State: WEST BENGAL

Agriculture Contingency Plan for District: BARDHAMAN

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 plateau (chhotanagpur) And Eastern Ghats, Hot Subhumid Eco-Region (12.3)		
	Agro-Climatic Zone (Planning Commission)	Lower Gangetic plain region (III)		
	Agro Climatic Zone (NARP)	Old Aluuvial Zone (WB-3)		
	List all the districts or part thereof falling under the NARP Zone	Burdwan, Dakshin Dinajpur and Hooghly, Bankura, Birbhum, Haora, Malda, Midnapur(west), Murshidabad, , Nadia, Purulia, Uttar dinajpur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		23º 13’ 56.75” N	87º 51’ 49.43” E	36m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station (NAZ) BCKV, Gayeshpur, Dist-Nadia, West Bengal,-741234		
	Mention the KVK located in the district	Budbud KVK, Distt. Bardhaman-713 403, West Bengal		

1.2	**Rainfall** (Ten years average 1998-2007)	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1048.9	1st week of June	4th week of September
	NE Monsoon(Oct-Dec):	144.7	-	-
	Winter (Jan- Feb)	74.4	-	-
	Summer (Mar-May)	172.9	-	-
	Annual	1440.9	-	-

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)	698.8	470.5	21.2	206.0	0.32	7.6	1.2	1.04	7.40	1.96

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area (‘000 ha)**	**Percent (%) of total**
	1. Loamy	357.6	51.2
	2. Gravelly loamy	42.3	6.1
	3. Clayey	37.6	5.4
	4. Clayey loamy	28.2	4.0
	5. Loamy sandy	4.7	0.7

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	452.0	184
	Area sown more than once	380.1	
	Gross cropped area	832.1	

1.6	Irrigation	Area (‘000 ha)		
	Net irrigated area	331.6		
	Gross irrigated area	693.3		
	Rainfed area	138.8		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	-	296.0	89.2
	Tanks	-	-	-
	Open wells	-	-	-
	Bore wells	-	-	-
	Lift irrigation schemes	1116.0	35.6	10.7
	Micro-irrigation	-	-	-
	Other sources (please specify)	-	-	-
	Total Irrigated Area	-	331.6	99.9
	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 0.062-0.40 mg/lit
	Critical	-	-	Arsenic depth range 32-100 mbgl

	Semi- critical	5	-	-
	Safe	11	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	Arsenic contamination in 5 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) (2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer irrigated**	**Grand total**
	Rice	-	17.6	17.6	414.5	-	414.5	203.7	635.8
	Wheat	-	-	-	2.2	-	2.2	-	2.2
	Pulses	-	-	-	1.5	-	1.5	-	1.5
	Oilseeds	-	11.1	11.1	-	-	-	-	11.1
	Jute	-	54.4	54.4	-	-	-	-	54.4
	Potato	-	-	-	50.6	-	-	-	50.6

	Horticulture crops - Fruits	**Area ('000 ha)**
		Total
	Mango	3.8
	Banana	1.0
	Papaya	0.5
	Guava	0.7
	Jackfruit	0.6
	Horticulture crops - Vegetables	**Total**
	Brinjal	8.2
	Cabbage	3.3
	Cauliflower	3.2
	Cucurbits	13.0
	Ladies fingers	5.1
	Tomato	2.7

	Medicinal and Aromatic crops	-
	Plantation crops	-
	Fodder crops	-
	Total fodder crop area	-
	Grazing land	-
	Sericulture	-
	Others (specify)	-

1.8	**Livestock (2007-08)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	467.5	1,019.5	1,487.0
	Crossbred cattle	48.5	195.2	243.7
	Non descriptive Buffaloes (local low yielding)	67.8	52.5	120.3
	Graded Buffaloes	-	-	-
	Goat	-	-	1408.3
	Sheep	-	-	175.7
	Others (Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)	-	-	-
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	Broiler-1064, Improved Layer-33	In Farm: Broiler-1748563, Layer-206200, Duck-8571 [District Total of Improved strains Fowl-2374218, Duck-102526, Quail-120, Other-26028]	
	Backyard	Fowl-68, Duck (commercial + backyard)-22	In Farm: Deshi Total Fowl-18431, Duck-8571 [District Total of Deshi Fowl-2250018, Duck-1676308]	

