State: WEST BENGAL

Agriculture Contingency Plan for District: BANKURA

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Western Himalayas, Warm Sub humid (To Humid With Inclusion Of Perhumid) Eco-Region. (12.3) Assam And Bengal Plain, Hot Sub humid To Humid (Inclusion Of Perhumid) Eco-Region. (15.1) Eastern plateau (chhotanagpur) And Easter (12.3)		
	Agro-Climatic Zone (Planning Commission)	Lower Gangetic Plain Region (III)		
	Agro Climatic Zone (NARP)	Red and Laterite Zone (WB-5) Old Alluvial Zone (WB-3)		
	List all the districts or part thereof falling under the NARP Zone	Bankura, Birbhum, Burdwan, Midnapur(west), Murshidabad and Purulia, Dakshin Dinajpur, Haora, Hooghly, Malda, Nadia, Uttar dinajpur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		23º 14' 04.92" N	87^0 04'20.84" E	84 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station (R&L), Zone BCKV, Jhargram, Medinipur (W) - 721 507		
	Mention the KVK located in the district	Sonamukhi KVK, Bankura, Pin–722 207		

1.2	**Rainfall (**Ten year' average 1998-2007)	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	992.4	1st week of June	4th week of September
	NE Monsoon (Oct-Dec):	132.9	-	-
	Winter (Jan- February)	69.00	-	-
	Summer (march-May)	150.4	-	-
	Annual	1344.7	-	-

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)	688.0	383.93	148.9	148	0.7	2.0	2.7	1.7	37.5	1.03

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area (‘000 ha)**	**Percent (%) of total geographical area**
	1. Loamy	307.6	44.7
	2. Gravelly clay loamy	46.7	6.8
	3. Loamy sandy	27.3	4.0
	4. Clayey-loamy	7.8	1.1

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	345.4	164
	Area sown more than once	220.3	
	Gross cropped area	565.7	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	276.9		
	Gross irrigated area	453.3		
	Rainfed area	112.4		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	-	180.3	65.1
	Tanks	20977	33.5	12.1
	Open wells	7106	2.5	0.9
	Bore wells	-	-	-
	Lift irrigation schemes	28468	54.5	19.6
	Micro-irrigation	-	-	-
	Other sources (please specify)	1190	6.28	2.3
	Total Irrigated Area	-	276.9	100
	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	-	-	Fluoride level 1.04-7.26 mg/lit
	Critical	-	-	Depth range for Fluoride 11-39 & above
	Semi- critical	-	-	-
	Safe	9	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	Ground Water contaminated with Fluoride 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 irrigated**	**Grand total**
	Rice	-	20.4	20.4	328.8	-	328.8	67.6	416.8
	Wheat	-	-	-	3.5	-	-	-	3.5
	Pulses	-	-	-	-	0.3	-	-	0.3
	Oilseeds	-	-	-	40.1	-	40.1	-	40.1
	Potato	-	-	-	41.9	-	41.9	-	41.9

	Horticulture crops - Fruits	**Area ('000 ha)**
		Total
	Mango	1.6
	Banana	0.6
	Papaya	0.6
	Guava	0.7
	Jackfruit	0.5
	Horticulture crops - Vegetables	**Total**
	Cucurbits	11.8
	Brinjal	10.0
	Ladies finger	5.7
	Cauliflower	5.3
	Cabbage	4.8
	Tomato	3.2

1.8	Livestock (2007-08)	Male (‘000)	Female (‘000)	Total (‘000)
	Non descriptive Cattle (local low yielding)	631.6	814.1	1,445.7
	Crossbred cattle	26.2	79.6	105.8
	Non descriptive Buffaloes (local low yielding)	74.1	24.6	98.7
	Graded Buffaloes	-	-	-
	Goat	-	-	893.9
	Sheep	-	-	100.8
	Others (Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)	-	-	-
1.9	Poultry	No. of farms	Total No. of birds (‘000)	
	Commercial	Broiler-339, Improved Layer-9	In Farm: Broiler-1557014, Layer-206200 [District Total of Improved strains Fowl-1695913, Duck-42241, Quail-9, Other-13242]	
	Backyard	0	In Farm: Deshi Total Fowl-0, Duck-70000 [District Total of Deshi Fowl-1441338, Duck-687906]	

1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		No. of Farmer: 10155 Area of Pond (ha.) : 6459.84		6 Nos. (Total 408.00 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				4 ton prawn (Freshwater) (2008-09)

	ii) Fresh water (Data Source: Fisheries Department)	Culturable area: 20669.55 ha. Semi-Derelict area: 3810.75ha. Derelict area: 1332.70 ha. Total area: 25813.00 ha.	From Ponds under FFDA Scheme= 4.39 t/ ha.	64061 ton Fish (2008-09) Fish Seed Production (08-09)= 2949 million
	Others	(River) 15930.15 ha. (Canal) 11711.04 ha. (Beel/Baor) 1073.00 ha.		

