State: TAMIL NADU

Agriculture Contingency Plan of District: THANJAVUR

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

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	339.7	3.4	81.5	1.2	13.2	4.7	2.1	10.1	28.1

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

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

Area under major field crops & horticulture etc.

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

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

1.8	**Livestock ***	**Number ('000)**		
		Male ('000)	**Female ('000)**	**Total ('000)**
	Cattle	174.4	272.3	446.7
	Buffaloes total	-	-	28.1
	Commercial dairy farms	-	-	
	Goat			432.0
	Sheep			51.7
	Others (Camel, Pig, Yak etc.)			4.78
1.9	**Poultry ***			
	Commercial			
	Backyard			

1.10 Fisheries (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	31842					30

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	500	----	2340

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production (tons)**

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

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

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

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

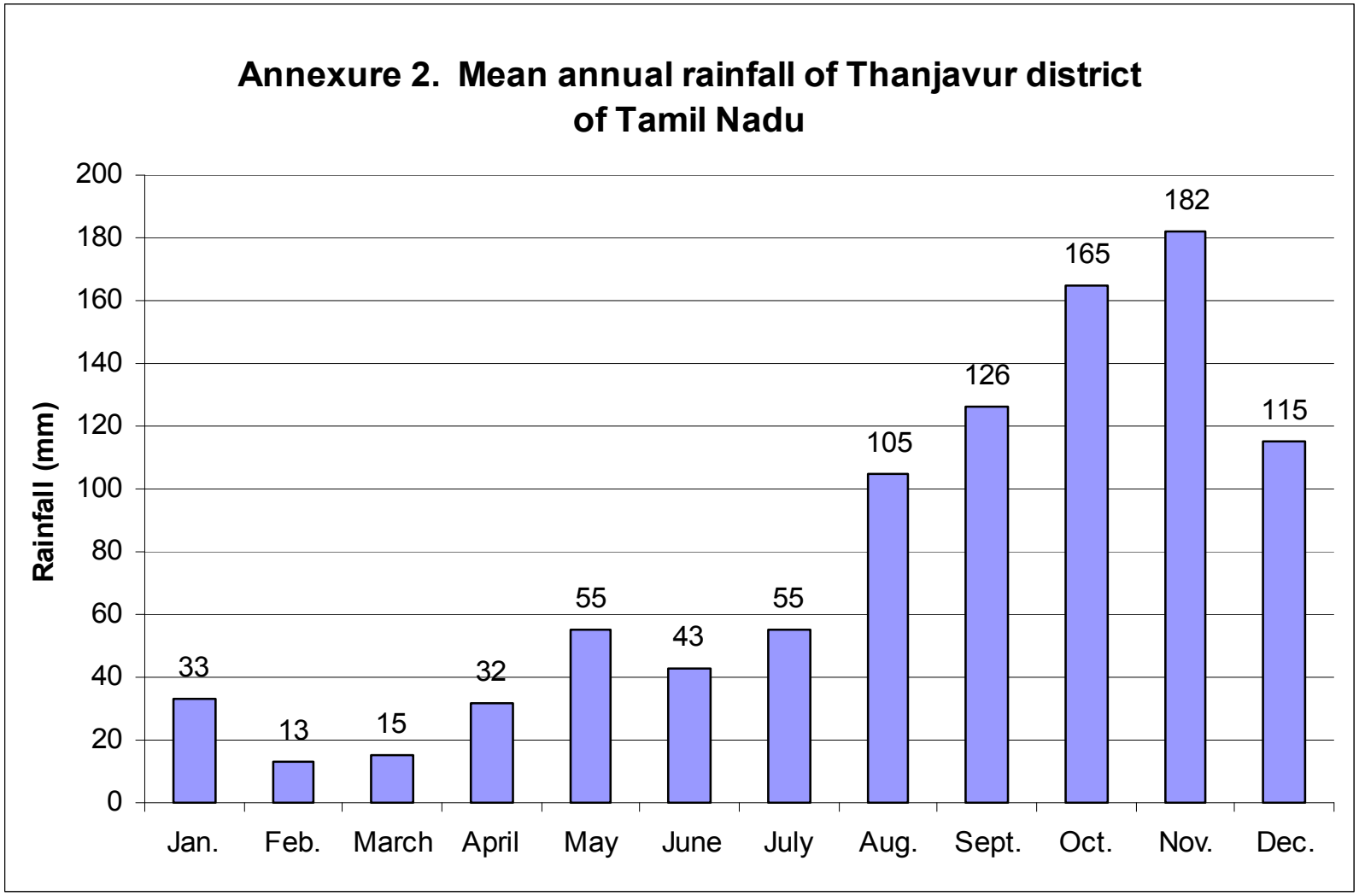
		1st week of June				1st week of June
	Rabi- Rainfed	NA				
	Rabi-Irrigated	3rd Week of Oct to 1st week of November	3rd Week to 4th week of January	3rd Week to 4th week of January	3rd Week to 4th week of January	-

