State: WEST BENGAL

Agriculture Contingency Plan for District: UTTAR DINAJPUR

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Assam And Bengal Plain, Hot Subhumid To Humid (Inclusion Of Perhumid) Eco-Region. (15.1) Eastern Plain, Hot Subhumid (moist) Eco-Region(13.1)		
	Agro-Climatic Zone (Planning Commission)	Lower Gangetic Plain Region (III)		
	Agro Climatic Zone (NARP)	New Alluvial Zone (WB-4) Old Aluuvial Zone (WB-3)		
	List all the districts falling under the NARP Zone*(*>50% area falling in the zone)	Burdwan, Murshidabad, Malda, Uttar Dinajpur, Nadia, Cooch Behar, Dakshin dinajpur, Hooghly		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		$25^0$36’50.50”N	$87^0$07’36.77’ E	53 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station (OAZ), UBKV, Majhian, Patiram – 733 133, Dakshin Dinajpur, West Bengal		
	Mention the KVK located in the district with address	DDKVK, RRS, UBKV, Majhian, Patiram – 733 133, Dakshin Dinajpur, West Bengal		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	AMFU, Regional Research Station (OAZ), UBKV, Majhian, Patiram – 733 133, Dakshin Dinajpur, West Bengal		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-September):	1448	1st week of June	4th week of September
	NE Monsoon(October-December):	138		
	Winter (January- February)	19		
	Summer (March-May)	252		
	Annual	1857		

Source: WBSMB 2008

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (‘000 ha)	313.0	248	0.9	32.1	0.3	9.5	3.2	0.1	6.5	0.2

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area (‘000 ha)**	**Percent (%) of total cultivable area**
	Sandy soils	56.47	23.40
	Sandy Loam soils	97.78	40.52
	Loamy soils	51.07	21.16
	Clay Loam soils	32.86	13.62
	Clay	3.1	1.30

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	241.3	210
	Area sown more than once	264.5	
	Gross cropped area	505.8	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	272.58		
	Gross irrigated area	310.892		
	Rainfed area	194.908		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	Nil	Nil	Nil
	Tanks/Ponds/Canal	905	1.865	1.53
	Open wells	nil	nil	-
	Bore wells (DTW)	163	6.520	5.36
	Lift irrigation schemes (River)	75	3.800	3.1
	Micro-irrigation	Nil	Nil	-
	Other sources (STW-private))	50859	97.218	80
	Shallow Tube Well (STW)-Govt.	3047	12.188	10.02
	Medium DeepTube Well (MDTW)	2	0.040	0.032
	Total Irrigated Area		121.57	
	Pump sets	-		
	No. of Tractors	-		
	Groundwater availability and use* (Data source: State/Central Ground water	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride,

	Department /Board)			saline etc)
	Over exploited	Nil	-	Only Itahar Block of Uttar Dinajpur District is affected by fluoride ion. However no survey has been done but declining ground water trend has been observed.
	Critical	Nil	-	
	Semi- critical	Nil	-	
	Safe	09	-	
	Wastewater availability and use	-	-	
	Ground water quality	Good		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2009-10)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	-	205.47	-	-	-	72.8	278.27
	Oilseed (mustard)	-	-	-	-	-	64.93	-	64.93
	Wheat	-	-	-	-	-	55.45	-	55.45
	Jute	-	-	44.98	-	-	-	-	44.98
	Maize	-	-	-	-	-	29.4	28.41	57.81
	Potato	-	-	-	-	-	23.70	-	23.70
	Horticulture crops - Fruits	**Area ('000 ha)**							
	Mango	1.6							
	Banana	1.0							
	Pineapple	2.6							
	Litchi	0.6							
	Papaya	0.6							
	Guava	0.5							
	Horticulture crops - Vegetables								
	Brinjal	9.19							
	Chillies	6.82							
	Cabbage	3.7							
	Cauliflower	3.1							
	Tomato	2.35							

	Peas	0.5
	Ladyfinger	1.2
	Turmeric	1.90
	Ginger	1.19
	Medicinal and Aromatic crops	-
	Plantation crops	**Total**
	Coconut	0.24
	Arecanut	0.4
	Betelvine	0.2
	Makhana	0.1
	Tejpatta	0.1

1.8	**Livestock (2007-08)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	348.5	427.4	775.9
	Crossbred cattle	6.4	32.6	39.0
	Non descriptive Buffaloes (local low yielding)	15.9	5.4	21.3
	Descriptive Buffaloes	-	-	-
	Goat	-	-	713.2
	Sheep	-	-	5.5
	Others (Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)			-
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Fowl	200	1810.949	
	Duck			

1.10	**Fisheries**						
	A. Capture						
	i) Marine	**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)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**	
	-	NA	Survey not done	
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)		-	-	-
Others		-	-	-

