

# STATE: TRIPURA

## Agriculture Contingency Plan for District: Unakoti

<b>1.0 District Agriculture profile</b>			
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>		
	Agro Ecological Sub Region (ICAR)	<p><b>Humid Eastern Himalayan Region (17.2)</b>- Purvachal (Eastern Range), warm to hot perhumid ESR with medium to deep loamy Red and Yellow soils, low to medium AWC and LGP 300 days (D3A10).</p> <p>Hot sub-humid (moist) to humid (inclusion of perhumid) eco-region- 15.3 Q8A9- Northern part of Dharmanagar Teesta, lower Brahmaputra Plain and Barak Valley, hot moist humid to per humid ESR with deep, loamy to clayey alluvium derived soils, medium AWC and LGP 270-300 days (Q8A9)</p>	
	Agro-Climatic Region (Planning Commission)	<b>Eastern Himalaya Region (II)</b>	
	Agro Climatic Zone (NARP)	<b>Mild -tropical hill zone- Jampui hills and rest under Mid Tropical Plain Zone (NEH-6)</b>	
	List all the districts or part thereof falling under the NARP Zone	South Tripura, West Tripura, Dhalai, Sipahijala, Unakoti, Gomati, Khowai	
	Geographic coordinates of district	Latitude	Longitude
		24.2366° N,	92.0199° E
		Altitude	
		12.80 m MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR Research Complex for N.E.H. Region, Tripura Centre Lembucherra, West Tripura, Tripura.	
	Mention the KVK located in the district	Krishi Vigyan Kendra, North Tripura, Panisagar, Tripura.	
	Name & address of the nearest Agro met field unit ( AMFU, IMD) for agro-advisories in the zone	ICAR Research Complex for N.E.H. Region, Tripura Centre Lembucherra, West Tripura, Tripura.	
<b>1.2</b>	<b>Rainfall – recent</b>	<b>Average (mm) 2011</b>	<b>Normal Onset (specify week and month)</b>
			<b>Normal Cessation (specify week and month)</b>
	SW monsoon (June-September):	1814.3	2 <sup>nd</sup> week of June
	NE Monsoon (October-December):	34.2	2 <sup>nd</sup> week of October
	Winter (Jan-February) 26	18.0	-
	Summer (March-May)	917.3	3 <sup>rd</sup> – 4 <sup>th</sup> week of March
			Last week of May

Annual	2783.8	-	-
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Source: IMD, India & Agromet Service, ICAR (RC) for NEHR, Lembucherra, West Tripura

District	Reporting Area for LUS	Classification of Reporting Area											Net Area Sown	Cropped Area	Area Sown More Than Once
		Forests	Not Available for Cultivation			Other Uncultivated Land Excluding Fallow Land				Fallow Land					
			Area Under Non Agricultural Uses	Barren and Unculturable Land	Total	Permanent Pasture and Other Grazing Land	Land Under Misc. Tree Crops and Groves not Included in Net Area Sown	Culturable Waste Land	Total	Fallow Lands Other Than Current Fallows	Current Fallow	Total			
UNAKOTI	68779	33039	13037	-	13037	367	3044	894	4305	279	315	594	17804	31989	14185

Source: Source: Land Use Statistics of Tripura

1.4	Major Soils (common names like shallow red soils etc.)	Area (ha)	Percent (%) of total	
	1. Deep sandy loamy soil	12001 ha	17.45	(North district covers 1,41,837 ha & Unokoti 68779 ha )
	2. Deep fine coarse loamy soil	20125 ha	29.26	
	3. Very deep fine coarse loamy soil	750 ha	1.09	
	4. Very deep fine loamy soil	16568 ha	24.09	
	5. Very deep clay loam soil	895 ha	1.30	
	6. Very deep fine clay soil	18440 ha	26.85	
	Total	68779	100	--
1.5	Agricultural land use (1014-15)	Area ('000 ha)		Cropping intensity %
	Net sown area	17.722		179%
	Area sown more than once	13.951		

	Gross cropped area	31.673		
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Source: Agriculture Department, Govt. of Tripura

1.6	Irrigation	Area ('000 ha)		
	Net cultivated Area	17.722		
	Net irrigated area	5.668		
	Gross cultivated area	30.736		
	Gross irrigated area	11.293		
	Rainfed area	52.07		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>% of total irrigated area</b>
	Canals (medium and minor)			
	Tanks			
	Open wells	NA		
	Bore wells	NA		
	Lift irrigation schemes	179	5.575	43.12
	Micro-irrigation (Drip and sprinkler)	NA	-	
	Other sources (please specify) WHS	400	0.361	42.05
	Pump sets	714	0.714	9
	Canals (medium and minor)	Not Available	-	-
	Total Irrigated Area		11.293	100
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils	(% ) area	
	Over exploited		Data Not Available	
	Critical		Data Not Available	
	Semi- critical		Data Not Available	
	Safe		Data Not Available	
	Wastewater availability and use		Data Not Available	
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.6. a.	Fertilizer and Pesticides use	Type	Total quantity (tonnes)
1	Fertilizers*	Urea DAP Potash SSP RP NPK	644.31 tonnes 2.73 tonnes 170.215 tonnes 115.457 0.0 1.3
2	Chemical Pesticides*	Insecticides+ Fungicides Weedicides Others (specify)	50.88 N.A. --

Source: CDAP of North Tripura, Agriculture Department, Tripura, 2007-08

\* 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 (2013-14 & 2014-15)

1.7	Major Field Crops cultivated	Area ('000 ha)					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
1	Aush Paddy (Summer)	-	-	-	-	5.531	5.531
2	Aman Paddy (Kharif)	-	13.845	-	-	-	13.845
3	Boro Paddy (Rabi)	-	-	0.351	-	-	0.351
	Jhum paddy				1.368		1.368
4	Maize	-	0.435	-	-	-	0.435
5	Oilseed	-			0.15	-	0.15
	Pulses (kharif)	-	0.67	-	-	-	0.67
	Pulses (Rabi)			-	0.2	-	0.2
	<b>Horticulture crops - Fruits</b>	<b>Total area</b>		<b>Irrigated</b>		<b>Rainfed</b>	
1	Mango	0.793		-		0.793	
2	Pineapple	1.18		-		1.18	
3	Jackfruit	0.61		-		0.61	
4	Banana	0.92		-		0.92	
5	Litchi	0.36		-		0.36	
	<b>Horticultural crops - Vegetables</b>	<b>Total area</b>		<b>Irrigated</b>		<b>Rainfed</b>	
1	Okra	0.106				0.106	

