State: Madhya Pradesh

Agriculture Contingency Plan for District: Umaria

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-Sub region (10.3)			
	Agro-Climatic Zone (Planning Commission)	Central Plateau And Hills Region (VIII)			
	Agro Climatic Zone (NARP)	Kymore Plateau And Satpura Hill Zone (MP-4)			
	List all the districts or part thereof falling under the NARP Zone	Shahdol, Sidhi, Anuppur, Dindori, Mandla, Umaria			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		23° 38' to 24° 20' N	**80° 28' to 82° 12' E**	457 msl	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Dindori			
	Mention the KVK located in the district	Programme Coordinator Krishi Vigyan Kendra, House No 8, R.I. Training Centre Campus, Distt. Umaria 484 661			
1.2	**Rainfall**	Normal RF(mm)	Normal Onset	Normal Cessation	
	SW monsoon (June-Sep):	1193.8	2nd week of June	1st week of October	
	NE Monsoon(Oct-Dec):	71.9			
	Winter (Jan -Feb)	70.1			
	Summer (March-May)	38.9			
	Annual	1374.7	-	-	

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)	374.7	211.0	76.5	32.2	4.1	28.8	0.3	21.8	25.5	25.1

* Net sown area + current fallow + old fallow

1. 4	Major Soils (common names like red sandy loam deep soils (etc.,)*	Percent (%) of total
	1. Deep soil	52.01
	2. Medium deep soil	20.5
	3. Shallow soil	27.4
	Others (specify):	-

Source: NBSS & LUP, Nagpur

1.5	Agricultural land use(2008-09)	Area ('000 ha)	Cropping intensity %
	Net sown area	160.4	121
	Area sown more than once	33.7	
	Gross cropped area	194.1	

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	19.4		
	Gross irrigated area	19.4		
	Rainfed area	141.0		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	27	2.9	14.9
	Tanks	205	0.8	4.1
	Open wells	3062	3.9	20.09
	Bore wells	1002	3.7	19.0
	Lift irrigation schemes river	NA	-	

	Micro-irrigation	-NA	-	
	Other sources (reservoir)	3670	8.10	41.72
	Total Irrigated Area		19.40	
	Pump sets	-	-	-
	No. of Tractors	-	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils 03	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	-
	Critical	-	-	-
	Semi- critical	-	-	-
	Safe	03	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	-		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

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

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**							
		Kharif			**Rabi**			**Summer**	**Total**
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**NA**	
	Rice	0.714	43.78	44.5	-			-	44.5
	Kodo Kutki		16.2	16.2	-			-	16.2
	Maize	-	10.40	10.4	-			-	10.4
	Pigeonpea (Tur)	-	6.4	6.4	-			-	6.4
	Blackgram		3.0	3.0					3.0
	Sesame		2.4	2.4					2.4
	Wheat				19.27	5.02	24.30		24.3
	Mustard					7.3			7.3
	Chickpea				1.26	4.73	6.00		6.0
	Lentil					5.8			5.8
	Linseed					3.3			3.3

	Horticulture crops – Fruits	Total area(ha)	Irrigated	Rainfed
	Mango	559	-	559
	Water Chestnut	46	-	46
	Aonla	297	-	297
	Papaya	38.50	38.50	-
	Guava	551	-	551
	Leman	223.75	-	223.75
	Banana	8.50	8.50	-
	Pomegranate	6.50	-	6.50
	Jackfruit	47.25	-	47.25
	Custard apple	35.100	-	35.100
	Karonda	16.50	-	16.50
	Others (specify)	147.200	-	147.200

Horticultural crops – Vegetables	Total area(ha)	Irrigated(ha)	Rainfed
Okra	181.5	181.5	-
Brinjal	134.4	134.4	-
Potato	217.0	217.0	-
Tomato	92.0	92.0	-
Chilies	45	45	-
Bottle gourd	67.0	67.0	-
Ridge gourd	26.0	26.0	-
Bitter gourd	45.0	45.0	-
Cowpea	110.0	110.05	-
Pumpkin	206.7	206.7	-
Radish	60.4	60.4	-
Arum	153.4	153.4	-
Tomato	202.5	202.5	-
Cauliflower	113.0	113.0	-

