State: TAMILNADU

Agriculture Contingency Plan for District: ARIYALUR

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 Cost 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, Tiruvarur, Nagapattinam, Trichy, Cuddalore and Pudhukottai districts		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		11°0812.09"N	79°04'33"E	83 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Cotton Research Station, Veppanthattai -621116		
	Mention the KVK located in the district	CREED KVK, Cholanmadevi, Ariyalur District - 612602		
1.2	**Rainfall**	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	357	1st week of June	1st week of October
	NE Monsoon(Oct-Dec):	485	2nd week of October	4th week of December
	Winter (Jan- Feb)	29		
	Summer (Mar-May)	83		
	Annual	954		

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)	193.3	9.0	27.4	1.3	3.8	6.4	36.1	9.1	2.6

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total**
	Deep Black soils	845.2	43.4
	Deep Red soils	195.6	10.0
	Misc. /WB/Settlement soils	103.2	5.3
	Moderately Deep Red soils	155.0	8.0
	Very Deep Black soils	412.4	21.2
	Very Deep Red soils	180.6	9.3
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	124.8	103.0
	Area sown more than once	3.8	
	Gross cropped area	128.6	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	39.8		
	Gross irrigated area			
	Rainfed area	84.9		
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals (Km)		11.7	
	Tanks	544	6.7	
	Open wells	32262	3.2	
	Bore wells Tube wells, Filter ponds	6370	18.2	
	Lift irrigation schemes	-	-	

	Other sources	-	-	
	Total	-	-	
	Pumpsets	-	-	
	Micro-irrigation			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-	-	Data not available
	Critical	-	-	
	Semi- critical	1	16.7	
	Safe	5	83.3	
	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***		**Summer**	**Total**
		Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	Rice	-	-	-	-	-	29.1
	Groundnut	-	-	-	-	-	17.5
	Sugarcane	-	--	-	-	-	12.2
	Maize	-	-	-	-	-	11.2
	Sorghum	-	-	-	-	-	4.1
	Horticulture crops - Fruits	**Total area**					
	Mango	-					
	Guava	-					
	Banana	-					
	Horticultural crops - Vegetables	**Total area**					
	Chillies	1.5					
	Tapioca	0.2					
	Onion	-					

	Medicinal and Aromatic crops	**Total area**
	Medicinal and Aromatic crops	-
	Plantation crops/Spices	**Total area**
	Turmeric	0.1
	Coriander	0.3
	Tamarind	0.3
	Cashew	29.5
	Fodder crops	**Total area**
	-	-
	Total fodder crop area	-
	Grazing land	
	Sericulture etc	
	Others (Specify)	

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	37.1	68.0	105.2
	Crossbred cattle	15.5	84.0	99.5
	Non descriptive Buffaloes (local low yielding)	3.1	12.9	16.1
	Graded Buffaloes			
	Goat			265.2
	Sheep			73.9
	Others (Camel, Pig, Yak etc.)	10.1	36.2	46.3
	Commercial dairy farms (Number)			110
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	311.5	
	Backyard			

1.10	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 20		No. of Reservoirs		No. of village tanks	
	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 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 MT	Productivity (kg/ha)
	Rice	-	-	-	-	-	-	159226	5470
	Groundnut	-	-	-	-	-	-	23711	1352
	Sugarcane	-	-	-	-	-	-	1534	126t/ha
	Maize	-	-	-	-	-	-	23705	2112
	Sorghum	-	-	-	-	-	-	6252	1519

	Major Horticultural crops							Production MT	Productivity (t/ha)
	Chillies					-	-	2647	1.7
	Tapioca					-	-	8596	41.9

	Banana					-	-	8842	53.6
	Cashew						-	5904	0.2
	Tamarind						-	739	2.5
	Mango						-	2937	5.5
Others									