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

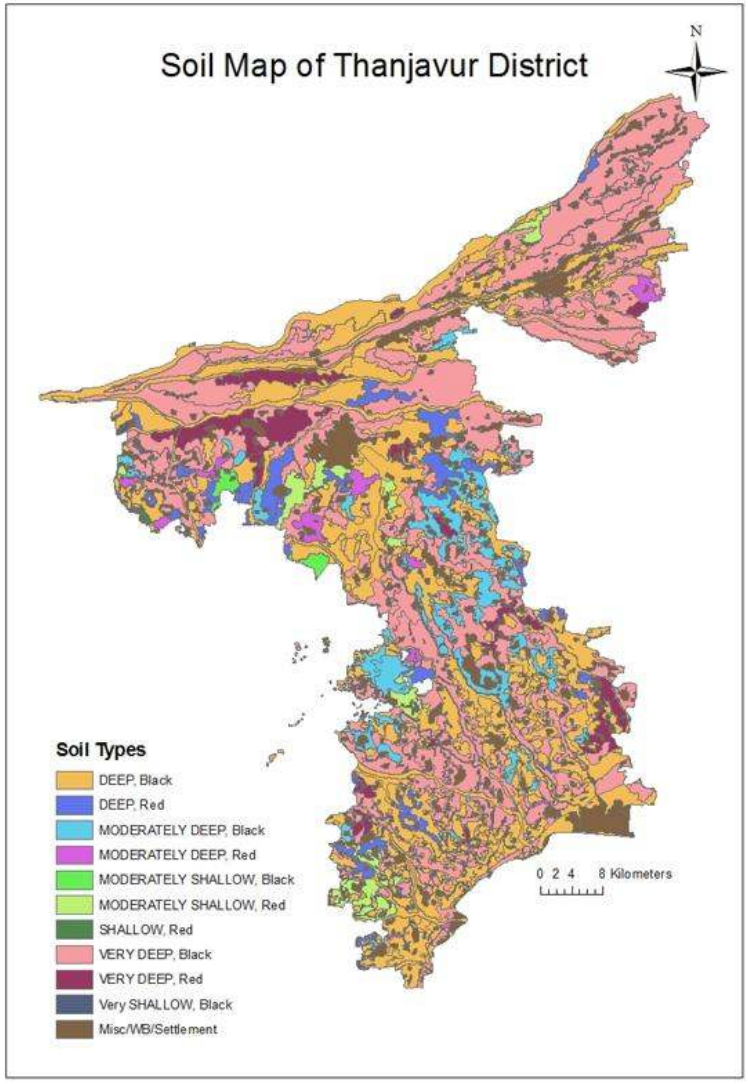
1.14	Include Digital maps of the district for		
		Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure 1. Location map of Thanjavur district and the blocks

Annexure 2. Mean annual rainfall of Thanjavur district



ANNEXURE 3. SOIL MAP OF THANJAVUR DISTRICT



Source; NBSSLUP

2.0 Strategies for weather related contingencies

2.1 Drought

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

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 , 4, 6 and 8 weeks	NA				

Condition			Suggested Contingency measures		
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil management**	**Remarks on Implementation**
	NA				

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

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

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed/ limited release of water in canals due to low rainfall	Old delta Rice based farming system clay soil	Rice (Jun-Sep)-Rice (Oct-Jan)-Pulses/gingerly (Feb-May)	Maize/Vegetables/Gingerly/Green manure crops (Jun-Sep)-Rice (Oct-Feb)-Pulses/ Sunflower/ Cotton (Feb-May)	Rice: Raise community nursery, use Short duration varieties, (ADT 36, 37, 43, ADT (R) 48) Adopt SRI method of planting/Adopt Drum seeder/Adopt Semi dry rice ADT(R) 48 Apply $ZnSO_4$ @ 25 kg/ha along with 50 kg dry sand before transplanting	-
	New delta Rice based farming system	Rice (SD)-Rice (MD)-Pulse/Sesamum	Maize-rice -pulse(summer irrigated)	Maize Hybrids : COMH 5, Kargil, SPIC Application of DoA micronutrient mixture @ 12.5 kg/ha with sand Seed treatment with VAM @ 10 g/kg of seed Management of shoot fly through seed treatment with	-