	2	Brinjal	0.270	0.118	0.152
	3	Cole Crops	1.153	1.153	
	4	Tomato	0.125	0.125	-
	5	Chilli	0.203	0.095	0.108
		<b>Medicinal and Aromatic crops</b>	<b>Total area</b>	<b>Irrigated</b>	<b>Rainfed</b>
		Nil.	Data Not Available		

		<b>Plantation crops</b>	<b>Total area</b>	<b>Irrigated</b>	<b>Rainfed</b>
	1	Coconut	0.407	-	0.407
	2	Arecanut	0.528	-	0.528
	3	Cashewnut	0.08	-	0.08
	4				
	5				
		<b>Fodder crops</b>	<b>Total area</b>	<b>Irrigated</b>	<b>Rainfed</b>
	1	Not Available	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-
	5	-	-	-	-
		<b>Total fodder crop area</b>	-	-	-
		<b>Grazing land</b>	1.064	-	-
		<b>Sericulture etc</b>	-	-	-
		<b>Others (Specify)</b>	-	-	-

Source: CDAP of North Tripura, Agriculture Department, Tripura, 2007-08

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	17.86	53.59	71.45
	Crossbred cattle	-	6.908	6.908
	Non descriptive Buffaloes (local low yielding)	-	-	830.4
	Graded Buffaloes	-	-	Nil
	Goat	-	-	57.288
	Sheep	-	-	0.306
	Others (Camel, Pig, Yak etc.)	-	-	34.284

	Commercial dairy farms (Number)	-	-	Nil			
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>				
	Commercial	350	228.97				
	Backyard	58	-				
<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)						
	<b>A. Capture</b>						
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		-	-	-	-	-	-
	<b>ii) Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
		11333		0		11333	
	<b>B. Culture</b>						
		<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>	
	<b>i) Brackish water</b> (Data Source: MPEDA/ Fisheries Department)	-		-		-	
	<b>ii) Fresh water</b> (Data Source: Fisheries Department)	2233.60		2.24		5008.49	
	<b>Others</b>	-		-		-	

Source: Department of Fisheries, Govt. of Tripura

**1.11 Production and Productivity of major crops (Average of last 2 years: 2013-14 & 2014-15)**

1.11	Name of crop	Kharif		Rabi		Summer		Jhum		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)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>												
Crop 1	Rice	33.293	3020	2.383	3390	33.293	4020	2.948	2150	71.917	12580	-
Crop 2	Maize	0.486	1.12	-	-	-	-	-	-	0.486	1.12	-
Crop 3	Groundnut	0.052	878	0.027	8120	-	-	-	-	0.079	8998	-
Crop 4	Sesamum	0.05	132.3	-	-	-	-	-	-	0.05	132.3	-
Crop 5	Mustard	-	-	0.11	238	-	-	-	-	0.11	238	-
Others		-	-	-	-	-	-	-	-	-	-	-
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>												
Crop 1	Okra	1.01		-	-	-	-			1.01		-
Crop 2	Brinjal											-
Crop 3	Cole Crops	-	-	4.63		-	-			4.63		-
Crop 4	Tomato	-	-	3.30		-	-			3.30		-
Crop 5	Chilli	-	-	0.99		-	-			0.99		-
Others												

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Crop 1: <u>Rice</u>	2: <u>Maize</u>	3: <u>Groundnut</u>	4: <u>Sesamum</u>	5: <u>Rape and Mustard</u>
	Kharif- Rainfed	June 1 <sup>st</sup> to June 4 <sup>th</sup> week	5	2 <sup>nd</sup> week of June to 1 <sup>st</sup> week of July	1 <sup>st</sup> week of April to 2 <sup>nd</sup> week of April	-

	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	-	Mid October to mid December	-	15 <sup>th</sup> September to 15 <sup>th</sup> October

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













Hot and humid summer with sufficient rainfall between June & October and dry winter characterize the climate of North Tripura District. Rainfall is usually high in the District compared to other Districts in the State. But since last year (i.e. 2008) the amount of rainfall has decreased somewhat. Temperature is



generally moderate and mild variations are noticed in various places of North Tripura District. The North Tripura District is situated in intense seismic region, which is placed in the category of Zone – ‘V’.

**Disasters (North Tripura)**

**Types of Disasters: (Experienced in the District)**

<i>Common Natural Disasters</i>	<i>Man Made disasters</i>
 Cyclone ✓	 Chemical Hazards ✗
 Flood ✓	 Fire- House / Forest ✓
 Drought ✓	 Communal riot ✗
 Heat Wave- Sunstroke ✗	 Accident- Road/ Railway ✓
 Earthquake ✓	 Rasta Roko ✗
 Hail Storm/ Whirl wind ✗	 Insurgency ✓

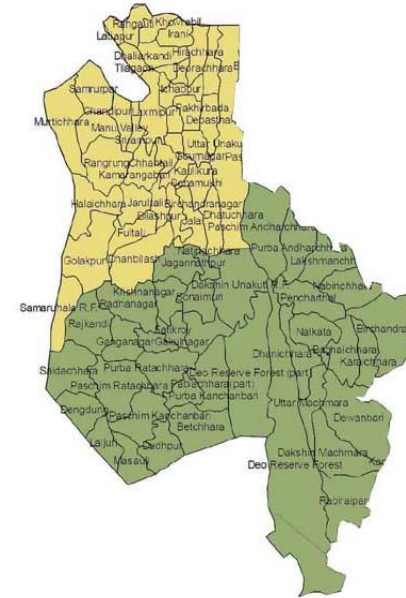
(Source: DISTRICT DISASTER MANAGEMENT AND RESPONSE PLAN OF NORTH TRIPURA (2011-2012))

<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

**Location map of district within State as Annexure I**



BANGLADESH



D  
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■ --> Kumarghat Subdivision  
■ --> Kailashahar Subdivision

**Mean annual rainfall as Annexure 2**

**District : Unakoti District (as per IMD the data of rainfall comprises North Tripura & Unakoti District in combination).**

**Note : (1) The District Rainfall(mm.)(R/F) shown below are the arithmetic averages of Rainfall of Stations under the District.**

