

**State: KARNATAKA**

**Agricultural Contingency Plan for District: BIDAR**

<b>1.0 District Agriculture Profile</b>				
<b>1.1</b>	<b>Agro climatic/Ecological zone</b>			
	Agro-ecological sub region (ICAR)	Hot semi arid, North karnataka plateau (6.2)		
	Agro-climatic region (Planning commission)	Southern plateau and Hills Region (10)		
	Agro-climatic Zone (NARP)	Zone I (North eastern transitional zone) (KA-1)		
	List all the districts or part there of falling under the NARP zone	Bidar and Gulbarga		
	Geographic co-ordinates of district	Latitude	Longitude	Altitude
		17 <sup>0</sup> 35' N	76 <sup>0</sup> 42' E	614 M
	Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS	1) Agricultural Research Station, Halladakeri farm, Bidar-585 401 2) Agricultural Research Station, Janawada, Bidar-585 401		
Mention the KVK located in the district	Krishi Vignana Kendra, Janawada, Bidar-585 401			
<b>1.2</b>	<b>Rainfall</b>	Average (mm)	Normal onset (specify week and month)	Normal cessation(specify week and month)
	SW monsoon (June-Sep)	693	First week of June	Last week of September
	NE monsoon (Oct-Dec)	90	First week of October	second week November
	Winter (Jan-March)	21	-	
	Summer (Apr-May)	44	-	
	Annual	<b>848</b>	-	

<b>1.3</b>	<b>Land use pattern of the district(latest statistics)</b>	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under misc, crops and tree groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (Lakh ha)	541.8	27.7	22.0	14.0	19.4	10.9	19.1	57.0	41.5

<b>1.4</b>	<b>Major soils</b>	<b>Area('000 ha)</b>	<b>Percent (%) of total</b>
	Very Shallow, Mixed clayey & red loamy soils	174.3	31.9
	Deep alluvial black calcareous clayey soils	134.8	24.7
	Deep Black clayey soils	124.6	22.8
	Deep lateritic gravely clay soils	111.3	20.4
	Deep lateritic clayey soils	1.3	0.2
<b>1.5</b>	<b>Agricultural land use</b>	<b>Area('000 ha)</b>	<b>Cropping intensity %</b>
	Net sown area	355.8	122.6
	Area sown more than once	80.5	
	Gross cropped area	436.3	

<b>1.6</b>	<b>Irrigation</b>	Area('000 ha)	Percent (%)
	Net irrigated area	47.2	13.55
	Gross irrigated area	48.5	20.35
	Rain fed area	308.6	48.25
	<b>Sources of irrigation</b>	Number	Area('000 ha)
	Canals	69	1.2
	Tanks	1031	1.0
	Open wells	29920	0.3
	Bore wells	14900	18.4
	Tube irrigation	43257	0.00224
	Other sources	1782	0.15
	Total		0.6
	Pumpsets		0.4
	Micro-irrigation		-
	<b>Ground water availability and use</b>	No. of blocks	% area
	Over exploited		
	Critical		

	Semi-critical		
	Safe		<70%
	Wastewater availability and use		

- Over –exploited: groundwater utilization >100%, critical: 90-100; Semi-critical: 70-90; Safe: <70

1.7	Major field crops cultivated	Area(*000 ha)				Total	
		Kharif		Rabi			Summer
		Irrigated	Rainfed	Irrigated	Rainfed		
1	Sorghum		57.5		30.0	87.5	
2	Redgram		73.7			73.7	
3	Bengalgram				56.1	56.1	
4	Soybean		43.5			43.5	
5	Blackgram		39.2			39.2	
6	Greengram		33.9			33.9	
7	Sugarcane				23.8	23.8	
8	sunflower		13.7		7.6	21.3	
9	Wheat			7.3		7.3	
	<b>Horticulture crops- Fruits</b>			<b>Total area</b>			
1	Mango			0.9			
2	Banana			0.4			
3	Citrus			0.7			
4	Grape			0.2			
5	Papaya			0.1			
	<b>Horticulture crops- Vegetables</b>			<b>Total area</b>			
1	Tomato			0.9			
2	Brinjal			0.3			
3	Onion			0.6			
4	Okra			0.3			
5	Cauliflower			0.4			
	<b>Medicinal and aromatic crops</b>						
	<b>Plantation crops</b>			<b>Total area</b>			
1	Tamarind			0.2			
2	Ginger			1.7			
3	Turmeric			0.5			

4	Dry chillies	0.9
5	Cashew	0.2
	<b>Flowers</b>	
1	Marigold	0.2
2	Jasmine	0.03
3	Chrysanthmum	0.002
4	Rose	0.005
5	Tuberose	0.003
	<b>Total fodder crop area</b>	
	Grazing land	-
	Sericulture etc	0.002
	Others (Specify)	-

