State: Tripura

Agriculture Contingency Plan for District: Gomati

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Humid Eastern Himalayan Region (17.2)		
	Agro-Climatic Region (Planning Commission)	Eastern Himalaya Region (II)		
	Agro Climatic Zone (NARP)	Mid Tropical Plain Zone (NEH-6)		
	List all the districts or part thereof falling under the NARP Zone	South, Gomati, Sipahijhala,West, Khowai, Dhalai, Unokoti and North Tripura		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		$22^0 57'$ & $23^0 45'$ N	$91^0 19'$ & $91^0 53'$	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Dept. of Agriculture, Govt. of Tripura, Agartala, Tripura		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Gomati, Amarpur, Tripura.		
	Name & address of the nearest Agromet field unit (AMFU, IMD) for agro-advisories in the zone	ICAR Research Complex for N.E.H. Region, Tripura Centre Lembucherra, West Tripura, Tripura.		
1.2	**Rainfall**	**Average (mm)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-September):	1646.6	2nd week of June	4th week of Sept
	NE Monsoon (October-December):	67.2	2nd week of October	First week of November
	Winter (Jan-February)	8.2	-	-
	Summer (March-May)	431.8	1st week of April	1st week of June
	Annual	2153	-	-

Source: Office of the Supdt. Of Agriculture, Santirbajar,Govt. of Tripura

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 (ha)	148.912	100.704	7.758	0.055	0.008	0.137	-	0.028	0.068

Source: Source: Land Use Statistics of Tripura

1. 4	**Major Soils (common names like shallow red soils etc.)**	**Area (ha)**	**Percentage of land**
	1. Red Soil		
	2. Alluvial Soil		
	3. Sandy Soil		
	4. Sandy Loam		
	5. Clay Loam		
	Others (specify):	--	--
1.5	**Agricultural land use**	**Area (ha)**	**Cropping intensity %**
	Net sown area	40.154	183
	Area sown more than once	33.543	
	Gross cropped area	73.697	

Source: Agriculture Department, Govt. of Tripura

1.6	**Irrigation**	**Area ('000 ha)**		
	Net cultivated Area	40.154		
	Net irrigated area	14.936		
	Gross cultivated area	73.697		
	Rainfed area			
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**% of total irrigated area**
	Canals (medium and minor)			

	Tanks			
	Open wells			
	Bore wells			
	Lift irrigation schemes			
	Micro-irrigation (Drip and sprinkler)			
	Other sources (please specify) WHS			
	Total Irrigated Area			
	Pump sets			
	Canals (medium and minor)	Not Available	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	Ground water quality	Contaminant –Iron, greater than 1.00 mg/lit.		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Department of Agriculture, Govt. of Tripura

1.6. a.	**Fertilizer and Pesticides use**	**Type**	**Total quantity (tonnes)**
1	Fertilizers*	Urea DAP Potash SSP RP Other complex fertilizers (specify) **Total**	**8806000 kg/147687ha = 60 kg/ha**
2	Chemical Pesticides*	Insecticides+ Fungicides Weedicides Others (specify) **Total**	**66430 kg/147687ha= 450 g/ha.**

* If break up is not available, indicate total quantity used in the district for any recent year, mention here the year and source of statistics.

1.7 Area under major field crops & horticulture etc. (2014-15)

1.7		**Major Field Crops cultivated**	**Area ('000 ha)**					
			Kharif		***Rabi***		**Summer**	**Total**
			Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	1	Aush Paddy (Summer)						
	2	Aman Paddy (Kharif)						
	3	Boro Paddy (Rabi)						
	4	Maize						
	5	Kharif oilseed						
		Rabi oilseed						
		Kharif Pulses						
		Rabi pulses						
		Horticulture crops - Fruits	**Total area**		**Irrigated**		**Rainfed**	
	1	Mango						
	2	Pineapple						
	3	Papaya						
	4	Banana						
	5	Litchi						
		Horticultural crops - Vegetables	**Total area**		**Irrigated**		**Rainfed**	
	1	Okra						
	2	Brinjal						
	3	Cabbage						
	4	Cauliflower						
	5	Tomato						
	6	Chilli						
		Medicinal and Aromatic crops	**Total area**		**Irrigated**		**Rainfed**	
	1	Nil.	Data Not Available					
	2							
	3							
	4							
	5							

		Plantation crops	**Total area**	**Irrigated**	**Rainfed**
	1	Coconut			
	2	Arecanut			
	3	Cashewnut			
	4	Rubber			
	5				
		Fodder crops	**Total area**	**Irrigated**	**Rainfed**
	1	Not Available	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-
	5	-	-	-	-
		Total fodder crop area	-	-	-
		Grazing land		-	-
		Sericulture etc	-	-	-
		Others (Specify)	-	-	-

Source: Dept. of Agriculture, Govt. of Tripura

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	39.281	63.292	102.573
	Crossbred cattle	5.372	17.919	23.291
	Non descriptive Buffaloes (local low yielding)	0.643	1.005	1.648
	Graded Buffaloes	-	-	-
	Goat	25.036	50.826	`75.862
	Sheep	0.015	0.259	0.274
	Others (Camel, Pig, Yak etc.)	Data not available	Data not available	Data not available
	Commercial dairy farms (Number)	Data not available	Data not available	Data not available
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	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)	
		-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department) 2013-14	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
	B. Culture						

		Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-	-	-
	ii) **Fresh water** (Data Source: Fisheries Department) 2013-14			
	Others	-	-	-

1.11 Production and Productivity of major crops (Average of last 5 years: 2012, 13, 14, 15, 16)

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
Crop 1	Rice									
Crop 2	Maize									
Crop 3	Groundnut									

Crop 4	Sesamum									
Crop 5	Mustard									
Others										
Major Horticultural crops (Crops to be identified based on total acreage)										
Crop 1	Okra									
Crop 2	Brinjal									
Crop 3	Cole Crops									
Crop 4	Tomato									
Crop 5	Chilli									
Others										

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Crop 1: Rice	2: Maize	3: Groundnut	4: Sesamum	5: Rape and Mustard
	Summer rice-Rainfed	Sumer rice-April 1st week to May 4th week			1st week of April to 2nd week of April	
	Kharif- Rainfed	Nursery-June 1st to June 3rd week	2nd week of May to 1st week of June	2nd week of June to 1st week of July	1st week of April to 2nd week of April	-
	Kharif-Irrigated	Transplanting-4th week of June to 2nd week of july	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	-	Mid October to mid December	-	15th October to 15th November

1.13	**What is the major contingency the district is prone to?** (Tick mark and mention years if known during the last 10 year period)	Regular			Sporadic			None
		Severe	Moderate	Mild	Severe	Moderate	Mild	
	Drought	-	-	-	-	√	√	-
	Flood	-	√	-	-	√	√	-
	Cyclone	-	-	-	-	√	√	-
	Hail storm	-	-	-	-	-	√	-

	Heat wave	-	-	-	-	-	Mild	-
	Cold wave	-	-	-	-	-	Mild	-
	Frost	-	-	-	-	-	-	-
	Sea water intrusion	-	-	-	-	-	-	-
	Pests and diseases (specify) i) Potato Potato late blight , Termite ii) Rice Rice blast, BLB, Gall midge, Stem borer, Leaf folder iii) Other Crops Stem borer, pod borer, Fruit borer, leaf folder, LB, Termite, Mango hopper, Fruit flies, Mango weevil, fruit & Shoot borer, wilt, leaf curl,		√ √		√	-	-	-
	Others	-	-	-	-	-	-	-

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

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks April 4th week (Pre-monsoon)	a. Upland-rain fed (Red soil with moderate rainfall, no irrigation facility	Upland rice (NDR 97), Maize (HQPM-1)	Pigeon pea based intercropping	i) Sowing with the onset of rainfall. iii). Closer row and plant spacing iv). Apply full P, K and 50% N of recommended dose along with well decomposed organic matter for early seedling vigour Ridge and furrow methods of sowing at closer plant-to-plant distance with wider inter-row spacing.	Linkage with State Agriculture Dept. under CSS for supply of seed
	b. Medium land-rainfed summer (Red soil with moderate rainfall, no irrigation facility	Sesamum (ST-1683, B-67, GT-10, GT-5, Tripura Till-1), greengram (TMB-37, HUM-16), Maize,	Maize for green cob and fodder, Maize+vegetable cowpea	i) Sowing with the onset of rainfall. iii). Closer row and plant spacing iv). Apply full P, K and 50% N of recommended dose along with well decomposed organic matter for early seedling vigour	
	Low land- (Red soil with moderate rainfall, no irrigation facility)	Rice (var. Naveen, MTU-1010, Sahabhagi)	No change		

Delay by 4 weeks May 2nd week (Pre-monsoon)	a. Upland-rain fed (Red soil with moderate rainfall, no irrigation facility	Upland rice , Maize (HQPM) Sesamum (ST-1683), Moong (Pusa Vishal), Backgram (Uttara, PU-31, Tripura Maskoloi-1)	Maize and pulse based intercropping	i) Sowing with the onset at rainfall. iii). Closer row and plant spacing iv). Apply full P, K and 50% N of recommended dose along with well decomposed organic matter for early seedling vigour Ridge and furrow methods of sowing at closer plant-to-plant distance with wider inter-row spacing.	Linkage with State Agriculture Dept. under CSS for supply of seed
	b. Medium land-rainfed summer (Red soil with moderate rainfall, no irrigation facility	Sesamum (ST-1683, B-67), greengram (TMB-37, HUM-16), Maize (HQPM-1)	No Change	i) Sowing with the onset at rainfall. iii). Closer row and plant spacing iv). Apply full P, K and 50% N of recommended dose along with well decomposed organic matter for early seedling vigour	
	c. Low land- (Red soil with moderate rainfall, no irrigation facility)	Rice (Gomati, Sahabhagi)	adopt long duration rice varities and escape from Aush rice	Community nursuary,	
Delay by 2 weeks (Monsoon) (June 4th week	Upland, Red soil with moderate to high rainfall, no irrigation facility	Sesamum (May to 2nd week of June)	Groundnut, groundnut+maize,	) Sowing with the onset at rainfall. ii) Dust Mulching iii). Closer row and plant spacing iv). Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigour	Linkage with State Agriculture Dept. under CSS for supply of seed