1.10	**Fisheries** (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		No. Farmer owned ponds (Under FFDA Scheme up to 08-09)	No. of Reservoirs	No. of village tanks			

	ii) Inland (Data Source: Fisheries Department)	No. of Farmer: 21803 Area of Pond (ha.) : 13031.24		1 No. (266.00 ha.)		Record not available		
		-		-		-		
	B. Culture							
		Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**		
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	Nil				18 ton prawn (freshwater) (2008-09)		
	ii) **Fresh water** (Data Source: Fisheries Department)	Culturable area: 20618.79 ha. Semi-Derelict area: 7386.63ha. Derelict area: 3189.49 ha. Total area: 31194.91 ha.		From Ponds under FFDA Scheme = 4.4 t/ ha.		115174 ton Fish (2008-09) Fish Seed Production (08-09) = 1024 million		
	Others	(River) 795.63 ha. (Canal) 5695.85 ha. (Beel/Baor) 632.16 ha.		-		-		

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								
	Rice	48.1	3069	1231.1	2953	642.5	3129	1921.7	3012
	Wheat	-	-	6.7	2313	-	-	6.7	2313
	Pulses	-	-	1.2	849	-	-	1.2	849
	Oilseeds	-	-	43.1	850	-	-	43.1	850
	Jute	223.0	3019	-	-	-	-	223.0	3019
	Potato	-	-	1058.0	21674	-	-	1058.0	21674
	Major Horticultural crops								
	Cucurbits	-	-	126.0	9687	-	-	126.0	9687
	Brinjal	-	-	145.2	17767	-	-	145.2	17767
	Cabbage	-	-	92.7	28513	-	-	92.7	28513
	Cauliflower	-	-	85.9	27167	-	-	85.9	27167
	Okra	-	-	55.8	11330	-	-	55.8	11330

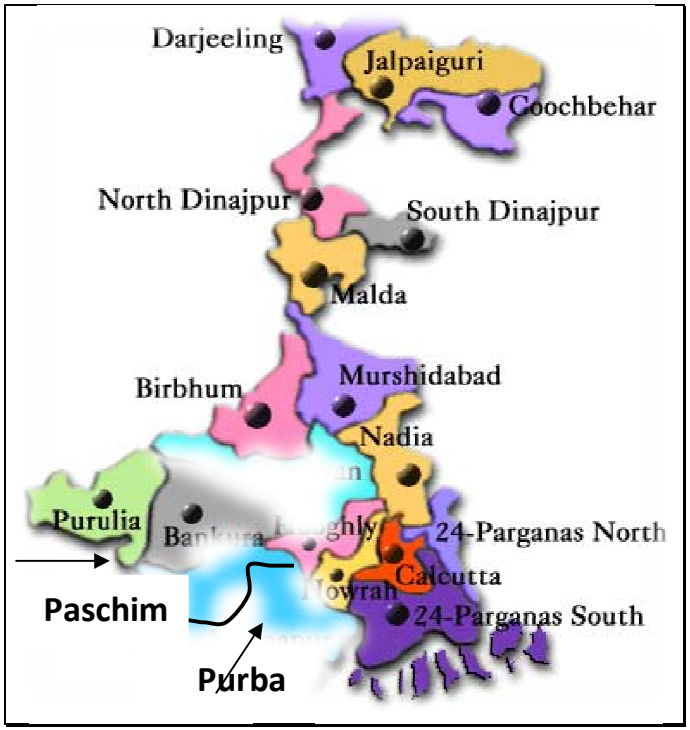
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Potato	Oilseed	Jute	Vegetables
	Kharif- Rainfed	July 1st to 4th week	-	-	March 4th week to April 3rd week.	Throughout the year
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	Jan. 3rd to 4th week	Nov.1st to 2nd week	Nov. 1st to3rd wk.	-	-

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)	√	-	-
	Others (specify)	-	-	√

