State: WEST BENGAL

Agriculture Contingency Plan for District: SOUTH 24-PARGANAS

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern Coastal Plain, Hot Subhumid To Semi-Arid Eco-Region (18.5) Assam And Bengal Plain, Hot Subhumid To Humid (Inclusion Of Perhumid) Eco-Region. (15.1)		
	Agro-Climatic Zone (Planning Commission)	Lower Gangetic Plain Region (III)		
	Agro Climatic Zone (NARP)	Coastal Saline Zone (WB-6)		
	List all the districts or part thereof falling under the NARP Zone	Calcutta, 24-Parganas (S), Howrah, Hoogly, 24 Paraganas (N), Midnapur East		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		$21^0$40’38.95” N	$88^0$18’33.27”E	7 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, Coastal & Saline Zone Akhoyuagar, Kakdwip, 24 Pgs (S), W.B.-743 347		
	Mention the KVK located in the district	KVK, Nimpith ashram 74338 AMFU, Kakdwip- 743347		

1.2	**Rainfall**	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1302.8	1st week of June	4th week of September
	NE Monsoon(Oct-Dec):	266.0	-	-
	Winter (Jan- March)	60.00	-	-
	Summer (Apr-May)	167.40	-	-
	Annual	1796.2	-	-

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)	953.37	380.46	426.30	138.30	0.05	0.04	2.94	0.44	8.17	-

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	1. Clayey	93.28	24%
	2. Clayey – loamy	101.05	26%
	3. Loamy	194.33	50%

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	372.29	143
	Area sown more than once	158.97	
	Gross cropped area	531.26	

1.6	**Irrigation (2006 – 07)**	Area ('000 ha)		
	Net irrigated area	115.73		
	Gross irrigated area	415.53		
	Rainfed area	256.46		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	-	44.90	38.8
	Tanks (small ponds)	-	14.99	13.0
	Open wells	-	-	-
	Bore wells (shallow tube wells)	-	34.62	29.92
	Lift irrigation schemes (river-lift)	-	21.21	18.3
	Micro-irrigation	-	-	-
	Other sources	-	-	-
	Total Irrigated Area	-	115.73	-
	Pump sets	-	-	-
	No. of Tractors	-	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	Arsenic level 0.052-0.20 mg/lit
	Critical	-	-	Fluoride level 2.02-24.18 mg/lit
	Semi- critical	-	-	Salinity CI-111& above

	Safe	10	-	Arsenic depth range 80-225
	Wastewater availability and use	-	-	Fluoride depth range 31- above mbgl &Salinity
	Ground water quality	Presence of Arsenic & Fluoride in 6 blocks		
*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) (year 2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	324.3	324.3	0.8	-	0.8	67.4	392.5
	Wheat	-	-	-	2.4	-	2.4	-	2.4
	Pulses **(**Lathyrus, Blackgram, Greengram)	-	-	-	-	15.2	15.2	-	15.2
	Oilseeds (**Sunflower**, Safflower, Mustard, Linseed)	-	-	-	-	14.4	14.4	-	14.4
	Dry Chillis	-	4.9	4.9	-	-	-	-	4.9
	Potato	-	-	-	2.8	-	2.8	-	2.8
	Horticulture crops - Fruits	**Area ('000 ha)**							
		Total							
	Mango	1.00							
	Banana	2.12							
	Papaya	0.90							
	Guava	1.99							
	Litchi	0.51							
	Horticulture crops - Vegetables	**Total**							
	Brinjal	8.33							
	Cucurbits	12.45							
	Ladies finger	7.00							
	Cabbage	5.60							
	Cauliflower	4.66							
	Tomato	4.39							

	Medicinal and Aromatic crops	Total	Irrigated	Rainfed
	Plantation crops	-	-	-
	Betel vine	-	-	-
	Coconut, Arecanut	-	-	-
	Eg., industrial pulpwood crops etc.	-	-	-
	Fodder crops	-	-	-
	Total fodder crop area	-	-	-
	Grazing land	-	-	-
	Sericulture etc	-	-	-