				Ridge and furrow methods of sowing at closer plant-to-plant distance with wider inter-row spacing.	
	2 Medium land, Red soil with moderate to high rainfall, no irrigation facility	Sesamum, moong, cowpea (May to 2nd week of June)	Groundnut, groundnut+maize Vegetable cow pea, maize + vegetable cowpea	I) Mulching ii) Sowing with the onset of rain iii) Maintain more plant iv) Mixed cropping with cowpea (var. Kashi Kanchan)	
		Groundnut (GG20, GG7, ICGS 76) + Arhar (UPAS 120, Narendra-1)	No change	.Sowing with the rainfall starts, Apply full P, K and 30% N of recommended dose along with well decomposed FYM.	
	3. Lowland land, Red soil with moderate to high rainfall, no irrigation facility	Rice	high yielding long duration rice varieties like swarna, swarna sub-1, gomati, ranjit etc.	Adopt SRI or ICM for water conservation and higher yield	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks (July 2nd Week)	1. Upland, Red soil with moderate to high rainfall, no irrigation facility	Arhar/ Groundnut (May-June)	Groundnut (GG20, GG7) Arhar (UPAS- 120)	Conserve soil moisture by mulching Intercropping of Arhar with Groundnut. Apply 0.5 % KCl spray at vegetative stage Live saving irrigation	Linkage with State Agriculture/Horticulture Dept. under CSS for supply of seed
		Cowpea (May-June)	Cabbage (early variety)	Life saving irrigation	

	2. Medium land, Red soil with moderate to high rainfall, no irrigation facility	Upland Rice (May-June)	Sesamum (Variety – ST 1683) Maize (RCM series) Groundnut (GG 7, ICGS 76)	Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation in groundnut crop	
	3. Low land, with moderate to high rainfall, no irrigation facility	Rice	Short duration rice varieties/hybrids like shabhagi, Navven, MTU-1010, Rajlakshmi etc.	Adopt SRI or ICM for water conservation and higher yield. , Integrated nutrient mangemnt, real time nitrogen management with leaf colour chart, application of $ZnsO_4$.	

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc. April 4th wk	a. Upland-rain fed (Red soil with moderate rainfall, no irrigation facility	Upland rice , maize, greengram, cowpea	• Gapfilling • Resowing	• Mulching • Maximum use of organic matter • Spraying of 2% urea solution • Use for primed seed • Adopt conservation agriculture • Application of sufficient organic matter in the nursery bed • Staggered community nursery with irrigation • Delay transplanting/sow	1. Buffer stock of Seed 2. Identification & evaluation of suitable varieties specific to prevailing situation and their seed production.
	b. Medium land-rainfed summer (Red soil with moderate rainfall, no irrigation facility	Blackgram, greengram, rice	1. Manually watering in the nursery bed 2. Resowing 3. Treatment of seed with 4% KCl solution		1. Buffer stock of Seed 2. Identification & evaluation of suitable varieties specific to prevailing situation and

				ing by 2 weeks.	their seed production.
	Low land- (Red soil with moderate rainfall, no irrigation facility)	Rice-rice/vegetables	1. Manually watering in the nursery bed 2. Resowing 3. Repairing of bund for soil moisture conservation 4. Treatment of seed with 4% KCl sol.	1. Spraying of 2% urea solution in nursery bed. 2. Maximum use of organic manure 3. Use of organic mulch	1. Buffer stock of Seed 2. Identification & evaluation of suitable varieties specific to prevailing situation and their seed production.
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc. (July 1st Week)	a. Upland-rain fed (Red soil with moderate rainfall, no irrigation facility	Rice, Maize, cowpea, greengram, blackgram	• Manually watering • Resowing	• Mulching • Use of organic matter • Spraying of 2% urea solution	1. Buffer stock of Seed 2. Identification & evaluation of suitable varieties specific to prevailing situation and their seed production. 2. Training by KVK and ATMA.
	1. Medium land, Red soil with moderate to high rainfall, no irrigation facility	Sesamum /Vegetables	Resowing of sesamum/vegetables if the mortality is more than 50%.	i. Moisture conservation measures ii. Recommended nutrient and intercultural management iii. Life saving irrigation	
	2. Lowland , Alluvial soil, high rainfall, no irrigation facility (Rainfed)	Rice	10 to 12 days nursery can be replanted Adopt SRI or ICM for water conservation and higher yield, Integrated nutrient mangemnt, real time nitrogen management with leaf colour chart, application of $ZnsO_4$.	• Urea application at active tillering stage can be delayed in rainfed shallow lowland • Intercultural operations can be delayed • Treatment of seed with 4% KCl sol	