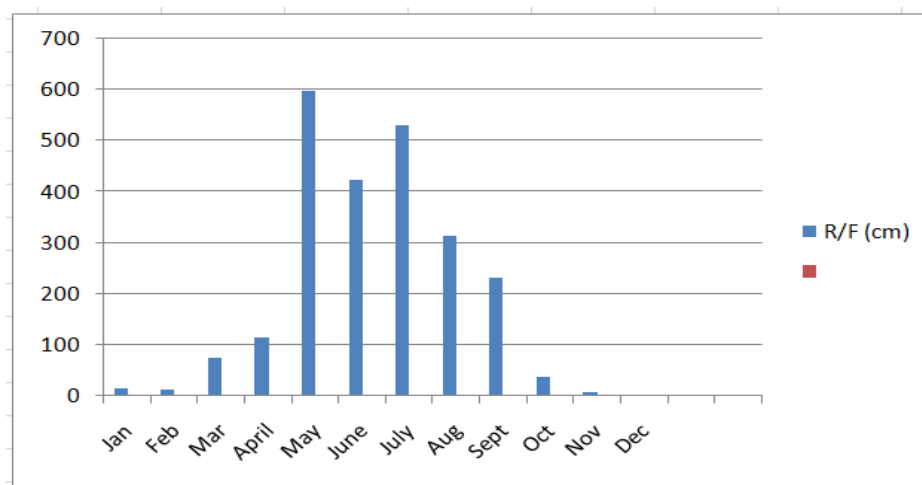
**(2) % Dep. are the Departures of rainfall from the long period averages of rainfall for the District.**

(3) Blank Spaces show non-availability of Data.

2013	0.0	-100	4.4	-88	3.0	-97	107.2	-61	846.8	92	328.3	-31	337.6	-16	440.7	20	197.6	-29	157.3	-9	0.0	-100	12.6	-4
2014	0.0	-100	11.9	-68	36.8	-69	114.7	-58	477.5	8	370.8	-22	474.2	18	237.3	-35	457.9	64	39.9	-77	0.0	-100	0.0	-100
2015	2.3	-83	23.1	-38	0.4	-99	417.6	53	463.4	5	388.7	-19	331.1	-18	378.2	3	185.8	-34	81.3	-53	11.0	-76	40.6	210
2016	5.3	-61	115.9	212	147.4	24	419.1	54	670.1	52	293.3	-39	291.4	-28	442.5	20	335.5	20	97.3	-44	153.9	241	6.9	-47
2017	0.0	-100	5.3	-86	209.4	77	507.8	86	445.1	1	790.7	66	322.1	-20	612.8	67	308.4	10	331.8	91	2.5	-94	100.4	666

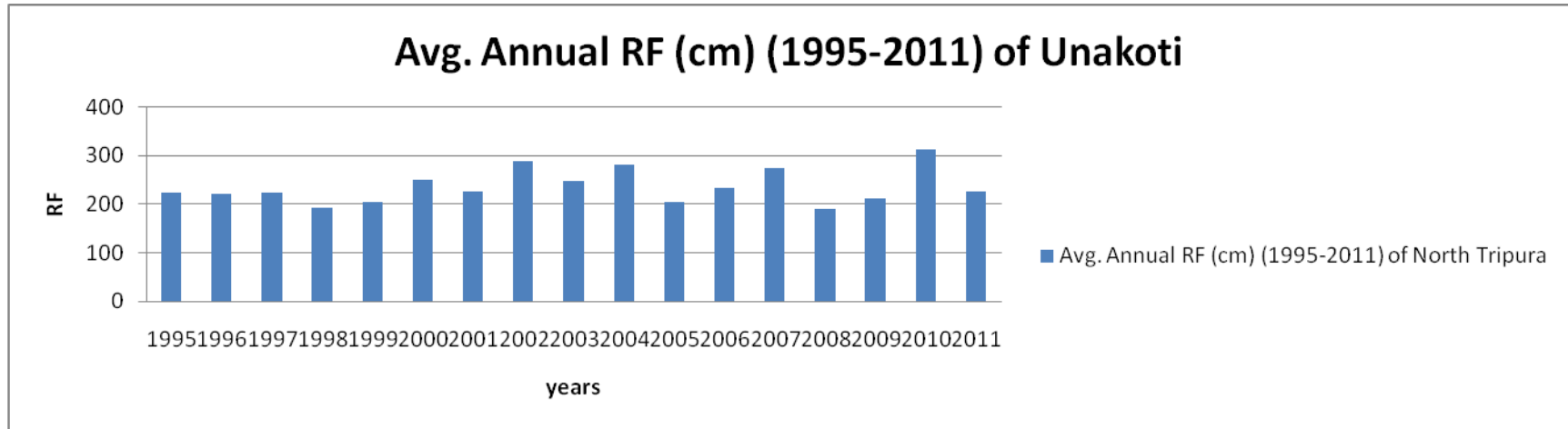
**MEAN ANNUAL RAINFALL (2011) of Unakoti District**

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
R/F (cm)	14.2	12.4	74.1	113.2	596.7	422.9	529.8	312.3	229.9	37.2	7.1	0.0



