evacuation of Poultry from flooded areas should be readied with sufficient equipments, first aid kits, portable corrals, communication gadgets etc.</p> <p>Creation of contingency fund with the officer in charge for vehicle hiring charges, rescue, rehabilitation of marooned animals and birds</p> <p>Farmers should be advised to house their poultry in sheds constructed in elevated areas with proper drainage facilities</p>	<p>Rescue, transport, transfer of rescued animals to temporary sheds in elevated places.</p> <p>Birds are rescued with bamboo baskets and transferred to temporary pens</p>	<p>The loss of poultry should be assessed for providing compensation to the farmers</p> <p>Provision of interest free loans to establish new poultry units in the district</p>	
Feeding, Health and Disease management	<p>Vaccination against Ranikhet disease and IBD.</p> <p>Deworming</p> <p>Supplementation of vitamins, minerals and antistress formula.</p>	<p>Provision of Supplementation of vitamins and minerals.</p> <p>Disease Outbreak:</p> <p>Reporting the outbreak to the local veterinarian.</p> <p>Isolation and treatment affected stock.</p> <p>Proper disposal of dead birds.</p> <p>Collection of samples</p>	<ol style="list-style-type: none"> 1. Nutritional supplementation of poultry. 2. Preparation of road map for increasing the feed ingredients production. 3. Ensuring enough stock of ingredients in the future. <p>Disease Outbreak:</p>	<p>TANUVAS Agro Meteorological Advisory Centre, Namakkal.</p> <p>Linked to the regular vaccination programmes of the Department of Animal Husbandry.</p>

		and send to CRL and CUL.	1. No poultry should be introduced in the area for next 3 months. 2. Compensation for forced culling. 3. Sending the disease outbreak annual and completion report.	
Drinking water	The requirements of drinking water needed in the affected areas should be assessed and arrangements to be made to provide clean, sanitised water	Provision of sanitised water in the temporary sheds. Providing B-Complex and Vitamin C in water.		
Cyclone				
Heat wave				
Shelter/environment management	Before Heat wave: Plantation of trees around the poultry shed. Purchase of new or regular upkeep of the existing sprinklers/foggers. Hanging the wet gunny bags on the sides of the shelter to provide a cooler environment.	During Heat wave: Keep the shelter fully aerated. Use water sprinklers and foggers. Use of industrial fans. Use of wet gunny bags along the sides of the shelter. Trees must not be pruned during the heat wave. Reduce the stock density in deep litter system. Supplementation of anti-stress formulation in the feed.		
Health and disease management	Before Heat wave: Assessment of RD titre	During Heat wave: Continuous supply of		

	<p>and vaccination against RD and IBD.</p> <p>Deworming of poultry.</p> <p>Provision of foggers and sprinklers to reduce heat load.</p> <p>Supplementation of vitamins and minerals.</p> <p>Proper planning and disposal of batch between September to January to avoid mortality during the summer.</p> <p>Provision of cooler environment in the farm premises by tree plantation.</p>	<p>cool potable water.</p> <p>Feeding during cooler part of the day (early morning and evening).</p> <p>Increasing the height of deep litter.</p> <p>Reducing the number of birds per shed.</p> <p>Provision of ceiling fan @ one per 1000 sq.ft.</p> <p>Anticoccidial measures.</p> <p>Summer management of poultry- use of foggers and sprinklers</p> <p>Supplementation of vitamins and minerals.</p> <p>Avoiding vaccination and debeaking during summer.</p> <p>Storing the feed only for short duration to avoid loss of vitamins.</p> <p>Avoiding having stock of layers between 21 to 36 weeks of age.</p> <p>Disease Outbreak:</p> <p>Reporting the outbreak to the local veterinarian.</p> <p>Isolation and treatment affected stock.</p> <p>Proper disposal of dead birds.</p> <p>Collection of samples and send to CRL and CUL.</p>		
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2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Repairing the crafts and gears	Repairing the crafts and gears.	Training the fishermen in hygienic handling of fishes and fish processing.
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Drying and disinfecting the ponds	Drying and disinfecting the ponds	Training the fish farmers in fish culture practices
(ii) Changes in water quality	Analysing the water quality parameters	---	Assessing the microbial load of the sediment and water.
(iii) Any other	---	---	---
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Harvesting the fish tanks	Desilting the tanks for rectifying disease problem.	Training the fish farmers in composite fish culture practice
(ii) Impact of salt load build up in ponds / change in water quality	Assessment of water hardness and salinity check.	Assessing the environmental parameters for algal check.	Conducting awareness camps in fish culture practices.
(iii) Any other	---	---	---
2) Floods			
A. Capture			
Marine	Repairing the crafts and gears.	Keep the crafts and gears in safe condition.	Training the fishermen in hygienic handling of fishes, fish preservation and processing.
Inland			
(i) Average compensation paid due to loss of human life	Keep the flood warning systems in alert condition	Keep the inlets and outlets in alert condition to tackle flood water rush.	Survey the human loss for paying compensation benefits.
(ii) No. of boats / nets/damaged	---	---	---
(iii) No. of houses damaged	Alert the fish farmers before floods	Warning systems to be alerted	Survey on the houses damaged

(iv) Loss of stock	Sampling the fish stock in tanks and ponds.	---	Sampling the tanks and ponds for loss of fish stock.
(v) Changes in water quality	Environmental monitoring of the aquatic systems	Analysing the environmental parameters of the tanks and ponds	Assess the plankton productivity of tanks and ponds.
(vi) Health and diseases	Check the microbial load of the sediment and water	---	Check the presence of microbial pathogens in water and sediment.
B. Aquaculture			
(i) Inundation with flood water	Harvesting the farms.	Keeping the ponds without stocking	Making the ponds ready for stocking
(ii) Water continuation and changes in water quality	Water quality check	Water quality check.	Assessing the water quality for seed stocking.
(iii) Health and diseases	Checking the microbial load.	Checking the microbial load.	Water treatment for control of microbes.
(iv) Loss of stock and inputs (feed, chemicals etc)	---	---	---
(v) Infrastructure damage (pumps, aerators, huts etc)	---	---	---
(vi) Any other	---	---	---
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	Safety of fishermen and fishing accessories.	Safety of fishermen and fishing accessories.	Estimating the loss of lives for compensation.
(ii) Avg. no. of boats / nets/damaged	Safety of boats and nets.	Keeping the boats and nets in safe condition.	Assessing the damages to boats and nets.
(iii) Avg. no. of houses damaged	Safety of houses	Safety of houses	Estimating the loss for damaged houses.
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)	Training of fish farmers for safety of farm accessories	Safety of feeds, chemicals <i>etc.</i>	Estimate the losses.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Alertness for safety of infrastructure.	Safety of infrastructure.	Renovation and reconstruction of infrastructure.
(vi) Any other	---	---	---
4. Heat wave and cold wave			
A. Capture			
Marine	Studying the temperature of water and assessing mass mortality of fishes.	Studying the environmental characters and removing the dead fishes.	Assessing the fish catches and provide compensation for fishermen.
Inland	---	---	---
B. Aquaculture			
(i) Changes in pond environment (water quality)	Studying the water temperature periodically.	Studying the water temperature periodically.	Take measures for control rise/fall of water temperature.
(ii) Health and Disease management	Monitoring the disease problem in cultured fishes.	Control mortality of fishes by providing disease treatment.	Remove infected animals and provide disinfection and treatment.
(iii) Any other			

State: TAMILNADU

Agriculture Contingency Plan for District: THIRUVALLUR

1.0 District Agriculture profile

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats And TamilNadu Uplands And D (8.3)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains And Hills Region (XI)		
	Agro Climatic Zone (NARP)	North eastern zone (TN-1)		
	List all the districts or part thereof falling under the NARP Zone	Villupuram, Kancheepuram, Cuddalore, Thiruvannamalai and Vellore		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		12 ⁰ 10 to 13 ⁰ 15 N	79 ⁰ 15 to 80 ⁰ 20 E	39.47m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Rice Research Station, Tirur, Tiruvallur District		
Mention the KVK located in the district	ICAR-KVK, Tirur, Tiruvallur District			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	449.5	1 st Week of June	4 th week of September
	NE Monsoon(Oct-Dec):	604.1	1 st week of October	4 th Week of December
	Winter (Jan- Feb)	33.5	-	-
	Summer (Mar-May)	65.7	-	-
	Annual	1152.8	-	-

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)	342.2	19.7	107.9	8.1	8.0	7.7	13.6	26.3	39.3

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1 Red	72.2	21.1
	2 Lateritic soils (Alfisols)	15.5	4.4
	3 Alluvial soils (Inceptisols)	24.5	7.2
	4. Black soil	188.9	55.2
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	113.0	132.1
	Area sown more than once	36.3	
	Gross cropped area	149.4	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	91.8	82.1	
	Gross irrigated area	122.1	84.1	
	Rainfed area	21.3	17.8	
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	17	1.6	1.8
	Tanks	1895	13.8	15.1
	Open wells	12775	22.5	-
	Bore wells	1615	56.3	61.4
	Lift irrigation	-	-	-
	Other sources(tube wells& filter points)	17616	-	63.3
	Total	33918	93.8	130.5
	Pumpsets	-	-	-
	Micro-irrigation	-	-	-
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	06	42.9	Salinity level: 757 % good, 24% moderate and 1% poor Residual Sodium Carbonate: 100% good Sodium Adsorption Ratio:100 % good
	Critical	02	14.3	
	Semi- critical	05	35.7	
	Safe	01	7.1	
Wastewater availability and use	Data not available		-	
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)*					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Paddy	36.8	2.2	28.4	1.2	10066	96.8
2	Groundnut	2.5	7.5	18.0	-		28.0
3	Greengram	-	0.2	1.9	-	-	13.1
4	Sugarcane	54.0		12.9			10.0
5	Gingelly		1.0	1.0			2.0
	Others	-	-	-	-	-	-
	Horticulture crops - Fruits	Total area					
1	Mango	9.6					
2	Banana	1.6					
3.	Guava	0.2					
4.	Water melon	0.4					
5.	Citrus	0.098					
	Horticultural crops - Vegetables	Total area					
1	Brinjal	0.2					
2	Cowpea	0.1					
3	Bhendi	0.1					
4	Greens	-					
5	Bitter gourd	-					
	Flowers						

		Medicinal and Aromatic crops	Total area
1		Medicinal and Aromatic crops	
2		Ocimum	0.058
		Plantation crops	Total area
1		Coconut	11.1
		Fodder crops	Total area
		Total fodder crop area	
		Grazing land	7.9

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	43.9	54.9	98.8
	Crossbred cattle	97.9	127.4	225.3
	Non descriptive Buffaloes (local low yielding)			194.5
	Graded Buffaloes			
	Goat			321.4
	Sheep			92.9
	Others (Camel, Pig, Yak etc.)			6.0
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial	-	654.3	
	Backyard	-	-	
1.10	Fisheries (Data source: Chief Planning Officer)			
	A. Capture			

i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	22029	338	1194/3360	1106/118644	204 / 0	29 / 6
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	1855		6		174	
B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	3500			0.001		5.243
ii) Fresh water (Data Source: Fisheries Department)	1681593			0.004		6.794
Others				0.000		80.357

	Reservoir	Intensive Inland Fish Culture in major irrigation & seasonal tanks	FFDA Tanks	Short seasonal tanks & ponds	Derelict water	Aquaculture farm	Estuaries & backwaters
Inland Fish Production for Thiruvallur district (Quantity in tonnes) 2008-2009/	3263	7813	749	8032	215	86	9236

	Mechanised	Motorised	Non mechanised	Shore Seine	Total
Marine Fish Production- Craft wise (Quantity in tones) 2008-2009	-	4166.70	4844.50	0.00	9011.20

	Number of fishing villages	No. of Fish Landing Centres		
		Major	Minor	Total
Marine Fishing villages & Landing Centres (Thiruvallur district)	58	1	27	28

	Number of crafts								
	Mechanised	Wooden Vallams		FRP Vallams		Wooden Catamarans		FRP Catamarans	
		With engine	Without engine	With engine	Without engine	With engine	Without engine	With engine	Without engine
Details of fishing crafts-mechanized fishing boats and country crafts	-	-	-	-	-	-	699	2029	-

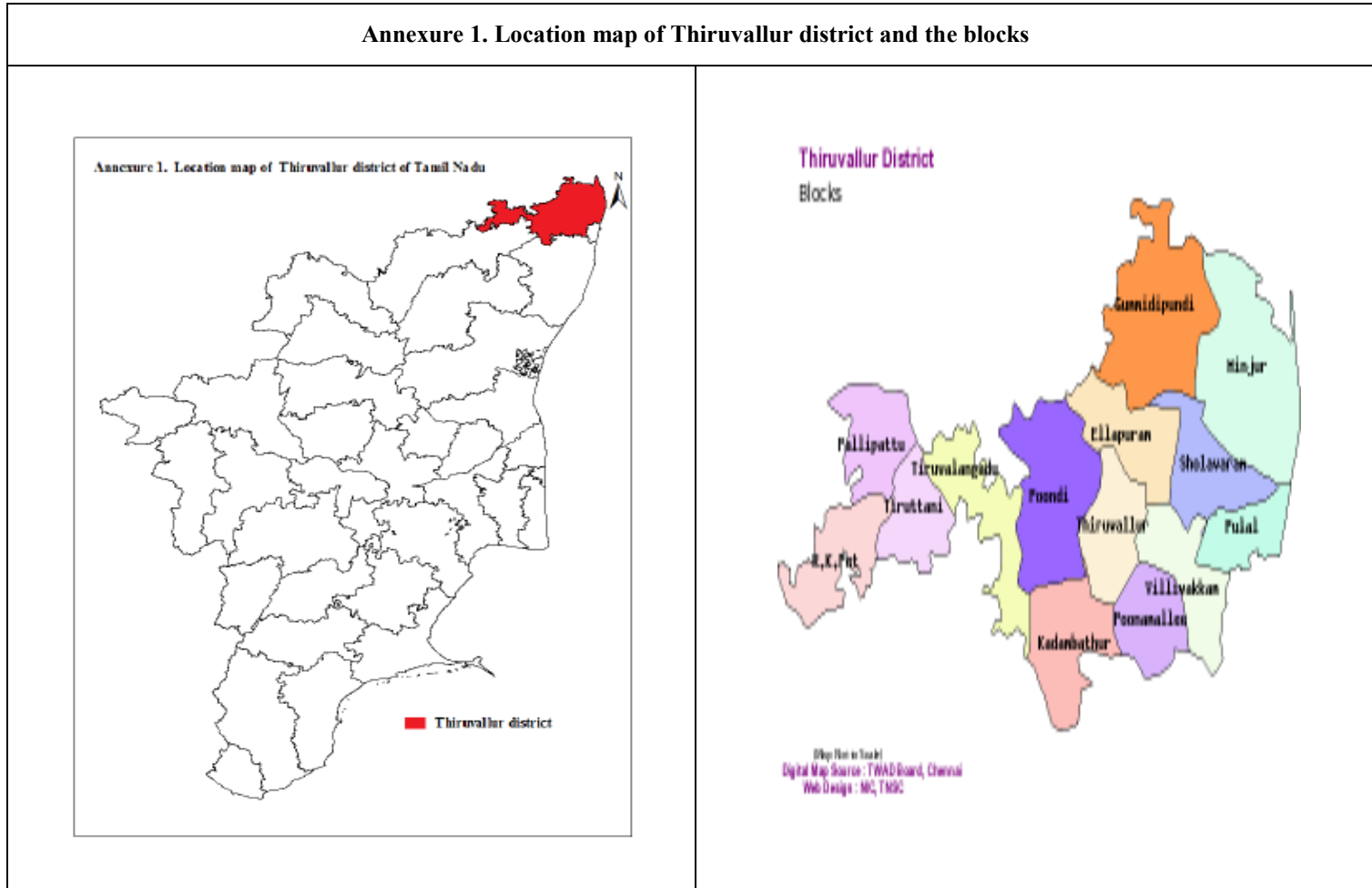
1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	254.3	4422	-	-			254.3	4422
2	Ground nut	-	-	62.0	3130	-	-	62.1	3130
3	Green gram	-	-	6.0	650	-	-	6.0	650
4	Sugarcane			649.8	120 t/ha			649.8	120 t/ha
5	Gingelly							0.7	0.5
	Major Horticultural crops							32.3	3364
1	Mango							75.0	47741
2	Banana							35.2	13603
3	Guava							0.8	2986
4	Citrus								

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Ground nut	Pulse
	Kharif- Rainfed	April-July August-November Dec -January	June-July July 1 st FN to Aug 1 st week	June - July
	Kharif-Irrigated	April 1 st FN - May 1 st FN		-
	Rabi- Rainfed	-	-	-
	Rabi-Irrigated	Dec 1 st week – Dec. 30 th	Dec-January	Jan - Feb

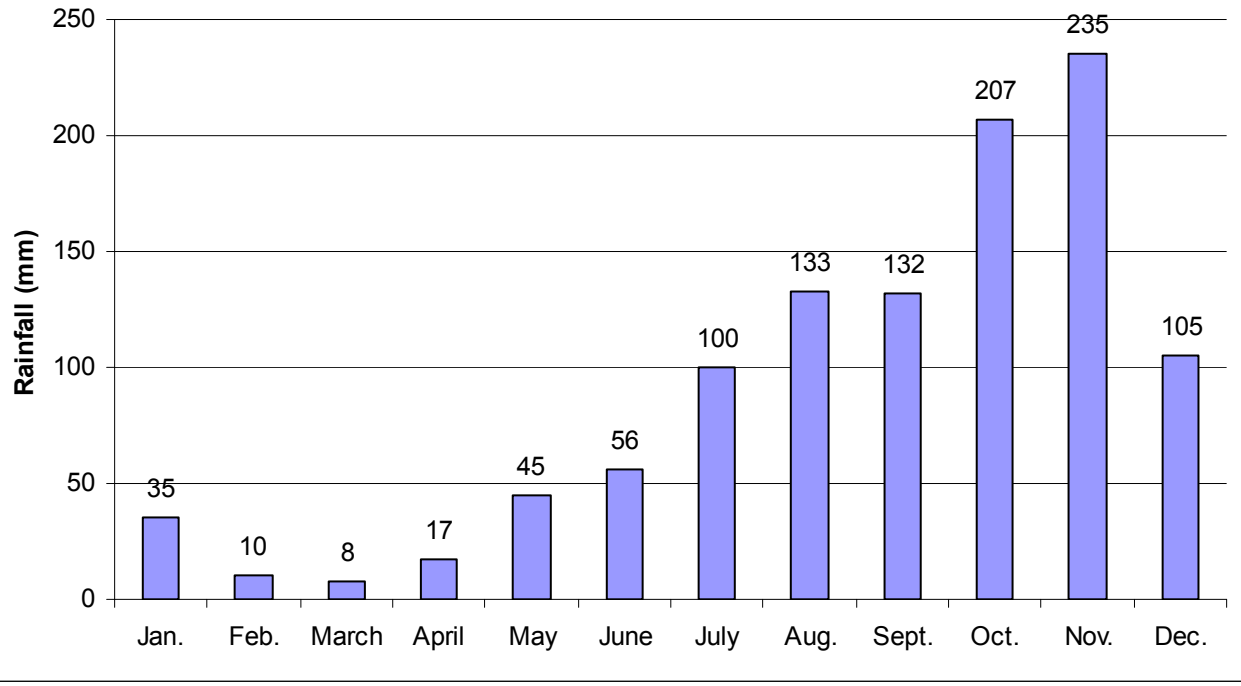
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	√		
	Flood	√		
	Cyclone	√		
	Hail storm			✓
	Heat wave			✓
	Cold wave			✓
	Frost			✓
	Sea water inundation	√		
	Pests and diseases (specify)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

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

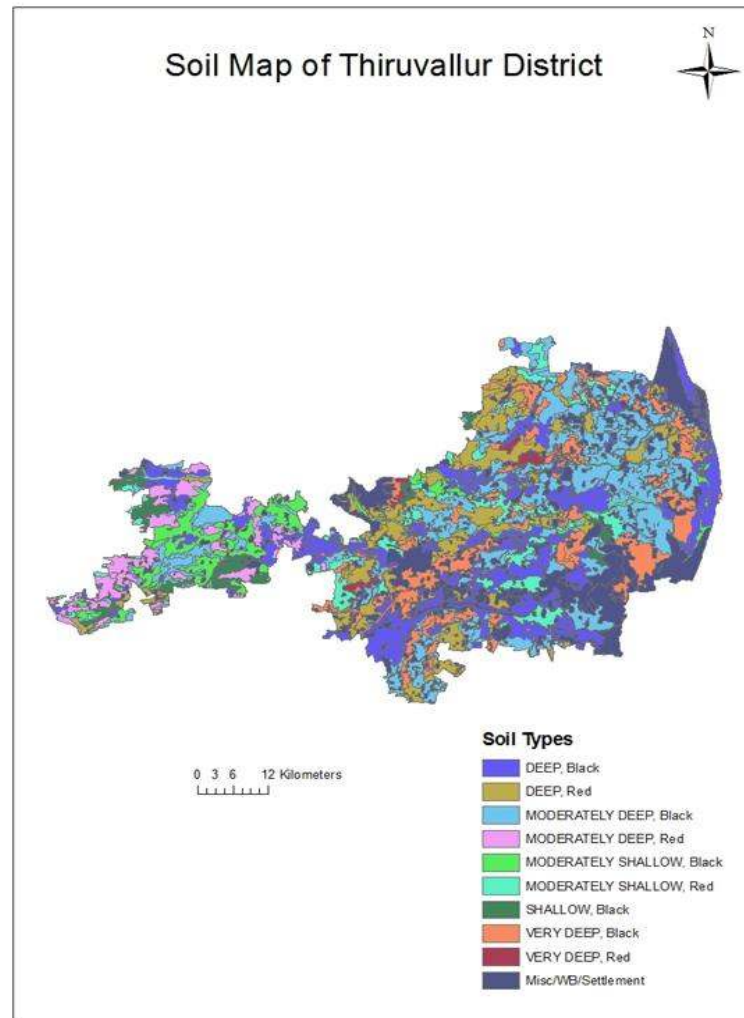
Annexure 1. Location map of Thiruvallur district and the blocks



Annexure 2. Mean annual rainfall of Thiruvallur district of Tamil Nadu



Annexure 3. Soil map of Thiruvallur district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks (June 3 rd week)	Laterite and red soils	Dry rice (June-Aug) Ground nut (June-Sep) Gingelly (Oct –Feb)	No change	No change	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks July 1st week	Laterite and red soil	Dry rice (June-Aug) Ground nut (June-Sep) Gingelly (Oct –Feb)	Maize/sunflower/groundnut Tapioca+ Groundnut Groundnut/Gingelly	Making field free of weeds for full utilization of water and nutrient Adopt higher seed rate Adopt Seed hardening	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (July 3 rd week)	Laterite and red soils	Dry rice (June-Aug) Ground nut (June-Sep) Gingelly (Oct –Feb)	Pure crop of Pearl millet ICMV – 221/ green gram COGG 912	1. Pearl millet cut for fodder 45 and 65 days and left for grains if rains are continued 2. Thinning of crops 3. Top dressing of Urea	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks (August 1st week)	Laterite and red soils	Dry rice (June-Aug) Ground nut (June-Sep) Gingelly (Oct –Feb)	Fodder Sorghum	Thicker sowing of fodder or green manure for <i>insitu</i> cultivation	

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
	Laterite and red soil	Dry rice (June-Aug) Groundnut (June-Sep) Gingelly (Oct –Feb)	Timely weeding Re -sowing		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Crop/cropping system	Crop management	Soil management	Remarks on Implementation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Laterite and red soils	Paddy	Three splits 25kg N and 12.5 kg K at 22-25, 40-45 and -65 day can be adopted Regular monitoring of the crop for pest and disease Timely weed management to conserve soil moisture	Keep the field bund clean to minimize pest and disease attack	Awareness creation on crop/soil management techniques
Vegetative stage		Groundnut+ Redgram (7:1) intercropping system	Protection from Thrips transmitted BND and PSND	Mulching with groundnut shells (1ton/acre)	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)	Laterite and red soils	Paddy	Foliar spray of 1% urea + 2% DAP + 1% KCL at panicle initiation and 10days later may be taken up for enhancing the rice field, if sufficient soil	.	
At reproductive stage					

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)		Groundnut+ Redgram (7:1)	moisture is ensured Regular monitoring of the crop for pest and disease Spray Urea @ 20g/litre of water at 35,45 and 65days after sowing Repeated inter cultivation		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought	Laterite and red soils	Paddy	Harvest the crop when 80% of the panicles are ripened	Tied ridges to conserve rainwater during <i>kharif</i> for regular sowing of <i>rabi</i> crops	
		Groundnut+ Red gram intercropping system	Use mobile sprinkler to maintain optimum soil moisture		

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	NA				

Condition	Suggested Contingency measures			
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures
Non release of water in canals under delayed onset of monsoon in catchment	NA			

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	Tank fed red soils and Tank fed black soils	paddy	Blackgram and Greengram are	Irrigation at critical stages Field should be properly leveled for uniform distribution of water	Linkage with NFSM /ISOPOM for seed supply

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Paddy	Short duration varieties	-	-
		Groundnut (Jan- April) TMV Pollachi red+ Redgram (LRG 30) intercropping (7 :1)	Normal Season cropping system TMV 2 POL 1 TAG 24	Normal sowing are done Soil Test based fertilizer recommendation	Under ISOPOM project certified seed of groundnut varieties can be sourced from ORS, Tindivanam/state department supply Under ICDP project certified seeds of pearl millet can be sourced from department
		Pearl Millet	Normal season cropping system KM 2, ICMU 221	Normal sowing - broadcast	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Bore well irrigated red soils and black soils	Groundnut and Sunflower	No change	Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material	-
Any other condition (specify)					