1.11 Production and Productivity of major crops (2009-10)

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Major Field crops (Crops to be identified based on total acreage)								
	Rice	508.83	2476	-	-	265.36	3645.0	774.19	2782
	Wheat	-	-	135.40	2442	-	-	135.40	2442
	Mustard	-	-	35.51	547	-	-	35.51	547
	Jute	-	-	-	-	-	-	159.150	2259
	Pulses			0.27	571			0.27	571
	Potato	-	-	321.43	13559	-	-	321.43	13559
	Major Horticultural crops (Crops to be identified based on total acreage)								
	Chilli	-	-	-	-	-	-	6.604	967.1
	Vegetables	330.6	6800	195.7	12700	96.9	9000	623.2	9500
	Mango	-	-	-	-	19.58	12000	19.58	12000
	Banana	-	-	-	-	14.58	14371.4	14.58	14371.4
	Pineapple	-	-	-	-	10.26	3904.8	10.26	3904.8

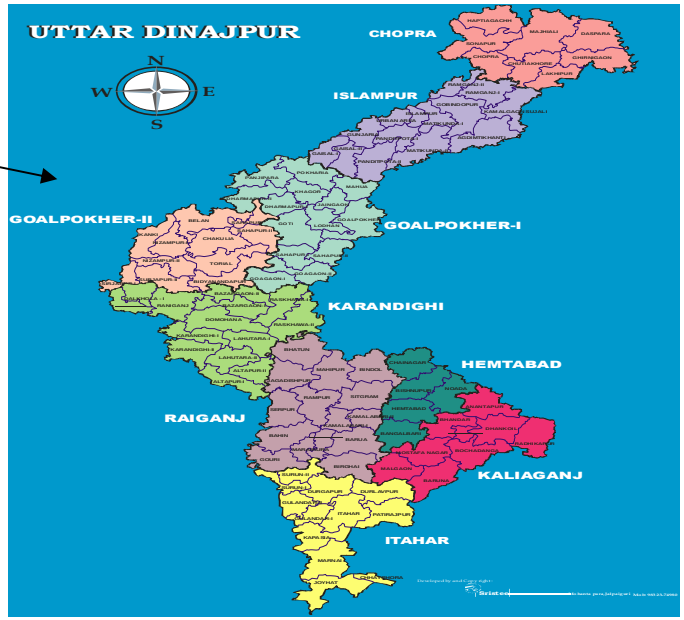
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Wheat**	**Jute**	**Mustard**	**Potato**
	Kharif- Rainfed	July 1st week to Aug 2nd week (transplanting)	-	-	-	-
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	Nov 1st week to Dec 2nd week	-	Oct 4th week to Nov 2nd week	Nov 1st week to Dec 4th week
	Summer / Pre-kharif	Boro rice – Jan 3rd week to Feb 2nd week	-	March 4th week to April 3rd week	-	-

1.13	**What is the major contingency the district is prone to?**	**Regular**	**Occasional**	**None**
	Drought	-	-	-
	Flood	-	√	-
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water intrusion	-	-	√
	Pests and disease outbreak	√. Potato late blight. Kharif rice- Stem borer, Leaf folder, Sheath blight, rice blast, stem rot .Jute-Stem rot, Bihar Hairy Caterpillar, Mite. Mustard_ Aphid, Club root, Leaf spot .Wheat – Stem borer	-	

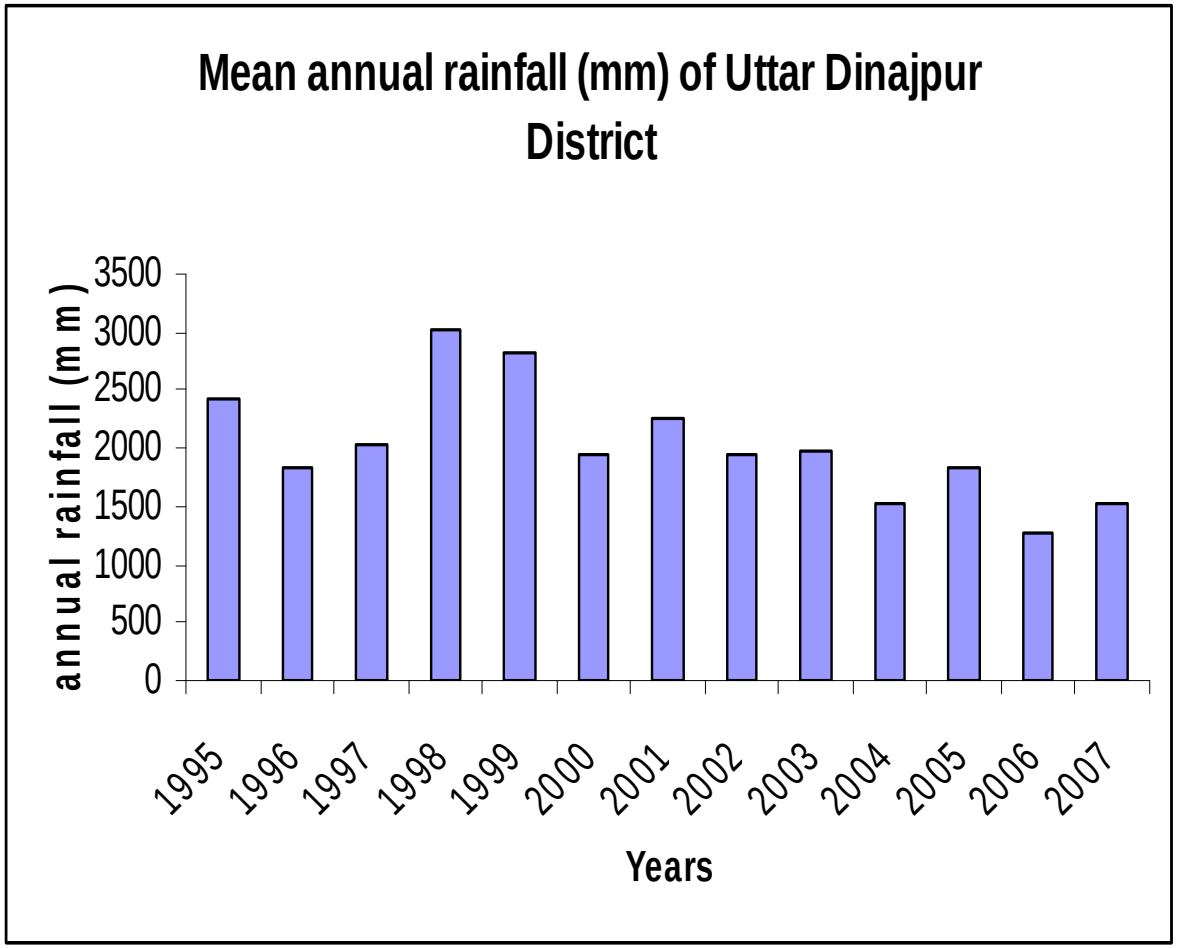
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Fig. 1 Yes
		Mean annual rainfall as Annexure 2	Enclosed: Fig. 2 Yes
		Soil map as Annexure 3	Enclosed: Fig. 3 Yes

