

State: TAMILNADU

**Agriculture Contingency Plan of District: KANCHEEPURAM**

1.0 District Agriculture profile				
1.1	<b>Agro-Climatic/Ecological Zone</b>			
	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 <sup>o</sup> 20' N	79 <sup>o</sup> 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	<b>Rainfall</b>	Average (mm)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	462	1 <sup>st</sup> Week of June	4 <sup>th</sup> week of October
	NE Monsoon (Oct-Dec):	697	1 <sup>st</sup> week of October	4 <sup>th</sup> Week of December
	Winter (Jan- March)	49	-	-
	Summer (Apr-May)	120	-	-
	Annual	1420	-	-

<b>1.3</b>	<b>Land use pattern of the district</b> (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
	<b>Area ('000 ha)</b>	443.2	23.9	146.5	18.3	10.7	12.9	10.9	34.9	56.5

<b>1.4</b>	<b>Major Soils</b>	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
<b>1.5</b>	<b>Agricultural land use</b>	Area ('000 ha)	Cropping intensity %
	Net sown area	140.0	106.4
	Area sown more than once	9.0	
	Gross cropped area	149.0	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)	Percent (%)		
	Net irrigated area	130.7	95.1		
	Gross irrigated area	139.6	95.4		
	Rainfed area	9.3	4.6		
	<b>Sources of Irrigation</b>	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				
	<b>Groundwater availability and use</b>	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>		<b>Summer</b>	<b>Total</b>
		<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						
	<b>Horticulture crops - Fruits</b>	<b>Total area ('000 ha)</b>					
1	Mango	2.4					
2	Banana	0.3					
3	Water melon	1.6					
4	Guava	0.2					
5.	Citrus	0.2					
	<b>Horticultural crops - Vegetables</b>	<b>Total area ('000 ha)</b>					
	1. Brinjal	0.1					
	2. Bhendi	0.1					
	<b>Flowers</b>						

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

<b>1.8</b>	<b>Livestock</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>			
	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)						
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>				
	Commercial	-	353.8				
	Backyard	-	-				
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>						
	<b>A. Capture</b>						
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			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	-
<b>ii) Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks(FFDA tanks)</b>		
	63ha		3263ha		749ha		

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

<b>1.11</b>	<b>Production and Productivity of major crops</b> (Average of last 3 years: 2006, 07, 08)	<b>Kharif</b>		<b>Rabi</b>		<b>Summer</b>		<b>Total</b>	
		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		-	-	-	-	-	-		
<b>Major Horticultural crops</b>									
1	Mango	-	-	-	-	-	-	13.4	5216
2	Banana	-	-	-	-	-	-	14.4	47741
3	Guava	-	-	-	-	-	-	232.6	13603
4	Citrus (Lemon)	-	-	-	-	-	-	376.0	2986

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

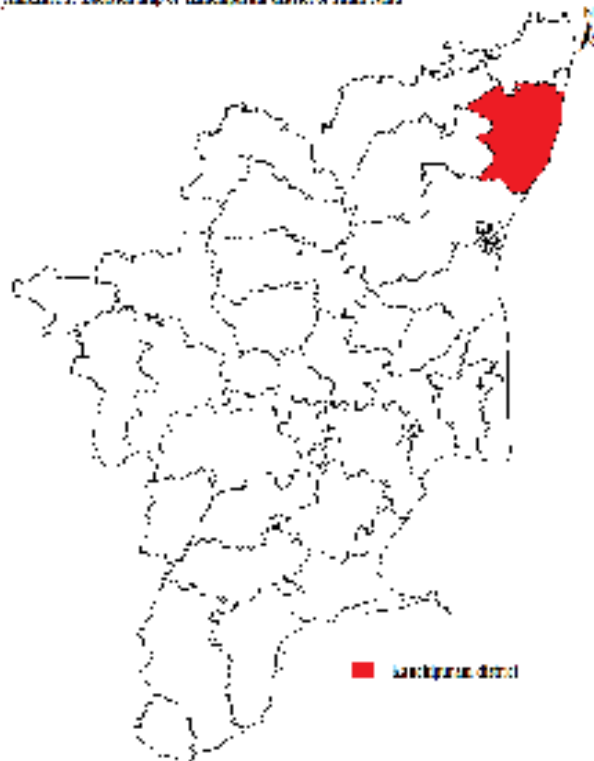
		th week of May				
	Rabi- Rainfed	1 <sup>st</sup> week of August 4 <sup>th</sup> week of November	1 <sup>st</sup> week of October to 4 <sup>th</sup> week of January	-	-	1 <sup>st</sup> week of October to 1 <sup>st</sup> week to 4 <sup>th</sup> week of January
	Rabi-Irrigated	1 <sup>st</sup> week to 4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