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000 ha)</b>	<b>Female ('000 ha)</b>	<b>Total ('000 ha)</b>		
	Non descriptive Cattle (local low yielding)	123.0	140.7	263.8		
	Crossbred cattle	2.3	11.2	13.6		
	Non descriptive Buffaloes (local low yielding)	20.3	15.,4	176.7		
	Graded Buffaloes					
	Goat			189.0		
	Sheep			84.6		
	Others (Pig + Dogs + Rabbit)			21.37		
	Commercial dairy farms (Number)					
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>			
	Commercial		752.702			
	Backyard					
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>					
	<b>A. Capture</b>					
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>	
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	

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>
	<b>9</b>	<b>3</b>	<b>104</b>
<b>B. Culture</b>			
	<b>Water Spread Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production ('000 tons)</b>
i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)	-	-	-
ii) <b>Fresh water</b> (Data Source: Fisheries Department)	4.0	5	20
<b>Others</b>			

**1.11 Production and Productivity of major crops** (Average of last 5 years: 2004, 05, 06, 07, 08)

1.11	Name of crop	<b>Kharif</b>		<b>Rabi</b>		<b>Summer</b>		<b>Total</b>		<b>Crop residue as fodder ('000 tons)</b>
		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 to be identified based on total acreage)</b>										
1	Sorghum							102.6	853.0	-
2	Redgram							49.8	758.8	
3	Bengalgram							41.6	938.4	
4	Soybean							2.9	965.0	
5	Black gram							10.3	255.0	
6	Greengram							9.8	278.6	
7	Sugarcane							200.0	59.6	
8	Sun flower							11.4	678.4	
9	Wheat							6.6	999.8	
<b>Major Horticultural crops-Fruits (Crops to be identified based on total acreage)</b>										
1	Mango							7.2	8.2	
2	Banana							10.2	29.2	
3	Citrus							2.6	18.3	
4	Grape							3.5	18.2	
5	Papaya							6.0	72.0	

<b>Vegetables</b>										
1	Tomato							22.7	40.5	
2	Brinjal							6.9	22.2	
3	Onion							10.7	17.9	
4	Okra							2.8	8.2	
5	Cauliflower							8.6	19.6	
<b>Medicinal and aromatic crops and plantation crops</b>										
<b>Plantation Crops</b>										
1	Tamarind							0.4	2.4	
2	Ginger							14.7	9.3	
3	Turmeric							8.9	18.0	
4	Dry Chilli							0.9	0.9	
5	Cashew							0.3	1.7	
<b>Flowers</b>										
1	Marigold							1.3	8.0	
2	Jasmine							0.2	7.3	
3	Chrysanthmum							0.01	1.6	
4	Rose							0.1	0.9	
5	Tuberose							0.02	7.2	

<b>1.12</b>	<b>Sowing window for 5 major crops start and end of sowing period)</b>	Jowar	Redgram	Bengalgram	Soybean	Black gram
	Kharif-Rainfed	1 <sup>st</sup> week of June to 4 <sup>th</sup> week of July	1 <sup>st</sup> week of June to 4 <sup>th</sup> week of July	-	1 <sup>st</sup> week of June to 4 <sup>th</sup> week of July	1 <sup>st</sup> week to 4 <sup>th</sup> week of June
	Kharif-irrigated	-	-	-	-	-
	Rabi-rainfed	2 <sup>nd</sup> week of September to 2 <sup>nd</sup> week of October	-	1 <sup>st</sup> week of 1 <sup>st</sup> week of October to 4 <sup>th</sup> week of November	-	-
	Rabi-irrigated	2 <sup>nd</sup> week of September to 2 <sup>nd</sup> week of October	-		-	-

<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 inundation	-	-	√
	Pest and diseases(specify)	√	-	

<b>1.14</b>	<b>Include digital maps of the district for</b>	Location map of distict with in state as Annexure 1	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