Annexure - I

Location map of Uttar Dinajpur in West Bengal

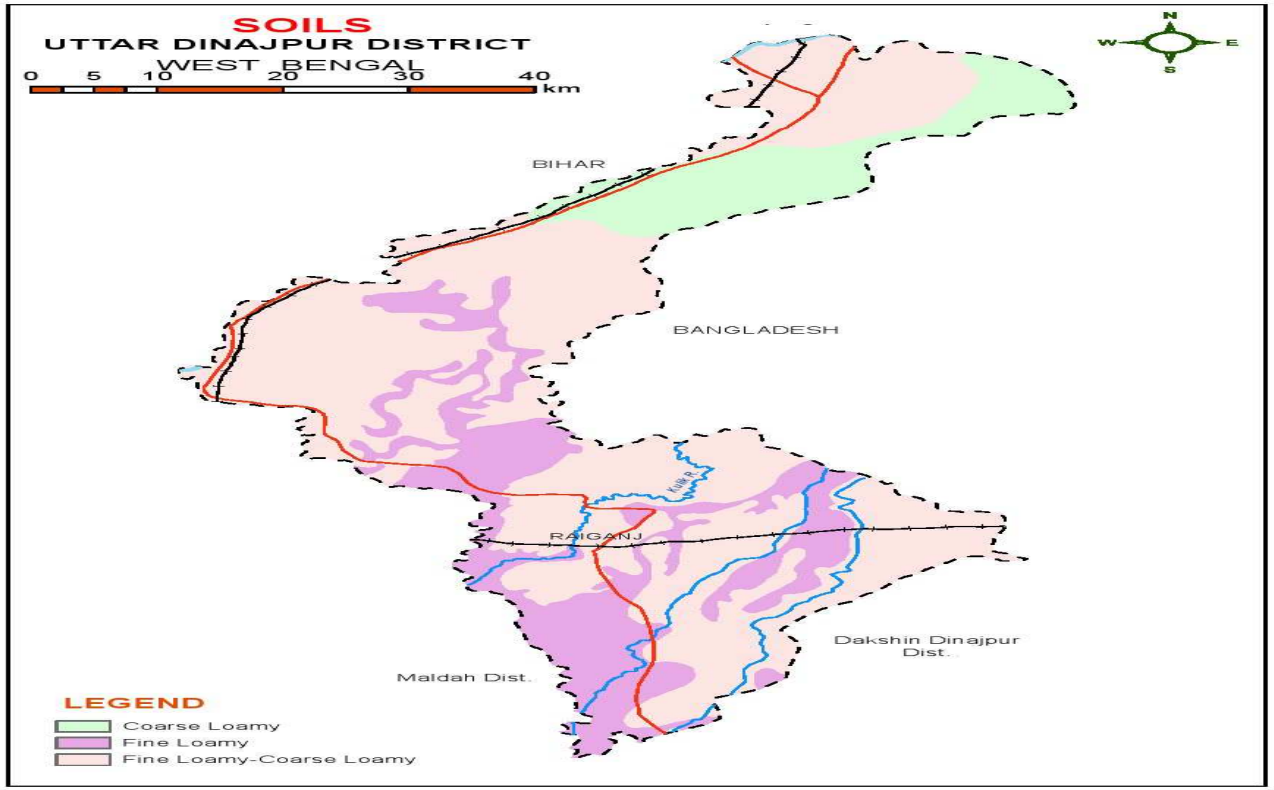


Annexure - II



Mean annual rainfall of Uttar Dinajpur district

Annexure - III
Soil map of Uttar Dinajpur District



Source: NBSS & LUP Regional Centre, Kolkata

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**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 3rd week of June	Deep clay to clay loam soil (Low land)	Rice	No change. Prefer varieties like tall Indica or IET 5656 or Sabita	• Normal transplanting of 2-3 seedlings/ hill • Normal package practices of UBKV	Link the Agricultural Farms of Agriculture, Govt. of WB, Regional Research Station, UBKV, Majhian and KVK at Chopra for supply of seed
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	No change	-do-	
		Jute-Rice	No change	Gap filling with the same crop in the rows	
	Sandy soil (High Land)	Rice	No change. Prefer varieties like tall Indica or IET 5656 or Sabita	• Normal Transplanting of 2-3 seedlings/ hill • Normal package practices of UBKV	
		Jute-Rice	No change	Gap filling with the same crop in the rows	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks 1st week of July	Deep clay to clay loam soil (Low land)	Rice	No change. Prefer varieties like tall Indica or IET 5656 or Sabita	Rice cultivation though SRI system.	Link the Agricultural Farms of Agriculture, Govt. of WB, Regional Research Station, UBKV, Majhian and KVK at Chopra for supply of seed
	Deep sandy loam to loam soil	Rice-Mustard	No change	• Direct sowing using drum seeder • Seedbed preparation under SRI	

	(Medium Land)	Jute-Rice	No change	Gap filling with the same crop in the rows	
	Sandy soil (High Land)	Rice	No change. Prefer varieties like tall Indica or IET 5656 or Sabita	• Direct sowing using drum seeder • Rice cultivation though SRI system. • Supplemental irrigation	
		Jute-Rice	No change	Normal Agronomic practices	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks 3rd week of July	Deep clay to clay loam soil (Low land)	Rice	No change. Prefer varieties like tall Indica or IET 5656 or Sabita	• Stager nursery with short duration variety.(Annada) or • Transplanting with 4-5 seedling / hill in case of long duration variety (Lalat, Sabita, swarna masuri)	• Link the Agricultural Farms of Agriculture, Govt. of WB, Regional Research Station, UBKV, Majhian and KVK at Chopra for supply of seed • Link farm pond technology with watersheds NREGS.
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	No change	• Direct sowing using drum seeder with short / medium variety (Khitish, Satabd	
		Jute-Rice	No change	-	
	Sandy soil (High Land)	Rice	Rice-Wheat/Vegetables	• Prefer SRI System cultivation • Staggared nursery upto September 15	