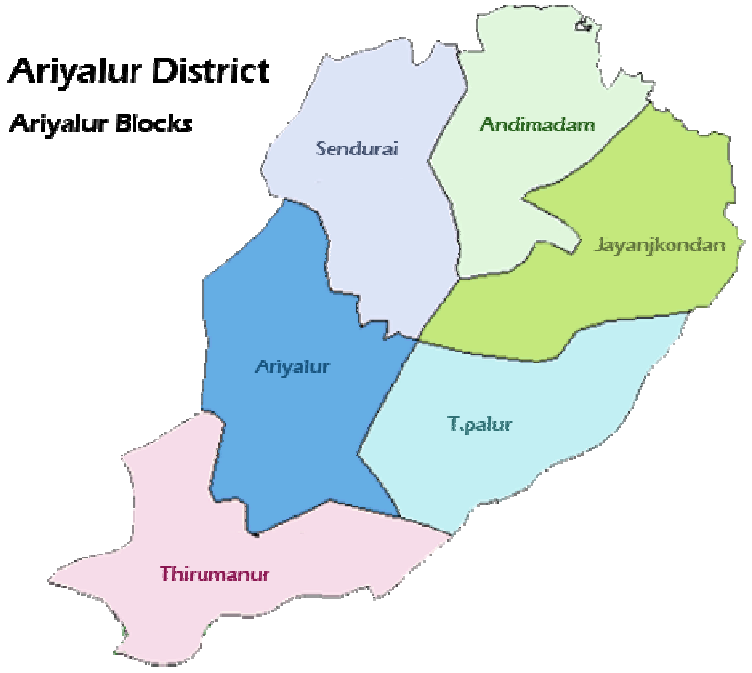
1.12	**Sowing window for 5 major crops (start and end of sowing period)**	**Rice**	**Groundnut**	**Sugarcane**	**Maize**	**Sorghum**
	Kharif- Rainfed	2nd week of July - 2nd week of August	2nd week of June - 2nd week of July	-	2nd week of September - 2nd week of October	1st week of August- 2nd week of September
	Kharif-Irrigated	2nd week of June – 2nd week of July	-	2nd week of December - 2nd week of January	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	2nd week of October - February	2nd week of October - 2nd week of November	-	1st week of January – 3rd week of February	2nd week of January - 2nd week of February

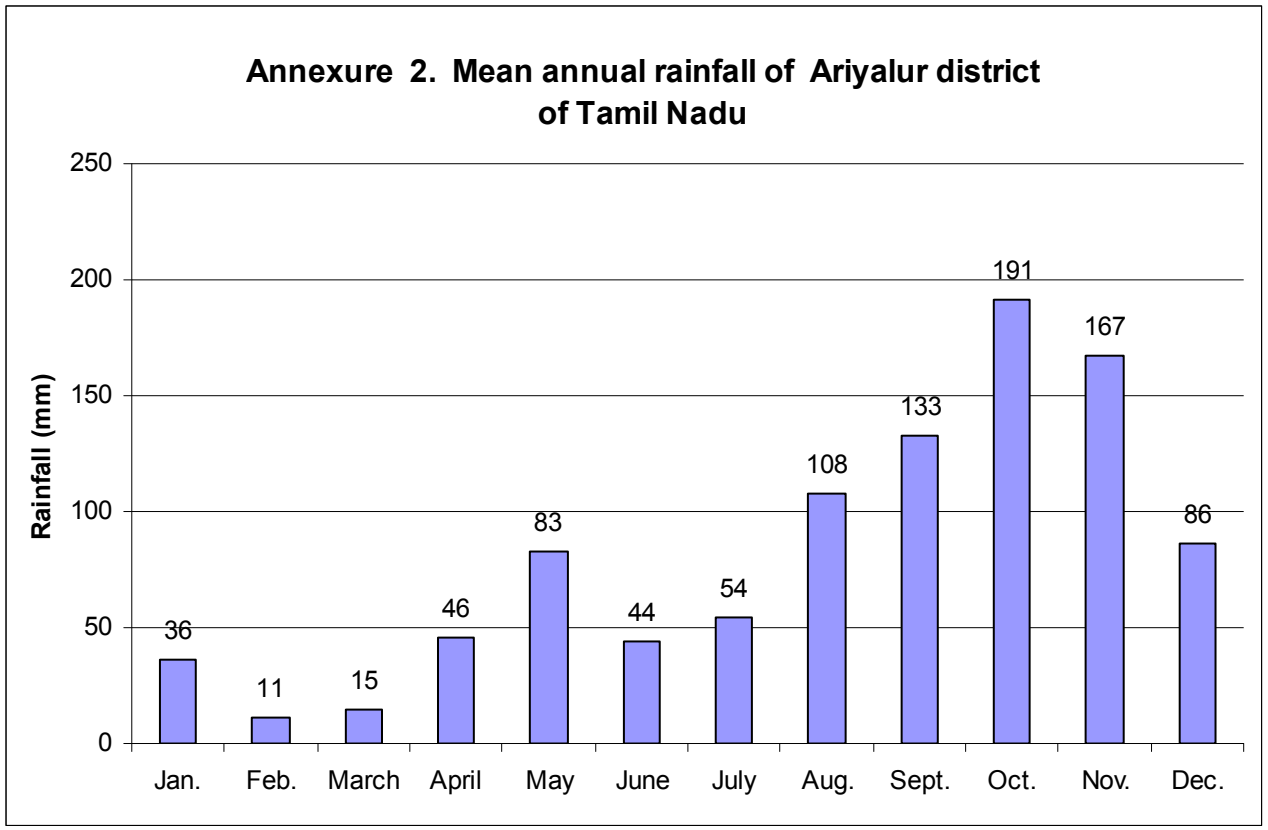
1.13	**What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)**	Regular	Occasional	None
	Drought	✓		
	Flood			✓
	High intense storms			✓
	Cyclone			✓
	Hail storm			✓
	Heat wave			✓

