

**State: Madhya Pradesh**  
**Agriculture Contingency Plan for District: Mandla**

<b>1.0 District Agriculture profile</b>			
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>		
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-Sub region (10.4)	
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau And Hills Region (VII)	
	Agro Climatic Zone (NARP)	North Hill Zone of Chattisgarh (MP-3)	
	List all the districts or part there of falling under the NARP Zone	Shahdol, Mandla, Umaria, Anuppur, Dindori and Sangrauli	
	Geographic coordinates of district headquarters	Latitude	Longitude
		22° 20' to 23° 22' N	80° 18' to 81° 50' E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Dindori	
	Mention the KVK located in the district	Progranme Coordinator Krishi Vigyan Kendra, Mridu Kishore Colony, P.O. Binjhia, Jabalpur road, Distt. Mandla- 481 661	
<b>1.2</b>	<b>Rainfall</b>	<b>Normal RF(mm)</b>	<b>Normal Cessation</b>
	SW monsoon (June-Sep):	1289.3	2 <sup>nd</sup> week of June
	NE Monsoon (Oct-Dec):	61.7	-
	Winter (Jan- Feb)	54.7	-
	Summer (March-May)	39.4	-
	Annual	1445.1	-

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)	965.6	277.9	593.2	42.4	19.9	21.5	0.1	10.6	31.4	32.2

\* net sown area+current fallow+old fallow

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Percent (%) of total
	Deep soils	22.9
	Medium Deep soils	21.3
	Shallow soils	55.7

Source: NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area (Kharif & Rabi)	214.3	130
	Area sown more than once	64.7	
	Gross cropped area	279.0	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	20.4		
	Gross irrigated area	20.4		
	Rainfed area	193.9		
	<b>Sources of irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	67	15.9	77.9
	Tanks	3	0.18	00
	Open wells	3180	2.9	14.2
	Bore wells	00	00	00
	Lift irrigation schemes	NA	NA	NA
	Micro-irrigation	NA	NA	NA
	Other sources- <b>Reservoirs</b>	539	1.6	7.8

	Total irrigated area		20.4	
	Pump sets	3056		
	No. of tractors	637		
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	<b>No. of blocks/ Tehsils 09</b>	<b>(%) area</b>	<b>Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)</b>
	Over exploited	-		
	Critical	06	65	Fluoride, Saline
	Semi- critical	02	20	Fluoride
	Safe	01	15	
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

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

1.7	Area ('000 ha)								
	Major Field crops Cultivated	Kharif			Rabi			Summer	Total
Irrigated		Rainfed	Total	Irrigated	Rainfed	Total	NA		
	Rice	-	-	115.1	-	-	-	-	115.1
	Minor millets (Kodo-kutki)	-	-	39.7	-	-	-	-	39.7
	Maize	-	-	18.5	-	-	-	-	18.5
	Niger	-	-	8.3	-	-	-	-	8.3
	Pigeonpea	-	-	3.9	-	-	-	-	3.9
	Soybean	-	-	2.6	-	-	-	-	2.6
	Wheat	-	-	-	-	-	29.4	-	29.4
	Peas	-	-	-	-	-	16.8	-	16.8
	Mustard	-	-	-	-	-	16.2	-	16.2
	Lentil	-	-	-	-	-	14.8	-	14.8
	Chickpea	-	-	-	-	-	5.8	-	5.8

<b>Total area (ha)</b>		<b>Total area (ha)</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Mango	1468		
	Guava	682		
	Jackfruit	466		
	Aonla	390		
	Lime	381		
	Others (Specify)	--	--	--
	<b>Horticultural crops- Vegetables</b>	<b>Total area (ha)</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Pea	2868	2008	860
	Tomato	952	952	
	Potato	843	843	
	Cucurbits	801	801	
	Others (Specify) Brinjal	595	595	
	<b>Medicinal &amp; aromatic crops</b>	<b>Total area (ha)</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Charotha	39911		39911
	Harra	2000		2000
	Amla	6000		6000
	Mahua	3400		3400
	Char	2000		2000
	Tendu leaf	11000		11000
	Goand	1230		1230