1.8	**Livestock (2007-08)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	319.1	732.8	1,051.9
	Crossbred cattle	12.6	38.7	51.3
	Non descriptive Buffaloes (local low yielding)	4.9	7.0	11.9
	Graded Buffaloes	-	-	-
	Goat	-	-	901.8
	Sheep	-	-	226.7
	Others (Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)	-	-	-
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	-	
	Backyard	-	-	

1.10	**Fisheries** (Data source: Chief Planning Officer) ***(obtain the data from district fisheries department and incorporate the data)***						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**	**Storage facilities (Ice plants etc.)**	
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
			-	-	-	-	-

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**	**No. of village tanks**
	-		-	**-**
B. Culture				
	Water Spread Area (ha)	**Yield (t/ha)**		**Production ('000 tons)**
i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**-**	**-**		**-**
ii) **Fresh water** (Data Source: Fisheries Department)	**-**	**-**		**-**

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08)

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	8.33	2434	658.78	1977	199.28	3126	866.38	2512
	Wheat	-	-	4.78	1886	-	-	4.78	1886
	Pulses	-	-	4.18	652	-	-	4.18	652
	Oilseeds	-	-	14.23	1205	-	-	14.23	1205
	Jute	11.8	2364	-	-	-	-	11.80	2364
	Potato	-	-	54.9	17885	-	-	54.9	17885
	Major Horticultural crops (Crops to be identified based on total acreage)								
	Cabbage	-	-	178.35	31840	-	-	178.35	31840
	Cauliflower	-	-	93.00	19950	-	-	93.00	19950
	Tomato	-	-	75.90	17290	-	-	75.90	17290
	Brinjal	-	-	146.21	17550	-	-	146.21	17550
	Cucurbits	-	-	150.93	12120	-	-	150.93	12120
	Okra	-	-	85.50	12210	-	-	85.50	12210

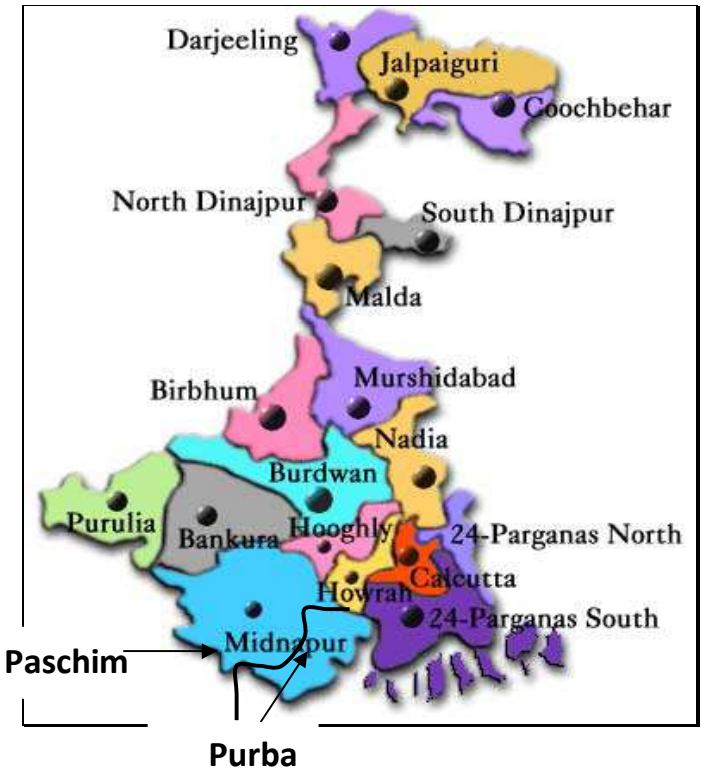
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	Pulses	Oilseeds	Vegetables
	Kharif- Rainfed	Aman rice transplanted: July 4th week to Aug 4th week	-	-	-
	Kharif-Irrigated	-	-	-	-
	Rabi- Rainfed	-	Dec 2nd week of Dec to Jan 1st week	Dec 2nd week of Dec to Jan 1st week	Dec 2nd week of Dec to Jan 1st week
	Rabi-Irrigated	-	-	-	-