	Cold wave			✓
	Frost			✓
	Sea water inundation			✓
	Pests and diseases Rice: Leaf folder, Stem borer, BPH, False smut, Sheath rot, Groundnut: Tikka leafspot, Groundnut leafminer Sugarcane: Redrot, whitefly, intermodal borer, Early shoot borer		✓	

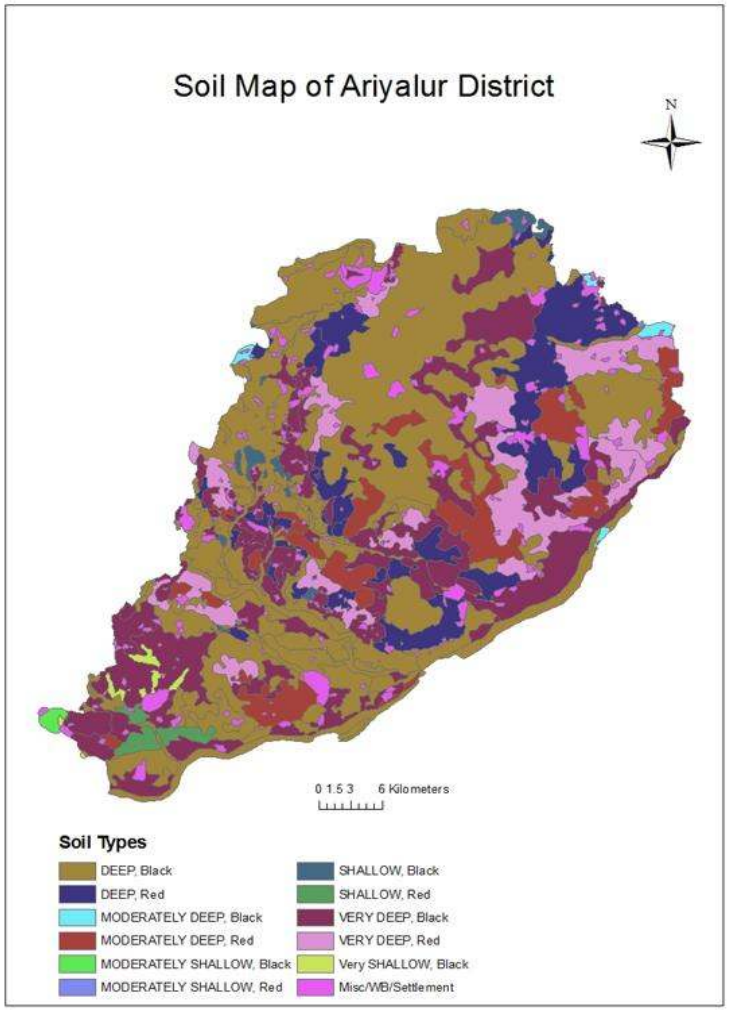
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Yes
		Mean annual rainfall as Annexure 2	Yes
		Soil map as Annexure 3	Yes

