State: BIHAR

Agriculture Contingency Plan for District: SAHARSA

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern Plains (15)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain (IV)		
	Agro Climatic Zone (NARP)	North East Alluvial Zone (II)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Saharsa, Madhepura, Supaul, Araria, Katihar, Purnea, Kisanganj and Khagaria,		
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**
		25^0 52" 55' N	27^0 48" 56' E	44m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station (RRS), Agwanpur, Saharsa P.O – SISAI PIN 852201 Phone/Fax : 06478-281061		
	Mention the KVK located in the district with address	KVK, Agwanpur , Saharsa PIN : 852201		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Mandan Bharti Agriculture College, Agwanpur, Saharsa P.O – SISAI Dist : Saharsa PIN - 852201		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep)	1082.6	Not Available (NA)	3rd Week of June	3rd Week of October
	NE Monsoon(Oct-Dec)	86.1	-	-	-
	Winter (Jan- March)	51.5	--	-	-
	Summer (Apr-May)	105.6	-	-	-

	Annual	1325.8	65	-	-

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)	164.559	107.143	0.171	-	1.167	0.479	4.273	11	-	11.13

Ssource;C-DAP,Saharsa

1.4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**	**Remarks**
	Loam to Silt loam	52.884	32.1	Plain Upland
	Loam to loamy clay	45.393	27.6	Deep water and waterlogged area
	Clay loam, Loam to Silt loam	25.320	15.4	Mid upland to low land
	Sandy, Sandy clay & Sandy loam	41.014	24.9	Area within the Kosi Embankments

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	107.143	177%
	Area sown more than once	82.935	
	Gross cropped area	190.078	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	55.318		
	Gross irrigated area	76.000		
	Rainfed area	52.825		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	-	10.177	18.4
	Tanks	855	1.637	2.9
	Open wells	-	1.269	2.3

	Bore wells	-	17.157	31.0
	Lift irrigation schemes	-	02.948	5.4
	Micro-irrigation	-	-	-
	Other sources (please specify)	1200	22.130	40.0
	Total Irrigated Area	-	**55.318**	**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	-	-	-
	Critical	-	-	-
	Semi- critical	-	-	-
	Safe	All blocks	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	05 Tehsils		Excess Iron (upto 10ppm)
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	-	27.940	-	-	-	-	27.940
	Maize	-	-	0.941	7.0	-	7.0	-	7.941
	Wheat	0	0	0	49.69	-	49.69	-	49.690
	Lentil/Pulses	0	0	0	-	-	1.427	-	1.427

	Mustard	0	0	0	1.682	-	1.682	-	1.682
	Greengram	-	-	-	-	-	-	1.058	1.058

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Mango	2.581	-	-
	Guava	0.292	-	-
	Banana	0.277	-	-
	Litchi	0.357	-	-
	Makhana	0.800	-	-
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	6.200	-	-
	Cabbage	0.992	-	-
	Onion	0.280	-	-
	Tomato	0.137	-	-
	Bhendi	0.226	-	-
	Cucurbits	1.35	-	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**

	Mentha	0.020	-	-
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Sorghum + Meth	0.150	-	-
	Total fodder crop area	**-**	**-**	**-**
	Grazing land	**-**	**-**	**-**
	Sericulture etc	**-**	**-**	**-**
	Others (specify)	**-**	**-**	**-**

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	110.602	137.144	247.746
	Improved cattle	-	-	-
	Crossbred cattle	3.030	8.661	11.691
	Non descriptive Buffaloes (local low yielding)	23.599	103.256	126.855
	Descript Buffaloes	-	-	-
	Goat	89.027	185.994	275.021
	Sheep	0.143	0.171	0.314
	Others (Camel, Pig, Yak etc.)	-	-	-
	Commercial dairy farms (Number)			.038
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	41	18.470	
	Backyard	1120	141.437	
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. of Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		860		**941**		**81**	
	B. Culture						
				Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**	
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)						
	ii) **Fresh water** (Data Source: Fisheries Department)			**1057.13**	**3.2/ha**	**1552.11**	
	Others						

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**		**Crop residue as fodder** ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	47.008	1685	-	-	-	-	47.008	1685	42.00
	Wheat	-	-	108.082	2190	-	-	108.082	2190	98.50
	Maize (Rabi)	-	-	19.095	2512	-	-	19.095	2512	5.5
	Maize (Kharif)	0.837	889	-	-	-	-	0.837	809	0.1

	Lentil	-	-	0.863	605	00	00	0.863	605	1.2
	Greengram	-	-			0.751	710	0.751	710	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	23.024	90000	-
	Potato	-	-	-	-	-	-	903.00	14500	-
	Onion	-	-	-	-	-	-	6.030	20200	-

SOURCE: DAO, SAHARSA-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Wheat**	**Maize**
	Kharif- Rainfed	-	-	2nd week of May to 2nd week of June
	Kharif-Irrigated	3rd week of May to 4th week of June	-	-
	Rabi- Rainfed	-	-	-
	Rabi-Irrigated	-	2nd week of November to 2nd week of December	3rd week of October to 2nd week of November

