

**State: RAJASTHAN**  
**Agriculture Contingency Plan for District: Udaipur**

1.0 District Agriculture profile					
1.1	<b>Agro-Climatic/Ecological Zone</b>				
	Agro Ecological Sub Region (ICAR)	Northern Plain (And Central Highlands) Including Aravallis, Hot Semi-Arid Eco-Region (4.2)			
	Agro-Climatic Zone (Planning)	Central Plateau & Hills Region (VIII)			
	Agro Climatic Zone (NARP)	Sub Humid Southern Plain Zone (RJ-7)			
	List all the districts or part thereof falling under the NARP Zone	Bhilwara, Bundi, Chittorgarh and Udaipur			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		24 <sup>0</sup> 35'N	73 <sup>0</sup> 42'E	582.2	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station , Maharana Pratap university of Agriculture and technology RCA campus , Udaipur-313001			
Mention the KVK located in the district	Krishi Vigyan Kendra, Badgaon, Distt. Udaipur-313001				
1.2	<b>Rainfall</b>	Normal RF(mm)	Normal Rainy days (number)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	549.8	18	25 <sup>th</sup> Week, June	38 <sup>th</sup> Week, September
	NE Monsoon(Oct-Dec):	28.7	2		
	Winter (Jan- March)	7.1	1	-	-
	Summer (Apr-May)	15.2	1	-	-
	Annual	600.8	22	-	-

1.3	<b>Land use pattern of the district (latest statistics)</b>	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
	<b>Area ('000 ha)</b>	1462.105	347.076	419.657	156.563	88.152	120.443	0.822	329.392	18.188	63.189

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Black clayey deep soil	102.64	7.02
	Brown loamy medium to deep soil	503.84	34.46
	Red gravelly loam hilly soil	692.60	47.37
	Red loamy shallow to medium soil	84.23	5.76
	Red gravelly loam shallow soil	51.61	3.53

\* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	265.699	145.34
	Area sown more than once	120.462	
	Gross cropped area	386.161	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	108.334		
	Gross irrigated area	112.863		
	Rainfed area	291.486		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		18.893	17.44
	Tanks	--	8.257	7.62
	Open wells	50052	74.309	68.59
	Bore wells	1620	6.366	5.85
	Lift irrigation schemes	NA	NA	--
	Other sources –check dam/anicuts etc.	--	0.499	0.46
	Total Irrigated Area		108.334	
	Pump sets	45243		
	No. of Tractors	6217		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)

Over exploited	8		
Critical	3		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%			

**1.7 Area under major field crops & horticulture (as per latest figures) (2007-08)**

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Maize	-	-	193.466	-	-	-	-	193.466	
Urd	-	-	8.670	-	-	-	-	8.670	
Wheat	-	-	-	-	-	79.369	-	79.369	
Gram	-	-	-	-	-	13.711	-	13.711	
Rapeseed & Mustard	-	-	-	-	-	18.776	-	18.776	
Groundnut	-	-	4.546	-	-	-	-	4.546	
Sorghum	-	-	7.340	-	-	-	-	7.340	
Sesame	-	-	3.639	-	-	-	-	3.639	

Horticulture crops (2002-03) – Fruits	Area ('000 ha)		
	Total	Irrigated	Rainfed
Mango	0.852	-	-
Guava	0.154	-	-
Lime	0.089	-	-
Custard Apple	0.096	-	-
Horticulture crops – Vegetables	Total	Irrigated	Rainfed
Tomato	0.132	0.132	-
Okra	0.203	0.203	-
Brinjal	0.090	0.090	-
Bottle Gourd	0.098	0.098	-
Onion	0.049	0.049	-

	<b>Medicinal &amp; Aromatic and Spice crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Isabgol	0.002	-	-
	Ginger	0.112	-	-
	Red Chilli	0.728	-	-
	Garlic	0.144	-	-
	Ajwain	0.882	-	-
	Grazing land	81.152	-	-

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>		
	Non descriptive Cattle (local low yielding)	-	-	1038.263		
	Crossbred cattle	-	-	-		
	Non descriptive Buffaloes (local low yielding)	-	-	430.405		
	Graded Buffaloes	-	-	-		
	Goat	-	-	1164.316		
	Sheep	-	-	204.491		
	Others (Camel, Pig, Yak etc.)	-	-	127.548		
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>			
	Commercial	-	<b>67.105</b>			
	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>	<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized		
	<b>ii) Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>
		Nil		17		840
	<b>B. Culture</b>					
		<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>
	<b>ii) Fresh water</b> (Data Source: Fisheries Department)	13171		--		412

### 1.11 Production and Productivity of major crops (Average of last 5 years: 2003-04 to 2007-08)

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 to be identified based on total acreage)</b>										
	Maize	257.117	1396	-	-	-	-	257.117	1396	-
	Urd	2.475	246.19	-	-	-	-	2.475	246.19	-
	Wheat	-	-	158.702	2490	-	-	158.702	2490	-
	Mustard	-	-	18.917	1101	-	-	18.917	1101	-
	Gram	-	-	14.240	1079	-	-	14.240	1079	-
	Sorghum	-	-	4.082	485	-	-	4.082	485	-
	Sesame	-	-	0.951	251	-	-	0.951	251	-
	Groundnut	-	-	4.406	820	-	-	4.406	820	-
<b>Major Horticultural crops (Crops to be identified based on total acreage)(2001-2002)</b>										
	Mango	17.9285	-	-	-	-	-	17.9285	-	-
	Guava	0.4269	-	-	-	-	-	0.4269	-	-
	Tomato	0.280	-	-	-	-	-	0.280	-	-
	Okra	0.198	-	-	-	-	-	0.198	-	-
	Bottle Gourd	0.040	-	-	-	-	-	0.040	-	-

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Crop 1: Maize	2: Urd	3: Wheat	4: Mustard	5: Gram
	Kharif- Rainfed	4 <sup>th</sup> week of June to 2 <sup>nd</sup> week of July (onset of monsoon)	1 <sup>st</sup> week to 3 <sup>rd</sup> week of July (Onset of Monsoon)			
	Kharif-Irrigated	2 <sup>nd</sup> to 4 <sup>th</sup> week of June	2 <sup>nd</sup> – 4 <sup>th</sup> week of June			
	Rabi- Rainfed			15 Oct – 15 Nov.	15 <sup>th</sup> Sept. - 15 <sup>th</sup> Oct.	1 <sup>st</sup> Oct – 15 Nov.
	Rabi-Irrigated			1 <sup>st</sup> week – 3 <sup>rd</sup> week of Nov.	1 Oct – 20 Oct.	15 <sup>th</sup> Oct – 30 <sup>th</sup> oct .