Annexure 1. Location map of Ariyalur district and the blocks




Annexure 2. Mean annual rainfall of Ariyalur district of Tamil Nadu
Rainfall (mm)
250
200
150
100
50
0
36
11
15
46
83
44
54
108
133
191
167
86
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.

Annexure 3. Soil Map of Ariyalur district



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed By 2 weeks June 3 rd week	Red soil	Groundnut	Sesamum (TMV 3, CO1) / Blackgram (VBN 1, VBN2)	Thinning at 15 and 30 DAS	Linkage with State Agriculture Department
Delayed By 4 weeks July 1st week	Red soil	Groundnut	Sesamum (TMV 3, CO1) / Blackgram (VBN 1, VBN2)	Thinning at 15 and 30 DAS	
Delayed By 6 weeks July 3 rd week	Red soil	Rice (Rainfed)	Pearl millet (CO7, CO4) / Sorghum / (CO -4, COH -4, BSR 1) Thenai (CO - 6, CO -7) / Varagu (CO -3)	Seed hardening with 2% KH_2PO_4 or 2% KCl	
Delayed By 8 weeks August 1st week	Red soil	Sorghum	Chillies + Pulses Direct sown Paddy –ADT 3, ADT 43, And ADT 45,	-Sowing in ridges -Foliar sprayer of nutrient and growth regulators as Booster -Drum seed sowing -Application of pre emergence herbicide	

Condition			**Suggested Contingency Measures**		
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
	Red soil	Groundnut	1.Seed hardening with 0.5% $CaCl_2$ 2.Seed drill sowing	1.Application of lime @2t/ha 2.Polythene mulching	
	Red soil	Sorghum	1.Seed hardening with2 % KH_2PO4 (or) 1% Prosopis leaf extract 2. Sorghum + Cowpea inter cropping	Application of enriched FYM	
	Black soil	Maize	1.Seed hardening with 2% KCl	Application of VAM with enriched FYM	

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 soil	Groundnut	Life saving Irrigation Grountnut + Redgram –Inter Cropping	Soil mulching	
	Red soil	Sorghum	Thinning out the population Sorghum + Pulses Inter Cropping	-	
	Black soil	Maize	1% KCl foliar spraying Maize + Pulses Inter Cropping	-	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
At reproductive stage	Red soil	Grountnut	Spraying 0.5% KCl at Flowering and Pod development stage	-	-
	Red soil	Sorghum	3% Kaolin spray		
	Black soil	Maize	1% KCl (or) 1% K_2SO_4 Foliar spray		

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Red soil	Groundnut	Crop for fodder purpose Mobile sprinkler Irrigation	Sowing of Horse gram	-
	Red soil	Sorghum	Crop for fodder purpose	Sowing of Horse gram	

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	Canal irrigation Alluvial soils	Kharif	Pulses – Black gram Green gram/ Maize (or) Green Manure crop	1.Seed treatment with Bio fertilizer 2.Potasium basal application 3. DAP @ 2% Foliar spray 4. Spraying Cycocel 1000ppm	
	Canal irrigation Alluvial soils	Rabi	Direct sown Paddy –ADT 3, ADT 43 and ADT 45,	1.Seed hardening with 1% KCl 2.Pre emergence application of herbicide	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water	Canal irrigation Alluvial soils	*Kuruvai*	Green manure crop sowing	1. Seed treatment with Bio fertilizer 2.Phosphores fertilizer application	-