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	-	√	-
	Flood	-	√	-
	Cyclone	-	√	-
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	-
	Frost	-	-	√
	Sea water intrusion	-	√	-
	Pests and disease outbreak (specify)	√	-	-

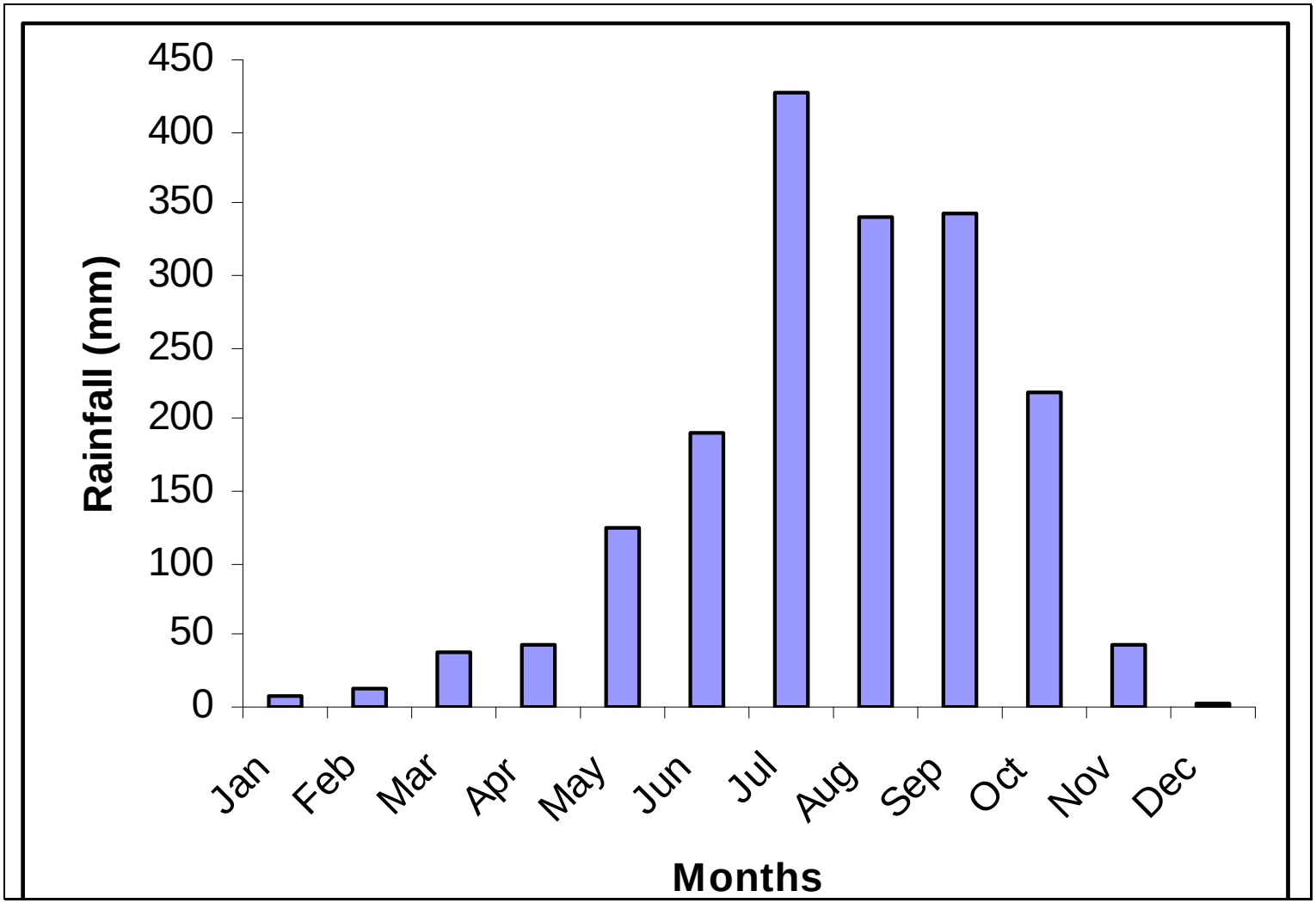
1.14	**Include Digital maps of the district for**	Location map of district within State, Annexure 1	Enclosed: Yes
		Mean annual rainfall, Annexure 2	Enclosed: Yes
		Soil map, Annexure 3	Enclosed: Yes