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Paddy	Drainoutthe excess water	Drainoutthe excess water	Drainoutthe excess water Harvesting at physiological maturity stage	Shift to safer place, use mechanical drier
Groundnut				Shift to safe place dry in shade and turn frequently
Greengram				
Sugarcane				
Gingelly				
Heavy rainfall with high speed winds in a short span²				
Paddy	Drainoutthe excess water and tying of lodged plants		Drainoutthe excess water	Shift to safe place Shift to safe place dry in shade and turn frequently
Groundnut	Drainoutthe excess water			
Greengram				
Sugarcane	Drainoutthe excess water tying of lodged plants			
Gingelly	Drainoutthe excess water			
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Protect against sheath blight	Set up light trap Spray Hexoconazole for protection against rice blast	Spray carbendazim+ thiram to manage grain discolouration	Dry the grains to 12% moisture level and store
Plant Hoppers, Sheath blight Grain discolouration				
Gingelly				

Groundnut	Need based Integrated Pest management practices			
Greengram				
Sugarcane				

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Paddy	Drainage, Appropriate Plant protection against Thrips	Drainage, appropriate Plant protection management for leaffolder, gall midge & stem borer and BPH	Drainage, appropriate Plant protection management	Drainout excess water
Groundnut	Drainage appropriate Plant protection management	Drainage appropriate Plant protection management	Drainage appropriate Plant protection management	Drainout excess water
Continuous submergence for more than 2 days				
Paddy	Drainout excess water	Drainout excess water, gap filling, top dressing with urea	Drainout the excess water	Drainout the excess water
Groundnut				
Sugarcane				
Greengram				
Blackgram				
Sea water intrusion				
Paddy	-			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<p>As the district is moderately prone to drought the following measures to be taken to mitigate the drought situation</p> <p>Sowing of cereals (Sorghum) and leguminous crops during North-East monsoon under dry land system for dry fodder production.</p> <p>Harvesting of fodder crops and hay making during the months of January and February for use in summer months/drought season.</p> <p>Ensiling and enrichment of surplus green grasses and sugarcane tops.</p> <p>Motivating the sugarcane farmers to convert</p>	<p>Harvest and use biomass of dried up crops (Paddy/groundnut/Greengram) material as fodder</p> <p>Chaffing of green and dry fodder to avoid wastage</p> <p>Use of unconventional and locally available cheap feed ingredients for feeding of livestock.</p> <p>Enrichment of dry fodder with urea, Salt and molasses.</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Transport of dry fodder bales from the fodder grid at DLF, Hosur to the drought affected villages</p> <p>Advising the farmers to feed balanced ration during summer months.</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands & supporting them with assisting infrastructures like seeds, money manure.</p> <p>Supply of quality seeds of COFS 29, Stylo and fodder slips of Co3, Co4,</p>

	<p>green sugarcane tops in to silage by the end of February</p> <p>Create awareness on establishment of pasture with drought resistant fodder Varieties like Guinea grass, stylo, kolukkattai grass, Acacia trees, etc.</p> <p>Creation of tree fodder models with Subabul, Glyricidia, Agathi, etc for tree fodder production during summer.</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp.</p> <p>Keeping sufficient stock of mineral mixture.</p> <p>Popularization of the use of chaff cutters to avoid fodder wastage.</p> <p>Educate the farmers about the proper method of hay making in order to avoid spoilage.</p> <p>Promote Azola cultivation at backyard</p> <p>Capacity building and preparedness of the stakeholders and official staff for the unexpected events</p>	<p>Feeding of chaffed and salt sprinkled crop residues.</p> <p>Supplementation of tree fodder with the available grass fodder.</p> <p>Feeding livestock with locally available cheaper brewery waste.</p> <p>Using of ensiled grasses and sugarcane tops during the drought period.</p> <p>Promotion of cultivation of Horse gram as contingent crop and harvesting it at vegetative phase as fodder</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	<p>guinea grass well before monsoon</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>

	Community drinking water trough can be arranged in shandies /community grazing areas		
Health and disease management	<p>List out the endemic diseases (species wise) in that district</p> <p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures.</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

<p>Floods</p>	<p>In case of early forewarning (EFW), harvest all the crops (Paddy/groundnut /greengram) that can be useful as feed/fodder in future (store properly)</p> <p>Don't allow the animals for grazing if severe floods are forewarned</p> <p>Keep stock of bleaching powder and lime</p> <p>Carry out Butax spray for control of external parasites</p> <p>Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>Identify the volunteers who can serve in need of emergency</p> <p>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</p>	<p>Transportation of animals to elevated areas</p> <p>Proper hygiene and sanitation of the animal shed</p> <p>In severe storms, un-tether or let loose the animals</p> <p>Avoid soaked and mould infected feeds / foddors to livestock</p> <p>Emergency outlet establishment for required medicines or feed in each village</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Bring back the animals to the shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Deworming with broad spectrum dewormers</p> <p>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</p> <p>Drying the harvested crop material and proper storage for use as fodder.</p>
<p>Cyclone</p>	<p>Harvest all the possible wetted grain (Paddy/groundnut /greengram etc) and use as animal feed.</p> <p>Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone</p> <p>Incase of EFW of severe cyclone, shift the animals to safer places.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen. Health camps should be organized</p> <p>In severe cases un-tether or let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR</p> <p>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</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p>

			<p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant</p> <p>Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.</p>
Heat wave and cold wave	NA		

2.5.2 Poultry

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with

	against RD and IBD	one litre water)	lime powder in pit
Floods			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed
Drinking water		Use water sanitizers or offer cool hygienic	

		drinking water	
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / deep burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against Ranikhet Disease (0.5ml S/c)

2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris and strengthening of pond embankments through turfing 	<ul style="list-style-type: none"> i. Shallow areas of derelict water bodies can be used for raising table sized fishes using stunted fish seeds and the culture can be done in enclosures (pens). Pens of 0.1 to 0.2ha are ideal for easy operation and economical. ii. Indian major carps and 	<ul style="list-style-type: none"> i. Due to severe water shortage farmers have to harvest fish in large quantities to avoid loss due to mortality. Leading to difficulties in marketing the fish farmers can be trained on the frozen storage techniques and in preparing value added products (ready to eat and processed products) ii. Adoption of short term culture of species wherein culture of species having rapid initial growth can be stocked. Eg. minor carps like silver

		<p>freshwater prawns are ideal species for culture.</p> <p>iii. Temporarily raising the height of the enclosures maybe done to prevent loss of stock in the event of sudden rise in water level due to sudden onset of rain or flooding.</p>	<p>barb (<i>Puntius gonionotus</i>) and fringe lipped carp (<i>Labeo fimbriatus</i>) can be undertaken.</p> <p>iii. Culture of minor carp like <i>Amblypharyngodon mola</i> can be done in shallow ponds and this being an auto breeder it spawns two or three times in a year which also ensure auto stocking.</p>
(ii) Changes in water quality	<p>i. Strictly implement in avoiding the use of plastics and other non-biodegradable material along the river belts (intervention and polluting by human is a common factor)</p> <p>ii. Avoid entry of pollutants like industrial effluents, run off from agricultural land into rivers</p>	<p>i. Reduced water volume in the pond/ local water bodies lowers its buffering capacity hence every precaution has to be taken while adopting use of manures and fertilizers to avoid onset of algal blooms and eutrophication</p>	
(iii) Any other	--	<p>i. Stunting of major carp fingerlings and stocking in grow out ponds as they grow faster (three times more growth than the non stunted fingerlings)</p> <p>ii. Ornamental fish rearing utilizing gold fishes, koi carp or</p>	

		live bearers like mollies and guppies can be done in summer. This ensures money flow to the farmers. ** subsidy to farmers for inputs like feed,seed.	
B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Water depth should be at least 1m for initiating fish culture. ii. Adopt low stocking density to reduce culture duration and culture should be done only after ensuring water availability for minimum period of 3 months. iii. In low tidal amplitude areas which receives north-east monsoon it is advised not to go for summer crop because of high temperatures which will lead to stress of culturable species. 	<ul style="list-style-type: none"> i. Farmers can be advised to take up integrated farming (poultry, piggery, duckery and animal husbandry with crops) to cut down cost on expensive inputs like feed and manure. ii. Avoid fertilization and manuring on supplementary basis. iii. Air breathing fish culture to be practised (Cat fish farming) 	<ul style="list-style-type: none"> i. Prepare pond for the next crop after early harvest ii. Always keep a constant check on the onset of algal blooms which will cause mass mortality of fishes iii. Harvest fish broodstock if any and shift to deeper safer areas like cement systems in indoor units to utilize for breeding on onset of monsoon
(ii) Impact of silt load build up in ponds / change in water quality	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris 	<ul style="list-style-type: none"> i. Feeding should be minimum to avoid organic loading 	<ul style="list-style-type: none"> i. On onset of sudden heavy rains heavy mortality will result so feeding should be controlled to avoid waste accumulation on pond bottom soil.
(iii) Any other	<ul style="list-style-type: none"> i. The physico-chemical quality of water has to be monitored regularly for its suitability for fish 	<ul style="list-style-type: none"> i. Concept of Re-circulatory system can be adopted as 	<ul style="list-style-type: none"> i. Train the farmers to breed fish in captivity and produce required amount of seed either through

	culture.	<p>additional water is not required thereby curtailing need for water exchange.</p> <p>ii. Use of aerators to overcome thermal stratification and build up of ammonia during high temperatures will help break the thermal stratification</p> <p>subsidy can be provided to farmers for the aerators</p> <p>iii. Partial harvesting to reduce biomass thereby competition for space and food is reduced.</p> <p>iv. Reduced stocking densities</p>	<p>hormonal treatment and environment manipulation.</p> <p>ii. Use of cryopreserved milt supplied from research units to aid breeding and ensure healthy stock</p> <p>(in collaboration with TANUVAS)</p>
2) Floods	Before the event	During the event	After the event
A. Capture			
Marine	<p>i. Train fisher folk on hygienic handling of fishes, short and long term preservation techniques and on preparation and packaging of value added fish products – as a small scale village activity</p> <p>ii. Establish cold chain facilities</p> <p>iii. Ensure strengthening of coastal belt by planting and maintaining the mangrove ecosystems</p> <p><i>** mangrove wetlands mitigate the adverse impact of storms, cyclones Tsunami in coastal areas and</i></p>	<p>i. Avoid fishing in deeper waters to avoid loss to gear, craft and human lives.</p>	<p>i. Loss incurred should be reported will be assessed by the State Fisheries Department officials and reimbursed.</p>

	<p><i>coastal erosion</i></p> <p><i>** mangroves are ideal breeding ,nursery and feeding grounds for a number of commercially important prawns, fishes and other shell fishes.</i></p> <p>iv. Ecologically sensitive areas to be earmarked such as mangroves, corals and estuaries to avoid overfishing</p> <p>v. Commercial exploitation of coral reefs and large scale removal of mangrove vegetation to be surveyed as this leads to dwindling fish harvests</p>		
Inland			
(i) Average compensation paid due to loss of human life	--- NA---	--- NA---	As per the norms of the State Government and implemented by the State Fisheries Department
(ii) No. of boats / nets/damaged	---NA---	---NA---	
(iii) No. of houses damaged	---NA---	---NA---	
(iv) Loss of stock	Sell the available fish stock as much as possible	Installation of gill net and using cast net for fishing the stock escapement through flooding	Onset of toxic gases in the system hence immediate stocking of fishes should not be carried out.
(v) Changes in water quality	Strengthening of bunds and embankments either through turfing and terracing to avoid water overflow or entry of waters from outside.	** Water should not be used for domestic purposes	Onset of toxic gases in the system hence immediate stocking of fishes should not be carried out.
(vi) Health and diseases	Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters		Ulcers and pox diseases in fishes will occur hence the fish stock has to be discarded or buried.

B. Aquaculture/ Mariculture in ponds	Before the event	During the event	After the event
(i) Inundation with flood water	i. Avoid culture of fishes requiring longer duration of culture. ii. Initiating fish culture in advance in areas frequently prone to flooding.	Immediately harvest the stocked fishes	--
(ii) Water exchange and changes in water quality	i. Strengthening of bunds and embankments either through turving and terracing	--	Application of lime to stabilize pH.
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters	--	Discard diseased stock and the following measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss	--	Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	i. Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure	--	** As on date there has been no measure to give subsidy to the inland fish farmers for loss of fish stock or infrastructure hence the farmers are suffering a heavy loss.

			** Therefore suggestions can be made to the Government to assess the impact of damage and the rate of compensation can be decided by the officials
(vi) Any other	** Special emphasis can be made to the Government for compensation to the practicing inland fish farmers as there is no help from the Government as given to the fisher folk suffering damages due to cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation		
3. Cyclone / Tsunami	Before the event	During the event	After the event
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
(ii) Avg. no. of boats / nets/damaged	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
(iii) Avg. no. of houses damaged	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
Inland	Cyclone / Tsunami		
B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Overflow / flooding of ponds	i. Planting trees like casuarinas along coastal belt to avoid coastal erosion and inundation of sea waters.	--	
(ii) Changes in water quality (fresh water / brackish water)	i. Stocking fishes which can tolerate wide salinity	--	Application of lime to stabilize pH.

ratio)	changes eg. Milkfish, pearl spot etc.		
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters	--	Discard diseased stock and the following measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	i. The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss	--	Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure	--	** Special emphasis can be made to the Government for compensation to the practicing inland fish farmers as there is no help from the Government as given to the fisher folk suffering damages due to cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation
(vi) Any other	Training programmes for stakeholders including resource users, planners and policy makers on coastal regulations, shoreline protection and environmental awareness.		
4. ****Heat wave and cold wave	Before the event	During the event	After the event
A. Capture			
Marine			i. To conduct studies on the ecological changes to

			assess the density and diversity of phyto and zooplankton and other benthic macro fauna (collaborative work with State Universities-TANUVAS)
Inland			
B. Aquaculture	Before the event ^a	During the event	After the event
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other	<p>i. Conservation of our coral reefs (natural treasures) as they are the most diversified and complex marine ecosystems</p> <p>ii. Conserve seagrass beds by imposing strict measures on trawling, removal for commercial purposes.</p>		

State: TAMILNADU

Agriculture Contingency Plan for District: THIRUVANNAMALAI

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghats (8.3)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills region (X)		
	Agro Climatic Zone (NARP)	North eastern zone (TN-1)		
	List all the districts or part thereof falling under the NARP Zone	Chengelpet, Vellore, Thiruvannamali, Villupuram, Cuddalore excluding Chidambaram and Kattumannarkovil		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		11° 55' to 13° 15' N	78° 20' to 79° 50' E	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, Virinjipuram, Vellore District -632 104 Oil Seeds Research Station, Thindivanam, Vilupuram District Sugarcane Research Station, Melalathur, Vellore		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Vedapuri, Thiruvannamalai		

1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep)	458	1 st week of June	1 st week of October
	NE Monsoon(Oct-Dec)	427	2 nd week of October	4 th week of December
	Winter (Jan- Feb)	59		
	Summer (Mar-May)	103		
	Annual	1047		

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)	631.2	153.3	93.5	2.9	13.1	2.3	21.1	90.6	29.9

Source: "G" Return , 2007-08

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Deep Black	135	21.5
	Deep Red	115	18.3
	Moderately Deep Black	91	14.6
	Moderately Deep Red	66	10.5
	Shallow Black	73	11.5
	Shallow Red	69	11.1

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	219.8	121.4
	Area sown more than once	47.1	
	Gross cropped area	266.9	

Source: Dept. of Soil Science, TNAU, Coimbatore & Directorate of Economics & Statistics (2008-09)

1.6	Irrigation	Area ('000 ha)	Percent (%)	
1	Net irrigated area	147.7	75.9	
2	Gross irrigated area	191.5	73.9	
3	Rainfed area	72.1	24.1	
	Sources of Irrigation	Number	Area ('000 ha)	Percent (%)
4	Canals		1.4	1.0
5	Tanks	1965	33.3	22.2
6	Open wells	155577	157.9	80.0
7	Bore wells	1331		
8	Lift irrigation	-		
9	Other sources	-	-	
10	Total		191.7	103.2
11	Pumpsets	150879	115.0	
12	Micro-irrigation	-		

	Groundwater availability and use	No. of blocks	percentage	Quality of ground water
13	Over exploited	9	50.0	Salinity level: 73 % good, 24% moderate and 3% poor Residual Sodium Carbonate: 90% good and 9% moderate Sodium Adsorption Ratio: 100 % good
14	Critical	2	11.1	
15	Semi- critical	5	27.8	
16	Safe	2	11.1	
	Wastewater availability and use	Data not available	--	
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: 'G' Return.

1.7. Area under major field crops & horticulture etc. (2009-10 – Source: Office of the JDA, Thiruvannamalai)

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

S.No.	Major crops cultivated	Irrigated	Rainfed	Total ('000 Ha)
	Major field crops			
1	Paddy	112.0	0.1	112.1
2	Groundnut	38.9	56.8	95.7
3	Sugarcane	28.2	0.0	28.2
4	Bajra	0.3	3.7	4.0
5	Blackgram	0.6	2.2	2.8
6	Ragi	0.9	1.5	2.4
	Horticultural crops			
1	Banana	3.2	0.0	3.2
2	Mango	0.3	0.4	0.7
3	Chillies	0.4	0.0	0.4
4	Brinjal	0.1	0.0	0.1

1.8 Livestock

Sl.No	Livestock	Male ('000)	Female ('000)	Total ('000)
1	Non Descriptive Cattle (Local low yielding)	94.1	110.0	204.1
2	Crossbred cattle	83.0	430.0	513.1
3	Non descriptive Buffaloes (Local low yielding)	-	-	22.6
4	Graded Buffaloes	-	-	
5	Goat			272.8
6	Sheep			366.7
7	Others: Pig, Yak, Rabbit			7.2

1.9 Poultry

	Poultry	No. of Farms	Total No. of birds (number)
	Commercial		314136
	Backyard		
	Turkey		170

1.10	Fisheries	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water			

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

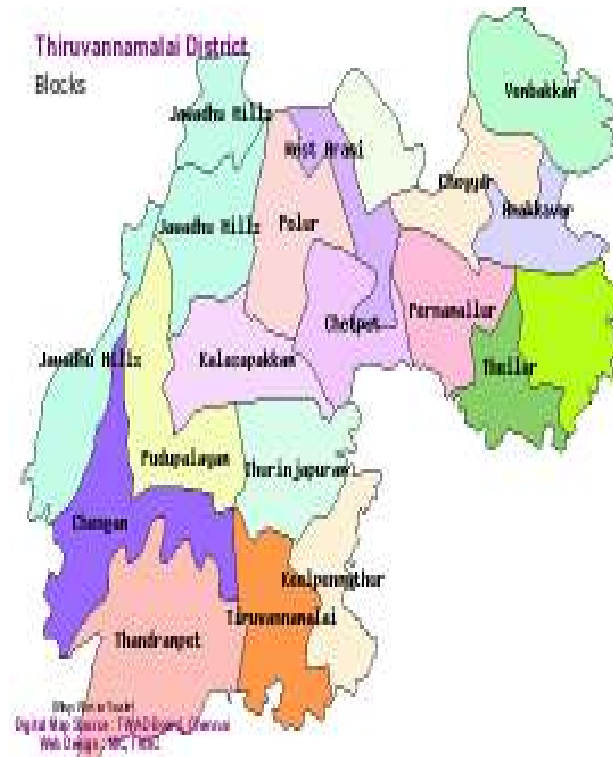
S.No.	Crops	Annual	
		Production ('000 t)	Productivity (kg/ha)
1	Paddy	392.5	3500
2	Bajra	4.2	1039
3	Ragi	3.9	1654
5	Blackgram	2.2	767
6	Groundnut	204.8	2139
7	Sugarcane	3274.3	116000
8	Brinjal	1.4	10329
9	Chillies	0.2	506
10	Banana	236.4	75104

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Ground nut	Blackgram	Ragi	Sugarcane
1	Kharif- Rainfed	-	July-August	-	-	-
2	Kharif-Irrigated	May- June	-	July-August	-	-
3	Rabi- Rainfed	-	-	-	November	-
4	Rabi-Irrigated	September - October	November - December	-	December – January	January –February

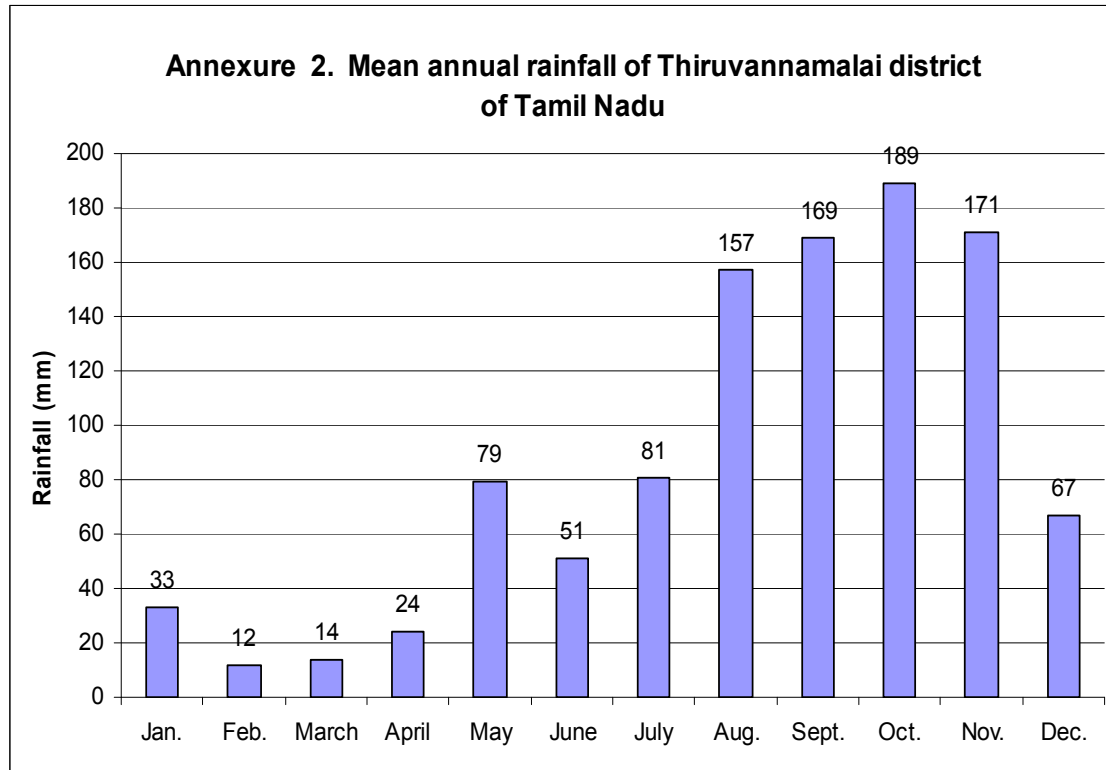
1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
1	Drought		✓	
2	Flood			✓
3	Cyclone			✓
4	Hail storm			✓
5	Heat wave			✓
6	Cold wave			✓
7	Frost			✓
8	Sea water inundation			✓
9	Pests and diseases (specify)			✓

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

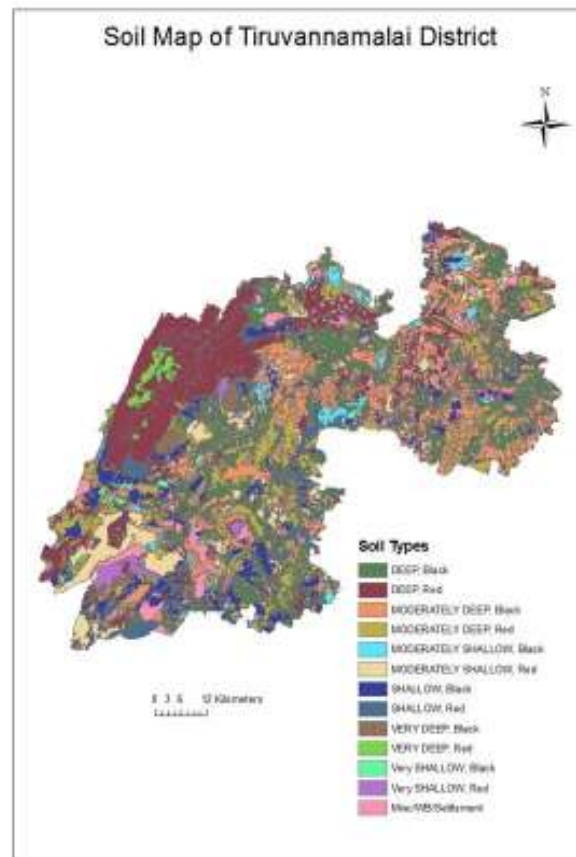
Annexure 1. Location map of Thiruvannamalai district and the blocks



Annexure 2. Mean annual rainfall of Thiruvannamalai district of Tamil Nadu



Annexure 3. Soil map of Thiruvannamalai district of Tamil Nadu



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation (*Kharif* season)

Condition	Major Farming situation	Normal Crop /cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Red, laterite and heavy clay soils	<ul style="list-style-type: none"> • Groundnut / Maize (June-Sep.) • Gingelly (June-Sep.) 	No change	-	-
Delayed by 2 weeks (June 3 rd week)			Pearl millet / horsegram / minor millets	<u>Pearl millet</u> Use short duration drought resistant varieties Seed hardening with 2 % potassium chloride Dust mulching by inter cultivation operations If failure of Maize/pearl millet, sesame may be sowing Re-sowing with fodder (fodder can be harvested at any stage keeping in view sowing of the next season)	-
Delayed by 4 weeks (July 1st week)			Pearl millet / horsegram /	-do-	
Delayed by 6 weeks					

July 3 rd week			minor millets / pulses		
Delayed by 8 Weeks August 1 st week			Fallow	-Plan for rabi crops	

