

## State: MADHYA PRADESH

### Agriculture Contingency Plan for District: SAGAR

1.0 District Agriculture profile				
1.1	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-Region (10.1)		
	Agro-Climatic Region (Planning Commission)	Central Plateau And Hills Region (VIII)		
	Agro Climatic Zone (NARP)	Vindhya Plateau Zone (MP-5)		
	List all the districts or part thereof falling under the NARP Zone	Bhopal, Sehore, Raisen, Vidisha, Sagar, Damoh		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		23° 10' to 24° 27' N	78° 40' to 79° 21' E	810 msl
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Agricultural Research Station , Bhopal Road, Sagar		
Mention the KVK located in the district	Programme Coordinator, Krishi Vigyan Kendra, Zonal Agril. Res. Station Bamhori, P.O. Rajaua Distt. Sagar – 470002			

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep)	1086.7	48	2 <sup>nd</sup> week of June	1 <sup>st</sup> week of October
	NE Monsoon(Oct-Dec)	54.5	4		
	Winter (Jan-Feb)	38.5	3		
	Summer (March-May)	17.9	1		
	Annual	1197.6	56		

<b>1.3</b>	Land use pattern of the district	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)	1022.8	537.4	298.0	53.0	85.4	10.3	1.3	14.6	9.50	13.30

<b>1.4</b>	<b>Major Soils</b>	<b>Area ('000 ha)</b>	<b>Percent (%) of total</b>
	1. Deep black soils	573	55.9
	2. Shallow soils	289	28.2
	3 Medium deep black soils	160.8	15.7

Source: NBSS & LUP, Nagpur

<b>1.5</b>	<b>Agricultural land use</b>	<b>Area ('000 ha)</b>	<b>Cropping intensity %</b>
	Net sown area	537.4	137
	Area sown more than once	198.9	
	Gross cropped area	736.3	

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>		
	Net irrigated area	241		
	Gross irrigated area	241.1		
	Rainfed area	296.4		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>Percentage of total irrigated area</b>
	Canals	43	8.2	3.4
	Tanks	34	2.6	1.07
	Open wells	54202	117	47.9
	Bore wells	7087	37	15.2
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (Reservoir)	12	76.30	31.28
	Total Irrigated Area		241.10	
	Pump sets	3500		
	No. of Tractors	8000		

	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils 11	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe	All the block	100%	
	Wastewater availability and use	115612 han		
	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	Major Field Crops cultivated	Area ('000 ha)							
		Kharif			Rabi			Summer	Total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Soybean			254.9					254.9
	Blackgram			22.7					22.7
	Rice			8.7					8.7
	Maize			8.0					8.0
	Sorghum			4.3					4.3
	Chickpea						197		197
	Wheat						180		180
	Lentil						66		66
	Pea						8		8
	Linseed						6.3		6.3
<b>Horticulture crops – Fruits</b>		<b>Total area ('000 ha)</b>			<b>Irrigated</b>		<b>Rainfed</b>		
	Citrus	0.23							
	Papaya	0.17							
	Guava	0.15							
	Mango	0.04							
	Aonla	0.17							
<b>Horticultural crops – Vegetables</b>		<b>Total area ('000 ha)</b>			<b>Irrigated</b>		<b>Rainfed</b>		
	Potato	1.4							

	Onion	0.9		
	Tomato	0.9		
	Okra	0.3		
	Brinjal	0.7		
	Cauliflower	0.15		
	Chilli	0.6		
	Coriander	0.3		

	Medicinal and Aromatic crops	Total area ('000 ha)	Irrigated	Rainfed
	Safed musli	0.2		
	Satavar	0.01		
	Lemon grass	0.03		
	Ashwagandha	0.015		

	Plantation crops	Total area ('000 ha)	Irrigated	Rainfed
	<b>Fodder crops</b>			
	M.P. Chari	0.1		
	Jowar Chari	0.01		
	Barseem	0.06		
	Lucern	0.1		
	Bajra Chari	0.06		
	Maize +oat	0.02		
	<b>Total fodder crop area</b>	0.29		
	<b>Grazing land</b>	49.8		
	<b>Sericulture etc</b>	0.8		

