State: Madhya Pradesh

Agriculture Contingency Plan for District: Betul

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 (10.2)		
	Agro-Climatic Region (Planning Commission)	Central Plateau And Hills Region (VIII)		
	Agro Climatic Zone (NARP)	Satpura Plateau Zone (MP-9)		
	List all the districts or part thereof falling under the NARP Zone	Chhindwara, Hardha, Hoshangabad , Narasimhapur and Betul		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21° 22' to 22° 24' N	77° 10' to 78° 33' E	660 msl
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station, Chhindwara		
	Mention the KVK located in the district	Programme Coordinator Krishi Vigyan Kendra, Betul Bazar, Distt. Betul – 460 004 (M.P.)		
1.2	**Rainfall**	Normal RF(mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	950.4	2nd Week of June	1st week of October
	NE Monsoon(Oct-Dec):	76.1		
	Winter (Jan- Feb.)	30.2	-	-
	Summer (Mar.-May)	24.6	-	-
	Annual	1081.3	-	-

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)	1007.8	404	396.7	46.8	27.3	40.9	0	26	30.6	34.9

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

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Deep soils	201.8	20.01
	Medium deep soil	208.8	20.8
	Shallow (red/black)soils	592.4	59.03

Source: NBSS & LUP Nagpur

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	404.6	139
	Area sown more than once	156.5	
	Gross cropped area	561.1	

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

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	115.9		
	Gross irrigated area	115.9		
	Rainfed area	288.7		
	Sources of Irrigation	Number	Area (000ha)	Percentage of total irrigated area
	Open wells	53150	71.6	61.5
	Canals	92	18.9	16.2
	Bore wells	3427	12.6	10.8
	Tanks	15	0.2	0.1
	Lift irrigation schemes	NA	-	
	Micro-irrigation	NA	18.9	

	Other sources (reservoir)	92	12.6	10.8
	Total Irrigated Area		115.9	
	Pump sets	48049		
	No. of Tractors	8610		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils 10	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-		-
	Critical	-		-
	Semi- critical	01		-
	Safe	09		-
	Wastewater availability and use	-	-	-
	Ground water quality	Good		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture etc.

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***			**Summer**	**Total**
		Irrigated	***Rainfed***	**Total**	***Irrigated***	***Rainfed***	**Total**		
	Soybean	-		189.4		-	-	NA-	189.4
	Sorghum	-		47.1	-	-	-	-	47.1
	Maize			42.4	-	-	-	-	42.4
	Rice	-		42.4	-	-		-	42.4
	Pigeonpea	-	-	24.5	-	-		-	24.5
	Niger			22.8					22.8
	Wheat						83.1		83.1
	Chickpea						34.0		34
	Sugarcane						5.4		5.4
	Pea						4.2		4.2
	Lentil						3.4		3.4
Total area (000 ha)		**Irrigated**			**Rainfed**				

	Mango	0.01		
	Guava	0.005		
	Orange	0.341		
	Others (specify)			
Total area(000 ha)		**Irrigated**	**Rainfed**	
	Cabbage	0.69		-
	Potato	0.83		-
	Brinjal	0.23		-
	Tomato	0.31		-
	Chili	1.72		-
	Garlic	0.31		
	Coriander	0.55		
	Cauliflower	0.62		
	Pea	0.41		

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

	Medicinal and Aromatic crops	**Total area**	**Irrigated**	**Rainfed**
	-	-	-	-
	Plantation crops			
	Others such as industrial pulpwood crops etc (specify)			
	Fodder crops	**Total area (000 ha.)**	**Irrigated**	**Rainfed**
		-	**-**	**-**
	Total fodder crop area	NA		
	Grazing land	27.3		
	Sericulture etc	0.078		
	Others (Specify)			

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

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	Non descriptive Cattle (local low yielding)			490.5
	Crossbred cattle			NA

	Non descriptive Buffaloes (local low yielding)			NA
	Graded Buffaloes			132.3
	Goat			153.2
	Sheep			2.5
	Others (Pig + Horse)	-	-	13.2
	Commercial dairy farms (Number)			NA
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	26	25452	
	Backyard	-	226876	