Annexure –I

Location map of South 24 parganas district



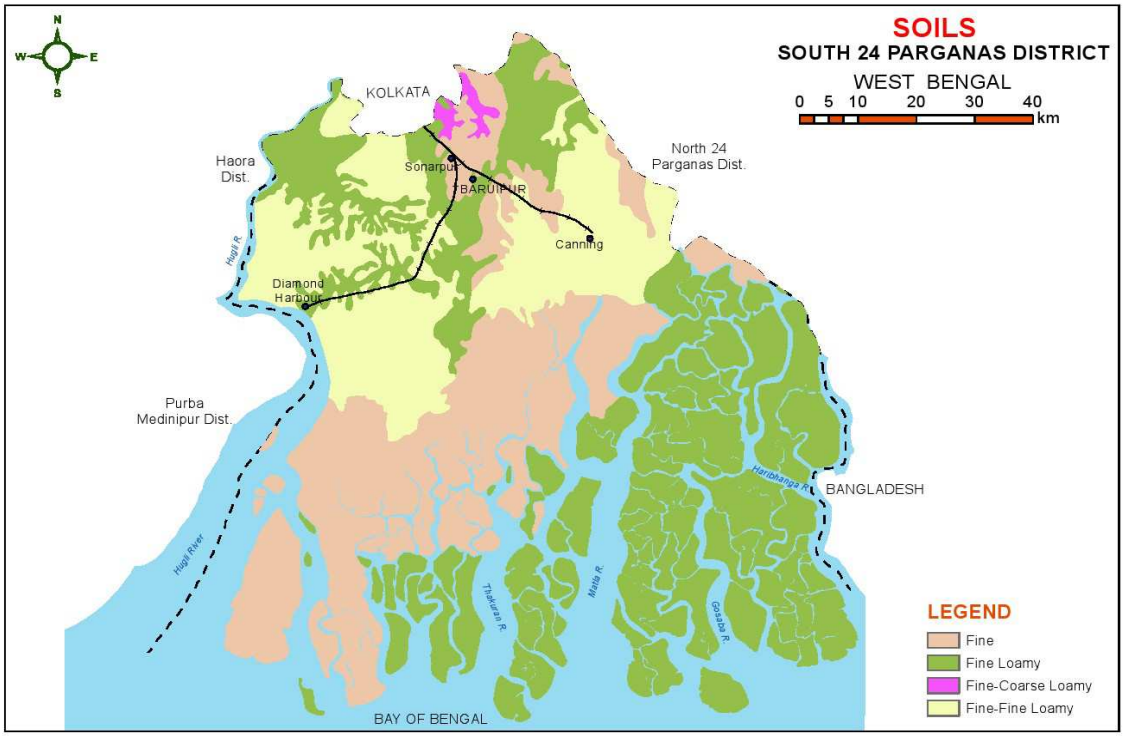
Annexure-II



Mean monthly rainfall of South 24 Parganas district

Annexure-III

Soil Map of South 24 Parganas district



Source: NBSS & LUP Regional Centre, Calcutta

2.0 Strategies for weather related contingencies

2.1 Drought Adopt salt tolerant varieties (Lunishri) and other popular varieties like Sabita, Dudeswar, Swarna Mahsuri, Lalat