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Canal irrigation Alluvial soils	*Thaladi*	Cultivation of short duration rice variety –AD739, AD736	Seed hardening with 1% KCl	
Insufficient groundwater	Tube well Red soils		Aerobic rice, Maize and Vegetable crops	1.Limited irrigation 2.Alternate furrow irrigation	
	Alluvial soils		Maize	Foliar spraying of 1% KCl (or) 1% K_2SO_4	

Drought

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**
Delay by 2 weeks (June 3rd week)	Deep black soils	Cotton + Blackgram	No Change	• Seed hardening (2% KCl for 5 hr) • Sowing with tractor drawn seed drill • Sowing in Broad Bed Furrow system • Seed treatment (mix with wood ash) • Cotton / red gram nursery • Run-off harvesting • Contour sowing	State Department of Agriculture
		Sorghum + Cowpea			
		Maize			
		Pulses – Greengram Blackgram Redgram			

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 4 weeks (July1st week)	Deep black soils	Cotton + Blackgram	Pearl Millet (CO 7, CO 4, COH 4 and BSR 1)	• Seed hardening • (2% KCl 5 hr) • Seed treatment • Sowing with seed drill • Moisture conservation measures (BBF) • Cotton / Red gram portray nursery • Run-off harvesting • Seed treatment (mix with wood ash)	State Department of Agriculture
		Sorghum + Cowpea	Sunflower CO 4, TCSH 1		
		Maize	CO 1, COH(M)4		
		Pulses – Green gram Black gram Redgram	Blackgram (VBN 1, VBN2) Redgram VBN (RG)3		

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 3rd week)	Shallow / deep black soils	Cotton + Black gram	Pearl millet (CO 7, CO 4, COH 4)	• Seed hardening • (2% KCl 12 hr) • Seed treatment • (biofert. & bio agents) • Seed drill sowing • Moisture conservation • (contour sowing)	State Department of Agriculture
		Sorghum + Cowpea	Sunflower CO 4, TCSH 1		
		Maize	Coriander		
		Pulses – Green gram Black gram Redgram	Minor millets		

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)	Shallow / deep black soils	Cotton + Blackgram	Bajra (CO 7, CO 4, COH 4)	• Seed hardening • (2% KCl 12 hr) • Seed treatment • (biofert. & bio agents)	State Department of Agriculture
		Sorghum + Cowpea	Sunflower		
		Maize	Bengal Gram (CO 3 and CO 4) /		

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**
			Horse gram (CO 1, Paiyur 1)	• Seed drill sowing • Moisture conservation • (contour sowing)	
		Pulses – Greengram Blackgram Redgram	Senna (KKM Se 1 and ALF –T2)		

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
	Shallow / deep black soils	Cotton + Blackgram	Gap filling	Sowing in BBF method Mulch application Vertical mulching	State Department of Agriculture
		Sorghum + Cowpea	Thinning		
		Maize + Greengram	Severe condition re-sowing		
		Pulses	Raising Cotton/Redgram in nursery Contour sowing		

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	Shallow / deep black soils	Cotton + Black gram	Alternate rows can be removed	Soil mulching Vertical mulching Contour sowing	State Department of Agriculture
		Sorghum + cowpea	Mulch application		
		Maize + green gram	Cotton / red gram raising portray nursery for gap filling		
		Pulses	Foliar nutrition spray 1% urea, 1% DAP, 1% All 19:19:19 Spray 1% KCl		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
At reproductive stage	Shallow / deep black soils	Cotton + Blackgram Sorghum + cowpea Maize + green gram Pulses	Harvest at physiological maturity Spray 1% KCl / water 1% Kaolin spray	Dust mulching Waste mulching	State Department of Agriculture

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
	Shallow / deep black soils	Cotton + Black gram Sorghum + cowpea Maize + green gram Pulses	Harvest at physiological maturity Spraying growth regulator/ NaCl 1% to hasten maturity	--	State Department of Agriculture