	Cabbage	104.5	104.5	-
	Sweet potato	39.75	39.7	-
	Carrot	16.25	16.2	-
	Leafy vegetables	62.2	62.2	-
	Onion	87.0	87.0	-
	Pea	180.0	180.0	-
	Watermelon	7.5	7.5	-
	Others (specify)	**23.7**	**23.7**	**-**

Medicinal and Aromatic crops -	**Total area**	**Irrigated**	**Rainfed**
Lemon grass	3.0	-	3.0
Palmarosa	0.50	-	0.50
Ashwagandha	31.0	-	31.0
Sandal wood	3.5	-	3.5
Kalemegh	15.0	-	15.0
Sataver	6.75	-	6.75
Others (specify)	12.75	-	12.75

	Plantation crops-	**Total area**	**Irrigated**	**Rainfed**
	-	**NA**	-	-
	Others such as industrial pulpwood crops etc (specify)	**-**	**-**	**-**
	Fodder crops-	**Total area**	**Irrigated**	**Rainfed**
	-	**NA**	-	-
	Others (specify)	-	-	-
	Total fodder crop area	-	-	-
	Grazing land	14,486	-	14,486
	Sericulture etc	-	-	-
	Others (Specify)	-	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			253.3
	Crossbred cattle			NA
	Non descriptive Buffaloes (local low yielding)			44.8
	Graded Buffaloes			2.4
	Goat			72.0
	Sheep			4.4
	Others (Pig + Horse etc.)			2.5
	Commercial dairy farms (Number)			NA
1.9	**Poultry**	**No. of farms -**	**Total No. of birds ('000)**	
	Commercial	**NA**	-	
	Backyard	-	72.118	

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**	
		141		**14**		**1379**	

	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)	1584	Village ponds 2000 kg/ha and Reservoirs 70 kg/ha	-
	Others	-	-	-

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.11 Production and Productivity of major crops