1.11 Production and Productivity of major crops (Average of last 5 years: 2004 - 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	49.17	2602	906.33	2770	152.83	2636	1108.33	2744
	Wheat	-	-	11.03	2073	-	-	11.03	2073
	Pulses	-	-	0.32	671	-	-	0.32	671
	Oilseeds	-	-	25.35	705	-	-	25.35	705
	Potato	-	-	682.78	19489	-	--	682.78	19489
	Maize	1.44	2352	-	-	-	-	1.44	2352
	Major Horticultural crops (Crops to be identified based on total acreage)								
	Cucurbits	-	-	-	-	-	-	161.43	13703
	Brinjal	-	-	-	-	-	-	194.85	19504
	Okra	-	-	-	-	-	-	64.29	11180
	Cauliflower	-	-	-	-	-	-	145.65	27429
	Cabbage	-	-	-	-	-	-	155.33	32495

1.12	**Sowing window for 5 major field crops**(start and end of normal sowing period)	Rice	Potato	Oilseeds	Wheat	Vegetables
	Kharif- Rainfed	July 1st to 3rd week	-	-	-	-
	Kharif-Irrigated	July 1st to 3rd week	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	January 3rd to 4th week	Nov 2nd to 4th week	Nov 1st to 4th week	Nov 1st to 2nd week	Round the year

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)	-	-	√

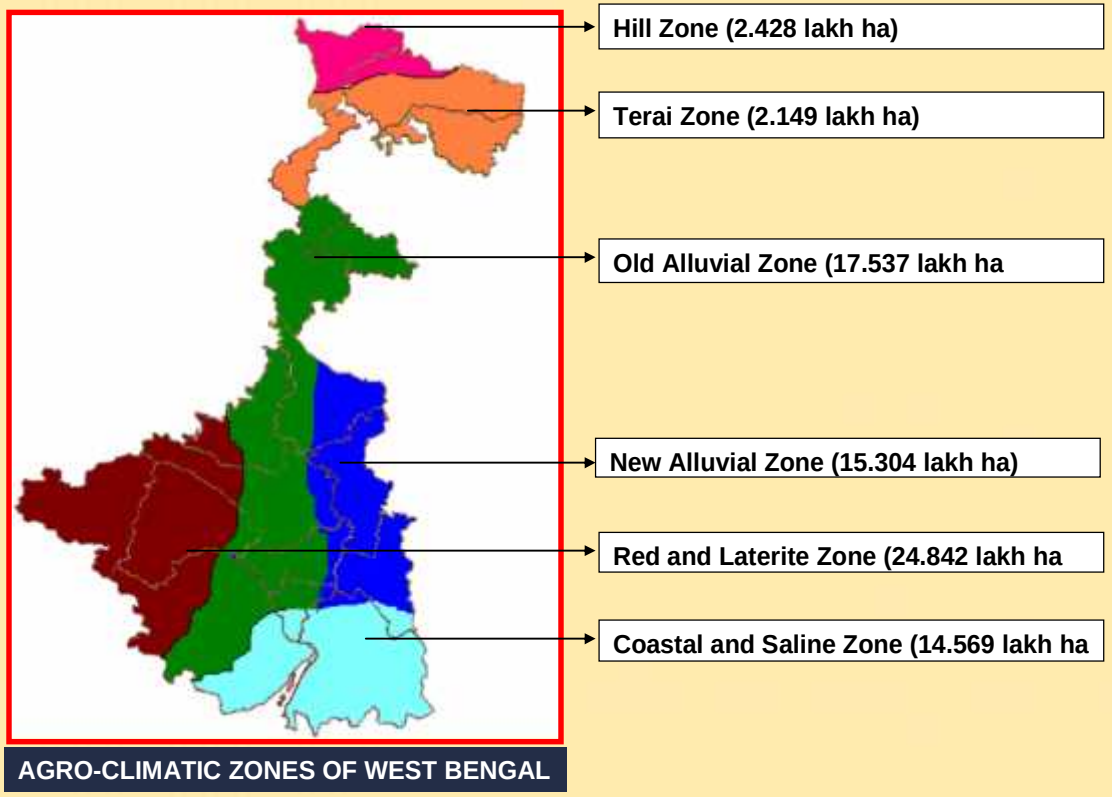
1.14	**Include Digital maps of the district for**	Location map of district within State, Annexure I	Enclosed: Yes
		Agroclimatic Zones of West Bengal, Annexure 2	Enclosed: Yes
		Mean annual rainfall, Annexure 3	Enclosed: Yes
		Soil map West Bengal, Annexure 4	Enclosed: Yes