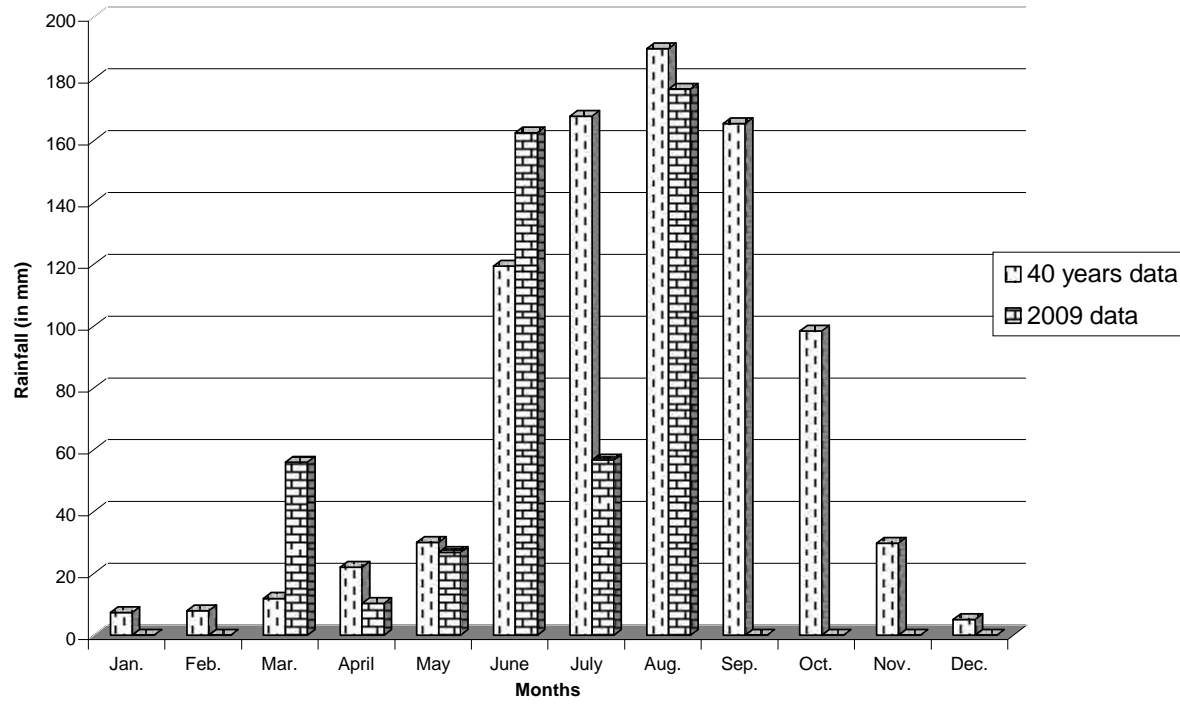
Annexure-1 Location map of Bidar in Karnataka



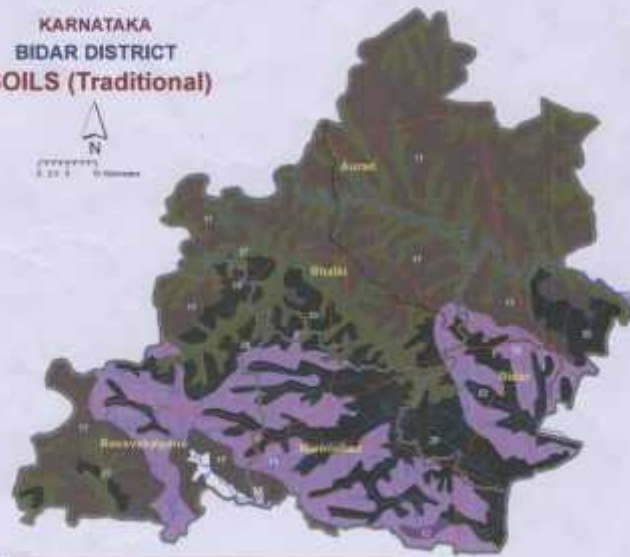


Annexure-2

Average of Last 40 years(1968-2008) Versus 2009 Rainfall



**KARNATAKA  
BIDAR DISTRICT  
SOILS (Traditional)**



Soil Code	Area in ha (Per cent)
15. Deep, laterite clayey soils	1,387 (0.31)
16. Deep, laterite gravelly clay soils	1,11,291 (25.31)
17. Very shallow, mixed black clayey and red laterite soils	1,74,238 (39.80)
21. Deep, black clayey soils	1,24,896 (28.31)
27. Deep, alluvial black calcareous clayey soils	1,34,778 (30.47)

**Key : Depth Classes**  
 Very Shallow : <25 cm  
 Shallow : 25 - 50 cm  
 Medium deep : 50-100 cm  
 Deep : >100 cm

Reference
— Rail
— Road
— Stream
□ Taluk boundary

**Note :** Area extent is approximate (calculated using GIS) and may not tally with revenue records  
 Soil (Traditional) unit nos are as per State Legend and are Prevalent in area  
 Source : Shive Prasad et al (1998), Soils of Karnataka for optimizing land use NBSS Publ. 47

GIS Lab, NBSS&UP, Bangalore

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (June 3 <sup>rd</sup> week) Kharif sowing : II F.N. of June	Laterite red soil and shallow to medium black soils	Redgram	No change	Follow dry sowing practice in redgram with ridges and furrows at 150 cm apart.  Seed treatment for drought resistant by CaCl <sub>2</sub> @ 2% (Redgram, Greengram, Blackgram and Sorghum) Choice of drought resistant variety	
		Blackgram			
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)			
		Redgram+Blackgram (1:5 or 2:6)			
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
		Redgram + Sorghum(1:5 or 2:6)			
	Medium to deep black soils (rabi season)	Fallow- Rabi sorghum	No change	Keep the lands fallow during kharif by treating with compartmental bunds and furrows for insitu moisture conservation	
		Fallow-safflower			
		Fallow-Bengalgram			
		Pulses-(Greengram/blackgram) or insitu green manuring – Rabi crops			
Rabi sorghum +Bengalgram (2:1)					
Safflower +Bengalgram (2:4)					
Rainfed drilled	Paddy	No change			

	paddy area in medium and deep black soil and laterite soil	Groundnut	No change	
	Medium to deep black soil (Kharif and rabi)	<b>Sunflower</b>	No change	
		Blackgram		
		Green gram		
		Soyabean		
		Sesamum		
		Green leafy vegetables		