	Lac	10122		10122
	Others (Specify) Spices crops			
	<b>Plantation crops</b>	<b>Total area</b>	<b>Irrigated</b>	<b>Rainfed</b>
	NA			
Others such as industrial pulpwood crops etc (Specify)				
	<b>Fodder crops</b>	<b>Total area (ha.)</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Berseem	110	110	
	Maize	65	65	
	Others (specify)			
	<b>Total Fodder crop area</b>	<b>175</b>	<b>175</b>	
	<b>Grazing land</b>	<b>19900</b>	<b>-</b>	
	<b>Sericulture etc.</b>	<b>44.8 ha</b>	<b>44.8 ha</b>	
	<b>Others (Specify)</b>			

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	82.0	359.6	441.6
	Crossbred cattle	0.8	2.7	3.5
	Non descriptive Buffaloes (local low yielding)	15.0	63.04	78.0
	Graded Buffaloes	0.2	0.6	0.8
	Goat	22.0	88.1	110.1
	Sheep	-	-	0.2
	Others (Pig and Horses)	-	-	23.9

	Commercial dairy farms (Number)			14		
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>			
	Commercial	12	126			
	Backyard	52	-			
	Duck	-	15			
1.10	<b>Fisheries (Data source: Chief Planning Officer)</b>					
	A. Capture					
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized		
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs	No. of village tanks	
		<b>743</b>	<b>50</b>		<b>17</b>	
	B. Culture					
		Water Spread Area (ha)		Yield	Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)					
	ii) Fresh water (Data Source: Fisheries Department)	2543		60 kg/ha		

### 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)							
	Rice	75.7	696	--	--	--	--	75.7	696	
	Maize	21.4	1179	--	--	--	--	21.4	1179	
	Kodo-Kutki	9.5	233	--	--	--	--	9.5	233	
	Pigeonpea	3.0	809	--	--	--	--	3.0	809	
	Soybean	1.1	733	--	--	--	--	1.1	733	
	Niger	1.6	203	--	--	--	--	1.6	203	
	Wheat	--	--	26.1	929	--	--	26.1	929	
	Chickpea	--	--	3.4	628	--	--	3.43	628	
	Peas	--	--	3.9	241	--	--	3.98	241	
	Lentil	--	--	5.8	408	--	--	5.86	408	
	Mustard	--	--	12.8	828	--	--	12.88	828	
	Linseed	--	--	1.5	346	--	--	1.52	346	

### Major Horticultural crops (Crops to be identified based on total acreage) NA

Major Horticultural crops (Crops to be identified based on total acreage) NA										
	Mango	29360								
	Guava	8184								
	Jackfruit	4660								