Annexure –I

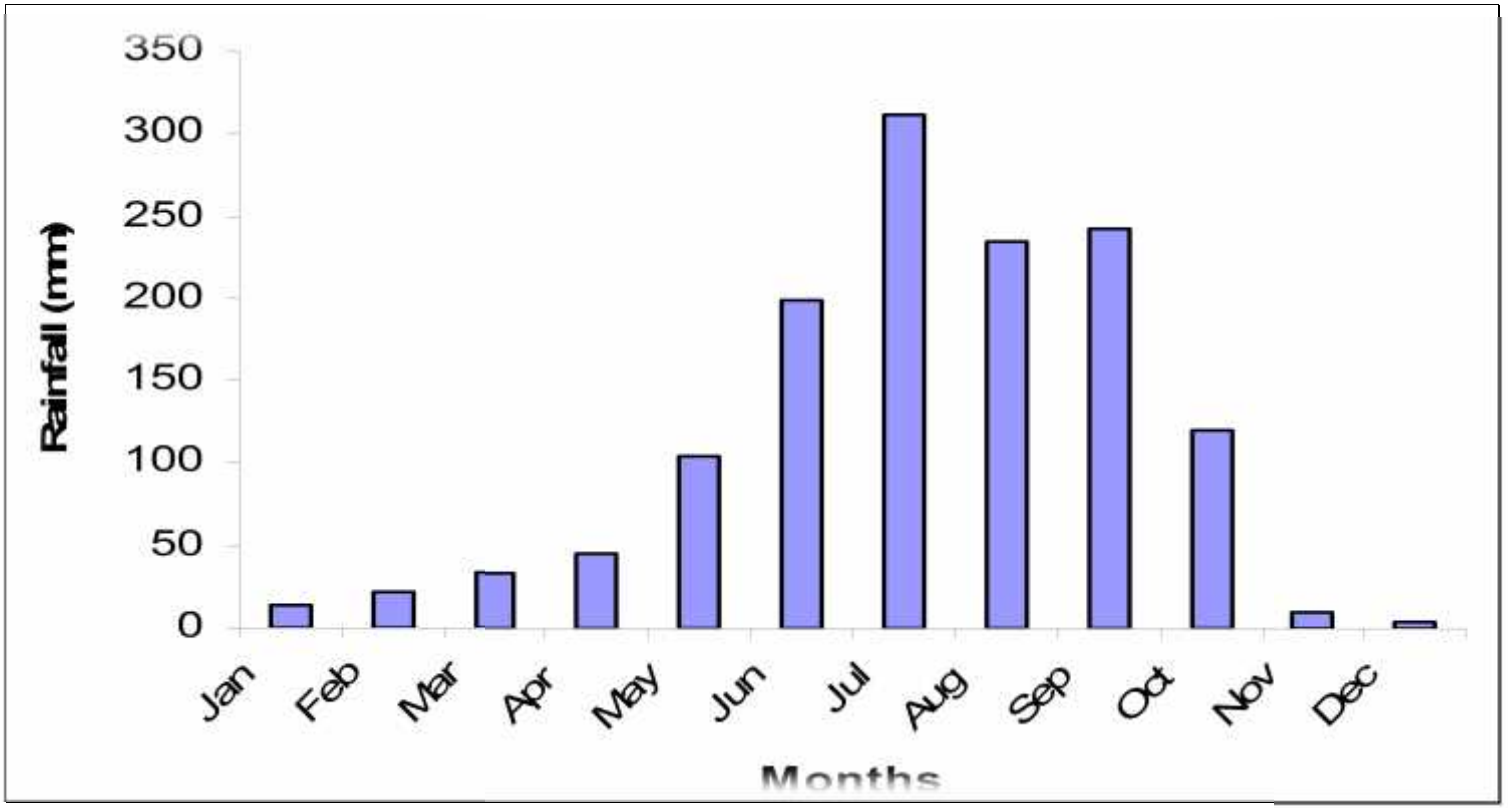
Location map of Bankura district

Annexure-II

Agroclimatic Zones of West Bengal



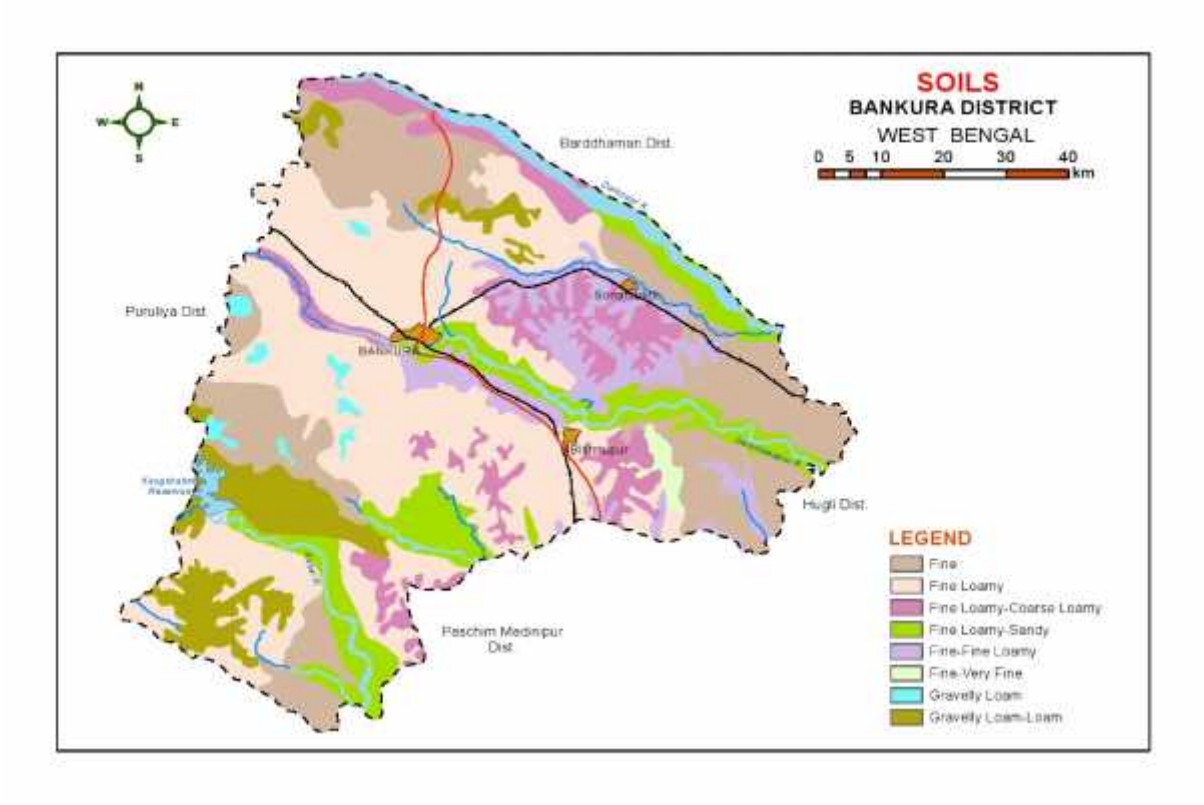
Annexure – III



Mean monthly rainfall of Bankura district (1998-2007)

Annexure-IV

Soil map of Bankura 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	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding • Timely weeding	Linkage with seed farms, Department of Agriculture, NSC, WBSC, BCKVV for supply of seed
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10 litres of water) • Transplant healthy seedlings of 35-40 days old	
		Okra	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cucurbits (Cucumber, Ridge gourd, Bottle gourd, Bitter gourd etc.)	No change. Prefer local cultivars	• Prepare mounds in the furrow for sowing of seeds • Application of 150-250 ppm Ethrel (1.5-2.0 ml/10 l of water), 400 ppm (4 ml/10 l of water) maleic hydrazide twice, first at two true leaves of the plants i.e. 15 days after sowing and subsequently repeated 7 days after helps in increasing the yield • The crop needs to be trained over low trellis of 1.5 m high above the ground • After 85 to 90 days of sowing, older leaves near the bottom of the vine are pruned • Timely control of downy mildew disease	
	Red & laterite soils,	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding	

	undulated land. Moderately deep to deep coarse loamy to fine loamy red soils			• Timely weed control	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old	
		Okra	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cucurbits (Cucumber, Ridge gourd, Bottle gourd, Bitter gourd etc.)	No change. Prefer local cultivars	• Prepare mounds in the furrow for sowing of seeds • Application of 150-250 ppm Ethrel (1.5-2.0 ml/10 l of water), 400 ppm (4 ml/10 l of water) maleic hydrazide twice, first at two true leaves of the plants i.e. 15 days after sowing and subsequently repeated 7 days after helps in increasing the yield • The crop needs to be trained over low trellis of 1.5 m high above the ground • Timely control of downy mildew disease.	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding • Timely weed control	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	-do-	-do-	
		Okra	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l) or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cucurbits (Cucumber, ridge gourd,	No change. Prefer varieties like Arka Anamika, Arka Abhay,	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidaclorpid (3.5 ml/ 10 l or	

		bottle gourd, bitter gourd etc.)	Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	Thiamethoxam (3.5 ml/ 10 l) to control whitefly	