		<b>Condition</b>				
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>	
<b>Delay by 4 weeks</b> (July 1 <sup>st</sup> week) Kharif sowing : I F.N. of July	Laterite red soil and shallow to medium black soils	Redgram	No change	1 Seed treatment for drought resistant by CaCl <sub>2</sub> @ 2% 2. Follow dry sowing practice in redgram with ridges and furrows at 150 cm apart. 3. Use 25% higher seed rate in Redgram with 90x20 cm spacing 4. Transplant the 25-30 days old redgram seedlings of BSMR-736 and Asha varieties 5. Grow medium duration redgram varieties.		
		Blackgram				
		Greengram				
		Soyabean				
		Sorghum	Redgram/Soyabean/Bajra/Sesamum /Setaria			
		Groundnut (bunch)	Ground nut Spreading			
		Redgram+Blackgram (1:5 or 2:6)	Redgram/Soyabean/Bajra/Sesamum /Setaria			
		Redgram+Greengram (1:5 or 2:6)	Redgram/Soyabean/Bajra/Sesamum /Setaria			
		Redgram+Soyabean (1:5 or 2 : 6)	No change			
	Redgram + Sorghum (1:5 or 2;6)	Redgram/Soyabean/Bajra/Sesamum /Setaria				
	Medium to deep black soils (rabi)	Fallow- Rabi sorghum	No change	Keep the lands fallow in kharif by treating with compartmental bunds and furrows for insitu		
		Fallow-safflower				
		Fallow-Bengalgram				

		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops	Fallow –Rabi crops	moisture conservation	
		Rabi sorghum +Bengalgram (2:1)	No change		
		Safflower +Bengalgram (2:4)			
	Rainfed drilled paddy area in medium and deep black soil and laterite soil	Paddy		-	
		Ground nut		-	
	Medium to deep black soil (Kharif and rabi)	<b>Sunflower</b>			
		Blackgram			
		Green gram			
		Soyabean		-	
		Sesamum			
	Green leafy vegetables				

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
<b>Delay by 6 weeks</b> ( July 3 <sup>rd</sup> week) Kharif sowing : <b>II F. N. of July</b>	Laterite red soil and shallow to medium black soils	Redgram	No change	1 Seed treatment for drought resistant by cacl2 @ 2% 2. .Follow dry sowing practice in redgram with ridges and furrows at 150 cm apart. 3. Use 25% higher seed rate in Redgram with 90x20 cm spacing 4. Transplant the 25-30 days old redgramseedlings of BSMR-736 and Asha varieties 5. Grow medium duration red gram varieties.	
		Blackgram	Redgram / Sesamum/ Horsegram / Foxtail millet / Bajra		
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)	Groundnut Spreading	Adopt wider spacing	

		Redgram+Blackgram (1:5 or 2:6)	Redgram + Foxtail millet(1:5)/Redgram + Bajra (1:5)			
		Redgram+Greengram (1:5 or 2:6)				
		Redgram+Soyabean (1:5 or 2 : 6)				
		Redgram + Sorghum (1:5 or 2;6)				
Medium to deep black soils (rabi)		Fallow- Rabi sorghum	No change	Keep the lands fallow in kharif by treating with compartment bunds and furrows for insitu moisture conservation		
		Fallow-safflower				
		Fallow-Bengalgram				
		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops	Fallow –Rabi crops			
		Rabi sorghum +Bengalgram (2:1)	No change			
		Safflower +Bengalgram (2:4)				
Medium and deep black soil and laterite soil		Paddy				
		Ground nut	Paddy/Castor			
Medium to deep black soil (Kharif and rabi)		<b>Sunflower</b>	Fallow /Sunhemp (Green manure crop)	Keep fallow lands till September or take up sunhemp as green manure or follow recommended in situ moisture conservation practices.		
		Blackgram				
		Green gram				
		Soyabean				
		Sesamum				
	Green leafy vegetables					

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
<b>Delay by 8 weeks</b> (August 1 <sup>st</sup> week) Kharif sowing : <b>I F.N. of August</b>	Laterite red soil and shallow to medium black soils	Redgram	Sunflower/Horsegram/Cowpea/Navane(Setaria)}	Adopt wider spacing ( 90 x 20 cm) for sunflower	
		Blackgram			
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)			
		Redgram+Blackgram (1:5 or 2:6)			
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
		Redgram + Sorghum (1:5 or 2;6)			
	Medium to deep black soils (rabi)	Fallow- Rabi sorghum	No Change	Keep the lands fallow during kharif by treating with compartment bunds and furrows for insitu moisture conservation	
		Fallow-safflower			
		Fallow-Bengalgram			
		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops	Fallow –Rabi crops		
		Rabi sorghum +Bengalgram (2:1)	No change		
		Safflower +Bengalgram (2:4)			
		Ground nut			
	Medium to deep black soil (Kharif and rabi)	<b>Sunflower</b>	Fallow	Keep fallow lands till September or follow recommended in situ moisture conservation practices.	
		Blackgram			
		Green gram			
		Soyabean			
		Sesamum			
		Green leafy vegetables			