<b>1.8</b>	<b>Livestock</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>			
	Non descriptive Cattle (local low yielding)			857653			
	Crossbred cattle			128648			
	Non descriptive Buffaloes (local low yielding)			246605			
	Graded Buffaloes			49321			
	Goat			139596			
	Sheep			700			
	Others (Pig + Horses)			4594			
Commercial dairy farms (Number)							
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds (*000)</b>				
	Commercial						
	Backyard		83815				
	Total						
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>						
	<b>A. Capture</b>						
	i) <b>Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	<b>Not applicable</b>						
	ii) <b>Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
		03		31		274	
	<b>B. Culture</b>						
			<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>		<b>Production (*tons)</b>
	i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)						
ii) <b>Fresh water</b> (Data Source: Fisheries Department)		121.5				440	

### 1.11 Production and Productivity of major crops

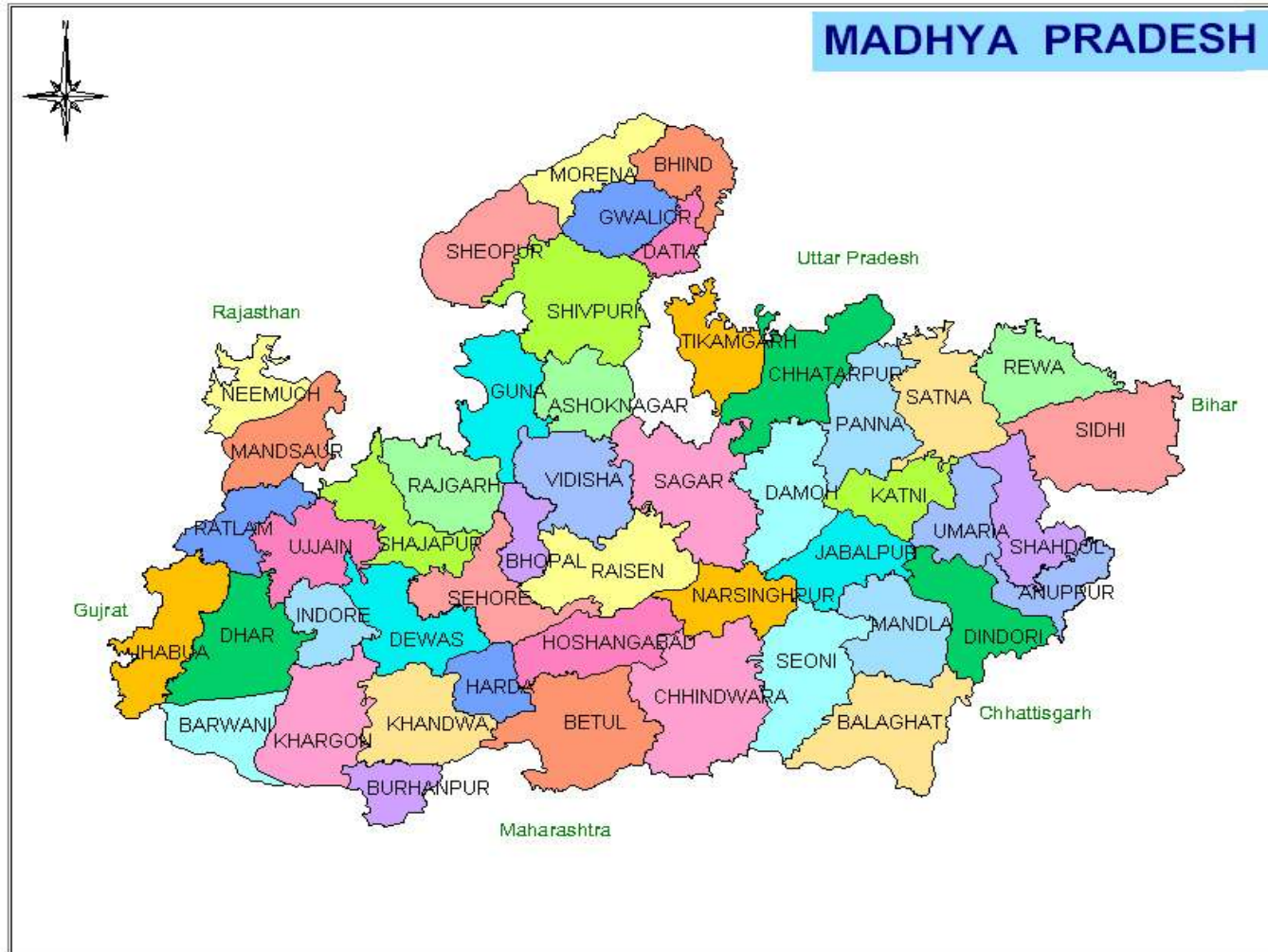
1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops identified based on total acreage)</b>										
	Soybean	170.8	828					170.8	828	
	Blackgram	7.2	338					7.2	338	
	Maize	4.9	1141					4.9	1141	
	Sorghum	4.5	1110					4.5	1110	
	Rice	4.3	565					4.3	565	
	Wheat			176.8	1123			176.8	1123	
	Chickpea			151.1	765			151.1	765	
	Lentil			29.7	432			29.7	432	
	Pea			3.8	476			3.8	476	
	linseed			2.7	494			2.7	494	
<b>Major Horticultural crops (Crops identified based on total acreage)</b>										
	Pea			4.8	6000			4.8	6000	
	Potato			2.8	2000			2.8	2000	
	Onion			2.2	25000			2.2	25000	
	Tomato			1.8	20000			1.8	20000	
	Brinjal	0.4	20000	1.0	20000			1.4	20000	
	Okra	0.25	15000	0.2	15000			.45	15000	
	Cauliflower			1.5	15000			1.5	15000	
	Bottle gourd	0.25	20000	0.2	20000			.25	20000	