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)	
		NA					
	ii) Inland (Data Source: Fisheries Department)	**No. of Farmers owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		NA					
	B. Culture						

		Water Spread Area (ha)	**Yield (t/ha)**	**Production (m tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**NA**	**NA**	**NA**
	ii) **Fresh water** (Data Source: Fisheries Department)	4500		120
	Others			

1.11 Production and Productivity of major crops

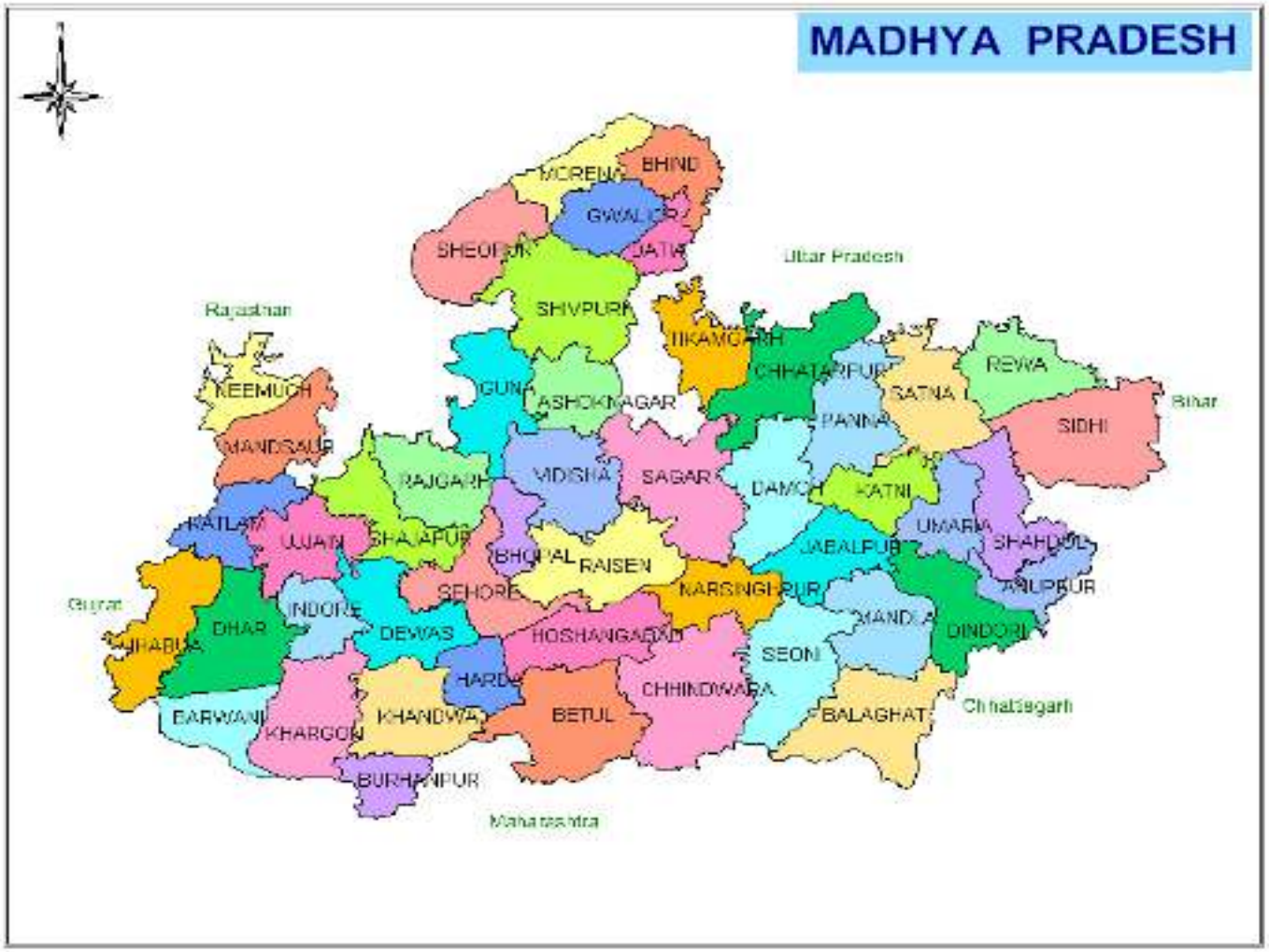
1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Soybean	180.6	1003			-		180.6	1003	
	Maize	63.5	1411					63.5	1411	
	Sorghum	48.7	1026					48.7	1026	
	Rice	40.4	1009					40.4	1009	
	Pigeonpea	17.7	691					17.7	691	
	Wheat			142.28	1610			142.2	1610	
	Sugarcane			22.62	4356			22.6	4356	
	Chickpea			19.74	634			19.7	634	
	Lentil			1.76	486			1.7	486	
	Pea			1.38	356			1.3	356	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Cabbage							2.8	20000	
	Potato							8.5	10302	
	Brinjal							3.5	15000	
	Tomato							2.1	21700	
	Chilli							1.4	856	