		Jute-Rice	No change	Normal Agronomy practices	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks	Deep clay to clay loam soil	Rice	No change .Prefer short duration variety like	Transplant 2-3 seedlings/hill	• Link Agricultural Farms

1st week of August	(Low land)		Annada		under Department of Agriculture, Govt. of WB, Regional Research Station, UBKV, Majhian and KVK at Chopra for supply of seed • Link farm pond technology with watersheds NREGS.
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	Black gram (Sarda, sulata, Pant U 19-31)/ Green gram (Samrat, Bireshwar, Sukumar) or continue with transplanted rice if seedlings are available or Vegetable like Brinjal /Chilli	• Land preparation for rabi crop	
		Jute-Rice	No change	• Land preparation for rabi rice • Increase the seed rateby19% and close spcing	
	Sandy soil (High Land)	Rice	No change	• Transplanting with 4-5 seedling / hill in case of long duration variety (Lalat, Sabita, swarna masuri)	
		Jute-Rice	No change	Normal Agronomic practices	

Condition			**Suggested contingency measures**	
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and moisture conservation methods**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Deep clay to clay loam soil (Low land)	Rice	• Gap filling with 2-3 seedlings / hill • Timely weeding	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	-do-	-do-
		Jute-Rice	• Inter culture • Gap filling with the same crop if population is below 50%	Supplemental irrigation
	Sandy soil (High Land)	Rice	• Gap filling with 2-3 seedlings / hill • Timely weeding	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation
		Jute-Rice	• Inter culture • Gap filling with the same crop if population is below 50%	Supplemental irrigation

Condition			**Suggested contingency measures**	
	Major Farming situation	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and moisture conservation methods**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) At vegetative stage	Deep clay to clay loam soil (Low land)	Rice	• Timely weeding • Protection against leaf folder with chlorpyriphos 2ml/l	Supplemental irrigation
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	Transplant 2-3 seedling / hill in the gaps	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation • Top dressing of 30-50 kg N/ha after relief of dry spell
		Jute-Rice	• Gap filling with improved variety of seed if population is less than 75% • Inter culture	Foliar spray with 2% Urea during the dry spell
	Sandy soil (High Land)	Rice	• Direct Drum seeding if the population is less than 75% • Timely weeding • Protection against leaf folder with chlorpyriphos 2ml/	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation • Transplant 2-3 seedling / hill • Top dressing of 30-50 kg N/ha after relief of dry spell
		Jute-Rice	Inter culture	Foliar spray with 2% Urea during the dry spell