At vegetative stage (July 3rd Week)	1. Upland land, Red soil with moderate to high rainfall, no irrigation facility	Sesamum / Vegetables	Thinning of plants to reduce the plant population and avoid the competition of moisture and nutrients among crops.	i. Mulching ii. Life saving iirigation	Training by KVK and ATMA experts
		Vegetables / Sesamum	Mid term correction	i. Mulching iii. Off season ploughing	
		Maize	During this drought season, the occurrence of Alphids in Maize crop at its vegetative stage is quite high. Long dry spells increase the incidence of this insect. This can be controlled by spraying Cypermethrin (0.1%) or Monocrotophos (0.05%) at 80-90 DAS.	i.Mulching ii. Life season irrigation	
		Groundnut	Incidence of White grub. The following control measures must be taken up: • Crop rotation with maize • Collection and destruction of white grub adults • Spraying the plants with Chloropyriphos 20 EC @ 2 ml/lit of water	i.Mulching ii. Life season irrigation	
		Black gram	During this dry spell, shot holes made by Beetles can be seen. This can be controlled by spraying Dimethoate @ 1ml/ lit of water	i. Life season irrigation	
	2. . Medium land, Red soil with moderate to high rainfall, no irrigation facility	Sesamum, maize, blackgram, cowpea	Mid term correction	• Mulching • Maximum use of organic matter • Spraying of 2% urea solution • Live saving irrigation	Training by KVK and ATMA experts

	3. Lowland , Alluvial soil, high rainfall, no irrigation facility (Rainfed)	Paddy	During this phase, appearance of Blast disease may be observed. As soon as one or two blast spots are seen, Carbendazim @ 1 g/lit of water is to be sprayed. There may be occurrence of Brown spot disease also. For this dry or wet seed treatment with carbendazim @ 1 g/kg of seed followed by one spraying of Mancozeb @ 2.5 g/lit maybe done at initial symptom development.	Gap filling with nursery kept for the purpose in the same field while transplanting (3-4 seedlings/hill). Repairing of field bunds to conserve water. Life saving irrigation	Training by KVK and ATMA experts
			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At flowering/ fruiting stage (August 1st week)	1.Upland , Red soil with moderate to high rainfall, no irrigation facility	Sesamum, blackgram, cowpea, greengram	Spray 2 % KCl + 0.1 ppm Boron to Black Gram	i. Mulching **ii.** Live saving irrigation	**Can be implemented under NICRA project**
	2. Medium land, Red soil with moderate to high rainfall, no irrigation facility	Black gram	Spray 2 % KCl + 0.1 ppm Boron to Black Gram	i.Mulching ii. uses of sufficient amount of organic manure	--
		Groundnut	If termite infestation found, Chloropyriphos @3 ml/L of water in soil	--	--
		Cucurbitaceous crops, Citrus	Need based plant protection measures	Moisture conservation practices like ridging, mulching.	
	3. Lowland , Alluvial soil, high rainfall, no irrigation facility (Rainfed)	Rice	1.Alternate Wetting and Drying technology can be practiced If crop is damaged early rabi oilseed pulses and vegetables should be	1. Application of sufficient amount of organic manures in main fields before transplanting/ sowing	--

			grown		
Terminal drought	1.Upland Red soil with moderate to high rainfall, no irrigation facility	Sesamum, blackgram, cowpea, vegetables	Providing life saving irrigation Mulching	Application of sufficient amount of organic manures in main fields before transplanting/ sowing	Implemented under NICRA project
	2. Medium land, Red soil with moderate to high rainfall, no irrigation facility	Ginger, Turmeric, Fruit crops, Cucurbitaceous crops, Brinjal	Providing life saving irrigation Mulching	Application of sufficient amount of organic manures in main fields before transplanting/ sowing	Implemented under NICRA project
	3. Lowland , Alluvial soil, high rainfall, no irrigation facility (Rainfed)	Boro rice	Sowing/planting, Providing life saving irrigation	Mustard seeds can be broadcasted in the lowland field	Implemented under NICRA project

Notes:

a. Describe the major farming situation such as shallow red soils, deep black soils, uplands, medium lands, eroded hill slops etc. tank fed black soils, shallow acid soils, sodic vertisols etc

b. Describe the normal crop or cropping system grown in that farming situation including catch crop, sequence, rotation & variety if known

c. Describe the alternative crop or variety or cropping pattern in view of the delay in monsoon and shortening of the growing period including delay in sowing of nurseries in case of paddy.

   - In case of normal onset followed by early season droughts re-sowing may be recommended including variety seed rate etc.
   - In case of early or mid season dry spells indicate crop management techniques to save standing crop.
   - In case of terminal drought indicate giving life saving supplemental irrigation, if available or taking up harvest at physiological maturity with some realizable grain/fodder yield etc.

d. Describe all agronomic practices which help in coping with late planting like increased or decreased spacing, changes in planting geometry, intercropping in case of sole crops, thinning, mulching, spray of anti-transpirants or other chemicals, supplemental irrigation, soil and moisture conservation practices like ridging, conservation furrows, dust mulch etc.

   - In case of early and mid season dry spells indicate moisture conservation techniques to save standing crop.

- In case of terminal drought indicate early rabi cropping with suitable crops/varieties with a possibility of giving pre-sowing/come up irrigation etc.

e. Give details on the source of the breeder seed, in case an alternate crop or variety is suggested as part of the contingency. For agronomic measures, indicate any convergence possible with ongoing central or state schemes like National Rural Employment Guarantee Scheme (NREGS), Integrated Watershed Management Programme (IWMP), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM), National Horticulture Mission (NHM), Community Land Development Programme (CLDP) etc., to meet the cost of materials, labour or implements etc. to carry out any field based activity quickly.