1.14	**Include Digital maps of the district for**	Location map of district within State, Annexure I	Enclosed: Yes
		Agro-climatic Zones of West Bengal, Annexure 2	Enclosed: Yes
		Mean annual rainfall, Annexure 3	Enclosed: Yes
		Soil map of West Bengal, Annexure 4	Enclosed: Yes

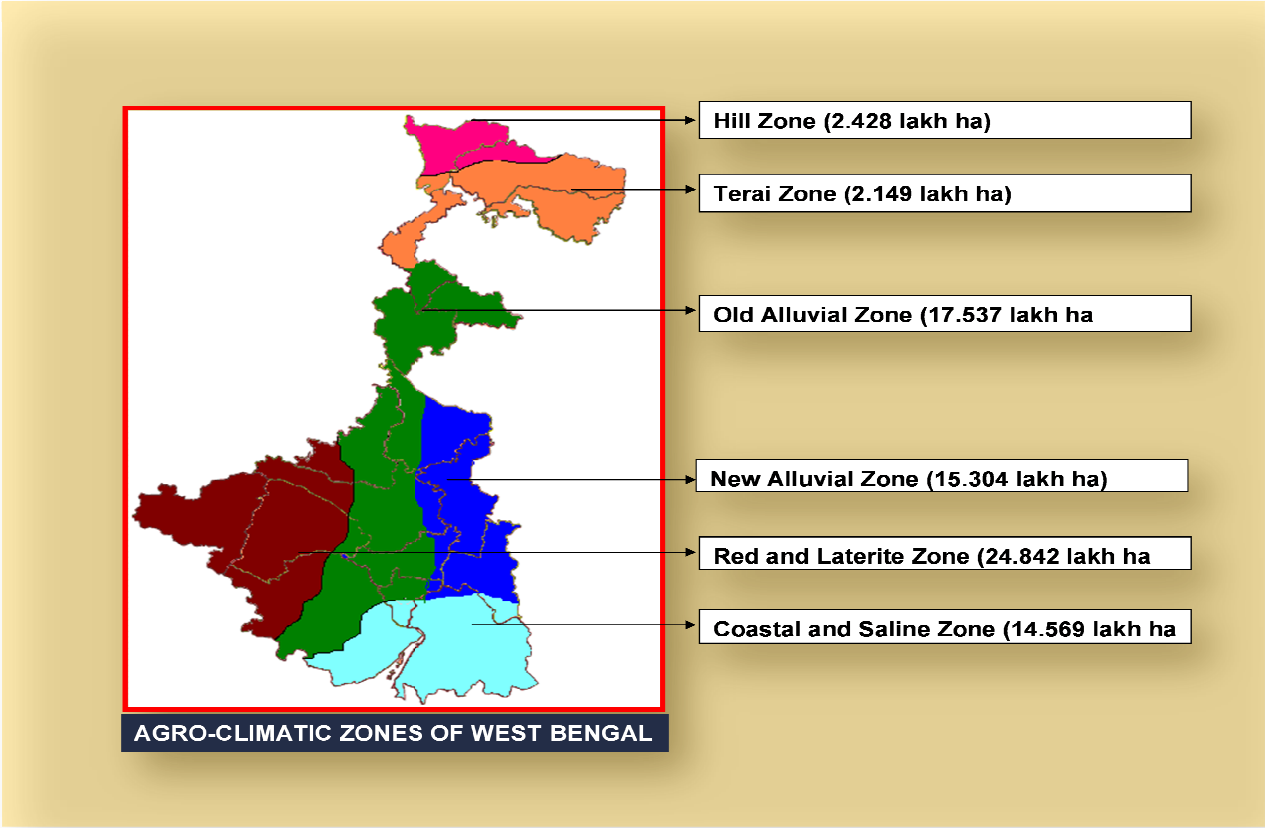
Annexure –I

Location map of Bardhaman district

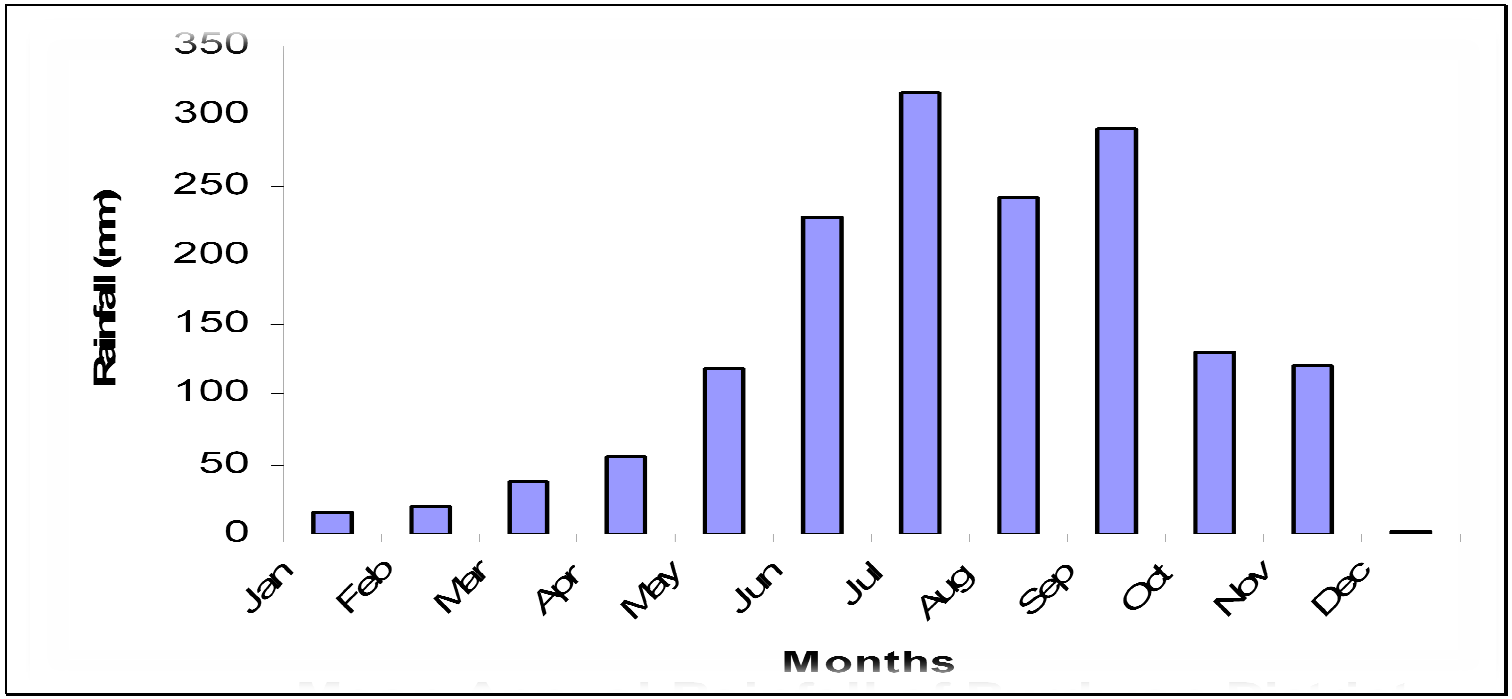


Annexure –II

Agro-climatic Zones of West Bengal



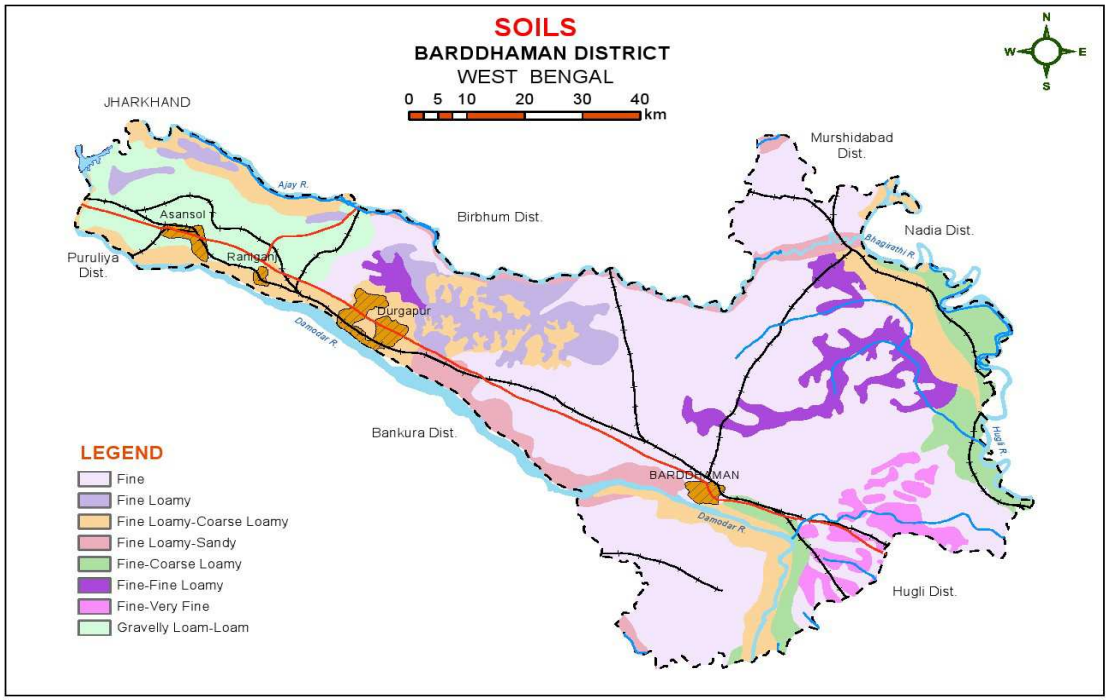
Annexure – III



Mean monthly rainfall of Bardhaman district (1998 -2007)

Annexure-IV

Soil map of Bardhaman 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 loamy soils Gangetic New Alluvial Plains High Rainfall (>1500 mm)	Rice-Pulse(Lentil/ Lathyrus)	No change. Prefer short duration varieties (Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	Adopt SRI method of cultivation	Link NSC,WBSC, and BCKVV, Kalyani for supply of seed
		Rice-Jute	No change. Adopt short duration HYV of Rice – Shatabdi, Khitish	-do-	