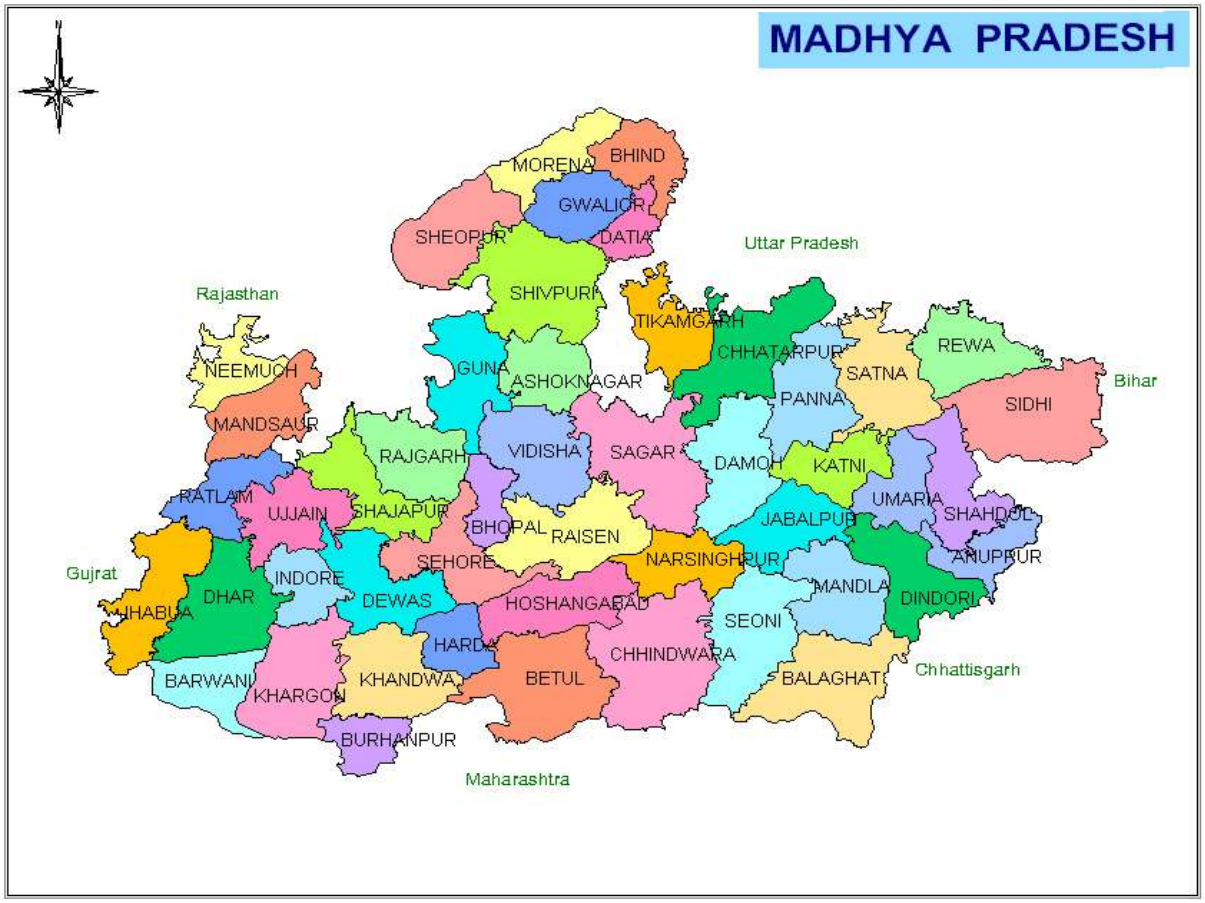
1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production (‘000 t)	Productivity (kg/ha)	Production (‘000 t)	Productivity (kg/ha)	Production (‘000 t)	Productivity (kg/ha)	Production (‘000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	RICE	26.9	723			-	-	26.9	723	-
	Kodo Kutki	5.0	282			-	-	5.0	282	-
	Maize	6.7	639			-	-	6.7	639	-
	Pigeon pea (Tur)	2.1	382			-	-	2.1	382	-
	Blackgram	0.7	240					0.7	240	
	Seasame	0.5	199			-	-	0.5	199	-
	Wheat			20.3	825			20.3	825	
	Mustard			2.8	374			2.8	374	
	Chickpea			2.5	434			2.5	434	
	Lentil			2.5	434			2.5	434	
	Linseed			1.1	317			1.1	317	
Major Horticultural crops (Crops to be identified based on total acreage) – .NA.										
	Mango					-	-	102.8	-	-
	Aonla					-	-	406.6	-	-
	Guava					-	-	661.1	-	-
	Okra- Tomato					-	-	461.95	-	-
	Brinjal					-	-	140.4	-	-
	-					-	-	64.93	-	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Kodo millet**	**Maize**	**Wheat**	**Chickpea**
	Kharif- Rainfed	1st week of June- 3rd week of July	2nd week of June – 2nd week of July	2nd week of June – 3rd week of June	-	-
	Kharif-Irrigated	3rd week of June- 3rd week of July	-	3rd week of June – 2nd week of July	-	-
	Rabi- Rainfed	-	-	-	2nd week of October- 4th week of October	2nd week of October -4th week of October
	Rabi-Irrigated	-	-	-	2nd week of November-2nd week of December	1st week of November – 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))- Rice – Stem borer and leaf blast Chickpea- Pod borer and wilt, Wheat- Termite	-	√	-
	Others (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
		Soil map as Annexure 3	Enclosed: Yes