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	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding • Timely weed control	Linkage with seed farms, Department of Agriculture, NSC, WBSC, BCKVV for supply of seed
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Pusa Deepali, Pusa Katki	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Okra	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cucurbits (Cucumber, Ridge gourd, Bottle gourd, Bitter gourd etc.)	No change. Prefer local cultivars	• Prepare mounds in the furrow for sowing of seeds • Application of 150-250 ppm Ethrel (1.5-2.0 ml/10 l of water), 400 ppm (4 ml/10 l of water) maleic hydrazide twice, first at two true leaves of the plants i.e. 15 days after sowing and subsequently repeated 7 days after helps in increasing the yield • The crop needs to be trained over low trellis of 1.5 m high above the ground • After 85 to 90 days of sowing, older leaves near the bottom of the vine are pruned • Timely control of downy mildew disease.	

		Cabbage	High temperature tolerant hybrids	• Raising of seed bed under transparent plastic cover; Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water); • Transplant healthy seedlings of 35-40 days old	
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding. • Timely weed control	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Okra	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cucurbits (Cucumber, Ridge gourd, Bottle gourd, Bitter gourd etc.)	No change. Prefer local cultivars	• Prepare mounds in the furrow for sowing of seeds • Application of 150-250 ppm Ethrel (1.5-2.0 ml/10 l of water), 400 ppm (4 ml/10 l of water) maleic hydrazide twice, first at two true leaves of the plants i.e. 15 days after sowing and subsequently repeated 7 days after helps in increasing the yield • The crop needs to be trained over low trellis of 1.5 m high above the ground • After 85 to 90 days of sowing, older leaves near the bottom of the vine are pruned • Timely control of downy mildew disease.	
		Cabbage	High temperature tolerant hybrids	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50	

				days after transplanting	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding • Timely weed control	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	-do-	-do-	
		Okra	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cucurbits (Cucumber, Ridge gourd, Bottle gourd, Bitter gourd etc.)	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Cabbage	High temperature tolerant hybrids	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	