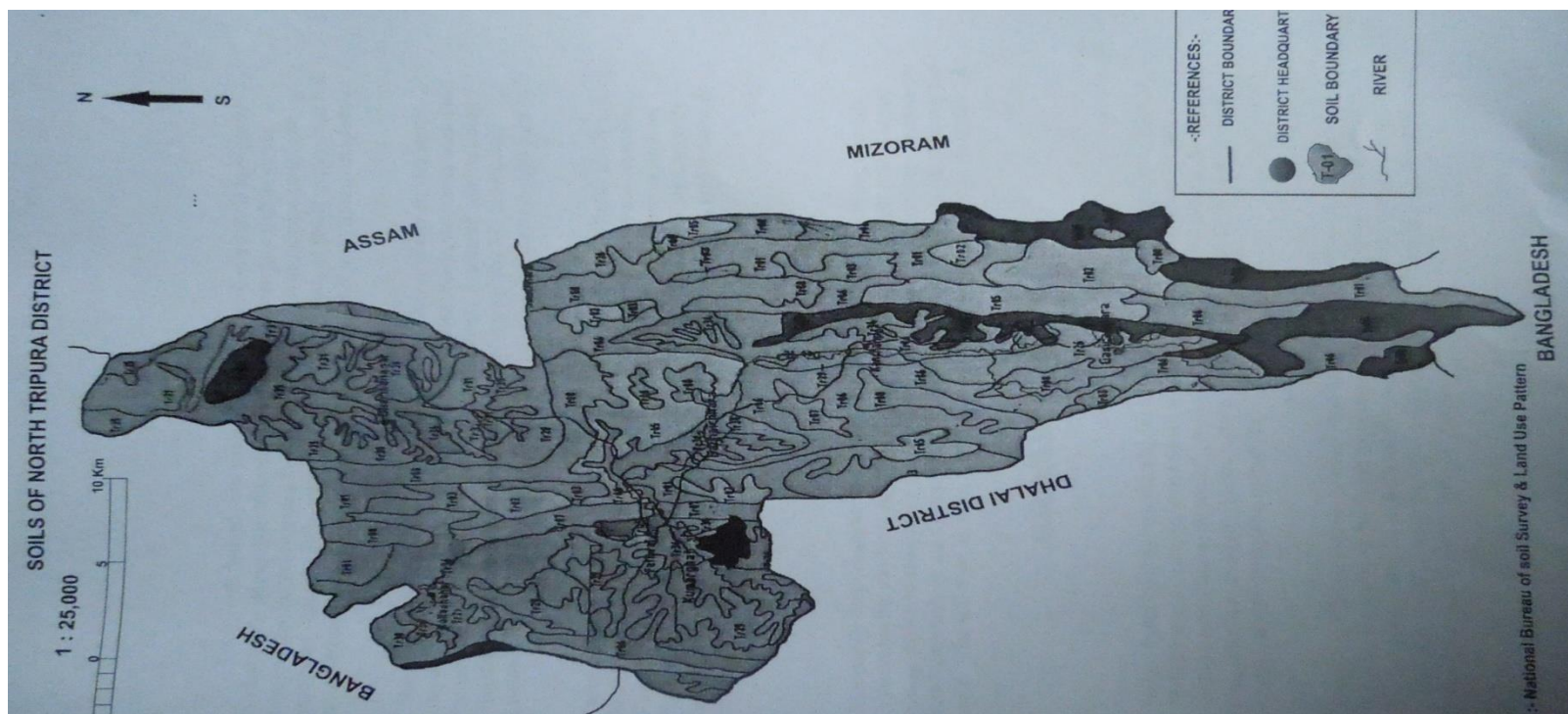
**Avg. Annual RF (cm) (1995-2011) of Unakoti**

1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
223.8	222.5	223.5	193.7	205.3	249.7	227.4	288.1	247.1	282.7	204.6	234.6	275.4	190.5	212.1	313.2	226.7



**Annual rainfall distribution in North Tripura district of Tripura**

**Source: IMD, India & Directorate of Economics & Statistics, Planning (Statistics) Department, Tripura**



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

##### 2.1.1.1 Pre Monsoon situation

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
<b>Early season drought (delayed onset)</b>					
<b>Delay by 2 weeks</b> ( June 4 <sup>th</sup> week)	a. Early rice system	Summer/ Aus Paddy variety Sahabhazi, , NRD-97, MTU 1010	No Change	--	--
<b>Delay by 4 weeks</b> ( July 2 <sup>nd</sup> week)		Summer/ Aus Paddy variety	No Change	--	--

		CO-51, Dishang			
<b>Delay by 6 weeks</b> ( July 4 <sup>th</sup> week)		N.A	N.A	N.A	N.A
<b>Delay by 8 weeks</b> ( August 2 <sup>nd</sup> week)		N.A	N.A	N.A	N.A

### 2.1.1.2 South West Monsoon situation

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
<b>Delay by 2 weeks</b> ( June 4 <sup>th</sup> week)	a. Upland-rain fed system (Red soil with moderate rainfall, no irrigation facility ) Maize - rice/vegetables/ /mustard	Upland & Jhum Paddy (Var-Goramalati, Betti, Gelong, Maichika, Aduma kiting & kolog, Tarikol, Ghuria).	No Change	--	--
		Maize (Local, HPQM-1)	No Change	--	--
		Vegetables ( Pumkin, Ash gourd, bottle gourd, cucumber, watermelon, muskmelon, elephant foot yam, brinjal, green chilli, colocasia, okra, Sesamum (B-67), Maize, Bhendi.	No change	--	--
		Ginger (Nadia, Mahima, Jampui, Local ) & turmaric (Lakadang, Rajebdra Sonia, Local)	No change	--	--
	b. Medium land-rainfed summer (Red soil with moderate rainfall, no irrigation facility- Paddy – kharif vegetable –	Kharif Paddy (Var- Swarna, Jaya, Pooja, Nabin,IR-64, Gomoti, Tripura Chikon Dhan, Tripura Nirogi),	No change	--	--
		Kharif Vegetables: Okra (VRO-6, Pusa Sawani, Arka Anamika,	No change	--	--

	potato –mustard	local).Cucumber (Chinese green, Pusa sanyog.).Ridge gourd (Pusa Nasdar, local).Bitter gourd (For spring season-Pusa Do Mausmi, Long green, local, Extra long. For summer-Monsoon monarch, Long green monsoon, Coimbatore long).Bottle gourd: Pusa summer prolific long, Pusa summer prolific round, local.Snake gourd: Long green, Long white, Extra long, local.  (N:B –suitable pvt sector varieties adopted)			
		Sesame (Tripura Siping, ST-1683, B-67),	No change	--	--
		Green Mung ( )	No change	--	--
		Jute (var JRO 524, S-19, JRO 520)	No change	--	--
	c. Low land- ( Red soil with moderate rainfall, no irrigation facility) – kharif paddy – potato – winter vegetables – oilseeds (mustard )	Kharif Paddy (Var- Swarna, Jaya, Pooja, Nabin,IR-64), Hybrid paddy (NK 5251, Raja Laxmi),	No change	--	--
		Colocasia (Panchmukhi, Muktakeshi, Guabir mukhi ) swamp Taro	No change	--	--

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)					