Condition				
	Major Farming situation	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient and moisture conservation methods**
Mid season drought (long dry spell) At flowering/ fruiting stage	Deep clay to clay loam soil (Low land)	Rice	Timely weeding	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	-do-	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation
		Jute-Rice	-do-	Supplemental irrigation
	Sandy soil (High Land)	Rice	-do-	• Foliar spray with 2% Urea during the dry spell • Supplemental irrigation
		Jute-Rice	-do-	Supplemental irrigation

Condition			Suggested Contingency measures	
	Major Farming situation	**Normal Crop / Cropping system**	**Crop management**	**Rabi crop planning**
Terminal drought (Early withdrawal of monsoon)	Deep clay to clay loam soil (Low land)	Rice	Life saving irrigation	Rabi fallow
	Deep sandy loam to loam soil (Medium Land)	Rice-Mustard	-do-	Land preparation for rabi mustard
		Jute-Rice	-do-	Land preparation for rabi rice
	Sandy soil (High Land)	Rice	-do-	Plan for fodder crops like maize(African tall) and cowpea
		Jute-Rice	-do-	Land preparation for rabi rice

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	NA				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	NA				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	NA				

Condition			**Suggested Contingency measures**		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep clay to clay loam soil (Low land)	Rice-Wheat/Mustard	No change	• Adopt SRI method for rice cultivation • Irrigation at critical crop growth stages • Adopt alternate furrow irrigation for potato / mustard / Vegetable	Linkage with NSC, WBSC and farms and Dept. of agriculture for seed supply and other inputs
		Jute-Rice-Wheat/Mustard	-do-	• Adopt alternate furrow irrigation • Irrigation at critical crop growth stages • Adopt SRI method for rice cultivation	
	Deep sandy loam to loam soil (Medium Land)	Jute-Rice-Mustard/Wheat	No change	-do-	
		Jute-Rice-Vegetables	- do -	-do-	
	Sandy soil (High Land)	Jute-Rice-Mustard/Wheat	- do -	-do-	
		Jute-Rice-Vegetables/Potato	- do -	-do-	

Condition			Suggested Contingency measures		
Insufficient groundwater recharge due to low rainfall	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
	Deep clay to clay loam soil (Low land)	Rice-Wheat/Mustard	No change	• Adopt SRI method for rice cultivation • Irrigation at critical crop growth stages Adopt alternate furrow irrigation for potato / mustard / Vegetable	Linkage with NSC, WBSC and farms and Dept. of agriculture for seed supply and other inputs
		Jute-Rice-Wheat/Mustard	- do -	• Adopt alternate furrow irrigation • Irrigation at critical crop growth stages • Adopt SRI method for rice cultivation	
	Deep sandy loam to loam soil (Medium Land)	Jute-Rice-Mustard/Wheat	- do -	-do-	
		Jute-Rice-Vegetables	- do -	-do-	
	Sandy soil (High Land)	Jute-Rice-Mustard/Wheat	- do -	-do-	
		Jute-Rice-Vegetables/Potato	- do -	-do-	

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

Condition- Continuous high rainfall in a short span leading to water logging				
Crop	**Suggested contingency measure**			
	Vegetative stage	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	• Drain excess water • Postpone topdressing N fertilizers till water recedes • Take up gap filling either with available nursery or by splitting the tillers from the surviving hills	• Drain excess water • Apply the recommended nutrients after draining excess water.	• Drain excess water • Spray 2% brine solution to prevent premature germination in field	• Drain excess water and spread sheves loosely in the fields or field bunds where there is no stagnation • Spray 2% brine solution to prevent premature germination in field • Allow the crop to dry completely before harvesting

				• Dry the grain to proper moisture content before bagging and storage
Jute	• Drain excess water • Take intercultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds	• Drain excess water • Take intercultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds	• Drain excess water • Allow the crop to dry completely before harvesting	Shift the produce to the safer place
Wheat	-do-	-do-	-do-	• Allow the crop to dry completely before harvesting • Dry the grain to proper moisture content before bagging and storing storage
Mustard	-do-	-do-	-do-	-do-
Pulse (Blackgram)	-do-	-do-	-do-	-do-
Horticulture				
Mango	Draint excess water as soon possible	Drain excess water as soon possible possible	• Drain excess water as soon possible • Harvest the mature produce on a clear sunny day • Fallen fruits may be collected, graded and marketed if feasible	• Store fruits in well ventilated temporary structures before marketing • Market the fruits as soon as possible
Potato	• Drain excess water • Postpone topdressing N fertilizers till water recedes	Drain excess water as soon possible	Drain excess water as soon possible	-
Condition-Heavy rainfall with high speed winds in a short span				
Rice	• Drain excess water • Gap filling with seedlings raised from upland nursery /other sources	• Drain excess water • Apply 30-50 kg N/ha after removing excess water	• Drain excess water • Spray 2% brine solution to prevent premature germination in field	• Spray 2% brine solution to prevent premature germination in field • Allow the crop to dry completely