	Aonla	97.52							
	Lime	3810							

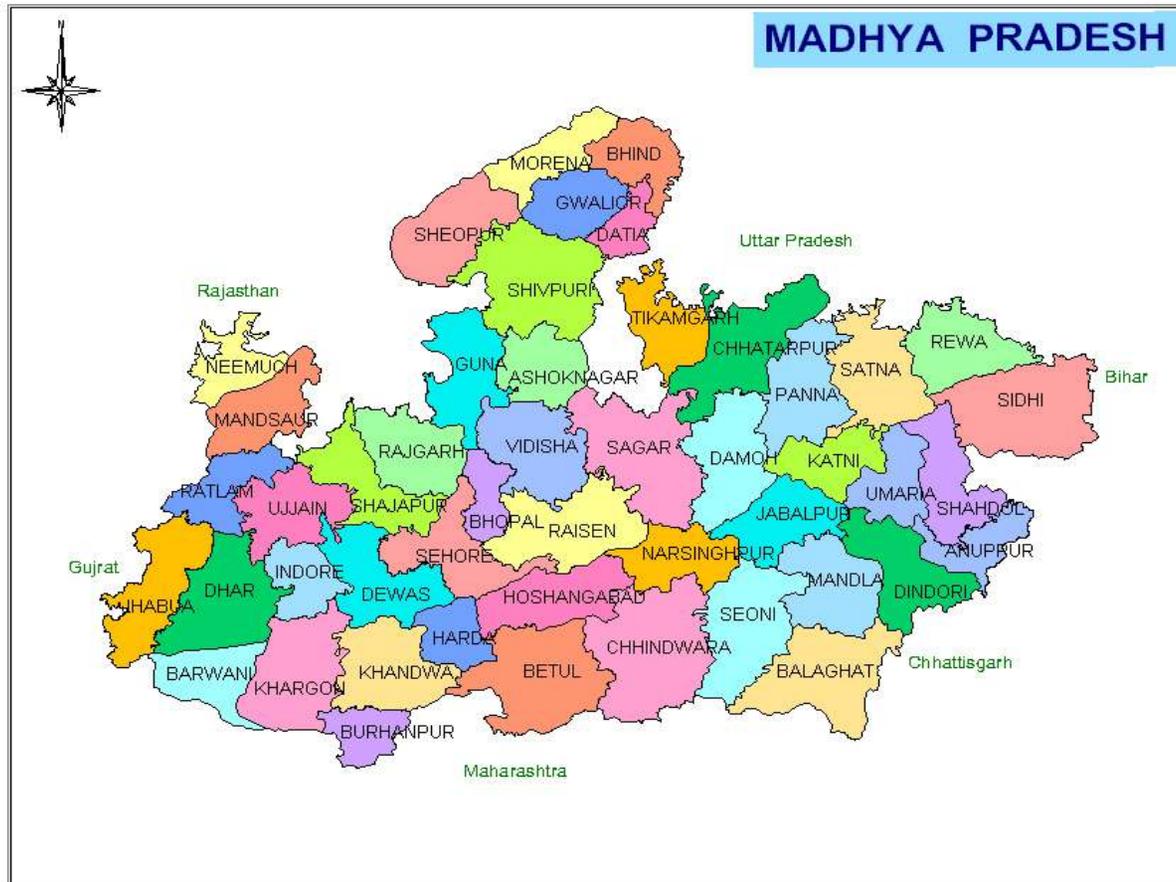
<b>1.12</b>	<b>Sowing window for 5 major field crops (start and end of normal sowing period)</b>	<b>Rice</b>	<b>Maize</b>	<b>Kodo, Kutki, Ragi</b>	<b>Niger</b>	<b>Pigeonpea</b>
	Kharif- Rainfed	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July	2 <sup>nd</sup> week of June – 4 <sup>th</sup> week of June	2 <sup>nd</sup> week of June - 4 <sup>th</sup> week of June	2 <sup>nd</sup> week of July – 2 <sup>nd</sup> week of August	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July
	Kharif-Irrigated	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July	-	-	-	-
		<b>Wheat</b>	<b>Chickpea</b>	<b>Peas</b>	<b>Lentil</b>	<b>Mustard</b>
	Rabi- Rainfed	3 <sup>rd</sup> week of October- 2 <sup>nd</sup> week of November	2 <sup>nd</sup> week of October – 2 <sup>nd</sup> week of November	2 <sup>nd</sup> week of October - 2 <sup>nd</sup> week of November	2 <sup>nd</sup> week of October – 1 <sup>st</sup> week of November	2 <sup>nd</sup> week of October – 4 <sup>th</sup> week of October
	Rabi-Irrigated	3 <sup>rd</sup> week of November- 3 <sup>rd</sup> week of December	2 <sup>nd</sup> week of November – 4 <sup>th</sup> week of November	-	-	-

<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	✓		
	Flood			✓
	Cyclone			✓
	Hail storm		✓	
	Heat wave		✓	
	Cold wave		✓	
	Frost		✓	

	Sea water intrusion			✓
	Pests and disease outbreak (specify)		✓	
	Others (specify)			