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Sandy clay loam soil	Rice -Fallow-Pulse(Summer Irrigated)	Pulse-rice-fallow-pulse	Imidacloprid 70 WS 10 g/kg of seed, Set up low cost TNAU fish meal trap 12/ha till the crop is 30 days old, Spray Endosulfan 35 EC 500 ml/ha. **Rice** Use short duration variety Raise community nursery, SRI method of planting Mechanization ZnSO4 application @ 25 kg/ha with 50 kg dry sand before transplanting Gypsum application @ 500 kg/ha at last ploughing Management of sucking pest by using neem based products Adoption of IPDM practices ie., 1. Seed treatment with *Pseudomonas fluroscens* @ 10 g/kg of seed. 2. Pest and disease management in nursery by spraying Neem Seed Kernel Extract @ 5% or neem oil @ 2%. 3. Release of both *Trichogramma chilonis* for leaf folder and T.*japonicum* for stem borer thrice @ 5 cc/ha at weekly interval when the moth activity is noticed Disease management 1. Spray P. fluorescens @0.2% 1 kg in 500 litre of water for 1 ha for Blast 2. Spray NSKE @ 5% or neem oil @ 3% or carbendazim @ 250 g/ha for leaf spot 3. Spray neem oil @ 3% or streptomycin sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Rice based farming system Sandy clay loam and clay soil	Rice-Rice-Pulse/Oilseed	Rice (samba) – RF pulse Rice (samba) Sesamum Pulse/Groundnut/Maize-Rice-RF pulse/Sesamum/Groundnut	**Rice** Use Long duration varieties ADT 44, White ponni, CO 43 **False smut Disease management** seed treatment with P. fluroscens @ 10 g/kg of seed Seedling dip with P.fluorescens @ 1 kg/ac Spray P.fluorescens at 45 & 60 th day @ 1 kg/ac Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac **Blackgram:** Varieties ADT 3, 5 Seed treatment for Blackgram: The blackgram seeds are fortified with 0.5% Zn So_4 for 3 hours (350 ml of 0.5 % Zn So_4 solution is required to soak one kg of seed) followed by sequential coating with polykote / polymer @ 3g / kg + 5 ml of water + Dimethoate @ 4ml/kg + Trichoderma viride @ 4 g/kg + *Rhizobium* @ 20g/kg + Azophos @ 120g/ kg. Application of Pendimethalin @ 2lit/ha on 3 DAS for weed management Foliar spray of TNAU Pulse wonder @ 2.25 kg/ac **Pest and disease management** *Management of armyworm* 1. Use light trap or pheromone trap @12/ha 2. Grow castor along borders 3. Spray NPV at 1.5 x 10^{12} POB/ha with teepol @ 1ml/l Management of Yellow Mosaic Virus 1. Rogue out infected plants 2. Protct against white fly Management of root rot 1 Seed treatment with T. *viride* @ 4 g or *P. fluorescens* @ 10 g/kg of seed. 2. Neem cake application @ 150 kg/ha or soil application of P.fluorescens @ 2.5 kg/ha with 50 kg sand/FYM	TNAU Pulse wonder is available in Department of crop Physiology, TNAU, Coimbatore. Rate: Rs. 100/kg. For designer seed treatment polymer or polykote is available in Coimbatore.

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Gingelly SVPR 1, 2 TMV 7 Basal Application of $MnSO_4$ @ 5 kg/ha Leaf webber management by spraying neem formulation @ 0.03% or neem seed kernel extract @ 5% or neem oil @ 2% Root rot management by soil application of P. fluroescens @ 2.5 kg/ha with 50 kg sand or FYM or carbendazim @ 1 g/lit.	

Condition			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	NA				

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	Rice based farming system- Sandy clay loam and clay soil	Vegetables (Jun-Sep)-Rice (Aug-Dec)-/Rice (Oct-Feb)-Groundnut (Dec-Mar)	Groundnut/sunflower/Maize/Vegetables-Rice-Pulse/Oilseeds	**Groundnut** Gypsum application @ 400 kg/ha on 40 & 70th day Basal application of $ZnSO_4$ @ 25 kg/ha Application of DoA micronutrient mixture @ 12.5 kg/ha Foliar spray of DAP @ 2.5 kg, Ammonium sulphate @ 1 kg and Borax @ 0.5 kg per ha on 25 and 35 th DAS. Foliar spray of TNAU Groundnut rich @ 2.20 kg/ac at peak flowering and pod development stages Polythene film Mulching – use 7 micron polythene @ 50 kg/ha Weed management – application of Alachlor @ 20 kg/ha on 20 DAS Irrigation at pegging, flowering and pod development stage Root rot management by seed treatment with thiram @ 4 g/kg of seed, soil application of P. fluroescens @ 2.5 kg/ha with 50 kg sand or FYM **Sunflower** Application of sulphur @ 20 kg/ha Spray borax @ 0.2% to capitulum at ray floret opening stage for seed setting and filling Keep bee hives @ 5/ha for seed setting. Alternaria leaf spot and rust management by spraying mancozeb @ 1000 g/ha	Groundnut Micro-nutrient mixture can be sourced from TNAU, Coimbatore