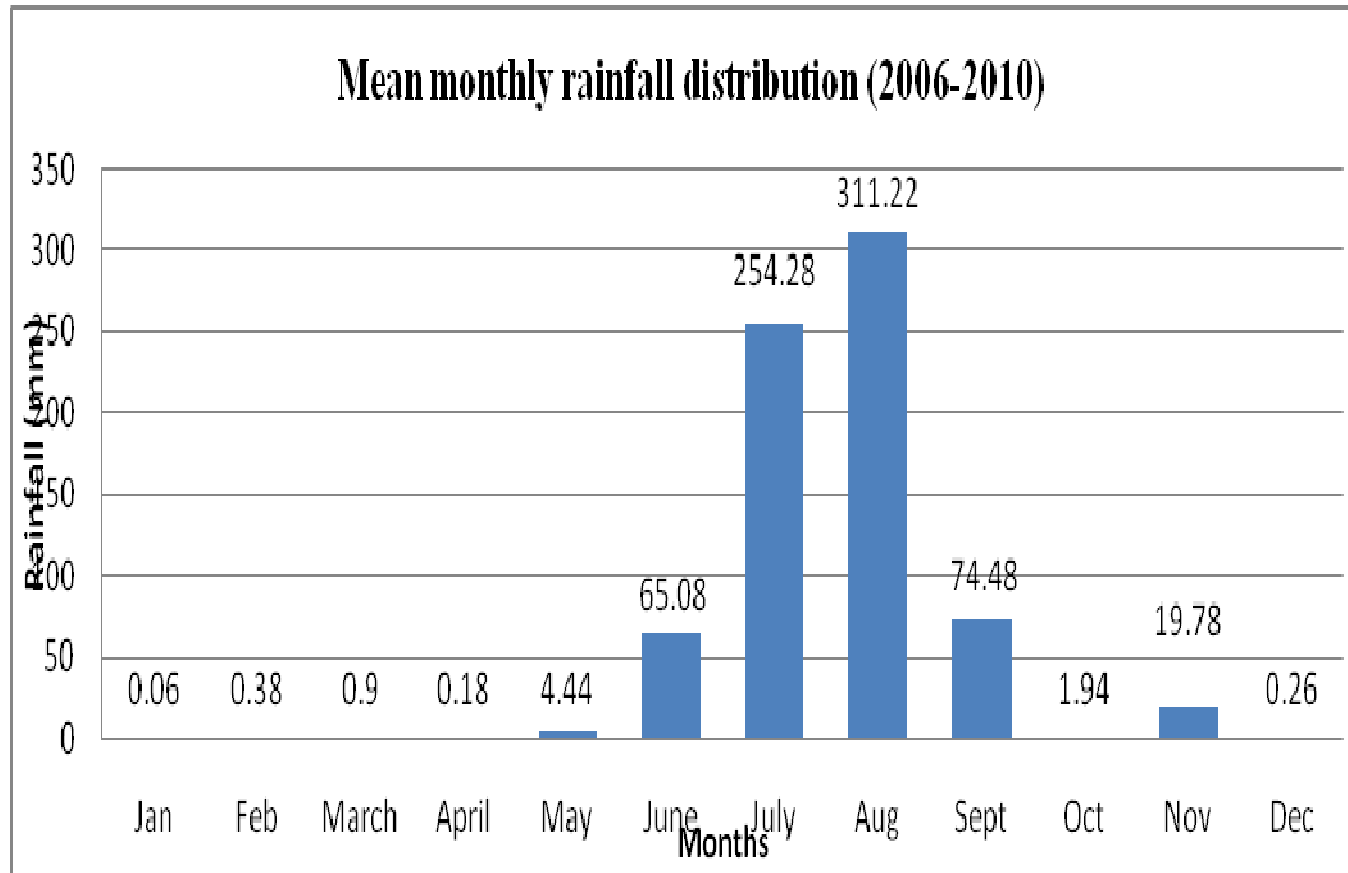
<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	√	-	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	√	-
	Frost	-	√	-
	Sea water intrusion	-	-	√
	Pests and disease outbreak – Grass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

<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  
Location map of Udaipur district

