

State: **TAMILNADU**

**Agriculture Contingency Plan for District: Vellore**

**1.0 District Agriculture profile**

1.0 District Agriculture profile				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	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			
<b>1.2</b>	<b>Rainfall (2008-09)</b>	Average (mm)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	468	1 <sup>st</sup> Week of June	1 <sup>st</sup> week of October
	NE Monsoon(Oct-Dec):	416	2 <sup>nd</sup> week of October	4 <sup>th</sup> Week of December
	Winter (Jan- Feb)	27	-	-
	Summer (Mar-May)	104	-	-
	Annual	1015	-	-

<b>1.3</b>	<b>Land use pattern of the district (latest statistics)</b>	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

<b>1.4</b>	<b>Major Soils</b>	<b>Area (*000 ha)</b>	<b>Percent (%) of total</b>
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
<b>1.5</b>	<b>Agricultural land use</b>	<b>Area (*000 ha)</b>	<b>Cropping intensity %</b>
	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)

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)	Percent (%)		
	Net irrigated area	99.6	54.38		
	Gross irrigated area	115.9	59.120		
	Rainfed area	97.8	45.62		
	<b>Sources of Irrigation</b>	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				
	<b>Groundwater availability and use</b>	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

<b>Major Field Crops cultivated</b>		Area ('000 ha)					Total
		<i>Kharif</i>		<i>Rabi</i>		Summer	
		<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>	-	
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						
<b>Horticulture crops – Fruits</b>		<b>Total area</b>					
1	Mango	12.5					
2	Guava	0.4					
3	Sapota	0.5					
4	Banana	0.3					
5	Others	-					
<b>Horticultural crops – Vegetables</b>		<b>Total area</b>					
1	All vegetables	4.2					
<b>Spices &amp; Condiments</b>		<b>Total area</b>					
1	Spices & Condiments	1.2					
<b>Plantation crops</b>		<b>Total area</b>					
1	Plantation crops	0.1					
<b>Flower crops</b>		<b>Total area</b>					
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									
	<b>Major Horticultural crops</b>								
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

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

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

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

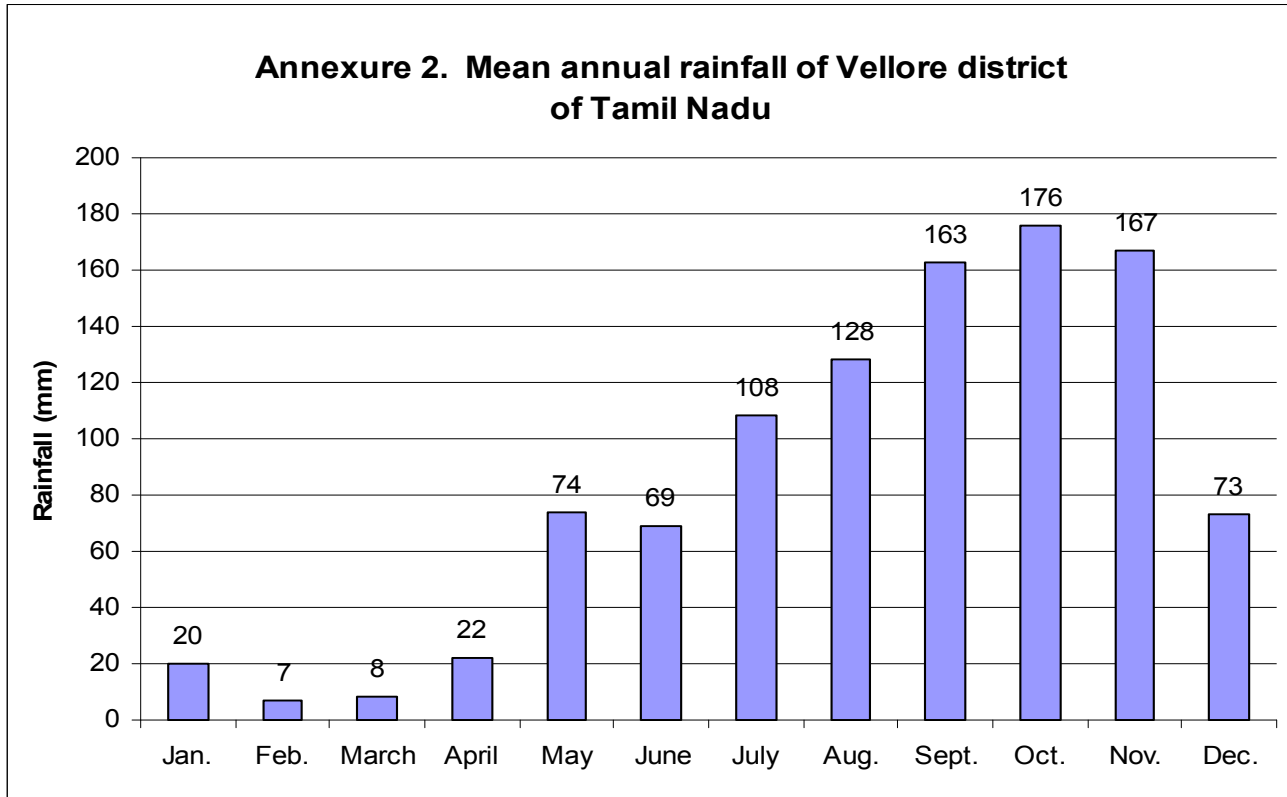
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure 1. Location map of Vellore district and the blocks