Annexure I




AGRO CLIMATIC ZONES
BUNDELKHAND
CENTRAL NARMADA VALLEY
CHATTISGARH PLAIN BALAGHAT
GRID REGION
JHABUA HILLS
KYMORE PLATEAU SATPURA HILLS
MALWA PLATEAU
NIMAR PLAINS
NOTHERN HILL REGION OF CHATTISGARH
SATPURA PLATEAU
VINDHYA PLATEAU
AGROCLIMATIC ZONES OF MADHYA PRADESH
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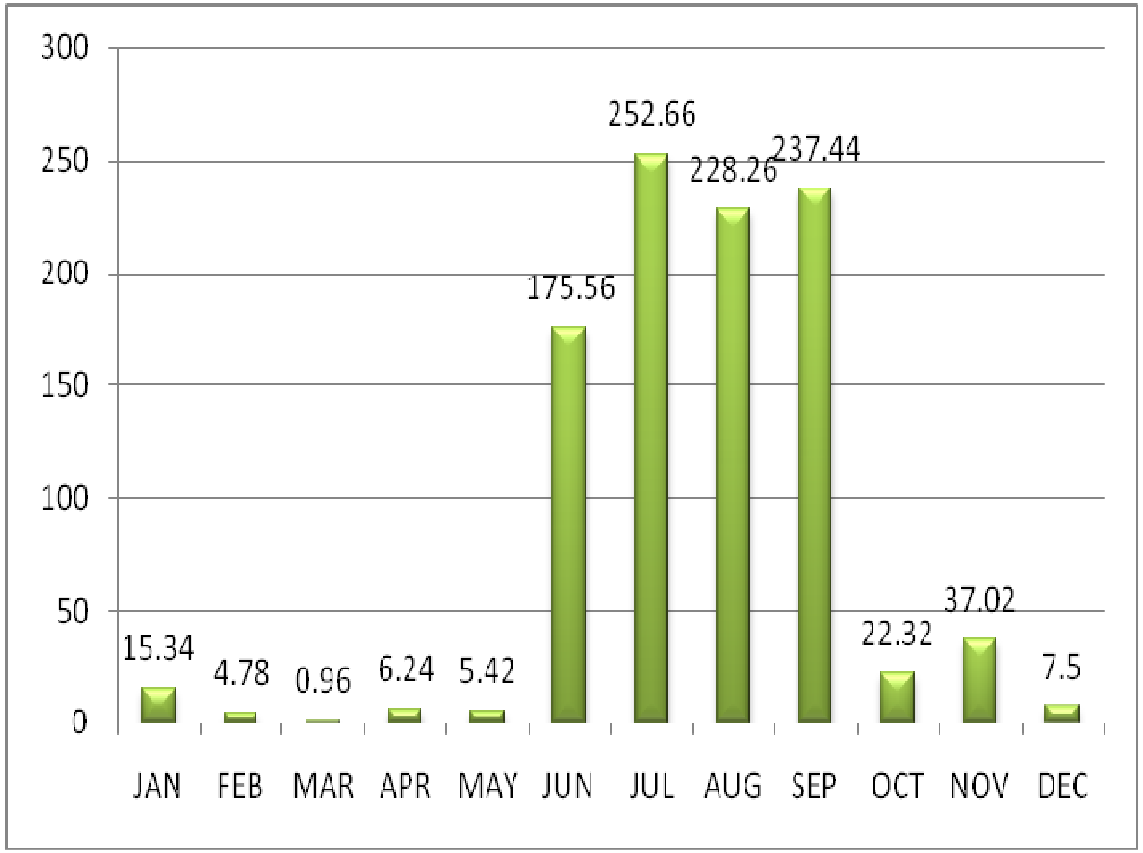
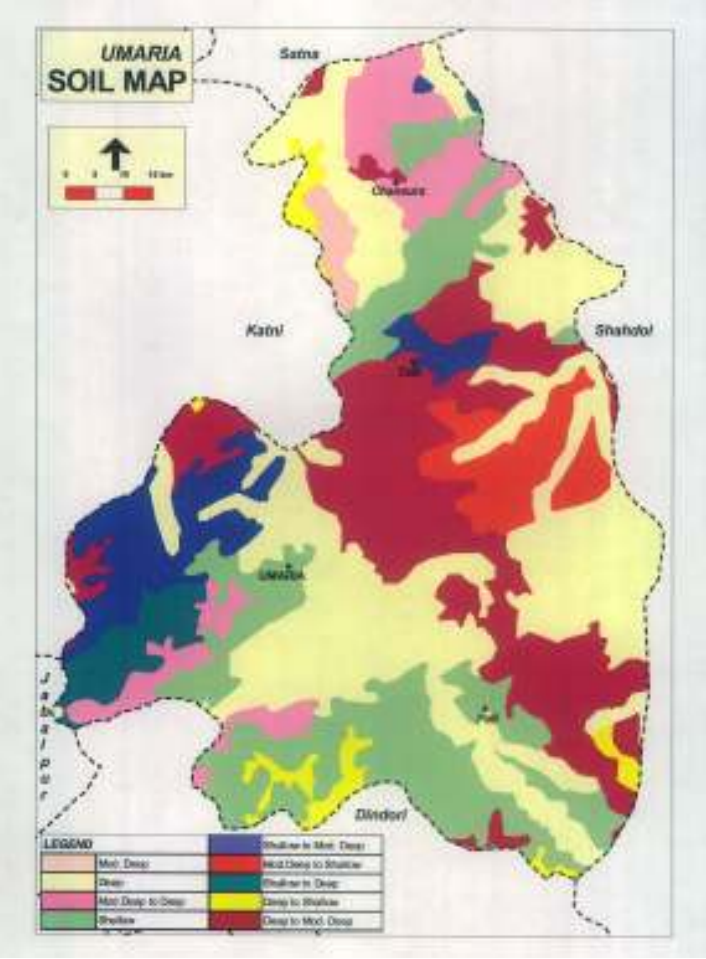
GWALIOR
DATIA
SHEOPUR
SHIVPURI
TIKAMGARH
CHHATARPUR
REWA
SATNA
PANNA
SIDHI
NIMACH
MANDSAUR
GUNA
ASHOKNAGAR
RAJGARH
VIDISHA
SAGAR
DAMOH
KATNI
UMARIA
SHAHDOL
SHAJAPUR
RATLAM
UJJAIN
BHOPAL
RAISEN
JABALPUR
ANUPPUR
SEHORE
NARSIMHAPUR
DINDORI
JHABUA
DHAR
INDORE
DEWAS
HOSHANGABAD
MANDLA
HARDA
SEONI
CHHINDWARA
WEST NIMAR
EAST NIMAR
BETUL
BALAGHAT
BARWANI
BURHANPUR
0
45
90
180
Kilometers