Condition	Major farming situation	Crop/cropping system	Suggested contingency measures		
			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	Laterite red soil and shallow to medium black soils	Redgram	Thining out and Reducing population by thinning upto 25-66% depending on stress upto 30-35 DAS  .Frequent intercultivation  Resowing the crop within 15 days when population is less than 30%  Protective irrigation if possible  Weeding	Opening conservation furrows at 1.5-2.0 m apart	
		Blackgram			
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)			
		Redgram+Blackgram (1:5 or 2:6)			
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
	Redgram + Sorghum (1:5 or 2;6)				
	Medium to deep black soils (rabi)	Fallow- Rabi sorghum	-	Compartmental bunding and other moisture conservation practices in fallow areas	
		Fallow-safflower			
		Fallow-Bengalgram			
		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops			
		Rabi sorghum +Bengalgram (2:1)			
		Safflower +Bengalgram (2:4)			
		Ground nut			
	Medium to deep black soil (Kharif and rabi)	Sunflower	1.Thining out and Reducing population by thinning upto 25-66% depending on stress upto 30-35 DAS 2.Frequent intercultivation 3.Resowing the crop within 15 days	Opening conservation furrows at 15-20 m apart	
Blackgram					
Green gram					



		Soyabean	when population is less than 30% 4. Protective irrigation if possible 5. Weeding		
		Sesamum			
		Green leafy vegetables			
<b>Condition</b>			<b>Suggested contingency measures</b>		
Mid season drought (long dry spell, consecutive 2 weeks <b>rainless(&gt;2.5 mm) period</b> )			<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measures</b>	<b>Remarks on implementation</b>
<b>At vegetative stage</b>	Laterite red soil and shallow to medium black soils (kharif)	Redgram	1.Repeated deep intercultivation and weeding 2.Removal of weaklings in sorghum and Bajra between 30-45 DAS 3.Removal /thinning of alternate rows 4.Foliar spray of urea in groundnut with 2.0 % after rains.	1.Frequent intercultivation 2.Opening of conservation furrow at 15-20 m apart 3.provide protective irrigation 4.Spraying of antitranspirant kaolion @ 5.0 %	
		Blackgram			
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)			
		Redgram+Blackgram (1:5 or 2:6)			
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
	Redgram + Sorghum (1:5 or 2;6)				
	Medium to deep black soils (rabi)	Fallow- Rabi sorghum	-	1.Compartment bunding and other moisture conservation practices in fallow areas	
		Fallow-safflower			
		Fallow-Bengalgram			
		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops			
		Rabi sorghum +Bengalgram (2:1)			
Safflower +Bengalgram (2:4)					
Medium to deep black soil (kharif and rabi) in	Sunflower	1.Repeated deep intercultivation and weeding 2 Removal /thinning of alternate	1.Frequent intercultivation 2. Opening of conservation furrow		
	Blackgram				
	Green gram				

		Soyabean	rows	at 3-5 m apart	
		Sesamum			
		Green leafy vegetables			

Condition		Suggested contingency measures			
Mid season drought (long dry spell)	Major farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on implementation
At reproductive stage (Flowering Fruiting Stage)	Rainfed cropping in kharif season in laterite red soil and shallow to medium black soils	Redgram	1. Life saving irrigation 2. Pigeonpea and greengram can be harvested for vegetable purpose 3.Stripping of old and non functional leaves in sorghum. 6.Incorporate green gram/sunnhemp into soil. 7.Repeated intercultivations and weeding	1 Opening of conservation furrow at 15-20 m apart 2.Spraying the crops with antitranspirants with kaolin @ 5% 3.Provide supplemental irrigation 4.Mulching with crop residues/stubbles/grasses	
		Blackgram			
		Greengram			
		Soyabean			
		Sorghum			
		Groundnut (bunch)			
		Redgram+Blackgram (1:5 or 2:6)			
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
		Redgram + Sorghum (1:5 or 2;6)			
Rainfed single cropping in rabi in medium to deep black soils	Fallow- Rabi sorghum	Fallow- Rabi sorghum	-	Compartmental bunding and other moisture conservation practices in fallow areas	
		Fallow-safflower			
		Fallow-Bengalgram			