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Soybean**	**Maize**	**Rice**	**Wheat**	**Chickpea**
	Kharif- Rainfed	4th week of June – 1st week of July	2nd week of June- 4th week of June	3rd week of June- 4th week of July	-	-
	Kharif-Irrigated	-	2nd week of April- 2nd week of June	2nd week of June- 4th week of June	-	-
	Rabi- Rainfed	-	-	-	1st week of October- 3rd week of October.	1st week of October- 3rd week of October.
	Rabi-Irrigated	-	-	-	3rd week of October - 1st week of November.	3rd week of October - 4th week of October

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 (root rot in soybean, borer in gram and maize, blast in Rice)	√		
	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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MORENA
BHIND
GWALIOR
SHEOPUR
DATIA
Uttar Pradesh
Rajasthan
SHIVPURI
TIKAMGARH
CHHATARPUR
REWA
SATNA
Bihar
NEEMUCH
GUNA
ASHOKNAGAR
PANNA
SIDHI
MANDSAUR
RAJGARH
VIDISHA
SAGAR
DAMOH
KATNI
RATLAM
UJJAIN
SHAJAPUR
BHOPAL
RAISEN
JABALPUR
UMARIA
SHAHDOL
SEHORE
NARSINGHPUR
ANUPPUR
Gujrat
INDORE
DHAR
DEWAS
HOSHANGABAD
MANDLA
DINDORI
JHABUA
SEONI
HARDA
CHHINDWARA
KHANDWA
BETUL
BALAGHAT
Chhattisgarh
BARWANI
KHARGON
BURHANPUR
Maharashtra