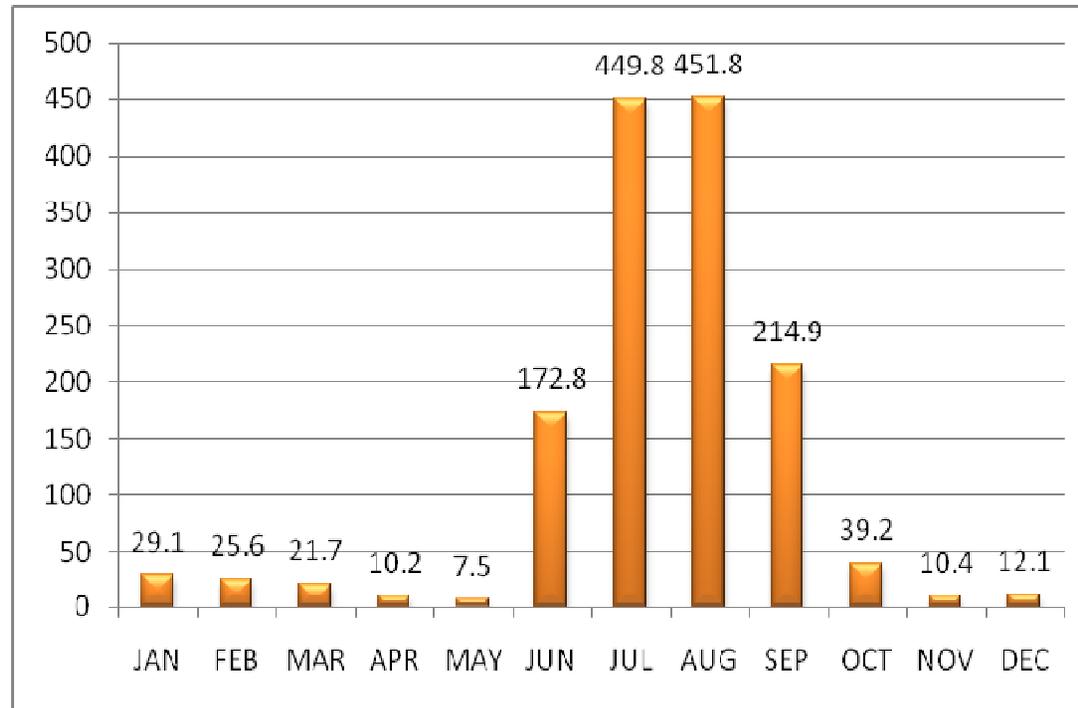
<b>1.14</b>	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure I