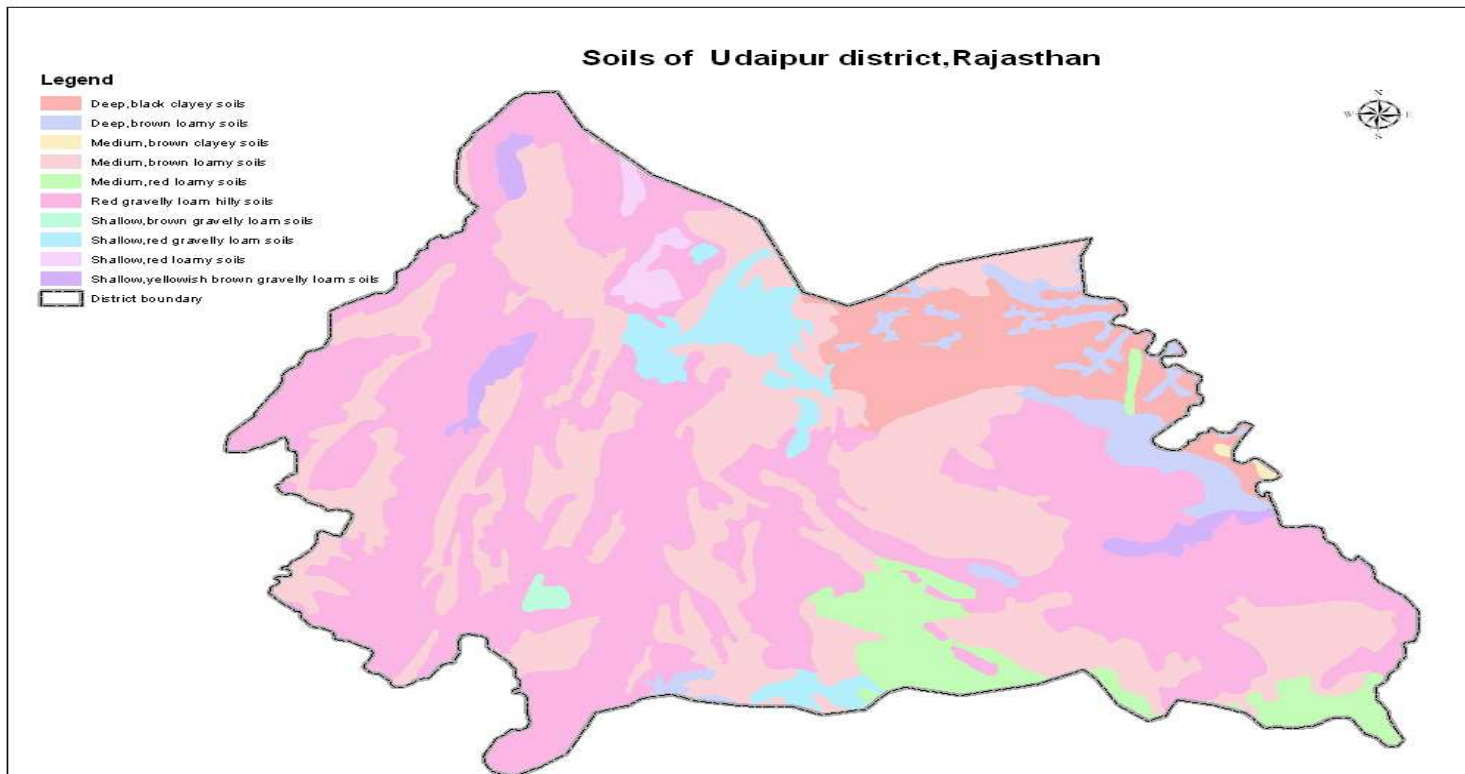


Annexure 2  
Mean monthly rainfall graph of Udaipur district





**Annexure 3**  
**Soil map**



Source: NBSS&LUP, Regional Centre, Udaipur

## 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 <sup>a</sup>	Normal Crop / Cropping system <sup>b</sup>	Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay by 2 weeks (Specify month)*  (July 2 <sup>nd</sup> wk)	Brown Loamy Medium to Deep Soils	<b>Maize:</b> Mahi Dhaval, Navjot,Ganga – 11, Aravali Makka – 1,Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5	<b>Maize:</b> Aravali Makka-1, Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5, Mahi Kanchan	<ul style="list-style-type: none"> <li>• Inter cropping of blackgram (2:2) or pigeonpea (1:1)</li> <li>• Dry sowing/ sowing by roto-till-drill</li> <li>• Seed priming of maize (0.1 % thiourea)for 6 hrs</li> </ul>	<ul style="list-style-type: none"> <li>• Seed Drills/rota till drill may be provided under RKVY</li> <li>• Supply of seed through RSSC/ NSC</li> <li>• Availability of seed drill for inter cropping through RKVY.</li> </ul>
		<b>Sorghum:</b> CSH–6, CSH – 14, CSH – 9, Pratap jowar 1430, CSV-17, CSV-15, CSH-13, CSV- 13, SPV- 346 and RJ 96	<b>Sorghum:</b> CSH – 6, CSH – 14, Pratap jowar 1430, CSV-17, CSV-15, CSH-13, CSV- 13, RJ - 96	<ul style="list-style-type: none"> <li>• Increase seed rate by 25 %</li> <li>• Dry sowing/ sowing by roto-till-drill</li> <li>• Apply 20 kg of carbofuron or phorate (3g) granules in the seed row before sowing to check shoot fly infestation</li> <li>• Grow sorghum with green gram in 1:1 row ratio at 30 cm spacing</li> </ul>	
		<b>Groundnut:</b> AK 12- 24, G.G. – 2, J –38, D.H.-86, TG-37-A, J.L. – 24, Pratap mungphali – 1, Pratap mungphali – 2	<b>Groundnut:</b> J.L. – 24, Pratap mungphali – 2, TG – 37 – A	Intercropping with sesamum at 6:2 row ratio.	
		<b>Sesame:</b> RT – 46, RT – 125, TC – 25	<b>Sesame:</b> RT – 46, RT – 125, TC – 25	Line sowing	
		<b>Blackgram:</b> Krishna, T– 9, PU-19, RBU-38	<b>Blackgram:</b> T– 9, PU-19, RBU-38	-	
	Red Gravelly Loam Hilly Soils	<b>Maize:</b> Mahi Dhaval, Navjot,Ganga – 11, Aravali Makka – 1,Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5	<b>Maize:</b> Aravali Makka-1, Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5, Mahi Kanchan	<ul style="list-style-type: none"> <li>• Inter cropping of blackgram (2:2) or pigeonpea (1:1)</li> <li>• Dry sowing/ sowing by roto-till-drill</li> <li>• Seed priming of maize (0.1 % thiourea)for 6 hrs</li> </ul>	-
		<b>Sorghum:</b> CSH–6, CSH – 14, CSH – 9, Pratap jowar	<b>Sorghum:</b> CSH – 6, CSH – 14, Pratap jowar 1430,	<ul style="list-style-type: none"> <li>• Increase seed rate by 1.5 times</li> <li>• Dry sowing/ sowing by roto-till-drill</li> </ul>	

		1430, CSV-17, CSV-15, CSH-13, CSV- 13, SPV-346 and RJ 96	CSV-17, CSV-15, CSH-13, CSV- 13, RJ - 96	<ul style="list-style-type: none"> <li>• Apply 20 kg of carbofuron or phorate (3g) granules in the seed row before sowing to check shoot fly infestation</li> <li>• Grow sorghum with green gram in 1:1 row ratio at 30 cm spacing</li> </ul>		
		<b>Groundnut:</b> AK 12- 24, G.G. – 2, J –38, D.H.-86, TG-37-A, J.L. – 24, Pratap mungphali – 1, Pratap mungphali – 2	<b>Groundnut:</b> J.L. – 24, Pratap mungphali – 2	Intercropping with sesamum at 6:2 row ratio.		
		<b>Sesame:</b> RT – 46, RT – 125, TC – 25	<b>Sesame:</b> RT – 46, RT – 125, TC – 25	Line sowing		
		<b>Blackgram:</b> Krishna, T– 9, PU-19, RBU-38	<b>Blackgram:</b> T– 9, PU-19, RBU-38	-		
	Black Clay Deep Soils	<b>Maize:</b> Mahi Dhaval, Navjot,Ganga – 11, Aravali Makka – 1,Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5	<b>Maize:</b> Aravali Makka-1, Him – 129, PEHM-1, PEHM- 2, Pratap Hybrid Maize-1, Pratap Makka-3, Pratap Makka-5, Mahi Kanchan	<ul style="list-style-type: none"> <li>• Inter cropping of blackgram (2:2) or pigeonpea (1:1)</li> <li>• Dry sowing/ sowing by roto-till-drill</li> </ul>		
		<b>Sorghum:</b> CSH–6, CSH – 14, CSH – 9, Pratap jowar 1430, CSV-17, CSV-15, CSH-13, CSV- 13, SPV-346 and RJ 96	<b>Sorghum:</b> CSH – 6, CSH – 14, Pratap jowar 1430, CSV-17, CSV-15, CSH-13, CSV- 13, RJ - 96	<ul style="list-style-type: none"> <li>• Increase seed rate by 1.5 times</li> <li>• Dry sowing/ sowing by roto-till-drill</li> <li>• Apply 20 kg of carbofuron or phorate (3g) granules in the seed row before sowing to check shoot fly infestation</li> <li>• Grow sorghum with green gram in 1:1 row ratio at 30 cm spacing</li> </ul>		
		<b>Groundnut:</b> AK 12- 24, G.G. – 2, J –38, D.H.-86, TG-37-A, J.L. – 24, Pratap mungphali – 1, Pratap mungphali – 2	<b>Groundnut:</b> J.L. – 24, Pratap mungphali – 2, TG – 37 – A	Intercropping with sesamum at 6:2 row ratio.		
		<b>Sesame:</b> RT – 46, RT – 125, TC – 25	<b>Sesame:</b> RT – 46, RT – 125, TC – 25	Line sowing		
		<b>Soybean:</b> JS–335, MACS–13, PK – 472, MACS–58,	<b>Soybean:</b> PK – 472, MACS–58, PS – 16,	Intercrop soybean with maize in 1:1 row ratio		