Condition	Major situation	Farming	Normal Crop/cropping system	Suggested Contingency measures		
				Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Red, laterite and heavy clay soils		Groundnut / Maize (June-Sep)	Re-sow with subsequent rain rather than allowing sub-optimal poor plant stand or Gap filling	In-situ moisture conservation with locally available materials	
Mid season drought (long dry spell) At vegetative stage			Groundnut (June-Sep.)	Anticipating the prolonged dry spell Follow Intercropping (Companion cops – green gram, cowpea) Foliar spraying of nutrient / top dressing with fertilizer	Frequent inter culture operation to facilitate effect of loose soil as dust mulch Irrigation with rain gun or mobile sprinklers from farm ponds	
Mid season drought (long dry spell) At reproductive stage			Gingelly (June-Sep.)	Thinning	Frequent interculture operation to facilitate effect of loose soil as dust mulch Irrigation with rain gun or mobile sprinklers with available water	
Terminal drought				If necessary, harvest at physiological maturity	Supplemental irrigation if available	

2.1.2 Rabi Season

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Early season drought (delayed onset of NE Monsoon)			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed by 2 weeks October 3 rd week	Red, laterite and heavy clay soils	<ul style="list-style-type: none"> • Groundnut / Pulses / F ingermillet (Oct.-Feb.) • Gingelly (Oct.-Feb.) • Groundnut (Oct.-Feb.) 	No crop change	Foliar spraying of nutrient/ top dressing with fertilizer is done generally after establishment good crop stand	Linkage with NFSM for supply of seed
Delayed by 4 weeks November 1 st week			Pearl millet / Horsegram /minor Millets / Pulses (Oct.- Jan.)	<u>Pearl millet</u> Usage of short duration drought resistant varieties Seed hardening with 2 % potassium chloride Dust mulching by intercultivation In case of failure of Maize/ Pearl millet, Sesamum may be sown <u>Pulses</u> Seed hardening with 100 ppm of Zinc Sulphate and 100 ppm of Manganese Sulphate (Blackgram and	

				Greengram) Seed hardening with 100ppm of Zinc Sulphate (Red gram) Seed hardening with 1% Potassium Dihydrogen Phosphate (Bengalgram) Re-sowing with fodder (fodder can be harvested at any stage keeping in view sowing of the next season)	
Delayed by 6 weeks November 3 rd week			Pearl millet / Horsegram / minor millets / Pulses (Oct.- Jan.)	-do-	
Delayed by 8Weeks December 1 st week			Fallow	Rabi crops	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Red, laterite and heavy clay soils	• Groundnut / pulses /fingermillet (Oct.- Feb.)	Re-sow with subsequent rain rather than allowing sub-optimal poor plant stand to persist	In-situ moisture conservation with locally available materials Irrigation with rain gun or mobile sprinklers with	-

		• Gingelly (Oct.-Feb.)		available water	
Mid season drought (long dry spell) At vegetative stage			Anticipating the prolonged dry spell follow Inter-row cropping (Companion – green gram, cowpea) Foliar spraying of nutrient/ top dressing with fertilizer is done	Frequent inter culture operation to facilitate effect of loose soil as dust mulch Irrigation with raingun or mobile sprinklers with available water	
Mid season drought (long dry spell) At reproductive stage			Reduction of moisture stress by thinning the crops	Frequent inter culture operation to facilitate effect of loose soil as dust mulch	
Terminal drought			-	Supplemental irrigation to save crop	

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Changes in Crop/Cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Command areas (Sathanur) Heavy clay and sandy soils	Rice/Maize (Aug.-Jan) – Pulses/Gingelly (Jan. – Apr.)	Groundnut/Maize (Aug. – Dec.) – Pulses (Jan.- Apr.)	<u>Rice</u> Use of short duration drought resistant varieties Upland rice/aerobic rice/SRI/Semi-dry rice cultivation	

				<p>Use of pre-emergence herbicide</p> <p>Additional dosage (25%) of recommended N</p> <p>Spray of potassium chloride</p> <p><u>Pulses</u></p> <p>Seed hardening with 100ppm of Zinc Sulphate and 100 ppm of Manganese sulphate (Black gram and green gram)</p> <p>Seed hardening with 100ppm of Zinc Sulphate (Red gram)</p> <p>Seed hardening with 1% Potassium Dihydrogen Phosphate (Bengal gram)</p> <p><u>Groundnut</u></p> <p>Seed treatment with 0.5 % Calcium chloride</p> <p>Irrigation at pegging, flowering and pod development stage</p>	
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				<p>0.5 % potassium chloride spray during flowering and pod development stages to alleviate water stress</p> <p>Apply composted coir pith to soil for better water retention</p> <p><u>Maize</u></p> <p>Irrigation at 75 % available soil moisture Depletion (ASMD)</p> <p>Irrigation at critical stages (40 to 65 DAS)</p> <p>Skip irrigation at seedling, knee high and dough stages under water scarce situation</p> <p>Gingelly</p> <p>Life saving irrigation at 7DAS</p> <p>Irrigation at critical stages of moisture requirement - flowering stage (35-45 DAS)</p>	
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<p>Non release of water in canals under delayed onset of monsoon in catchment</p>		<p>Rice/Maize (Aug.-Jan) – Pulses/Gingelly (Jan. – Apr.)</p>	<p>Pearl millet/Sorghum/fodder (Oct.-Jan.)</p> <p>Cluster bean/Vegetable beans (Oct.-Jan.) in heavy soils</p>	<p><u>Rice</u></p> <p>Use of short duration drought resistant varieties</p> <p>Upland rice/aerobic rice/SRI/Semi-dry rice cultivation</p> <p>Perfect leveling of main field</p> <p>Shallow water depth at the time of planting (2cm)</p> <p>Use of pre-emergence herbicide</p> <p>Additional dosage (25%) of recommended N to make good volatilization loss of N</p> <p>Top dressing of Potassium</p> <p><u>Maize</u></p> <p>Irrigation scheduled at 75 % available soil moisture Depletion (ASMD)</p> <p>Irrigation done during the critical phase (40 to 65 DAS)</p>	
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				<p>Skipping irrigation at seedling, Knee high and dough stages followed under water scarce situation</p> <p><u>Pearl millet</u></p> <p>Use of short duration drought resistant varieties</p> <p>Seed hardening with 2 % potassium chloride</p> <p>Irrigation at crop critical growth phases (Heading and flowering)</p> <p>Dust mulching by intercultivation operations</p> <p>If failure of Maize/pearl millet, sesame may be sown (low seed requirement)</p> <p><u>Sorghum</u></p> <p>Seed hardening with 2 % potassium chloride</p> <p><u>Vegetables</u></p> <p>Drip irrigation and</p>	
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				<p>fertigation</p> <p>Mulching soil surface with organic materials and clean cultivation</p> <p>Growing vegetable such as cluster bean, cowpea, lab lab bean, radish, peas which can sustain with less amount of water</p> <p>Enhancing cucurbitaceous vegetables by raising nursery in Polythene bags followed by transplanting in order to save 2-3 irrigations</p> <p>Sowing/planting cucurbitaceous vegetable adopting hill and channel system to economise water</p> <p><u>Fodder crop</u></p> <p>Life irrigation</p> <p>Raingun can be effectively used for irrigation with a water saving of 25-30%</p>	
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Lack of inflows into tanks due to insufficient /delayed onset of monsoon		Rice/Maize (Aug.-Jan) – Pulses/Gingelly (Jan. – Apr.)	Pearl millet/Sorghum/fodder (Oct.-Jan.) Cluster bean/vegetable beans (Oct.-Jan.) in heavy soils	-do-	
Insufficient groundwater recharge due to low rainfall	Red and laterite soils (Well irrigated areas)	<ul style="list-style-type: none"> • Rice (Aug.-Jan.) - groundnut (Feb.-April) – gingelly (Apr. - June) • Sugarcane (Dec.-Jan.) - ratoon sugarcane (Jan.-Nov.) - rice (Dec.-May) - groundnut (June-Sep.) – 3 years rotation • Vegetables (June-Oct.) - maize (Oct.-Jan.) - cotton / pulses (Feb.-May) • Maize (June-Sep.) – marigold (Oct.-Feb.) – pulses (Feb.-May) • Vegetables (Jun.-Sept.) – sugarbeet (Sept.-Feb) – pulses (Feb-May) • Groundnut (Jun-Sept) – sugarbeet (Sept.-Feb) – Sweet sorghum* (Feb- 	<ul style="list-style-type: none"> Vegetables (May-July) - Maize/Sunflower (Aug.-Dec.) - Pearl millet / Groundnut / Gingelly/ (Jan.-April) • Groundnut (Jun-Sept) – (Sept. sowing) • Maize (Jun-Sept) – Sugarbeet (Sept.-Feb) – pulses (Feb-Apr) • Pearl millet / Sorghum / <i>Periwinkle</i>/ Senna (July-Oct.) - Wheat (Nov.-Feb.) - Cluster bean / lab lab / Bhendi / Water melon (Feb.-May) 	<p><u>If Sugarcane is still taken up, follow:</u></p> <p>Drip irrigation & fertigation (25-30 % water saved)</p> <p>Planting setts at 150cm (super factory model)</p> <p>Alternate furrow irrigation and broad bed furrow method</p> <p>Skip furrow irrigation (clay and loam soils)</p> <p>Sugarcane trash mulching/dust mulching through inter cultivation operation</p> <p>Alternate furrow should be skipped and may be converted to ridges having a wider bed.</p>	

		<p>May)</p> <ul style="list-style-type: none"> • Groundnut (Jun-Sept.) – Jatropha* (Sept. sowing) 		<p>Short duration crops like pulses can be raised in wider bed without excessive irrigation</p> <p>Intercultural operations may be undertaken to create dust mulch</p> <p>Irrigation at critical stages of crop growth</p> <p>Weed control through herbicides/weeds may be cut and used as surface mulch to conserve soil moisture</p> <p>Earthing up operation also could be taken</p> <p>If poor growth main crop can be harvested and maintained as ratoon (harvested crop may used seed cane)</p> <p>Spray of 2.5 % urea with 2.5 % KCl or MOP may be useful in areas where some soil moisture is available. This will impart drought tolerance to plants</p>	
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				<p><u>Rice</u></p> <p>Seed treatment with seed hardening chemicals</p> <p>Upland rice/aerobic rice/SRI/Semi-dry rice cultivation</p> <p>Additional dosage (25%) of recommended N</p> <p>Top dressing of potassium</p> <p>Spray anti-transpirants</p> <p>Spray of potassium chloride</p> <p><u>Vegetables</u></p> <p>Drip irrigation and fertigation</p> <p>Mulching soil surface with organic materials and clean cultivation</p> <p>Growing vegetable such as cluster bean, cowpea, lab lab bean, radish, peas which can sustain with less amount of water</p> <p>Enhancing cucurbitaceous</p>	
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				<p>vegetables by raising nursery in Polythene bags followed by transplanting in order to save 2-3 irrigations</p> <p>Sowing/planting cucurbitaceous vegetable adopting hill and channel system to economise water</p> <p><u>Maize</u></p> <p>Irrigation will be scheduled at 75 % available soil moisture Depletion (ASMD)</p> <p>Irrigation will be done during the critical phase (40 to 65 DAS)</p> <p>Skipping irrigation at seedling, Knee high and dough stages may be followed under water scarce situation</p> <p><u>Pearl millet</u></p> <p>Usage of short duration drought resistant varieties</p>	
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				<p>Seed hardening with 2 % potassium chloride</p> <p>Irrigation at crop critical growth phases (Heading and flowering)</p> <p>Dust mulching by intercultivation operations</p> <p>If Maize / Pearl millet fail, Sesame may be sown (low seed requirement)</p> <p><u>Sorghum</u></p> <p>Seed hardening with 2 % potassium chloride</p> <p><u>Groundnut</u></p> <p>Irrigation at critical stages pegging, flowering and pod development stage</p> <p>0.5 % potassium chloride spray during flowering and pod development stages will aid to mitigate the ill effects of water stress</p> <p>Coir pith compost increase moisture</p>	
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				<p>availability and better drainage in heavy textured soil is required</p> <p>Seed treatment with 0.5 % Calcium chloride</p> <p><u>Gingelly</u></p> <p>Life saving irrigation at 7DAS</p> <p>Critical stages for moisture requirement is flowering phase (35-45 DAS)</p> <p><u>Sunflower</u></p> <p>Skip/alternate furrow irrigation under water scarce condition</p> <p>Seed treatment with 2% of potassium chloride solution</p>	
Any other condition (specify)	-	-	-	-	-

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations) – This situation occurs very rarely

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Crops	Drain excess water	Drain excess water	Follow weather advisory before harvest decision	<ol style="list-style-type: none"> 1. Shift produce immediately from the field 2. Threshing will be taken as soon as possible 3. Drying the produce with mechanical dryers 4. Postharvest chemical treatments of produce and marketing

2.5 Contingent strategies for Livestock & Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed & Fodder availability	Training to farmers on silage & hay making with method demonstration has to be carried out Education on drought resistant grasses & tree fodders Increase in concentrate feed to off set drought	<ul style="list-style-type: none"> ➤ Silage, Azola and hay to be fed during draught. ➤ Increased amount of concentrates to be given to off set grazing. 	Supply of Co3,Co4 cuttings to farmers Impact on the training programme & method demonstration on feed & fodder management during drought period has to be evaluated.

Drinking water	De-silting of ponds	Daily requirement of water supply for cattle in Tiruvannamalai district: 12671.053Kld (Kld- Kilo Litres per day) Existing system of water supply (Cattle troughs, Ponds, Oorani, Springs Canals & ditches) : 3686.253 Kld Digging of Borewells, open wells, with Power pump, Mini power pump and Hand pump to meet the water requirement is suggested.	Power pump - 4023 Nos. Mini power pump - 3190 Nos. Community drinking water trough can be arranged in shandies and more in community grazing areas
Health & Disease management	Information to farmers on how to combat outbreaks Possible outbreaks during drought By Capacity building programmes, Awareness campaign.	FMD outbreak occurred during July 2008 at Vadamathimangalam, Tiruvannamali Dt. Vaccination for FMD & deworming were carried out during in the outbreak area. Refresher courses for Veterinary staff and Livestock Inspector with regard to health & management measures may be taken up	Vaccination & deworming were carried out during Mass contact programs/ Kalnadai Padukappu thittam. ASCAD awareness campaigns were carried out Impact on information disseminated to the farmers on disease prevention & control measures during drought period has to be carried out.
Floods	Not applicable		
Heat wave & Cold wave		Community shed for giving shelter to all livestock during heat wave & cold wave is suggested. Planting of trees/ fodder trees in village community grazing area is suggested.	
Feed & Fodder availability	Training to farmers on silage & hay making with method demonstration has to be carried out Education on drought resistant grasses & tree fodders	--	Supply of Co3,Co4 cuttings

	Increase in concentrate feed to off set drought		
Drinking water	Desilting of ponds	--	Supply of Power pumps and mini-power pumps as in the past Community drinking water trough can be arranged in shandies and more in community grazing areas
Health & Disease management	Information to farmers on how to combat outbreaks Possible outbreaks during drought By Capacity building programmes, Awareness campaign.	Awareness on Summer and winter management recommendations are to be given during Awareness campaigns and farmers interaction is the suggestive measure to overcome heat and cold wave.	Vaccination & de-worming Mass contact programs/ Kalnadai Padukappu thittam. ASCAD awareness campaigns as done in the past Impact on information disseminated to the farmers on disease prevention & control measures during drought period needs to be assessed for further improvement

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			

<p>(i) Shallow water depth due to insufficient rains/inflow</p>	<p>i. Rainwater harvesting</p> <p>ii. Deepening/ Desilting of existing water bodies</p> <p>iii. Removal of debris and strengthening of pond embankments through turfing</p>	<p>i. Shallow areas of derelict water bodies can be used for raising table sized fishes using stunted fish seeds and the culture can be done in enclosures (pens). Pens of 0.1 to 0.2ha are ideal for easy operation and economical.</p> <p>ii. Indian major carps and freshwater prawns are ideal species for culture.</p> <p>iii. Temporarily raising the height of the enclosures maybe done to prevent loss of stock in the event of sudden rise in water level due to sudden onset of rain or flooding.</p>	<p>i. Due to severe water shortage farmers have to harvest fish in large quantities to avoid loss due to mortality. Leading to difficulties in marketing the fish farmers can be trained on the frozen storage techniques and in preparing value added products (ready to eat and processed products)</p> <p>ii. Adoption of short term culture of species wherein culture of species having rapid initial growth can be stocked. Eg. minor carps like silver barb (<i>Puntius gonionotus</i>) and fringe lipped carp (<i>Labeo fimbriatus</i>) can be undertaken.</p> <p>iii. Culture of minor carp like <i>Amblypharyngodon mola</i> can be done in shallow ponds and this being an auto breeder it spawns two or three times in a year which also ensure auto stocking.</p>
<p>(ii) Changes in water quality</p>	<p>i. Strictly implement in avoiding the use of plastics and other non-biodegradable material along the</p>	<p>i. Reduced water volume in the pond/ local water bodies lowers its buffering capacity hence every precaution has to be taken while adopting use of manures and fertilizers to avoid onset of algal blooms and eutrophication</p>	

	<p>river belts (intervention and polluting by human is a common factor)</p> <p>ii. Avoid entry of pollutants like industrial effluents, run off from agricultural land into rivers</p>		
(iii) Any other	--	<p>i. Stunting of major carp fingerlings and stocking in grow out ponds as they grow faster (three times more growth than the non stunted fingerlings)</p> <p>ii. Ornamental fish rearing utilizing gold fishes, koi carp or live bearers like mollies and guppies can be done in summer. This ensures money flow to the farmers</p> <p>Supply of fish stock in case of loss</p>	
B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Shallow water in ponds due to insufficient rains/inflow	<p>i. Water depth should be at least 1m for initiating fish culture.</p> <p>ii. Adopt low stocking density to reduce culture duration and culture</p>	<p>i. Farmers can be advised to take up integrated farming (poultry, piggery, duckery and animal husbandry with crops) to cut down cost on expensive inputs like feed and manure.</p>	<p>i. Prepare pond for the next crop after early harvest</p> <p>ii. Always keep a constant check on the onset of algal blooms which will cause mass mortality of fishes</p>

	<p>should be done only after ensuring water availability for minimum period of 3 months.</p> <p>iii. In low tidal amplitude areas which receives north-east monsoon it is advised not to go for summer crop because of high temperatures which will lead to stress of culturable species.</p>	<p>ii. Avoid fertilization and manuring on supplementary basis</p> <p>iii. Air breathing fish culture to be practiced (Cat fish farming)</p>	<p>iii. Harvest fish brood stock, if any and shift to deeper safer areas like cement systems in indoor units to utilize for breeding on onset of monsoon</p>
(ii) Impact of silt load build up in ponds / change in water quality	<p>i. Rainwater harvesting</p> <p>ii. Deepening/ Desilting of existing water bodies</p> <p>iii. Removal of debris</p>	<p>i. Feeding should be minimum to avoid organic loading</p>	<p>i. On onset of sudden heavy rains heavy mortality will result so feeding should be controlled to avoid waste accumulation on pond bottom soil.</p>
(iii) Any other	<p>i. The physico-chemical quality of water has to be monitored regularly for its suitability for fish culture.</p>	<p>i. Concept of Re-circulatory system can be adopted as additional water is not required thereby curtailing need for water exchange.</p> <p>ii. Use of aerators to overcome thermal stratification and build up of ammonia during high temperatures will help break the thermal stratification</p> <p>** subsidy can be provided to farmers for the aerators</p> <p>iii. Partial harvesting to reduce biomass thereby</p>	<p>i. Train the farmers to breed fish in captivity and produce required amount of seed either through hormonal treatment and environment manipulation.</p> <p>ii. Use of cryopreserved milt supplied from research units to aid breeding and ensure healthy stock</p> <p>(in collaboration with TANUVAS)</p>

		competition for space and food is reduced. iv. Reduced stocking densities	
2) Floods	Before the event	During the event	After the event
A. Capture			
Marine	<p>i. Train fisher folk on hygienic handling of fishes, short and long term preservation techniques and on preparation and packaging of value added fish products – as a small scale village activity</p> <p>ii. Establish cold chain facilities</p> <p>iii. Ensure strengthening of coastal belt by planting and maintaining the mangrove ecosystems</p> <p><i>** mangrove wetlands mitigate the adverse impact of storms, cyclones Tsunami in coastal areas and coastal erosion</i></p> <p><i>** mangroves are ideal breeding ,nursery and feeding grounds for a number of commercially important prawns, fishes and other shell fishes.</i></p>	i. Avoid fishing in deeper waters to avoid loss to gear, craft and human lives.	i. Loss incurred should be reported will be assessed by the State Fisheries Department officials and reimbursed.

	iv. Ecologically sensitive areas to be earmarked such as mangroves, corals and estuaries to avoid overfishing v. Commercial exploitation of coral reefs and large scale removal of mangrove vegetation to be surveyed as this leads to dwindling fish harvests		
Inland			
(i) Average compensation paid due to loss of human life	--- NA---		As per the norms of the State Government and implemented by the State Fisheries Department
(ii) No. of boats / nets/damaged	---NA---		
(iii) No. of houses damaged	---NA---		
(iv) Loss of stock	Sell the available fish stock as much as possible	Installation of gill net and using cast net for fishing the stock escaped through flooding	There is a possibility of onset of toxic gases in the system, hence immediate stocking of fishes should not be carried out
(v) Changes in water quality	Strengthening of bunds and embankments either through turfing and terracing to avoid water overflow or entry of waters from outside.	Water should not be used for domestic purposes	There is a possibility of onset of toxic gases in the system, hence immediate stocking of fishes should not be carried out
(vi) Health and	Water quality management to be followed thoroughly by		Ulcers and pox diseases in fishes will occur hence

diseases	weekly sampling to monitor water quality parameters		the fish stock has to be discarded or buried.
B. Aquaculture/ Mariculture in ponds	Before the event	During the event	After the event
(i) Inundation with flood water	i. Avoid culture of fishes requiring longer duration of culture. ii. Initiating fish culture in advance in areas frequently prone to flooding.	Immediately harvest the stocked fishes	--
(ii) Water exchange and changes in water quality	i. Strengthening of bunds and embankments either through turfing and terracing		Application of lime to stabilize pH.
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters		Discard diseased stock and the following measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss		Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure	i. Initiating fish culture in advance in areas frequently prone		As on date there has been no measure to give

damage (pumps, aerators, huts etc)	to flooding to prevent damage to the infrastructure		subsidy to the inland fish farmers for loss of fish stock or infrastructure hence the farmers are suffering a heavy loss. Therefore suggestions can be made to the Government to assess the impact of damage and the rate of compensation can be decided by the officials
(vi) Any other	Compensation to practicing inland fish farmers may be contemplated in case of cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation		
3. Cyclone / Tsunami	Before the event	During the event	After the event
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	As per prevailing Government norms		
(ii) Avg. no. of boats / nets/damaged	As per prevailing Government norms		
(iii) Avg. no. of houses damaged	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
Inland	Cyclone / Tsunami		

B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Overflow / flooding of ponds	i. Planting trees like casuarinas along coastal belt to avoid coastal erosion and inundation of sea waters.	--	
(ii) Changes in water quality (fresh water / brackish water ratio)	i. Stocking fishes which can tolerate wide salinity changes eg. Milkfish, pearl spot etc.	--	Application of lime to stabilize pH.
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters	--	Discard diseased stock and the following measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	i. The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss	--	Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators,	Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure	--	-

shelters/huts etc)			
(vi) Any other	Training programmes for stakeholders including resource users, planners and policy makers on coastal regulations, shoreline protection and environmental awareness		
4 Heat wave and cold wave	Before the event	During the event	After the event
A. Capture			
Marine			i. To conduct studies on the ecological changes to assess the density and diversity of phyto and zooplankton and other benthic macro fauna
Inland			
B. Aquaculture	Before the event	During the event	After the event
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other	i. Conservation of our coral reefs (natural treasures) as they are the most diversified and complex marine ecosystems ii. Conserve sea grass beds by imposing strict measures on trawling, removal for commercial purposes.		