<b>1.12</b>	<b>Sowing window for 5 major field crops</b> (start and end of normal sowing period)	<b>Soybean</b>	<b>Greengram</b>	<b>Blackgram</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- 2 <sup>nd</sup> week of July	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July	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	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July	2 <sup>nd</sup> week of June – 2 <sup>nd</sup> week of July
		<b>Wheat</b>	<b>Chickpea</b>	<b>Lentil</b>	<b>Linseed</b>
	Rabi- Rainfed	3 <sup>rd</sup> week of October - 1 <sup>st</sup> week of November	3 <sup>rd</sup> week of October - 1 <sup>st</sup> week of November	3 <sup>rd</sup> week of October - 4 <sup>th</sup> week of October	3 <sup>rd</sup> week of October - 1 <sup>st</sup> week of November
	Rabi-Irrigated	2 <sup>nd</sup> week of October - 3 <sup>rd</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 – 1 <sup>st</sup> week of November	2 <sup>nd</sup> week of October - 2 <sup>nd</sup> week of November

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

<b>1.14</b>	<b>Include Digital maps of the district for</b>	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

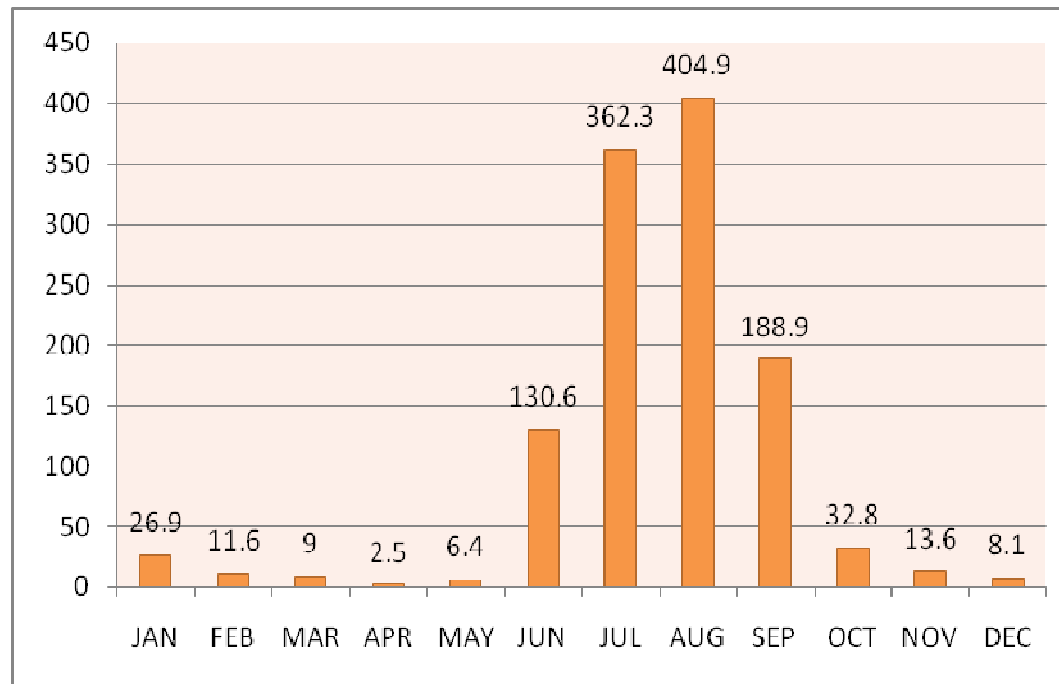




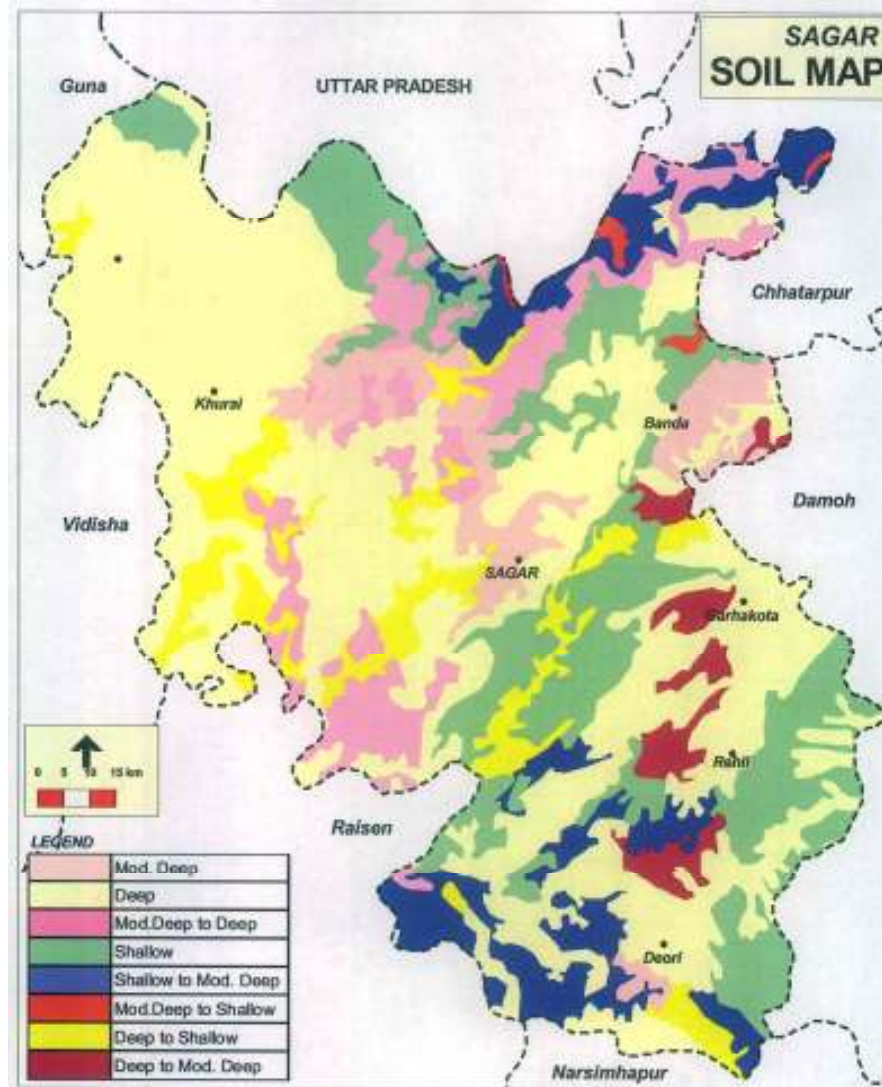


**Annexure II**

**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 <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks  4 <sup>th</sup> week of June	Deep black soils	Soybean-Wheat/ /Chickpea/Lentil/  Linseed	No Change	1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weed in late onset of monsoon  2. For high production adaptation of recommended packages by sowing of soybean, Pigeonpea, Greengram and Blackgram on bunds  3. Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers	-
	Medium deep black soils	Soybean	No change		
		Pigeonpea			
		Paddy			
		Blackgram			
	Shallow light black soils	Maize			
Blackgram		No change  <b>Pigeonpea-</b> Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) ,JKM-189			
Sorghum					
Sesame					