		Pulses-Greengram/blackgram or insitu green manuring – Rabi crops			
		Rabi sorghum +Bengalgram (2:1)			
		Safflower +Bengalgram (2:4)			
	Rainfed drilled paddy area in medium and deep black soil and laterite soil	Paddy	1.Repeated deep intercultivation and weeding 2.Foliar spray of urea in groundnut with 2.0 % after rains.	1.Provide life saving irrigation	
		Ground nut			
	Rainfed double cropped area (Kharif & Rabi) in medium to deep black soil	Sunflower	1. Life saving irrigation 2 Greengram and blackgram can be harvested for vegetable purpose 3.Incorporate green gram into soil as green manure. 7.Repeated intercultivations and weeding	1 Opening of conservation furrow at 15-20 m apart 2.Spraying the crops with antitranspirants with kaolin @ 5% 3.Provide supplemental irrigation 4.Mulching with crop residues/stubbles/grasses	
		Blackgram			
		Green gram			
		Soyabean			
		Sesamum			
	Green leafy vegetables				

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Laterite red soil and shallow to medium black soils	Redgram	1. Life saving irrigation 2. Pigeonpea and greengram can be harvested for vegetable purpose 3. Harvest the crops at physiological maturity and go for early rabi crops 4. Harvest green gram/blackgram for fodder purpose	Spraying the crops with antitranspirants with kaolin @ 5% 2.Surface Mulching	
		Blackgram			
		Greengram			
		Soybean			
		Sorghum			
	Groundnut (bunch)				

		Redgram+Blackgram (1:5 or 2:6)	5. Close soil cracks by repeated intercultivation		
		Redgram+Greengram (1:5 or 2:6)			
		Redgram+Soyabean (1:5 or 2 : 6)			
		Redgram + Sorghum (1:5 or 2;6)			
	Medium to deep black soils (rabi)	Fallow- Rabi sorghum	-	Compartment bunding	
		Fallow-safflower			
		Fallow-Bengalgram			
		Pulses-Greengram/blackgram or In situ green manuring – Rabi crops			
		Rabi sorghum +Bengalgram (2:1)			
		Safflower +Bengalgram (2:4)			
	Medium to deep black soil (Kharif & Rabi)	Sunflower	1. Life saving irrigation 2. Greengram can be harvested for vegetable purpose 3. Harvest at physiological maturity and go for early rabi crops 4. Harvest for fodder purpose	1..Spraying the crops with antitranspirants with kaolin @ 5%	
		Blackgram			
		Green gram			
		Soyabean			
		Sesamum			
		Green leafy vegetables			

### 2.1.2 Irrigated situation

Condition	Major farming situation	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	Canal irrigated area in red and black soils	Hybrid sorghum -Wheat	Sunflower-Groundnut	1. Tranplanting in redgram 2. In cotton dibble the seeds at 90 x 45 cm spacing	
		Greengram/Blackgram -Bengalgram	Bengalgram/Sunflower/Wheat		
		Sunflower- Bengalgram	No change		

Condition	Major farming situation	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	Not Applicable
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Condition	Major farming situation	Crop/cropping system	Suggested contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on implementation
Non release of water in canals under delayed onset of monsoon in catchment	-NA-				

Condition	Major farming situation	Crop/cropping system	Suggested contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on implementation
Lack of inflows into tanks due to insufficient/delayed onset of monsoon	Black and lateritic red soil	Paddy – Paddy	Fallow rainfed cropping system No Change Wheat	-	
		Sugarcane Soyabean – Chickpea Hybrid Cotton (Bt)	Sunflower / Rabi jowar / Chickpea		
		Redgram	Redgram		
		Paddy – Paddy	Maize – Chick pea	Moisture Conservation	
		Sugarcane	Redgram+ Black gram /Green gram Wheat	Repeated Intercultivation, Earthing up,	

		Soyabean – Chickpea	No Change		
		Hybrid Cotton (Bt)	Sunflower / Rabi jowar / Chickpea		
		Redgram	Redgram		

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

Condition	Suggested contingency measures			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Redgram	Drainage Spray of urea Growth Regulators Resowing/Gapfilling	Drain out excess water, Top dress the crop with N & K Intercultivation Weeding Plant Protection measures	Drain out excess water Harvest at Physiological maturity	Proper drying and storage of grains
Sorghum	Drainage Nutrient management Resowing/Gapfilling			
Sugarcane	Drainage Nutrient management Re planting Gapfilling			
Blackgram	Drainage Nutrient management Resowing/Gapfilling			
Greengram	.Drainage Nutrient management Resowing/Gapfilling			
Sunflower	Drainage Nutrient management Resowing/Gapfilling	Drainage  Hand pollination after rain in morning hours		
<b>Horticulture-vegetables</b>				
Onion	Drainage Spray of urea	Drainage, Spraying NAA with liquid NPK	Drainage	Proper drying and storage of tubes