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall	Lowland , Alluvial soil	Rice Lentil	Late sown variety (short duration) of rice (Naveen) HYV of Mustard(Pusa agrony)/Toria(B-9)	Mulching Life saving irrigation	--
		Cauliflower, Cabbage, Brinjal, Potato, Tomato	No change	Mulching Aphid problems may be appeared due to late sowing. Application of Methyl parathion @2 ml/L of water. Fruit and shoot borer may appear in brinjal. Apply Carbaryl @2 g /L of water.	-
Limited release of water in canals due to low rainfall	Lowland , Alluvial soil	Rice	Drought resistant variety of rice may be taken (Tripura khara dhan-1, khara dhan-2) Late sowing of boro rice Lentil (var WBL 58, B 77) and Toria/Mustard may be taken in place of Rice	Recommended package of practices Mulching for residual soil moisture Life saving irrigation	-

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
		Cole crops, potato, tomato	Cowpea, Brinjal, Chilli, green pea may be taken	--	--

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Lowland, Alluvial soil	RIce	Mustard/Toria Lentil	Nitrogen application in split doses Timely Inter culture Mulching for moisture conservation Life saving irrigation	Can be implemented under NICRA project
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Lowland, Alluvial soil	RIce	Mustard/Toria Lentil	Nitrogen application in split doses Timely Inter culture Mulching for moisture conservation	-
		Cole crops, potato, tomato	Cowpea, Brinjal, Chilli, Green pea may be taken	Nitrogen application in split doses Timely Interculture Mulching for moisture conservation	-
Insufficient groundwater recharge due to low rainfall	Lowland, Alluvial soil	RIce	Mustard/Toria Lentil	Mulching Life saving irrigation	-
Any other condition (specify)	--	--	--	--	-

Notes:

[f] Describe such as uplands, medium and low lands and source of irrigation such as tank fed medium or deep black/alluvial/red soils, tube well irrigated alluvial soils, canal irrigated red soils, well irrigated black soils etc.,

[g] The normal crop or cropping systems grown in a given irrigated situation

[h] Suggested change in the crop, variety or cropping system in view of delay in release of irrigation water, less water availability etc.,

[I] All agronomic measures like improved methods of irrigation (skip row etc.), micro irrigation (drip/sprinkler/sub-surface), deficit irrigation, limited area irrigation, mulching etc, that improve water use efficiency and make best use of limited water including methods of ground water recharge and sharing.

[j] Comments on source of availability of seed of the alternate crop or variety, any constraints in marketing of alternative crop implications for livestock and dairy sectors and details of state or central schemes like National Rural Employment Guarantee Scheme (NREGS), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM), National Horticulture Mission (NHM) etc., which facilitate implementation of the agronomic measures suggested.

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[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Crop1 Rice	Drainage of excess water	Application of nutrient solution to prevent flower drop.	Harvesting at Physiological Maturity.	Proper Sun Drying, Keep away from Storage Pest.
Crop 2 Maize, Groundnut	Drainage of stagnating water	Drainage channels	Harvesting immediately at physiological maturity	Storing the produce at dry place
Crop3 Sesamum, Mustard/Rapeseed	Drainage of stagnating water	Drainage channels	Harvesting immediately at physiological maturity	Storing the produce at dry place
Crop4 Blackgram, Green gram	Drainage of stagnating water	Drainage channels	Harvesting immediately at physiological maturity	Storing the produce at dry place
Horticulture				
Crop1 (specify) Chilli, Potato, Cowpea, Okra, Brinjal, Cole Crops	Drainage	Drainage , Application of hormones, nutrient, sprays to prevent flower drop	Drainage Harvesting of the produce before the rain occurs	. Shifting of the produce to drier place, Cold storage.
Crop2 Papaya, Citrus, Jack fruit, Mango, Banana	Avoid waterlogging at the Collar portion	Avoid water logging at the Collar portion Application of hormones, nutrient, sprays to prevent flower drop.	Avoid water logging at the Collar portion	- Store the produce in a dry place
Heavy rainfall with high speed winds in a short span[2]				