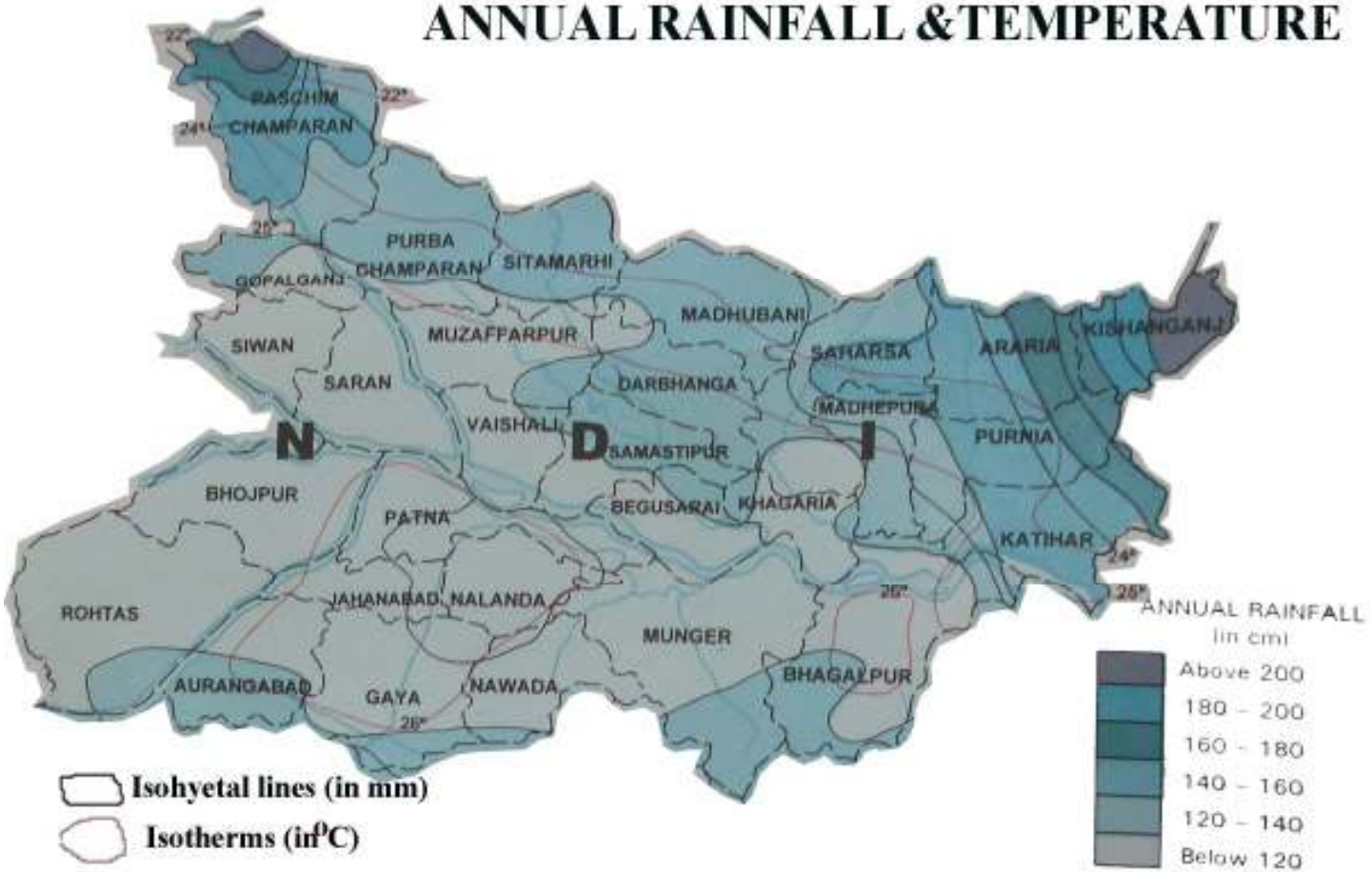
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood	✓		
	Cyclone			
	Hail storm		✓	
	Heat wave		✓	
	Cold wave		✓	
	Frost			
	Sea water intrusion			
	Pests and disease outbreak (specify)		✓	

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes (Tabular Form)

		Soil map as Annexure 3	Enclosed: No

Annexure-I :

ANNUAL RAINFALL &TEMPERATURE



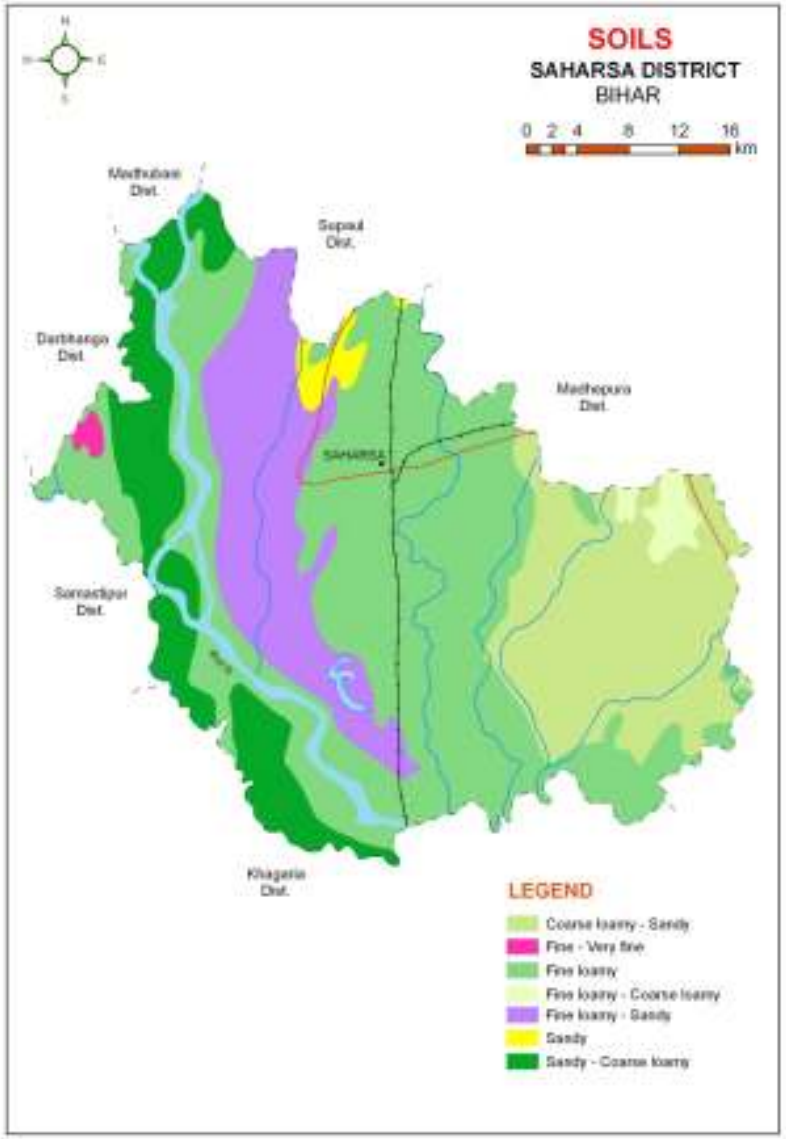
Annexure-2

ANNUAL RAINFALL OF SAHARSA DISTRICT (2001 TO 2005)

Name of Month	2001	2002	2003	2004	2005
January	Nil	12.0	14.0	Nil	7.0
February	Nil	Nil	56.6	Nil	4.2
March	Nil	Nil	5.1	Nil	Nil
April	12.0	50.85	37.65	20.6	Nil
May	119.9	118.4	48.7	104.0	Nil
June	167.6	187.8	198.5	247.86	105.4
July	122.8	225.56	280.4	391.2	126.9
August	225.3	182.5	156.7	110.4	258.9
September	289.26	127.8	84.07	44.9	165.2
October	220.2	26.2	111.0	71.8	19.8
November	Nil	Nil	Nil	Nil	Nil
December	Nil	Nil	5.0	Nil	Nil
Total :	**1157.1 (70)***	**931.1 (64)***	**997.7 (78)***	**990.8 (66)***	**687.4 (46)***