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/ cropping system	Change in crop/cropping system <sup>c</sup>	Agronomic measures	Remarks on Implementation
Delay by 4 weeks  2 <sup>nd</sup> week of July	Deep black soils	Soybean-Wheat/ /Chickpea/Lentil/  Linseed	<b>Pigeonpea-</b> Pragati , Jagriti, Asha ,Nmuber-148,JKM-7, JA-4, Type-21-Pusa- 855, ICPL-85063 (Laxmi), JKM-189	1. Use of blade harrow (Bakhar) for moisture conservation 2. Increase seed rate 25 % under late sowing condition .Sowing of crops against the slope in ridge and furrow methods 3. Selection of higher production potential varieties.	Source of seed is SAU's and Beej Nigam
	Medium deep black soils	Soybean			
		Pigeonpea			

		Paddy	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	<ol style="list-style-type: none"> <li>4. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed followed by treated with biofertilizers</li> <li>5. Use of balanced fertilizer and biofertilizer according to recommendation to crop and application of zinc where deficiency is occurred.</li> <li>6. Sowing of crops against the slope depends on crops.</li> <li>7. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation</li> <li>8. Application of bio-fertilizer and potash fertilizer under late sown condition</li> </ol>	
		Blackgram			
		Maize			
	Shallow light black soils	Blackgram			
	Sorghum				
	Sesame	<p><b>Blackgram</b> – JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha</p> <p><b>Pigeonpea</b>- Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) ,JKM-189</p> <p><b>Sesame</b> : TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12, Jange</p>			

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 6 weeks 4 <sup>th</sup> week of July	Deep black soils	Soybean-Wheat/ /Chickpea/Lentil/ Linseed	Sowing of Sesame, Niger and kodo Kutki  <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	<ol style="list-style-type: none"> <li>1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weeds in late onset of monsoon</li> <li>2. For high production adaptation of recommended package of practice.</li> <li>3. Sowing of crops against the slope depends on crops.</li> <li>4. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation</li> </ol>	Source of seed is SAU's and Beej Nigam
	Medium deep black soils	Soybean			
		Pigeonpea			
		Paddy			
		Blackgram			
		Maize			

	Shallow light black soils	Blackgram		5. Application of biofertilizer and potash fertilizer under late sown condition.. 6. Prefer short duration varieties. 7. Line sowing and improved crop management practices-Kodo kutki. 8. Sowing on ridge and furrow method	
		Sorghum			
		Sesame			

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)  Delay by 8 weeks  2 <sup>nd</sup> week of August	Deep t black soils	Soybean-Wheat /Chickpea/Lentil/Linseed	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	1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weeds in late onset of monsoon 2. Selection of short duration varieties 3. SSowing of crops against the slope depends on crops. 4. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation. 5. Application of biofertilizer and potash fertilizer under late sown condition. 6. Line sowing and improved crop management practices-Kodo kutki. 7. Sowing on ridge and furrow method	Source of seed is SAU's and Beej Nigam
	Medium deep black soils	Soybean			
		Pigeonpea			
		Paddy			
		Blackgram			
	Shallow light black soils	Maize			
		Blackgram			
Sorghum					
		Sesame			

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures	Remarks on Implementation <sup>e</sup>
Early season drought (Normal onset)					

Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Deep t black soils	Soybean-Wheat /Chickpea/Lentil/Linseed	1.Re sowing & replace Early duration variety  2. In case of poor population , needs gap filling	1. Soil mulching, 2. Plant protection measures, foliar spray of nutrients in pulses DAP 2.5%, Non pulses – Urea 2% 3. Storage of water in lower side of the field and make use for life saving irrigation in <i>Rabi</i> crops 4. Use of Dora/Kulpha /Hand hoe for intercultural operation in between rows and use of removed weeds use as mulch for moisture conservation	
	Medium deep black soils	Soybean		1. Storage of water in lower side of the field and make use for life saving irrigation in <i>Rabi</i> crops	
		Pigeonpea		2. <i>In-situ</i> moisture conservation	
		Paddy		3. Use of FYM and vermicompost at the time of sowing for increase of water holding capacity.	
		Blackgram		4. Ridges are made after 15-20 lines of crops for the moisture conservation	
	Shallow light black soils	Blackgram			
		Sorghum			
		Sesame			

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, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Deep black soils	Soybean-Wheat /Chickpea/Lentil/Linseed	Protective irrigation By sprinkler or Drip system	1. Soil mulching, plant protection measures, foliar spray of nutrients in pulses DAP 2.5%, Non pulses – Urea 2% 2. Storage of water in lower side of the field and make use for life saving irrigation in <i>Rabi</i> crops 3. <i>In-situ</i> moisture conservation	
	Medium deep black soils	Soybean		1. Storage of water in lower side of the field and make use for life saving	