AGROCLIMATIC ZONES
AGROCLIMATIC ZONES OF MADHYA PRADESH
MORENA
BHIND
GWALIOR
DATIA
SHEOPUR
SHIVPURI
TIKAMGARH
CHHATARPUR
REWA
SATNA
PANNA
SIDHI
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ASHOKNAGAR
NEEMUCH
MANDSAUR
RAJGARH
VIDISHA
SAGAR
DAMOH
KATNI
UMARIA
SHAHDOL
RATLAM
SHAJAPUR
UJJAIN
SEHORE
HOSHANGABAD
NARSINGHPUR
JABALPUR
ANUPUR
DINDORI
MANDLA
KHARGONE
DHAR
DEWAS
HARDA
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BARWANI
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BURHANPUR
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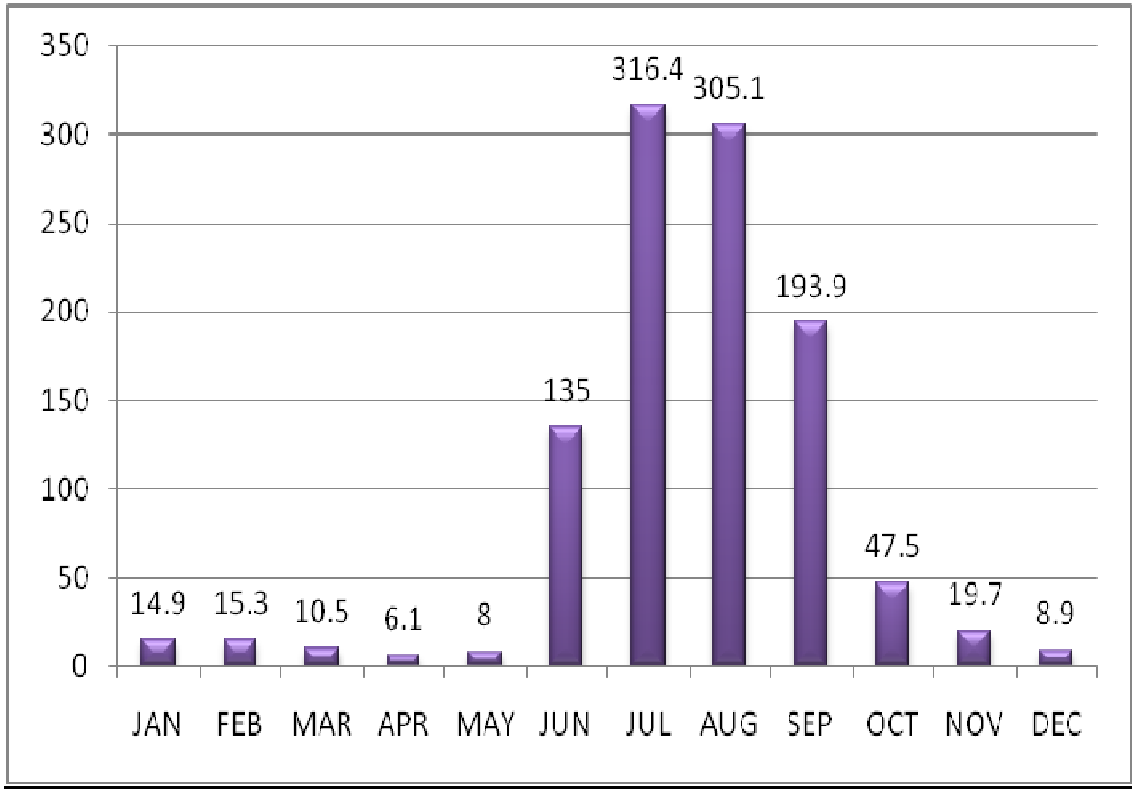
Kilometers

Annexure II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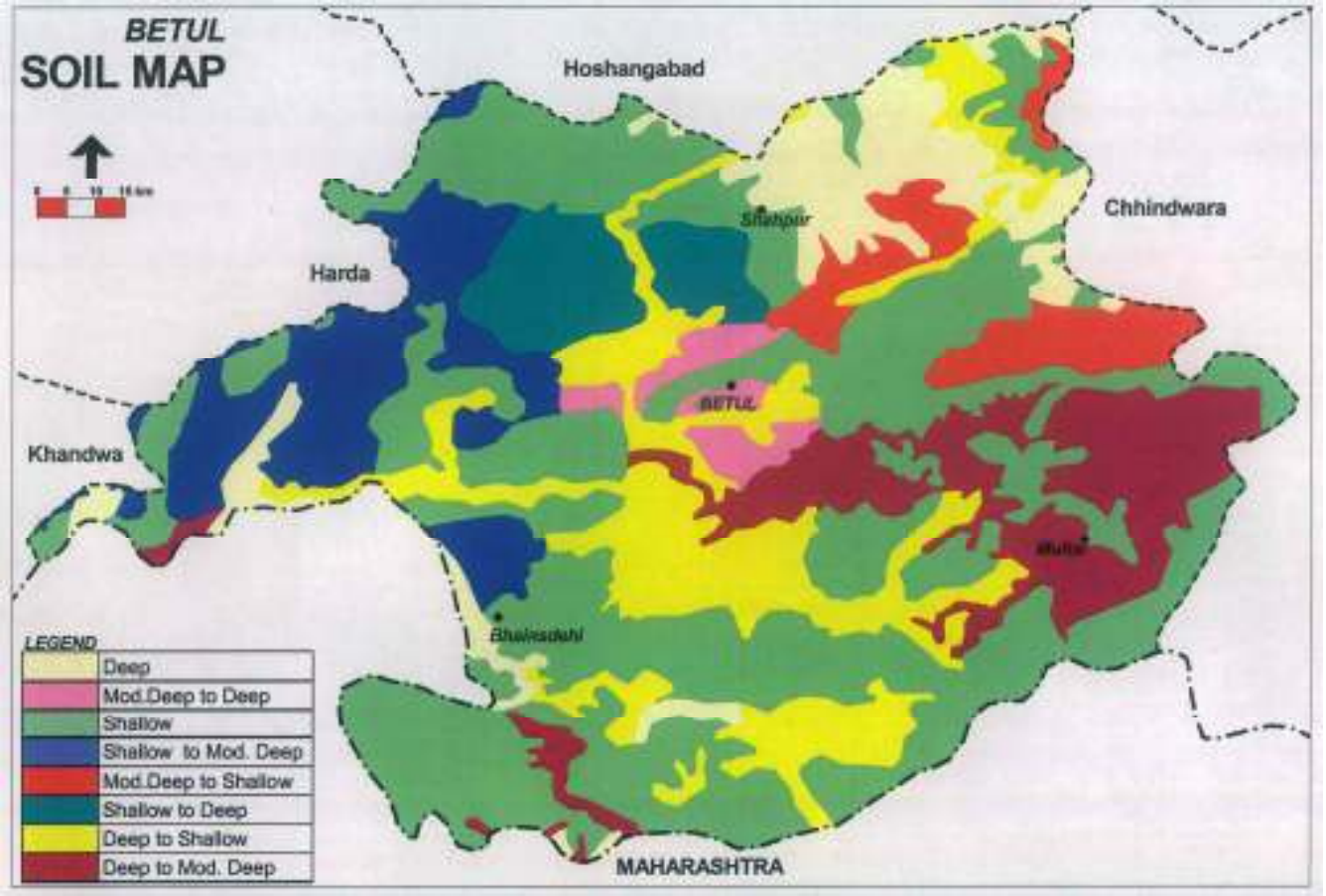
Annexure III