Note : Figures in the parenthesis* indicate no. of rainy days

Annexure-III



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[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 1st week of July	Up land Sandy loam to loam, Deep Soil	Rice-Wheat	Early Rice – Wheat Early Rice – Pea - Greengram Greengram - Pusa Baisakhi, SML-668, PDM-44, T-44 Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I Wheat- HD 2733, PBW 343, HP 1731, K307, HD 2824	• Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM
	Medium land Clay loam to loam, deep soil	Rice- Wheat	Rice-Wheat Medium duration Rice Rice - Rajendra Bhagawati, Rajendra Suwasni Prabhat , MTU 1010 Wheat- HD 2733, PBW 343, HP 1731, HD 2824	• Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM

	3. Low land Clay loam to loamy clay soil	Rice (Deep Water)– Fallow – Summer(Greengram + Sorghum) Rice (Deep Water) – Local Desaria, Kashan Greengram – Pusa Baisakhi Makhana (in ponds) Var. local	Rice – Fallow –Summer (Greengram + Sorghum) Medium to long duration Rice be selected	• Normal package of Practices • Life saving irrigation • Enhanced dose of N with full basal dose of NPK at transplanting • Old age rice seedlings may be used with 3 seedlings/hill with close spacing • Direct seeding of Rice can be done before onset of monsoon with full basal P and K dose	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM
	4. Low Land (Submerged)	Deep Water Rice – Boro Rice Rice(Deep Water) – Desaria, Kashan Rice (Boro) – Sita, Local	Deep water Rice – Boro Rice Deep Water Rice - Vaidehi, Swarna Sub 1 Rice (Boro) – Gautam, Saroj		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

Delay by 4 weeks 3rd week of July	Sandy loam to loam, deep soil	Rice- Wheat Pigeonpea – Greengram Greengram - Pusa Bashaki, SML668, PDM- 54, T-44 Rice- Jaya, R. Mahsuri 11, Dhanlaxmi, Rajendra Bhagwati, Saroj Wheat- PBW 373, UP 262 Pigeon pea – Bahar, Pusa 9	Short duration Rice-Wheat (Timely sown) Short duration Rice –Rabi Maize Rice- Prabhat, Dhanlaxmi, MTU 1010, Richharia, , Saroj, Saryu 52 Wheat- HD 2733, PBW 343, K 307, K 9107 Rabi Maize - Hybrid	▪ Normal seedling of rice can be used with adequate NPK ▪ Old age 30-35 d seedlings of early rice variety may also be used ▪ 20 days Dapog seedling can be used in rice ▪ Direct seeding of rice ▪ SRI technique	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM
	Medium land Clay loam to loam, deep soil	Rice – Wheat Rice - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat Wheat- HD 2733, PBW 343, HP 1731	Rice-Wheat Rice – Rabi Maize Mid duration Rice up to 125-130 days Rice - Rajendra Bhagawati, Rajendra Suwasni , Rajshree, Prabhat, MTU 1010 Maize – Shaktiman 3, Shaktiman 4	• Full basal dose of NPK • Life saving irrigation • Application of Potash at PI stage	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM
	Low land	Rice – Wheat – Summer (Greengram) Rice- Rajshree, Rajendra Suwasni, Rajendra Mahsuri 1	Rice - Late Wheat –Summer (Greengram) Rice – Rajendra Mahsuri 1, MTU1001 Wheat (Late Sown) – PBW 373, HD 2643, DBW 14	• Full basal dose of NPK at dry seeding of rice • Direct seeding of deep water rice • Even low land rice can be direct seeded • Brown manuring in low land rice	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of seeds through NFSM

		Rice(Deep Water) –Boro Rice Makhana (in ponds) Var. local Rice (Deep Water) – Vaidehi, Desaria, Kashan Boro Rice – Local	Deep water Rice – fallow – summer (Greengram + Sorghum) Rice(Deep water)- Swarna Sub 1, Greengram – SML 668, Samrat, Meha Boro Rice – Gautam, Saroj		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks 1st week of August	Sandy loam to loam, deep soil	Rice-Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj Wheat- HD-2733, PBW-343, HP-1731	Early Rice – Wheat / Satawar- Wheat- Greengram / Ashwagandha – Wheat – Greengram/ Blackgram/ Finger Millet - Wheat Blackgram - T 9, Navin, Pant Urd 30 , Pant Urd 19 Finger Millet - DB 7, BR 5, BR 10, Coimbatore 1 Wheat- HD 2733, PBW 343,	• Direct sowing of rice • Dapog seedling can be used • Application of Potasic fertilizer with adjuvant vegetative stage • Zero tillage for rice & wheat to makeup the time • Protective spray of pesticides with adjuvant against BLB & BLAST& Helminthosporium leaf spot.	1. Seeds from RAU, Pusa, NSC, TDC, BRBN etc. 2. Seed drills under RKVY 3. Supply of Rice drum seeder under RKVY 4. Supply of seeds of Medicinal crops through NHM

			K 307, K 9107, HD 2824 Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj, MTU 1010 Greengram – Pusa Vishal, Meha, PDM 54	• Transplanting of old age seedling of 30-35 days	
	2. Medium land Clay loam to loam, deep soil	Rice – Wheat Rice Rabi - Maize Rice - Rajendra Bhagawati, Rajendra Suwasni Rajshree, Prabhat Wheat- PBW 343, HP 1731, UP 262 Maize - Hybrids	Rice (Short duration)- Wheat Blackgram/ Finger Millet- Wheat Rice Rabi - Maize Blackgram- T-9, Navin, Pant Urd-30 , Pant Urd-19 Finger Millet- DB-7, BR-5, BR-10, Coimbatore-1 Wheat- HD-2733, PBW-343, HP-1731, K 307, HD 2824 Maize(Hybrid) – Shaktiman 3 Shaktiman 4 Or other prevalent hybrids	• Enhanced basal dose of NPK to boost the early vegetative growth • Application of Potasic fertilizer with adjuvant • Direct seedling of rice • Use of 20 days old dapog seedling for rice • Protective spray of pesticides with adjuvant against BLB, BLAST& Helminthosporium leaf spot.	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc. 2. Supply of zero till seed drill through RKVY
	3. Low land Loamy Clay, Deep Soil	Rice (Deep Water)-Fallow-Green Gram Rice (Deep Water)-Boro Rice Deep water Rice – Swarna Sub 1, Vaidehi, Local	Rice –Vegetable/Pea - Green Gram Rice- Berseem (fodder)- Green Gram Rice – Fallow – Greengram + Sesame Rice- Rajshree,	• Used for rice • Direct sown rice in low land with basal NPK • Protective spray of pesticides • Enhanced basal dose of NPK	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Supply of zero till seed drill for Rice through RKVY