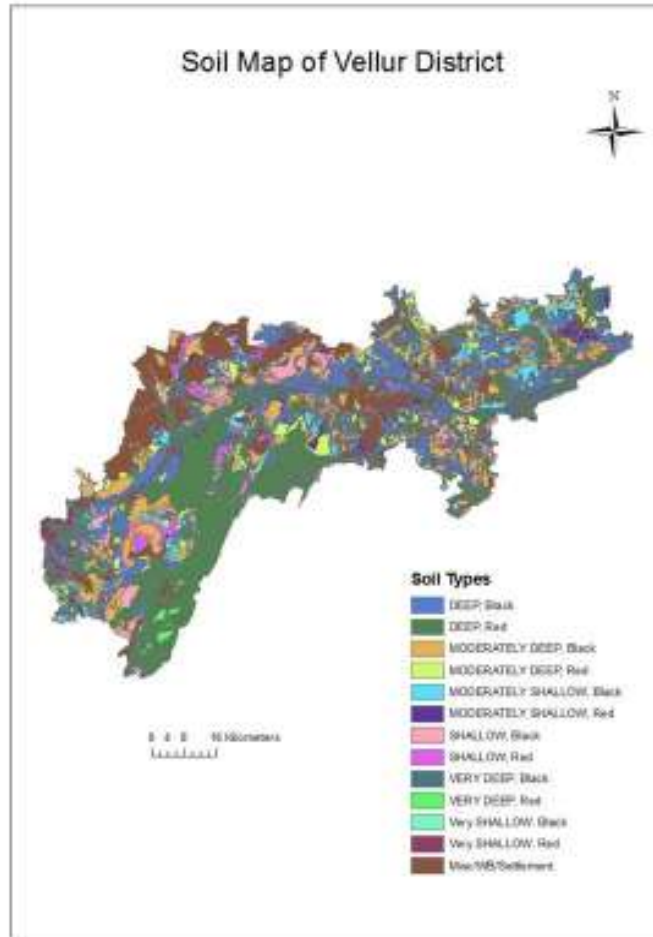




**Annexure 2. Mean annual rainfall of Vellore district of Tamil Nadu**



### 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 <sup>rd</sup> 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 <b>Maize</b> 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 <sup>rd</sup> 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 <sup>st</sup> week		Fallow	Cotton (Aug sown)	Mulching, Spray 1% KNO <sub>3</sub> 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	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil management	Remarks on Implementation
Mid season drought (long dry spell)					radio

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			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 <sup>th</sup> 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"> <li>➤ Silage, Azola and hay to be fed during draught.</li> <li>➤ Increased amount of concentrates to be given to off set grazing.</li> </ul>	❖ 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"> <li>➤ Digging of Borewells to meet the water requirement is suggested.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Borewell with motors can be installed in rest of the Veterinary dispensaries in Vellore district.</li> <li>➤ Community drinking water trough can be arranged in shandies /community grazing areas</li> </ul>
Health & Disease management	Awareness Campaigns	<ul style="list-style-type: none"> <li>➤ Vaccination &amp; deworming are to be carried out during Mass contact programs/ Kalnadai padukappu thittam.</li> <li>➤ Vaccination against FMD, BQ, HS PPR along with anthrax vaccine in endemic areas to be carried out..</li> <li>➤ Awareness campaigns are to be carried out in 20 blocks of Vellore district.</li> <li>➤ Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health &amp; management measures.</li> <li>➤ Multivitamins &amp; area specific mineral mixture to be supplied during drought.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Impact on information disseminated to the farmers on disease prevention &amp; control measures during drought period has to be carried out.</li> </ul>
<b>Floods</b>	Not reported		
Feed & Fodder availability			
Drinking water			
Health & Disease management			
<b>Cyclone</b>	Not reported		
Feed & Fodder availability			
Drinking water			