State: TAMILNADU

Agriculture Contingency Plan District: THIRUVARUR

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	East Coastal Plain, hot, subhumid ecosubregion (18.2)		
	Agro-Climatic Region (Planning Commission)	East Coastal Plains and Hill Region (XI)		
	Agro Climatic Zone (NARP)	Cauvery Delta zone (TN-4)		
	List all the districts or part thereof falling under the NARP Zone	Thiruvarur, Thanjavur, Nagapattinam and Parts of Trichy, Ariyalore, Cuddalore and Pudukottai		
	Geographic coordinates of district Hqs	Latitude	Longitude	Altitude
		10° 20' N	75° 15' E	10 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Tamil Nadu Rice Research Institute, P.O :Aduthurai.		
Mention the KVK located in the district	Krishi Vigyan Kendra , Needamangalam (Post), Thiruvarur District			
1.2	Rainfall	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Aug):	302	2 nd week of June	1 st week of August
	NE Monsoon (Sep - Dec):	665	2 rd week of September	1 st week of December
	Winter (Jan- Feb)	57	4 nd week of January	2 nd week of February
	Summer (Mar-May)	100	3 rd week of April	2 nd week of May
	Annual	1124		

1.3	Land use pattern of the district	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Net cultivated area	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable Land	Current fallows	Other fallows
	Area ('000ha)	209.7	2.45	37.08	0.79	155.24	1.74	2.19	0.12	2.14	7.97

1.4	Major Soils	Area (Sq.Km)	Percent (%) of total
	Very deep black soils	828	39.5
	Deep black soils	628	30.0
	Deep red soils	118	5.6
	Moderately deep red soils	112	5.3
	Moderately deep black soils	59	2.8
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	155.2	176.5
	Area sown more than once	118.8	
	Total cultivable area	274.0	

1.6	Irrigation	Area ('ha)	Per cent (%) to gross and net cultivated area	
	Net irrigated area	149.6	94.79	
	Gross irrigated area	187.1	96.25	
	Rainfed area	5.7	5.21	
	Sources of Irrigation	Number	Area (ha)	% area
	Canals	13	145.2	100.0
	Tanks	-	-	
	Open wells	164	-	
	Tube wells -	10477	-	
	Filter points tube well	2849	-	
	Dug cum bore wells	338	-	
	Other sources-Supplementary wells	-	27248	16.4
	Total irrigated area		166145	100.0
	Pumpsets	18860	-	
	No. of Tractors	NA	-	
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	1	14.1	pH – 7.2 to 7.6 EC - 1.3 to 1.5
	Critical	1	11.4	
	Semi- critical	4	50.7	
	Safe	2	23.8	
	Waste water availability and use (MCum)	Data not available		

*NA=Not available

1.7 Area under major field crops & horticulture etc. (2008-09)

1.7	S.No.	Major Field Crops cultivated	Area ('000 ha)*					
			Kharif		Rabi		Summer	Total
			Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	
1	Paddy	9.0	-	140.6	-	1.9	151.6	
2	Blackgram	0.4	-	0.3	52.9	-	53.7	
3	Greengram	-	0.02	-	30.7	-	30.7	
4	Groundnut	0.09	-	7.7	-	-	7.8	
5	Gingelly	-	0.01	0.7	2.0	-	2.7	
	S. No	Horticulture Crops - Vegetables	Total Area ('000 ha)* (2008-09)					
	1.	Tapioca	0.2					
	2.	Brinjal	0.02					
	3.	Bhendi(ladies finger)	0.01					
	4.	Drumstick	0.04					
	5.	Greens	0.008					
	S. No	Horticulture Crops – Fruits	Total Area ('000 ha)* (2008-09)					
	1.	Banana	0.4					
	2.	Mango	0.1					
	3.	Jack	0.01					
	S. No	Flowers	Total Area (2008-09)					
			-					
	S. No	Spices & Plantation crops	Total Area ('000 ha)* (2008-09)					
	1	Arecanut	0.02					
	2	Coconut	5.3					
	3	Tamarind	0.1					

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)			
	Cattle	-	-	269.5			
	Buffalo			7.6			
	Sheep			311.1			
	Goat			5.8			
	Others			2.05			
	Commercial poultry			6000(No. of farms-6)			
	Rat			386			
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial						
	Backyard						
1.10	Fisheries						
	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)	
		12032	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		300		----		4814	
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	540		1		540	

ii) Fresh water (Data Source: Fisheries Department)	500	2	1000
Others	-	-	-

1.11 Production and Productivity of major crops (Average of last 3 years i.e. 2006, 2007, 2008)

1.1 1	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)
	Paddy	32.2	3568	271.8	1933	7.2	3707	311.3	3069
	Blackgram	91.6	207	62.6	207	10977.8	207	11132.0	207
	Greengram	4.4	135	4905.6	135	-	-	4910.0	135
	Groundnut	215.6	2199	17133.3	2199	-	-	17349.0	2199
	Gingelly	431	570	1073	532	-	-	1504	551

1.12	Sowing window for 5 major crops (start & end of sowing period)	Paddy	Blackgram	Greengram	Groundnut	Cotton	Sugarcane
	Kharif- Irrigated	2 st week of June to 1 st week of July	1 st week of June to 1 st week of July	-	1 st week of June to 2 nd week of July	-	-
	Kharif - Rainfed	-	-	-	-	-	-
	Rabi- Irrigated	2 st week of September to 1 st week of October	3 rd week of September to 2 nd week of October	-	-	3 rd week of September to 2 nd week of October	2 nd week of December to last week of January
	Rabi-Rainfed	-	-	-	-	-	-

	Summer-Irrigated	2 st week of December to 1 st week of January	last week of December to 1 st week of January	4 th week of December to 1 st week of January	3 rd week of December to 2 nd week of January	2 st week of January to 1 st week of February	-
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1.13	What is the major contingency the district is prone to? (Tick mark)*	Regular	Occasional	None
	Drought	-	-	√
	Flood	√	-	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and diseases (specify)	-	√	-
	Others (specify)	-	-	-

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

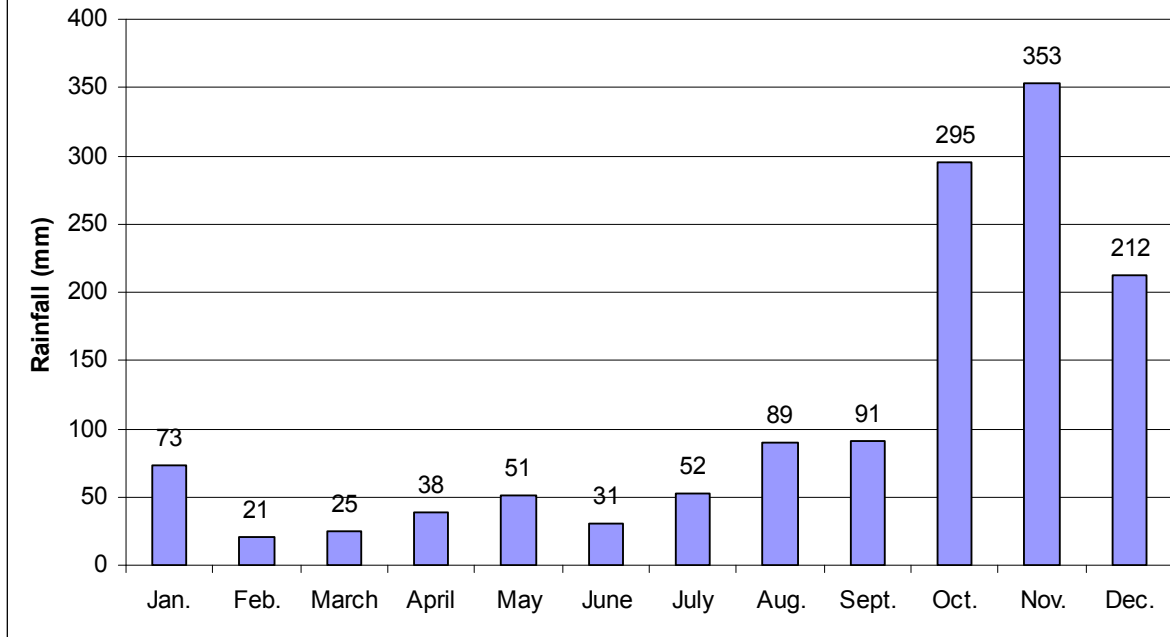
Annexure 1. Location map of Thiruvarur district and the blocks



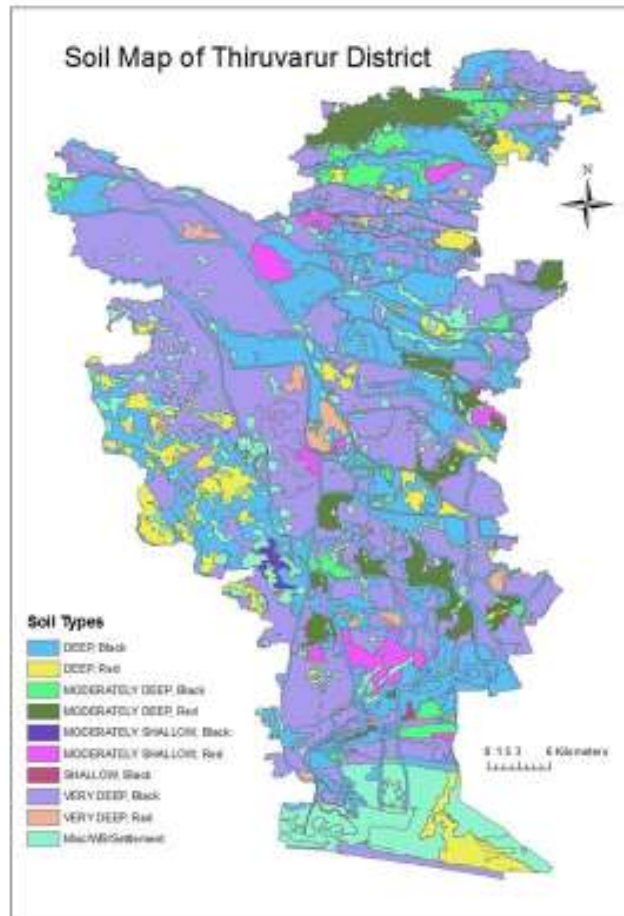
Thiruvarur District Blocks



Annexure 2. Mean annual rainfall of Thiruvarur district of Tamil Nadu



Annexure 3. Soil map of Thiruvarur district of Tamil Nadu



Source:NBSSLUP

2.0 Strategies for weather related contingencies

2.1 Drought –Not applicable

2.1.1 Rainfed situation – Not applicable for Thiruvavarur district

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks)			NA		
Delay by 4 weeks					
Delay by 6 Weeks					
Delay by 8 Weeks					
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.)			NA		
Mid season drought (long dry spell)			NA-		
At vegetative stage			NA-		
At reproductive stage			NA-		
	NA-				

2.1.2 Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop /cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Very deep clay, deep clay and medium clay soils	Rice-Rice-Pulse	Green manure-Rice-Pulse	Use short duration varieties like ADT 36, ADT 37 , ADT 38 , ADT (R) 48 SRI method of planting to reduce the duration of seedling age Direct sown wet seeding by drum seeder Areobic rice cultivation by irrigaion of water after disapperance Semi dry rice cultivation (line sowing and broad casting of sprouted seeds in well ploughed soil based on the receipt rainfall and converted as wetland conditionafter water released from canal water.	Source for seeds : Department of Agriculture, Krishi Vigyan Kendra, and Tamil Nadu Rice Research Institute.
	Deep red and moderately deep red soils	Rice (Short Duration)-Rice (Medium Duration)-Rice fallow pulse Fallow- Rice (Medium Duration)-Rice fallow pulse	Maize-Rice –Rice Fallow pulse (summer irrigated) Green manure-Rice-Irrigated and Rice fallow Pulse	Use maize short duration hybrids Hybrids : COMH 5, Kargil, Cultivation of maize in broad bed furrows Application of micro nutrient @ 12.5 kg /ha Management of shoot fly by treating the seeds with carbofuran 3 G (20 :1 ratio) Rice Sowing green manures like sunhemp, daincha and theprosia (Kozhungi) Use short duration variety like ADT 36, ADT 37 , ADT 38 , ADT (R) 48 SRI method of planting Transplanting the seedling by Paddy transplanter ZnSO4 application & 25 kg/ha Adopting IPDM practices to control pest and disease problem	Source for seeds : TNAU, Coimbatore ad Privte seed companies like MAHYCO, RASI seeds Source for green manure seeds: TRRI, Aduthurai and Department of Agriculture

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Rice based farming system Very deep clay, deep clay and medium clay soil Deep red and moderately deep red soil	Rice-Rice-Pulse/Groundnut	Pulse – Rice – Rice Fallow Pulse Pulse – Rice – Gingelly Pulse – Rice – Vegetables	Sowing short duration black gram varieties like ADT 3 and ADT 5. Long duration rice variety (CO (R) 50, CR 1009, BPT 5204 and Improved White Ponni Application rice micronutrient(IX) mixture Sowing improved gingelly varieties like SVPR 1, SVPR 2 and TMV 7 Cultivation of vegetables like bhendi, chilli and brinjal Foliar application of 2% DAP and 1% TNAU Pulse wonder spray for pulses Adopting IPDM practices for rice pests and disease problem like Stem borer, Leaf folder, Blast, Bacterial leaf streak, Grain discoloration Adopting IPDM practices for pulse pest and disease problem like Thrips, Aphids, Pod borer Adopting IPDM practices for gingelly pests and disease problem like Leaf miner, Phyllody Adopting IPDM practices for pests on vegetables and diseases problem like Fruit borer, Wilt	TNAU Pulse wonder is available in Department of crop Physiology, TNAU, Coimbatore. For gingelly and vegetable seeds Department of Seed science and technology and department of Olericulture, TNAU, Coimbatore
Insufficient groundwater recharge due to low rainfall	Rice based cropping system Very deep clay, deep clay and Medium clay soils Deep red and moderate deep	Rice-Rice-Pulse/Oilseeds	Groundnut/sunflower/Maize/vegetables-Rice-Pulse/Oilseeds	Groundnut Application of Gypsum @ 400 Kg/ha to groundnut Application of polythene mulch for Groundnut Pulses Foliar spray of nutrients DAP (25) and TNAU Pulse wonder(1%) to pulses Maize Sowing short duration maize hybrids CoMH 5, Kargil	TNAU Pulse wonder is available in Department of crop Physiology, TNAU, Coimbatore. Technology on polythene mulch is available from ARS, Vridhachalam and

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	red soils			Adopting IPDM practices for rice pest and disease problem like Stem borer, Leaf folder, Blast, Bacterial leaf streak, Grain discolouration Adopting IPDM practices for pulse pest and disease problem like Thrips and Aphids, Pod borer Adopting IPDM practices for groundnut pest and disease problem like Leaf miner, Leafspot Adopting IPDM practices for vegetables pest and disease problem like Fruit borer, Wilt	ORS, Tindivanam For groundnut, sunflower and vegetable seeds Department of Seed science and technology and department of Olericulture, TNAU, Coimbatore

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	Providing adequate drainage facility to drain out excess water Application of urea, gypsum, Neemcake and Potash at the rate of 22kg, 18, kg, 4, kg and 17 kg /acre	Providing adequate drainage facility to drain out excess water	Providing adequate drainage facility to drain out excess water Harvesting at physiological maturity stage	Drying the seeds at recommended moisture level of 14%
Pulses (Black gram, Green gram)	Providing adequate drainage facility to drain out excess water Gap filling by broadcasting the seed	Providing adequate drainage facility to drain out excess water Foliar application of DAP (2%) and Pulse wonder (1%) .		

Sesamum	--	Providing adequate drainage facility to drain out excess water Foliar application of NAA (2%)		
---------	----	--	--	--

Groundnut		-do -		
Sugarcane		Providing adequate drainage facility to drain out excess water Propping the plants		
Horticulture				
Banana	--	Propping with bamboo poles and tying with GI wires	--	--
Brinjal				
Coconut				

Heavy rainfall with high speed winds in a short span²				
Rice	Providing adequate drainage facility to drain out excess water	--	Foliar application of urea (2%), Super phosphate (1%) and Muriate of Potash (1%) Application zinc sulphate @ 10kg /ac	
Horticulture				
Banana		Propping with bamboo boles and tying with GI wires		
Outbreak of pests and diseases due to un seasonal rains				

Rice Stemborer Leaf folder Blast Bacterial leaf streak False smut / Grain discolouration Pulse Thrips and Aphids Pod borer Groundnut Leaf miner Leafspot	Spraying of Prophenophos 35 Ec @ 400ml /ac Spraying of Kocide 50 WP @ 300g /ac Spraying of Propiconazole 35 Ec @ 400ml /ac Adopting IPDM practices for rice pest and disease problem like Pheromone traps (5 no/ac), bird perches (20 nos/ac), sowing of cowpea seeds in bunds Adopting IPDM practices for pulse pest and disease problem like Systemic insecticide application Dimethote, Phosphomidon @ 400ml/ac And Endosulphon @ 400ml/ac Adopting IPDM practices for groundnut pest and disease problem	-
Horticulture		
Vegetables like Bhendi, Chillies, Brinjal Fruit borer Wilt	Adopting IPDM practices for vegetables pest and disease problem	

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹ Rice	Raised bed nursery and tray nursery Use sprouted seeds will be used for sowing	Nutrient management Foliar spray of 1% urea + 0.5% ZnSO ₄ Pest and disease management		

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries:

2.5.1 Livestock

Condition	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Establishment of grain and fodder banks at Taluk level	Block level officers to be entrusted with distribution of feed and fodder materials	Reviewing the number of feed and fodder banks and their ability to cope with the emergency in relation to feed and fodder availability and planning for more such feed and fodder banks in strategic areas
Drinking water	Creating filter points exclusively for supply of water In strategic areas Conservation of rain water in rain shed areas	Mobilization of water for drinking to affected areas from exclusive filter points at block level	Cleaning and desilting of water bodies in rain shed areas and cleansing the filter points for aquifer recharge
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients,minerals and trace elements	Ring vaccination in adjoining areas in case of outbreak to prevent further spread of disease Supply of essential nutrients,minerals and trace elements	Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients,minerals and trace elements
Floods			
Feed and fodder availability	Establishment of feed banks in elevated areas not known to be affected by floods	Mobilization of feed at the existing fodder bank from block level authorities	Replenishment of feed banks with good quality grains and crop residues

Drinking water	Establishment of filter points in elevated areas	Mobilization of water from filter points exclusively maintained for the purpose from block level authorities	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients,minerals and trace elements Sanitary measurement to be taken Provision of safe shelter Farm disaster kit containing temporary animal identification tags, handling equipment, first aid kit should be kept in a place known to the community	Mobilization of affected animals and provision of vaccine and medication Stranded animals should be rescued to safer places Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients,minerals and trace elements
Cyclone			
Feed and fodder availability	Establishment of feed banks in safe areas not known to be affected by cyclone	Mobilization of feed from the existing fodder bank	Replenishment of feed banks with good quality grains and crop residues
Drinking water	Establishment of filter points in safe areas	Mobilization of water from filter points exclusively maintained for the purpose	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients,minerals and trace elements Sanitary measurement to be taken Provision of safe shelter Farm disaster kit containing temporary animal identification tags, handling equipment, first aid kit should be kept in a place known to the community	Mobilization of affected animals with vaccine and medication Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients,minerals and trace elements
Heat wave and cold wave	Not applicable		

2.5.2 Poultry

	Suggested contingency measures			Convergence/lin kages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				-
Feed ingredients	Establishment of grain/feed banks at block levels	Mobilization of feed resources from block level	Replenishment of feed resources	
Drinking water	Establishment of filter points for supply of water	Mobilization of water for drinking from filter points	Cleaning and desilting water bodies and cleansing the filter points for aquifer recharge	
Health and disease management	Preventive vaccination against endemic diseases Supply of essential nutrients,minerals and trace elements	Ring vaccination in adjoining areas in case of outbreak to prevent further spread of disease Supply of essential nutrients,minerals and trace elements	Serological survey to assess the immunity against known endemic infectious diseases Supply of essential nutrients, minerals and trace elements	
Floods				
Feed ingredients	Establishment of feed and water banks in elevated areas not known to be affected by floods	Mobilization of feed from the existing fodder bank	Replenishment of feed banks with good quality grains and crop residues	
Drinking water	Establishment of filter points in elevated areas	Mobilization of water from filter points exclusively maintained for the purpose	Replenishment of water resources by proper cleaning and maintenance for recharging aquifers in filter points	
Health and disease management	Preventive vaccination against endemic diseases Supply of essential minerals and trace elements Provision of temporary shelters in high areas Sanitary measurement to be taken	Mobilization of affected birds with vaccine and medication Emergency Veterinary Squad to be formed	Follow up health coverage Serological survey to assess the immune status against known endemic infectious diseases Supply of essential nutrients,minerals and trace elements	
Cyclone	Not applicable			
Heat wave and cold wave				

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
1) Drought				-
A. Capture		-	-	
Marine	-	-	-	
Inland	-	-	-	
(i) Shallow water depth due to insufficient rains/inflow	-	-	-	
(ii) Changes in water quality	-	-	-	
(iii) Any other	-	-	-	
B. Aquaculture	-	-	-	
(i) Shallow water in ponds due to insufficient rains/inflow	Safe disposal of the stock	Emergency harvest/Water supply from other sources (bore well)	Pond drying till bottom cracking	
(ii) Impact of salt load build up in ponds / change in water quality	Increase in salinity		Reclamation of soil	
(iii) Any other	-			
2) Floods				
A. Capture				
Marine	Prevention of fishing	Safely return back to the shore/Staying in cyclone shelter	Return to fishing	
Inland				
(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	-	-	-	
(vi) Health and diseases	-	-	-	
B. Aquaculture				
(i) Inundation with flood water	Raising the bunds	Damage and loss	Strengthening the bunds	
(ii) Water continuation and changes in water quality	Emergency harvest		Water quality testing and corrective measures	
(iii) Health and diseases	Emergency harvest		Preparation of pond following sanitation measures	

(iv) Loss of stock and inputs (feed, chemicals etc)	Disposal of the stock to a safe place		Proper storage construction to keep the stock and inputs	
(v) Infrastructure damage (pumps, aerators, huts etc)	Safe removal of valuables to other place		Replacement/repairing the infrastructure	
(vi) Any other				
3. Cyclone / Tsunami	NA			

State: TAMILNADU

Agriculture Contingency Plan District: THOOTHUKODI

1.0 District Agriculture profile

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern Ghat (T.N. Uplands) semi-arid ecosubregion (8.3)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains and Hills Region (XI)		
	Agro Climatic Zone (NARP)	Southern Zone		
	List all the districts or part thereof falling under the NARP Zone	Tuticorin		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		8.48°09.29" N	78.08°42.5" E	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, Kovilpatti		
	Mention the KVK located in the district	SCAD- Krishi Vigyan Kendra, Vagaikulam		
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	33	-	-
	NE Monsoon(Oct-Dec):	445	1 st week of October	2 nd Week of December
	Winter (Jan- March)	81	-	-
	Summer (Apr-May)	68	-	-
	Annual	626	-	-

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)	470.7	11.0 (2.34%)	76.3 (16.22%)	5.1 (1.09%)	53.9 (11.46%)	39.4 (8.38%)	19.8 (4.22%)	14.3 (3.05 %)	74.9 (15.91%)

1.4	Major Soils	Area (000' ha)	Percent (%) of total
	Deep black soils	209.6	45.7
	Very deep black soils	88.7	19.3
	Moderately deep black soils	35.2	7.7
	Moderately deep red soils	30.3	6.6
	Deep red soils	26.9	5.7

1.5	Agricultural land use		Cropping Intensity
	Net sown area	169.7	104.0
	Area sown more than once	6.9	
	Gross cropped area	176.6	

1.6	Irrigation	Area ('000 ha)	Percent (%)		
	Net irrigated area	40.1	23.70		
	Gross irrigated area	46.8	25.44		
	Rainfed area	129.6	76.30		
	Sources of Irrigation	Number	Area ('000 ha)	Percent (%)	
	Canals	4 canals	11.8	28.4	
	Tanks	634 tanks	10.1	24.3	
	Open wells	22791			
	Bore wells	99	1.1	2.7	
	Lift irrigation				
	Other sources		-		
	Total		23.4	55.7	
	Pumpsets	684			
	Micro-irrigation	1.047 (1047ha)			
	Groundwater availability and use	No. of Blocks	% area	Quality of water	
	Over exploited	7	69	Salinity level: 28 % good, 32% moderate and 25% poor Residual Sodium Carbonate: 96% good and 4% moderate Sodium Adsorption Ratio:93 % good and 7% moderate	
	Critical	1	11		
Semi- critical	4	20			
Safe	-	-			
Wastewater availability and use	Data not available				
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%					

Area under major field crops & horticulture etc.