		Green Gram – P. Baisakhi, T 44	Sita, Rajendra Suwasni,MTU 1001 Rice (Deep Water)- Boro Rice Wheat - HD-2733, PBW-343, K 307 HP-1731, HD-2824 Sesame-Krishna Pragati Green Gram – Pusa Vishal, SML 668, Meha Deep water Rice – Swarna Sub 1, Vaidehi Boro Rice – Gautam, RajendraBhagwati, Saroj	• Brown manuring in rice	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks 3rd week of August	Sandy loam to loam, deep soil	Rice-Wheat Wheat – PBW 343, UP 262, HP 1731 Rice – Jaya, Saryu 52 Greengram – P. Baisakhi, T44	Early Rice – Late Wheat Early Rice - Vegetable/ Pea Early Rice – Lentil Rabi Pigeonpea (Sept. sown) – Greengram Toria(Rabi) – Potato – Summer Greengram Early Tomato – Summer	• Zero tillage for wheat to make up the time • Spray of potassic fertilizer with adjuvant in rice at vegetative stage • Life saving irrigation to Rice nursery raised • Use of 20 days old Dapog seedling in Rice	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Supply of zero till seed drill for Rice and wheat through RKVY

			Greengram Rice- Prabhat, Dhanlaxmi, Saroj , MTU 1010 Late Wheat – PBW-373, DBW-14, HP-1744, HD- 2643 Greengram – Samrat, Pusa Vishal, SML 668, PDM-54, T-44 Sept. Pigeonpea –Pusa-9 Sharad Potato – K. Ashoka, K. Anand. K Pukhraj Blackgram - T-9, Navin, Pant Urd-30 , Pant, Urd-19 Early Tomato – Pusa Ruby, Pusa Rupali, Pusa Gaurav Toria – RAUT's 17, Bhawani	• Direct seeding of rice • Enhanced basal dose of NPK in rice to boost early vegetative growth • Protective spray of pesticides with adjuvant against pest & disease • Application of organic manure and vermicompost initially for rice and other crops • SRI technique in rice/hybrid rice • Use of Polyhouse/Polytunnel raised cucurbits/ tomato seedling	
	2) Medium land Clay loam to loam, deep soil	Maize-Wheat Rice-Wheat Wheat – PBW 343, HP 1744, UP 262	Sesame –Rabi maize Sesame-Late Wheat Sesame – Krishna, Pragati Rabi Maize- Saktiman- 1,2,3,4,	• Zero tillage for wheat to make up the time • Spray of potassic fertilizer with adjuvant in rice at	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Supply of cono weeder and marker for SRI through

		Early Rice- Prabhat, Dhanlaxmi, Richharia, MTU 1010	Laxmi, Deoki, Rajendra Hybrid-1,2 Late Wheat – PBW 373, DBW-14, HP-1744, HD-2643, Raj 3765	vegetative stage • Life saving irrigation to rice nursery raised • Use of 20 days old Dapog seedling in rice • SRI technique • Direct seeding of rice • Enhanced basal dose of NPK in rice to boost early vegetative growth • Protective spray of pesticides with adjuvant against pest & disease • Application of organic manure and vermicompost initially for rice and other crops	RKVY
		Pigeonpea –Greengram	Sept. Pigeonpea-Greengram Greengram – Samrat, Pusa Vishal, SML 668, PDM-44, T-44 Sept.Pigeonpea–Pusa-9, Sharad Narendra Arhar-I	• Application of organic manure and vermicompost initially for rice and other crops	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

	Low land (Submerged) Loamy Clay, Deep Soil	Rice(Deep Water)- Fallow – Greengram Rice (Deep Water) – Local (Desaria & Kashan) Greengram – P. Baisakhi, Meha, P. Vishal	Rice (Deep Water)- Boro Rice Rice – Fallow – Greengram + Sorghum Rice – Fallow – Greengram + Napier Boro Rice – Gautam, Rajendra Bhagwati, Saroj Deep Water Rice – Swarna Sub 1	• Application of organic manure and vermicompost initially for rice and other crops • Direct seeding of rice in dry soil in anticipation of rain • Brown manuring in rice	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Supply of Rice seed drill through RKVY 3. Supply of seeds for brown manuring through NFSM
	Low land Sandy clay, deep soil	Rice – Wheat – Greengram Rice – Potato - Greengram	Sept. Pigeonpea – Greengram + Napier Sesame-Rabi maize Rice – Late Wheat Late Wheat- PBW 373, DBW 14, HD 2643 Rice- Rajshree, MTU1001 Rajendra Suwasni, Rajendra Mahsuri 1 Rice – Potato - Greengram + Sorghum Potato – PJ376, Rajendra Aloo- 1,2,3, Kufri Jyoti Rice – Potato- Sesame Greengram – Samrat, Pusa Vishal, SML 668,	• Use of Taller rice seedling • Brown manuring in rice • Protective spray of pesticide with adjustments in rice • Use of Dapog rice seedling	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

			Sesame – Krishna, Pragati		

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Sandy loam to loam, deep soil	Rice-Wheat Rice – Rabi Maize Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj Wheat- HD-2733, PBW 343, HP-1731, HD-2824 Maize – Hybrid	• Life saving irrigation • Gap filling of existing rice crop by extra seedlings of simultaneous transplanted crop of the same field	• Application of potash • Inter culturing • Mulching through mechanical weeding for moisture conservation • Conservation tillage • Inter culturing • Protective spray of pesticides with adjuvant against Pest and diseases	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land Clay loam to loam, deep soil	Rice – Jaya, Rajendra Mahsuri 1, Rajendra Suvasini Wheat- HD-2733, PBW-343, HP-1731, HD-2824	• Life saving irrigation • Gap filling by pulling extra rice seedling from simultaneous transplanted rice crop • Gap filling through Dapog nursery	• Application of potash • Mulching by weeds for moisture conservation • Conservation tillage • Inter culturing • Protective spray of pesticides with adjuvant against Pest and disease	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

	Low land Sandy clay to loamy clay, deep soil	Rice-wheat-Green gram Rice- Rajshree, Santosh , MTU1001, Sita, Rajendra Suwasni, R. Mahsuri 1 Wheat- HD-2733, PBW-343, HP-1731, HD-2824 Greengram – Samrat, Pusa Vishal, SML 668	• Life saving irrigation • Gap filling through Dapog nursery • Gap filling through extra Rice seedling from simultaneous transplanted Rice field	• Application of potash must at final land preparation • Inter culturing • Mulching by weeds for moisture conservation • Conservation tillage • Intercul turing • Spray potassic fertilizer with adjuvant at vegetative stage • Protective spray of pesticides with adjuvant against Pesticides and disease	**Seeds from RAU, Pusa, NSC, TDC , BRBN etc**
	Low Land (Deep Water) Sandy clay to loamy clay, deep soil	Rice – Fallow – Greengram Rice – Swarna Sub 1	No change	• Top dressing of neem based Urea @ 50kg/ha in rice crop or application of mud ball urea	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**