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	Red & laterite soils, undulated land. Shallow to moderately deep coarse	Aman rice-Fallow	No change or alternatively go for Maize, Groundnut, Black gram in high land situation	• Transplant 3-4 aged seedlings per hill • Follow Dapog & SRI method	Linkage with seed farms, Department of Agriculture, NSC, WBSC, BCKVV for supply of seed
		Aman rice-Wheat/ Mustard/	-do-	-do-	

	loamy fine loamy soils (hillocks, gravelly situation)	Vegetables			
		Cauliflower	No change. Prefer varieties like Hisar-1, Improved Japanese, Pusa Sharad, Pant Gobi-4, Pant Shubra	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, Green 621	-do-	
		Okra	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Brinjal	No change. Prefer varieties Muktakeshi, BCB-11, BCB-30 Bhangar, Patakata	• Raising of seed bed under transparent plastic cover • After transplanting two foliar sprays of 0.5% $ZnSO_4$ and single spray of 0.15% $CuSO_4$ increase yield and quality of fruits	
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice-Fallow	No change. Alternatively go for maize, Groundnut, black gram in high land situation	• Transplant 3-4 aged seedlings per hill • Follow Dapog & SRI method • Use of herbicides/ harrowing	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Hisar-1, Improved Japanese, Pusa Sharad, Pant Gobi-4, Pant Shubra	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, Green 621	-do-	
		Okra	No change. Prefer varieties like Arka	• Soaking the seeds in 0.2% Bavistin over night to	

			Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Brinjal	No change. Prefer varieties Muktakeshi, BCB-11, BCB-30, Bhangar, Patakata	• Raising of seed bed under transparent plastic cover; • After transplanting two foliar sprays of 0.5% $ZnSO_4$ and single spray of 0.15% $CuSO_4$ increase yield and quality of fruits	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-Fallow	No change	• Dry seeding of rice/ drum seeding • Timely weed control	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Hisar-1, Improved Japanese, Pusa Sharad, Pant Gobi-4, Pant Shubra	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, Green 621	-do-	
		Okra	No change. Prefer varieties like Early Kunwari, Pusa Early Synthetic, Synthetic 78-1	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Brinjal	No change. Prefer varieties Muktakeshi, BCB-11, BCB-30, Bhangar, Patakata	• Raising of seed bed under transparent plastic cover; • After transplanting two foliar sprays of 0.5% $ZnSO_4$ and single spray of 0.15% $CuSO_4$ increase yield and quality of fruits	

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 Aug	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	Vegetables / short duration rice in upland & medium land situation	• Transplant 3-4 aged seedlings per hill • Follow Dapog & SRI method	Linkage with seed farms, Department of Agriculture, NSC, WBSC, BCKVV for supply of seed
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-	
		Aman (winter rice) rice-Fallow	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Pusa Synthetic, Pusa Himjyoti, Pusa Shubhra,	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, KK cross, Green-621, Royal Challenger	-do-	
		Brinjal	No change. Prefer varieties like Muktakeshi, BCB-11, BCB-30; Bhangar, Patakata	• Raising of seed bed under transparent plastic cover • After transplanting two foliar sprays of 0.5% $ZnSO_4$ and single spray of 0.15% $CuSO_4$ increase yield and quality of fruits	
		Tomato	No change. Prefer varieties like TLBRH-6, JKTH-3098, BCTH-4 (All leaf curl tolerant hybrids)	• Raising of seed bed under 50 mesh nylon net • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l of water or Thiamethoxam (3.5 ml/ 10 l of water) to control whitefly	
		Chilli	No change. Prefer varieties like BCC-1, BCCH Sl-4,	• Raising of seed bed under 50 mesh nylon net • Spraying of Diafenthiuron @ 0.5 g/l of water and	

			Beldanga local	Dicofol @ 2.5 ml/l of water to control thrips and yellow mite, respectively.	
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice- Fallow	Vegetables / short duration rice in upland& medium land situation	• Transplant 3-4 aged seedlings per hill • Follow Dapog & SRI method	
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-	
		Aman (winter rice) rice-Fallow	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Pusa Synthetic, Pusa Himjyoti, Pusa Shubhra,	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, KK cross, Green-621, Royal Challenger	-do-	
		Brinjal	No change. Prefer varieties like Arka Anamika, Arka Abhay, Pusa A-4, VRO-6, Azad Krishna (OP), Mahyco-12, No-152 (Hybrid)	• Soaking the seeds in 0.2% Bavistin over night to protect the seedlings from wilt disease; • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l or Thiamethoxam (3.5 ml/ 10 l) to control whitefly	
		Tomato	No change. Prefer varieties like TLBRH-6, JKTH-3098, BCTH-4 (All leaf curl tolerant hybrids)	• Raising of seed bed under 50 mesh nylon net • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l of water or Thiamethoxam (3.5 ml/ 10 l of water) to control whitefly	
		Chilli	No change. Prefer varieties like BCC-1, BCCH Sl-4, Beldanga local	• Raising of seed bed under 50 mesh nylon net ; • Spraying of Diafenthiuron @ 0.5 g/l of water and Dicofol @ 2.5 ml/l of water to control thrips and yellow mite, respectively	
	Red & laterite soils, undulated land. Shallow to	Aman rice- Fallow	Vegetables / short duration rice in upland& medium land situation	• Transplant 3-4 aged seedlings per hill • Follow Dapog & SRI method	
		Aman rice- Wheat/	-do-	-do-	