Annexure-II

Mean annual rainfall (mm)



Annexure-III



Source: NBSS & LUP, Nagpur

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**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **4th week of June**	Upland unbunded shallow soils	Maize	**No change**	Follow normal recommended package of practices Timely sowing can be done Dry sowing of paddy Lehi method of sowing in Rice Sowing of Maize by ridge & furrow method	Seed availability, SAU, Beej nigam, NSC, Farmers societies.
		Kodo			
		Kutki			
		Niger			
		Soybean			
	Upland bunded shallow (gravelly sandu) soils	Paddy			
		Maize (JM-21)			
		Pigeonpea			
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil			
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

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 **2nd week of July**	Upland unbunded shallow soils	Maize	**Donot sow maize** Prefer alternate crops like Sesame, kodo, kutki, Blackgram, Greengram and Pigeonpea.	Moisture conservation practices like ridging, conservation furrows, dust mulch etc.,	Seed availability, SAU, Beej nigam, NSC, Farmers societies.
		Kodo	**Kodo**- Jawahar Kodo-1, 2, 41,		

			62, 101, 147, 439, Jawahar-48, Jawahar, 155, JK-106		
		Kutki	**Kutki -** Jawahar Kutki 1, 2, 8, JK 36		
		Niger	**Niger**-–JNC-6, JNC-1, JNC-9, JVN-1		
		Soybean	**Soybean**: JS 335, JS 95-60 Or **Blackgram –** JU-2, JU-3, JU-86, T-9, JBG-623, LBG 684, TAU-1, Berkha, PU-30,35,19 **Or** **Greengram:** Pusa vishal, K851, JM721, Jawahar 99 - 37, Hum-1, Hum-2,Tarme-1 L.G.450, T.M.98-50, JM-98-90, PDM 11, 54 and 139		
	Upland bunded shallow(gravelly sandu) soils	Paddy	**Paddy**: JR- 201		
		Maize	**Donot sow maize** Prefer alternate crops like Sesame, kodo, kutki, Blackgram, Greengram and Pigeonpea.		
		Pigeonpea	**Pigeonpea-** Pragati ,Jagriti,,Asha ,Nmuber-148,JKM-7,JA-4, Type-21-Pusa-855, ICPL-85063 (Laxmi), JKM-189		
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil	**Paddy**: JR- 201		
		Paddy-Wheat/ lentil/Mustard			
		Soybean	**Soybean**: JS 335, JS 95-60		

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 **4th week of July**	Upland unbunded shallow soils	Maize Kodo Kutki Soybean	Maize intercropping with Caster **Donot sow soybean after 10th July** Donot sow Maize, Kodo, Kutki, Blackgram and Greegram Prefer alternate crops like kodo, kutki, Sesame and Niger **Sesame-** TKG -306, TKG-35, JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12, JT-1 **Niger**-–JNC-6, JNC-1, JNC-9, JVN-1 **Kodo**- Jawahar Kodo-1, 2, 41, 62, 101, 147, 439, Jawahar-48, Jawahar, 155, JK-106 **Kutki -** Jawahar Kutki 1, 2, 8, JK 36	Line sowing with seed treatment and balance fertilizer. Line sowing Blade harrowing (Bakhar) for moisture conservation Intercropping of Sesame and niger with Pigeonpea	Seed availability, SAU, Beej nigam, NSC, Farmers societies.
		Niger	**Niger**-–JNC-6, JNC-1, JNC-9, JVN-1		
	Upland bunded shallow(gravelly sandu) soils	Paddy Maize Pigeonpea	Prefer to sow alternate crops like kodo, kutki, Sesame and Niger		
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil Paddy-Wheat/ lentil/Mustard Soybean	Prefer to sow alternate crops like kodo, kutki, Sesame and		