		PS – 16, JS – 71 – 05, Pratap Soya-1	JS – 71 – 05, Pratap Soya-1		
		<b>Blackgram:</b> Krishna, T– 9, PU-19, RBU-38	<b>Blackgram:</b> T– 9, PU-19, RBU-38	-	

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay by 4 week  July 4 <sup>th</sup> wk	Brown Loamy Medium to Deep Soils	Maize/sorghum for fodder or blackgram, greengram or sesame	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Greengram:</b> K – 851, RMG – 62 <b>Sesame:</b> RT – 46, RT – 125, TC – 25 <b>Blackgram:</b> T– 9, PU-19, RBU-38	Increase in seed rate by 10 – 15 per cent in greengram, sesame and blackgram	Availability of breeder seed from University to seed producing agencies. Availability of certified seed from RSSC/NSSC, etc. Seed Drills under RKVY.
	Red Gravelly Loam Hilly Soils	Maize/sorghum for fodder or blackgram, greengram or sesame	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Greengram:</b> K – 851, RMG - 62 <b>Sesame:</b> RT – 46, RT – 125, TC - 25 <b>Blackgram:</b> T– 9, PU-19, RBU-38	Increase in seed rate by 10 – 15 per cent in greengram, sesame and blackgram	
	Black Clayey Deep Soils	Maize/sorghum for fodder or blackgram, greengram or sesame	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Greengram:</b> K – 851, RMG - 62 <b>Sesame:</b> RT – 46, RT – 125, TC - 25 <b>Blackgram:</b> T– 9, PU-19, RBU-38	Increase in seed rate by 10 – 15 per cent in greengram, sesame and blackgram	

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)  Delay by 6 weeks Aug 2 <sup>nd</sup> wk	Brown Loamy Medium to Deep Soils	Maize/Sorghum (Fodder) or Fallow-mustard	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Maize + Cowpea (fodder)</b> <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Sorghum + cowpea (fodder)</b> Fallow-Toria/Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>One hoeing may be done for conserve soil moisture</li> </ul>	<ul style="list-style-type: none"> <li>Availability of certified seed from RSSC/NSSC, etc</li> </ul>
	Red Gravelly Loam Hilly Soils	Maize/Sorghum (Fodder) or Fallow-mustard	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Maize + Cowpea (fodder)</b> <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Sorghum + cowpea (fodder)</b> Fallow-Toria/Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>One hoeing may be done for conserve soil moisture</li> </ul>	
	Black Clayey Deep Soils	Maize/Sorghum (Fodder) or Fallow-mustard	<b>Maize (fodder):</b> African Tall, Pratap Makka Chari-6 <b>Maize + Cowpea (fodder)</b> <b>Sorghum (fodder):</b> Rajasthan Chari-1, Rajasthan Chari-2, Pratap Chari-1080, SSG-59-3 <b>Sorghum + cowpea (fodder)</b> Fallow-Toria/Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>One hoeing may be done for conserve soil moisture</li> </ul>	

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)  Delay by 8 weeks Aug 4 <sup>th</sup> wk	Brown Loamy Medium to Deep Soils	Fallow - Mustard/ Taramira	Fallow -Toria/ Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>Conserve moisture by run of Bakhar after every rainfall.</li> </ul>	Availability of certified seed from RSSC/NSSC, etc.
	Red Gravelly Loam Hilly Soils	Fallow - Mustard/ Taramira	Fallow -Toria/ Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>Conserve moisture by run of Bakhar after every rainfall.</li> </ul>	
	Black Clayey Deep Soils	Fallow - Mustard/ Taramira	Fallow -Toria/ Taramira/ Mustard/Gram	<ul style="list-style-type: none"> <li>Conserve moisture by run of Bakhar after every rainfall.</li> </ul>	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Brown Loamy Medium to Deep Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>If germination is less than 50% then farmers should go for re-sowing except groundnut with early maturing varieties with 25% higher seed rate and if plant population is more than 75% he should go for gap filling.</li> <li>In groundnut germination is less than 50% then farmers should go for re-sowing of other crops like sesame/blackgram.</li> <li>In groundnut gap filling can be done by sesame and in maize by blackgram or sesame</li> </ul>	<ul style="list-style-type: none"> <li>Hoeing by hand hoe to develop soil mulch for conservation of soil moisture.</li> <li>Removal of Weeds in time.</li> <li>Use weed as mulch</li> </ul>	Availability of wheel hoe and power weeder for Inter-culture operations through RKVY.
	Red Gravelly Loam Hilly Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>If germination is less than 50% then farmers should go for re-sowing except groundnut with early maturing varieties with 25% higher seed rate and if plant population is more than 75% he should go for gap filling.</li> <li>In groundnut germination is less than 50% then farmers should go for re-sowing of other crops like sesame/blackgram.</li> <li>In groundnut gap filling can be done by sesame and in maize by blackgram or sesame</li> </ul>	<ul style="list-style-type: none"> <li>Hoeing by hand hoe to develop soil mulch for conservation of soil moisture.</li> <li>Removal of Weeds in time.</li> <li>Use weed as mulch</li> </ul>	
	Black Clayey Deep Soils	Maize, Sorghum, Groundnut, Soybean, Sesame and Blackgram	<ul style="list-style-type: none"> <li>If germination is less than 50% then farmers should go for re-sowing except groundnut with early maturing varieties with 25% higher seed rate and if plant population is more than 75% he should go for gap filling.</li> <li>In groundnut germination is less than 50% then farmers should go for re-sowing of other crops like sesame/blackgram.</li> <li>In groundnut gap filling can be done by sesame and in maize by blackgram or sesame</li> </ul>	<ul style="list-style-type: none"> <li>Hoeing by hand hoe to develop soil mulch for conservation of soil moisture.</li> <li>Removal of Weeds in time.</li> <li>Use weed as mulch</li> </ul>	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At vegetative stage	Brown Loamy Medium to Deep Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• 30 to 50% plant removal.</li> <li>• Weed free environment</li> <li>• Removal of susceptible crop for fodder (maize) and retain the hardy crop (urd) in maize blackgram inter cropping</li> </ul>	<ul style="list-style-type: none"> <li>• Earthing at 30 to 35 days after sowing.</li> <li>• Life saving irrigation from rainwater harvesting</li> <li>• Mulching in crop rows</li> <li>• Spray of kaolin at 5%</li> <li>• Spray of 1000 ppm thiourea</li> <li>• Ridging in maize</li> </ul>	Availability of wheel hoe and power weeder for Inter-culture operations through RKVY.
	Red Gravelly Loam Hilly Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• 30 to 50% plant removal.</li> <li>• Weed free environment</li> <li>• Removal of susceptible crop for fodder (maize) and retain the hardy crop (urd) in maize blackgram inter cropping</li> </ul>	<ul style="list-style-type: none"> <li>• Life saving irrigation from rainwater harvesting Mulching in crop rows</li> <li>• Earthing at 30 to 35 days after sowing.</li> <li>• Spray of kaolin at 5%</li> <li>• Spray of 1000 ppm thiourea</li> <li>• Ridging in maize</li> </ul>	Availability of wheel hoe and power weeder for Inter-culture operations through RKVY.
	Black Clayey Deep Soils	Maize, Sorghum, Groundnut, Soybean, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• 30 to 50% plant removal.</li> <li>• Weed free environment</li> <li>• Removal of susceptible crop for fodder (maize) and retain the hardy crop (urd) in maize blackgram inter cropping</li> </ul>	<ul style="list-style-type: none"> <li>• Life saving irrigation from rainwater harvesting</li> <li>• Mulching in crop rows</li> <li>• Earthing at 30 to 35 days after sowing.</li> <li>• Spray of kaolin at 5%</li> <li>• Spray of 1000 ppm thiourea</li> <li>• Ridging in maize</li> </ul>	Availability of wheel hoe and power weeder for Inter-culture operations through RKVY.