2.1.1 Rainfed situation

Condition Early season drought (delayed onset)	**Major Farming Situation**	**Normal crop / cropping system**	**Suggested Contingency Measures**		
			Change in crop / cropping system including variety	**Agronomic measures**	**Remarks on implementation**
Delay by 2 Weeks 3rd week of June	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	No change Adopt salt tolerant varieties (Lunishri) and other popular varieties like Sabita, Dudeswar, Swarna Mahsuri, Lalat	• Transplant 2-3 seedlings/hill	Link NSC,WBSC, and BCKVV, Kalyani for supply of seed
		Rice- Pulse / Oilseed / Vegetable	No change. Prefer short duration rice varieties (Shatabdi, Khitish, Ranjit) and paira (relay) cropping with lathyrus, lentil	-do-	
Delay by 4 Weeks 1st week of July	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	No change Adopt salt tolerant varieties (Lunishri) and other popular varieties like Sabita, Dudeswar, Swarna Mahsuri, Lalat	• Transplant 2-3 seedlings/hill •	
		Rice- Pulse / Oilseed / Vegetable	No change. Prefer short duration rice varieties (Shatabdi, Khitish, Ranjit) and paira (relay) cropping with lathyrus, lentil	-do-	
Delay by 6 Weeks 3rd week of July	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	No change Adopt salt tolerant varieties (Lunishri) and other popular varieties like Sabita, Dudeswar, Swarna Mahsuri, Lalat	Transplant 4-5 seedlings/hill	
		Rice- Pulse / Oilseed / Vegetable	No change. Prefer short duration rice varieties (Shatabdi, Khitish, Ranjit) and paira (relay) cropping with lathyrus, lentil		
Delay by 8 Weeks 1st week of Aug	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	No change Adopt salt tolerant varieties (Lunishri) and other popular varieties like Sabita, Dudeswar, Swarna Mahsuri, Lalat	Transplant 4-5 seedlings/hill	
		Rice- Pulse / Oilseed / Vegetable	No change. Prefer short duration rice varieties (Shatabdi, Khitish, Ranjit) and paira (relay) cropping with lathyrus, lentil		

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	• Weeding • Take up gap filling with available nursery or by splitting the tillers from the surviving hills	Life saving irrigation through farm pond wateror alternative means (fertigation)	• Link NSC,WBSC, and BCKVV, Kalyani for supply of seed • Link with watershed programme and NREGSto implement farm pond technology
		Rice- Pulse / Oilseed / Vegetable	-do-	-do-	

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) At vegetative stage	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	• Weeding • Take up gap filling with available nursery or by splitting the tillers from the surviving hills	• Life saving irrigation (fertigation) • Avoid top dressing of nitrogen during the dry spell. • Apply50 kg N/ha after relief of dry spell	Link with watershed programme and NREGS to implement farm pond technology
		Rice- Pulse / Oilseed / Vegetable	-do-	-do-	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy	Rice – Fallow	Weeding Life saving irrigation (fertigation) In case of failure of rice, broadcast pulses (black gram)	Avoid top dressing of nitrogen during the dry spell. Apply50 kg N/ha after relief of dry spell-	Link with watershed programme and NREGS for Farm

	soils	Rice- Pulse / Oilseed / Vegetable	-do-	-do-	pond technology

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
Terminal drought (Early withdrawal of monsoon)	Lower Indo-Gangetic alluvial plains clay / clay loams / loamy soils	Rice – Fallow	Life saving irrigation	Plan for early rabi crops like wheat, oilseeds (sunflower/mustard/Linseed), pulses (black gram,Lathyrus) and, vegetables(dry-chillies)	Link NSC,WBSC, and BCKVV, Kalyani for supply of seed
		Rice- Pulse / Oilseed / Vegetable	-do-	-do-	

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	Not Applicable				
Limited release of water in canals due to low rainfall	Not Applicable				
Non release of water in canals under delayed onset of monsoon in catchment	Not applicable				
Lack of inflows into tanks due to insufficient rainfall in catchments	Not applicable				
Insufficient groundwater recharge due to low rainfall	Not applicable				