			Niger **(Donot sow soybean after 10th July)**		

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 **2nd week of August**	Upland unbunded shallow soils	Maize	**Prefer alternate crops**, Niger, Castor in kharif and plan for early rabi crops like mustard, linseed ,lentil.	1. Blade harrowing (Bakhar) for moisture conservation 2. Intercropping of Sesame and Niger with Pigeonpea. 3. Moisture conservation by repeat ploughing. 4. Prepration of field for rabi crop 5. Line sowing is preferable	Source of seed SAU, NSC & SSC For Agronomic Measures the Ongoing scheme like RKVY NREGS etc
		Kodo			
		Kutki			
		Niger			
		Soybean			
	Upland bunded shallow(gravelly sandu) soils	Paddy			
		Maize			
		Pigeonpea			
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil			
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland unbunded shallow soils	Maize	1. Prefer alternate crops like Soybean, Pigeonpea, Greengram and Blackgram on bunds 2. Weed management by using hand hoe between crop row.	1. Blade harrowing (Bakhar) for moisture conservation 2. Adopt moisture conservation practices. 3. Conservation of excess rain water in high rainfall areas. 4. Mulching. 5. Provide light	Source of seed SAU, NSC & SSC For Agronomic Measures the Ongoing scheme like RKVY NREGS etc
		Kodo			
		Kutki			
		Niger			
		Soybean			
	Upland bunded shallow(gravelly sandu) soils	Paddy	1. Resowing of direct seeded rice 2. Drought resistant varieties		
		Maize			
		Pigeonpea			

			of Rice (JR 201),	irrigation through farm pond. 6.Re-sowing,	
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil Paddy-Wheat/ lentil/Mustard Soybean	**1.** Prefer alternate crops like Soybean, Pigeonpea, Greengram and Blackgram on bunds **2.** Weed management using hand hoe between crop row. **3.** Drought resistant varieties of Rice (JR 201),		

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Upland unbunded shallow soils	Maize Kodo Kutki Niger Soybean	Life saving irrigation if available Maintain optimum plant population	1. Provide Supplemental irrigation if available 2. Mulching, 3. Spray of anti-transpirants. 4. Interculture with Dora/Kulpha/Hand hoe in between rows 5. Use uprooted weeds as mulch for moisture conservation.	-
	Upland bunded shallow(gravelly sandu) soils	Paddy Maize Pigeonpea			
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil Paddy-Wheat/ lentil/Mustard Soybean			

				6. Ridges are made after 15-20 lines of crops for the moisture conservation 7. Adopt plant protection measures	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At Flowering stage	Upland unbunded shallow soils	Maize Kodo Kutki Niger Soybean	Life saving irrigation if available -	1. Interculture with Dora/Kulpha/H and hoe in between rows . 2. Use of uprooted weeds use as mulch for moisture conservation. 3. Ridges are made after 15-20 lines of crops for the moisture conservation 4. Adopt plant protection measures	-
	Upland bunded shallow(gravelly sandu) soils	Paddy Maize Pigeonpea			
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil Paddy-Wheat/ lentil/Mustard Soybean			

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**

	Upland unbunded shallow soils	Maize	1. Life saving irrigation through sprinkler. 2.Soil moisture conservation by use of mulch. 3.Prefer to sow short duration crop varieties .	1. Prefer to sow Lentil, Linseed, Cickpea, irrigated and unirrigated wheat 2. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed followed by treated with biofertilizers 3. Sowing of small seeded grains mix with FYM and vermicompos 4. Apply light irrigation to Kharif crops for proper grain filling if required and this will helpful in field preparation of *Rabi* crops	Source of seed SAU, NSC & SSC For Agronomic Measures the Ongoing scheme like RKVY NREGS etc
		Kodo			
		Kutki			
		Niger			
		Soybean			
	Upland bunded shallow(gravelly sandu) soils	Paddy			
		Maize			
		Pigeonpea			
	Lowland bunded deep and medium deep soils	Paddy-Chickpea/lentil			
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