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At flowering/ fruiting stage	Brown Loamy Medium to Deep Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for baby corn if market is available</li> <li>• Detesseling in maize</li> <li>• Life saving irrigation by the harvested rain water except sesame</li> </ul>	<ul style="list-style-type: none"> <li>• Spray of kaolin at 5 %</li> <li>• Spray of thiourea at 1000 ppm</li> <li>• Life saving irrigation from rainwater</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of farm ponds through NAREGA and RKVY</li> <li>• Crop insurance</li> </ul>

			<ul style="list-style-type: none"> <li>• Removal of lower leaves for fodder in maize and sorghum</li> <li>• Weed free environment</li> </ul>	harvesting	
	Red Gravelly Loam Hilly Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for baby corn if market is available</li> <li>• Detesseling in maize</li> <li>• Life saving irrigation by the harvested rain water except sesame</li> <li>• Removal of lower leaves for fodder in maize and sorghum</li> <li>• Weed free environment</li> </ul>	<ul style="list-style-type: none"> <li>• Spray of kaolin at 5 %</li> <li>• Spray of thiourea at 1000 ppm</li> <li>• Life saving irrigation from rainwater harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of farm ponds through NAREGA and RKVY</li> <li>• Crop insurance</li> </ul>
	Black Clayey Deep Soils	Maize, Sorghum, Groundnut, Soybean, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for baby corn if market is available</li> <li>• Detesseling in maize</li> <li>• Life saving irrigation by the harvested rain water except sesame</li> <li>• Removal of lower leaves for fodder in maize and sorghum</li> <li>• Weed free environment</li> </ul>	<ul style="list-style-type: none"> <li>• Spray of kaolin at 5 %</li> <li>• Spray of thiourea at 1000 ppm</li> <li>• Life saving irrigation from rainwater harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of farm ponds through NAREGA and RKVY</li> <li>• Crop insurance</li> </ul>

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Crop management <sup>c</sup>	Rabi Crop planning <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Terminal drought (Early withdrawal of monsoon)	Brown Loamy Medium to Deep Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for green cobs if market is available</li> <li>• Life saving irrigation with harvested rain water.</li> <li>• Harvesting groundnuts for green pods</li> </ul>	If late season rains are there, after failure of kharif crops, rabi crops i.e. taramira/ toria/mustard can be sown	<ul style="list-style-type: none"> <li>• Construction of farm ponds through NAREGA and RKVY</li> <li>• Crop insurance</li> </ul>
	Red Gravelly Loam Hilly Soils	Maize, Sorghum, Groundnut, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for green cobs if market is available</li> <li>• Life saving irrigation with harvested rain water.</li> <li>• Harvesting groundnuts for green pods</li> </ul>	If late season rains are there, after failure of kharif crops, rabi crops i.e. taramira/ toria/mustard can be sown	
	Black Clayey Deep Soils	Maize, Sorghum, Groundnut, Soybean, Sesame and Blackgram	<ul style="list-style-type: none"> <li>• Harvest maize for green cobs if market is available</li> <li>• Life saving irrigation with harvested rain water.</li> <li>• Harvesting groundnuts for green pods</li> </ul>	If late season rains are there, after failure of kharif crops, rabi crops i.e. taramira/ toria/mustard can be sown	



### 2.1.2 Drought - Irrigated situation

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures			
			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	Canal irrigated Brown Loamy Medium to Deep Soils	Maize-wheat/barley/gram/ mustard	<b>Short Duration Varieties</b> <b>Wheat-</b> HI-1531, HI-1500, HI-8627, Raj-3777, <b>Barley-</b> RD-103, RD-2035, RD – 2052, RD - 2552 <b>Gram</b> – Pratap Chana – 1, ICCV – 10, Dahod Yellow <b>Mustard:</b> Laxmi, Bio – 902	<ul style="list-style-type: none"> <li>• Sowing of short duration varieties.</li> <li>• 25% increase in seed rate in wheat.</li> <li>• Irrigation by pressurized irrigation systems. (Sprinkler or drip)</li> <li>• Irrigation at critical growth stages</li> <li>• Thiourea spray at reproductive stage</li> </ul>	If ponds is available sowing can be done by harvested water Create awareness among the farmers in respect of skills and technologies through KVK	
		Cotton-wheat	-	<ul style="list-style-type: none"> <li>• Irrigation by pressurized irrigation systems. (Sprinkler or drip)</li> <li>• 25% increase in seed rate in wheat</li> <li>• Irrigation at critical growth stages</li> </ul>		
		Groundnut-wheat/barley	-	-do-		
		Fallow/fodder-wheat/gram/ mustard	-	-do-		
	Canal irrigated Red Gravelly Loam Hilly Soils	Maize/Sorghum-wheat/ Barley/Mustard	<b>Short Duration Varieties</b> <b>Wheat-</b> HI-1531, HI-1500, HI-8627, Raj-3777, <b>Gram</b> – Pratap Chana – 1, ICCV – 10, Dahod Yellow <b>Mustard:</b> Laxmi, Bio – 902	<ul style="list-style-type: none"> <li>• Sowing of short duration varieties.</li> <li>• 25% increase in seed rate in wheat.</li> <li>• Irrigation by pressurized irrigation systems(Sprinkler or drip systems)</li> <li>• Irrigation at critical crop growth stages</li> </ul>		
			Cotton-wheat	Cotton-wheat		-do-
			Maize-gram	Maize-gram		.-do-
			Kharif pulses-wheat	Kharif pulses-wheat		<ul style="list-style-type: none"> <li>• Irrigation at critical stages.</li> <li>• Thiourea spray at reproductive stage.</li> </ul>