Crop1 Rice, Maize, Groundnut, Sesamum	Drainage of excess water	Application of nutrient solution to prevent flower drop.	Harvesting at Physiological Maturity.	Proper Sun Dry Before Storing
Horticulture				
Crop1 Tomato, Chilli, Potato, Cowpea, Okra, Brinjal, Cole Crops.	Making of trenches/furrows in between ridges to facilitate drainage of excess water, propping.	Installation of wind breaks	Installation of wind breaks	Shifting of the produce to drier place, Cold storage.
Crop2 Banana, Citrus, Jack Fruit, Mango	Avoid waterlogging at the Collar portion	Installation of wind breaks, Propping	Installation of wind breaks, propping	Shifting of the produce to drier place, Cold storage.
Outbreak of pests and diseases due to unseasonal rains				
Crop[1] Rice	Field sanitation to prevent disease (Rice Blast) or Spray tricyclazole against blast, Rice hispa damage. Proper application of Chlorpyriphos 1 ml / litre water for leaf folder. Monocrotophos for stem borer,	Spray tricyclazole against blast and Chloropyriphos (2ml/lit of water) against stem borer, Cypermethrin against Swarming caterpillar & leaf folder	Keep the produce in air tight container to avoid the storage pest damage.	--
Crop[2] Groundnut, Mustard / Rapeseed	Proper drainage to prevent Damping off diseases	--	--	--
Crop[3] Sesamum	Removal of infested tips to manage leaf webber	Spraying of systemic insecticide against borers	Spray of Ekalux against capsule borer	Store in dry and clean room. Disinfect gunny bags / storage structure with malathion
Crop[4] Maize	Apply Phorate 10G in the whorls Spray Dimethoate against maize stem borer	Spray Methyl dematon against aphid	--	Store in clean godown after disinfection of gunny bags chemicals
Crop[5] Vegetables	Use Mancozeb or Carbendazim @ 2g/litre of water to prevent seedling rot diseases of any fungicides as precautionary measures.		--	Keep the produce in air tight container to against any pest damage.
Horticulture				

Crop1 Potato	Spray Mencozeb or cymocxelin @ 2 gm / litre of water as precautionary measure against Late Blight.	Drainage out excess water to prevent wilting diseases.	--	Store seed in clean and dryl condition with Fungicidal Treatment.

[k] Such as drainage in black soils, indicate taking up need based inter-culture operations, outbreak of pests/diseases along with their management etc.

[l] Such as drainage in black soils, application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruiting and indicate possibility of pest/disease outbreak with need based prophylactic / curative management etc.

[m] Such as drainage in black soils, measures for preventing seed germination etc and Indicate possibility of harvesting at physiological maturity immediately and shifting produce to safer place and protection against pest/disease damage in storage etc.

[n] Such as shifting of produce to safer place for drying and maintaining the quality of grain/fodder and protection against pest/disease damage in storage etc

2.3 Floods

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Crop1 Rice, Maize, Blackgram	Drain out excess water, Gap filling and drenching with fungicide to prevent seedling rot	Drain out excess water, Weeding and top dressing	Drain out excess water	Drain out excess water, Harvesting and drying of The product
Horticulture				
Crop1 Tomato, Chilli, Cowpea, Okra, Brinjal, Cole Crops	Cleaning of channels in between the raised nursery bed.	Drain out excess water	Drain out excess water	Drain out excess water
Crop2 Citrus, Jackfruit, mango.	Provision for proper drainage	Drain out excess water	Drain out excess water	Drain out excess water
Continuous submergence for more than 2 days[2]				
Crop1 Rice	Drain out excess water	Drain out excess water, Weeding and top dressing application of 40 kg urea and 40 kg MOP/ha after drain of excess water	Drain out excess water; Tying up of lodged plants	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting
Crop 2 Blackgram, Maize	Drain out excess water, Gap filling	Drain out excess water, Weeding and top dressing	Drain out excess water, Earthing up of maize plant; Tying up of lodged plants	Drain out excess water, Harvesting and drying of Cobs/plants
Horticulture				
Crop1	Crop cannot survive. New	-	-	-

Tomato, Chilli, Cowpea, Okra, Brinjal, Cole Crops.	seedling should be transplanted.			
Sea water intrusion[3]				
Crop1 Not Applicable		-	-	-

Notes:

[1] Water logging due to heavy rainfall, poor drainage in vertisols, flash floods in streams and rivers due to high rainfall, breach of embankments

[2] If the water remains in the field due to continuous rains, poor infiltration and push back effect

[3] Entry of sea water into cultivated fields in coastal districts due to tidal wave during cyclones or tsunami

[o] Crop/field management depends on nature of material (sand or silt) deposited during floods. In sand deposited crop fields/ fallows indicate ameliorative measures such as early removal of sand for facilitating *rabi* crop or next kharif. In silt deposited indo-gangetic plains, indicate early *rabi* crop plan in current cropped areas and current fallow lands. Indicate drainage of stagnating water and strengthening of field bunds etc. In diara land areas indicate crop plans for receding situations. Usually rice cropped areas are flood prone causing loss of nurseries, delayed transplanting or damage to the already transplanted fields etc. Indicate community nursery raising, scheduling bushenings, re-transplanting in damaged fields and transplanting new areas or direct seeding including seed availability so that the season is not lost. Indicate steps for preventing pre-mature germination of submerged crop at maturity or harvested produce.