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

**2.5.2 Poultry: -**

**2.5.3 Fisheries/ Aquaculture**

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
<b>Marine</b>	Not applicable		
<b>Inland</b>			
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>i. Rainwater harvesting</li> <li>ii. Deepening/ Desilting of existing water bodies</li> <li>iii. Removal of debris and strengthening of pond embankments through turfing</li> </ul>	<ul style="list-style-type: none"> <li><b>i.</b> 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.</li> <li><b>ii.</b> Indian major carps and freshwater prawns are ideal species for culture.</li> <li><b>iii.</b> Temporarily raising the height of the enclosures maybe done to prevent loss of stock in</li> </ul>	<ul style="list-style-type: none"> <li><b>i.</b> 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)</li> <li><b>ii.</b> 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</li> </ul>

		the event of sudden rise in water level due to sudden onset of rain or flooding.	undertaken. <b>iii.</b> 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>B. Aquaculture/ Mariculture</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>i. Water depth should be at least 1m for initiating fish culture.</li> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>ii. Avoid fertilization and manuring on supplementary basis.</li> <li>iii. Air breathing fish culture to be practised (Cat fish farming)</li> </ul>	<ul style="list-style-type: none"> <li>i. Prepare pond for the next crop after early harvest</li> <li>ii. Always keep a constant check on the onset of algal blooms which will cause mass mortality of fishes</li> <li>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</li> </ul>
(ii) Impact of silt load build up in ponds / change in water quality	<ul style="list-style-type: none"> <li>i. Rainwater harvesting</li> <li>ii. Deepening/ Desilting of existing water bodies</li> <li>iii. Removal of debris</li> </ul>	<ul style="list-style-type: none"> <li>i. Feeding should be minimum to avoid organic loading</li> </ul>	<ul style="list-style-type: none"> <li>i. On onset of sudden heavy rains heavy mortality will result so feeding should be controlled to avoid waste accumulation on pond bottom soil.</li> </ul>
(iii) Any other	<ul style="list-style-type: none"> <li>i. The physico-chemical quality of water has to be monitored regularly for its suitability for fish culture.</li> </ul>	<ul style="list-style-type: none"> <li>i. Concept of Re-circulatory system can be adopted as additional water is not required</li> </ul>	<ul style="list-style-type: none"> <li>i. Train the farmers to breed fish in captivity and produce required amount of seed either through hormonal treatment</li> </ul>

		<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>
<b>2) Floods</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>A. Capture</b>			
<b>Marine</b>	<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>		
<b>Inland</b>			
(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>B. Aquaculture/ Mariculture in ponds</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
(i) Inundation with flood water	<ul style="list-style-type: none"> <li>i. Avoid culture of fishes requiring longer duration of culture.</li> <li>ii. Initiating fish culture in advance in areas frequently prone to flooding.</li> </ul>	Immediately harvest the stocked fishes	--
(ii) Water exchange and changes in water quality	<ul style="list-style-type: none"> <li>i. Strengthening of bunds and embankments either through turfing and terracing</li> </ul>		Application of lime to stabilize pH.
(iii) Health and diseases	<ul style="list-style-type: none"> <li>i. Water quality management to be followed thoroughly by weekly sampling to monitor water quality parameters</li> </ul>		<p>Discard diseased stock and the following measures to be practiced:</p> <ul style="list-style-type: none"> <li>i. Drying up of confined water bodies</li> <li>ii. Let pond bottom to sun dry by cracking of soil to let out the release of obnoxious gases and other pests</li> <li>iii. Application of lime to balance soil pH.</li> </ul>
(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"> <li>i. Initiating fish culture in advance in areas frequently prone to flooding to prevent damage to the infrastructure</li> </ul>		** 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		
<b>3. Cyclone / Tsunami</b>	<b>Before the event</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	**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			
<b>Inland</b>	<b>Cyclone / Tsunami</b>		
<b>B. Aquaculture/ Mariculture</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
(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.		
<b>4. Heat wave and cold wave</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>A. Capture</b>			
<b>Marine</b>			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)
<b>Inland</b>			
<b>B. Aquaculture</b>	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
(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>		