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			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	Brown Loamy Medium to Deep	Maize-wheat/barley/gram/	Replace wheat by mustard and gram	• Irrigation by pressurized irrigation systems.	If ponds is available sowing can be done

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures			
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>	
to low rainfall	Soils	mustard	Inter cropping of gram + mustard (one row of mustard across the 4 m spacing)	<ul style="list-style-type: none"> <li>• Irrigation at critical stages.</li> <li>• Thiourea spray at reproductive stage.</li> <li>• Weed free environment</li> <li>• Use of weeds as mulch</li> <li>• Spray of kaolin at 5 %</li> </ul>	by harvested water Create awareness among the farmers in respect of skills and technologies through KVK	
		Cotton-wheat	Cotton-wheat	-do--		
		Groundnut-wheat/barley	Groundnut-wheat/barley	-do-		
		Fallow/fodder-wheat/gram/mustard	Fallow/fodder-wheat/gram/mustard	-do-		
		Red Gravelly Loam Hilly Soils	Maize/Sorghum-wheat/Barley/Mustard	Replace wheat by mustard and gram Inter cropping of gram + mustard (one row of mustard across the 4 m spacing)		<ul style="list-style-type: none"> <li>• Irrigation by pressurized irrigation systems.</li> <li>• Irrigation at critical stages.</li> <li>• Thiourea spray at reproductive stage.</li> <li>• Weed free environment</li> <li>• Use of weeds as mulch</li> <li>• Spray of kaolin at 5 %</li> </ul>
			Cotton-wheat	Cotton-wheat		-do-
	Maize-gram		Maize-gram	-do-		
	Kharif pulses-wheat		Kharif pulses-wheat	-do-		

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Non release of water in canals under delayed onset of monsoon in catchment	Brown Loamy Medium to Deep Soils	Maize-wheat/barley/gram/mustard	If conserve moisture is available due to late season rainfall only gram, mustard and taramira can be grow	<ul style="list-style-type: none"> <li>• Soil mulching by stirring</li> <li>• Weed free environment</li> <li>• Spray of kaolin at 5 %</li> </ul>	Create awareness among the farmers in respect of skills and technologies through KVK
		Cotton-wheat	-do-	-do-	
		Groundnut-wheat/barley	-do-	-do-	
		Fallow/fodder-wheat/gram/mustard	-do-	-do-	
	Red Gravelly Loam Hilly Soils	Maize/Sorghum-wheat/Barley/Mustard	If conserve moisture is available due to late season	<ul style="list-style-type: none"> <li>• Soil mulching by stirring</li> <li>• Weed free environment</li> </ul>	

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>
			rainfall only gram, mustard and taramira can be grown	<ul style="list-style-type: none"> <li>Spray of kaolin at 5 %</li> </ul>	
		Cotton-wheat	-do-	-do-	
		Maize-gram	-do-	-do-	
		Kharif pulses-wheat	-do-	-do-	

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>
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Brown Loamy Medium to Deep Soils	Maize-wheat/barley/gram/mustard	If conserve moisture is available due to late season rainfall only gram, mustard and taramira can be grown	<ul style="list-style-type: none"> <li>Soil mulching by stirring</li> <li>Weed free environment</li> <li>Spray of kaolin at 5 %</li> </ul>	Create awareness among the farmers in respect of skills and technologies through KVK
		Cotton-wheat	-do-	-do-	
		Groundnut-wheat/barley	-do-	-do-	
		Fallow/fodder-wheat/gram/mustard	-do-	-do-	
	Red Gravelly Loam Hilly Soils	Maize/Sorghum-wheat/Barley/Mustard	If conserve moisture is available due to late season rainfall only gram, mustard and taramira can be grown	<ul style="list-style-type: none"> <li>Soil mulching by stirring</li> <li>Weed free environment</li> <li>Spray of kaolin at 5 %</li> </ul>	
		Cotton-wheat	-do-	-do-	
		Maize-gram	-do-	-do-	
		Kharif pulses-wheat	-do-	-do-	

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>
Insufficient groundwater recharge due to low rainfall	Brown Loamy Medium to Deep Soils	Maize-wheat/barley/gram/mustard	<b>Short Duration Varieties</b> <b>Wheat-</b> HI-1531, HI-1500, HI-8627, Raj-3777, <b>Barley-</b> RD-103, RD-	<ul style="list-style-type: none"> <li>Sowing of short duration varieties.</li> <li>In situ mulching by weeds.</li> <li>Irrigation by MIS</li> </ul>	Percolation tanks may be dug out through NREGA or NABARD

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>
			2035, RD – 2052, RD - 2552 <b>Gram</b> – Pratap Chana – 1, ICCV – 10, Dahod Yellow <b>Mustard:</b> Laxmi, Bio – 902	<ul style="list-style-type: none"> <li>• Irrigation at critical stages.</li> <li>• Kulfa interculture practices should be followed.</li> <li>• Thiourea spray at reproductive stage.</li> </ul>	
		Cotton-wheat	-do-	-do-	
		Groundnut-wheat/barley	-do-	-do-	
		Fallow/fodder-wheat/gram/ mustard	-do-	-do-	
	Red Gravelly Loam Hilly Soils	Maize/Sorghum-wheat/ Barley/Mustard	<b>Short Duration Varieties</b> <b>Wheat-</b> HI-1531, HI-1500, HI-8627, Raj-3777, <b>Barley-</b> RD-103, RD-2035, RD – 2052, RD - 2552 <b>Gram</b> – Pratap Chana – 1, ICCV – 10, Dahod Yellow <b>Mustard:</b> Laxmi, Bio – 902	-do-	
		Cotton-wheat	-do-	-do-	
		Maize-gram	-do-	-do-	
		Kharif pulses-wheat	-do-	-do-	

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

Condition	Suggested contingency measure			
	Vegetative stage <sup>k</sup>	Flowering stage <sup>l</sup>	Crop maturity stage <sup>m</sup>	Post harvest <sup>n</sup>
<b>Continuous high rainfall in a short span leading to water logging</b>				
Maize	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainage</li> <li>• Earthing up of crop for anchorage</li> <li>• Intercultivation with hoe to improve the aeration and to control weeds</li> <li>• Apply 20kg N/ha at optimum</li> </ul>	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainage</li> <li>• Earthing up of crop for anchorage</li> <li>• Intercultivation with hoe to improve soil aeration and to control weeds</li> <li>• Apply multi nutrient or hormonal spray to promote flowering</li> </ul>	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainage as early as possible</li> <li>• Harvest green cobs from dislodged plants for immediate marketing</li> </ul>	<p>Harvest the cobs after they are dried up properly</p> <p>Dry the grains up to 10-12% moisture level</p>