2.1.2 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	Medium deep to deep soils	Paddy-Wheat/ lentil/Mustard Paddy-Chickpea/lentil	Green gram-Mustard/ Black gram-Wheat/ Black gram- Chickpea Fallow-Chickpea Medium duration variety of Rice (JRH-4,5,8, MTU 1010, IR-64, PS-3,5,)	Adopt water saving methods like direct seeded rice, SRI Cultivation, Aerobic rice **Wheat** Prefer short duration low water requirement varieties of wheat. Protective irrigation at CRI stage in wheat. **Chickpea** should be sown with residual moisture after harvest of soybean or give p re sowing irrigation to chickpea. Maintain optimum plant population	--

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Medium deep to deep soils	Rice-Wheat Rice -Chickpea	Rice-Chickpea / Green gram-Wheat(Early) Black gram/ Greengram-Wheat Limited irrigation requirement varieties of Wheat (JW 3020, JW 3173, 3269, HW 2004, Sujata) should be sown Limited irrigation requirement varieties of Chickpea (JG 218, 226, 130, 11, 14)	Adopt water saving methods like direct seeding seeded rice, SRI Cultivation, Aerobic rice **Blackgram/ Greengram:** Adopt *in-situ* moisture conservation practices at 30DAS Maintain optimum plant population Irrigate at critical stages Conservation tillage **Wheat** Prefer short duration low water requirement varieties of wheat. Protective irrigation at CRI stage in wheat. **Chickpea** should be sown with residual moisture after harvest of soybean or give p re sowing irrigation to chickpea	-

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	Medium deep to deep soils	Rice-Wheat Rice -Chickpea	Rice-Chickpea / Green gram-Wheat(Early) Blackgram-Chickpea/ wheat	**Blackgram/ Greengram:** Adopt *in-situ* moisture conservation practices at 30DAS Maintain optimum plant population Irrigate at critical stages Conservation tillage Farm bundin Deep ploughing Mulching	-

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

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	Not applicable				

2.2 Unusual rains (untimely, unseasonal etc]) (for both rain fed 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	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease out breaks	Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds Thresh after drying the sheaves properly Ensure proper grain moisture before storing
Maize	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation and at optimum soil moisture condition to loosen and aerate the soil and to control weeds Earthing up the crop for anchorage Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for Pink stem borer, sheath blight and Turcicum leaf blight	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for sheath blight and post flowering stalk rots	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Harvest the cobs after the they are dried up properly. Dry the grain to optimum moisture condition before storing
Pulses & Minor millets	Provide drainage, care should	Change care should be taken	Care should be taken that rain	Produce should be placed

	be taken that rain water does not stagnate in the field.	that rain water does not stagnate in the field.	water does not stagnate in the field.	under shade. Or protect the produce by tarpaulin kept in T flown
Wheat	Care should be taken that rain water does not stagnate in the field and not allow to top drashing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top drashing of nitrogenous fertilizers.	Proper drainage should be provided and adopt all plant protection measures	-
Chickpea	Care should be taken that rain water does not stagnate in the field and not allow to top drashing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top drashing of nitrogenous fertilizers.	Proper drainage should be provided and adopt all plant protection measures	
Heavy rainfall with high speed wind in a short span	Not applicable			
Out break of pests and diseases due to unseasonal rains				
Rice	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Removal and destruction of infected panicles due to Loose smut	-
Maize	Plant protection measures for stem borer, army worm. Control stem borer. For control of leaf blight spray Mancozeb @ 2.5g/l.	Plant protection measures for Rust, TLB. Control cob worm and rust PP measures for Stalk rot/rust//TLB by spraying Hexaconozole @ 0.1 %	Plant protection measures for Rust / TLB/Leaf spot in Maize	-
Soybean	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	-
Wheat	Spray 0.2 % mancozeb 76% WP against wheat rust.	Spray 0.2 % mancozeb 76% WP against wheat rust.	Carry out critical survey of fields for disease attack in crops	
Chickpea	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. "T" shaped pegs placed in late sown chickpea field for biological control of pod	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out critical survey of fields for insect and disease attack in crops	-