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 out excess water Gap filling from seedlings raised from Community rice nurseries or by splitting the tillers from the surviving hills	Drain out excess water Apply recommended dose of nutrients after draining out excess water	Spray 2% brine solution to prevent pre-mature seed germination In case of lodged plants by spraying 2% salt solution	Drain out excess water and spread sheves loosely in the field or field bunds or Shift produced to safer place spray 2% brine solution to prevent premature field germination of seeds Dry the grain to proper moisture content before bagging and marketing
Horticulture				
Betel vine	Drain out excess water Staking the plants	- Drain out excess water Staking the plants	Drain out excess water Staking he plants	
Condition-Heavy rainfall with high speed winds in a short span				
Rice	Drain out excess water Postpone top dressing of fertilizer till water recedes Gap filling from seedlings raised from Community rice nurseries	Drain out excess water Postpone top dressing of fertilizer till water recedes	Drain out excess water Spray 2% brine solution to prevent pre-mature seed germination In case of lodged plants by spraying 2% salt solution	Spray 2% brine solution to prevent premature field germination of seeds Dry the grain to proper moisture content before bagging and marketing
Condition-Outbreak of pests and diseases due to unseasonal rains				
Rice	Need based plant protection measures to adopted	Protect against bacterial leaf blight with hexaaconazole	Pre Protect against bacterial leaf blight with hexaaconazole Spray carendazim 0.1% to prevent seed discoloration/grain spot	Spray 2% brine solution to prevent premature field germination of seeds Dry the grain to proper moisture content before bagging and marketing
Horticulture				

Cauliflower	Spraying of Prophenophos @ 0.1% or Cypermethrin @ 0.1% to Control cabbage borer or diamond back moth	Spraying the crop with Copper-oxychloride (0.4%) or Mancozeb (0.25 %)/ Chlorothalonil (0.2%) or Difenconazole (0.5g/lt) with sticker at 10 days interval to prevent curd blight.	-	-
Okra	Four spraying of systemic insecticides starting from 20 days after sowing at 10 days interval	Spraying the crop with Cypermethrin @ 0.1% to control fruit borer	-	-
Cucurbits	Two sprays of 0.25% Fosetyl Al or Cyamoxanil- Mancozeb or Metalaxyl- Mancozeb at 10 days interval effectively control downy mildew disease.	-	-	-
Chillies	Spraying of Prophenophos @ 1ml/litre/ Diafenthiuron @ 1 g/litre/ Prlopergite @1 g/litre for the control of thrips and mites at 15-20 days interval	Spray COC30g+1g streptocycline in 10 liters of water, 2-3 times against the bacterial leaf spot and blight	Spray carbendazim 0.1% to control fruit rot	Quick drying of produce to prevent root -rot

2.3 Floods

Condition - Transient water logging/ partial inundation[1]				
Crop	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Crop maturity**	**Post harvest**
Rice (Aman)	• Drain out excess water at earliest • Delayed sowing of seed • Prefer submergence tolerant varieties (swarn sub) Gap filing from seedlings raised from Community rice nurseries or by splitting the tillers from the	• Drain out excess water at earliest • Delayed sowing of seed • Prefer submergence tolerant varieties (swarn sub) Gap filing from seedlings raised from Community rice nurseries or by splitting the tillers from the	• Drain out excess water at earliest • Take need based plant protection measures	Drain out excess water and spread sheves loosely in the field or field bunds or Shift produced to safer place Spray 2% brine solution to prevent premature field germination of seeds or Spray 5% common salt on

	surviving hills • Correct micronutrient deficiencies like Zn and Fe by foliar application of 0.2% ZnSO4 and FeSO4 two to three times at 4-5 days interval	surviving hills • Correct micronutrient deficiencies like Zn and Fe by foliar application of 0.2% ZnSO4 and FeSO4 two to three times at 4-5 days interval		panicles to prevent germination and spoilage of straw from moulds • Dry the grain to proper moisture content before bagging and marketing
Horticulture				
Condition-Continuous submergence for more than 2 days				
Rice	• Drain out excess water at earliest • Delayed sowing of seed • Prefer submergence tolerant varieties (swarn sub) Gap filing from seedlings raised from Community rice nurseries or by splitting the tillers from the surviving hills • Correct micronutrient deficiencies like Zn and Fe by foliar application of 0.2% ZnSO4 and FeSO4 two to three times at 4-5 days interval	• Drain out excess water at earliest • Delayed sowing of seed • Prefer submergence tolerant varieties (swarn sub) Gap filing from seedlings raised from Community rice nurseries or by splitting the tillers from the surviving hills • Correct micronutrient deficiencies like Zn and Fe by foliar application of 0.2% ZnSO4 and FeSO4 two to three times at 4-5 days interval	• Drain out excess water at earliest • Take need based plant protection measures	Drain out excess water and spread sheves loosely in the field or field bunds or Shift produced to safer place Spray 2% brine solution to prevent premature field germination of seeds or Spray 5% common salt on panicles to prevent germination and spoilage of straw from moulds Dry the grain to proper moisture content before bagging and marketing