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

Extreme event type	**Suggested contingency measure[r]**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]				
Crop1	-	-	-	-
Horticulture				
Crop1 Vegetables	Life Saving Irrigation should be given to vegetables crops and young plantations, and ridge and furrow method of planting with bed ridges at 15 – 20 m length is suggested.	Life Saving Irrigation should be given to vegetables crops and young plantations, and ridge and furrow method of planting with bed ridges at 15 – 20 m length is suggested.	Life Saving Irrigation should be given to vegetables crops and young plantations, and ridge and furrow method of planting with bed ridges at 15 – 20 m length is suggested.	
Crop2 Fruits	Bean and Cowpea should be grown in the interspaces of Orchard.	Irrigate, provide shade, white wash on tree trunks	Apply growth hormones to prevent fruit drop, maintain water balance to avoid fruit cracking	Harvest at morning hours, pre cooling is important
Cold wave[q]				
Crop1 Rice	Delayed raising of Rice nursery	10-12 days old seedling to be transplanted	Urea application at panicle stage delayed	-
Crop 2 Groundnut, Arhar	-	Mulching to avoid intercultural	Life saving irrigation	-

		operations(Paddy straw)		
Horticulture				
Crop1 Vegetables.	Provision for providing shade net and Thatch Roofing Protection.	-	-	-
Crop2 Fruit.	Frequent irrigation for young nursery	-	-	-
Frost				
Crop1	-	-	-	-
Horticulture				
Crop1 Vegetables	Provide shade	Irrigate regularly	Irrigate regularly	-
Crop2 Fruit	Provide shade	Provide wind break, irrigate regularly	Small trees cover with grasses, irrigate regularly	-
Crop3	Provision for construction of greenhouse and shade net house			
Hailstorm				
Crop1	delayed raising of Rice nursery	8-10 days old seedling is to be transplanted	Recommended urea application at panicle stage should be delayed	-
Crop 2	Groundnut	Mulching (Paddy straw)	Life saving irrigation	
Horticulture				
Crop1 Vegetable	Provide shade	Provide shade	Provide shade	-
Crop2	-	-	-	-
Cyclone				
Crop1	-	-	-	-
Horticulture				
Crop1	Growing of wind break trees	-	-	-
Crop2	Provision for providing Net.	-	-	-

[p] In regions where the normal maximum temperature is more than 40^0C, if the day temperature exceeds 3^0Cabove normal for 5 days it is defined as heat wave. Similarly, in regions where the normal temperature is less than 40^0C, if the day temperature remains 5^0C above normal for 5 days, it is defined as heat wave.

[q] In regions where normal minimum temperature remains 10^0C or above, if the minimum temperature remains 5^0C lower than normal continuously for 3 days or more it is considered as cold wave. Similarly in regions with normal minimum temperature is less than 10^0C, if the minimum temperature remains 3^0C lower than normal it is considered as cold wave

[r] Indicate appropriate crop/soil management measures depending upon the crop and its stage for alleviating the specified stress.

2.5.1 Contingent strategies for Livestock, Poultry & Fisheries

2.5.2 Livestock

Drought	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**
Feed and fodder availability	a. Storage of feed ingredient namely Maize, wheat bran, rice polish, moc etc. b. Storage of Rice straw silage making. c. Cultivation of perennial grass, fodder trees etc	a. Stall feeding (restricted) b. Utilization of agricultural by-product, house hold wastage, kitchen wastage, hotel wastage(pig)	a. Rainfed fodder cultivation of both seasonal and perennial type b. Utilization of fodder tree leaves
Drinking water	a. Provision created for shallow tube well, Mini deep tube well. b. Community water tank	a. Utilization of shallow Tubewell, Ring well b. Community water tank c. Minimum use of water	Community tank
Health and disease management	Vaccination against viral and bacterial disease b. Anti stress management	a. Heat stress management as and when required. b. Showering facilities c. Wallowing (Bufalloo) d. Restricted movement	a. Health tonic, Vitamin b. Management for any disease management break
Floods			
Feed and fodder availability	a. Storage of feed ingredient (wheat bran, Rice polish) b. Straw, processed fodder above the water level of last major flood.	a. Community shelter b. Restricted stall feeding c. Fodder tree leaves.	a. Cultivation of seasonal and perennial fodder crop b.Utilization of fodder tree leaves
Drinking water	a. Overhead storage water tank	Utilization of chemical treated (Chlorinated) water Boiled water	Community tank
Health and disease management	a. Vaccination against FMD, HS, BQ b. De-worming	a. Community rescue centre b.Quarantine/ Isolation facility c.Vaccination/ Treatment	a. Post flood disease management (Vaccination/Treatment/ Isolation) b. Quarantine/ Isolation of any suspected animal
Cyclone			
Feed and fodder availability	a. Storage of feed ingredient (wheat bran, Rice polish) b. Storage of fodder crop in the form of silage etc	--	--
Drinking water	a. Ground water facility creation--	--	--
Health and disease management	a. Vaccination against FMD, HS, BQ b. De-worming	a. Community rescue centre b. Quarantine/ Isolation facility c. Vaccination/ Treatment	a. Post flood disease management (Vaccination/Treatment/ Isolation) b. Quarantine/ Isolation of any

			suspected animal
Heat wave and cold wave			
Shelter/environment management	Provision for community shelter	a. Community shelter facility b. Covering sheds/ animals during cold wave c. Roof reflector for sun light during heat wave.	--
Health and disease management	Vaccination against common disease	a. Anti stress medicated b. Restricted movement c. Stall feeding and watering	Culling of affected animals