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

<b>1.14</b>	<b>Include Digital maps of the district for</b>	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

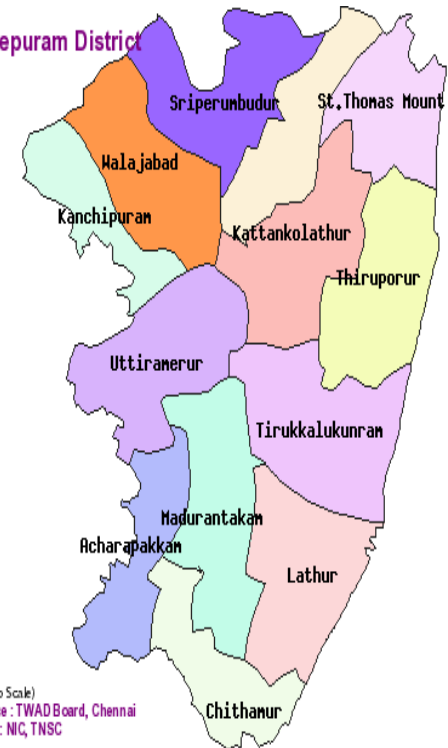
## Annexure 1. Location map of Kancheepuram district and the blocks

Annexure 1. Location map of Kancheepuram district of Tamil Nadu



### Kancheepuram District

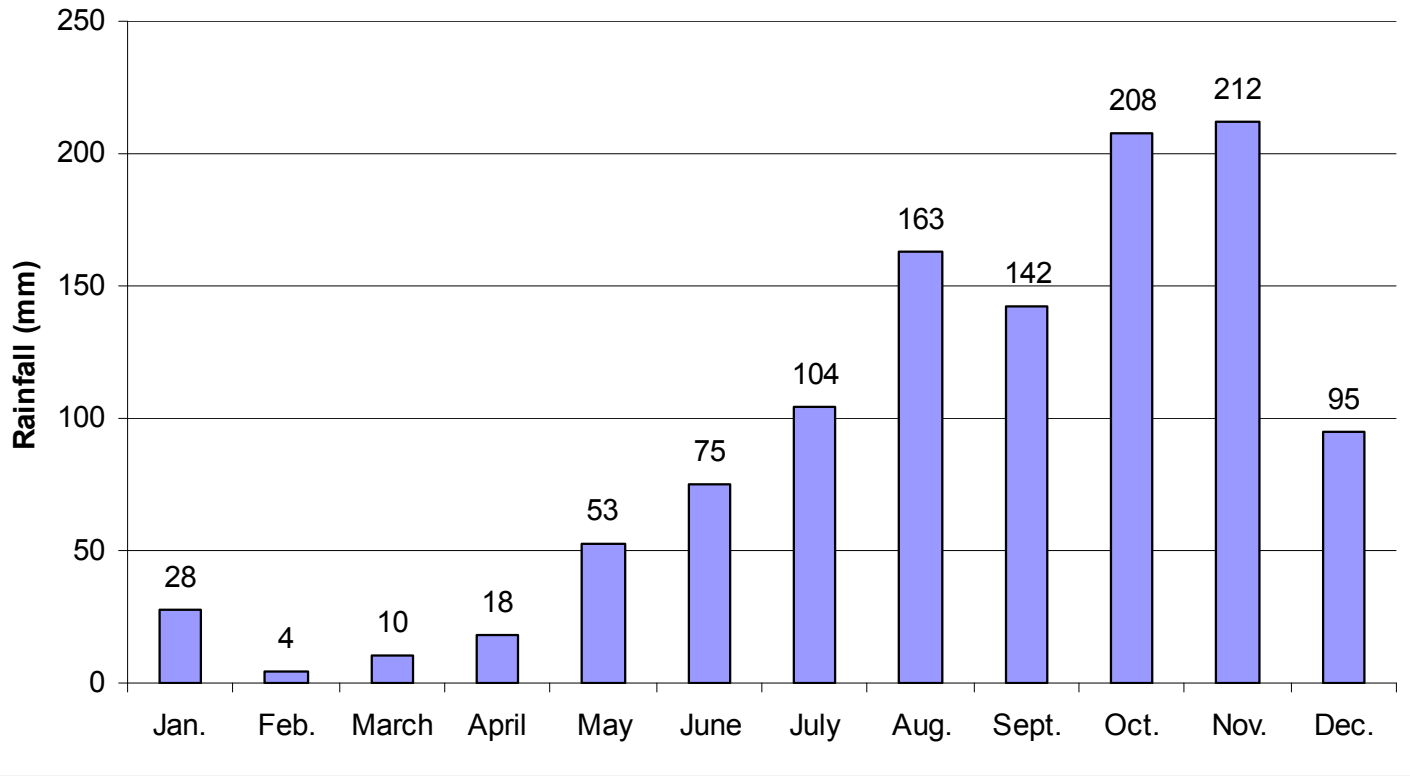
Blocks



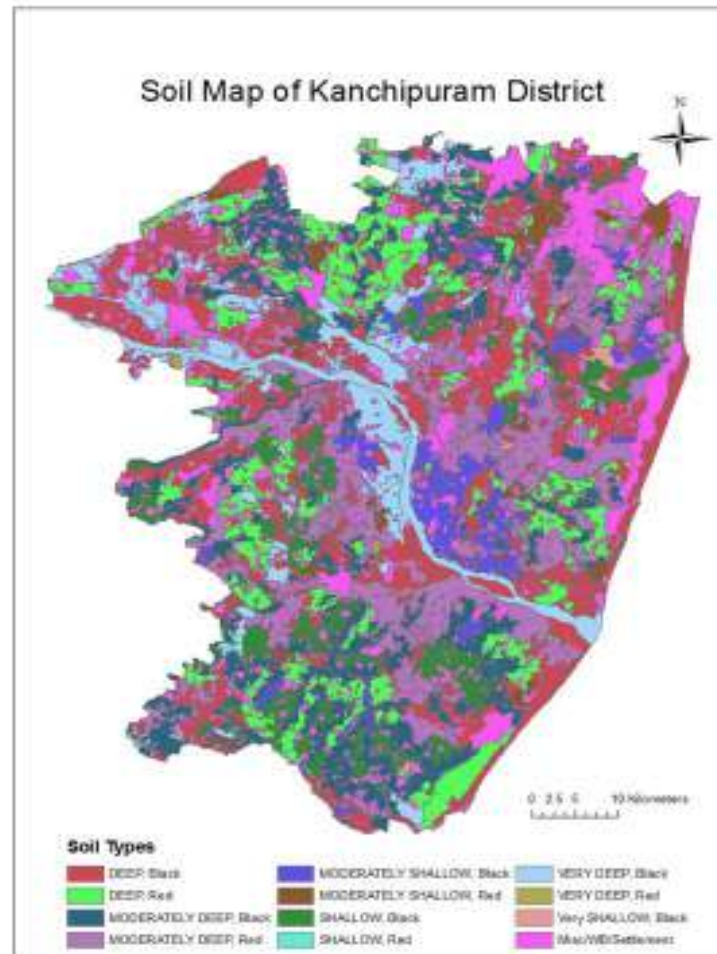
(Map Not to Scale)  
Digital Map Source : TWAD Board, Chennai  
Web Design : NIC, TNSC