<b>Delay by 4 weeks (July 2<sup>nd</sup> week)</b>	a. Upland-rain fed (Red soil with –high rainfall, hills slope situation availability of irrigation facility. Maize - rice/vegetables/ /mustard	Summer and kharif vegetables like brinjal ,Snake gourd, okra, ridge gourd, bottle gourd, Bitter gourd Sweet guard, cucumber, sesame followed by Rabi vegetables, rapeseed, pea potato, French bean.	Late kharif vegetables followed by normal Rabi vegetables, Sowing of tapioca & other tubers in hill slope	i. Weed management, ii. Supply of minimum irrigation, iii. Use suitable short duration rice varieties either for direct sowing/ transplanting. Grow seedlings accordingly. Apply whole of the fertilizers at the time of sowing/ transplanting unlike normal condition. iv. use of organic manures	State Agri. Deptt, ICAR, Tripura centre
		Pineapple, mandarin, Sweet orange, Sathkara		Normal cultivation practices, use of recommended dose of fertilizer	
		Jhum rice (Var-Goramalati, Betti, Gelong, Maichika)	Mix cropping of Jhum rice with maize	Use of pig manure & other organic inputs	
		Jhum rice+ Sesamum,, Cotton	No change	--	--
	b. High rainfall with Medium to low land (Sandy Loam to clay loam) Paddy –kharif vegetable –potato – mustard	Jhum rice+ Sesame, Cotton	No change	--	--
		Kharif paddy (Ranjit, Swarnamasuri,Gomati)	Short duration and drought resistant varieties.	SRI with proper crop management practices	
		Summer vegetables, Cucurbits & solanaceous Sugarcane	No change	--	--
		Kharif vegetables mainly solanaceous	No change	--	--
		Rice-Rice Autumn rice + winter rice	Short duration paddy (Sahabhagi, , NRD-97, MTU 1010,CO-51, Dishang) followed by pulse.	Integrated weed & water management	State Agriculture, Horticulture, ICAR and other KVK's



	3 Low land -High rainfall with Red Soil kharif paddy – potato – winter vegetables – oilseeds (mustard )	Kharif paddy (Ranjit, Swarnamasuri,Gomati)	Short duration paddy (Sahabhagi, , NRD-97, MTU 1010,CO-51, Dishang)	Intercultural operation, soil health management , drainage of excess water	State Agriculture, Horticulture, ICAR and other KVK's

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)					
Delay by 6 weeks (July 4 <sup>th</sup> week)	1 High rainfall with Upland/ hills slope situation	Kharif veg- Rabi veg, Brinjal: SingnathPusa purple round, Pusapurple long, Pusa Kranti,Longai (Local). Chilli: Pusa Jowala, Krishna, local.	Delay in transplanting of paddy, Colocasia  No Change	sowing with ferti-cum-seed drill Thinning, Inter culture Grow important winter vegetables. Timely land preparation & sowing. Soil & moisture conservation measures (Organic mulches + more FYM). Ridge & furrow cultivation. Utilization of water for irrigation from nearby natural water source, ponds, and rivers, natural depressions etc. pitcher irrigation may be followed wherever is possible.	State Agriculture, Horticulture, ICAR and KVK
	2 High rainfall with Medium to lowland situation (Sandy Loam to clay loam)	Late kharif paddy, Sesamum (Variety B-67), Solanaceous / Vegetable / Bhindi, Groundnut (GG-7 & GG-20, TG 37A)	No change	vegetables cultivation practices, Utilization of water for irrigation from nearby Natural water bodies, ponds, rivers, natural depressions etc. Use of black polythene mulch if possible.	

	3 High rainfall with Red Soil	Vegetable (ridge & sponge gourd), okra	No change	Sufficient organic matter like compost , FYM should be applied Mulching with waste materials	

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)  Delay by 8 weeks (August 2 <sup>nd</sup> week)	1 High rainfall with Upland/ hills slope situation	Summer Vegetables, aush followed by amon paddy, Blackgram	Red Gram, Blackgram Blackgram + Summer vegetables.	Integrated weed management, soil health improvement	Sate agric. Dept & ICAR, Tripura centre
	2 High rainfall with Medium to lowland situation (Sandy Loam to clay loam)	Okra, early winter vegetables (Cabbage-, Early Drum head), cauliflower (Kashi kanwari), Knolkhol, Tomato	No change in cropping pattern	Thinning , Proper spacing, use of micro nutrient in cruciferous vegetables, Mulching	State Agriculture, Horticulture, ICAR and KVK
	3 Low land with High rainfall with Red Soil	Vegetables , tapioca, Elephant Foot yam(Gajedra, Kavur & TRC D1)	Arhar / Groundnut	Spraying of nutrient solution Thinning , Proper spacing, Mulching	

**\*Matrix for specifying condition of early season drought due to delayed onset of monsoon (2, 4, 6 & 8 weeks) compared to normal onset (2.1.1)**

Normal onset (Month and week)	Month and week for specifying condition of early season drought due to delayed onset of monsoon			
	Delay in onset of monsoon by			
	2 wks	4 wks	6 wks	8 wks
June 1 <sup>st</sup> wk	June 3 <sup>rd</sup> wk	July 1 <sup>st</sup> wk	July 3 <sup>rd</sup> wk	Aug 1 <sup>st</sup> wk
June 2 <sup>nd</sup> wk	June 4 <sup>th</sup> wk	July 2 <sup>nd</sup> wk	July 4 <sup>th</sup> wk	Aug 2 <sup>nd</sup> wk
June 3 <sup>rd</sup> wk	July 1 <sup>st</sup> wk	July 3 <sup>rd</sup> wk	Aug 1 <sup>st</sup> wk	Aug 3 <sup>rd</sup> wk
June 4 <sup>th</sup> wk	July 2 <sup>nd</sup> wk	July 4 <sup>th</sup> wk	Aug 2 <sup>nd</sup> wk	Aug 4 <sup>th</sup> wk
July 1 <sup>st</sup> wk	July 3 <sup>rd</sup> wk	Aug 1 <sup>st</sup> wk	Aug 3 <sup>rd</sup> wk	Sep 1 <sup>st</sup> wk

July 2 <sup>nd</sup> wk	July 4 <sup>th</sup> wk	Aug 2 <sup>nd</sup> wk	Aug 4 <sup>th</sup> wk	Sep 2 <sup>nd</sup> wk
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Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (Normal onset)					
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	1. High rainfall with Upland/ hills slope situation	Vegetables (cucurbits & solanaceous crops), kharif & jhum paddy  Maize based cropping system Maize - rice/soybean - potato/vegetables/ wheat/mustard Sesamum (local) Arhar (U.P.A.S. – 120)	Thinning and gap filling the existing crop, Re sowing with short duration variety, Re sow if the mortality is more than 50%.	Application of sufficient organic matter, Straw Mulching, Organic matter, FYM application, Complete hoeing weeding and earthing up at 20 DAS for moisture conservation. Weeding	State Agriculture, Horticulture, ICAR and other KVK
	2. High rainfall with Medium to lowland situation (Sandy Loam to clay loam)	Rice-Rice Autumn rice + winter Rice Kharif pulse – Toria Summer, Sugarcane	1. Thinning and gap filling the existing crop 2. Resowing with short duration variety, seeds should be treated with 4 % MOP for 24 hours & dry in shade for 24 hours. 3. Mat Nursery technique to meet the shortage of seedlings.  4. Resowing	Rice- 1. Top dressing of N as it rains, P & K as top dressing in line sowing crop, Apply P upto 3 weeks after seeding & K up to flowering. 2. Large Scale utilization of organic mulches & FYM. 3. Rain water harvesting by 30 cm high bunding. 4. Weeding & breaking of soil mulch by,	State Agriculture, Horticulture, ICAR and other KVK