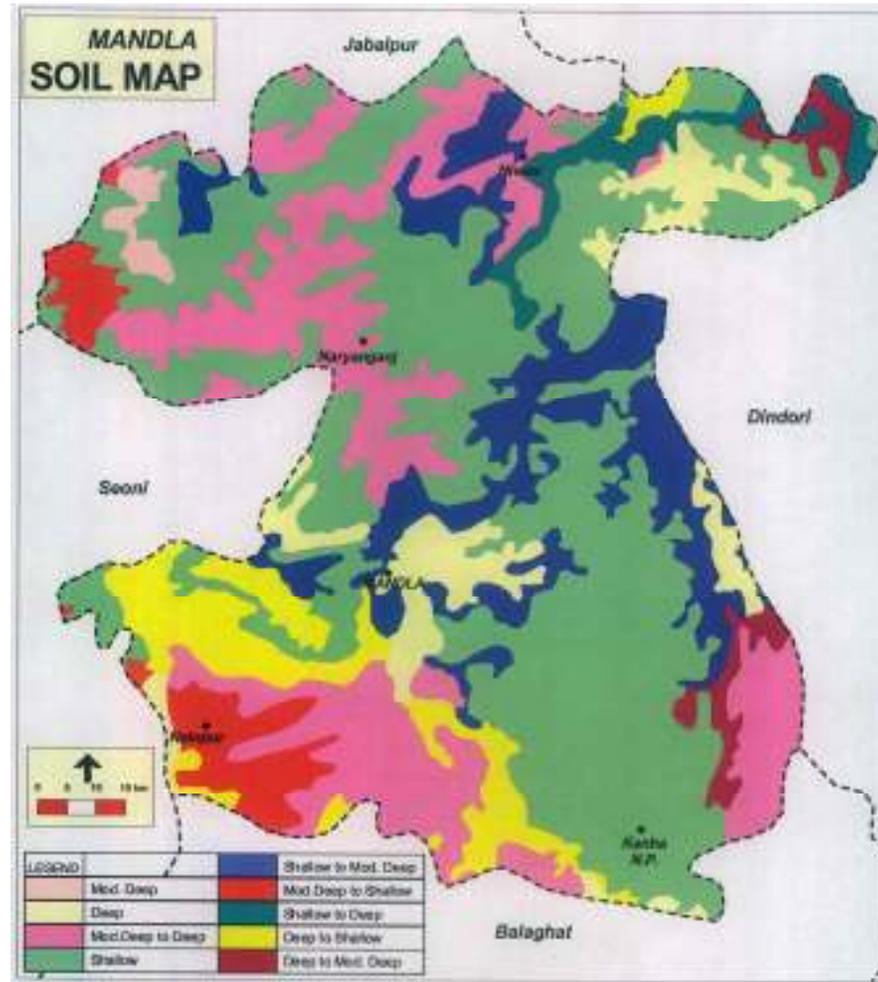




**Annexure II**



### Annexure III



Source: NBSS & LUP, Nagpur

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks 4 <sup>th</sup> week of June	Upland unbanded shallow soils	Maize Kodo Kutki Niger Soybean	No change	Follow normal recommended package of practices	Seed availability, SAU, Beej nigam, NSC, Farmers societies.
	Upland banded shallow (gravelly sandu) soils	Paddy Maize (JM-21) Pigeonpea		Timely sowing can be done	
	Lowland banded deep and medium deep soils	Paddy-Chickpea/lentil Paddy-Wheat/ lentil/Mustard Soybean		Dry sowing of paddy	
				Lehi method of sowing in Rice	
				Sowing of Maize by ridge & furrow method	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks 2 <sup>nd</sup> week of July	Upland unbanded 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	<b>Kodo-</b> Jawahar Kodo-1, 2, 41, 62, 101, 147, 439, Jawahar-48, Jawahar, 155, JK-106	
		Kutki	<b>Kutki</b> - Jawahar Kutki 1, 2, 8, JK 36	
		Niger	<b>Niger</b> --JNC-6, JNC-1, JNC-9, JVN-1	
		Soybean	<b>Soybean:</b> JS 335, JS 95-60 Or <b>Blackgram</b> – JU-2, JU-3, JU-86, T-9, JBG-623, LBG 684, TAU-1, Berkha, PU-30,35,19  <b>Or</b> <b>Greengram:</b> 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	
	<b>Upland banded shallow (gravelly sandu) soils</b>	Paddy	<b>Paddy:</b> JR- 201	
		Maize	<b>Donot sow maize</b>  Prefer alternate crops like Sesame, kodo, kutki, Blackgram, Greengram and Pigeonpea.	
		Pigeonpea	<b>Pigeonpea-</b> Pragati ,Jagriti,,Asha ,Nmuber-148,JKM-7,JA-4, Type-21-Pusa-855, ICPL-85063 (Laxmi), JKM-189	
	<b>Lowland banded deep and medium deep soils</b>	Paddy-Chickpea/lentil	<b>Paddy:</b> JR- 201	
		Paddy-Wheat/ lentil/Mustard		
		Soybean	<b>Soybean:</b> 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 4 <sup>th</sup> week of July	Upland unbunded shallow soils	Maize	Maize intercropping with Caster  <b>Donot sow soybean after 10<sup>th</sup> July</b>  Donot sow Maize, Kodo, Kutki, Blackgram and Greegram  Prefer alternate crops like kodo, kutki, Sesame and Niger  <b>Sesame-</b> TKG -306, TKG-35, JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12, JT-1  <b>Niger</b> —JNC-6, JNC-1, JNC-9, JVN-1  <b>Kodo-</b> Jawahar Kodo-1, 2, 41, 62, 101, 147, 439, Jawahar-48, Jawahar, 155, JK-106  <b>Kutki -</b> 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.
		Kodo			
		Kutki			
		Soybean			
	Niger	<b>Niger</b> —JNC-6, JNC-1, JNC-9, JVN-1			
	Upland bunded shallow (gravelly sandu) soils	Paddy	Prefer to sow alternate crops like kodo, kutki, Sesame and		
	Maize				
	Pigeonpea				