		Rice-Mustard	No change. Prefer short duration varieties (Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	-do-	
		Rice-Vegetables-Sesame	No change. Prefer short duration varieties (Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	-do-	

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	Deep loamy soils Gangetic New	Rice-Pulse (Lentil/Lathyrus)	No change. Prefer short duration varieties **(**Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	Adopt SRI method of cultivation	Link NSC,WBSC, and BCKVV, Kalyani for supply of seed
		Rice-Jute	No change. Adopt short duration	-do-	

July	Alluvial Plains		HYV of Rice (Shatabdi, Khitish)		
		Rice-Mustard	No change. Prefer short duration varieties **(**Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	-do-	
		Rice-Vegetables-Sesame	No change. Prefer short duration varieties **(**Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna)	-do-	

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 loamy soils Gangetic New Alluvial Plains	Rice-Pulse(Lentil/ Lathyrus)	No change (Shatabdi, Khitish, Swarna Mahsuri, Sada Swarna) Alternatively prefer vegetables like brinjal (Muktakeshi, Makra) / Chillies (Surya mukhi, Jwala, BCCH SL-4)	Adopt SRI method of cultivation	• Link NSC,WBSC, and BCKVV, Kalyani for supply of seed • Link farm pond technology with watersheds, NREGS.
		Rice-Jute	No change. Adopt short duration HYV of Rice (Shatabdi, Khitish)	Adopt SRI method of cultivation Weeding in rice and jute	
		Rice-Mustard	No change Adopt short duration HYV of Rice (Shatabdi, Khitish	-do-	
		Rice-Vegetables-Sesame	No change Adopt short duration HYV of Rice (Shatabdi, Khitish	-do-	

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 1st week of August	Deep loamy soils Gangetic New Alluvial	Rice-Pulse (Lentil/Lathyrus)	Replace kharif rice, prefer brinjal (Muktakeshi, Makra) / Chillies (Surya mukhi, Jwala, BCCH SL-4), Greengram (Samrat -PDM 84-139; IPM-02-03, Bireswar, Sukumar)	Adopt SRI method Transplant 3-4 seedlings/hill	• Link NSC,WBSC, and BCKVV, Kalyani for supply of seed • Link farm pond