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /<u>Cyclone</u>

Extreme event type	**Suggested contingency measure**				
	Seedling / nursery stage	**Vegetative**	**Flowering**	**Crop maturity**	**Post harvest**
Heat Wave	Not applicable				
Cold wave	Not applicable				
Frost	Not applicable				
Heat Wave	Not applicable				

Cold wave	Not applicable				
Cyclone					
Rice	• Double transplanting • Raising community nurseries • Go for salt tolerant and submergence tolerant crops	-	Rabi crop planning	Rabi crop planning	Shift produce to safer place
Horticulture					
Betel vine	Replanting	• Propping and staking • Harvesting and marketing			
Sea Water intrusion					
Rice	Go for salt tolerant varieties Reclaim saline soil by raise green manure crops (Sesbania) in summer Strengthening of embankments	Ponding fresh water for leaching of salts wherever available			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[$]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Cultivation of perennial fodder in waste lands and on the bank of the rivers/ponds; preparation of hay & silage of excess left over fodder,, Community or Group approach for fodder cultivation Insurance of livestock Alert nearby Govt. fodder farms to stock straw	Feed fodder from nearby Govt. fodder farms, perennial fodder, prepared hay or silage etc. Collect fodder from nearby less affected areas Feed region specific concentrated feed supplements	Claim insurance Feed supplements Cull the unproductive stock
Drinking water	Dig bore well & establish water reservoir from the ground water or river on community basis	Use water from dig well, river or other water reservoirs	Creation of awareness for water conservation in water sheds
Health and disease management	Make alert for the Govt. & Non-Govt departments for adequate storage of medicines, vaccines, saline/dextrose	Organize health camp, treatment of animals, Use stress relieving medicines & protect	Treat sick animals Cull permanently unproductive

	Organize awareness camp	animal houses from extreme hot air	animals
Floods			
Feed and fodder availability	Stock dry straw in the nearby Govt. fodder farms, ask the private parties to stock straw, Preparation of hay & silage of excess left over fodder for use in natural disadvantageous situation, Insurance of livestock Alert nearby Govt. fodder farms to stock straw Constitute Departmental Disaster Management Committee at the Block, Sub-division & District level for planning management action Cancel leaves for the employees	Supply fodder from nearby Govt. fodder farms, private parties, prepared hay or silage, community fodder bank etc. Feed region specific concentrated feed supplements Establish Control Room at the Block, Sub-division & District level for prompt management action	Claim insurance Feed supplements Cull the unproductive stock Creation of awareness
Drinking water	Establish water reservoir from the ground water or river on community basis Digging shallow tube wells in the vicinity of farms	Use water from dig well, river or other water reservoirs, In devastating areas use ground water after local people	Ground water disinfection Use disinfection of nearby water sources
Health and disease management	Make alert for the Govt. & Non-Govt departments for adequate storage of medicines, vaccines, saline/dextrose Organize awareness camp Utilize Departmental Disaster Management Committee at different levels for prevention & therapy of animals	Organize health camp, treatment of animals, Mass use of protective and curing medicines for gut sterilization Use Departmental Disaster Management Committee at different levels for prompt therapy	Treat sick animals Cull permanently unproductive animals
Cyclone			
Feed and fodder availability	Stocking of green and dry fodder in Govt. & Private farms. Insurance of livestock Better forecasting for fodder farms Constitute Departmental Disaster Management Committee	Supply fodder from nearby Govt. fodder farms, private parties, prepared hay or silage, community fodder bank etc. Feed region specific concentrated feed supplements Establish Control Room at the Block, Sub-division & District level for prompt management action	Claim insurance Feed supplements Cull the unproductive stock Introduce new stock from the unaffected areas
Drinking water	Establish water reservoir on community basis	Use water from safe source	Ground water disinfection Use disinfection of nearby water