At vegetative stage	Deep sandy loam to loam soil	Rice-Potato Rice –Wheat Pigeonpea (Arhar)-Greengram Rice- Prabhat, Dhanlaxmi, Richharia, Saroj Potato – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti, Kanchan Wheat- HD 2733, PBW 343, HP 1731, HD 2824 Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I Greengram – Samrat, PusaVishal, SML 668, PDM 54, T-44	• Gap filling of existing rice crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helminthosporum leaf spot	• Inter culturing/weeding and mulching by weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops • LCC based N application in Rice	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land Deep clay loam to loam soil	Rice-wheat-Green gram Rice - Rajendra Bhagawati, Rajendra Suwasni, Rajshree, Prabhat Wheat- HD-2733, PBW-343, HP-1731, HD-2824 Green gram- SML 668, Pusa Vishal, Samarat	• Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & Helminthosporum leaf spot	• Inter culturing/weeding and mulching by weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At flowering/ fruiting stage	Up land Deep Sandy loam to loam soil	Maize-Wheat Vegetable – Wheat Maize - Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Maize-3 Wheat- HD-2733, PBW-343, HP-1731, HD-2824	• IPM practices • Spray of pesticides with spreader • Clipping of maize leaves	• Inter culturing/weeding and mulching by weeds • Conservation tillage • Life saving irrigation • Spray of potassic fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land Deep clay loam to loam soil	Rice – Wheat Rice- Prabhat,MTU1010 Dhanlaxmi, Richharia, Saroj Wheat- HD2733, K 307, PBW-343, HP-1731, HD-2824	• IPM practices • Spray of pesticides with spreader • If Rice crop withers & gets damaged Urd/Sesame-Wheat should be followed • IPM practices • Spray of pesticides with spreader	• Inter culturing/weeding and mulching by weeds • Conservation tillage • Life saving irrigation • Spray of potash and nitrogen fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
		Pigeonpea (Arhar)-Greengram Pigeonpea : Bahar, Narendra Arhar-1		• Inter culturing and mulching by weeds • Life saving irrigation • Conservation tillage • Spray of potassic fertilizer with adjuvant	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

	Low land Sandy clay to loamy clay, deep soil	Rice-wheat-green gram Rice- Rajshree, Santosh , MTU 1010, Sita, Rajendra Suwasni, Rajendra Sweta, Rajendra Mahsuri 1 Wheat- HD-2733, PBW-343 HP-1731, HD-2824 Green Gram- SML 668, Pusa Vishal, Samrat	• IPM and IDM	• Inter culturing • Mulching by weeds • Life saving irrigation • Conservation tillage • Spray of potassic fertilizer with adjuvant,	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Deep sandy loam to loam soil	Rice-Wheat Maize - Potato Rice-Prabhat, Dhanlaxmi, MTU 1010, Saroj, Pusa 677, Pusa 834 Wheat- HD 2733, PBW 343, HP 1731, HD 2824 Potato – Kufri Jyoti, Kufri Ashoka Maize – Composites	• Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning • Clipping of leaves in maize • Rice and wheat to be saved from moisture stress at milk stage	• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • Irrigation channel be cleaned for preventing moisture loss through seepage	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Medium land Deep clay loam to loam soil	Maize-wheat Rice - Wheat Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Maize-3 Wheat- HD 2733, PBW 343, HP 1731, HD 2824, K 9107 Rice – Rajendra Mahsuri 1, Sarju 52, MTU 1010, Sita Rajendra Sweta		• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing moisture loss through seepage	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

		Pigeonpea (Arhar)- Bahar, Narendra Arhar-1		• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stages of growth • To clean irrigation channel for preventing loss of moisture through seepage	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Low land Sandy clay to loamy clay, deep soil	Rice-wheat-Green gram Rice- Rajshree, Santosh , Satyam, Rajendra Suwasni, Rajendra Sweta, MTU 1001, MTU 7029, Rajendra Mahsuri 1 Wheat- HD 2733, PBW 343, HP 1731, HD 2824 Greengram- SML 668, Pusa Vishal, Samrat		• Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures[i]**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	**Up land**	Rice – Wheat Rice – Rabi Maize	Early Rice – Wheat Early Rice – Rabi Maize Rice – Prabhat, Saroj, MTU 1010, Pusa 677, Dhanlaxmi Wheat – HD 2733, HD 2824 K 9107, K 307, PBW 343	• Dapog Nursery • Direct seeding of rice • Use of Rice drum seeder • SRI technique • Timely irrigation in wheat at the most critical stage i.e. CRI stage whereas in Rabi maize upto 10 days after tassel emergence • Zero tillage in wheat for Resource Conservation	1. Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Seed drills under RKVY 3. Supply of seeds through NFSM
	Medium Land	Rice – Wheat – Greengram Rice – Rabi Maize	No change No change Rice – Saroj, Prabhat, MTU 1010, P 677 Rajendra Bhagwati	• Dapog Nursery • Use 20 days old seeding of rice • SRI technique • Use of RCT n the cropping system	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

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	Medium Land Deep clay loam to loam soil	Rice – Wheat Rice – Maize	Early Rice varieties be taken Early Rice varieties be taken Rice – MTU 1010,Prabhat Dhanlaxmi, Pusa 834,	• Restrict Nitrogen dose • SRI technique • Use more potassic fertilizers • Use of pre	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			Rajendra Bhagwati Wheat – K 9107, PBW 343 HP 1744	emergence Weedicides to check weed problem in Rice • Use potassic fertilizers at PI stage in rice • Use of RCT in the cropping system	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Medium Land Deep clay loam to loam soils	Rice – Wheat Rice – Rabi Maize Rice – Sita, Sarju 52, R. Suwasini, Saroj	Direct Sown Rice – Lentil/ Direct Sown Rice – Early Pea/ Direct Sown Rice- Toria/ Satawar-Early Pea-Greengram/ Aswagandha - Vegetable – Greengram/ Toria – RAUTS 17,Bhawani Early Pea – Pusa Prabhat, Harbhajan Rice – Sita, Sarju 52, R. Suwasini, Saroj	• Use Basal P and K only in direct seeded Rice • Use pre-em weedicides in Rice • Top dress N at 30 DAS in Direct Seeded Rice • SRI technique with early Rice varieties • LCC based N application • Potash application at PI stage • Use of RCT in the cropping system	Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures[i]**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon		Not Applicable			