	• Apply 30-50 kg N/ha after removing excess water			before harvesting • Dry the grain to proper moisture content before bagging and storage
Jute	• Draint excess water • Take intercultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds • Top dressing with 20-30 kg N/ha at optimum moisture condition	• Drain excess water • Take intercultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds • Top dressing with 20-30 kg N/ha at optimum moisture condition	• Drain excess water • Allow the crop to dry completely before harvesting	Shift the produce to the safer place
Wheat	-do-	-do-	-do-	• Allow the crop to dry completely before harvesting • Dry the grain to proper moisture content before bagging and storing storage
Mustard	-do-	-do-	-do-	-do-
Pulse	-do-	-do-	-do-	Quick threshing and drying
Horticulture				
Mango	Drain t excess water as soon possible	Drain excess water as soon possible	• Drainexcess water as soon possible • Harvest the mature produce on a clear sunny day • Fallen fruits may be collected, graded and marketed if feasible	• Store fruits in well ventilated temporary structures before marketing • Market the fruits as soon as possible
Potato	• Drain excess water • Formation of ridges and furrows after receding of water	• Draint excess water • Top dressing of recommended nutrients at optimum moisture	Drain excess water	-
Condition-Outbreak of pests and diseases due to unseasonal rains				
Rice	Protection against leaf blast	Protect against bacterial leaf	• Protect against bacterial leaf	-

	with tricyclazole @ 1 ml/l	blight with hexaconazole @ 1 ml/l	blight with hexaconazole @ 1 ml/l • Spray carbendazim 0.1% to prevent seed disculouration / grain spot	
Horticulture				
Potato	Spray metalaxyl + mancozeb mixture @ 2.5 g/l twice at 7 days interval to protect against late blight disease	Spray metalaxyl + mancozeb mixture @ 1.5 g/l twice at 10 days interval to protect against late blight disease	Spray metalaxyl + mancozeb mixture @ 1.5 g/l twice at 10 days interval to protect against late blight disease	• Dehaulming of affected parts and destroy • Severely infested produce is unfit for seed purpose

2.3 Floods

Condition - Transient water logging/ partial inundation				
Crop	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	• Drain excess water • Use the seedlings to fill up the gaps raised from upland nurseries/other sources • Growing of variety like IET 5656 and NC 490 (withstand submergence, late transplanting) • Maintain weed free condition	• Drain excess water • Apply booster dose of 50 kg N/ha • Spray zinc sulphate 0.2% if it is less than 45 days after tranplanting	• Drain excess water at the earliest • Take up need based plant protection measures • If the damage is severe take up alternate crops like Kalai, Mustard, Wheat, Lentil, Potato, Gram, Maize and Boro paddy	• Drain excess water and spread sheves loosely in the fields or field bunds where there is no stagnation • Spray 2% brine solution to prevent premature germination in field • Allow the crop to dry completely before harvesting • Dry the grain to proper moisture content before bagging and storage
Condition-Continuous submergence for more than 2 days				
Rice	• Drain excess water • Use the seedlings to fill	• Drain excess water • Apply booster dose of 50	Plan for alternate crops like Kalai, Mustard, Wheat, Lentil, Potato,	• Drain excess water • Early harvest

	up the gaps raised from upland nurseries/other sources • Growing of variety like IET 5656 and NC 490 (withstand submergence, late transplanting) • Maintain weed free condition	kg N/ha • Spray zinc sulphate 0.2% if it is less than 45 days after tranplanting	Gram, Maize and Boro paddy if damage is severe	• Spray 2% brine solution to prevent premature germination in field • Allow the crop to dry completely before harvesting • Dry the grain to proper moisture content before bagging and storage
Sea water intrusion	NA			

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone Not applicable

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	NA			
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Arrangement of feed and fodder for use in drought from Govt. & Private fodder farms	Adequate supply of feed and fodder in the affected places	Creation of awareness amongst farming community for storage and its usage in natural calamities. Awareness on cultivation of perennial

			fodders
Drinking water	Arrangement for ample supply of safe & hygienic water for usage in drought situation	Ample supply of hygienic potable water in affected areas	Creation of awareness for conservation and use of hygienic water for animals
Health and disease management	Scientific rearing practices including necessary arrangements of medicines and biological for treatment and prevention of animal diseases	Organization of animal health camps for treatment and control of animal disease occurrence and prevention	Creation of awareness for scientific rearing and disease prevention in drought
Floods			
Feed and fodder availability	Arrangement of feed and fodder for use in flood from Govt. & Private fodder farms	Adequate supply of feed and fodder in the affected places	Creation of awareness amongst farming community for storage and its usage in natural calamities
Drinking water	Arrangement for ample supply of safe & hygienic water for usage in flood prone areas	Ample supply of hygienic potable water in affected areas	Creation of awareness for conservation and use of hygienic water for animals
Health and disease management	Arrangement of shelter for animals and disease control measurers during flood. Community approach should be encouraged	Organization of animal health camps for treatment and control of animal disease occurrence and prevention	Creation of awareness for scientific rearing and disease prevention in flood prone areas
Cyclone			
Feed and fodder availability	Exploration of maximum cultivation of fodder to avoid losses in clyclone	Scientific management of animals. Ample supply of animal feed & fodder in the affected regions	Creation of awareness amongst farming community for storage and its usage in natural calamities
Drinking water	Arrangement for ample supply of safe & hygienic water for usage in cyclone prone areas	Scientific management of animals. Ample supply of hygienic water in the affected regions	Creation of awareness for conservation and use of hygienic water for animals
Health and disease management	Arrangement of manage mental practices to prevent occurrence of animal diseases. Arrangement of medicines and biologicals	Post-mortem examination and subsequent treatment and vaccination of animals. Organization of animal health camps.	Creation of awareness for scientific rearing and disease prevention in cyclone prone areas
Heat wave and cold wave			
Shelter/environment management	Arrangement of animal shelter near human habitat	Keep the animals in animal shelters	Creation of awareness for preparation of anima shelter and its usage on community basis
Health and disease management	Arrangement of treatment & prevention for animals in heat or cold wave flow	Keep the animals under shed. Treatment and control of affected animals	Creation of awareness for scientific rearing in specially constructed sheds