	and for chemical control spraying of Quinalphos 25 EC or Chloropyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 per hectare with duster.	borer and for chemical control spraying of Quinalphos 25 EC or Chloropyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 per hectare with duster.		
Horticulture				
Tomato	-	Use of Bird perchers @ 50/ha. Spray of Spray of Endosulfan @ 1.0 Lit /ha.against Fuit borer management at ETL	Spray of Endosulfan @ 1.0 Lit /ha.against Fuit borer management	-
Brinjal	-	Use of Bird perchrs @ 50/ha. Spray of Spray of Endosulfan @ 1.0 Lit /ha.against Fuit & shoot borer management at ETL	Spray of Endosulfan @ 1.0 Lit /ha.against Fuit borer management	-
Onion	-	Management of Chilli Thriphs Use of Imidacloprid @ 3ml/10 lit. of water	Management of Chilli Thriphs Use of Imidacloprid @ 3ml/10 lit. of water	-
Chilli	-	Management of Chilli Thriphs Use of Imidacloprid @ 3ml/10 lit. of water	Management of Chilli Thriphs Use of Imidacloprid @ 3ml/10 lit. of water	-
Cauliflower	-	Management of DBM , Aphids Use of Imidacloprid @ 3ml/10 lit. of water	Management of DBM , Aphids Use of Imidacloprid @ 3ml/10 lit. of water	-

2.3 Floods

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence	Not applicable			

for more than 2 days	
Sea water intrusion	

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	Light and repeated irrigation at the appearance of hair line cracks in soil surface, Correct iron deficiency with 0.5% iron sulphate spray.	Repeated irrigation at the appearance of hair line cracks in soil surface, pounding of water for 15 days after transplanting to check Fe deficiency and for crop establishment.	Repeated irrigation at the appearance of hairline cracks in soil surface	Harvest crop at physiological maturity
Maize, Pigeonpea and Blackgram	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation
Horticulture	-	-	-	-
Mango , Guava	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
Cold wave	-	-	-	-
Chick pea Wheat	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Harvest at physiological maturity
Frost				

Chickpea, Lentil, Pigeonpea	Give light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular -	Protect the crop with the help of light irrigation; Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular -	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary	Harvest at physiological maturity -
Horticulture				
Tomato	Delay or late raising of Nursery		Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary	-
Potato	Cold Toleratant Variety is grown i.e. Pusa Sheetal of Tomato			-
Chilli, Dhania Methi, Cauliflower	-	-		-
Hailstorm	-	-	-	-
Wheat, chickpea	Re-sowing in case of severe damage	Light and frequent irrigation.	• Apply 10% additional nitrogen • Light and frequent irrigation	Timely harvesting and shifting of produce to safer place in case of early forewarning
Mango , Guava- fruit crops	Not applicable	Prune damaged branches and twigs and apply Bordeaux paste 1% to avoid fungal infections	Prune damaged branches and twigs and apply Bordeaux paste 1% to avoid fungal infections Apply hormonal spray NAA 20 ppm + 1 % urea to prevent flower board	Immediate harvesting, grading and marketing of produce
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			

Feed and fodder availability	As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem Sowing of cereals (fodder varieties of Sorghum/ Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Collection of soybean and chick pea stover for use as feed supplement during drought Preserving the green maize fodder as silage Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp	Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc.,) material as fodder Harvest all the top fodder available (Subabul, Glyricidia, Pipel, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder Continuous supplementation of minerals and vitamin to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input subsidy Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon Encourage growing fodder crops like Berseem in winter and Juar in summer season Flushing the stock to recoup Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources De-silting of ponds	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water

	Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in sandies /community grazing areas		
Health and diseases management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods	**NA**		
Cyclone	NA		
Heat wave and cold wave			
Heat wave	i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

	shelter to animal to minimize heat stress	Put on the foggers / sprinklers /fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease	Culling of sick birds.	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one	Hygienic and sanitation of

management	De-worming and vaccination against RD and IBD	litre water)	poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	**NA**		
Cyclone	NA		
Heat wave and cold wave			
Shelter/environment management	**Heat wave:** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	De-worming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shallow water in ponds due to insufficient rains/inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks have to be developed. 3. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season

Impact of heat & salt load build up in ponds / change in water quality	1. Prepare to release water into the habitat	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms
Floods	**NA**		
Cyclone	**NA**		
Heat wave and cold wave			
Management of pond environment	Good water quality to be maintained, Water depth to be maintained	Recirculation of water and pruning	Water treatment with lime
Health and diseases management	Prophylactic measures to be taken	Maintain good quality water in ponds	Treatment of pond water with lime and medicines