	moderately deep loamy soils	Mustard/ vegetables			
		Aman (winter rice) rice-Fallow	-do-	-do-	
		Cauliflower	No change. Prefer varieties like Pusa Synthetic, Pusa Himjyoti, Pusa Shubhra,	• Raising of seed bed under transparent plastic cover • Spray the 15 days old seedlings with the starter solution of ammonium sulphate (50g/10litres of water) • Transplant healthy seedlings of 35-40 days old • Three foliar sprays of 0.3% borax after 20, 35 and 50 days after transplanting	
		Cabbage	No change. Prefer varieties like Green Express, KK cross, Green-621, Royal Challenger	-do-	
		Brinjal	No change. Prefer varieties like Muktakeshi, BCB-11, BCB-30, Bhangar, Patakata	• Raising of seed bed under transparent plastic cover • After transplanting two foliar sprays of 0.5% $ZnSO_4$ and single spray of 0.15% $CuSO_4$ increase yield and quality of fruits	
		Tomato	No change. Prefer varieties like TLBRH-6, JKTH-3098, BCTH-4 (All leaf curl tolerant hybrids)	• Raising of seed bed under 50 mesh nylon net • 4-5 foliar sprays of Imidacloprid (3.5 ml/ 10 l of water or Thiamethoxam (3.5 ml/ 10 l of water) to control whitefly	
		Chilli	No change. Prefer varieties like BCC-1, BCCH Sl-4, Beldanga local	• Raising of seed bed under 50 mesh nylon net • Spraying of Diafenthiuron @ 0.5 g/l of water and Dicofol @ 2.5 ml/l of water to control thrips and yellow mite, respectively	

Condition			**Suggested contingency measures**	
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks,	Aman rice- Fallow	• Take up gap filling either with available nursery or by splitting the tillers from the surviving hills • Inter culture / weeding • Supplemental irrigation.	Apply 30-50 kg N /ha after relief of drought.
		Aman rice- Wheat/	-do-	-do-

stand etc.	gravelly situation)	Mustard/ Vegetables		
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice- Fallow	-do-	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice- Fallow	-do-	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-

Condition			**Suggested contingency measures**	
	Major Farming situation	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
Mid season dry spell at Vegetative stage	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	• Take up gap filling either with available nursery or by splitting the tillers from the surviving hills • Inter culture / weeding • Supplemental irrigation	Apply 30-50 kg N /ha after relief of drought.
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice- Fallow	-do-	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice- Fallow	-do-	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	-do-

Condition			Suggested contingency measures	
	Major Farming situation	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
Mid season dry spell at Flowering stage	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	• Supplemental irrigation • Plan for land preparation to sow the fodder crops like maize and sorghum	• Spray 2% urea or DAP • Top dressing of 50 kg N/ha after the relief of dry spell • Need based pesticide application
		Aman rice- Wheat/ Mustard/ Vegetables	If the damage is severe, prepare land for *rabi* vegetables	-do-
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice- Fallow	• Supplemental irrigation • Plan for land preparation to sow the fodder crops like maize and sorghum	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	If the damage is severe, prepare land for *rabi* vegetables	-do-
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice- Fallow	• Supplemental irrigation • Plan for land preparation to sow the fodder crops like maize and sorghum	-do-
		Aman rice- Wheat/ Mustard/ Vegetables	If the damage is severe, prepare land for *rabi* vegetables	-do-

Condition				
	Major Farming situation	**Normal Crop/ cropping system**	**Crop management**	**Rabi Crop planning**
Terminal drought (Early withdrawal of monsoon)	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	Supplemental irrigation with farm pond water / other sources	Sowing of linseed/ Khesari as paira crop
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Sowing of short duration rape seed varieties like Sanjucta, Asech, B-54, Jhanti • Sowing of lentil / wheat / mustard/ vegetables
	Red & laterite soils, undulated land. .	Aman rice- Fallow	-do-	Sowing of linseed/ Khesari as paira crop

	Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Sowing of short duration rape seed varieties like Sanjucta, Asech, B-54, Jhanti • Sowing of lentil / wheat / mustard/ vegetables
	Red & laterite soils, undulated land.	Aman rice- Fallow	-do-	Sowing of linseed/ Khesari as paira crop
	Shallow to moderately deep loamy soils	Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Sowing of short duration rape seed varieties like Sanjucta, Asech, B-54, Jhanti • Sowing of lentil / wheat / mustard/ vegetables

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	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	No change. Prefer direct sowing of short duration rice like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	Linkage with NFSM, ISOPOM, for seed and farm equipment. Link watershed programme NREGS for the support of farm pond technology,
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to	Aman rice- Fallow	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	

	fine loamy red soils	Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice- Fallow	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	

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	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice- Fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	Linkage with NFSM, ISOPOM, for seed and farm equipment. Link watershed programme NREGS for the support of farm pond technology
		Aman rice- Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	

	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice-Fallow	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-Fallow	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management.	
		Aman rice-Wheat/ Mustard/ Vegetables	-do-	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	