Source: NBSS & LUP, Nagpur

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rain fed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **(4th week of June)**	Rainfed, shallow red sandy loam soils	Soybean-Chickpea	No Change **Soybean**- JS-335 , JS 80-21,JS 97-52, JS 94-60, JS 93-05, PK-472,JS- 80-21, NRC-12, NRC-37, JS97-42	1. Prefer use of blade harrow (Bakhar) for moisture conservation and to control the weeds 2. For higher production adaptation of recommended package of practices. 3. Adaptation of moisture conservation practices. Conservation of excess rain water in high rainfall area in farm pondsand use as life saving irrigation according to situation. 4. Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) @/kg seed followed by treated with biofertilizers 5. Use of recommended fertilizer and biofertilizers. Application of Zinc 25 kg/ha after every 4 crop cycle 6. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 7. Transplanting of rice seedlings according to rainfall situation **8.** Use of Dora/Kulpha/Hand hoe for weeding between the row of	
		Sorghum	Hybrids: CSH-14,16,17,18 CSH-9,		
		Rice	**Rice-**Upland field: IR-36, JR-201, JR-503, vandna, porrnima, Ananda, Narendr 97, Govinda and hybrid rice JRH -4, 5 and 8		
		Pigeonpea	Pragati ,Jagrati,Asha ,Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) , JKM-189		
		Maize-Wheat	**Maize - Composite Varieties:** JJ-1022, JJ-741,JJ938,JJ-1041,SPV-946 **Blackgram** – JU-2,JU-3,JU-86,T-9, JBG-623,LBG684,TAU-1, Berkha, PU-30,35,19 **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 **Cotton**- JKH-4, JRA5166, JKH2, 8, 10, NNH-44, Maljari, Tapti, Khandwa-2, JMC-1, KWA23 , JK 35, BT cotton JK Hy-1,4		
		Niger	No Change		