			Niger		
	<b>Lowland banded deep and medium deep soils</b>	Paddy-Chickpea/lentil	Prefer to sow alternate crops like kodo, kutki, Sesame and Niger  <b>(Donot sow soybean after 10<sup>th</sup> July)</b>		
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures					
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation			
Early season drought (delayed onset)								
Delay by 8 weeks  2 <sup>nd</sup> week of August	Upland unbanded 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 banded shallow(gravelly sandu) soils	Paddy						
		Maize						
		Pigeonpea						
	Lowland banded deep and medium deep soils	Paddy-Chickpea/lentil						
		Paddy-Wheat/ lentil/Mustard						
						Soybean		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
Normal onset followed by 15-20	Upland unbanded shallow soils	Maize	1. Prefer alternate crops like Soybean, Pigeonpea,	1. Blade harrowing (Bakhar) for moisture	Source of seed SAU, NSC & SSC
		Kodo			

days dry spell after sowing leading to poor germination/crop stand etc.		Kutki	Greengram and Blackgram on bunds 2. Weed management by using hand hoe between crop row.	conservation 2. Adopt moisture conservation practices. 3. Conservation of excess rain water in high rainfall areas. 4. Mulching. 5. Provide light irrigation through farm pond. 6.Re-sowing,	For Agronomic Measures the Ongoing scheme like RKVY NREGS etc
		Niger			
		Soybean			
	<b>Upland banded shallow(gravelly sandu) soils</b>	Paddy	1. Resowing of direct seeded rice 2. Drought resistant varieties of Rice (JR 201),		
		Maize			
		Pigeonpea			
	<b>Lowland banded deep and medium deep soils</b>	Paddy-Chickpea/lentil	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),		
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

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

				<p>Use uprooted weeds as mulch for moisture conservation.</p> <p>Ridges are made after 15-20 lines of crops for the moisture conservation Adopt plant protection measures</p>	
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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)					
At Flowering stage	Upland unbunded shallow soils	Maize	Life saving irrigation if available	<ol style="list-style-type: none"> <li>1. Interculture with Dora/Kulpha/H and hoe in between rows .</li> <li>2. Use of uprooted weeds use as mulch for moisture conservation.</li> <li>3. Ridges are made after 15-20 lines of crops for the moisture conservation</li> <li>4. Adopt plant protection measures</li> </ol>	-
		Kodo			
		Kutki			
		Niger			
		Soybean			
	Upland banded shallow(gravelly sandu) soils	Paddy			
		Maize			
		Pigeonpea			
	Lowland banded deep and medium deep soils	Paddy-Chickpea/lentil			
		Paddy-Wheat/ lentil/Mustard			
Soybean					

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	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, Chickpea, 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 banded shallow (gravelly sandu) soils	Paddy			
		Maize			
		Pigeonpea			
	Lowland banded deep and medium deep soils	Paddy-Chickpea/lentil			
		Paddy-Wheat/ lentil/Mustard			
		Soybean			

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			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	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  <b>Wheat</b> Prefer short duration low water requirement varieties of wheat.  Protective irrigation at CRI stage in wheat.  <b>Chickpea</b> should be sown with residual moisture after harvest of soybean or give pre sowing irrigation to chickpea.  Maintain optimum plant population	--
		Paddy-Chickpea/lentil			

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 / 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  <b>Blackgram/ Greengram:</b> Adopt <i>in-situ</i> moisture conservation practices at 30DAS  Maintain optimum plant population  Irrigate at critical stages  Conservation tillage <b>Wheat</b> Prefer short duration low water requirement varieties of wheat.  Protective irrigation at CRI stage in wheat.  <b>Chickpea</b> should be sown with residual moisture after harvest of soybean or give pre sowing irrigation to chickpea	-
		Rice -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 / Green gram-Wheat(Early) Blackgram-Chickpea/ wheat	<b>Blackgram/ Greengram:</b> Adopt <i>in-situ</i> moisture conservation practices at 30DAS  Maintain optimum plant population  Irrigate at critical stages  Conservation tillage Farm bundin  Deep ploughing  Mulching	-
		Rice -Chickpea			