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

1.7	Crops	Area (000'ha)*					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
	Major Field Crops cultivated	<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Paddy	6.0	-	8.6	-	3.3	18.0
2	Blackgram	-	1.3	0.06	34.1	-	35.5
3	Green gram	0.01	-	0.08	30.4	-	30.5
4	Pearl millet	-	-	0.1	11.0	-	11.1
5	Maize	-	0.04	1.1	6.2	-	7.4
6	Sorghum	-	-	0.1	7.4	-	7.5
	Horticulture crops - Fruits	Total area		Irrigated		Rainfed	
1	Banana	10.2		10.2		-	
	Horticultural crops - Vegetables	Total area		Irrigated		Rainfed	
1	Chillies	15.2		2.5		12.7	
2	Coriander	4.7		-		4.7	
3	Onion	1.0		0.1		0.9	
4	Drumstick	1.6		1.5		0.5	

Medicinal and Aromatic crops		Total area	Irrigated	Rainfed
1	Medicinal and Aromatic crops	-	-	-
Plantation crops		Total area	Irrigated	Rainfed
1	Coconut	6.3	6374.6	10.1
2	Palmarah	3.2	2.5	3279.8
Fodder crops		Total area	Irrigated	Rainfed
1	Fodder sorghum	8.0	0.06	8.0
Total fodder crop area		8.0	0.08	8.0
Grazing land		-	-	-
Sericulture etc		-	-	-
Others (Specify)		-	-	-

1.8	Livestock (17th Livestock Census)	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	59.3	242.5	301.8
	Crossbred cattle	131.4	525.6	657.1
	Non descriptive Buffaloes (local low yielding)			319.1
	Graded Buffaloes			
	Goat			318.3
	Sheep			540.7
	Others (Pig, dog etc.)			6.9
	Commercial dairy farms (Number)			
1.9	Poultry (17th Livestock Census)	No. of farms	Total No. of birds ('000)	
	Commercial		44.1	
	Backyard		360.6	
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)	
	69558	345	4287	345	--	19
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	Nil		Nil		1	
B. Culture						
	Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	400		---			
ii) Fresh water (Data Source: Fisheries Department)	11926		---		1920 kg	
Others						

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production (t)	Productivity (kg/ha)
1	Paddy	-	4127	-	4147	-	2802	73192	3692
2	Black gram	-	-	-	-	-	-	12768	533
3	Green gram	-	-	-	-	-	-	11595	522
4	Pearl millet	-	-	-	-	-	-	29988	3749
5	Maize	-	-	-	-	-	-	22498	3749
Others		-	-	--	-	-	-	-	-

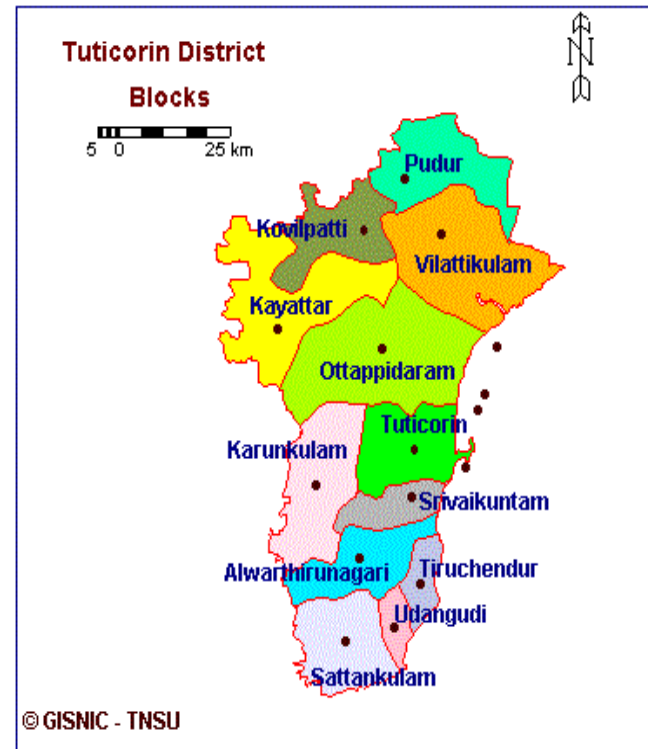
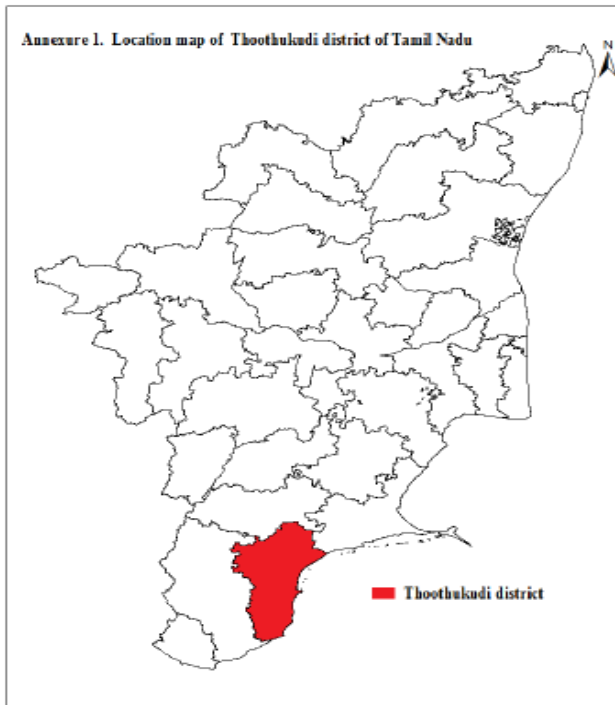
	Major Horticultural crops								
1	Chillies							5074	488
2	Coriander							1194	231
3	Banana							618720	65835
4	Coconut							472 (Lakh t)	7946 (Nuts/ha)

1.12	Sowing window for 5 major crops (start and end of sowing period)	Crop 1 (specify): Paddy	Crop 2: Blackgram	Crop 3: Green gram	Crop 4: Pearl millet	Crop 5: Maize
	Kharif- Rainfed	-	-	-	-	-
	Kharif-Irrigated	1 st week of June to 1 st week of July	-	-	-	-
	Rabi- Rainfed	-	4 th week of October to 2 nd week of November	4 th week of October to 2 nd week of November	4 th week of October to 2 nd week of November	4 th week of October to 2 nd week of November
	Rabi-Irrigated	4 th week of October to 3 rd week of November	-	-	-	4 th week of October to 2 nd week of November

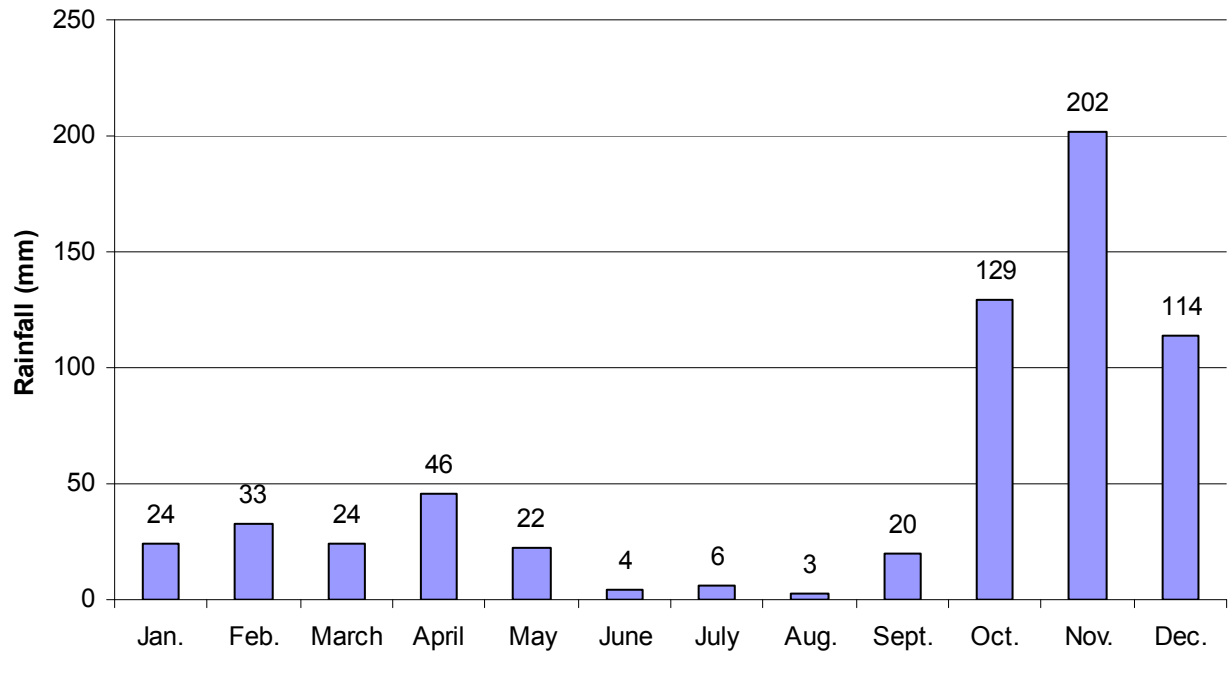
1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	√	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and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

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

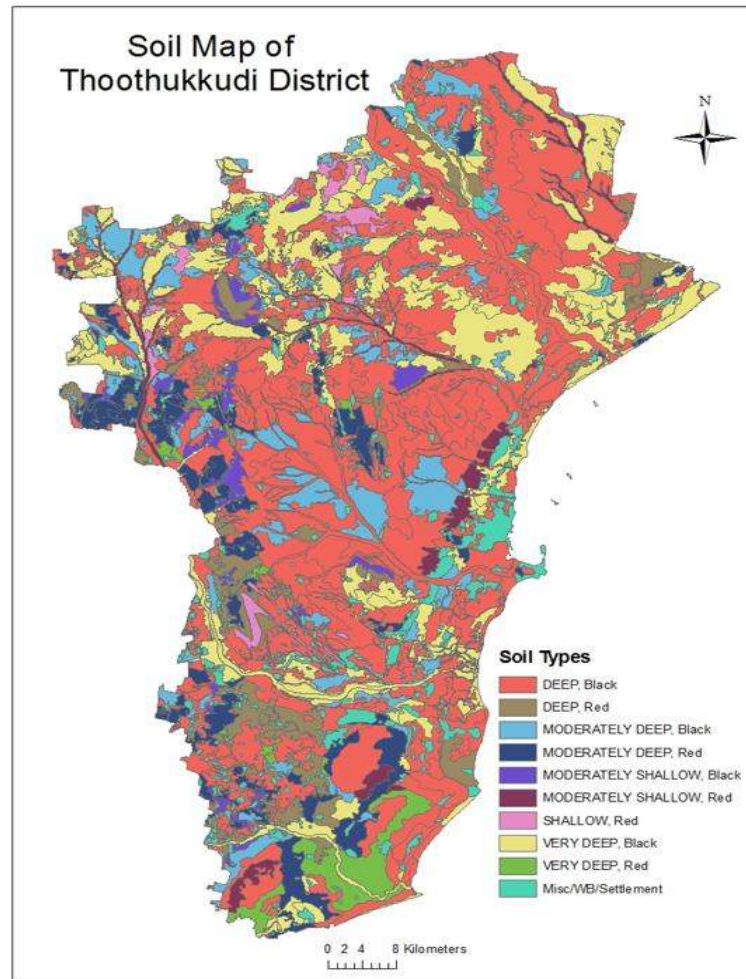
Annexure 1. Location map of Thoothukudi district and the blocks



Annexure 2. Mean annual rainfall of Thoothukudi district of Tamil Nadu



Annexure 3. Soil Map of Thoothukudi district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Deep and very deep black soils	Black gram Green gram (VBN 4, Co 6)	No change	Mechanical sowing with tractor drawn seed drill as the sowing window is narrow Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying Broad bed furrows	Department of Agriculture
		Pearlmillet Maize Chilles Sorghum Cotton	No Change		
Delay by 2 weeks (October 4 th week)	Deep Redsoil	Sorghum + Cow pea			
	Deep and very deep black soils	Black gram Green gram Maize Chilles Sorghum Cotton	Sunflower (Co 4 and private hybrids) Pearl millet (CO 7, CO (Cu) 9, X 7, ICMV 221) Finger millet Minor millets (Fox tail millet, Little millet) Coriander (PKM1) Bengal gram	Mechanical sowing with tractor drawn seed drill as the sowing window is narrow Soil test based integrated nutrient management Seed hardening-(18 hrs. soaking in water followed by 24 hrs. shade drying	
Delay by 4 weeks (November 2 nd week)	Deep Red soil	Sorghum + Cow pea	Sunflower (Co 4 and private hybrids) Pearl millet (CO 7, CO (Cu) 9, X 7, ICMV 221)	Broad bed furrows 10% excess seed rate	

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	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
	Deep and very deep black soils	Blackgram Greengram Pearlmillet Maize Chillies Sorghum Cotton	Re sowing/gap filling Supplemental irrigation (farm ponds) using micro irrigation system Thinning to retain one seedling at 30 cm Crop residue mulching	Application of Organic manure 12.5 t/ha Soil test based integrated nutrient management Broad bed furrows Thinning Dust (soil) mulching	Department of Agriculture
	Red soil	Sorghum + Cow pea	Re sowing/gap filling Supplemental irrigation (farm ponds) using micro irrigation system Thinning to retain one seedling at 30 cm Crop residue mulching	Application of Organic manure 12.5 t/ha Soil test based integrated nutrient management Compartmental bund Thinning Dust (soil) mulching	

Condition			Suggested Contingency measures		
			Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system
At vegetative stage	Deep and very deep black soils	Blackgram Greengram Pearlmillet Maize Chillies Sorghum Cotton	Life saving irrigation using microirrigation system 1% Kcl spray 3% Kaoline spray 0.1ppm Brasinosteriod spray 100ppm Salicylic acid Water spray	Application of Organic manure 12.5 t/ha Soil test based integrated nutrient management Broad bed furrows Thinning Dust (soil) mulching	Department of Agriculture
	Red Soil	Sorghum + Cow pea	Life saving irrigation using microirrigation system 1% Kcl spray 3% Kaoline spray 0.1ppm Brasinosteriod spray 100ppm Salicylic acid Water spray	Application of Organic manure 12.5 t/ha Soil test based integrated nutrient management Compartmental bund Thinning Dust (soil) mulching	
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At reproductive stage	Deep and very deep black soils	Blackgram Greengram Pearlmillet Maize Chillies Sorghum Cotton	Life saving irrigation (From constructed farm ponds) Weeding and Weed mulching 1% Kcl spray 3 %Kaoline spray 0.1ppm Brasinosteriod spray 100ppm Salicylic acid Water spray	---	Department of Agriculture
	Red Soil	Sorghum + Cow pea	---do---		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Terminal drought	Deep and very deep black soils	Blackgram Greengram Pearlmillet Maize Chillies Sorghum Cotton	Harvest at physiological maturity stage Water spray	===	Department of Agriculture
	Red soil	Sorghum + Cow pea	----do----		

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Low land tank/tube well /canal irrigated black soil	Paddy (ASD 16, 17, 18 and ADT 42,43 and CO 47)	SRI method of rice cultivation Maize	Limited irrigation with mulching	Department of Agriculture
		Banana (Vayal Vazhai, Poovan, Grand Naine)	Banana (Leaf purpose) Chillies (K 1, PKM 1)	Drip irrigation with mulching	
Non release of water in canals under delayed onset of monsoon in catchment		Paddy (ASD 16, 17, 18 and ADT 42,43 and CO 47)	Short duration Pulses	2% DAP spray for pulses	Department of Agriculture
		Banana (Vayal Vazhai, Poovan, Grand Naine)		Application of Organic manure 12.5 t/ha	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Low land tank/ tube well canal irrigated black soil	Paddy (ASD 16, 17, 18 and ADT 42,43 and CO 47)	Rainfed maize and Short duration Pulses	2% DAP spray for pulses Conservation Furrow Thinning Soil test based integrated nutrient management Application of Organic manure 12.5 t/ha	Department of Agriculture
		Banana (Vayal Vazhai, Poovan, Grand Naine)	=		
Insufficient groundwater recharge due to low rainfall	Irrigated black soil (Tube and open well)	Paddy (ASD 16, 17, 18 and ADT 42,43 and CO 47)	Maize, pulses,vegetables (Chilli, tomato and Brinjal)	Limited irrigation	
		Banana (Vayal Vazhai, Poovan, Grand Naine)	=	Alternate Furrow irrigation Drip irrigation	

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

Condition	Suggested contingency measure			
	Vegetative stage ^k	Flowering stage ^l	Crop maturity stage ^m	Post harvest ⁿ
Continuous high rainfall in a short span leading to water logging				
Paddy	Provide Drainage			Mechanical drying and Shift to safer place against storage pest and disease
Black gram		-do-		do
Green gram		do		do
Maize		-do-		do
Sorghum		-Do-		do
Horticulture				
Banana		-Do-		Cold storage

Chilli	-Do-			Mechanical drying and Safe storage against storage pest and disease
Heavy rainfall with high speed winds in a short span²				
Banana	Drainage erection of wind breaks and shelter belts	Drainage, erection of supporting poles wind breaks and shelter belts	Drainage, erection of supporting poles wind breaks and shelter belts	Cold storage
Chillies	Drainage and erection of wind breaks and live fences	Drainage and erection of wind breaks and live fences	Drainage and erection of wind breaks and live fences	Mechanical drying and cold storage
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Integrated Pest and Disease Management for, paddy, pluses, maize and sorghum	Integrated Pest and Disease Management for, paddy, pluses, maize and sorghum	-	Safe storage against storage pest and diseases
Black gram				
Green gram				
Maize				
Sorghum				
Horticulture				
Banana	- Integrated Pest and Disease Management	Integrated Pest and Disease Management		Cold storage
Chillies	Integrated Pest and Disease Management	Integrated Pest and Disease		-do-

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Paddy		-		Harvest and mechanical drying
Pulses		-do-		-do-
Horticulture				
Banana		Provide Drainage		
Chillies		Provide Drainage		
Continuous submergence for more than 2 days²				
Paddy		-		Harvest and mechanical drying
Pulses		Provide Drainage		Harvest and mechanical drying
Horticulture				
Chillies		Provide Drainage		Cold storage

Banana	Provide Drainage	Cold storage
Sea water inundation ³	NA	

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

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave ^p				
Cold wave ^q				
Frost				
Horticulture				
Hailstorm				
Cyclone				
Horticulture				
Banana	Drainage, erection of wind breaks and shelter belts	Drainage, erection of upporting poles wind breaks and shelter belts and Propping	Drainage, erection of supporting poles wind breaks and shelter belts and Propping	Cold storage

2.5 Contingent strategies for Livestock, Poultry & Fisheries:

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and Fodder availability	<p>Sowing of cereals (Sorghum) and leguminous crops (Lucerne, Horsegram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Fodder production with Sorghum – stylo- Sorghum on rotation basis.</p> <p>As the district is moderately prone to draught, all the available crop residues especially paddy straw, sorghum /Bajra/maize stover should be stored properly in the farm of hay at individual farmer level.</p> <p>Training to farmers on silage, Azolla cultivation</p> <p>Create awareness on establishment of pasture with drought resistant fodder Varieties like Guinea grass, stylo, kolukkattai grass, Acacia trees, etc.</p> <p>Creation of tree fodder models with Subabul, Glyricidia, Agathi, etc for tree fodder production during summer.</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp.</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop cutters.</p> <p>Creation of permanent fodder, feed and fodder seed banks in all drought prone</p>	<p>Harvest and use all the failed crop (Paddy, Sorghum, Maize, Bajra, Green gram, Blackgram, Horse Gram etc.) material as fodder.</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Agathi, Prosopis etc) and feed the LS during drought In severe drought don't allow for grazing and try to stall fed the animals</p> <p>Silage / hay, UMMB and mineral mixture should be supplied on subsidy to the farmers having high productive livestock</p> <p>Transport dry fodder bales from the fodder grid at DLF, Hosur to the drought affected villages</p> <p>All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals during severe drought</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive & breeding stock) during severe drought</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p>	<p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p> <p>Supply of quality seeds of COFS 29, Stylo and fodder slips of Co3, Co4, guinea grass well before monsoon to the farmers and encourage to grow by input subsidy</p>

	<p>villages</p> <p>Capacity building and preparedness of the stakeholders and official staff for the unexpected events</p>	<p>Subsidized loans (5-10 crores) should be provided to the livestock keepers</p>	
Cyclone	<p>Harvest all the possible wetted grain (Rice/ sorghum /Bajra/maize /blackgram etc) and use as animal feed.</p> <p>As the district is chronically prone for cyclone, arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone.</p> <p>Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport</p> <p>Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone</p> <p>Incase of EFW of severe cyclone, shift the animals to safer places.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen. Health camps should be organized</p> <p>In severe cases un-tether or let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR</p> <p>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</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant</p> <p>Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.</p>

<p>Floods</p>	<p>In case of early forewarning (EFW), harvest all the crops that can be useful as fodder in future (store properly)</p> <p>Don't allow the animals for grazing if severe floods are forewarned</p> <p>Keep stock of bleaching powder and lime</p> <p>Carry out Butax spray for control of external parasites</p> <p>Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>Identify the volunteers who can serve in need of emergency</p> <p>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</p> <p>Capacity building and preparedness of the stakeholders and official staff for the unexpected events</p>	<p>Transportation of animals to elevated areas</p> <p>Proper hygiene and sanitation of the animal shed</p> <p>In severe storms, un-tether or let loose the animals</p> <p>Avoid soaked and mould infected feeds / fodders to livestock</p> <p>Emergency outlet establishment for required medicines or feed in each village</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Bring back the animals to the shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Deworming with broad spectrum dewormers</p> <p>Proper disposal 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</p> <p>Drying the harvested crop material and proper storage for use as fodder.</p>
<p>Heat & Cold wave</p>	<p><i>NA</i></p>		
<p>Health and Disease management</p>	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Anthrax</p> <p>Vaccination against Anthrax during October,</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during</p>

	<p>December and January in Thoothukudi, Srivaikundam blocks</p> <p>Foot and Mouth Disease</p> <p>Vaccination against FMD during September and October in Ettayapuram and Thoothukudi blocks</p> <p>Blue Tongue</p> <p>Vaccination against Blue tongue disease during October and November in Kovilpatti, Vilathikulam, Ottapidaram, Karunkulam, Srivaikundam, Pudur and Ettayapuram blocks.</p> <p>PPR</p> <p>Vaccination against PPR disease during October and November in Ottapidaram block</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught /flood/cyclone management to be given to VAS, Jr.VAS, LI with regard to health & management measures.</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Restricting movement of livestock in case of any epidemic</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>July-September so that the peak milk production does not coincide with mid summer</p>
Insurance	<p>Encouraging insurance of livestock</p>	<p>Listing out the details of the dead animals</p>	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>
Drinking water	<p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in</p>	<p>Restrict wallowing of animals in water bodies/resources</p>	<p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>

	herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas		
--	--	--	--

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	Season
Foot and mouth disease (FMD)	Preferably in winter / autumn
PPR	All seasons, preferably in June-July
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	December / march

Vaccination programme for cattle and buffalo:

Disease	Age and season at vaccination
Anthrax	In endemic areas only, Feb to May
HS	May to June
BQ	May to June
FMD	November to December

2.5.2

Poultry

	Suggested contingency measures		
Drought	Before the event ^a	During the event	After the event
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods			
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem

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

^a based on forewarning wherever available

2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
Marine	Repairing and overhauling the ice plants and freezing plants	Keeping the fish preservation plants in good condition.	Training the fishermen in hygienic handling of fishes.
Inland			
(i) Shallow water depth due to insufficient rains/inflow	---	---	---
(ii) Changes in water quality	---	---	---
(iii) Any other	---	---	---
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Desilting and ploughing the aquaculture ponds.	Keeping the ponds dry for rectifying disease problem.	Making the ponds ready for stocking and start aquaculture practice.
(ii) Impact of salt load build up in ponds / change in water quality	Assessment of water hardness and salinity check.	Assessing the environmental parameters for algal check.	Liming the culture system for stocking of fish seeds.
(iii) Any other	---	---	---
2) Floods			
A. Capture			
Marine	Repairing the crafts and gears.	Keep the crafts and gears in safe condition.	Training the fishermen in hygienic handling of fishes, fish preservation and processing.
Inland			
(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	---	---	---
(vi) Health and diseases	---	---	---
B. Aquaculture			
(i) Inundation with flood water	Harvesting the farms.	Keeping the ponds without stocking	Making the ponds ready for stocking
(ii) Water continuation and changes in water quality	Water quality check	Water quality check.	Assessing the water quality for seed stocking.
(iii) Health and diseases	Checking the microbial load.	Checking the microbial load.	Water treatment for control of microbes.
(iv) Loss of stock and inputs (feed, chemicals etc)	Fish pond sampling and estimate the loss.	Safety of feeds and chemicals used for aquaculture.	Usage of feeds and chemicals for starting culture practice.
(v) Infrastructure damage (pumps, aerators, huts etc)	Safeguarding the pumps, aerators and pump house.	Safeguarding the pumps, aerators and pump house.	Repairing the pumps and aerators for use in aquaculture.
(vi) Any other	---	---	---
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	Safety of fishermen and fishing accessories.	Safety of fishermen and fishing accessories.	Estimating the loss of lives for compensation.
(ii) Avg. no. of boats / nets/damaged	Safety of boats and nets.	Keeping the boats and nets in safe condition.	Assessing the damages to boats and nets.
(iii) Avg. no. of houses damaged	Safety of houses	Safety of houses	Estimating the loss for damaged houses.
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)	Training of fish farmers for safety of farm accessories	Safety of feeds, chemicals <i>etc.</i>	Estimate the losses.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Alertness for safety of infrastructure.	Safety of infrastructure.	Renovation and reconstruction of infrastructure.
(vi) Any other	---	---	---
4. Heat wave and cold wave			
A. Capture			
Marine	Studying the temperature of water and assessing mass mortality of fishes.	Studying the environmental characters and removing the dead fishes.	Assessing the fish catches and provide compensation for fishermen.
Inland	---	---	---
B. Aquaculture			
(i) Changes in pond environment (water quality)	Studying the water temperature periodically.	Studying the water temperature periodically.	Take measures for control rise/fall of water temperature.
(ii) Health and Disease management	Monitoring the disease problem in cultured fishes.	Control mortality of fishes by providing disease treatment.	Remove infected animals and provide disinfection and treatment.
(iii) Any other			

^a based on forewarning wherever available

State: TAMILNADU

Agriculture Contingency Plan for District: TIRUCHIRAPALLI

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	East ghat (TN uplands), hot semi arid ecosystem (8.3)		
	Agro-Climatic Region (Planning Commission)	Southern plateau and hills region (X)		
	Agro Climatic Zone (NARP)	Cauvery Delta Zone and AZ 127 High altitude and hilly zone (TN-5, TN-4 and TN-2)		
	List all the districts or part thereof falling under the NARP Zone	Cauvery Delta Zone : Thuraiyur, Musiri, Kulithalai, Lalgudi and Trichy blocks High altitude and hilly zone : Kollimalai		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		10° 15' and 11°2' N	78° 10' to 79° 5' E	90 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	A.D.Agricultural College and Research Institute, Trichy,		
Mention the KVK located in the district	ICAR-KVK, Siruganmani, Tiruchirappalli District			
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	273.3	1 st Week of June	1 st week of October
	NE Monsoon(Oct-Dec):	394.8	2 nd week of October	4 th week of December
	Winter (Jan- Feb)	40.5		
	Summer (March-May)	134.0		
	Annual	842.6		

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)	440.4	36.8	85.0	0.7	7.4	2.0	12.8	27.4	94.2

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Deep black soil	141.9	32.2
	Deep red soil	74.1	16.8
	Moderately deep black soil	47.0	10.7
	Moderately deep red soil	110.2	25.1
	Shallow black soil	25.4	5.8
	Shallow red soil	96.6	22.0
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	182.7	104.9
	Area sown more than once	8.9	
	Gross cropped area	191.6	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	108.8	58.7	
	Gross irrigated area	116.2	57.9	
	Rainfed area	73.9	41.3	
	Sources of Irrigation	Number	Area ('000 ha)	
				%
	Canals	135	38.6	37.8
	Tanks	1767	4.7	4.6
	Open wells	6192	13.6	7.4
	Bore wells	477	7.6	50.3
	Lift irrigation	---	-	
	Other sources	--	-	
	Total		102.3	100.0
	Pumpsets	--		
	Micro-irrigation	--		
Groundwater availability and use	No. of blocks	% area	Quality of water	
Over exploited	3	-	64 % Good water, 16 % Marginally saline, 8 % saline, 2 % High SAR saline, 4 % marginally alkaline, 5 % alkali, 1 % Highly alkali	
Critical	2	-		
Semi- critical	5	-		
Safe	4	-		
Wastewater availability and use	Data not available	-		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Rice	5.1		52.7	0.6	3.0	61.3
2.	Sorgum	0.3	26.8	0.7	1.0		28.7
3.	Groundnut	0.4	8.9	4.7	0.1		14.1
4.	Black gram	0.1	1.0	0.3	8.0		9.4
5.	Sugarcane						6.8
6.	Maize	0.3	6.9	0.5	0.1		7.8
7.	Sunflower	1.2	1.3	4.4	0.2		7.2
	Horticulture crops - Fruits	Total area		Irrigated		Rainfed	
1	Banana	9.2		9.2		0	
2	Mango	2.4		0.8		1.6	
3	Guava	0.2		0.2		0.0	
	Horticultural crops - Vegetables	Kharif		Irrigated		Total	
1	Onion					4.0	
2	Brinjal					0.1	
3	Bhendi					0.1	
4	Tomato					0.2	