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

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

Outbreak of pests and diseases due to un seasonal rains				
Rice	Adoption of IPDM practices ie., ➢ Seed treatment with Pseudomonas fluroscens @ 10 g/kg of seed. ➢ Pest and disease management in nursery by spraying Neem Seed Kernel Extract @ 5% or neem oil @ 2%. ➢ Release of both Trichogramma chilonis for leaf folder and T.japonicum for stem borer thrice @ 5 cc/ha at weekly interval when the moth activity is noticed ➢ Spray Monocrotophos 36 SL @ 1000 ml/ha or profenophos 50 EC @ 1000 ml/ha ➢ Spray P. fluorescens @ 0.2% 1 kg in 500 litre of water for 1 ha for Blast ➢ spray NSKE @ 5% or neem oil @ 3% or carbendazim @ 250 g/ha for leaf spot ➢ spray neem oil @ 3% or carbendazim @ 250 g/ha ➢ spray neem oil @ 3% or streptomycin sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight ➢ False smut management ➢ seed treatment with P. fluroscens @ 10 g/kg of seed ➢ Seedling dip with P.fluorescens @ 1 kg/ac ➢ Spray P.fluorescens at 45 & 60 th day @ 1 kg/ac ➢ Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac			Safe storage against storage pest and diseases
Pulse – Black gram and Green gram	**Pest and disease management** *Management of armyworm* ➢ by using light trapor pheromone trap @12/ha ➢ grow castor along borders ➢ spray NPV at 1.5 x 10^{12} POB/ha with teepol @ 1ml/l *Management of Pod borer* ➢ spray Endosulfan 35 EC @ 1l/ha or monocrotophos 36 SL @ 500 ml/ha Management of Yellow Mosaic Virus ➢ Rogue out infected plants ➢ Spray monocrotophos @ 500 ml or methyl demeton @ 500 ml/ha. Management of root rot ➢ Seed treatment with T. viride @ 4 g or P. fluorescens @ 10 g/kg of seed. ➢ Neem cake application @ 150 kg/ha or soil application of P.fluorescens @ 2.5 kg/ha with 50 kg sand/FYM			
Horticulture	Banana disease management ➢ Spray carbendazim @ 1g/lit for sigatoka leaf spot ➢ Spray monocrotophos @ 1 ml/lit or methyl demetor @ 2 ml/lit for bunchy top ➢ For management of bunchy top – Injection (with TNAU Banana Injector) of monocrotophos 36 SC 1ml/plant at 45 days interval from 3rd month till flowering.			

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Drain out excess water Raised bed nursery Use sprouted seeds for direct seeding Use short duration varieties especially ADT 36, 37	Drain out excess water Foliar spray of 2 kg urea with 1 kg $ZnSO_4$ in 200 l of water in 1 acre Drain out excess water. Application of P.flourescens @ 1 kg with 20 kg sand/FYM for overall disease resistance Spray or Imidacloprid 17.8 SL @ 100 ml/ac for green leaf hopper Spray neem oil @ 3% or streptomycin Sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight Seed treatment with P. fluroscens @ 10 g/kg of seed or Seedling dip with P.fluorescens @ 1 kg/ac for false smut	Drain out excess water Foliar spray with 2% DAP Top dressing with 50 kg ammonium sulphate alone or 22 kg urea with 18 kg gypsum and 17 kg MOP. Spray monocrotophos @ 400 ml/ac for case worm. Spray endosulfan @ 400 ml/ac for Gall midge. Spray Chlorpyriphos @ 400 ml/ac for leaf folder Spray endosulfan @ 400 ml/ac for stem borer Spray P.fluorescens at 45 & 60 th day @ 1 kg/ac or Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac	
Sugarcane		Propping Drain out excess water Detrashing & Removal of buds Application of 80 kg urea with 16 kg neem cake and 25 kg potash for 1 acre Spray azadirachtin 1% 400 ml/ac or monocrotophos @ 800 ml/ac for white fly.		
Banana		Propping Application of 65 g urea and 175 g potash for poovan variety Application of 90 g urea and 175 g potash for rasthali variety Application of 90 g urea and 215 g potash for nendran variety Application of 90 g urea and 160 g potash for other varieties Spray carbendazim @ 1g/lit for sigatoka leaf spot	Application of Emison @ 0.1% (1 g/lit) @ 1-1.5 lit/tree.	