	moisture content		<ul style="list-style-type: none"> <li>Shift the produce into the shed</li> </ul>	before storage /bagging
Sorghum	-do-	-do-	-do-	-do-
Soybean	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage</li> <li>Intercultivation with hoe to improve the aeration and to control weeds</li> <li>Apply 20kg N/ha at optimum moisture content</li> </ul>	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage</li> <li>Intercultivation with hoe to improve soil aeration and to control weeds</li> <li>Apply multi nutrient or hormonal spray</li> <li>Plano fix to promote flowering</li> </ul>	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage as early as possible</li> <li>Harvest at physiological maturity on clear sunny day</li> </ul>	Dry the produce up to 10-12% moisture level before storage /bagging
Green gram,	-do-	-do-	-do-	-do-
Groundnut	<p>Drain out the excess water at the earliest</p> <p>Take-up the gap filling at the earliest</p> <p>Apply 10-15 kg N/ha after draining excess water</p> <p>Take up plant protection measures against possible pests and disease incidence</p>	<p>Drain out the excess water at the earliest</p> <p>Apply 4-5 kg N/acre after draining excess water</p> <p>Spray KNO<sub>3</sub> 1 % or Urea 2% water soluble fertilizers like 19-19- or 19, 20-20-20, 21-21-21 at 1% to support nutrition</p> <p>Take up plant protection measures against possible pests and disease incidence</p> <p>Incorporate Gypsum 200 kg/ acre at flowering.</p>	<p>Drain out the excess water at the earliest</p> <p>Spray KNO<sub>3</sub> 1 % or 2% Urea to support nutrition</p> <p>Take up plant protection measures against possible pests and disease incidence</p>	<p>Drain the field immediately.</p> <p>Harvest the produce after the event.</p> <p>Dry the pods to safe moisture level to prevent storage pests.</p>
Blackgram,	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage</li> <li>Intercultivation with hoe to improve the aeration and to control weeds</li> <li>Apply 20kg N/ha at optimum moisture content</li> </ul>	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage</li> <li>Intercultivation with hoe to improve soil aeration and to control weeds</li> <li>Apply multi nutrient or hormonal spray</li> <li>Plano fix to promote flowering</li> </ul>	<ul style="list-style-type: none"> <li>Drain excess water by proper drainage as early as possible</li> <li>Harvest at physiological maturity on clear sunny day</li> </ul>	Dry the produce up to 10-12% moisture level before storage /bagging
Sesame	-do-	-do-	-do-	-do-
Rabi Crops	Avoid irrigation in irrigated situation	Avoid irrigation in irrigated situation	Avoid irrigation in irrigated situation	Drying of the produce immediately after stop of rain
<b>Horticulture</b>				

<b>Vegetables</b>	Removal excess water from field by formation of small channels	Removal excess water from field by formation of small channels	Removal excess water and harvest vegetables	
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Maize	Removal excess water from field by formation of small channels Tying of 4 – 5 plants together	Removal excess water from field by formation of smallchannel Tying of 4 – 5 plants together	Removal excess water from field by formation of small channels Harvest green cobs of maize	
Sorghum	Drain out excess water Take up plant protection measures	Drain out excess water Timely plant protection measures are to be taken up	Drain out excess water	Shifting of grain immediately after drying
Soybean	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainage</li> <li>• Intercultivation with hoe to improve the aeration and to control weeds</li> <li>• Apply 20kg N/ha at optimum moisture content</li> </ul>	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainag</li> <li>• Intercultivation with hoe to improve soil aeration and to control weeds</li> <li>• Apply multi nutrient or hormonal spray</li> <li>• Planofix to promote flowering</li> </ul>	<ul style="list-style-type: none"> <li>• Drain excess water by proper drainage as early as possible</li> <li>• Harvest at physiological maturity on clear sunny day</li> </ul>	Dry the produce up to 10-12% moisture level before storage /bagging
Blackgram	-do-	-do-	-do-	-do-
Sesame	-do-	-do-	-do-	-do-
Groundnut	<p>Drain out the excess water at the earliest</p> <p>Take-up the gap filling at the earliest</p> <p>Apply 10-15kg N/ha after draining excess water</p> <p>Take up plant protection measures against possible pests and disease incidence</p>	<p>Drain out the excess water at the earliest</p> <p>Apply 4-5 kg N/acre after draining excess water</p> <p>Spray KNO<sub>3</sub> 1 % or Urea 2% water soluble fertilizers like 19-19- or 19, 20-20-20, 21-21-21 at 1% to support nutrition</p> <p>Take up plant protection measures against possible pests and disease incidence</p> <p>Incorporate Gypsum 200 kg/ acre at flowering.</p>	<p>Drain out the excess water at the earliest</p> <p>Spray KNO<sub>3</sub> 1 % or 2% Urea to support nutrition</p> <p>Take up plant protection measures against possible pests and disease incidence</p>	<p>Drain the field immediately.</p> <p>Harvest the produce after the event.</p> <p>Dry the pods to safe moisture level to prevent storage pests.</p>
<b>Horticulture (Fruits)</b>	Removal excess water from field by formation of small channels	Removal excess water from field by formation of small channels	Removal excess water from field by formation of small channels  Tying of 4 – 5 plants	

			together	
<b>vegetables</b>	Removal excess water from field by formation of small channels	Removal excess water from field by formation of small channels	Removal excess water and harvest vegetables	

<b>Outbreak of pests and diseases due to unseasonal rains</b>				
	<b>Disease</b>	<b>Control</b>	<b>Insect/pest</b>	<b>Control</b>
Sorghum	<b>Insect pest :-</b> Shootfly /Stem borer Quinalphos @ 2 ml/lit .	<b>Insect pest :-</b> Army worm Quinolphos 1.5 % or carbaril 10 % 20 kg/ha dusting <b>Disease :-</b> Leaf Blight , spry COC 3 g/ lit water	<b>Insect pest :-</b> Ear head caterpillar Quinalphos @ 2 ml/lit	Dusting of methyl parathion 2% at 25 kg/ha in the field
Maize	<b>Insect pest :-</b> Aphid, Jassids spray Dimethoate 30EC or Monocrotophos 36 SL 1ml / lit water	<b>Insect pest :-</b> Stem Borer Quinalphos @ 2 ml/lit.	-	-
Soybean	Early planted soybean is likely to be attacked by girdle beetle and green semilooper due to copious rains. Watch for drooping and drying of leaves.  Manually remove the infested plants or plant parts from below the girdles  Protect against semilooper when density reaches 2-4 larvae per m row length then go for with foliar spray of NSKE 5% or dimethoate 30 EC 1 ml/l	Monitor adult moth activity of <i>Spodoptera</i> through pheromone traps (10 traps /ha) and observe egg masses and gregarious larvae.  Wet spell followed by a dry spell of 7-10 days during flowering or up to two weeks after flowering severe pest incidence is likely.  When density crosses ETL of 1-2 larvae /m row length, apply quinalphos 25 EC 20 ml/10 l or Emamectin benzoate 5 SG @ 4 g/10 l or Profenofos 50 EC @ 25 ml/10 lit or Lambda cyhalothrin 5 EC @ 6 ml/10 lit or Indoxacarb	-	-