	Medicinal and Aromatic crops	Total area	Irrigated	Rainfed
1	Medicinal and Aromatic crops			
2	Betal wine	0.103	0.103	
3	Vasambu	0.002	0.002	
4	Mozhikizhangu	0.003	0.003	
5	Kanvazhikizhangu	0.011	0.007	
6	Vasanaipul	0.010	0.009	
	Plantation crops	Total area	Irrigated	Rainfed
1	Coconut	6.4		
2	Palm oil	0.2		
	Fodder crops	Total area	Irrigated	Rainfed
1	Sorghum	4.0	0.1	3.923
2	Subha grass	0.1	0.04	0.14
3	Fodder gross	0.0	0.0	0
	Total fodder crop area	4.1	0.1	4.0
	Grazing land			
	Sericulture etc			
	Others (Specify)			
	Flowers	0.916		

1.8	Livestock	Male (number)	Female (number)	Total (number)
	Non descriptive Cattle (local low yielding)	44.5	67.6	112.1
	Crossbred cattle	52.9	264.6	317.6
	Non descriptive Buffaloes (local low yielding)	-	-	46.9
	Graded Buffaloes (incl. Murrah)	-	-	
	Goat			486.7

	Sheep					212.7	
	Others (Camel, Pig, Yak etc.)	34.0		25.4		14.1	
	Commercial dairy farms (Number)					25	
1.9	Poultry	No. of farms		Total No. of birds (number)			
	Commercial	15				56.7	
	Backyard	-				221.7	
1.10	Fisheries						
	A. Capture						
	i. Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.,)
		19673	Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
			2	1229	12307	683 (Cast nets) Drag Net : 185 Other Nets: 63	
	ii. Inland (Data Source: Fisheries Department)	No. Farmers owned ponds		No. of Reservoirs		No. of village tanks	
		20					
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha0		Production (*000 tons)	
	i. Brackish water (Data Source: MPEDA/Fisheries)						

	Department)			
	ii. Fresh water(Data Source: Fisheries Department)			
	Others			

1.11	Production and Productivity of major crops (Average of last 5years: 2006, 07, 08,09,2010)	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	23.9	4131	178.1	3687	13.6	3371	215.6	3709
2	Sorghum							17.9	511
3	Bajra							1.7	477
4	Ragi							0.2	1856
5	Maize							16.1	2631
6	Black gram							1.7	368
7	Bengal gram							0.0	596
8	Redgram							0.6	432
9	Sugarcane							572.0	113
10	Ground nut							27.1	1845
11	Gingelly							0.3	574
	Major Horticultural crops	AV	Production						
1	Chillies							1.4	611
2	Turmeric							2.7	5348
3	Onion							31.2	10215
4	Brinjal							1.1	10011
5	Tomato							4.3	20085
6	Banana							400.2	42926

Others									
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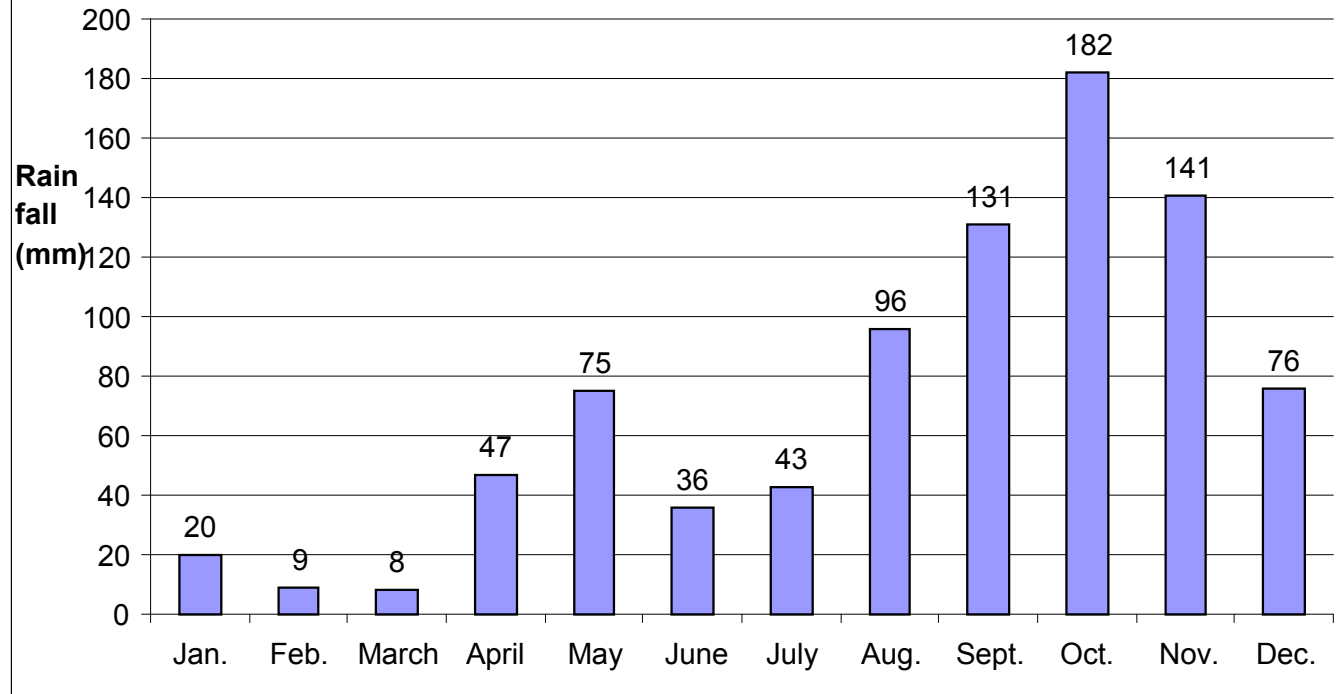
1.12	Sowing window for 5 major crops (start and end of sowing period)	Groundnut	Paddy	Sugarcane	Cotton	Black gram	Maize
	Kharif- Rainfed	July – August	-	-	-	-	June – July
	Kharif - Irrigated	April - May	June - July	-	-	July August	April- May
	Rabi – rainfed	November	-	-	Sep.- Oct.	-	September.- October,
	Rabi - irrigated	November	August, September., December	December,, January, February March	January ,February.	December., January.– February.	January.- February

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 inundation			√
	Pests and diseases (specify)			
	Rice – Stem borer	√		
	Rice – Leaf folder		√	

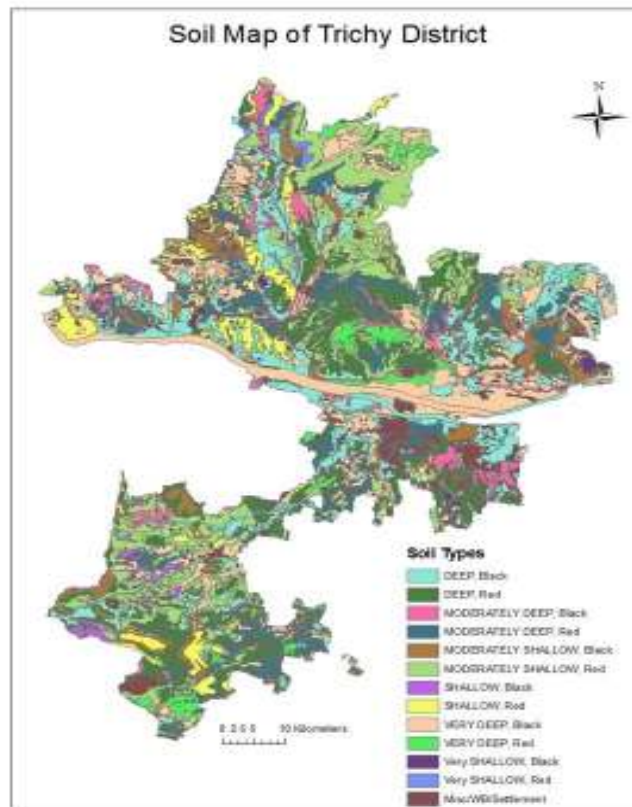
	Rice – Blast	√		
	Rice – Cut worm		√	
	Rice – False smut	√		
	Rice - mite		√	
	Black Gram - yellow mosaic		√	

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

Annexure 2. Mean annual rainfall of Tiruchirappalli district of Tamil Nadu



Annexure 3. Soil map of Tiruchirappalli district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks (Specify month) October	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	No change		
		Cluster bean / Bhendi			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks (Specify month) October	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	No change	In situ SWC measures in fallow: opening up of ridges and furrows Spraying 0.5% Potassium chloride during flowering and pod development stages will aid to mitigate the ill effects of drought.	Linkage with NREGA for SWC measures; Agro industry Schemes for Ridger, bund former, MB plough through state Department of Agriculture
		Cluster bean / Bhendi	No change		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks (Specify month) October	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	Sorghum (K Tall, CO 26, CO (S) 28, BSR 1)/ millets + pulses(black gram VBN 1, VBN 2, VBN 3, VBN(BG) 4, ADT 3,) (Green Gram Paiyur 1, CO 6, VBN 1, VBN (Gg) 2) / Gingelly (CO 1, TMV 3, TMV 5, SVPR 1, VRI(SV) 2)/ cucurbits	In situ SWC measures in fallow: opening up of ridges and furrows For sorghum Spraying 3% Kaolin (30 g in one litre of water) during periods of stress. This should be done before 75% of soil moisture is lost from available water. While sowing rainfed pulses sowing harden the greengram seeds for 3 hrs in aqueous solution of manganese sulphate @ 100 ppm / (0.1 g/lit) at 1/3 volume of seeds and quickly air-dry in shade to their original moisture content. For blackgram, zinc sulphate @ 100 ppm may be used for hardening.	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks (Specify month) August 1 st week	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	Fodder sorghum (K 7) / minor millets / fodder / coriander	In situ SWC measures in fallow: opening up of ridges and furrows	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Crop management	Soil nutrient and moisture conservation measures	
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	<ol style="list-style-type: none"> 1. Thinning of 30 – 50 % of population 2. In case of poor germination, resowing with same crop with short duration varieties. 	<ol style="list-style-type: none"> 1. Opening of conservation furrows at an interval of 15-20m 2. Mulching 3. Spraying 1 % KCl 	-
		Cluster bean / Bhendi	do		
		Sorghum (K Tall, CO 26, CO (S) 28, BSR 1)/ millets + pulses(black gram VBN 1, VBN 2, VBN 3, VBN(BG) 4, ADT 3,) (Green Gram Paiyur 1, CO 6, VBN 1, VBN (Gg) 2) / gingelly (CO 1, TMV 3, TMV 5, SVPR 1, VRI(SV) 2)/ cucurbits	Thinning, Intercultivation	Spraying 2 % potassium dihydrogen phosphate	
		Fodder sorghum (K7) / minor millets / fodder / coriander			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)					
At vegetative stage	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	Thinning of 33-50 % population Repeated intercultivation and weeding	Opening of conservation furrows at an interval of 15-20 m Mulching Antitranspirant spray (Spraying 1 % KCl)	
		Cluster bean / Bhendi			
		Sorghum / millets + pulses/ gingelly/ cucurbits			
		Fodder sorghum / minor millets / fodder / coriander			

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)					
At reproductive stage	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	Thinning, Life saving irrigation from rain water harvest ponds, Weeding and Weed mulching Harvest for fodder purpose Anti transpirant spray Harvesting at physiological maturity	1 % KCl spray will give drought tolerance	Opening of farm ponds through IWMP and NREGS as a long term drought proofing measure.

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)		Cluster bean / Bhendi	Life saving irrigation if available. Weeding and Weed mulching Harvest for fodder purpose	Mulching Antitranspirant spray Spraying 1 % KCl	Opening of farm ponds through IWMP and NREGS as a long term drought proofing measure.
		Sorghum / millets + pulses/ gingelly/ cucurbits	Harvest for fodder purpose and rationing with subsequent rains		
		Fodder sorghum / minor millets / fodder / coriander	Could be harvested for fodder purpose		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Terminal drought	Red, Black and laterite soils	Groundnut (TMV 7, VRI 2, CO 2) + redgram (APK 1, VBN (RG) 3)	Life saving irrigation if available Harvest at physiological maturity stage		Opening of farm ponds through IWMP and NREGS as a long term drought proofing measure.
		Cluster bean / Bhendi	Life saving irrigation		
		Sorghum / millets + pulses/ gingelly/ cucurbits			
		Fodder sorghum / minor millets / fodder / coriander			

2.1.2 Irrigated situation

Condition	Major Farming situation	Suggested Contingency measures							
		Crop/cropping system			Change in crop/cropping system			Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Alluvial soils	Kharif	Rabi	Summer	Kharif	Rabi	Summer	1.Limited irrigation 2. Alternate furrow irrigation/ drip irrigation for upland crops In case of aged rice seedling, to encourage the tiller production, enhance the basal N application by 50% from the Recommended and thereafter follow the normal schedule recommended for other stages. In canal command area, conjunctive use of surface and ground water may be resorted to for Judicious use of water. For cotton, KCI 1% spray, twice on 50 and 70 DAS for delayed sowing (first fortnight of March) of summer irrigated cotton	1.Seeds through NSC and NFSM
		Rice ADT 36, IR 50, IR 64, ASD 16, ADT 37, ASD 18, ADT 42, ADT 43, CO 47, ADT (R) 45 TRY (R)2*, ADTRH 1, ADT (R) 47	Rice IR20, White Ponni, ADT39, CO43, TRY1, ASD19, ADT(R)46	pulses / gingelly	Maize (CO 1, COH (M) 4, COH (M) 5, COBC 1/ Pulses (Black gram T 9, VBN 1, VBN 2, VBN 3, VBN(Bg) 4) (Green Gram CO 4, CO 6, KM 2, Paiyur 1, VBN 1, VBN(Gg) 2)/ Vegetables	Rice IR20, White Ponni, ADT39, CO43, TRY1, ASD19, ADT(R) 46	Pulses/ cotton (MCU 7, SVPR 3, Anjali)/ gingelly (TMV 3, TMV 4, TMV 6, CO 1, VRI(SV) 1, SVPR 1, VRI(SV) 2)/ sunflower		
		Sugarcane- ratoon sugarcane (Two years rotation) (varieties based on factories requirements)			No change			Alternate Furrow irrigation Drip irrigation Trash mulching	-

Condition	Major Farming situation	Suggested Contingency measures						Remarks on Implementation	
		Crop/cropping system			Change in crop/cropping system				Agronomic measures
Non release of water in canals under delayed onset of monsoon in catchment	Alluvial soils	Kharif	Rabi	Summer	Kharif	Rabi	Summer	1.Limited irrigation 2. Alternate furrow irrigation/ drip irrigation for upland crops 3. In canal command area, conjunctive use of surface and ground water may be resorted to for judicious use of water.	1. Seeds through NSC and NFSM
		Rice	Rice	pulses / gingelly	Maize / vegetables/ pulses/ sesame/ green manures	Rice / upland rice	Pulses / senna		
		-	Rice / groundnut	Gingelly	Coleus / Vincea rosea/ senna			1 Limited irrigation 2 Alternate furrow irrigation/ drip irrigation for upland crops 3. For groundnut Sprinkler irrigation will save water to the tune of about 30%. Borderstrip irrigation is recommended in command areas in light textured soils. Composted coir pith increases moisture availability and better drainage in heavy textured soil.	
		Sugarcane- ratoon sugarcane (Two years rotation)			No change			Soak the setts in lime solution (80 kg Kiln lime in 400 lit) for one hour. ii. Plant in deep furrows of 30 cm depth. iii. Spray potash and urea each at 2.5 per cent during moisture stress period at 15 days interval. iv. Spray Kaolin (60 g in 1 ltr. of water) to alleviate the water stress. v. Under water scarcity	-

Condition	Major Farming situation	Suggested Contingency measures			
		Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
					condition, alternate furrow and skip furrow method of irrigation is advised.. vi. Apply 125 kg of MOP additionally at 120 day of planting. vii. Basal incorporation of coir waste @ 25 tonnes/ha at the time of last ploughing. viii. Removal of dry trash at 5th month and leave it as mulch, in the field. ix. Mulching x. Antitranspirant spray

Condition	Major Farming situation	Suggested Contingency measures							
		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	Alluvial soils	Kharif	Rabi	Summer	Kharif	Rabi	Summer	1.Limited irrigation 2. Alternate furrow irrigation/ drip irrigation for upland crops 4. For rice, 3.Spray Cycocel 1000 ppm (1 ml of commercial product in one lit. of water) under water deficit situations to mitigate ill-effects. 4.Foliar spray of Kaolin 3% or KCl 1% to overcome moisture stress at different physiological	1. Seeds through NSC and NFSM
		Rice	Rice	pulses / gingelly	Fallow	Rice / upland rice	Pulses / senna		

Condition	Major Farming situation	Crop/cropping system			Suggested Contingency measures				
					Change in crop/cropping system			Agronomic measures	
								stages of rice.	
		-	Rice / groundnut	Gingelly	Coleus / <i>Vincea rosea</i> / senna			1. Limited irrigation 2. Alternate furrow irrigation/ drip irrigation for upland crops 3. Trash mulching Composted coir pith increases moisture availability and better drainage in heavy textured soil.	Do
		Sugarcane- ratoon sugarcane (Two years rotation)			No change			Soak the setts in lime solution (80 kg Kiln lime in 400 lit) for one hour. ii. Plant in deep furrows of 30 cm depth. iii. Spray potash and urea each at 2.5 per cent during moisture stress period at 15 days interval. iv. Spray Kaolin (60 g in 1 ltr. of water) to alleviate the water stress. v. Under water scarcity condition, alternate furrow and skip furrow method is beneficial. vi. Apply 125 kg of MOP additionally at 120 day of planting. vii. Basal incorporation of coir waste @ 25 tonnes/ha at	-

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				the time of last ploughing. viii. Removal of dry trash at 5th month and leave it as mulch, in the field.	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Well/ Tube well red, laterite, black and alluvial soils	<ul style="list-style-type: none"> • Rice (Aug. – Jan.)- Groundnut (Jan- April) • Vegetables (June – Sep.)- rice (Oct. – Feb.) • Banana (Jan- Dec.)- Ratoon banana (Jan- Dec) – rice (Dec. – April) • Vegetables / onion (June- sep.) – rice (Oct. – Jan.)- maize/ pulse (Feb- April) • Rice (Aug. – Jan.) -Groundnut (Jan.- April) 	<ul style="list-style-type: none"> • Maize (Aug.-Dec.) – Sesame / soybean (Dec. –Mar.) • Fodder / pulses/ Green manure (Aug. – Dec.)- Gingelly / groundnut/ sunflower/ sorghum / pearl millet (Dec. – Mar.) • Clusterbean/Lab-Lab/ Bhendi(July- Dec.) – Water melon/ cluster bean / Cucumber (Jan- April) 	<ol style="list-style-type: none"> 1. Limited irrigation 2. Alternate Furrow irrigation 3. Drip irrigation 4. Mulching 5. Antitranspirant spray 	-
Any other condition (specify)					

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging, Heavy rainfall with high speed winds in a short span				
Rice	In water logged condition, form open drains, about 60cm in depth and 45cm width across the field	Drain out excess water through drainage channel	Drain out excess water Harvesting at physiological maturity	Proper drying and storage of grains Use mechanical drier
Groundnut + Red gram	Drain out excess water	Drainage	Drain out Harvesting at physiological maturity stage	Shift to safe place, dry in shade and turn frequently
Black gram / green gram			Drain out Harvest for vegetable purpose	Proper drying and storage of grains Use mechanical drier
Gingelly			Drain out	Proper drying and storage of grains Use mechanical drier
Maize / sorghum			Drain out excess water, earthingup, fertilizer application.	Drain out excess water, Harvesting and drying the cobs
Sunflower	Drain out excess water, weeding and top dressing with urea	Drain out excess water, earthingup, fertilizer application / foliar spray (1 % 19 ;19 :19)	Drain out excess water, Harvesting and drying of ear heads	Proper drying and storage of grains
Sugarcane	Drain out excess water, weeding and top dressing of fertilizers, earthingup, propping, Detrashing	-	-	-

Horticulture				
Vegetables/Bhendi/ clusterbean	Drain out excess water, weeding and top dressing of fertilizers, earthingup,	Drain out excess water, earthingup, fertilizer application / foliar spray (1 % 19 ;19 :19)	-	-
Banana	Drain out excess water, weeding and top dressing of fertilizers, earthingup,	Drain out excess water, weeding and top dressing of fertilizers, earthingup, stalking	Harvesting of bunches and marketing	

Outbreak of pests and diseases due to unseasonal rains	The control measures may be taken up as per package of practices			
Rice	Brown planthopper Drain the water before use of insecticides and direct the spray towards the base of the plants. Monocrotophos @ 500 ml/ ac. (or) Acephate 200 g / ac	Brown plant hopper Drain water before use of insecticides and direct the spray towards the base of the plants. Monocrotophos @ 500 ml/ ac. (or) Acephate 200 g / ac. Blast: Spray after observing initial infection of the disease, □ Carbendazim WP 250 g or Tricyclozole 75 WP 500 g or Iprobenphos (IBP) 500ml/ha.	BPH Cut worm : Prolonged dry spell followed by heavy downpour leads to cutworm outbreak. Spray Chloropyriphos 2.5 ml / lit or Thiodicarb 75 WP 1.25 g / lit. False smut : Spray cuprous hydroxide 0.25 %	
Sunflower	-	Head rot: Spray Fenthion 1 ml/l + mancozeb 2 g/l at flowering stage twice at 10 days interval	Head rot : spray mancozeb 0.2 %	-
Sorghum	-	-	Grain mold: Spray Captan 2g/l + Aureofungin 0.2 g/l or Propiconazole 1.0 ml/l at grain formation stage immediately after cessation of rains	-
Black gram / green gram	Wilt in low lying water logged patches:	Root rot: Soil drenching with carbendazim 0.1 %	-	-

	Drench Carbendazim 1.0 g/l at the base of plants	Powdery mildew: Spray carbendazim 0.1 %		
Sorghum/Pearl millet		Rust: Spray mancozeb 0.2 %	-	-
Maize	-	-	-	-
Red gram	Wilt in low lying patches in field or field border: Drench Carbendazim 1.0 g/l at the base of plants	Maruca leaf and pod webber: Spray Quinalphos 2 ml/l	-	-
Sugarcane	Sett rot: 1. Sett treatment with Carbendazim before planting (Carbendazim 50 WP @ 0.05% or Carbendazim 25 DS @ 0.1% along with 1.0% Urea for 5 minutes) 2. Proper drainage and planting of setts in 1-2 cm depth.	-	-	-
Onion		Purple blotch: Spray mancozeb 0.2 % / Tebuconazole 0.15 % / zineb 0.2 % Thrips : spray profenophos 2 ml / lit or Acephate 1 g / lit		

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice	Drain out excess water			Drain out excess water
Sunflower	Drain out excess water, Gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride)	Drain out excess water, Weeding and top dressing with urea	Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of earheads
Sorghum	Drain out excess water, Gap filling		Drain out excess water	Drain out excess water, Tying up of lodged plants, drying of earheads and Harvesting
Black gram/ Green Gram	Drain out excess water, Gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride)		Drain out excess water	Drain out excess water, Harvesting and drying of plants
Sorghum/Pearl millet	Drain out excess water		Drain out excess water	Drain out excess water, Tying up of lodged plants, drying of earheads and Harvesting
Maize	Drain out excess water, Gap filling		Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of cobs
Red gram	Drain out excess water, Gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride)		Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Continuous submergence for more than 2 days				
Sunflower	Drain out excess water, Resowing with seed treatment in case of more than 50% mortality; otherwise gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride)	Drain out excess water, Weeding and top dressing with urea; Replacing mortality with sorghum (K)/chickpea (R)	Drain out excess water, Earthing up; Spray borax (0.5%) to the earhead	Drain out excess water, Harvesting and drying of earheads
Sorghum	Drain out excess water,	Drain out excess	Drain out excess water, Tying	Drain out excess water, Tying up of lodged

	Gap filling ; Resowing with seed treatment in case of more than 50% mortality	water, Weeding and top dressing with urea	up of lodged plants	plants drying of earheads and Harvesting
Black gram/ Green gram	Drain out excess water, Gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride); Resowing (in case of more than 50% mortality	Drain out excess water, Weeding and top dressing with urea;	Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Sorghum / Pearl millet	Drain out excess water	Drain out excess water, Weeding and top dressing with urea	Drain out excess water; Tying up of lodged plants	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting
Maize	Drain out excess water, Gap filling		Drain out excess water, Earthing up; Tying up of lodged plants	Drain out excess water, Harvesting and drying of cobs
Red gram	Drain out excess water, Gap filling and drenching with fungicides (0.5 % carbendazim or 0.25 % copper oxy chloride)		Drain out excess water, Spraying with NAA@ 25 ppm	Drain out excess water, Harvesting and drying of plants
Sugarcane	Drain out excess water, weeding and top dressing of fertilizers, earthingup, propping, Detrashing	--	--	--

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable for Tiruchirappali district			
Cold wave				
Frost				
Hailstorm	Not applicable for Tiruchirappali district			
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought	<ul style="list-style-type: none"> ○ As managed ○ Feed may be stored for emergency in a special go down ○ Rapid mobile veterinary team (RMVT) may be formed ○ Community animal shelter 	<ul style="list-style-type: none"> ○ Subsistence feed allowance may be given ○ Water in water troughs ○ RMVT may be pressed in to Service 	<ul style="list-style-type: none"> ○ As managed ○ Feed may be stored for emergency in a special go down ○ Rapid mobile veterinary team (RMVT) may be kept available ○ Community animal shelter may be
Feed and fodder availability			
Drinking water			
Health and disease management			
Floods			
Feed and fodder availability			
Drinking water			

Health and disease management	may be constructed <ul style="list-style-type: none"> ○ Required vaccines may be stored 		constructed
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management			
Health and disease management			

^s based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
				-
Drought	<ul style="list-style-type: none"> ○ As managed ○ Feed may be stored for emergency in a special go down ○ Rapid mobile veterinary team (RMVT) may be formed ○ Community bird shelter may be constructed 	<ul style="list-style-type: none"> ○ Subsistence feed allowance may be given ○ RMVT may be pressed 	<ul style="list-style-type: none"> ○ As managed ○ Feed may be stored for emergency in a special go down ○ Rapid mobile veterinary team (RMVT) may 	
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Floods				
Shortage of feed ingredients				

Drinking water	<ul style="list-style-type: none"> ○ Required vaccines may be stored 	in to Service	be kept available <ul style="list-style-type: none"> ○ Community bird shelter may be constructed ○ Immunization may be carried out 	
Health and disease management				
Cyclone				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management				
Health and disease management				

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

Suggested contingency measures			
	Before the event *	During the event	After the event
1. Drought			
Capture			
Inland: Shallow water depth due to insufficient rains / in flow	<ul style="list-style-type: none"> * Rain water harvesting. * Check dams. * Deepening / Desilting of existing water bodies. * Strengthening of pond embankments. 	<ul style="list-style-type: none"> * Shallow areas of direct water bodies can be used for raising table sized fishes using stunted fish seeds, Tilapia. * Murrel and <u>Pungasius</u> sp culture can be carried out. * Temporarily raising the height of the enclosures may be done to prevent loss of 	<ul style="list-style-type: none"> * Due to water shortage farmers have to harvest fish * Adoption of short term culture.

		stock in the event.	
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality		* Reduced water volume in the pond / local water bodies lower its buffering capacity, reduced manuring should be done to prevent algal bloom and water quality change.	
(iii) Any other		* Production of stunted major carps can be carried out. * Ornamental fish rearing can be done. * Conditioning of ponds.	
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	* Further loss of water due to seepage should be prevented by to polythene sheet lining of ponds murrel culture / cat fish farming can be tried. * Short term fish farming should be planned. * Preparations should be made to preserve / maintains the brood stock for the forth coming season. * The summer crop and the culture area can be minimized based on the availability of water.	* The stocking density or the stocks in pond should be reduced and marketed or stored in other pond. * Culture of cat fish can be curred out. * Minimize use of feed fertilizers and chemicals to maintain water quality. * Strict observation should be carried out to carry out spread of fdisease due to high density and high temperature. * Vegelable crops / short term crops / Low water requirement plants / fodder can be grown in the ponds / types as source of income.	* The ponds can be prepared for the next crop.