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Upland Deep loamy to silt loam soils	Rice-Wheat/ Oilseeds/ Pulses/ Rabi maize	Short duration Rice- Toria – Greengram/ Blackgram/ Sesame Satawar-Lentil-Fodder Aswagandha-Lentil-Greengram+Sorghum Rice-Prabhat, Dhanlaxmi, Richharia,MTU1010, Saroj, Santosh Sesame- Krishna, Pragati Blackgram- T-9, Navin, Pant Urd-30 , Pant Urd-19	• Dapog nursery for rice • Direct seeding of rice • Life saving irrigation • Spray of potassic fertilizer with adjuvant • Mulching • Application of organic manure and vermicompost • SRI technique of Rice • LCC based N application • Use of pre-em weedicide in Rice to check weed menace • Irrigation scheduling based on critical stages of growth • Brown manuring in direct sown Rice	1.Seeds from RAU, Pusa, NSC, TDC , BRBN etc 2. Tube well through MSTP
	Medium Land Deep clay loam to loam soils	Rice-Wheat/ Pulses/ Maize / Rice- Jaya, MTU 7029,	Short duration of Rice' Pigeonpea/ Blackgram/ Sesame Rice- Rajendra Bhagawati		Seeds from RAU, Pusa, NSC, TDC , BRBN etc

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
		Saroj, R. Mahsuri 1, Santosh, R. Kasturi, Sita Wheat- HD 2733, PBW 343, HP 1731, HD 2824	MTU 1010, Pusa 834 Prabhat, Saroj, Santosh Pigeonpea - Pusa-9 Narendra Arhar-I Rabi Maize- Saktiman-1,2,3,4, Laxmi, Deoki, Rajendra Hybrid 1,2 Sesame- Krishna Pragati Blackgram- T-9, Navin, Pant Urd-30 , Pant Urd-19		

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

Condition	**Suggested contingency measure**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	• Drainage management • Re transplanting through Dapog nursery if needed • Gap filling from extra seedling of Transplanted Rice crop • Re sowing through drum seeder	• Drainage management • Sequential crop if totally damaged i.e. Toria var. RAUTS 17, Bhawani etc.	• Drainage management • Sequential crop if totally damaged Eg. Toria/Early Pea (Vegetable) • Harvest at physiological maturity • Spray 5% Nacl solution to check germination of Rice spikelets	Storage at safer place - Protection measure against storage insect pest
Maize	• Drainage management • Gap filling from extra seedlings grown the same field rather than fresh sowing Of Maize seed • Re sowing, if completely damaged	• Drainage management • Alternative maize or other rabi crop if totally damaged	• Drainage management • Sequential crop if totally damaged • Harvest at physiological maturity	Storage at safer place
Pigeonpea	• Drainage management • September sowing if Kharif Arhar is • completely damaged • Gap filling if needed	• Drainage management • Alternative maize or other rabi crop if totally damaged	• Drainage management • Sequential crop if totally damaged • Harvest at physiological maturity	Storage at safer place
Vegetable	• Re sowing , if required • Replanting	• Drainage management	• Drainage management	Storage at safer place
Horticulture				
Mango	• Drainage management • Replanting on raised platform if completely damaged • Gap filling	• Drainage management • Need based IPDM	• Drenching with copper fungicides • Drainage management • Harvesting at proper maturity	Spray of mild fungicide to avoid fungal growth. Dipping fruits in 50^{o}c warm water for 10 minutes would enhance the

				self life of fruits
Litchi	• Drainage management • Replanting, on raised platform if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk • Drenching with copper fungicide	
Banana	• Drainage management • Replanting, if completely damaged • De suckering of new suckers	• Drainage management	• Drainage management • Spray and pasting of trunk • Propping	
Papaya	• Drainage management • Replanting, if completely damaged	• Drainage management	• Drainage management • Spray and pasting of trunk	
Heavy rainfall with high speed Winds in a short span				
Rice	• Drainage management • Replanting if completely damaged • Gap filling if needed	• Drainage management • Sequential crop if totally damaged i.e. Toria	• Drainage management • Sequential crop if totally damaged	Storage at safer place
Maize	• Re sowing If completely damaged • Gap filling if needed by extra seedlings transplanted simultaneously of the same field • Drainage management	• Drainage management • Alternative maize or other crop if totally damaged	• Drainage management • Sequential crop if totally Damaged	Storage at safer place
Pigeonpea	• Re sowing If completely damaged • Gap filling if needed • Drainage management	• Drainage management • Alternative crop if totally damaged eg. Rabi, Maize, Vegetable	• Drainage management • Alternative crop if totally Damaged	Storage at safer place
vegetable	▪ Drainage management ▪ Gap filling	• Drainage management	• Drainage management • Drenching with copper fungicide	
Horticulture				
Mango	• Drainage management • Need based IPDM • Replanting if substantially damaged • Staking/Providing wind break	• Drainage management • Need based IPDM • Drenching with copper fungicides	• Drainage management • Harvest at proper time • Spray of Bordeaux mixture to ward off fruit fly and fungal	

		• Providing Wind Break	infection, Neem based plant Protection measure	
Litchi	▪ Drainage management ▪ Gap filling ▪ Staking	Drainage management	• Drainage management • Drenching with copper Fungicide	
Banana	• Drainage management • Replanting if substantially damaged	• Drainage management • Staking	• Drainage management • Propping • Harvest at proper time	
Guava	• Drainage management • Replanting if substantially damaged	• Drainage management • Drenching with copper fungicides	• Drainage management • Harvest at proper time	
Outbreak of pests and diseases due to unseasonal rains				
Rice	• Seedling treatment with Carbendazim + Emidachloroprid • Spray of pesticides with adjuvant	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Storage at safer place
Maize	• Application of granular insecticides viz. Thimet 10 g/Carbofuran 3g in whorl of maize	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Storage at safer place
Pigeonpea	• Use of pesticides/insecticides	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides (Kelthel) with adjuvant • Drainage management	Storage at safer place
Vegetable	• Drainage management • Spraying of insecticide & fungicide	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Safe storage & transportation
Horticulture				
Mango	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	

Litchi	• Spray of pesticides (eg. Kelthel)with adjuvant to ward off attack of litchi mite • Drainage management	• Spray of specific pesticides (eg. Kelthel) with adjuvant • Drainage management	• Spray of specific pesticides (eg. Kelthel) with adjuvant • Drainage management	
Banana	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	
Guava	• Spray of pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	• Spray of specific pesticides with adjuvant • Drainage management	Mild insecticide to be applied to check fruit fly infection

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Water logging/Partial inundation	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
Rice For such situation var. like Swarna-Sub-I & local var. of Desaria Barogar etc. should be taken	• Drainage management • Re transplanting through Dapog nursery/community nursery if completely damaged • Gap filling	• Drainage management • Alternative crops if totally damaged • Gap filling by simultaneously transplanted Rice seedling of same field • 40-45 days old seedlings may be used • Kharuhan (double transplanting) be practiced	• Drainage management • Harvest at physiological maturity • Lentil as paira crop can be taken (var. PL 406 suited to paira crop)	Storage at safer place Spray 5% Nacl solution to check germination of Rice spikelets
Maize	• Drainage management • Re sowing if substantially damaged • Gap filling, if needed	• Drainage management • Alternative crops if totally damaged like maize or sequential crop i.e. Toria (RAUTS 17, Bhawani)	• Drainage management • Harvest at physiological maturity	Storage at safer place
Pigeonpea	• Drainage management • Re sowing if substantially damaged • Gap filling if needed	• Drainage management • Any rabi crop can e taken, if completely damaged	• Drainage management • Harvest at physiological maturity	Storage at safer place Protection against storage insect-pest