### 2.3 Floods Not Applicable

<b>Condition</b>	<b>Suggested contingency measure</b>			
	<b>Seedling / nursery stage</b>	<b>Vegetative stage</b>	<b>Reproductive stage</b>	<b>At harvest</b>
<b>Transient water logging/ partial inundation</b>	NA			

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>Horticulture</b>				
Vegetables (tomato/onion/Chilli/Brinjal)	Protected cultivation in shade net house Spray of Borax at 0.1 % Arrangement of wind breaks	Light and frequent irrigation	Light and frequent irrigation	Timely picking of fruits
<b>Cold wave</b>				
Wheat,	Light irrigation Smoking during night	Light irrigation	<ul style="list-style-type: none"> <li>• Burning of farm waste or crop residue around the field for smoke</li> <li>• Light irrigation</li> <li>• Spray of sulphuric acid at 0.1 %</li> </ul>	NA
Mustard	Light irrigation Smoking during night	Smoking during night		
Gram	Light irrigation Smoking during night			
<b>Horticulture</b>				
Pea, tomato, brinjal	Protected cultivation in shade net house Spray of Borax at 0.1 % Light irrigation Smoking during night	Light irrigation Smoking during night	<ul style="list-style-type: none"> <li>• Burning of farm waste or crop residue around the field for smoke</li> <li>• Light irrigation</li> <li>• Spray of sulphuric acid at 0.1 %</li> </ul>	-
<b>Frost</b>				
Wheat, Mustard, Gram	Light irrigation Smoking during night	Light irrigation Smoking during night	<ul style="list-style-type: none"> <li>• Burning of farm waste or crop residue around the field for smoke</li> <li>• Light irrigation</li> <li>• Spray of sulphuric acid at 0.1 %</li> </ul>	NA
<b>Horticulture</b>				
Pea, tomato, brinjal	Protected cultivation in shade net house Spray of Borax at 0.1 %	--	<ul style="list-style-type: none"> <li>• Burning of farm waste or crop residue around the field for smoke</li> <li>• Light irrigation</li> <li>• Spray of sulphuric acid at 0.1 %</li> </ul>	-



## 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 regularly drought prone one, it should have some feed and fodder reserves at any point of the year for mobilization to the drought affected villages, Hence the under mentioned feed reserves should be created at district head quarter</p> <p>Urea molasses mineral bricks (UMMB):50-100 t</p> <p>Hay:100-250 t</p> <p>Concentrates: 20-50 t</p> <p>Minerals and vitamin supplements mixture:5-10 t</p> <p>Preserve available maize green fodder as silage for feeding productive animals during drought/summer</p> <p>Sowing of Horsegram/Lucerne etc., during NE monsoon</p> <p>Available crop residues especially Bajra Karabi, Wheat/barley straw/ Chopped sewan/Dhaman/Bharut/ Dry leaves of Jharberi/ Groundnut bhusa should be stored properly in the farm of hay at individual farmer level.</p> <p>Harvest the top fodder (Khejari, Neem, Subabul, Acasia, Pipol etc) and create fodder banks at village level</p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component</p>	<p>Harvest and use all the failed crop (Maize, Blackgram, Sorghum, Ground nut, Cluster bean, Wheat, Barley, Green gram, Soybean etc.,) material as fodder and feed the Livestock.</p> <p>Use judiciously the karabi, Preserved sewan /Dhaman /Bharut, Wheat straw, Lopped Khejari</p> <p>High productive animals should be Supplemented with tree fodder</p> <p>Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals</p> <p><b>In case of Severe drought:</b> UMMB, hay, concentrates and vitamin &amp; mineral mixture should be transported to the drought affected villages</p> <p>All the hay should be enriched with 2% 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</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive &amp; breeding stock)</p> <p>Available kitchen waste should be mixed with dry fodder while feeding</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>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>

	<p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production</p> <p>Increase area under short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 etc.) on farmers fields with some input subsidy</p> <p>Avoid burning of wheat straw</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon</p> <p>Proper drying, bailing and densification of harvested grass</p> <p>Capacity building and preparedness of the stakeholders and official staff for the extreme events</p>	<p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans should be provided to the livestock keepers for procurement of feed</p>	
<p><b>Floods</b></p>	<p>Harvest all the possible wetted grain (Sorghum, Wheat, Groundnut etc) and use as animal feed.</p> <p>Don't allow the animals for grazing in case of early fore warning (EFW)</p> <p>Incase of EFW, shift the animals to safer places.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen arrangement should be made to mitigate the problem</p> <p>Protect the animals from heavy rains and thunder storms</p> <p>In severe cases un-tether <b>or</b> let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible out breaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime powder in pit</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of above mention short duration fodder crops in unsown and water logged areas</p> <p>Application of urea (20-25kg/ha)</p>

			in the CPR's to enhance the bio mass production.
<b>Heat &amp; Cold wave</b>	<p>Arrangement for protection from <b>heat wave</b></p> <ul style="list-style-type: none"> <li>i) Provision shed with bamboo/thatched material</li> <li>ii) Plantation around the shed</li> <li>iii) H<sub>2</sub>O sprinklers / foggers in the shed</li> <li>iv) Application of white reflector paint on the roof</li> </ul> <p><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>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Put on the foggers / sprinklers during heat waves and heaters during cold waves</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H<sub>2</sub>O during severe heat 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>Health and Disease management</b>	<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 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
Drinking water	<p>Identification of water resources</p> <p>Desilting 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 shandies /community grazing areas</p>	<p>Restrict wallowing of animals in water bodies/resources</p> <p>Provide clean drinking water</p>	<p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>

## 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	<p>Storing of house hold grain like maize, wheat, sorghum, bajra etc,</p> <p>Culling of weak birds</p>	<p>Supplementation only for productive birds with house hold grain</p> <p>Supplementation of shell grit (calcium) for laying birds</p>	Supplementation to all the birds
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	<p>Culling of sick birds.</p> <p>Deworming and vaccination against RD and IBD</p>	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	<p>Hygienic and sanitation of poultry house</p> <p>Disposal of dead birds by burning / burying with lime powder in pit</p>
<b>Floods</b>			
Shortage of feed ingredients	<p>In case of EFW, shift the birds to safer place</p> <p>Storing of house hold grain like wheat/rice, sorghum, bajra etc,</p> <p>Culling of weak birds</p>	<p>Use stored feed as supplement</p> <p>Don't allow for scavenging</p> <p>Protect from thunder storms</p>	Supplementation to all the birds

Drinking water	Provide clean drinking water	Sanitation of drinking water	Give sufficient water as per the bird's requirement
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
<b>Heat wave</b>			
Shelter/environment management	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
Health and disease management	Deworming and vaccination against RD and IBD	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
<b>Cold wave</b>			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Arrangement for protection from chilled air	Supplementation of grains Antibiotics in drinking water to protect birds from pneumonia	Routine practices are followed

### 2.5.3: Fisheries/Aquaculture: Not Applicable