	Plains		/Blackgram (Pant U-31, 19, WBU-108 - Sharada, WBU-109 Sulota), kharif Maize		technology with watersheds and NREGS.
		Rice-Jute	-do-	Separation of Jute fibre by Ribbon method followed by retting of fibre with microbial culture in tank	
		Rice-Mustard	-do-	Adopt SRI method Transplant 3-4 seedlings/hill	
		Rice-Vegetables-Sesame	-do-	-do-	

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Deep loamy soils Gangetic New Alluvial Plains	Rice - Pulse(Lentil/ Lathyrus) /Jute / Mustard / Vegetables	• Take up gap filling with available nursery or by splitting the tillers from the surviving hills • Weeding	• Adopt SRI method of cultivation • Transplant 3-4 seedlings/hill	• Linkage with Agricultural Farms 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.
		Rice-Jute	-do-	-do-	
		Rice-Mustard	-do-	-do-	
		Rice-Vegetables-Sesame	-do-	-do-	

Condition	**Suggested Contingency measures**				
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Mid season dry spell at Vegetative stage	Deep loamy soils Gangetic New Alluvial Plains	Rice - Pulse (Lentil/Lathyrus) /Jute / Mustard / Vegetables	• Gap filling with the seedlings from available community nursery • Weeding	• Adopt SRI method of cultivation • Transplant 3-4 seedlings/hill	• Linkage with Agricultural Farms 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
		Rice-Jute	-do-	-do-	
		Rice-Mustard	-do-	-do-	
		Rice-Vegetables-Sesame	-do-	-do-	

Condition	**Suggested Contingency measures**				
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Mid season dry spell at Flowering stage	Deep loamy soils Gangetic New Alluvial Plains	Rice - Pulse(Lentil/Lathyrus) /Jute / Mustard / Vegetables	• Weeding • In case of failure of rice, broadcast pulses (blackgram) Adopt SRI method of cultivation	• Transplant 3-4 seedlings/hill • Life saving irrigation (fertigation)	Link with watersheds NREGS programmes for support of farm pond technology
		Rice-Jute	-do-	-do-	
		Rice-Mustard	-do-	-do-	

		Rice-Vegetables-Sesame	-do-	-do-	

Condition	**Suggested Contingency measures**				
Terminal drought (Early withdrawl of monsoon)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
	Deep loamy soils Gangetic New Alluvial Plains	Rice - Pulse(Lentil/Lathyrus) /Jute / Mustard / Vegetables	Life saving irrigation	Plan for early rabi crops like oilseeds, pulses, vegetables	
		Rice-Jute	-do-	-do-	
		Rice-Mustard	-do-	-do-	
		Rice-Vegetables-Sesame	-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 /delayed onset of monsoon	Tube-well irrigated lowland alluvial soil	Rice-rice-rice	No change Alternatively: Rice + Lathyrus as paira cropping	• Starter dose of 2% DAP to Lathyrus • Dapog method of nursery for rice and adopt SRI method of cultivation	• Linkage with Agricultural Farms under Department of Agriculture, Govt. of WB, Regional Research Station, UBKV, Majhian and KVK at Chopra for supply of seed • Machine for Zero tillage under NFSM
	Tube-well irrigated medium land alluvial soil	Rice-potato-sesame	Rice-lentil (Asha, Ranjan) groundnut (TAG-51, Tag-24)/sesame (Kanke white, Rama) /Green gram (Samrat)	• Dapog method of nursery for rice • Adopt SRI method of cultivation • Prefer ridge and furrow system for groundnut	
		Rice-rapeseed-rice	Rice-rapeseed (B-9)sesame (Rama)	• Dapog method of nursery for rice • Adopt SRI method of cultivation	
		Rice-Wheat	No change	Zero till for wheat	
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 t 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 • Allow the crop to dry completely before harvesting	• Draint excess water and spread sheaves loosely in the fields or field bunds where there is no stagnation or • Spray 2% brine solution to prevent premature germination in field. • Dry the grain to proper moisture