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	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice-Fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	Linkage with NFSM, ISOPOM, for seed and farm equipment. Link watershed programme NREGS for the support of farm pond technology
		Aman rice-Wheat/ Mustard/ Vegetables	Rice (Raasi, Khitesh, Kiron, Bhupan) – Khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management	

	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice-Fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
		Aman rice-Wheat/ Mustard/ Vegetables	Rice (Raasi, Khitesh, Kiron, Bhupan) – Khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-Fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
		Aman rice-Wheat/ Mustard/ Vegetables	Prefer direct sowing of short duration rice variety to follow the crop sequences of Rice – khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt alternate wetting and drying upto primordial initiation stage to save water • Better weed management	

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall Any other condition	Red & laterite soils, undulated land. Shallow to moderately deep coarse loamy fine loamy soils (hillocks, gravelly situation)	Aman rice-Fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	Linkage with NFSM, ISOPOM, for seed and farm equipment. Link watershed programme NREGS for the

		Aman rice-Wheat/ Mustard/ Vegetables	Rice (Raasi, Khitesh, Kiron, Bhupan) – Khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt SRI method • Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	support of farm pond technology.
	Red & laterite soils, undulated land. Moderately deep to deep coarse loamy to fine loamy red soils	Aman rice-fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
		Aman rice-wheat/ mustard/ vegetables	Rice (Raasi, Khitesh, Kiron, Bhupan) – Khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed management	
	Red & laterite soils, undulated land. Shallow to moderately deep loamy soils	Aman rice-fallow	No change. Prefer direct sowing of short duration rice varieties like Raasi, Khitesh, Kiron, Bhupan	• Adopt SRI method • Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed Management. • If rice crop cannot be taken, select fodder crops like maize and sorghum or prepare land for *rabi* wheat / mustard	
		Aman rice-wheat/ mustard/ vegetables	Rice (Raasi, Khitesh, Kiron, Bhupan) – Khesari / linseed / pulses / oilseed (mustard / rape seed)	• Adopt alternate wetting and drying up to primordial initiation stage to save water • Better weed management	

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 • Post pone topdressing of N fertilizer till water recedes • Take up gap filling either with available nursery or splitting the tillers from surviving hills	Drain excess water	• Drain excess water • Immediate harvesting + kept under shed with airy places. • Spray 2% brine solution to prevent premature germination in the field • Allow the crop to dry completely before harvesting	Dry the grain to proper moisture content before bagging and storage
Wheat	• Drain excess water • Take up gap filling if population is < 75% • Take inter cultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds	• Drain excess water • Take inter cultivation 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	Dry the grain to proper moisture content before bagging and storage
Mustard & other oil seed.	• Drain excess water • Take inter cultivation at optimum soil moisture condition to loosen and aerate the soil and to control weeds • Spray Mancozeb (0.25 %) to control fungal diseases	• Drain excess water • Take inter cultivation 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 harvest	Dry the grain to proper moisture content before bagging and storage
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 improve curd colour and quality	Early harvesting	Large leaves are trimmed away leaving only sufficient jacket leaves to protect the curd from bruising and other mechanical injury in transport.

Condition-Heavy rainfall with high speed winds in a short span				
Rice	• Drain excess water • Takeup gap filling either with available nursery or splitting the tillers from surviving hills	Drain excess water	• Immediate harvesting • Arrange for drying of the produce in airy sheds • Spray 2% brine solution to prevent premature germination in the field	Dry the grain to proper moisture content before bagging and storage
Horticulture				
Cauliflower	Drain excess water	• Drain excess water • Spraying the crop with Copper-oxychloride (0.3%) or Mancozeb (0.25 %)/ Chlorothalonil (0.2%) or Difenconazole (0.5g/lt) with sticker at 10 days interval to prevent curd blight.	Immediate harvesting	Maintain optimum moisture before marketing
Cabbage	Drain excess water	Spray the crop with Cypermethrin @0.1% with sticker to control cabbage borer	-do-	-do-
Okra	Drain excess water	Spraying the crop with Cypermethrin @ 0.1% to control fruit borer.	-do-	-do-
Brinjal	Drain excess water	Clipping off the infested shoot by brinjal fruit and shoot borer at regular interval and spraying the crop with Cartap hydrochloride @ 1 g/l of water / Spinosad @ (0.15ml/l), 0.25% Carbaryl or 0.05% Endosulfan at the early flowering stage and after harvesting of fruits during bearing stage is very effective	Immediate harvesting	-
Condition-Outbreak of pests and diseases due to unseasonal rains				
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	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.	-	Apply poison bait. Bait is prepared by mixing 20 g Malathion 50% WP with 500 g molasses + 20 g yeast hydrolysate. This mixture is mixed with 2 litres of water for poison baiting and 20 liters of water for bait spray for the control of fruit fly	-
Chilli	Spraying of Profenophos @ 1ml/litre/ Diafenthiuron @ 1 g/litre/ Propergite @1 g/litre for the control of thrips and mites at 15-20 days interval	-	Spray the crop with Hexaconazole 0.1% followed by 0.3% Blitox after removal of the infected twigs at 10 days interval for the control of dieback or anthracnose	-