(ii) Impact of salt load build up in ponds / change in water quality	Deepening and desilting of existing water bodies.	Application of feed and manures should be minimized.	
(iii) Any other	The quality and quantity of water has to be monitored.	<ul style="list-style-type: none"> * Recirculatory system can be adopted to as to used mineral water. * Use of aerators to overcome thermal stratifications and ammonia build up. * Regular training to the farmers on fish culture, integrated farming and management of drought. * Seed banks / Brood stock banks of Government fish farm should hotel the breeders / seeds for next season. 	* The government should provide quality seeds for the farmers for starting culture
2) Floods			
A. Capture			
Aquaculture	<ul style="list-style-type: none"> * Strengthening of bunds. * Clearing of near by water channels for easy flow of water without entering the ponds. * The main inlet provision in the farm should be maintained. * The farmers / entrepreneurs should be trained to manage flood situation. * The stocks in low lying products of ponds prone to flooding should be transferred to other pond. 	<ul style="list-style-type: none"> * Water storage to the maximum level should be taken. * Entry of flood water in to the pond should be prevented as to reduce silt and mortality and spread of disease. * Nets at every possible ways should be placed pe of fished. 	
(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	Th crop duration should be reduced The cropping area should be reduced	*The loss should be reported to the fisheries department	New stock has to be procured *Disease free stock should be maintained
Change in water quality			
Health and diseases			
B.Aquaculture			
Inundation with flood water	i. Avoid culture of fishes requiring longer duration of culture. ii. Initiating fish culture in advance in areas frequently prone to flooding.		
Water exchange and changes in water quality			
Health and diseases			
Loss of stock and inputs (feed, chemicals etc.,			
Infrastructure damage(pumps, aerators, huts etc)	i. Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure		

Any other			
3. Cyclone	Before the event	During the event	After the event
A. Capture			
Average compensation paid due to loss of fishermen lives			
Average no of boats / nets / damaged			
Average no of houses damaged			
Inland			
B. Aquaculture	Before the event	During the event	After the event
Overflow / flooding of ponds	i. Planting trees like casuarinas.		
Changes in water quality(fresh water / brackish water ratio)	Stocking fishes which can tolerate wide salinity changes eg. milkfish, pearl spot etc.,		
Health and diseases			
Loss of stock and inputs (feed, chemicals etc.,)			
Infrastructure damage(pumps, aerators,shelters/huts etc.,			

Any other	Training programmes for stakeholders including resource users, planners and policy makers on coastal regulations, shoreline protection and environmental awareness.		
Heat wave and cold wave	Before the event	During the event	After the event
A. Capture			
Inland			
B. Aquaculture	Before the event	During the event	After the event
Changes in pond environment (water quality)			
Health and Disease management			
Any other			

State: TAMIL NADU

Agriculture Contingency Plan for District: TIRUPPUR

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Region /Sub Region (ICAR)	Eastern Ghat (TN uplands and SE Sahyadris), hot semi-arid ecosystem with mixed red and black soils and GP 90-120 days (8.1,8.3)	
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region (X)	
	Agro Climatic Zone (NARP)	Western zone of Tamil Nadu (TN-3)	
	List all the districts or part thereof falling under the NARP Zone	Erode, Coimbatore and Tiruppūr Districts, Tiruchengodu taluk of Namakkal district, Manapparai of Tiruchirapalli district, Karur & Aravakurichi taluks of Karur district, Uthamapalayam & Periyakulam taluks of Theni district, Usilampatti taluk of Madurai district, Nilakottai and palani taluks of Dindigul district	
	Geographic coordinates of district	Latitude decimal degrees	Longitude decimal degrees
		10°24' N	77°26'E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, Bhavanisagar	
	Name and Address of the KVK located in the District	-	
1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)
	SW monsoon (June-Sep):	131.4	2 nd week of June
	NE Monsoon(Oct-Dec):	324.7	2 nd week of October
	Winter (Jan- March)	18.9	-
	Summer (Apr-May)	144.3	-
	Annual	619.3	-
			Normal Cessation (specify week and month)
			1 st week October
			3 rd week of December
			-
			-
			-

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
	('000 ha)	519.6	48.2	66.9	0.1	4.0	0.6	2.5	89.4

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Black soils	254.9	46.4
	Red soils	236.7	50.0
	Others	19.0	3.6
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	196.0	103.0
	Area sown more than once	5.9	
	Gross cropped area	201.9	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	119.3	62.8	
	Gross irrigated area	123.1	60.9	
	Rain fed area	72.9	37.1	
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	18	42.2	35.4
	Tanks	178	1.4	1.2
	Tube wells & filter points	12911	10.1	8.7
	Lift irrigation	79244	75.6	54.8
	Other sources	-	0.1	0.1
	Total	92155	119.4	100
	Pump sets	87945		
	Micro-irrigation			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	1	7.9	Salinity level: 58 % good, 33% moderate and 9% poor Residual Sodium Carbonate: 53% good, 46% moderate and 1% poor Sodium Adsorption Ratio: 100 % good
	Critical	3	15.7	
Semi- critical	8	71.6		
Safe	1	04.8		
Wastewater availability and use	Data not available	--		

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

Area under major field crops & horticulture etc.

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

1.7	Major Field Crops cultivated	Area ('000 ha)					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
1	Maize	13.7	0.0	14.4	0.4	-	28.5
2	Sorghum	1.9	13.6	1.0	10.0	-	26.5
3	Rice	0.0	0.0	9.7	-	1.3	11.1
4	Groundnut	1.3	5.5	2.6	0.2	-	9.7
5	Sugarcane	6.4				-	6.4
6	Horse gram	-	1.1	-	4.7	-	5.9
7	Green gram	-	1.4	0.1	2.1	-	3.6
8	Cowpea	-	2.0	0.1	1.3	-	3.4
9	Gingelly	0.2	0.4	1.8	0.1		2.5
10	Sunflower	0.6	-	1.1	0.0	-	1.7
	Horticulture crops - Fruits	Total area		Irrigated		Rainfed	
1	Total fresh fruits	6.2		6.2		0.0	
2	Banana	3.9		3.9		-	
3	Mango	1.7		1.7		0.0	
4	Sapota	0.4		0.3		0.1	
5	Guava	0.1		0.1		0.0	
6	Amla	0.6		0.6		0.0	
	Horticultural crops - Vegetables	Total area		Irrigated		Rainfed	
1	Onion	3.0		1.4 (K)	1.7(R)	-	
2	Tomato	1.5		1.5		-	
3	Tapioca	1.3		1.3		-	
4	Drumstick	0.7		0.7		0.6	
5	Beet root	0.4		0.4		-	
6	Brinjal	0.3		0.3		-	

	Medicinal and Aromatic crops	Total area	Irrigated	Rainfed
1	Kanvazhi kizanku (<i>Choriosa superpa</i>)	1.0	1.0	-
2	Tobacco	0.3	0.3	0.0
	Spices and condiments			
1	Turmeric	1.3	1.3	-
2	Chillies	1.0	1.0	-
3	Coriander	0.8	0.2	0.6
	Plantation crops	Total area	Irrigated	Rainfed
1	Coconut	44.282	44.282	-
	Fodder crops	Total area	Irrigated	Rainfed
1	Sorghum	23.5	1.2	22.3
2	Naripayir (Phillipesara)	5.0	-	5.0
	Total fodder crop area	29.0	1.6	27.4
	Grazing land		-----	
	Sericulture etc			
	Others (Specify)			

1.8	Livestock	Male (number)	Female (number)	Total (number)
	Non descriptive Cattle (local low yielding)	-	-	19.2
	Crossbred cattle	-	-	220.3
	Non descriptive Buffaloes (local low yielding)	-	-	84.6
	Graded Buffaloes	-	-	
	Goat	-	-	223.2
	Sheep	-	-	300.5
	Others (Camel, Pig, Yak etc.)	-	-	66.6
	Commercial dairy farms (Number)			--
1.9	Poultry	No. of farms	Total No. of birds (number)	

	Commercial		5124.9				
	Backyard						
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
			-	-	-	-	-
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)						
	ii) Fresh water (Data Source: Fisheries Department)						
	Others						

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	Maize							168.7	7302
2	Sorghum							88.6	1867
3	Paddy							83.0	6547

4	Groundnut								
5	Sugarcane								
Others									

* Tiruppur is the 31st district created recently and therefore production and productivity data is not available.

1.12	Sowing window for 5 major crops (start and end of sowing period)	Maize	Sorghum	Paddy	Groundnut	Sugarcane
	Kharif- Rainfed	July 1 st week to Aug 1 st week	July 1 st week to Aug 1 st week Up to July 1 st week (grain) Up to Mid Sep (fodder)	---	June 3 rd week to July 2 nd week	---
	Kharif-Irrigated	May 2 nd week- June 3 rd week	July 2 nd week-Aug 2 nd week	June 2 nd week to July 3 rd week	---	---
	Rabi- Rainfed	Oct 2 nd week to Nov 1 st week	Oct 3 rd week-Nov 2 nd week	---	---	---
	Rabi-Irrigated	Nov 2 nd week – Dec 4 th week	Dec 1 st week- Dec 4 th week	Aug 3 rd week to Sep 2 nd week	---	Oct-Jan

1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought	√	-	
	Flood	-	-	√
	High intense storms	-	√	-
	Cyclone	-	-	√

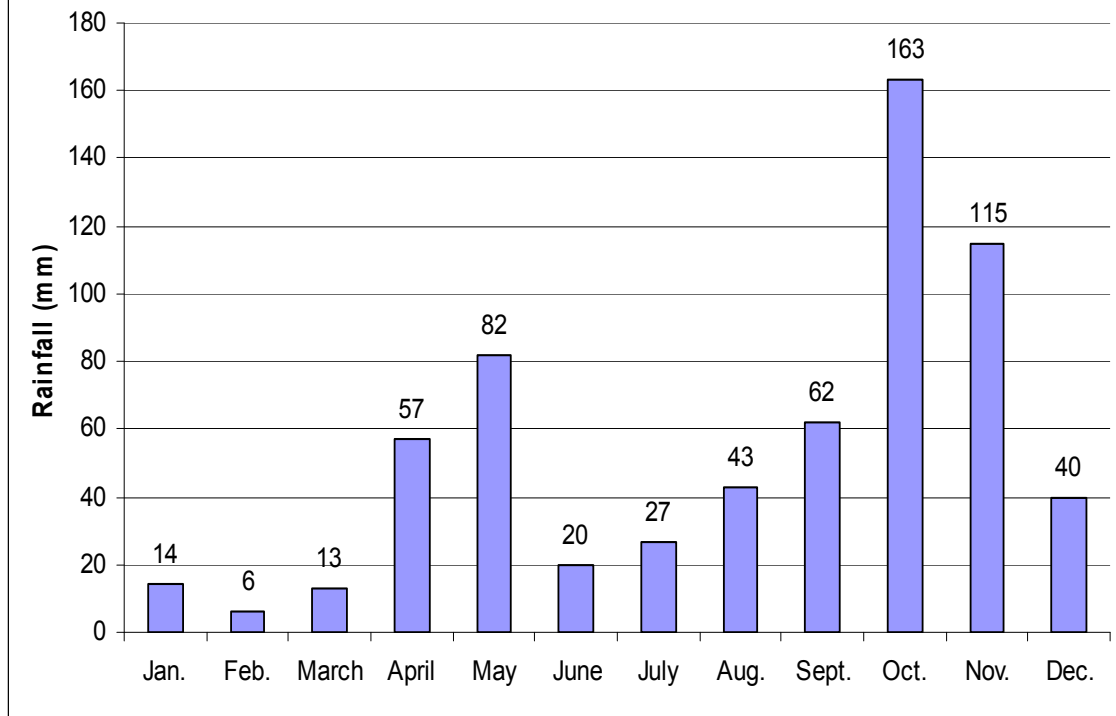
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Sea water inundation	-	-	√
	Pests and diseases (specify)	√	-	-

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

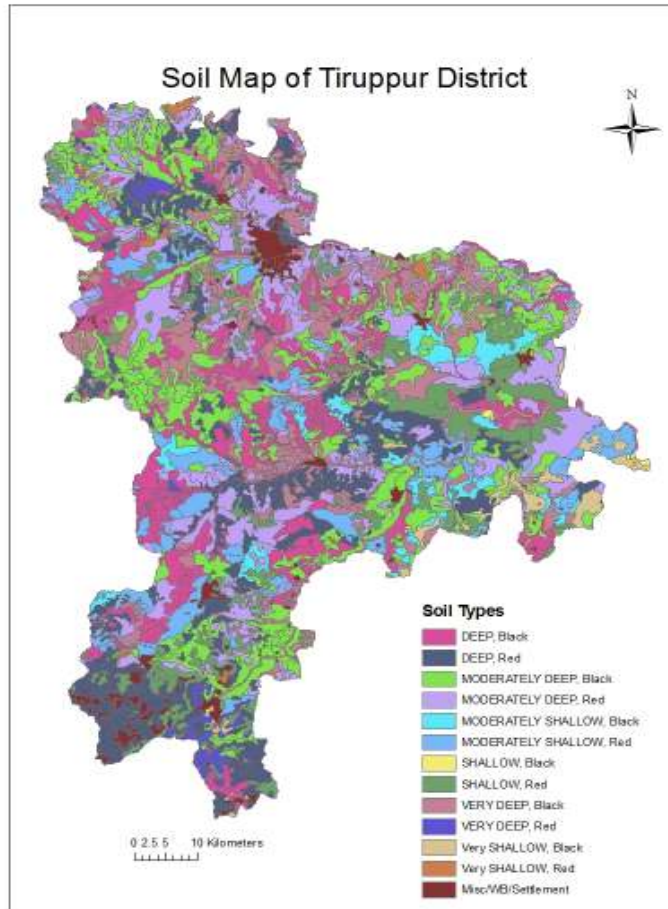
Annexure 1. Location map of Tiruppur district and the blocks



Annexure 2. Mean annual rainfall of Tiruppur district of Tamil Nadu



Annexure 3. Soil map of Tiruppur District of Tamil Nadu



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures for Kharif		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Shallow red soils	Groundnut + Pulses intercropping	No change	<ul style="list-style-type: none"> ➤ Mechanical sowing with tractor drawn seed drills to speed up the sowing to capture moisture for germination ➤ Seed hardening with 50% of volume solution of 0.5% Calcium chloride, for 6 hours ➤ Supplemental irrigation if available 	Dept. of Agriculture
Delay by 2 weeks (July 1 st week)					
Delay by 4 weeks (July 3 rd week)			Pure crop of sorghum/pearl millet/horgegram	-do-	
Delay by 6 weeks (August 1 st week)		Pure crop of fodder sorghum /Horse gram /	<p>Sowing along the contour</p> <p>If terminal drought occurred, crops may be harvested for fodder purpose.</p> <p>For sorghum crop, nitrogen application during vegetative stage enables early flowering when sufficient moisture is available</p>		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures for Kharif		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks (August 3 rd week)	Shallow red soils	Groundnut + pulses intercropping system	Early sowing of rabi crops	-	-

Early season drought (delayed onset)	Major Farming situation	Suggested Contingency measures for Rabi			Remarks on Implementation
		Crop/cropping system	Change in crop/cropping system	Agronomic measures	
Delay by 2 weeks October 3 rd week	Black and red soils -Rabi	Maize/Sunflower/sorghum/Horse gram	No change	For sunflower, soaking seeds in 2% ZnSO ₄ for 12 hrs and shade drying as seed hardening For sorghum, the seeds are pre-soaked in 2% potassium dihydrogen phosphate solution for 6 hours in equal volume and then dried back to its original moisture content in shade and are used for sowing Supplemental irrigation especially for maize available harvested water	
Delay by 4 weeks November 1 st week			Sunflower/sorghum/horse gram	Early maturing hybrids/varieties sunflower: CO-1, Morden Supplemental irrigation if available	
Delay by 6 weeks November 3 rd week			Same crops to be sown. If failure of grain crop, it may be used for fodder	For sorghum crop, nitrogen application during vegetative stage enables flowering when sufficient moisture is available No fertilizer is recommended for horse gram	
Delay by 8 weeks December 1 st week			Crop failure	-	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures for <i>Kharif</i>		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset)	Shallow red soils	Groundnut + Pulses/ intercropping system	<ul style="list-style-type: none"> ➤ Fodder sorghum as a alternate crop ➤ Initial drought of 15-20 days will not affect germination / crop stand. It actually helps groundnut crop for profuse and synchronous flowering 	<ul style="list-style-type: none"> ➤ Compartmental bunding on regular basis as the district is prone for frequent drought ➤ Tied ridging ➤ Sowing along the contour, ridging after three weeks. 	
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period At vegetative stage			<ul style="list-style-type: none"> ➤ Supplemental irrigation through rain gun irrigation if available 	<ul style="list-style-type: none"> ➤ Sowing along the contour and ridging after three weeks. ➤ Thinning to reduce the plant population ➤ Dust mulching 	
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period At reproductive stage			<ul style="list-style-type: none"> ➤ Severe drought years, crop will be harvested for fodder purpose. ➤ Supplemental irrigation with harvested rain water in ponds (10 mm depth.) 	<ul style="list-style-type: none"> ➤ Soil dust mulching 	
Terminal drought			<ul style="list-style-type: none"> ➤ Pods may be digged out manually using mamutty ➤ Soaking the soil artificially to enable easy picking. 	--	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures for Rabi season		
			Crop management	Soil management	Remarks on Implementation
Early season drought (Normal onset)	Black and red soils	Sunflower/Sorghum/Horse gram	<ul style="list-style-type: none"> ➤ Resowing of crops ➤ Seed hardening with chemicals 	<ul style="list-style-type: none"> ➤ Compartmental bunding on regular basis as the district is prone for frequent drought ➤ Tied ridging 	
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period At vegetative stage)			Supplemental irrigation Rain gun irrigation if available	<ul style="list-style-type: none"> ➤ Sowing along the contour, tying alternate furrows with mulching of locally available material can be practiced ➤ Sowing along the contour, ridging after three weeks especially for sunflower. 	
Mid season drought (long dry spell, > 2 consecutive weeks rainless (>2.5 mm) period At reproductive stage)			Severe drought years, crop will harvest for fodder purpose. Supplemental irrigation with harvested rain water in ponds		
Terminal drought			-	<p>Late rabi Crop planning</p> <p>1. In rainfed black soils the following crops are recommended.</p> <p>a) Bengal gram (First FN of December)</p>	

2.1.2 Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Canal irrigated red and black soils	Paddy	ID crops like maize-sunflower/ Gingelly	1. Irrigation at critical stages 2. Adopting microrrigation systems drip/sprinkler	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Canal irrigated red soils	Paddy	Maize/Sorghum/ greengram / horsegram are recommended during October as rainfed crops.	Prefer Drought tolerant variety Supplemental irrigation	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Bore well irrigated red soils and black soils	Sorghum	Sorghum area can be increased instead of maize.	Timely sowing ² . Adopting irrigation for at critical stages Applications of nitrogen fertilizers to sorghum crop initiates early flowering	
		Pearl millet Pulses			

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Groundnut	----		Drain excess water and Weather based advisory to be followed for harvesting.	1. Immediately after harvesting drying of produce

2.3 Floods

Not Applicable

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.6 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	On anticipation of draught, farmers are advised to preserve the available fodder either in the form of hay or silage	Farmers are advised to avoid feed wastages by using machineries like feed chop cutter Advised to utilize agricultural by-products. Utilization of draught resistant tree fodders like leaves and pods of karuvel and velvel.	Feeding of animals for health improvement Farmers are advised to cultivate fodder for animal feeding.
Drinking water	Farmers are advised to build rain water harvesting system in their house and other building, construction of check dam and ponds in their field and other procedures to improve the ground water level. Farmers are educated to conserve the water.	Avoid wastage of water and advised to use only necessary quantity of water for all their operations.	Advised for effective utilization of water.
Health and disease management	As per the disease forecast of Animal Husbandry, Tirupur, the following diseases were encountered in this area during the period of draught and animals should be vaccinated 3 months before	Bacterial diseases should be treated with antibiotics. Viral diseases should be treated with supportive therapy. Antibiotic therapy for prevention of secondary	Animals should be treated with supportive therapy. Feeding of animals for health improvement.

	the anticipated draught. 1. Sheep pox 2. Foot and Mouth disease 3. Anthrax.	bacterial infections.	
Floods	Not Applicable		
Cyclone	Not Applicable		
Heat wave and cold wave	Not Applicable		

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Shortage of feed ingredients	On anticipation of drought, farmers are advised to store the available feed ingredients.	Use unconventional feed ingredients. Maintain the birds depending upon the available feed	Maintain the birds depending upon the available feed	NIL
Drinking water	Farmers are advised to build rain water harvesting system in their house and other building, construction of check dam and ponds in their field and other procedures to improve the ground water level. Farmers are educated to	Avoid wastage of water and advised to use only necessary quantity of water for all their operations. Use of modern drinkers like nipple drinkers etc should be used	Advised for effective utilization of water.	

	conserve the water.			
Health and disease management	The birds should be vaccinated, medicated as per the schedule. Necessary steps to be taken to prevent heat related by draught like planting the trees, covering the low heat conducting material on the top of the shed etc.	Bacterial diseases should be treated with antibiotics. Viral diseases should be treated with supportive therapy. Antibiotic therapy for prevention of secondary bacterial infections. Necessary steps to be continued to prevent heat related by draught like planting the trees, covering the low heat conducting material on the top of the shed etc.	Birds should be treated with supportive therapy. Feeding of birds for health improvement and improved productivity.	
Floods	Not Applicable			
Cyclone	Not Applicable			
Heat wave and cold wave	Not Applicable			

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> • Harvesting large individuals • Increased Stocking-density in smaller/confined areas 	<ul style="list-style-type: none"> • Harvesting large individuals • Disposable of unwanted excess stock • Stocking of desirable/special individuals in brood stock ponds 	<ul style="list-style-type: none"> • Proper management of the local environment

(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	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • Harvesting of the stock • Transferring of smaller fishes to artificial ponds (if available) for tiding over the drought 	<ul style="list-style-type: none"> • Steps to improve the quality of stocked fishes, via feed management water quality management
(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> • Harvesting of the stock 	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • Steps to improve the quality of stocked fishes, via feed management water quality management
(iii) Any other	Not applicable		
2) Floods			
3. Cyclone / Tsunami			
4. Heat wave and cold wave			

State: TAMILNADU

Agriculture Contingency Plan for District: Vellore

1.0 District Agriculture profile

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Region / Sub Region (ICAR)	Eastern coastal plain, hot sub humid to semi arid eco region (8.3)		
	Agro-Climatic Region (Planning Commission)	East Coast Plains and Hills Region (XI)		
	Agro Climatic Zone (NARP)	North Eastern Zone (TN-1)		
	List all the districts or part thereof falling under the NARP Zone	Chengelpet, Vellore, Cuddalore excluding Chidambaram and Kattumannarkovil.		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		12° 15' to 13° 15' North	78° 20' to 79° 50' East	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, Virinjipuram, Vellore District -632 104 Sugarcane Research Station, Melalathur, Vellore District – 632 104		
Mention the KVK located in the district	ICAR-Krishi Vigyan Kendra, Virinjipuram, Vellore District -632 104			
1.2	Rainfall (2008-09)	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	468	1 st Week of June	1 st week of October
	NE Monsoon(Oct-Dec):	416	2 nd week of October	4 th Week of December
	Winter (Jan- Feb)	27	-	-
	Summer (Mar-May)	104	-	-
	Annual	1015	-	-