				crops	
	Deep to medium deep soils	Soybean-Chickpea	No Change **Soybean**- JS-335 , JS 80-21,JS 97-52, JS 94-60, JS 93-05, PK-472,JS- 80-21, NRC-12, NRC-37, JS97-42		
		Sorghum	Hybrids: CSH-14,16,17,18 CSH-9,		
		Rice	**Rice-**Upland field: IR-36, JR-201, JR-503, vandna, porrnima, Ananda, Narendr 97, Govinda and hybrid rice JRH -4, 5 and 8		
		Pigeonpea	Pragati ,Jagrati,Asha ,Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) , JKM-189		
		Maize-Wheat	**Blackgram** – JU-2,JU-3,JU-86,T-9, JBG-623,LBG684,TAU-1, Berkha, PU-30,35,19 **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 **Cotton**- JKH-4, JRA5166, JKH2, 8, 10, NNH-44, Maljari, Tapti, Khandwa-2, JMC-1, KWA23 , JK 35, BT cotton JK Hy-1,4		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures** 1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weed in late sown monsoon 2. Don't sow the soybean, maize	**Remarks on Implementation**
Delay by 4 weeks	Shallow (red sandy loam) soils	Soybean-Chickpea	**Dont sow Soybean**		SAU, Beej Nigam, NSC
		Sorghum	**Greengram**-Pusa		

(2nd week of July)		Rice Pigeonpea Maize-Wheat	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 **Blackgram** – JU-2,JU-3,JU-86,T-9, JBG-623, LBG684,TAU-1, Berkha, PU-30, 35, 19 **Sesame** - TKG -306, TKG-35, JGS-8, JT-21, JT-22,JT-55, PKTS-11, PKTS12, JT-1 **Pigeonpea** - Pragti, Jagrati,Asha , Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi), JKM-189	sorghum and cotton and sowing c alternate crop like Greengran Blackgram , Sesame 3. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) @/kg seed followed by treated with biofertilizers 4. Use of balanced fertilizer and biofertilizer 5. Application of zinc in deficient areas. 6. Sowing of crops against the slope. 7. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 8. Adoption of plant protection as per requirement as rainfall condition 9. Timely weeding is done and use weed plant as mulch between rows of crops for moisture conservation 10. Application of biofertilizer and potash fertilizer under late sown condition 11. Intercropping in rainfed based area 12. Sowing of sesame and blackgram as intercrop	
		Niger	No Change		
	Deep to medium deep soils	Soybean-Chickpea	**Dont sow Soybean**		
		Sorghum	Greengram/ Greengram		
		Rice	**Rice-**Upland field: IR-36, JR-201, JR-503, vandna, porrnima, Ananda, Narendr 97, Govinda and hybrid rice JRH -4, 5 and 8		
		Pigeonpea	Pragati ,Jagrati,Asha ,Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) , JKM-189		
		Maize-Wheat	**Blackgram** – JU-2,JU-3,JU-86,T-9, JBG-623,LBG684,TAU-1, Berkha, PU-30,35,19 **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 **Cotton**- JKH-4, JRA5166, JKH2, 8, 10, NNH-44, Maljari, Tapti, Khandwa-2, JMC-1, KWA23 , JK		

			35, BT cotton JK Hy-1,4		

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)**	Rainfed, shallow (red sandy loam) soils	Soybean-Chickpea	**Dont sow Soybean**	1. Use of blade harrow (Bakhar) for moisture conservation .n 2. Don't sown the soybean, maize sorghum and cotton and sowing o alternate crop like greengram blackgram, sesame 3. Seed treatment with mixture of Thiram (1.5g)+ Dithane M-45 (1.5g) @/kg seed followed by treated with biofertilizers 4. Use of balanced fertilizer and biofertilizer according to recommendation to crop and application of zinc in deficient area. 5. Sowing of crops against the slope. 6. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 7. Application of biofertilizer and potash fertilizer under late sown condition 8. Intercropping in rainfed based area **9.** Sowing of Sesame and blackgram as intercrop	SAU, Beej Nigam, NSC
		Rice	**Niger**–JNC-6, JNC-1, JNC-9, JVN-1		
		Pigeonpea			
		Maize-Wheat			
		Niger			
	Deep to medium deep soils	Soybean-Chickpea	Dont sow soybean		
		Sorghum	**Sesame** - TKG -306, TKG-35, JGS-8, JT-21, JT-22,JT-55, PKTS-11, PKTS12, JT-1 **Niger**–JNC-6, JNC-1, JNC-9, JVN-1		
		Rice			
		Pigeonpea			
		Maize-Wheat			