Brinjal	Drainage Nutrient management	Drainage, Spraying NAA with liquid NPK	Drainage	
Bhendi	Drainage Nutrient management	Drainage, Spraying NAA with liquid NPK	Drainage	
Cauliflower	Drainage Nutrient management	Drainage, Spraying NAA with liquid NPK	Drainage	
Tomato	Drainage Nutrient management Pest and Disease management	Drainage, Spraying NAA with liquid NPK Does spraying NAA with liquid NPK really offset the ill effects of continuous high rainfall in a short span or water logging in almost all the crops covered here? Is it practically possible? If not please delete it.	Drainage	
Green chilli	Drainage Nutrient management. Pest management	Drainage, Spraying NAA with liquid NPK Spray of planofix	Drainage,value addition	
<b>Horticulture-fruits</b>				
Mango	Drainage	Management of diseases(PM) Drainage, Spraying NAA with liquid NPK	Drainage	
Banana	Drainage and staking the plant	Drainage, Spraying NAA with liquid NPK	Harvest the bunch	Proper storage
Citrus	Drainage	Drainage, Spraying NAA with liquid NPK	Drainage	
Grape	Drainage Diseasmanagement	Drainage, Spraying NAA with liquid NPK	Drainage	
Cauliflower	Drainage Pest management	Drainage, Spraying NAA with liquid NPK	Drainage	
<b>Heavy rainfall with high speed winds in a short span- vegetables</b>				

Onion	Uprooting and resowing	.Nutrient management	Harvest for crop	
Brinjal	Drainage and Nutruent management	Drainage Tying of fallen plants	Uprooting and sowing of other crops	
Bhendi	Drainage and Nutruent management	Drainage and Nutruent management	Drainage and Nutruent management	
Cauliflower	Drainage and Nutruent management	Uprooting and sowing of other crops	Uprooting and sowing of other crops	
Tomato	Uprooting and resowing	Uprooting and sowing of other crops	-	
<b>Fruits</b>				
Mango	Nutrient management	Nutrient management	Control of hopper and powdery mildew	
Banana	Drainage and stacking the plant	Nutrient management	Harvest the bunch	Proper storage
Citrus	Nutrient management	Nutrient management	-	
Grape	Drainage	Nutrient management	-	
Cabbage	Nutrient management	Nutrient management Harrowing and sowing of short duration crops (if more damage)	Harrowing and sowing of short duration crops (if more damage)	
Green chilli	Nutrient management Harrowing and sowing of short duration crops(If more damage)	Nutrient management Harrowing and sowing of short duration crops (if more damage)	Harrowing and sowing of short duration crops (if more damage)	
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Redgram	-	IPM and use of new molecules	IPM and use of new molecules	
Jowar	-	Management of smut	Grain mold	
Sugarcane	The pest Pyrilla management	The pest Pyrilla management	-	
Blackgram	PM disease management	PM disease and pod borer management	-	
Sunflower	PM disease and spodaptora pest management	PM disease and spodaptora pest management	Earhead borer	
<b>Horticultural</b>				



Mango	Leaf spot disease management	PM disease and jassid management	PM disease and jassid management	
Banana	Panama disease management	Rhizom weevil management	Bunchy top of banana disease management	
Citrus	Citrus cancar management	Citrus cancar management	Citrus cancar management	
Grape	PM and DM management	PM and DM management	PM and DM management	
Cabbage	Pest and disease management	Pest and disease management	-	
Green chilli				

### 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation</b>				
Redgram	Drain out excess water Take up gap filling Plant protection measures	Drain out excess water Weeding and Topdressing With urea Plant protection measures Resowing/Gapfilling	Drain out excess water And earthing up, spray with NAA	Drain out excess water and harvesting and drying
Jowar	Drain out excess water Top dressing Take up gap filling Intercultivation, weeding Plant protection measures Resowing/Gapfilling	Drain out excess water Weeding and Topdressing With urea Resowing/Gapfilling	Drain out excess water	Drain out excess water Tying of lodged plants and harvesting and drying, ear heads
Sugarcane	Drain out excess water Resowing/Gapfilling	Drain out excess water	Drain out excess water	Drain out excess water Tying of lodged plants
Greengram	Drain out excess water Resowing/Gapfilling	Drain out excess water	Drain out excess water	Drain out excess water Harvesting and drying of plants
Blackgram	Drain out excess water	Drain out excess water	Drain out excess water	Drain out excess water