[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**	ASCAD for Avian Influenza
Drought				
Shortage of feed ingredients	Arrangement for procurement of poultry feed ingredients and prepared feed storage for usage in drought	Adequate supply of feed from Govt. & Private feed plants	Creation of awareness for preparation & storage of feed in drought	
Drinking water	Arrangement of hygienic water	Adequate supply of hygienic water	Creation of awareness for conservation of hygienic water	
Health and disease management	Arrangement of medicines & biological for future use and Mass Vaccination of birds	Observation or strict vigilance on occurrence of poultry diseases and accordingly treatment &control measures to be installed	Creation of awareness for prevention of poultry diseases in drought	
Floods				
Shortage of feed ingredients	Arrangement for procurement of poultry feed ingredients and prepared feed storage for usage in flood	Adequate supply of feed from Govt. & Private feed plants	Creation of awareness for preparation & storage of feed in flood situation	
Drinking water	Arrangement of hygienic water	Adequate supply of hygienic water	Creation of awareness for conservation of hygienic water	
Health and disease management	Arrangement of medicines & biological for future use and Mass Vaccination of birds, atleast in prone areas	Scientific managemental practices of keeping poultry birds to be adopted along with treatment & control of diseases	Creation of awareness for prevention of poultry diseases in flood	
Cyclone				
Shortage of feed ingredients	Exploration of maximum cultivation of poultry feed ingredients and production of feed to avoid losses in cyclone	Scientific management of birds. Ample supply of poultry feed in the affected regions	Creation of awareness amongst farming community for storage of poultry feed and its usage in natural calamities	
Drinking water	Arrangement for ample supply of safe & hygienic water for usage in cyclone prone areas	Scientific management of animals. Ample supply of hygienic water in the affected regions	Creation of awareness for conservation and use of hygienic water for animals	

Health and disease management	Arrangement of managemental practices to prevent occurrence of poultry diseases. Arrangement of medicines and biologicals	Post-mortem examination and subsequent treatment and vaccination of birds. Organization of animal health camps.	Creation of awareness for scientific rearing of birds and disease prevention in cyclone prone areas	
Heat wave and cold wave				
Shelter/environment management	Arrangement of poultry shed for large population on community basis	Housing of the affected birds in shelter	Creation of awareness for specially constructed poultry shed and planting of trees surrounding the poultry houses	
Health and disease management	Arrangement of medicines and biological, Mass Vaccination	Management of birds on scientific basis	Awareness of poultry farmers	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Proposed for excavation of earth from periphery areas so that water can retain in the deep pockets and building of high embankment	Supply of water into the water body from tube well, nearby river etc. and observe mortality of fish and proper management of the said water body.	Proper post-event management, retention of water, disinfecting water (if possible) to prevent disease out-breaks.
(ii) Changes in water quality	Water and soil quality tests suggested from time to time.	Proper management in ponds for soil and water as per the test report.	Proper disinfection of water and maintenance of water temperature and plankton quantity.
(iii) Any other	Nil	Nil	Nil
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Proposed for excavation of earth from the pond so that water can retain during drought and supply of water in to the	Control of pond water quality parameters and maintenance of optimum level of planktons (fish	Suggested for disinfection of pond water through liming and periodic netting to assess the biomass.