				Gap filling, Weed management, Supply of Life saving irrigation,	
	3 High rainfall with Red Soil	Cucurbits & solanaceous, Groundnut (GG 7 & GG 20), legume crops	1. Thinning and gap filling the existing crop 2. Resowing with short duration variety,	Soil health management by legume crops, Mulching Weeding Application of FM	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Mid season drought (long dry spell, consecutive 2 weeks rainless (&gt;2.5 mm) period)</b>	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measures</b>	<b>Remarks on Implementation</b>
<b>At vegetative stage</b>	1 Upland & hill slopes situation	Summer Vegetables, Black Gram, Moong, Blackgram	Strengthen bunds and prevent runoff, Delay top dressing of urea .Close observation on disease pest incidence and adopt prompt remedial measures.	Solution, Weed management, Supply of minimum irrigation,	
	2 Medium lowland situation (Sandy Loam to clay loam)	Sub mergible paddy (Swarna Sub-1), Kharif paddy (Ranjit, Swarna,Swarna), Colocasia	Strengthen bunds and prevent runoff, Delay top dressing of urea .Close observation on disease pest incidence and adopt prompt remedial measures	Spray 0.5-1.0% MOP solution, Spray 2.0% urea	Can be implemented through State Agriculture, Horticulture, ICAR and KVK
	3 Red Soil	Kharif veg- Rabi veg , Groundnut	Large Scale utilization of organic mulches & FYM. Rain water harvesting.	Mulching Field ,Bunding, Off season ploughing, use of organic manures	

			<p>Weeding &amp; breaking of soil mulch by finger weeder.</p> <p>Ridge &amp; furrow cultivation.</p> <p>Apply N as top dress as it rains, P &amp; K also as top dress if not applied as basal in line seeded crop.</p> <p>P should be applied up to 3 weeks after sowing &amp; K up to flowering.</p>		
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Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil nutrient & moisture conservation measues <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At flowering/ fruiting stage	1 Upland & hill slopes situation	Summer and kharif vegetables like brinjal ,Snake gourd, okra, ridge gourd, bottle gourd, bitter gourd Sweet guard, cucumber , sesame followed by rabi vegetables, pulses	Crop can be cut and ratooned. Foliar application at 2 % Urea in Pre Flowering and Flowering Stage.	i.Mulching ii. Off season ploughing to conserve moisture iii. Cover / Crop	
	2 Medium lowland situation (Sandy Loam to clay loam)	Kharif paddy, rainy season vegetables like Yard long bean, ridge & sponge gourd	Strengthen bunds and prevent runoff Close observation on disease pest incidence and adopt prompt remedial measures	Rice- Weed management, Supply of minimum irrigation, Top dressing additional quantities of MOP Spray 2% MOP solution, Delay top dressing of urea up to heading	Can be implemented through State Agriculture, Horticulture, ICAR and KVK
	3 Red Soil	Solanaceous vegetables, Groundnut	Thinning	Application of sufficient amount of organic manures in main fields	

				before transplanting/ sowing, Mulching	

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Rabi Crop planning <sup>d</sup>	Remarks on Implementation <sup>e</sup>
	1 Upland & hill slopes situation	Vegetables / Arhar / Sesamum	i.Mulching ii.Life saving irrigation	-	-
	2 Medium lowland situation (Sandy Loam to clay loam)	Vegetables / Sesamum	Mulching	Toria / Mustard	May be implemented through KVK and ICAR

**Notes:**

- a. Describe the major farming situation such as shallow red soils, deep black soils, uplands, medium lands, eroded hill slopes 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- not applicable**

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Delayed release of water in canals due to low rainfall	Upland				
	Medium Land				
Low Land					

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Limited release of water in canals due to low rainfall					

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Non release of water in canals under delayed onset of monsoon in catchment					

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Lack of inflows into tanks due to insufficient /delayed onset of monsoon					

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Insufficient groundwater					



Condition	Suggested Contingency measures				
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
recharge due to low rainfall					
Any other condition (specify)					

**Notes:**

<sup>f</sup> 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.,

<sup>g</sup> The normal crop or cropping systems grown in a given irrigated situation

<sup>h</sup> Suggested change in the crop, variety or cropping system in view of delay in release of irrigation water, less water availability etc.,

<sup>i</sup> 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.

<sup>j</sup> 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 <sup>k</sup>	Flowering stage <sup>l</sup>	Crop maturity stage <sup>m</sup>	Post harvest <sup>n</sup>
Crop1 (specify)	Rice	Gap filling in damaged patches if seedlings are available Top dressing of urea after the recess of rains, provide Drainage	Necessary control Measures against outbreak of caseworm, gundi bug and stem borer. Nutrient application.	Drain out Harvesting at physiological maturity stage	Shift to safer place Dry in shade in a well ventilated space and turn frequently.
Crop2	Maize	Provide drainage Drain out and	Provide drainage	Harvest at physiological	Shift to safer place