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Early storage of feed ingredients	Restricted feeding, reducing the stock	Reducing the stock and restricted feeding	No
Drinking water	Storage water tank, Jal kund construction	Restricted use of water	Restricted use of water	No
Health and disease management	Strategic vaccination of the bird for all possible diseases	Preventive doses of antimicrobial drug, bio-security, electrolyte powder in day to day management	Preventive doses of antimicrobial drug, bio-security, electrolyte powder in day to day management.	No
Floods				
Shortage of feed ingredients	Storage of feed ingredients	Reducing the stock	Reducing the stock and restricted feeding	No
Drinking water	Over head water reservoir, Jal kund construction	Use boiled water	Use boiled water.	No
Health and disease management	Strategic vaccination of the bird for all possible diseases	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	No
Cyclone				

Shortage of feed ingredients	Storage of feed ingredients	Reducing the stock	Reducing the stock and restricted	--
Drinking water	Ground water facility creation-	Use boiled water	Use boiled water	--
Health and disease management	Strategic vaccination of the bird for all possible diseases, anti stress medicine	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management , anti stress medicine	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	--
Heat wave and cold wave				
Shelter/environment management	Arrangement of coverage of the poultry sheds	Proper coverage of the poultry sheds		
Health and disease management	Strategic vaccination and preventive application of anti-microbial drug, anti stress medicine	Preventive doses of antimicrobial drug, bio-security, electrolyte powder in day to day management , anti stress medicine		--

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	--	--	--
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Extensive use of pens for grow-out culture of carps in lakes /reservoirs and beels to provide flexibility while doing culture.	-	
(ii) Changes in water quality	--	--	--
(iii) Any other			--
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	a. Reduce the stocking density of fishes by harvesting the marketable	a. Application of feed and FYM should be restricted.	a. After drought one partial harvesting should be done to check the fish health.

	sized fishes b. At one side of the pond, depth should be made more by digging so that during drought fishes can take shelter in this deeper portion of the pond. c. If possible, provision should be made for pumping water into the pond from other sources or ground water. d. If the water body is very small, air breathing fishes like magur culture should be encouraged rather than IMC e. If possible provision for mechanical aerator should be made.	b. Aeration should be done either manually or mechanically at least two times in a day (Morning and evening) c. Netting over pond surface can be made in these areas where attack of predatory birds is dominant. d. Frequent netting activities should be restricted. e. Lime should be applied at proper dose. f. $KMnO_4$ can also be applied @ 2-4ppm	If any symptom of disease seen, measures should be taken immediately. b. Lime should be applied at proper dose. c. Restock the pond with fingerlings if available. d. If the water quality and fish health is good enough then start feeding.
(ii) Impact of salt load build up in ponds / change in water quality	a. Growth of Azolla pinnata should be encouraged to check eutrophication and excessive evaporation. b.Lime should be applied according to PH of water.	a. Don't make any disturbances in the pond from outside like netting, application of feed, FYM etc. b. Activities like bathing, washing domestic animals should be stopped. --	After drought check water quality and fish health. b. When fish health and water quality becomes normal start feeding and fertilizing activities
(iii) Any other			
2) Floods			
A. Capture			
Marine	--	--	--
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	a. Broken dykes of pond should be repaired. b. Height of the pond dyke should be increased above the flood level. c. Bamboo screen or nylonnets should be made ready for sudden rise in flood level. d. Inlets and outlets of the ponds should be checked for working	a. Bamboo screen or nylonnets should be placed round the pond dyke. b. Stop application of feed, fertilizer and lime. c. If flood level starts decreasing apply $KMnO_4$ @ 2-4 ppm.	a. Lime should be applied at proper dose. b. Repeated netting should be done to check fish health and entry of any unwanted and predatory fishes. c. Apply $KMnO_4$ @ 2-4 ppm

	condition. e. Marketable sized fishes should be harvested		
(ii) Water continuation and changes in water quality	a. Reduce the stocking density of fishes by harvesting the marketable sized fishes b. Stop application of feed, fertilizer and manure. c. Lime should be applied at proper dose.	a. Stop feeding b. Stop application of manure.	a. Examine water quality and then go for liming, manuring and feeding. --
(iii) Health and diseases	a. Lime should be applied at proper dose. b. Apply $KMnO_4$ @ 2-4 ppm frequently. .	a. Stop feeding, manuring and netting activities.	a. Check fish health by netting b. Lime should be applied at proper dose.— c. Apply CIFAX.
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	--
(v) Infrastructure damage (pumps, aerators, huts etc)	--	--	--
(vi) Any other			
3. Cyclone / Tsunami	NA		
A. Capture	--	--	--
Marine	--	--	--
(i) Average compensation paid due to loss of fishermen lives	--	--	--
(ii) Avg. no. of boats / nets/damaged	--	--	--
(iii) Avg. no. of houses damaged	--	--	--
Inland	--	--	--
B. Aquaculture	--	--	--
(i) Overflow / flooding of ponds	--	--	--
(ii) Changes in water quality (fresh water / brackish water ratio)	--	--	--
(iii) Health and diseases	--	--	--
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	--
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	--	--	--
(vi) Any other	--	--	--
4. Heat wave and cold wave-	NA		
A. Capture			
Marine	--	--	--

Inland	--	--	--
B. Aquaculture			
(i) Changes in pond environment (water quality)	--	--	--
(ii) Health and Disease management	--	--	--
(iii) Any other	--	--	--

[a] based on forewarning wherever available

***