Horticulture				
Mango	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
Litchi	• Gap filling • Replanting if substantially damaged • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvest
Banana	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
Guava	• Replanting if substantially damaged • Gap filling • Drainage management	• Drenching with copper fungicides • Drainage management	• Drenching with copper fungicides • Drainage management	Judicious harvesting
Continuous submergence for more than 2 days				
Rice (for such situation Swarna Sub-1 should be grown)	• Gap filling, if needed • Re-sowing after receding of flood, if completely damaged	• Replanting through Kharuhan (double transplanting) by 3-4 seedlings per hill • Short duration rice variety	• Toria/Late wheat if completely damaged	Storage at safer place Spray 5% Nacl solution to check germination of Rice spikelets
Maize	• Re-sowing after receding of flood, if completely damaged	• Re sowing or gap filling as the case may be	• Toria/Late wheat if completely damaged	Storage at safer place Protection against storage insect pest
Horticulture				
Mango	• Drainage management			
Guava	• Drainage management			
Banana	(i) Drainage management			
Sea water intrusion[3]				

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Rice	Life saving irrigation	Life saving irrigation Spray of potassic fertilizer with adjuvant	Life saving irrigation Spray of potassic fertilizer with adjuvant	
Maize	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Pigeonpea	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Wheat			Life saving irrigation (Terminal heat)	
Horticulture				
Mango	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Litchi	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Papaya	Life saving irrigation	Life saving irrigation	Life saving irrigation	
Cold wave				
Wheat		Irrigation, inter culturing, mulching by weeds		
Maize		Irrigation, inter culturing, mulching by weeds		
Mustard		Irrigation, inter culturing, mulching by weeds		
Potato		Irrigation, inter culturing, mulching by weeds, Spray Mancozeb 0.2% or Ridomil MZ 0.1%		
Pulses		Irrigation, inter culturing, mulching by weeds		
Horticulture				
Bhendi		Irrigation, inter culturing, mulching by weeds		
Brinjal		Irrigation, inter culturing,		

		mulching by weeds		
Chili		Irrigation, inter culturing, mulching by weeds		
Tomato		Irrigation, inter culturing, mulching by weeds		
Lauki		Irrigation, inter culturing, mulching by weeds		
Frost				
wheat		Irrigation, inter culturing, mulching by weeds		
Chickpea		Irrigation inter culturing, mulching by weeds		
Pigeonpea		Irrigation inter culturing, mulching by weeds		
Lentil		Irrigation inter culturing, mulching by weeds		
Horticulture				
Bhendi	Treat the seeds in 0.2% soln of Dithane M-45	Irrigation, inter culturing, mulching by weeds		
Brinjal		Irrigation inter culturing, mulching by weeds		
Chilli		Irrigation inter culturing, mulching by weeds		
Tomato & Potato	Treat the seeds in 0.25% soln of Dithane M-45 (Mancozeb 2.5kg/ha)	Earth up to 15cm ht. Irrigation, inter culturing, mulching by weeds	Spray Dithane M-45/ Mancozeb @ 2.5 gm/lt of water in 3rd week of December at 10 days interval 3 times	Harvest in dry weather

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the events	**During the event**	**After the event**

Drought			
Floods			
Feed and fodder availability	**1.** Cultivation of fodder tree **2.** Storage of Improved Quality Fodder **3.** Conservation & Storage of • Feed & Fodder • Hay & Silage: — Preserve the fodder in the form of hay from Berseem & other grasses as well as silage from (a) Maize- harvesting at well developed cob. (b) Sorghum - at flowering stage. (c) Oat (d) Hybrid Napier – 40-45 day old. (e) Water hycianth mixing with Rice straw in ratio of 4:1 with 70 kg molasses /ton of clean water hycianth. (f) Potato leaves mixing with wheat straw in ratio of 7:1 and should be supplemented with 3% molasses. Hay: – • Berseem/Lucerne and other grasses. • Bales of hay and other dry fodder should be stored in dry places at a height of last flood level and covered with asbestos sheet or polythene sheet. **4.** Development & storage of: – (a) Complete Feed Block (CFB) (b) Urea-Molasses-Mineral-Block (U.M.M.B) **5.** Development of Fodder Bank	1. Feeding of Complete Feed Block 2. Feeding of Urea-Molasses-Mineral-Block & Fodder 3. Feeding of stored Hay/Silage/Improved Quality Fodder 4. Feeding of Tree leaves some of which are as follows: 1. Bamboo leaves 2. Neem 3. Bargad 4. Peepal 5. Seesam 6. Subabul Use of unconventional feed stuff: (i) Aquatic Plants – water hycianth (i) Lotus (ii) Aquatic weeds	Production of forage crops **1.** Balanced feeding of Animal supported with little higher concentrate mixture **2.** Cultivation of fodder Rabi maize if water stagnated upto Nov/ December **3.** Sorghum/Cowpea **4.** Maize in September
Drinking water			
Health and disease management	Veterinary Preparedness with Medicines, Vaccines and provision for mobile ambulatory van. • Vaccination During flood stress becomes an incriminating factor for the precipitation of diseases in livestock and poultry.	Animal safety, Health camp and Treatment Important Suggestions for animal and Poultry safety During flood, all efforts should be made to	Sanitation, de worming, treatment, health camps Culling of Sick animals and disposal of carcass