				content before bagging and storage
Potato	Drain excess water	Drain excess water	• Drain excess water • Harvest the produce on a clear sunny day after the water recedes	Keep the harvested produce in shed for aeration
Mustard	Drain excess water Inter cultivation at optimum moisture condition to loosen and aerate the soil and to control weeds	Drain excess water Inter cultivation at optimum moisture condition to loosen and aerate the soil and to control weeds	• Drain excess water • Allow the crop to dry completely before harvesting	Dry the produce to proper moisture content before bagging and storage
Sesame	-do-	- do -	-do-	-do-
Jute	-do-	-do-	-do-	Immediately after harvesting, go for retting
Wheat	-do-	-do-	-do-	-do-
Pulses	-do-	-do-	-do-	-do-
Horticulture				
Cauliflower	• Drain excess water • Three sprays of 0.1% Ammonium molybdate 15, 30 and 45 days after transplanting	• Drain excess water • Blanching i.e. covering the curd through tying the outer leaves up over the curd improves curd color and quality.	• Drain excess water • Harvest on clear sunny day	Large leaves are trimmed away leaving only sufficient jacket leaves to protect the curd from bruising and other mechanical injury in transport.
Cabbage	-do-	-do-	-do-	-do-
Brinjal	-do-	-do-	-do-	-do-
Condition- Heavy rainfall with high speed winds in a short span				
Boro rice	Drain excess water	Drain excess water	Spray brine (2%) solution to prevent field germination	Dry the grain to proper moisture content before bagging and storing
Cauliflower	Drain excess water	Drain excess water	Drain excess water-	-

		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.		
Cabbage	-do-	Spraying the crop with Cypermethrin @ 0.1% with sticker to control Cabbage borer	-do-	-
Okra	-do-	Spraying the crop with Cypermethrin @ 0.1% to control fruit borer	-do-	-
Condition-Outbreak of pests and diseases due to unseasonal rains				
Rice	Protection against blast and sheath blight with hexaconazole or propiconazole @ 1ml/l	Protect against bacterial leaf blight with hexaconazole @1ml/l	Protect against bacterial leaf blight with hexaconazole @1ml/l	Prevent grain discolouration by spraying carbendazim 0.1%
Potato	Spray metalaxyl+mancozeb mixture @2.5g/l twice at 7days interval to protect against late blight disease	Spray metalaxyl+mancozeb mixture @1.5g/l twice at 10days interval to protect against late blight disease	Protection against late blight with carbendazim spray 0.1% immediately after cessation of rain	Dehaulming of affected parts and destroy Severely infected produce is unfit for seed purpose
Mustard	• Spray application of carbaryl 0.1 % or endosulfan 0.07 % or phosalone 0.05% or profenofos 0.05% for the control of mustard saw fly • Early sowing of mustard before 15th October will help to escape the attack of the mustard aphid and economic damage and Spray application of metasystox 0.05% or imidacloprid 0.01% or acetamiprid @ 0.01% also controls the pest	• Spray application of carbaryl 0.1 % or endosulfan 0.07 % or phosalone 0.05% or profenofos 0.05% for the control of mustard saw fly • Early sowing of mustard before 15th October will help to escape the attack of the mustard aphid and economic damage and Spray application of metasystox 0.05% or imidacloprid 0.01% or acetamiprid @ 0.01% also controls the pest		
Horticulture				
Cauliflower	Spraying of Prophenophos @ 0.1%	Spraying the crop with Copper-	-	-

	or Cypermethrin @ 0.1% to Control cabbage borer or diamond back moth with sticker	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 sprayings 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.	-	-	-
Chilli	Spraying of Prophenophos @ 1ml/litre/ Diafenthiuron @ 1 g/litre for the control of thrips and mites at 15-20 days interval	-	-	-