				maturity	
Crop3	Rapeseed & mustard	Provide drainage	Drain out Harvest for vegetable purpose	Drain out Harvesting at physiological maturity stage	Shift to safer place
Crop4	Sesamum	Drainage			
Crop5	Groundnut	Drainage	Provide drainage. Timely earthing – up.	Drain out the excess water. Harvesting at physiological maturity stage.	Shift to safer place and dry in shade and turn frequently.
<b>Horticulture</b>					
Crop1 (specify)	Summer vegetables , Chilli, Cowpea, Okra, Brinjal,	Provide drainage Re-sowing of short duration late variety Need based protective measures against	Proper Drainage.	Drain out Harvesting at physiological maturity stage Use as fodder	Segregation of infested vegetables & destruction, Use as fodder
Crop2	Winter vegetables- cabbage, cauliflower, Knolkhol, radish, carrot etc	Provide drainage Re-sowing of short duration late variety Need based protective measures against	Provide drainage Need based protective measures against pests and diseases.	Drain out Harvesting at physiological maturity stage Use as fodder	Segregation of infested vegetables & destruction, Use as fodder
Crop3	Potato	Provide drainage, Take protective measures against late blight of potato.	Provide drainage, Take protective measures against late blight of potato.	Drain out excess water Harvest at physiological maturity stage	Dry in shade. Safe storage against storage pests and diseases
Crop4	Ginger & turmeric	Timely Earthing up to provide drainage.	Provide drainage	Drain out the excess water.	Shift to safe place ; dry in shade and turn frequently. Safe storage against storage pests and diseases.
Crop5	Papaya, Citrus, Jack fruit, Mango, Banana, pineapple	Avoid water logging at the Collar portion	Avoid water logging at the Collar portion	Avoid water logging at the Collar portion	Avoid water logging at the Collar portion
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>					
Crop1	Rice	Drainage	Application of nutrient solution to prevent flower	Harvesting at Physiological Maturity.	Proper Sun Dry Before Storing

			drop.		
Crop2	Maize	Drainage			
Crop3	Rapeseed & mustard	Drainage			
Crop4	Sesamum	Drainage			
Crop5	Groundnut	Drainage			
<b>Horticulture</b>					
Crop1 (specify)	Summer & winter vegetables , Chilli, Cowpea, Okra, Brinjal, Tomato, Potato, Cole Crops.	Stocking / Proper Drainage.	Stocking and Proper Drainage.	Stocking and Proper Drainage	Proper Drainage
Crop2	Potato	Provide drainage, Take protective measures against late blight of potato.	Provide drainage, Take protective measures against late blight of potato.	Drain out excess water Harvest at physiological maturity stage	
Crop3	Citrus, Jack Fruit, Mango	Avoid Waterlogging at the Collar portion and provision for wind break trees.			
Crop4	Banana	Provision for plantation of wind break trees.	Propping	Propping	
Crop5	Ginger & turmeric	Timely Earthing up to provide drainage.	Provide drainage	Drain out the excess water.	Stored in dry & wind free place
<b>Outbreak of pests and diseases due to unseasonal rains</b>					
Crop1	Rice	Need based IPM measures. Field Sanitation to prevent disease (Rice Blast) or Spray tricyclazole against blast, Rice hispa damage. Proper application of Chlorpyrifos 1 ml / litre water for leaf folder. Monocrotophos for stem borer,	Need based IPM measures. Spray tricyclazole against blast, Chloropyrifos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Need based IPM measures. Keep the produce in air tight container to avoid the stored against pest damage.	Safe storage against storage pests and diseases.
Crop2	Maize	Apply Phorate 10G in the whorls & spray of Endosulfan against	Spray Methyl dematon against aphid		Store in clean godown after

	maize stem borer			disinfection of gunny bags chemicals
Crop3	Groundnut, Mustard / Rapeseed	Proper drainage to prevent Damping off diseases		
Crop <sup>4</sup>	Sesamum	Removal of infested tips to manage leaf webber	Spraying of systemic insecticide against borers	Spray of Ekalux against capsule borer
				Store in clean godown, disinfection of gunny bags / storage structure with malathion
<b>Horticulture</b>				
<b>Crop1</b>	Vegetables	Specific IPM & disease management	Specific IPM & disease management , Apply pesticide and ITK measures	Specific IPM & disease management , Apply pesticide and ITK measures
Crop2 (specify)	Potato	Spray Cymixicilin + Mencozeb @ 2 gm / litre of water as precautionary measure against Late Blight.	Drainage out excess water to prevent wilting diseases.	Store seed in well condition with Fungicidal Treatment.

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

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

<sup>m</sup> 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.

<sup>n</sup> 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 <sup>o</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>l</sup></b>				
Crop1 (specify) Paddy	Drainage of the Nursery bed, If not possible go for re -sowing	Drainage of excess water. Apply 50% N + 50% K2O as top dressing during the tillering stage. In partially damaged field. Gap filling may	Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming	Growing of boro rice after receding flood water

		be done by redistributing the tillers.	rabi crops. Management of pests & diseases	
<b>Horticulture</b>				
Crop1 (specify) Summer/Kharif vegetables, Colocasia	Re sowing	Provide Drainage or re sowing of late varieties	Drainage or pre rabi and rabi vegetables	Pre rabi and rabi vegetables
Crop2 Banana, papaya, Citrus, Jackfruit, mango.	Provide Drainage	Provide Drainage	Provide Drainage	Provide Drainage
Crop3 ginger & turmeric	Provide Drainage	Provide Drainage, formation of ridges and furrows	Provide Drainage, formation of ridges and furrows	Drying of the plots keeping sufficient moisture
<b>Continuous submergence for more than 2 days<sup>2</sup></b>				
Crop1 Paddy	Drainage of the Nursery bed, If not possible go for re -sowing	Drainage of excess water. In partially damaged field. Gap filling may be done by redistributing the tillers. Management of pests & diseases	Drainage of excess water. Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to compensate the loss during kharif.	Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops Supply of seeds and other agro-inputs of rabi crops at subsidized rate, provision of bank loan etc. Wet seeding of short duration
<b>Horticulture</b>				
Crop1 (specify) Summer/Kharif vegetables, Colocasia	Resowing	Provide drainage Resowing of late varieties	Provide drainage Use as animal feed	Harvest and dry in shade as soon as possible Safe storage against storage pest and diseases
Crop2 Banana, papaya, Citrus, Jackfruit, mango	Provide Drainage	Provide Drainage	Provide Drainage	Provide Drainage
Crop3 ginger & turmeric	-	Provide Drainage, formation of ridges and furrows	Provide Drainage, formation of ridges and furrows	Drying of the plots keeping sufficient moisture
<b>Sea water intrusion<sup>3</sup></b>				
Crop1	-	-	-	-

**Notes:**

<sup>1</sup> Water logging due to heavy rainfall, poor drainage in vertisols, flash floods in streams and rivers due to high rainfall, breach of embankments

<sup>2</sup> If the water remains in the field due to continuous rains, poor infiltration and push back effect

<sup>3</sup> Entry of sea water into cultivated fields in coastal districts due to tidal wave during cyclones or tsunami

<sup>o</sup> 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: Cyclone**

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Cyclone</b>				
Crop1 Paddy	Selection of lodging resistant varieties	Potash application at 25 and 45 DAT	Application of recommended dose of fertilizers & organic manures	-
<b>Horticulture</b>				
Crop1 Kharif Vegetables	Provision for providing Net.	Proper staking & Growing of wind break trees	Proper staking & Growing of wind break trees	Proper staking & Growing of wind break trees
Crop2 Fruit crops	Growing of wind break trees, Crop/weather insurance.	Growing of wind break trees & staking , Crop/weather insurance.	Growing of wind break trees, Crop/weather insurance.	Growing of wind break trees, Crop/weather insurance.