	So, necessary vaccination of livestock and poultry should be done against economically important contagious disease. This will be helpful not only to check epidemic in animals, but also to reduce the probability of zoonoses in human beings. Care should be taken for mass vaccination of livestock and poultry with a view to covering 80% of livestock population in order to achieve herd immunity. Mass vaccination should be conducted by a team of Department staff with proper maintenance of detailed Inoculation Register. Pro-active steps should be taken to receive and stock the required doses of vaccines against different diseases for their use in face of Flood.	rescue most of the livestock and poultry as carefully as possible. The people should be made conscious through announcement with the help of mikes or other means of communication, so that they may escape with their livestock and poultry to safe area. The fisherman or the people who knows swimming should be deputed for the rescue of drowning and floating animals and birds. During flood do not leave halter or headstalls on animals. Do not tie animals together when releasing. Report the location, identification and disposition of livestock and poultry to authorities handling the disaster. Health camp and treatment Water borne diseases are one of the most common phenomena during the flood Diarrhoeal diseases outbreaks can Report the location, identification and disposition of livestock and poulrty to authorities handling the disaster. Health camp and treatment Water borne diseases are one of the most common phenomena during the flood Diarrhoeal diseases outbreaks can occur after drinking contaminated water.	Maintenance of Sanitation: Adequate attention is to be paid to disinfect the premises of temporary sheds with the help of bleaching powder, phenol, carbolic acid etc. In no case the carcass/ cadaver should come in contact with healthy animals rehabilitated in sheds. Arrangements should be made accordingly. De-worming after the flood: Immediately after flood, the animals like cattle, buffalo. Sheep, goat, pig, dog and poultry need to be de-wormed with suitable broad spectrum anthelmentics. This will enable the animals to regain proper health. In water logged area, sucks can be introduced as biological control measures against snails to protect livestock from parasitec disease. Treatment of sick animals: The Disposal of Carcass: the disposal of dead animals and birds are to be done by Animal Husbandry Department. Accordingly, necessary arrangement should be made for prompt and easy disposal of carcasses during the Flood and Post-Flood period.

		Diseases that can occur during flood should be given special attention and accordingly medicines should be available in the health camp for the following mentioned diseases. Salmonella spp. Escherichia coli Giardiasis Amoebiasis Rotavirus Leptospirosis Scabies Black leg Malignant Edema Foot rot Anthrax Botulism Tetanus Red water Black disease Entertoxemia Liver fluke Amphistomiasis Brooders pnemonia Treatment of Non infectious Arrangement should be made for the treatment of drowning and traumatic injuries, aspiration pneumonia, lameness and other surgical cases in the health camp. Disinfection of livestock premises and Poultry shed Disinfection of livestock premises and the temporary sheds should be done with the help of bleaching powder, phenol, carbolic acid etc	Carcasses of animals affected by the disease are the chief source of soil infection. They harbour the germs in large numbers and liberate them from both artificial and natural body openings into the surrounding soil. Methods of Carcass disposal to be adopted Burial Burning Composting Vulturing s. Health Camp after the flood: Protection of livestock from out breaking and communicable diseases be made. Health camps are to be organised in Flood affected areas to restore the normal breeding capability of breedable population as well as to restore the normal health of livestock and poultry.
Cyclone			

Heat wave and cold wave			

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Floods				
Shortage of feed ingredients				
Drinking water				
Health and disease management	Vaccines to be used for different animals and Poultry **Cattle and Buffalo** Hemorrhagic SepticemiaVaccine Black Quarter Vaccine FMD Vaccine Anthrax Vaccine as per endemicity. **Sheep and Goat** Hemorrhagic Septicemia Vaccine PPR Vaccine FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity **Pigs** Hemorrhagic Septicemia Vaccine PPR Vaccine			

	FMD Vaccine Goat pox Vaccine Enterotoxemia Vaccine Anthrax Vaccine as per endemicity. **Dogs** Rabies Vaccine **Poultry** Mareks disease vaccine RDV (F_1 & R_2B), FPV, IBRV & IBDV (Annexure-1) • Medicines All Districts should be earmarked for flood. An inventory of required medicines to treat the affected livestock in case of eventualities should be made. The Govt. should take steps to procure sufficient quantity of essential life saving medicines. **List of life saving Medicines** Corticosteroids Nikethamide Antibloat Adrenaline Antihistaminic Antidotes for common poisoning Antisnake venom Broad spectrum antibiotics Anti-inflammatory Antipyretic and Analgesics Fluids and Electrolytes • **Mobile Veterinary Clinics** Mobile Veterinary Clinics should be kept			

	ready at Veterinary Hospital or Veterinary Camps so that immediate treatment of injured and affected animals may be done. For this MVC must have adequate drugs like antibiotic, analgesic, dewormer, ointment, antisnake venom and emergency health care facilities along with trained personnel. A good no. of mobile clinic teams should be planned consisting dedicated and experienced technical workers with allotment of area of operation. The teams should be kept in readiness **having required stock of medicines and equipment** to work in any adverse situation. A telephone directory should be maintained at the District level by collecting the telephone nos. of Vets, Para-Vets, NGOs / youth clubs / societies, volunteers etc. to collect feedback and plan the activities during the emergency. An emergency kit for poultry should be made ready well in advance. The Poultry kit should have Cage, mask, mash, pellet feed trough, waterers, detergents, poultry vaccines, Veterinary drugs, workers protection uniform etc.			
Cyclone				
Heat wave and cold wave				

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	(i) Thinning of population (ii) Arrangement of water supply from external resource	(i) Partial harvesting (ii) Addition of water (iii) Stocking of air breathing fishes	(i) Maintenances of remaining stock till favorable condition achieved (ii) If not feasible, total harvesting or transfer of fishes may be done. (iii) Preparation of the pond for next crop.
(ii) Impact of salt load build up in ponds / change in water quality	(i) Regular monitoring of water quality parameter. (ii) Arrangement of aeration (iii) Addition of water from external resource	(ii) Arrangement of aeration. (iii) Addition of water • Monitoring of water quality • Reduction of manuring according to water level.	
2) Floods			
B. Aquaculture			
(i) Inundation with flood water	(i) Elevation/ Renovation of pond dyke. (ii) Sale of Table/marketable size fishes (iii) construction of earthen nursery ponds in upland areas	Collection of naturally bred seeds (Spawn /fry /fingerling) from flooded water Stocking in nursery ponds for rearing	-Retain the water in pond immediately after flood through repairing of damaged dyke etc. -Netting of pond -Removal of unwanted, predatory/weed fishes -Sell of large size fishes
(ii) Water contamination and changes in water quality	Arrangement of regular water quality monitoring		
(iii) Health and diseases	(a) Use lime/ potassium permanganate (b) Arrangement of CIFAX and medicines & chemical stock		-Sampling of fishes and water for disease analysis - Liming, use of drugs/ medicine if required in consultancy of fisheries

			experts
(iv) Loss of stock and inputs (feed, chemicals etc)	Raising the height of dyke by fencing with net and bamboo poles to prevent loss of stock	Arrangement of advance size fingerling/ yearlings for stocking	Stocking of large size fingerlings carp Fertilization of pond and regular feeding of fish Harvesting and sale of fish
(v) Infrastructure damage (pumps, aerators, huts etc)	Repairing/ arrangement of alternate safe place to keep pumps aerators etc.	A regular water on the flood and infrastructure facilities.	Re establishment of the infra structural facility.
3. Cyclone / Tsunami			
A. Capture			
B. Aquaculture			
4. Heat wave and cold wave			
A. Capture			
B. Aquaculture			

[a] based on forewarning wherever available