2.3 Floods

Condition- Transient water logging/ partial inundation				
Crop	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice (Aman)	• Drain excess water • Delayed sowing of seed • Growing variety like IET5656 and Nc490 (withstands submergence and late transplanting • Maintain weed free condition	• Drain excess water • Take up gap filling with available seedlings from community nursery • Spray zinc sulphate 0.2% if the crop is affected by floods within 45 days after transplanting	Early rabi crop planning with vegetables, oilseeds etc	• Drain excess water and spread sheaves loosely in the fields or field bunds where there is no stagnation or • Spray 2% brine solution to prevent premature germination in field. • Dry the grain to proper moisture content before bagging and storage
Jute (Olitorius)	• Drain excess water • Inter cultivation at optimum	• Drain excess water • Inter cultivation at optimum soil	• Drain excess water • Allow the crop to dry	Immediately after harvesting, go for retting

	soil moisture condition to loosen and aerate the soil and to control weeds	moisture condition to loosen and aerate the soil and to control weeds	completely before harvesting	
Horticulture				
Cabbage	Raised and poly covered seed bed	Quick drainage and need based plant protection measure to be adopted	-	-
Cauliflower	-do-	-do-	-	-
Brinjal	Protect against damping off with Dithane M 45 @ 2g/l spray	Quick drainage and need based plant protection measure to be adopted	-	
Condition-Continuous submergence for more than 2 days				
Rice	Re-transplanting / double transplanting	-	Early rabi crop planning	-
Horticulture	More than 2 to 3 days submergence will damage all the horticultural crops			
Sea water intrusion	NA			

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

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	Cultivation of perennial fodder (Pusagaint, NB-21, IGFRI-3, IGFRI-6, 7, 10, BN-1, 2, 4, 6 and Co-1, Paragrass)on the bank of the rivers Sowing of cereals (Sorghum/ Maize/Bajra) and leguminous crops Lucerne (Anand-2, T-9, Chetak)/Berseem (Mescavi, wardan etc)/ Rice bean (DagoreRani, S-8, S-9, K-1)/ Cowpea (Russian Giant, UPC-287, UPC 5286, C-30) during North-East monsoon for fodder	Harvest and use biomass of dried up crops material as fodder Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Judicious use of available fodder from fodder banks Concentrate ingredients such as Grains,	Encourage progressive farmers to grow multi cut fodder crops of sorghum (Meethi Sudan, Raj Chari, PC-6, PC-9, PC-23)/maize (African Tall, J 1006, Vijay, Moti, Jawahar)/ Oats (OS-6, Kent, UPO 212, UPO 94, PO 3) Flushing the stock to

	production. Cultivation of JOB'S TEAR OR COIX (Bidhan Coixno. 1, PC-9, PC-23) with summer rains Establishment of village level fodder banks with surplus material Encourage cultivate short-term fodder crops like sunhemp Promote Azola cultivation at backyard Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods	brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Promotion of cultivation of Horse gram as contingent crop and harvesting it at vegetative stage as fodder	recoup Replenish the feed and fodder banks
Drinking water	Establish water reservoir from the ground water or river on community basis Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and disease management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses and milking sheds clean and spray disinfectants Farmers should be

	Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods			
Feed and fodder availability	Preparation of hay & silage of excess left over fodder for use in natural disadvantageous situation, Insurance of livestock In case of early forewarning (EFW), harvest all the crops that can be useful as feed/fodder in future (store properly) Store sufficient dry fodder for the transportation to the flood affected villages Don't allow the animals for grazing if severe floods are forewarned Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations	Supply fodder from nearby Govt. fodder farms, private parties, prepared hay or silage, community fodder bank etc. Establish Control Room at the Block, Sub-division & District level for prompt management action Transportation of animals to elevated areas Proper hygiene and sanitation of the animal shed In severe storms, un-tether or let loose the animals Use of unconventional and locally available cheap feed ingredients for feeding of livestock. Avoid soaked and mould infected feeds / fodders to livestock Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Encouraging farmers to cultivate Short-term fodder crops like sunhemp. Deworming with broad spectrum dewormers Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder. Claim insurance

Cyclone	NA
Heat wave and cold wave	NA

2.5.2 Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.	Use water sanitizers or offer cool hygienic drinking water	Sanitation of drinking water
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD

	maize, broken rice, bajra etc,		
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.	Use water sanitizers or offer cool hygienic drinking water	Sanitation of drinking water
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone	NA		
Heat wave & cold wave	NA		

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 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	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	Placing nets to prevent escape of fish from the culture ponds.	Repair of pond dyke.

	stock before onset of monsoon.		
(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			
4. Heat wave and cold wave	NA		