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

onset)					
Delay by 8 weeks **(2nd week of August)**	Rainfed, shallow red sandy loam soils	Soybean-Chickpea Sorghum Rice Pigeonpea Maize-Wheat Niger	Sunflower and Niger **Niger**–JNC-6, JNC-1, JNC-9, JVN-1	1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weed in late sown monsoon 2. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) @/ kg seed followed by treated with bio-fertilizers **3.** Preparation of field for *Rabi* crops	SAU, Beej Nigam, NSC
	Deep to medium deep soils	Soybean-Chickpea Sorghum Rice Pigeonpea Maize-Wheat			

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea Sorghum Rice Pigeonpea Maize-Wheat Niger	Re-sowing with early matured varieties Gap filling. Intercultural operation.	1. Storage of water in lower side of the field and make use for life saving irrigation 2. Practice of Dora/Kulpha/Hand hoe in between rows and use of removed weeds use as mulch for moisture conservation. 3. Use of FYM and vermicompost at the time of sowing for increase of water holding capacity. 4. Ridges are made after 15-20 lines of crops for the moisture conservation 5. Use of plant protection measures	
	Deep to medium deep soils	Soybean-Chickpea Sorghum Rice Pigeonpea Maize-Wheat			
At vegetative stage	Scarce rainfall, shallow red sandy loam	Soybean-Chickpea / Sorghum Rice	Intercultural operations; Proper plant population	1. Storage of water in lower side of the field and make use for life saving irrigation in *Rabi* crops 2. Practice of Dora/ Kulpha/ Hand hoe	-

	soils	Pigeonpea		ing between rows and use of removed weeds use as mulch for moisture conservation 3. Ridges are made after 15-20 lines of crops for the moisture conservation 4. Use of plant protection measures 5. Mulching 6. Life saving irrigation through sprinklers	
		Maize-Wheat			
		Niger			
	Deep to medium deep soils	Soybean-Chickpea			
		Sorghum			
		Rice			
		Pigeonpea			
		Maize-Wheat			
At flowering/ fruiting stage	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea / Maize-Wheat	Life saving irrigation through sprinklers. Proper plant protection measures.	7. Storage of water in lower side of the field and make use for life saving irrigation in *Rabi* crops 8. Practice of Dora/ Kulpha/ Hand hoeing between rows and use of removed weeds use as mulch for moisture conservation. 9. Ridges are made after 15-20 lines of crops for the moisture conservation 10. Use of plant protection measures	
		Sorghum			
		Rice			
		Pigeonpea			
		Maize-Wheat			
		Niger			
	Deep to medium deep soils	Soybean-Chickpea			
		Sorghum			
		Rice			
		Pigeonpea			

Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
Early withdrawal of monsoon)	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea	Protective irrigation. Optimum plant population. Harvest crop at physiological stage	1. Adopt Moisture and weed Management practice, destroy the weed under early withdrawal of monsoon for rabi season 2. Preference will be given on sowing of Lentil, Linseed, Chickpea, irrigated and un irrigated wheat 3. Selection of short duration	Seed procurement through NFSM, RKVY, ISOPAM.
		Sorghum			
		Rice			
		Pigeonpea			
		Maize-Wheat			
		Niger			
	Deep to medium deep soils	Soybean-Chickpea			
		Sorghum			

		Rice Pigeonpea Maize-Wheat		of varieties 4. Diversification of crops 5. Line sowing of Lentil, Linseed, Chickpea in moisture zone 6. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed then after treated with biofertilizers 7. Sowing of small seeded grains mix with FYM and vermicompost	

2.1.2. Drought. Irrigated situation

Condition	**Suggested Contingency measures**				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea \Maize-Wheat	Chickpea, Lentil, Linseed will be preferred instead of wheat	1. Integrated approaches for moisture conservation will be followed. 2. Sprinkler irrigation will be preferred. 3. RDF will be as per the availability of irrigation water.	Seed management under NESM, RKVY, ISOPAM.

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	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea \Maize-Wheat	Chickpea, Lentil, Linseed will be preferred instead of wheat	1. Moisture conservation will be followed. 2. Sprinkler irrigation will be preferred.	Seed management under NESM, RKVY, ISOPAM

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				3. RDF will be as per the availability of irrigation water.	