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	Not Applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				
Rice	Drain out excess water Raised bed nursery Use sprouted seeds for direct seeding Use short duration varieties especially ADT 36, 37	Drain out excess water Foliar spray of 2 kg urea with 1 kg $ZnSO_4$ in 200 l of water in 1 acre Drain out excess water. Application of P.flourescens @ 1 kg with 20 kg sand/FYM for overall disease resistance Spray monocrotophos 36 WSC @ 400 ml/ac or Imidacloprid 17.8 SL @ 100 ml/ac for green leaf hopper Spray neem oil @ 3% or streptomycin Sulphate+tetracycline combination 300 g + copper oxy chloride @ 1250 g/ha for bacterial leaf blight Seed treatment with P. fluroscens @ 10 g/kg of seed or Seedling dip with P.fluorescens @ 1 kg/ac for false smut	Drain out excess water Foliar spary with 2% DAP Top dressing with 50 kg ammonium sulphate alone or 22 kg urea with 18 kg gypsum and 17 kg MOP. Spray monocrotophos @ 400 ml/ac for case worm. Spray endosulfan @ 400 ml/ac for Gall midge. Spray monocrotophos @ 400 ml/ac or chlorpyriphos @ 400 ml/ac for leaf folder Spray endosulfan @ 400 ml/ac for stem borer Spray P.fluorescens at 45 & 60 th day @ 1 kg/ac or Spray propiconazole @ 200 ml/ac or copper hydroxide @ 500 g/ac	Implementation of Weather based crop insurance by department of Agriculture
Sugarcane		Drain out excess water Propping Make deep trench for drainage Detrashing & Removal of buds Application of 80 kg urea with 16 kg neem cake and 25 kg potash for 1 acre Spray azadirachtin 1%monocrotophos @ 800 ml/ac for white fly.		Implementation of Weather based crop insurance by department of Agriculture
Banana		Propping Application of 65 g urea and 175 g potash for poovan variety	Application of Emison @ 0.1% (1 g/lit) @ 1-1.5 lit/tree.	Implementation of Weather based crop insurance by department of Agriculture

		Application of 90 g urea and 175 g potash for rasthali variety Application of 90 g urea and 215 g potash for nendran variety Application of 90 g urea and 160 g potash for other varieties Spray carbendazim @ 1g/lit for sigatoka leaf spot		

2.5 Contingent strategies for Livestock, Poultry & Fisheries:

2.5.1 Livestock

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

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

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

[s] based on forewarning wherever available

2.5.2 Poultry

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

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

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Collective water shed management. Construction of water harvesting/recharging structure. Or Safe disposal of the stock	Optimal utilization of water without exchange/Water recycling. /Water supply from other sources (bore well)/ Emergency harvest	Pond drying till bottom cracking
(ii) Impact of salt load build up in ponds / change in water quality	Increase in salinity		Reclamation of soil
(iii) Any other			
2) Floods			
A. Capture			
Marine	Construction of cyclone shelters. Going for Short term fishing holiday	Safely return back to the shore/Staying in cyclone shelter	Return back to fishing
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No. of houses damaged			
(iv) Loss of stock			

(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Creation of shelter belts/bio shields Raising the bunds. Making net fencing along the bundles and in inlet/outlets.	Damage and loss	Strengthening the bunds
(ii) Water continuation and changes in water quality	Proper disinfection & sanitation measures to be followed. Emergency harvest. Reduction or suspension of feeding.		Water quality testing and corrective measures
(iii) Health and diseases	Emergency harvest		Preparation of pond following sanitation measures
(iv) Loss of stock and inputs (feed, chemicals etc)	Disposal of the stock to a safe place		Proper storage construction to keep the stock and inputs
(v) Infrastructure damage (pumps, aerators, huts etc)	Safe removal of valuables to other place		Replacement/repairing the infrastructure
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine	Cancellation of fishing trips. Successful attempts to protect fishing boats, gears and infrastructure in the shore. Construction of cyclone shelters and fish jetties. Installation of storm warning systems including radio relay stations, shore-to-boat and boat-to-boat communication networks; supply of life-saving appliances; establishment of an effective search and rescue capability, and provision of training and technical advice on sea safety	Safely return back to the shore/Staying in cyclone shelter	Short term, Medium term and long term rehabilitation of affected area

[a] based on forewarning wherever available