<sup>p</sup> In regions where the normal maximum temperature is more than 40°C, if the day temperature exceeds 3°C above normal for 5 days it is defined as heat wave. Similarly, in regions where the normal temperature is less than 40°C, if the day temperature remains 5°C above normal for 5 days, it is defined as heat wave.

<sup>q</sup> In regions where normal minimum temperature remains 10°C or above, if the minimum temperature remains 5°C 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°C, if the minimum temperature remains 3°C lower than normal it is considered as cold wave

<sup>r</sup> Indicate appropriate crop/soil management measures depending upon the crop and its stage for alleviating the specified stress.

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event <sup>s</sup>	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	Farmers can grow crops like green gram, fodder crops and tuber crops.	The harvested paddy straw and other biomass need to be enriched and fortified and compact feed blocks need to be prepared.	Enriched complete feed blocks containing dry roughage, concentrates / unconventional supplements in the ratio 50:50 be supplied.
Drinking water	To minimise thermal stress, animals to be kept in shaded place. This will also help in reducing the water requirement	Fresh groundwater may be provided with water soluble vitamins	Fresh groundwater may be provided with water soluble vitamins
Health and disease management	Vaccination schedule against FMD, BQ & HS in large ruminants, and PPR in small ruminants be carried out.	Screen animals for symptoms of dehydration, metabolic disorders and check for wound and injuries and take the services of Veterinary Doctor for treatment.	Dry roughages be sprayed with 10% molasses or crude jaggery solution and 2% urea for maintenance of animal's health.
<b>Floods</b>			
Feed and fodder availability	Feeds to be protected from fungal contamination and wet feeds to be dried and fed.	Animals to be housed in dry place and dry bedding (straw) to be provided to young animals.	Damaged grain (not fungus contaminated) to be diverted for livestock feeding.
Drinking water	Sources of fresh water should be identified earlier	Fresh water should be provided with sanitizer	Fresh water should be provided with sanitizer
Health and disease management	Farmers should be advised to use 40-50 g of salt and 30-40 g mineral mixture per adult animal and 10-20 g for small ruminants and calves to be provided daily through feed for better health.	Animals to be dewormed with suitable anti-helmentic drug and be checked and treated for ecto-parasites, if any.	

<b>Cyclone</b>			
Feed and fodder availability	Feeds to be protected from fungal contamination and wet feeds to be dried and fed (Hay & Straw)	Animals to be tied in well ventilated house with sufficient amount of feed	
Drinking water	Fresh water sources be identified	Fresh water be provided from earlier sources identified	
Health and disease management	Vaccination schedule against FMD, BQ & HS in large ruminants, and PPR in small ruminants be carried out.	Animals to be dewormed with suitable anti-helmentic drug and be checked and treated for ecto-parasites, if any.	
<b>Heat wave and cold wave</b>			
Shelter/environment management	Farmers should be advised to build a well ventilated animal house to protect from both heat & cold waves	Animal house be well ventilated along with electric fan if possible/ 100 watt bulb during cold waves	
Health and disease management	Fresh water sources be identified	Ad lib cold fresh water & anti-stress vitamins be provided in both seasons	

<sup>s</sup> based on forewarning wherever available

### 2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event <sup>a</sup>	During the event	After the event	
<b>Drought</b>				
Shortage of feed ingredients	--	--	--	No
Drinking water	Fresh water sources be identified with well conservation of rain water to be made		--	No



Health and disease management	--			No
<b>Floods</b>				
Shortage of feed ingredients	Feeds to be protected from fungal contamination and should be provided with good storage			No
Drinking water				No
Health and disease management				No
<b>Cyclone</b>				
Shortage of feed ingredients				--
Drinking water				--
Health and disease management				--
<b>Heat wave and cold wave</b>				
Shelter/environment management			Ventilation should be checked	--
Health and disease management				--

based on forewarning wherever available

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Marine	--	--	--

<b>Inland</b>			
(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.	Air breathing fish culture should be taken.	
(ii) Changes in water quality	--	--	--
(iii) Any other	--	--	--
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	Partial harvesting of the stock Partial harvesting of the stock proportionate to the receding water volume should be undertaken. Application of fertilizer and manure should also be reduced to avoid eutrophication/algal blooms.	Farmers should go for short term fish culture (Aug- March) of medium carps. These carps attain marketable size within the stipulated period.	Protect Brood stock by making deep trenches /pools in the middle of brood stock ponds with shallow channels all along the periphery to provide shelter to fishes in the wake of scarcity of water.
(ii) Impact of salt load build up in ponds / change in water quality	--	--	--
(iii) Any other	Paddy cum fish culture needs to be propagated. Live fish culture should be taken.		
<b>2) Floods</b>			
<b>A. Capture</b>			
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>B. Aquaculture</b>			
(i) Inundation with flood water	Pond dyke height should be increased/	--	--

	temporary fencing may be given to reduce fish escape.		
(ii) Water continuation and changes in water quality	--	--	Necessary rectification may be done by using chemicals and fertilizers.
(iii) Health and diseases	--	--	Proper disease diagnosis should be undertaken during this period and prophylactic medicine and chemicals should be used.
(iv) Loss of stock and inputs (feed, chemicals etc)	--	--	Stock assessment, restocking should be done after assessing the productivity of the water body.
(v) Infrastructure damage (pumps, aerators, huts etc)	--	--	Repairing of infrastructure and other facilities should be undertaken.
(vi) Any other	--	--	--
<b>3. Cyclone / Tsunami</b>			
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	--	--	--
<b>4. Heat wave and cold wave</b>			
<b>A. Capture</b>			
Marine	--	--	--
Inland	--	--	--
<b>B. Aquaculture</b>			
(i) Changes in pond environment (water quality)	--	--	--
(ii) Health and Disease management	--	--	--
(iii) Any other	--	--	--

<sup>a</sup> based on forewarning wherever available