	pond from tube well / river etc.	food) in the pond through proper fertilization (if required)	
(ii) Impact of salt load build up in ponds / change in water quality	Not applicable (No saline water nearby)	Not applicable (No saline water nearby)	Not applicable (No saline water nearby)
(iii) Any other	Nil	Nil	Nil
2) Floods			
A. Capture			
Marine	Not applicable (No marine fishery resource)	Not applicable (No marine fishery resource)	Not applicable (No marine fishery resource)
Inland			
(i) Average compensation paid due to loss of human life	Creating awareness among the fishermen on emergency strategies to be adopted in the case of flood.	Advise to shift to high land / flood shelter camps to save life.	Monetary compensation to the affected family for loss of life.
(ii) No. of boats / nets/damaged	Training fishermen on protection of boats, nets etc. in case of occurrence of flood.	Keeping the boat / net in dry / high places during flood situation.	Damage reports are to be sent to higher authority for compensation.
(iii) No. of houses damaged	Nil	Nil	Damage reports are to be sent to higher authority for compensation.
(iv) Loss of stock	Advise to strengthen protection dyke so that during flood dyke remains safe and fish stock are not affected. Placing fish aggregation devices in the deeper zones so that fish are accumulated there.	Advise to protect fish stock from escaping by putting nets in the areas where dyke is damaged.	Assessing the residual fish stock after the flood and taking proper management strategies as per the advice of Fishery Department.
(v) Changes in water quality	Nil	Nil	Application of lime / other disinfectants in the water body
(vi) Health and diseases	Nil	Nil	Monitoring and taking preventive measures against out-break of disease
B. Aquaculture			
(i) Inundation with flood water	Raising the height of the pond dyke in the flood prone areas, Harvesting the stock before onset of monsoon.	Placing nets to prevent escape of fish from the culture ponds.	Repair of pond dyke.
(ii) Water contamination and changes in water quality	Nil	Nil	Suggested for water testing and advice for corrective measures.

(iii) Health and diseases	Nil	Nil	Suggested for water treatment through liming and other disinfectants and monitoring of health of fish stock..
(iv) Loss of stock and inputs (feed, chemicals etc)	Arrangement for keeping feeds / chemicals in dry & safe place.	Immediately shift the inputs to high / safe place. Sundry (if possible) the wet inputs.	Recommending to higher authority for supplying mini kit (fingerlings, lime & other critical inputs)
(v) Infrastructure damage (pumps, aerators, huts etc)	Keeping them in safe place after use.	Immediately shift the pump / aerator from the pond to safe place. Remove the other valuable items from the hut in case possibilities of flood water entering to the hut	Recommending to higher authority for compensation against the loss.
(vi) Any other	Insurance for aquaculture activities. Constitute Departmental Disaster Management Committee at the Block, Sub-division & District level for planning management action.	Establish Control Room at the Block, Sub-division & District level for prompt management action. Cancel leaves for the employees	Claim insurance
3. Cyclone / Tsunami			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland			
(i) Average compensation paid due to loss of fishermen lives	Creating awareness among the fishermen on emergency strategies to be adopted in the case of cyclone.	Advise to shift to high land / flood shelter camps to save life.	Monetary compensation to the affected family for loss of life.
(ii) Avg. no. of boats / nets/damaged	Training fishermen on protection of boats, nets etc. in case of occurrence of cyclone.	Keeping the boat / net in dry / high places during flood situation.	Damage reports are to be sent to higher authority for compensation.
(iii) Avg. no. of houses damaged	Nil	Nil	Damage reports are to be sent to higher authority for compensation.
B. Aquaculture			
(i) Overflow / flooding of ponds	Raising the height of the pond dyke in the flood prone areas, Harvesting the stock before onset of monsoon.	Placing nets to prevent escape of fish from the culture ponds.	Repair of pond dyke.
(ii) Changes in water quality (fresh	Not applicable	Not applicable	Not applicable

water / brackish water ratio)	(No brackish water source nearby)	(No brackish water source nearby)	(No brackish water source nearby)
(iii) Health and diseases	Nil	Nil	Monitoring and taking preventive measures against out-break of disease
(iv) Loss of stock and inputs (feed, chemicals etc)	Arrangement for keeping feeds / chemicals in dry & safe place.	Immediately shift the inputs to high / safe place. Sundry (if possible) the wet inputs.	Recommending to higher authority for supplying mini kit (fingerlings, lime & other critical inputs)
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	Keeping them in safe place after use.	Immediately shift the pump / aerator from the pond to safe place. Remove the other valuable items from the hut in case possibilities of flood water entering to the hut	Recommending to higher authority for compensation against the loss.
(vi) Any other	Insurance for aquaculture activities. Constitute Departmental Disaster Management Committee at the Block, Sub-division & District level for planning management action.	Establish Control Room at the Block, Sub-division & District level for prompt management action. Cancel leaves for the employees	Claim insurance

4. Heat wave and cold wave			
A. Capture			
Marine	Not applicable	Not applicable	Not applicable
Inland	Harvesting of fish stock to minimize the loss due to heat / cold wave.	Placing the tree branches, old pipes etc. in the deeper zone so that fish can take shelter in the cool places.	Nil
B. Aquaculture			
(i) Changes in pond environment (water quality)	Increase pond water depth by pumping water in to the pond during summer months.	During heat wave, place the tree branches, old pipes etc. in the deeper zone so that fish can take shelter in the cool places. If pond water depth reduces, partially harvest stock, reduce / stop supplementary feeding, reduce / stop fertilization, watch out for Dissolve oxygen (DO) depletion.	Try to increase the pond water depth, take necessary measure for improving pond water quality parameters.
(ii) Health and Disease management	Be vigilant for fish disease	Do not go for additional stocking.	Watch out for health status of fish stock

		Take appropriate treatment for the diseased fish after consulting fishery expert / Fishery Extension Officer.	through netting.
(iii) Any other	Nil	Nil	Nil