**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 <sup>rd</sup> 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 <sup>rd</sup> 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 <sup>st</sup> 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				
<b>Heavy rainfall with high speed winds in a short span</b>				
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		
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
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
<b>Transient water logging/ partial inundation</b>				
Paddy	Drainage, Appropriate Plant protection management for thrips	Drainage, Appropriate Plant protectionmanagement	Drainage, Appropriate Plant protection management	Drain out excess water
Groundnut	Drainage Appropriate Plant protection management	Drainage Appropriate Plant protection management leaffolder, gall midge & stem borer moth catches Incidence of BPH		
<b>Continuous submergence for more than 2 days</b>				
Paddy	Drain out excess water			
Groundnut				
Sugarcane				
Greengram				
Blackgram				
<b>Sea water inundation</b>				
Paddy	Soil amendments application			
<b>Condition</b>	<b>Suggested contingency measure</b>			
<b>Transient water logging/ partial inundation</b>	<b>Seedling / nursery stage</b>			
Paddy	Drainage, Appropriate Plant protection management for Thrips			
Groundnut	Drainage Appropriate Plant protection management			
<b>Continuous submergence for more than 2 days</b>				
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
<b>Drought</b>			
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
<b>Floods</b>			
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
<b>Cyclone</b>			
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
<b>Heat wave and cold wave</b>	NA		

## 2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event <sup>a</sup>	During the event	After the event	
<b>Drought</b>				
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	
<b>Floods</b>				
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	
<b>Cyclone</b>				
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	
<b>Heat wave and cold wave</b>	NA			

### 2.5.3 Fisheries/ Aquaculture

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

		of fish stocks Coastal planning to restore coastal eco systems	
<b>Inland</b>			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>• Make adequate water harvesting facility</li> <li>• Provide refuges and sanctuaries</li> </ul>	<ul style="list-style-type: none"> <li>• Keep the fish stock at minimal level</li> <li>• Use polythene layered ponds and cover to avoid percolation &amp; evaporation</li> </ul>	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"> <li>• Have adequate filter mechanisms.</li> <li>• Keep operations at lowest possible side</li> </ul>	Assess water quality
(iii) Any other Higher inland water temperature	<ul style="list-style-type: none"> <li>• Reduce fish stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Lower water quality causing more disease and fish mortality can be avoided by reducing the fish stock.</li> </ul>	Plan for the minimal water levels in inland water bodies with other water users
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>• Try to have buffer ponds to meet exigencies</li> <li>• Have adequate flushing facility to safeguard broodstock</li> </ul>	<ul style="list-style-type: none"> <li>• Harvest the fishes as and when emergency arises</li> <li>• Keep stock at minimum with only essential stock</li> </ul>	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"> <li>• Plan for keeping stock of stunted fingerlings to reduce the crop period.</li> <li>• Plan for alternative livelihood to local fishers</li> <li>• Integrate pond aquaculture with traditional crops and livestock to reduce farmer's vulnerability to drought to boost overall production and profit</li> </ul>
<b>2) Floods</b>	<b>Before the event<sup>a</sup></b>	<b>During the event</b>	<b>After the event</b>
<b>A. Capture</b>			
<b>Marine</b>			
Rising sea level	<ul style="list-style-type: none"> <li>• Provide adequate shelter in inland and take stock of community stay facility and life saving devices to guard human &amp; cattle life</li> <li>• Take adequate measure against epidemics</li> </ul>	<ul style="list-style-type: none"> <li>• Engage all possible life saving machinery to save human and cattle life.</li> <li>• Keep people far away from water bodies</li> <li>• Loss of coastal eco systems such as mangrove forests</li> </ul>	<ul style="list-style-type: none"> <li>• Take stock of situation</li> <li>• Pay feed, medicine engage people from voluntary organization to ensure victims getting relief measures early</li> <li>• Enhancement of wild catch through improved traditional gear</li> </ul>