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	Clayey loam soils	Rice – Rice – Pulse	Green manure – Rice (short duration)	SRI methods of rice cultivation Drip fertigation	Do A
		Sugarcane	Sugarcane (Subsurface drip fertigation)		
		Vegetables	Vegetables (drip fertigation)		

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	Clayey loam soils	Rice – Rice – Pulse	Green manure – Rice	Daincha, sunhemp	Do A
		Sugarcane	Maize (drip) Pulses	Drip fertigation	
		Vegetables	Vegetable (drip)		

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	Clayey loam soils	Rice-Rice-Pulse	Green gram Black gram	Short duration pulses	Do A
		Sugarcane	Maize Sun flower / cotton	Cotton – pro tray nursery	
		Vegetables	Vegetables (drip irrigation)	Vegetables – precision farming	

2.3 Flood – NOT APPLICABLE

2.4 Extreme events - NOT APPLICABLE

2.5 Livestock Poultry and Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Collect all tapioca waste and store properly for use as feed supplement during drought Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February All the available crop residues especially sorghum	Harvest and use biomass of dried up crops (paddy/Sorghum//maize/ Groundnut/Black gram/Green gram) material as fodder Use of unconventional and locally available cheap feed ingredients especially tapioca for feeding of livestock	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,

	stover, groundnut haulms, paddy straw, and sugarcane tops should be stored properly in the farm of hay at individual farmer level. Sowing of cereals (Sorghum) and leguminous crops (Lucerne, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production Encourage fodder production with Sorghum – stylo-Sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp Create awareness on establishment of pasture with drought resistant fodder Varities like Guinea grass, stylo, kolukkattai grass, Acacia trees, etc. Creation of tree fodder models with Subabul, Glyricidia, Agathi, etc for tree fodder production during summer. Promote Azola cultivation at backyard Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop cutters. Capacity building and preparedness of the stakeholders and official staff for the drought/floods	during drought Harvest all the top fodder available (Subabul, Glyricidia, Agathi, Prosopis etc) and feed the LS during drought Promotion of cultivation of Horse gram as contingent crop and harvesting it at vegetative stage as fodder All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. Continuous supplementation of minerals to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals Arrangements should be made for mobilization of small ruminants across the districts where no drought exits Unproductive livestock should to be culled during severe drought Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals) Subsidized loans (5-10 crores) should be provided to the livestock keepers	Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with some input subsidy Supply of quality seeds of COFS 29, Stylo and fodder slips of Co3, Co4, guinea grass well before monsoon Flushing the stock to recoup Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and disease management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their

	Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures. Procure and stock multivitamins & area specific mineral mixture	Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods	-Not applicable-		
Cyclone			
Heat wave and cold wave			

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house 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			
Heat wave and cold wave			

2.5.3 Fisheries

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

Inland: Shallow water depth due to in sufficient rains / in flow	* Rain water harvesting. * Check dams. * Deepening / Desilting of existing water bodies. * Strengthening of pond embankments.	* Shallow areas of direct water bodies can be used for raising table sized fishes using stunted fish seeds, Tilapia. * Murrel and Pungasius sp culture can be carried out. * Temporarily raising the height of the enclosures may be done to prevent loss of stock in the event.	* Due to water shortage farmers have to harvest fish * Adoption of short term culture.
(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 / Marineculture			
(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.	* 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 / Marine	* Strengthening of banks. * Clearing of near by water channels for easy flow of	* Water storage to the maximum level should be taken. * Entry of flood water in to the pond should be prevented	

	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.	as to reduce silt and mortality and spread of disease. * Nets at every possible ways should be placed to parent ed.	
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	The 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		
3. Cyclone / Tsunami	Before the event	During the event	After the event
A. Capture			
Marine	-	-	-
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
Mariculture			
Overflow / flooding of ponds	i. Planting trees like casuarinas along coastal belt to avoid coastal erosion and inundation of sea waters.		
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			
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
Changes in pond			

environment (water quality)			
Health and Disease management			
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.		