		Pigeonpea		irrigation in <i>Rabi</i> crops 2. Use of Dora/Kulpha/ Hand hoe for interculture operation in between rows and use of uprooted 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
		Paddy		
		Blackgram		
	Maize			
	Shallow light black soils	Blackgram		
		Sorghum		
Sesame				

Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Suggested Contingency measures	Remarks on Implementation
<b>Mid season drought (long dry spell)</b>				<b>Soil nutrient &amp; moisture conservation measures</b>	
At flowering/ fruiting stage	Deep black soils	Soybean-Wheat /Chickpea/Lentil/Linseed	Life saving Supplemental irrigation.  Spray of anti transpirants.  Plant protection measures.	1. Soil mulching 2. Plant protection measures, foliar spray of nutrients in pulses DAP 2.5%, Non pulses – Urea 2% 3. Storage of water in lower side of the field and make use for life saving irrigation in <i>Rabi</i> crops 4. Use of Dora/Kulpha/ Hand hoe for interculture operation in between rows and use of uprooted weeds use as mulch for moisture conservation	-
				Medium deep black soils	
	Pigeonpea	2. Use of Dora/Kulpha/ Hand hoe for interculture operation in between rows and use of uprooted weeds use as mulch for moisture conservation			
	Paddy	3. Use of FYM and vermicompost at the time of sowing for increase of water holding capacity			
	Blackgram	4. Ridges are made after 15-20 lines of crops for the moisture conservation			
	Maize				
	Shallow light black soils	Blackgram			
		Sorghum			
		Sesame			



Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Suggested Contingency measures	
				Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Deep t black soils	Soybean-Wheat /Chickpea/Lentil/Linseed	Life saving Irrigation  Harvest at physiological Maturity.	<ol style="list-style-type: none"> <li>1. Soil mulching</li> <li>2. Plant protection measures, foliar spray of nutrients in pulses DAP 2.5%, Non pulses – Urea 2%</li> <li>3. Storage of water in lower side of the field and make use for life saving irrigation in <i>Rabi</i> crops</li> <li>4. Use of Dora/Kulpha/ Hand hoe for interculture operation in between rows and use of uprooted weeds use as mulch for moisture conservation.</li> <li>5. Field preparation for rabi crops.</li> </ol>	Source of seed is SAU's and Beej Nigam
	Pigeonpea	<ol style="list-style-type: none"> <li>2. Use of Dora/Kulpha/ Hand hoe for interculture operation in between rows and use of removed weeds use as mulch for moisture conservation</li> <li>3. Use of FYM and vermicompost at the time of sowing for increase of water holding capacity</li> <li>4. Ridges are made after 15-20 lines of crops for the moisture conservation</li> </ol>			
	Paddy				
	Blackgram				
	Maize				
	Shallow light black soils	Blackgram			
		Sorghum			
		Sesame			

### 2.1.2 Drought- Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agromomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>

Condition	Suggested Contingency measures				
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Delayed release of water in canals due to low rainfall	Deep to medium deep black soils	Soybean- Wheat/Chickpea/Linseed/Lentil	Mustard – Pusa, Jaikisan, Pusa bold, Varuna Lentil JL-3, Noorie  Chickpea– JG-11,12,14 Pea – Rachna, JP-885	Reduce the usage of fertilizer to extent of <25%; Seed treatment with fungicide before sowing.  Sowing of early duration varieties of oilseeds	Source of seed SAU, NSC & SSC. For Agronomic Measures the Ongoing scheme like RKVY NREGS etc.,

Condition	Suggested Contingency measures				
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Limited release of water in canals due to low rainfall	Deep to medium deep black soils	Soybean- Wheat/Chickpea	Oilseeds & pulses in place of cereals crop	Irrigation at the critical stages only through sprinkler; Reduce the usage of fertilizer to extent of <25%); Seed treatment with fungicide before sowing.	Sources of seed SAU, NSC & SSC.