		<ul style="list-style-type: none"> <li>• Reduced stock for capture fisheries</li> <li>• Damage to fishing gear, higher risk to fishers</li> <li>• Damage to coral reefs that serve as breeding habitats and help protect the shore from wave action</li> </ul>	
<b>Inland</b>			
(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"> <li>• Repair of dykes or embankments of aquaculture facilities</li> <li>• Ensure bunds, canals are freed flowing to avoid breach of bunds</li> </ul>	<ul style="list-style-type: none"> <li>• Keep the fish stock at minimal level</li> <li>• Keep operations at lowest possible side</li> </ul>	<ul style="list-style-type: none"> <li>• Try to shift the stock to place of better water quality</li> <li>• Repair the breached bunds and other on war footing</li> <li>• Fishermen dependent on fisheries from rivers for their livelihood need to provided with fishing equipments like nets and boats for continuing their livelihood activity</li> </ul>
(v) Changes in water quality	<ul style="list-style-type: none"> <li>• Repair of dykes or embankments of freshwater bodies</li> <li>• Ensure bunds, canals are freed flowing to avoid breach of bunds</li> </ul>	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>B. Aquaculture</b>			
(i) Inundation with flood water	<ul style="list-style-type: none"> <li>• Plan for short culture periods and minimal capital investments to reduce stock loss and associated cost</li> <li>• Repair of dykes or embankments of aquaculture facilities</li> <li>• Ensure bunds, canals are freed flowing to avoid breach of bunds</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of disease and predators into aquaculture facilities</li> <li>• Try to safeguard by netting various entry and exit points</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor and assess risk for promotion of aquaculture</li> <li>• Repair of dykes or embankments of aquaculture facilities for initiating culture operations</li> </ul>
(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"> <li>• Fingerlings of Indian major crops should be stocked</li> <li>• Sizeable quantities of chemicals, Mahua oil cake, lime, bleaching powder will be required for preparation of various confined water bodies for fish culture operation</li> <li>• 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</li> </ul>
(v) Infrastructure damage (pumps, aerators, huts etc)			Document the loss and report to Department of Fisheries for necessary claims
(vi) Any other			
<b>3. Cyclone / Tsunami</b>	<b>Before the event<sup>a</sup></b>	<b>During the event</b>	<b>After the event</b>
<b>A. Capture</b>			
<b>Marine</b>			
(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"> <li>• Habitat loss like destruction of reef areas and other inshore vulnerable habitats</li> <li>• Decreases biodiversity with a shift in species dominance</li> </ul>	<ul style="list-style-type: none"> <li>• Provide adequate assistance or relief to fisher folk</li> <li>• Reestablishment of species and habitats</li> <li>• Fishermen dependent on fishing for their livelihood need to be provided with fishing equipments like nets and boats for continuing their livelihood activity</li> </ul>
(ii) Avg. no. of boats / nets/damaged	-	-	
(iii) Avg. no. of houses damaged	-	-	
<b>Inland</b>	-	--	
<b>B. Aquaculture</b>	-	-	
(i) Overflow / flooding of ponds	-	-	<ul style="list-style-type: none"> <li>• Monitor and assess risk for promotion of aquaculture</li> <li>• Repair of dykes or embankments of aquaculture facilities for initiating culture operations</li> </ul>
(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		
<b>4. Heat wave and cold wave</b>	NA		