	Resowing/Gapfilling			Harvesting and drying of plants
Sunflower	Drain out excess water Take up gap filling. Drenching with fungicides Resowing/Gapfilling	Drain out excess water Weeding and Topdressing With urea	Drain out excess water And earthing up	Drain out excess water and harvesting and drying of ear heads
<b>Continuous submergence for more than 2 days</b>				
Redgram	Draining the excess water Re-sowing with seed treatment if mortality is more otherwise take up gap filling	Drain out excess water Top dressing with urea weeding Nipping at 50 DAS	Drain out excess water Earthing up.Tying of lodged plants, Spray with NAA	Drain out excess water Harvesting and drying
Jowar	Draining the excess water Re-sowing with seed treatment if mortality is more otherwise take up gap filling	Drain out excess water Top dressing with urea weeding	Drain out excess water Earthing up.Tying of lodged plants	Drain out excess water Tying of lodged plants Harvesting and drying
Sugarcane	Draining the excess water  Re-planting/Gapfilling	Drain out excess water Top dressing with urea weeding	Drain out excess water Earthing up.Tying of lodged plants	Drain out excess water Tying of lodged plants
Sunflower	Draining the excess water Re-sowing with seed treatment if mortality is more otherwise take up gap filling	Drain out excess water Top dressing with urea weeding	Drain out excess water Earthing up.	Drain out excess water Harvesting and drying of ear heads
<b>Sea water intrusion</b>				

## 2.4 Extreme events: Heat wave/cold wave/frost/hailstorm/cyclone

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	-Not applicable-			
Cold wave				
Frost				
Hailstorm				
Cyclone				

## 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 moderately prone for drought, it should have some feed and fodder reserves at any point of the year for mobilization to the drought affected villages</p> <p>Urea molasses mineral bricks (UMMB):50-100 t            Hay:100-250 t            Concentrates: 20-50 t            Minerals and vitamin supplements mixture:1-5 t</p> <p>The available sorghum stover and sugar cane tops should be properly stored in the farm of hay.            All the available CPRs must be top dressed with N in 2-3 split doses @ 20-25 kg N/ha during the monsoon to get more biomass            Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP</p>	<p>Harvest and use all the failed crop (Sorghum, Bengal gram, Soybean, Blackgram, Greengram, Wheat) material as fodder.            Harvest all the top fodder available (Neem, Subabul, Acasia, Pipol etc) and feed the LS during drought            In severe drought don't allow for grazing and try to stall fed the animals            Supply silage / hay to farmers having productive stock on subsidized rates  <b>Mild drought:</b> hay should be transported to the drought affected villages  <b>Moderate drought:</b> hay, silage and vitamin &amp; minerals mixture should be transported to the drought affected villages  <b>Severe drought:</b> UMMB, hay, concentrates and vitamin &amp; mineral mixture should be transported to the drought affected villages. All the hay should be enriched with 2%</p>	<p>Flushing the stock to recoup            Replenish the feed and fodder banks</p>

	<p>chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands &amp; supporting them with assisting infrastructures like seeds, money manure.</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop cutters.</p> <p>Creation of permanent fodder, feed and fodder seed banks in all drought prone villages</p> <p>Capacity building and preparedness of the stakeholders and official staff for the unexpected events</p>	<p>Urea molasses solution or 1% common salt solution and fed to LS</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals during severe drought</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive &amp; breeding stock)</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers</p>	
<b>Cyclone</b>	NA		
<b>Floods</b>	NA		
<b>Heat &amp; Cold wave</b>	NA		
<b>Health and Disease management</b>	<p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Procure and stock emergency medicines vaccines for important 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>Carryout deworming 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>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>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</p>

			animals
<b>Drinking water</b>	Identification of water resources 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	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources Provide clean drinking water

**Vaccination schedule in small ruminants (Sheep & Goat)**

<b>Disease</b>	<b>Season</b>
Foot and mouth disease (FMD)	Preferably in winter / autumn
PPR	All seasons, preferably in June-July
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	December / march

**Vaccination programme for cattle and buffalo:**

<b>Disease</b>	<b>Age and season at vaccination</b>
Anthrax	In endemic areas only, Feb to May
HS	May to June
BQ	May to June
FMD	November to December

## 2.5.2 Poultry

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>Drought</b>			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking 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>	NA		

## 2.5.3 Fisheries/ Aquaculture:

1) Drought	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>A. Capture</b>			
Marine	No intervention	No intervention	No intervention
Inland			
(i) Shallow water due to depth to	Stocking of advanced fingerlings in half or even less than the normal stocking density or stocking of common carp seed	Immediate harvesting or decreasing the density commensurate with the water	De weeding and deepening of tank to ensure retention of water for a longer

insufficient rains/inflow		quantity.	period and provision of employment under MGNREGP
(ii) Changes in water quality	Regular monitoring of water quality parameters and application of geolites, soil probiotics, etc to maintain water quality	Immediate harvesting or changing the water quality by application of sanitisers.	Removal of top layer, deep ploughing of tank and application of lime
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	Crop holiday or going for stocking of yearlings by reducing the density according to availability of water	Harvesting of fish and leaving the pond fallow till next season	Removal of top layer, deep ploughing of tank and application of lime
(ii) Impact of salt load build up in ponds / change in water quality	Stocking of salinity tolerant fish / shrimp, application of geolites and other buffers	Frequent change of water with fresh water	Frequent draining of the pond with fresh water, removal of top layers
(iii) Any other			
<b>2) Floods -NA</b>			
<b>3.Cyclone/Tsunami</b>	NA		
<b>4. Heat wave and cold wave</b>	NA		