2.3 Floods: Not applicable

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 in barren lands and on the bank of the rivers; feeding of Babla, Soobabul, Akashmoni, Stylo, Antropogon fodder in natural disadvantageous situation, Insurance of livestock Alert nearby Govt. fodder farms to stock straw and fodder Irrigation by installing deep tube wells Strengthening of Govt. fodder farms to cultivate unconventional fodders	Establishing Control Room, Feed fodder from nearby Govt. fodder farms, perennial fodder. Collect fodder from nearby less affected areas Feed region specific concentrated feed supplements Distribute fodder through cattle shed in organized manner through BLDOs (1 shed per 4-5 villages)	Claim insurance Feed supplements Cull the unproductive stock Repayment of Credit for livestock rearing may be waived or extended for long time
Drinking water	Dig deep tube wells in the pockets of water sheds and use on community basis Pond preparation / reclamation Conservation of Rain water	Use water from deep tube well, river or other water reservoirs. Treatment of water. Receive water supply from nearby less	Sterilize drinking water, if possible

		affected places	
Health and disease management	Make alert for the Govt. & Non-Govt departments for adequate storage of medicines, vaccines, saline/dextrose Make provisions of cattle shed on community basis Constitute Departmental Disaster Management Committee at the Block, Sub-division & District level for planning, management & stocking of medicine/vaccines etc.	Organize health camp, treatment of animals in community cattle sheds. Use stress relieving medicines & protect animal houses from extreme hot air Use Departmental committee and form Control room	Treat sick animals Cull permanently unproductive animals Introduce new stock from the unaffected areas
Floods			
Feed and fodder availability	Stock dry straw in the nearby Govt. fodder farms, ask the private parties to stock straw, Insurance of livestock Alert nearby Govt. fodder farms to stock straw and also insist upon ample production of green fodder Constitute Departmental Disaster Management Committee at the Block, Sub-division & District level for planning of management action	Supply fodder from nearby Govt. fodder farms, private parties, 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 from the ground water or river or rain water harvesting in water sheds on community basis	Use water from deep tube 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.	Supply fodder from nearby Govt. fodder farms, private parties, prepared hay or silage,	Claim insurance Feed supplements

	Insurance of livestock Better forecasting for fodder farms Constitute Departmental Disaster Management Committee	community fodder bank etc. Feed region specific concentrated feed supplements Establish Control Room at the Block, Sub-division & District level for prompt management action	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	Make arrangements of safe drinking water. Preparation of animal houses on scientific manner. Establish shelters at safe position in the areas for avoidance of heat/cold wave. Plant the trees giving shed to the houses Use protection of curtains over the windows	Give ample green fodder during heat wave, Make arrangements of ample drinking water, Feed ample water mixed with molasses and common salt, Give shed of straw over roof of animal house, In cold wave give drinking water with concentrate mixture to feed.	
Health and disease management	Store medicine, saline etc. House animals in safe & comfortable area	Administer stress removing medicaments	

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	Assessment of cage management in	Establishing Control Room,	Avail insurance	

ingredients	shed areas Insurance Bank linkage Instruct Govt. feed supplies to stock feed for urgency	Feed from stocked feed Keep the birds in specifically constructed shed with provision of saline water & feed ingredients.	Introduce new stock from the unaffected areas	
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 Organize awareness camp Formulate Departmental Disaster Management Committee at Block, Sub-division & District levels for proper planning & give requisition of medicine, vaccines, biological beforehand for the Govt. supplies Bio-security measurers must be in action for prevention of emerging diseases to obstacle in the transmission of disease	Undisrupted supply of medicines Organize mass health camp & treat birds Utilize Departmental Disaster Management Committee for prompt therapy & control of diseases	Treatment of affected birds. Culling of affected birds & subsequent disposal	
Floods				
Shortage of feed ingredients	Establishing shed for keeping of birds on community basis. 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 Introduce new stock from the unaffected areas	
Drinking water	Sterilization of drinking water. Dig deep tube wells.	Use water from dig well after disinfection		
Health and disease management	Store medicines & vaccines. Arrangement of vehicle, police, local administrations. Organize awareness cap Obtain allotment of fund from Head Quarter upto Block level for feed,	Control room. Organize mass health camp & treat birds	Culling of affected birds & subsequent disposal	

	medicine, vaccines etc.			
Cyclone				
Shortage of feed ingredients	-	-	-	-
Drinking water	-	-	-	-
Health and disease management	Group Insurance or Community Insurancing for affected animals against diseases of birds	-	-	-
Heat wave and cold wave				
Shelter/environment management	Construct houses at safe place for emergency housing of poultry birds one per 4-5 villages. Establish shelters at safe position in the upland at Block/Sub-division/District level Bio-security system should be practiced in all the occasions of emerging poultry diseases	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 management	Preparedness for timely supply of medicines/vaccines/biological is essential			

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	Keeping the boat / net in dry / high	Damage reports are to be sent to

	boats, nets etc. in case of occurrence of flood.	places during flood situation.	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,	Establish Control Room at the Block, Sub-division & District level for prompt management	Claim insurance

	Sub-division & District level for planning management action.	action. Cancel leaves for the employees	
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 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	Establish Control Room at the Block, Sub-division & District level for prompt management action.	Claim insurance

	planning management action.	Cancel leaves for the employees	
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