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	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea \Maize-Wheat	25% increased seed rate of drought tolerant crop like toria, mustard, linseed etc. will be followed	1. Sprinkler irrigation will be preferred. 2. RDF will be as per the availability of irrigation water. 3. Mulching	Seed management under NESM, RKVY, ISOPAM

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	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea \Maize-Wheat	25% increased seed rate of drought tolerant crop like toria, mustard, linseed etc. will be followed	Sprinkler irrigation will be preferred. RDF will be as per the availability of irrigation water. Mulching	Awareness through training to farmer.

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	Scarce rainfall, shallow red sandy loam soils	Soybean-Chickpea , Maize-Wheat	Sowing of oilseed (linseed, mustard, safflower) and pulse (Chickpea, lentil) crops.	1. Integrated approaches for moisture conservation will be followed. 2. Sprinkler irrigation will be preferred.	Awareness through training to farmer

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				3. RDF will be as per the availability of irrigation water 4. Select early maturing crop variety.	

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**
Soybean	Provide drainage care should be taken that rain water does not stagnate in the field.	Care should be taken that rain water does not stagnate in the field. Interculture operation by hand hoe.	Care should be taken that rain water does not stagnate in the field. Harvesting in clear day. Keep the produce in safe place.	Produce should be placed under shade. or protect the produce by tarpaulin kept in T. floor
Maize	-	Maize-TLB pp measures	Maize-4 % Malathion dusting	Spraying of fungicide for avoiding secondary infection& proper drying of produce
Sorghum	Drain out excess water, Weeding and top dressing with urea	Drain out excess water	Drain out excess water, Tying up of lodged plants drying of ear heads and if it matured go for harvesting	Proper drying and storage of grains
Wheat	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers. Intercultural operation by hand hoe.	Proper drainage should be provided and adopt all plant protection measures. Harvesting in clear day. Keep the produce in safe place.	As above

Chickpea	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers; Intercultural operations by hand hoe.	Proper drainage should be provided and adopt all plant protection measures. Harvesting in clear day. Keep the produce in safe place.	As above
Heavy rainfall with high speed wind in a short span				
Outbreak of pests and diseases due to unseasonal rains				
Soybean	Carry out critical survey of fields for insect and disease attack in crops To control semi-looper spray NSKE 5% or quinalphos 25 EC 20 ml/10 lit.	Carry out critical survey of fields for insect and disease attack in crops To control semilooper spray NSKE 5% or quinalphos 25 EC 20 ml/10 lit.	Carry out critical survey of fields for insect and disease attack in crops	-
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	-
Sorghum	Early sowing of sorgum to control Shootfly. Use of carbofuran granules 3G 8-10kg/ha to control stem borer	Use of carbofuran granules to control midge	Use of systematic insecticide as dusting with carbrabryl powder(25kg/ha) to control Ear head bug Prefer grain mold resistant varieties	Quick drying to prevent molds
Wheat	Spray 0.2% Dithane M-45 WP against wheat rust.	Spray 0.2% Dithane M-45 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. ·	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence.	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out	-

	"T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC or methyl parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Quinalphos 1.5 WP 20-25 per hectare with duster.	"T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC or methyl parathion 50 EC@ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Quinalphos 1.5 WP 20-25 per hectare with duster.	critical survey of fields for insect and disease attack in crops	

2.3 Floods -Not Applicable

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days[2]				
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				
Soybean, Maize, Pigeonpea, Sorghum	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

Horticulture				
Vegetables	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	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
Hailstorm	Not applicable			
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, gram and chick pea stover for use as feed supplement during drought Motivating the sugarcane farmers to convert	Harvest and use biomass of dried up crops (sorghum, Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc.,) material as fodder Harvest all the top fodder available (Subabul, Glyricidia, Pipol, 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	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

	green sugarcane tops in to silage by the end of February 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	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	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-ilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and 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	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	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

	with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	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	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 shelter to animal to minimize heat stress	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 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.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
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 management	Culling of sick birds. De-worming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	**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