			sources
Health and disease management	Make alert for the Govt. & Non-Govt. departments for adequate storage of medicines, vaccines, saline/dextrose Organize awareness camp Utilize Departmental Disaster Management Committee at different levels for prevention & therapy of animals	Organize health camp, treatment of animals, Mass use of protective and curing medicines for gut sterilization Use Departmental Disaster Management Committee at different levels for prompt therapy	Treat sick animals Cull permanently unproductive animals
Heat wave and cold wave			
Shelter/environment management	Preparation of animal houses on scientific manner Plant the trees giving shed to the houses Use protection of curtains over the windows	Use window curtains made up of locally available materials	Creation of awareness on scientific management practices
Health and disease management	Store medicine, saline etc.	Administer stress removing medicaments	Awareness on disease control

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Insurance Bank linkage Instruct Govt. feed supplies to stock feed for urgency	Feed from stocked feed	Avail insurance	ASCAD
Drinking water	Install bore well In city area seek drinking water supply	Use drinking water from different kind of water reservoirs	Use disinfection and sterilization of drinking water	
Health and disease management	Emergency preparedness of Govt. department Organise awareness camp Formulate Departmental Disaster Management Committee at Block, Sub-	Organise mass health camp & treat birds Utilize Departmental Disaster Management Committee for prompt therapy & control of	Culling of affected birds & subsequent disposal	

	division & District levels for proper planning & give requisition of medicine, vaccines, biologicals beforehand for the Govt. supplies Bio-security measures must be in action for prevention of emerging diseases to obstacle in the transmission of disease	diseases		
Floods				
Shortage of feed ingredients	Emergency preparedness for Govt. feed plants and also for non-Govt. companies	Supply from nearby Private or Govt. feed plants	Cull dead and affected birds and subsequently to be buried in isolated place	
Drinking water	Sterilization of drinking water. Dig deep tube wells.	Use water from dig well after disinfection & supply it	Awareness on hygienic water conservation	
Health and disease management	Emergency preparedness of Govt. department Organise awareness cap	Organise mass health camp & treat birds	Culling of affected birds & subsequent disposal	
Cyclone				
Shortage of feed ingredients	Arrangement of poultry feed ingredients and more production of poultry feed for future usage	Ample supply of poultry feed in the affected areas	Awareness on preparation of poultry feed using unconventional feed ingredients and	
Drinking water	Arrangements of hygienic potable water and conservation of water	Ample supply of safe water	Awareness of water conservation	
Health and disease management	Group Insurance or Community Insurance for affected animals against diseases of birds. Mass vaccination.	Adopt scientific rearing practices. Supply of medicines and vaccines	Awareness on poultry disease prevention & control in natural disaster	
Heat wave and cold wave				
Shelter/environment management	Construct houses at safe place for emergency housing of poultry birds at district level at least	Avoid further spread of disease by housing the birds in the safe location outside the infected zone	Re-introduce birds from unaffected areas	
Health and disease	Preparedness for timely supply of	Ample supply of medicines &	Creation of awareness on	

management	medicines/vaccines/biologicals is essential	vaccines	scientific manage mental practices and control of diseases	

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Negligible impact	Negligible impact	Negligible impact
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 pond from tube well / river etc.	Control of pond water quality parameters and maintenance of optimum level of planktons (fish food) in the pond through proper fertilization (if required)	Suggested for disinfection of pond water through liming and periodic netting to assess the biomass.
(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	Negligible impact	Negligible impact	Negligible impact
Inland			
(i) Average compensation paid due to	Creating awareness among the	Advise to shift to high land / flood	Monetary compensation to the affected

loss of human life	fishermen on emergency strategies to be adopted in the case of flood.	shelter camps to save life.	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	Develop better forecasting system on cyclone / tsunami	Advising fishermen not to venture in to the sea	Arranging relief for the affected fisherman
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 water / brackish water ratio)	Not applicable (No brackish water source nearby)	Not applicable (No brackish water source nearby)	Not applicable (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. Take appropriate treatment for the diseased fish after consulting fishery expert / Fishery Extension Officer.	Watch out for health status of fish stock through netting.
(iii) Any other	Nil	Nil	Nil

[a] based on forewarning wherever available