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)**

<b>Condition</b>	<b>Suggested contingency measure</b>			
	<b>Vegetative stage</b>	<b>Flowering stage</b>	<b>Crop maturity stage</b>	<b>Post harvest</b>
<b>Continuous high rainfall in a short span leading to water logging</b>				
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 <sub>3</sub> 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 <sub>3</sub> 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	
<b>Heavy rainfall with high speed wind in a short span</b>	Not applicable			
<b>Out break of pests and diseases due to unseasonal rains</b>				
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 Hexaconazole @ 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 and for chemical	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 and for chemical	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	-

	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.	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.		
<b>Horticulture</b>				
Tomato	-	Use of Bird perchrs @ 50/ha. 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 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 Thrips Use of Imidacloprid @ 3ml/10 lit. of water	Management of Chilli Thrips Use of Imidacloprid @ 3ml/10 lit. of water	-
Chilli	-	Management of Chilli Thrips Use of Imidacloprid @ 3ml/10 lit. of water	Management of Chilli Thrips 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 <sup>o</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Continuous submergence for more than 2 days	Not applicable			

<b>Sea water intrusion</b>	
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#### 2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave</b>	-	-	-	-
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	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
<b>Horticulture</b>	-	-	-	-
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
<b>Cold wave</b>	-	-	-	-
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
<b>Frost</b>				
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 -

		-		
<b>Horticulture</b>				
Tomato	Delay or late raising of Nursery		Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature	-
Potato	Cold Tolerant Variety is grown i.e. Pusa Sheetal of Tomato			-
Chilli, Dhania Methi, Cauliflower	-	-		-
<b>Hailstorm</b>	-	-	-	-
Wheat, chickpea	Re-sowing in case of severe damage	Light and frequent irrigation.	<ul style="list-style-type: none"> <li>• Apply 10% additional nitrogen</li> <li>• Light and frequent irrigation</li> </ul>	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
<b>Cyclone</b>	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
<b>Drought</b>			
Feed and fodder availability	As the district is occasionally prone to drought the following practices may be implemented to	Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc., ) material as	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input

	<p>prevent fodder shortage problem</p> <p>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.</p> <p>Collection of soybean and chick pea stover for use as feed supplement during drought</p> <p>Preserving the green maize fodder as silage</p> <p>Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp</p>	<p>fodder</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies &amp; 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</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals and vitamin to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	<p>subsidy</p> <p>Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon</p> <p>Encourage growing fodder crops like Berseem in winter and Juar in summer season</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>
<p>Drinking water</p>	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>De-silting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>

	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
<b>Floods</b>	<b>NA</b>		
<b>Cyclone</b>	<b>NA</b>		
<b>Heat wave and cold wave</b>			
<b>Heat wave</b>	<ul style="list-style-type: none"> <li>i) Plantation around the shed</li> <li>ii) H<sub>2</sub>O sprinklers / foggers in the shed</li> <li>iii) Application of white reflector paint on the roof</li> <li>iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress</li> </ul>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers /fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>

		should be added in H <sub>2</sub> O during heat waves.	
<b>Cold wave</b>	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)
<b>Insurance</b>	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

		<b>Suggested contingency measures</b>	
		<b>Before the event</b>	<b>During the event</b>
			<b>After the event</b>
<b>Drought</b>			
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
<b>Floods</b>	<b>NA</b>		
<b>Cyclone</b>	<b>NA</b>		

<b>Heat wave and cold wave</b>			
<b>Shelter/environment management</b>	<b>Heat wave:</b> 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
	<b>Cold wave:</b> 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
<b>Health and disease management</b>	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

	<b>Suggested contingency measures</b>		
	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>Drought</b>			
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
<b>Floods</b>	NA		
<b>Cyclone</b>	NA		
<b>Heat wave and cold wave</b>			

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