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	Deep to medium deep black soils	Soybean- Wheat/Chickpea	Use of short duration varieties of soybean (JS-95-60) or blackgram, greengram, sesame etc.	Application of full package and practices	
			Sowing of hybrid Jowar at large scale	High seed rate (25% more) with seed treatment	
				Raised bed sowing	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				Reduce the usage of fertilizer to extent of <25%.	
				Weed management with weedicide Imazethapyr @ 750 ml/ha	
				Use of Pendimethalin @ 1kg/ha as PPI/PRE in blackgram and greengram	
				Use of Alachlor @ 1kg/ha as PRE in Sesame	

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	Deep to medium deep black soils	Soybean- Wheat/Chickpea	Use of short duration varieties of soybean (JS-95-60) or blackgram, greengram,sesame etc. Sowing of hybrid Jowar at large scale	Application of full package and practices	
				High seed rate (25% more) with seed treatment	
				Raised bed sowing	
				Reduce the usage of fertilizer to extent of <25%.	
				Weed management with Imazethapyr @ 750 ml/ha	
				Use of Pendimethalin @ 1kg/ha as PPI/PRE in blackgram and greengram	
				Use of Alachlor @ 1kg/ha as pre in Sesame	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation

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	Deep to medium deep black soils	Soybean- Wheat/Chickpea	Sowing of pulses & oilseeds in place of cereals Prefer short duration low water requirement varieties of wheat.	Chickpea should be sown with residual moisture after harvest of soybean or give pre sowing irrigation to chickpea. Protective irrigation at CRI stage in wheat.	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b> Soybean, Blackgram, Greengram, Maize	Drain excess rain water. Sowing with ridge & furrow method, Top dressing of urea.	Drainage of excess water; Spray of suitable hormone. Care should be taken that rain water does not stagnate in the field. Interculture operation by hand hoe.	Drainage of excess water Harvesting of crop in clear weather. Care should be taken that rain water does not stagnate in the field. Harvesting in clear day. Keep the produce in safe place.	Safe storage of grains After drying. Produce should be placed under shade. or protect the produce by tarpaulin kept in T. floor

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
<b>Horticulture</b>				
Tomato, Chilly, Brinjal	Sowing with raised bed method, Use tunnels for sowing	Drainage of excess water	Drainage of excess water	
<b>Heavy rainfall with high speed winds in short span<sup>2</sup></b>	Not applicable			
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
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 Hexaconazole@ 0.1 %	Plant protection measures for Rust / TLB/Leaf spot in Maize	-

### 2.3 Floods: Not Applicable

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation <sup>1</sup>				
Continuous submergence for more than 2 days <sup>2</sup>				
Sea water intrusion				

### 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>				Harvesting of at physiological maturity or earliest possible
Soybean, 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; wind breaks are necessary where cold and heat wave in regular
<b>Horticulture</b>				
Tomato, Chilly, Brinjal	Grow in shade house	May be cultivated in net house & supply of irrigation water, protect the plants by wind breaks/shelter belts	May be cultivated in net house & supply of irrigation water, protect the plants by wind breaks/shelter belts	
<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>				
Wheat, Chickpea, Lentil, Linseed	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	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	Provide irrigation water by sprinkler method , Smoke generation at night time to rise temperature ; Protect the crop with the help of light irrigation,	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

	in regular			regular
<b>Hailstorm</b>	Not Applicable			
<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	<p>As the district is occasionally prone to drought the following practices may be implemented to 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, gram 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>Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc., ) material as 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>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input 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>
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking</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>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in sandies /community grazing areas</p>	bodies	<p>water / water sources</p> <p>Provide clean drinking water</p>
Health and diseases management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health &amp; management measures</p> <p>Procure and stock multivitamins &amp; area specific mineral mixture</p>	<p>Carryout de-worming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>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</p>
<b>Floods</b>	NA		
<b>Cyclone</b>	NA		
<b>Heat wave and cold wave</b>			
<b>Heat wave</b>	<p>i) Plantation around the shed</p> <p>ii) H<sub>2</sub>O sprinklers / foggers in the shed</p> <p>iii) Application of white reflector paint on</p>	<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</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing</p>



	<p>the roof</p> <p>iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress</p>	<p>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 should be added in H<sub>2</sub>O during heat waves.</p>	(normal timings)
<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)	<p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
<b>Insurance</b>	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>

### 2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
<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	<p>Supplementation only for productive birds with house hold grain</p> <p>Supplementation of shell grit (calcium) for laying birds</p> <p>Culling of weak birds</p>	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>	NA		
<b>Cyclone</b>	NA		
<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

	Suggested contingency measures		
	Before the event	During the event	After the event
<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.	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to	1. Excavate the ponds to increase the depth. 2. Try to release water into the

	3. Renovation and maintenance of existing water harvest structures	reduce the density of population in ponds.	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