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)	592.0	150.7	85.9	4.0	6.0	3.0	21.0	56.6	67.6

Source: "G" Return

1.4	Major Soils	Area (*000 ha)	Percent (%) of total
1.	Sandy and Sandy loam	48.9	13.9
2.	Red Loam soil	178.8	51.1
3.	Clay and clay loam soil	118.1	33.8
4.	Black cotton soil	3.8	1.1
	Total	349.6	100
1.5	Agricultural land use	Area (*000 ha)	Cropping intensity %
	Net sown area	197.4	109.8
	Area sown more than once	19.4	
	Gross cropped area	216.8	

Source: Directorate of Economics & Statistics (2008-09)

1.6	Irrigation	Area ('000 ha)	Percent (%)		
	Net irrigated area	99.6	54.38		
	Gross irrigated area	115.9	59.120		
	Rainfed area	97.8	45.62		
	Sources of Irrigation	Number	Area ('000 ha)	% area	
	Canals	654	-	0.42	
	Tanks	1317	1.1	1.1	
	Open wells				
	Bore wells	129199	15.3	15.2	
	Lift irrigation				
	Other sources		0.2	0.4	
	Total		17.2	18.0	
	Pumpsets				
	Micro-irrigation				
	Groundwater availability and use	No. of blocks	% area	Quality of water	
	Over exploited	16	79.91%	Salinity level: 65 % good, 31% moderate and 4% poor Residual Sodium Carbonate: 83% good, 13% moderate and 4% poor Sodium Adsorption Ratio:100 % good	
	Critical	02 (Nemili, kaveripakkam)	13.44%		
	Semi- critical	02 (Arakonam and Walaja)	6.64%		
	Safe	0	-		
	Wastewater availability and use	Data not available			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%					

Area under major field crops & horticulture etc. (2009-10 – Source: Office of JDA, Vellore)

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

Major Field Crops cultivated		Area ('000 ha)					Total
		Kharif		Rabi		Summer	
		Irrigated	Rainfed	Irrigated	Rainfed	-	
1	Groundnut		36.6		8.8		45.5
2	Paddy	9.8	-	30.0	-		39.8
3	Redgram		16.7	0	0		16.7
4	Sugarcane	8.3		5.8			14.1
5	Sorghum		9.9	0	0		9.9
6	Pearl Millet						
7	Others						
Horticulture crops – Fruits		Total area					
1	Mango	12.5					
2	Guava	0.4					
3	Sapota	0.5					
4	Banana	0.3					
5	Others	-					
Horticultural crops – Vegetables		Total area					
1	All vegetables	4.2					
Spices & Condiments		Total area					
1	Spices & Condiments	1.2					
Plantation crops		Total area					
1	Plantation crops	0.1					
Flower crops		Total area					
1	Flower crops	3.1					

1.8 Livestock

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non Descriptive Cattle (Local low yielding)	76.6	105.3	182.0
	Crossbred cattle	51.7	339.8	391.6
	Non descriptive Buffaloes (Local low yielding)			34.0
	Graded Buffaloes			
	Goat			248.2
	Sheep			249.6
	others (Camel, Pig, Yak etc.)			12.3
1.9	Poultry	No. of Farms	Total No. of birds (number)	
1	Commercial	768	6509291	
2	Backyard			
3	Quail	12	31500	
4	Turkey	6	1135	
5	Others (Emu)	11	1270	
1.10	Fisheries	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water			(Marine catch fishes) in tones 39125
	Fresh water			
	Others			

1.11	Production and Productivity of major crops Avg. of 2006-07; 2007-08 and 2008-09	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							149.8	3368
2	Groundnut							53.3	1000
3	Redgram							5.9	661
4	Sorghum							9.2	1070
5	Sugarcane							1904.1	94 .6 (t/ ha)

Others									
	Major Horticultural crops								
1	Mango							7.5	6.0
2	Guava							4.8	12.0
3	Sapota							9.6	20.0
4	Banana							112	40.0
5	Vegetables							75.6	18.0

Source: Season and crop reports of 2006-07; 2007-08 and 2008-09

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Groundnut	Redgram	Sorghum	Sugarcane
	Khariif- Rainfed		June – July	June- July		
	Khariif-Irrigated	May- June				
	Rabi- Rainfed				October	
	Rabi-Irrigated	Aug- September	-	-	-	December

1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought		✓	
	Flood			✓
	Cyclone			✓
	Hail storm			✓
	Heat wave			✓
	Cold wave			✓

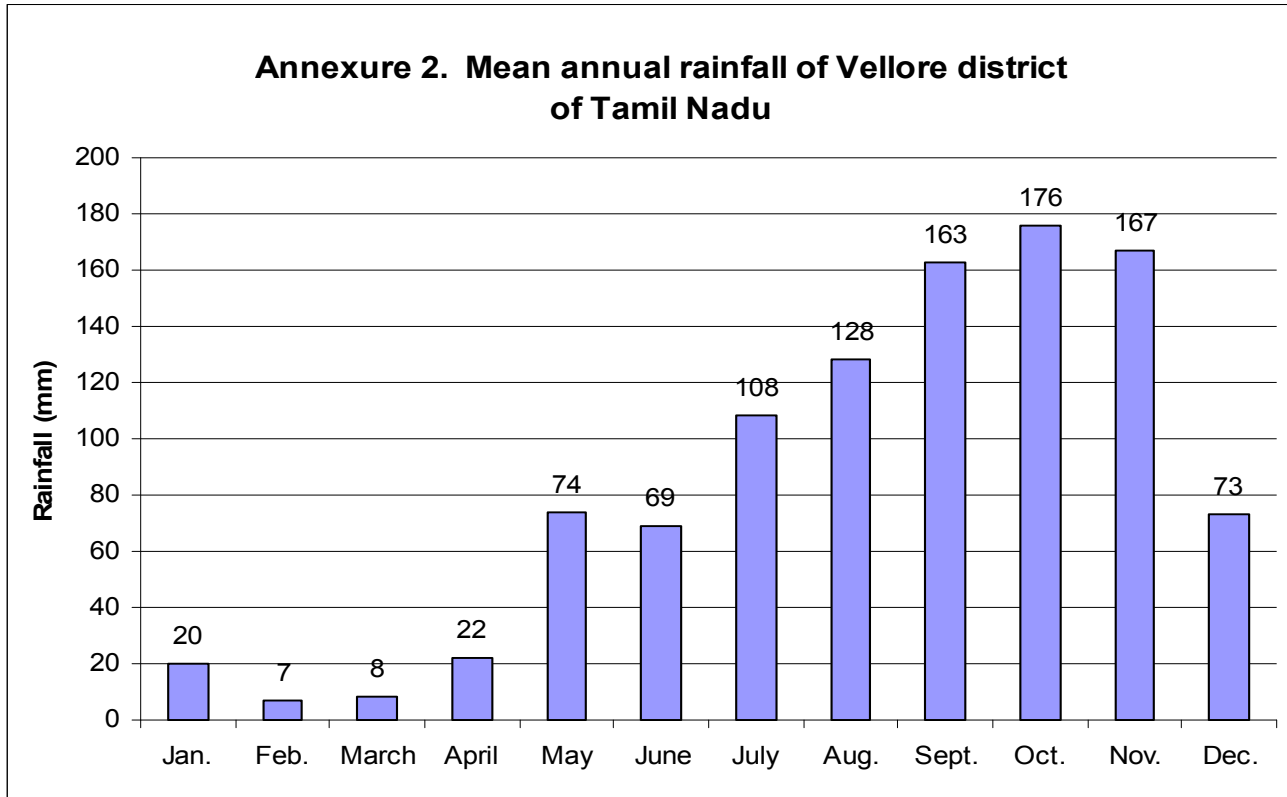
	Frost			✓
	Sea water inundation			✓
	Pests and diseases (specify)			✓

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

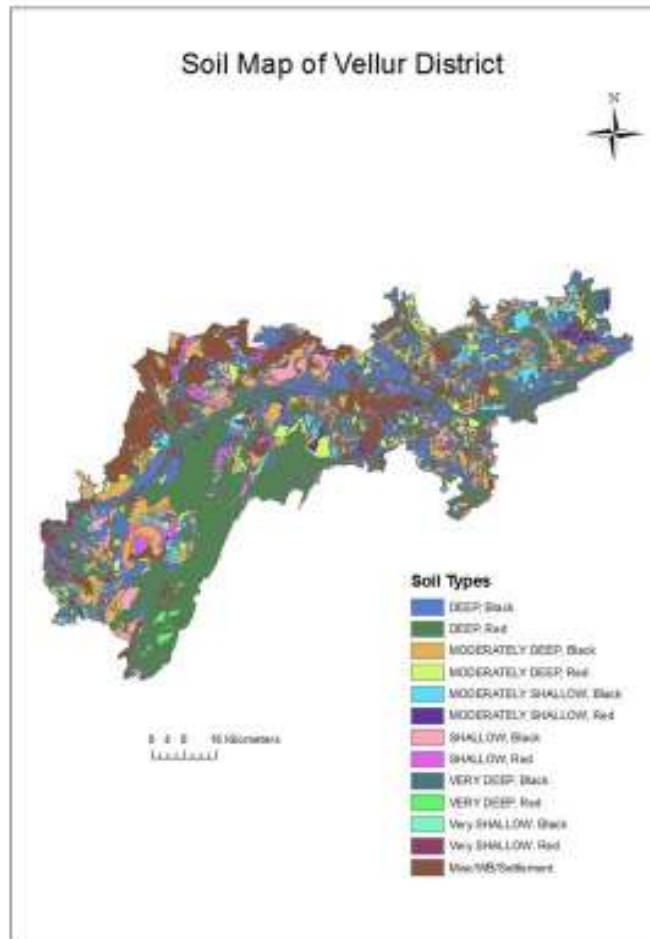
Annexure 1. Location map of Vellore district and the blocks



Annexure 2. Mean annual rainfall of Vellore district of Tamil Nadu



Annexure 3. Soil Map of Vellore District



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Kharif season		Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks June 3 rd week	Red and laterite soils	Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	No change		
Delay by 4 weeks July 1st week	Red and laterite soils	Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Ragi/ Maize / Sunflower/ Groundnut	Seed hardening Wider spacing Inter cultivation Thinning Maize Spraying of Potash (0.25%) during early stage of the crop	NFSM for seed supply

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks July 3 rd week	Red and laterite soils	Pearl Millet / sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Fodder Sorghum / Minor millets Fodder Pearl Millet Fodder Cowpea	0.5% KCL spray Cycocel spray	Linkage with ATMA for fodder seeds
Delay by 8 Weeks- August 1 st week		Fallow	Cotton (Aug sown)	Mulching, Spray 1% KNO ₃ spray	Linkage with ATMA for fodder seeds

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	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
	Red and laterite soils	Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Supplemental irrigation; Water spray Mulching Thinning	Dust mulching Application of soil conditioners like Terra Cotton Basal application of FYM or Vermicompost to improve the soil physical properties	IEC materials on early season drought may be issued to the farming community

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At vegetative stage	Red and laterite soils	Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Supplementary Irrigation through rain gun, siphon irrigation Water spraying Spraying of Drought tolerance chemicals/ growth regulators	Mulching Weeding	IEC materials may be issued to the farming community

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
At reproductive stage	Red and laterite soils	Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Grain crop may be converted into fodder crop	-	Farmers may be advised to take suitable measures during mid season drought through

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil management	Remarks on Implementation
					radio

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
-		Pearl millet / Sorghum (June-Sep.) Gingelly (June-Sep.) Groundnut (June-Sep.)	Crop can be used as fodder	Crop residues may be ploughed back for the next crop	IEC materials may be issued on terminal drought management. Mass media may be used

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Heavy clay and red soils	Paddy	Black gram / Green gram/ Maize SRI Paddy Cultivation	Alternate wetting and drying and Inter cultivation	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Heavy clay and red soils	Black gram Green gram	No change	Mulching / Inter cultivation	ISOPOM / NFSM for seed supply

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	Heavy clay and red soils	Rice/ Vegetables (Aug. – Jan.)- Pulses (Dec- Jan.)	Wheat/ Fodder (November – Feb.) Pulses/Ragi/maize (Feb-May)	Mulching and Inter cultivation	Awareness creation through mass media

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	Bore well irrigated red and laterite soils	Groundnut (June-Sept) Maize (June-Sept) Vegetables (June-Oct)	Sorghum / Pearl Millet / Ragi / senna (July-Oct)-Wheat (Nov-Feb)-Vegetables (Feb-Mar)	Mulching Water harvesting and Recycling	-
Any other condition (specify)	-	Maize (Oct-Jan) – Pulses (Feb-Mar) Rice (Aug-Jan)-Groundnut (Feb-April)- Sesame/Pulses/maize(April-June)	-	-	-

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging	Provision of Drainage	Drain excess water Spraying of growth regulators to avoid / minimize flower shedding	Follow weather advisory before harvest decision	1. Shift produce immediately from the field 2. Threshing 5 th day after harvesting groundnut

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation	Not applicable for Vellore District			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not Applicable for Vellore District			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries:

2.5.1 Livestock

Suggested contingency measures			
Drought	Before the event	During the event	After the event
Feed & Fodder availability	Training to farmers on silage, Azola cultivation & hay making with method demonstration has to be carried out Silage making & Azola cultivation were promoted through ATMA scheme. Education on drought resistant	<ul style="list-style-type: none"> ➤ Silage, Azola and hay to be fed during draught. ➤ Increased amount of concentrates to be given to off set grazing. 	❖ Impact on the training programme & method demonstration on feed & fodder management during drought period has to be evaluated.

	grasses & tree fodders		
Drinking water	Desilting of ponds	<ul style="list-style-type: none"> ➤ Digging of Borewells to meet the water requirement is suggested. 	<ul style="list-style-type: none"> ➤ Borewell with motors can be installed in rest of the Veterinary dispensaries in Vellore district. ➤ Community drinking water trough can be arranged in shandies /community grazing areas
Health & Disease management	Awareness Campaigns	<ul style="list-style-type: none"> ➤ Vaccination & deworming are to be carried out during Mass contact programs/ Kalnadai padukappu thittam. ➤ Vaccination against FMD, BQ, HS PPR along with anthrax vaccine in endemic areas to be carried out.. ➤ Awareness campaigns are to be carried out in 20 blocks of Vellore district. ➤ Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures. ➤ Multivitamins & area specific mineral mixture to be supplied during drought. 	<ul style="list-style-type: none"> ❖ Impact on information disseminated to the farmers on disease prevention & control measures during drought period has to be carried out.
Floods	Not reported		
Feed & Fodder availability			
Drinking water			
Health & Disease management			
Cyclone	Not reported		
Feed & Fodder availability			
Drinking water			

Health & Disease management			
Heat wave & Cold wave			
Feed & Fodder availability	<p>Training to farmers on silage & hay making with method demonstration has to be carried out</p> <p>Education on drought resistant grasses & tree fodders</p> <p>Increase in concentrate feed to off set drought</p>	<ul style="list-style-type: none"> ➤ Silage, Azola and hay to be fed during draught. ➤ Increased amount of concentrates to be given to off set grazing. 	<ul style="list-style-type: none"> ➤ Impact on the training programme & method demonstration on feed & fodder management during drought period has to be evaluated.
Drinking water	Desilting of ponds	Digging of Borewells to meet the water requirement is suggested.	<ul style="list-style-type: none"> ➤ Borewell with motors can be installed in rest of the Veterinary dispensaries in Vellore district. ➤ Community drinking water trough can be arranged in shandies /community grazing areas
Health & Disease management	<p>Information to</p> <ol style="list-style-type: none"> 1. farmers on how to combat outbreaks 2. Possible outbreaks during drought 3. By Capacity building programmes, Awareness campaign. 	<ul style="list-style-type: none"> ➤ Community shed for giving shelters to all livestock during heat wave & cold wave is suggested. ➤ Planting of trees/ fodder trees in village community grazing area is suggested. ➤ Supply of straws for farmers by purchase from nearby states wherein the government to own the transportation cost and the fodder cost by the individual farmers is also one of the suggested measure which has followed in twenty years ago (1980's). 	<ul style="list-style-type: none"> ➤ Impact on information disseminated to the farmers on disease prevention & control measures during drought period has to be carried out.

2.5.2 Poultry: -

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Not applicable		
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris and strengthening of pond embankments through turving 	<ul style="list-style-type: none"> i. Shallow areas of derelict water bodies can be used for raising table sized fishes using stunted fish seeds and the culture can be done in enclosures (pens). Pens of 0.1 to 0.2ha are ideal for easy operation and economical. ii. Indian major carps and freshwater prawns are ideal species for culture. iii. Temporarily raising the height of the enclosures maybe done to prevent loss of stock in 	<ul style="list-style-type: none"> i. Due to severe water shortage farmers have to harvest fish in large quantities to avoid loss due to mortality. Leading to difficulties in marketing the fish farmers can be trained on the frozen storage techniques and in preparing value added products (ready to eat and processed products) ii. Adoption of short term culture of species wherein culture of species having rapid initial growth can be stocked. Eg. minor carps like silver barb (<i>Puntius gonionotus</i>) and fringe lipped carp (<i>Labeo fimbriatus</i>) can be

		the event of sudden rise in water level due to sudden onset of rain or flooding.	undertaken. iii. Culture of minor carp like <i>Amblypharyngodon mola</i> can be done in shallow ponds and this being an auto breeder it spawns two or three times in a year which also ensure auto stocking.
(ii) Changes in water quality	<p>i. Strictly implement in avoiding the use of plastics and other non-biodegradable material along the river belts (intervention and polluting by human is a common factor)</p> <p>ii. Avoid entry of pollutants like industrial effluents, run off from agricultural land into rivers</p>	i. Reduced water volume in the pond/ local water bodies lowers its buffering capacity hence every precaution has to be taken while adopting use of manures and fertilizers to avoid onset of algal blooms and eutrophication	
(iii) Any other	--	<p>i. Stunting of major carp fingerlings and stocking in grow out ponds as they grow faster (three times more growth than the non stunted fingerlings)</p> <p>ii. Ornamental fish rearing utilizing gold fishes, koi carp or</p>	

		live bearers like mollies and guppies can be done in summer. This ensures money flow to the farmers. <i>** subsidy to farmers for inputs like feed,seed.</i>	
B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> i. Water depth should be at least 1m for initiating fish culture. ii. Adopt low stocking density to reduce culture duration and culture should be done only after ensuring water availability for minimum period of 3 months. iii. In low tidal amplitude areas which receives north-east monsoon it is advised not to go for summer crop because of high temperatures which will lead to stress of culturable species. 	<ul style="list-style-type: none"> i. Farmers can be advised to take up integrated farming (poultry, piggery, duckery and animal husbandry with crops) to cut down cost on expensive inputs like feed and manure. ii. Avoid fertilization and manuring on supplementary basis. iii. Air breathing fish culture to be practised (Cat fish farming) 	<ul style="list-style-type: none"> i. Prepare pond for the next crop after early harvest ii. Always keep a constant check on the onset of algal blooms which will cause mass mortality of fishes iii. Harvest fish broodstock if any and shift to deeper safer areas like cement systems in indoor units to utilize for breeding on onset of monsoon
(ii) Impact of silt load build up in ponds / change in water quality	<ul style="list-style-type: none"> i. Rainwater harvesting ii. Deepening/ Desilting of existing water bodies iii. Removal of debris 	i. Feeding should be minimum to avoid organic loading	i. On onset of sudden heavy rains heavy mortality will result so feeding should be controlled to avoid waste accumulation on pond bottom soil.
(iii) Any other	i. The physico-chemical quality of water has to be monitored regularly for its suitability for fish culture.	i. Concept of Re-circulatory system can be adopted as additional water is not required	i. Train the farmers to breed fish in captivity and produce required amount of seed either through hormonal treatment

		<p>thereby curtailing need for water exchange.</p> <p>ii. Use of aerators to overcome thermal stratification and build up of ammonia during high temperatures will help break the thermal stratification</p> <p><i>** subsidy can be provided to farmers for the aerators</i></p> <p>iii. Partial harvesting to reduce biomass thereby competition for space and food is reduced.</p> <p>iv. Reduced stocking densities</p>	<p>and environment manipulation.</p> <p>ii. Use of cryopreserved milt supplied from research units to aid breeding and ensure healthy stock</p> <p>(in collaboration with TANUVAS)</p>
2) Floods	Before the event	During the event	After the event
A. Capture			
Marine	<p>i. Train fisher folk on hygienic handling of fishes, short and long term preservation techniques and on preparation and packaging of value added fish products – as a small scale village activity</p> <p>ii. Establish cold chain facilities</p> <p>iii. Ensure strengthening of coastal belt by planting and maintaining the mangrove ecosystems</p> <p><i>** mangrove wetlands mitigate the adverse impact of storms, cyclones Tsunami in coastal areas and</i></p>	<p>i. Avoid fishing in deeper waters to avoid loss to gear, craft and human lives.</p>	<p>i. Loss incurred should be reported will be assessed by the State Fisheries Department officials and reimbursed.</p>

	<p><i>coastal erosion</i></p> <p><i>** mangroves are ideal breeding ,nursery and feeding grounds for a number of commercially important prawns, fishes and other shell fishes.</i></p> <p>iv. Ecologically sensitive areas to be earmarked such as mangroves, corals and estuaries to avoid overfishing</p> <p>v. Commercial exploitation of coral reefs and large scale removal of mangrove vegetation to be surveyed as this leads to dwindling fish harvests</p>		
Inland			
(i) Average compensation paid due to loss of human life	--- NA---		As per the norms of the State Government and implemented by the State Fisheries Department
(ii) No. of boats / nets/damaged			
(iii) No. of houses damaged			
(iv) Loss of stock	Sell the available fish stock as much as possible	Installation of gill net and using cast net for fishing the stock escapement through flooding	Onset of toxic gases in the system hence immediate stocking of fishes should not be carried out.
(v) Changes in water quality	Strengthening of bunds and embankments either through turfing and terracing to avoid water overflow or entry of waters from outside.	** Water should not be used for domestic purposes	Onset of toxic gases in the system hence immediate stocking of fishes should not be carried out.
(vi) Health and diseases	Water quality management to be followed thoroughly by weekly sampling to monitor water		Ulcers and pox diseases in fishes will occur hence the fish stock has to be discarded or buried.

	quality parameters		
B. Aquaculture/ Mariculture in ponds	Before the event	During the event	After the event
(i) Inundation with flood water	<ul style="list-style-type: none"> i. Avoid culture of fishes requiring longer duration of culture. ii. Initiating fish culture in advance in areas frequently prone to flooding. 	Immediately harvest the stocked fishes	--
(ii) Water exchange and changes in water quality	<ul style="list-style-type: none"> i. Strengthening of bunds and embankments either through turfing and terracing 		Application of lime to stabilize pH.
(iii) Health and diseases	<ul style="list-style-type: none"> i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters 		<p>Discard diseased stock and the following measures to be practiced:</p> <ul style="list-style-type: none"> i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss		Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators, huts etc)	<ul style="list-style-type: none"> i. Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure 		** As on date there has been no measure to give subsidy to the inland fish farmers for loss of fish stock or infrastructure hence the farmers are suffering a heavy

			loss. ** Therefore suggestions can be made to the Government to assess the impact of damage and the rate of compensation can be decided by the officials
(vi) Any other	** Special emphasis can be made to the Government for compensation to the practicing inland fish farmers as there is no help from the Government as given to the fisher folk suffering damages due to cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation		
3. Cyclone / Tsunami	Before the event	During the event	After the event
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	**As per the existing government norms compensation is given to the fisherfolk whenever there is loss due to the impact of cyclones/tsunami		
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland	Cyclone / Tsunami		
B. Aquaculture/ Mariculture	Before the event	During the event	After the event
(i) Overflow / flooding of ponds	i. Planting trees like casuarinas along coastal belt to avoid coastal erosion and inundation of sea waters.		
(ii) Changes in water quality (fresh water / brackish water ratio)	i. Stocking fishes which can tolerate wide salinity changes eg. Milkfish, pearl spot etc.		Application of lime to stabilize pH.
(iii) Health and diseases	i. Water quality management to be followed thoroughly by weekly sampling to monitor water		Discard diseased stock and the following

	quality parameters		measures to be practiced: i. Drying up of confined water bodies ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests iii. Application of lime to balance soil pH.
(iv) Loss of stock and inputs (feed, chemicals etc)	i.The stock (feed and medicines) have to be stored separately in rooms designed for the purpose with air circulation facilities and they have to be stored on raised platforms to avoid loss		Discard stock if affected by water as they will lead to fungal borne infections in the fish stock.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure		** Special emphasis can be made to the Government for compensation to the practicing inland fish farmers as there is no help from the Government as given to the fisher folk suffering damages due to cyclone. The practicing inland/marine fish farmers should register with the State Fisheries Department to avail the formulated compensation
(vi) Any other	Training programmes for stakeholders including resource users, planners and policy makers on coastal regulations, shoreline protection and environmental awareness.		
4. Heat wave and cold wave	Before the event	During the event	After the event
A. Capture			
Marine			i. To conduct studies on the ecological changes to assess the density and diversity of phyto and zooplankton and other benthic macro fauna (collaborative work

			with State Universities-TANUVAS)
Inland			
B. Aquaculture	Before the event	During the event	After the event
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other	<p>i. Conservation of our coral reefs (natural treasures) as they are the most diversified and complex marine ecosystems</p> <p>ii. Conserve seagrass beds by imposing strict measures on trawling, removal for commercial purposes.</p>		