State: Madhya Pradesh

Agriculture Contingency Plan for District: CHHATARPUR

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-sub region (10.3)		
	Agro-Climatic Zone (Planning Commission)	Central Plateau and Hills Region (VIII)		
	Agro Climatic Zone (NARP)	Bundelkhand Zone (MP-8)		
	List all the districts or part thereof falling under the NARP Zone	Datia, Tikamgarh, Chhatarpur and some part of Shivpuri		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		24° 06' to 25° 20' N	**78° 59' to 80° 26' E**	600 msl
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ZARS, Tikamgarh		
	Mention the KVK located in the district	Programme Coordinator Krishi Vigyan Kendra, Nowgaon, Pan Research Centre, Distt. Chhatarpur – 472 001 (M.P.)		
1.2	Rainfall	Normal RF(mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	984.8	3rd week of June	1st week of October
	NW Monsoon(Oct-Dec):	58.1		-
	Winter (Jan-Feb)	37.6	-	-
	Summer (march-May)	14.6	-	-
	Annual	1095.1	-	-

1.3	**Land use pattern of the district** (latest statistics)	**Geographical area**	**Cultivable area***	**Forest area**	**Land under non-agricultural use**	**Permanent pastures**	**Cultivable wasteland**	**Land under Misc. tree crops and groves**	**Barren and uncultivable land**	**Current fallows**	**Other fallows**
	Area ('000 ha)	863.0	469.3	214.0	44.2	63.3	70.3	0.3	1.6	105.0	44.4

* Net Sown area + current fallows + old fallows

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Deep soil	262.2	30.2
	Medium deep soils	267.4	30.8
	Shallow soils	337.0	38.8

Source: NBSS & LUP, Nagpur

1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	319.9	127
	Area sown more than once	84.8	
	Gross cropped area	404.7	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	157.0		
	Gross irrigated area	157.0		
	Rain fed area	162.9		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	45	7.9	5.06
	Tanks	143	3.2	2.05
	Open wells	68410	120.7	77.2

	Bore wells	373	3.1	1.9
	Lift irrigation schemes	Na	-	-
	Micro-irrigation	NA	-	-
	Other sources (reservoir)	351	22.1	14.1
	Total Irrigated Area	-	157.0	-
	Pump sets	360	-	-
	No. of Tractors	7179	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils 08	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Nil	0	20%medium salinity and low sodium80% high salinity and low sodium
	Critical	Nil	0	
	Semi- critical	01 (Loundi)	-	
	Safe	07	-	
	Wastewater availability and use	94841 ha m	-	
	Ground water quality	Alkaline $C_2 S_1$ K $C_3 S_1$ (EC less than 1000µs/Cm at Villages ,No_3 less than 45 mgl in 50 % Samples, Tehsil Laundi has high F (2.65mgl)		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

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

1.7	**Major Field Crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***			**Summer**	**Total**
		Irrigated	***Rainfed***	**Total**	***Irrigated***	***Rainfed***	**Total**		
	Blackgram	-		34.8				**NA**	34.8
	Sesame	-		33.0					33.0
	Soybean	-		25.7					25.7
	Sorghum	-		14.3					14.3
	Rice	-		9.3					9.3
	Pigeonpea	-		5.9					5.9

	Ground nut	-		5.9					5.9
	Greengram	-		5.4					5.4
	Wheat						133.8		133.8
	Chickpea						89.2		89.2
	Pea						19.8		19.8
	Mustard						11.5		11.5
	Linseed						10.6		10.6
	lentil						9.7		9.7
	Barley						8.5		8.5
	Others (specify)								

Horticulture crops - Fruits		**Total area (ha)**	**Irrigated**	**Rainfed**
1	Mango	38		-
	Guava	40		-
	Papaya	8		-
	Aonla	12		-
	Lime	5		-
	Banana	01		-
	Others (specify)	**163**		**-**

	Horticultural crops - Vegetables	**Total area (ha)**	**Irrigated**	**Rainfed**
	Potato	915		-
	Tomato	928		-
	Okra	114		-
	Brinjal	1273		-
	Onion	137		
	Colocacia	766		-

	Cucurbitaceus	436		-
	Sweet potato	414		-
	Cauliflower	50		-
	Cowpea	-		-
	Garlic	205		
	Chilli	588		
	Coriander	269		
	Ginger	574		-
	Medicinal and Aromatic crops	**Total area (ha)**	**Irrigated**	**Rainfed**
	Safed Musali	0.4		-
	Mentha	11		-

		Plantation crops	**Total area**	**Irrigated**	**Rainfed**
		-	-	-	-
		Others such as industrial pulpwood crops etc (specify)			

	Fodder crops	**Total area (000 ha.)**	**Irrigated**	**Rainfed**
		-		
	Total fodder crop area	-	-	-
	Grazing land	63.30	-	--
	Sericulture etc	-	-	--
	Others (Specify)	-	-	-

1.8	Livestock	Male (‘000)	Female (‘000)	Total (‘000)
	Non descriptive Cattle (local low yielding)	-	-	507.9
	Crossbred cattle	-	-	NA
	Non descriptive Buffaloes (local low yielding)	-	-	NA
	Graded Buffaloes	-	-	220.4
	Goat	-	-	311.8
	Sheep	-	-	49.5
	Others (Pig, etc.)	-	-	27.7
	Commercial dairy farms (Number)	-	-	-
1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**	
	Commercial	-	-	
	Backyard	2991	55.7	
	Total	2991	55.7	

1.10	**Fisheries** (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		NA					
	ii) Inland (Data Source: Fisheries Department) **In Madhya Pradesh**	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		3346		**2546**		**29477**	
	B. Culture						
		Water Spread Area (ha)		**Yield (t/ha)**		**Production (tons)**	
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	NA		NA		NA	

	ii) **Fresh water** (Data Source: Fisheries Department)	1328 ha	-	2114
	Others	-	-	-

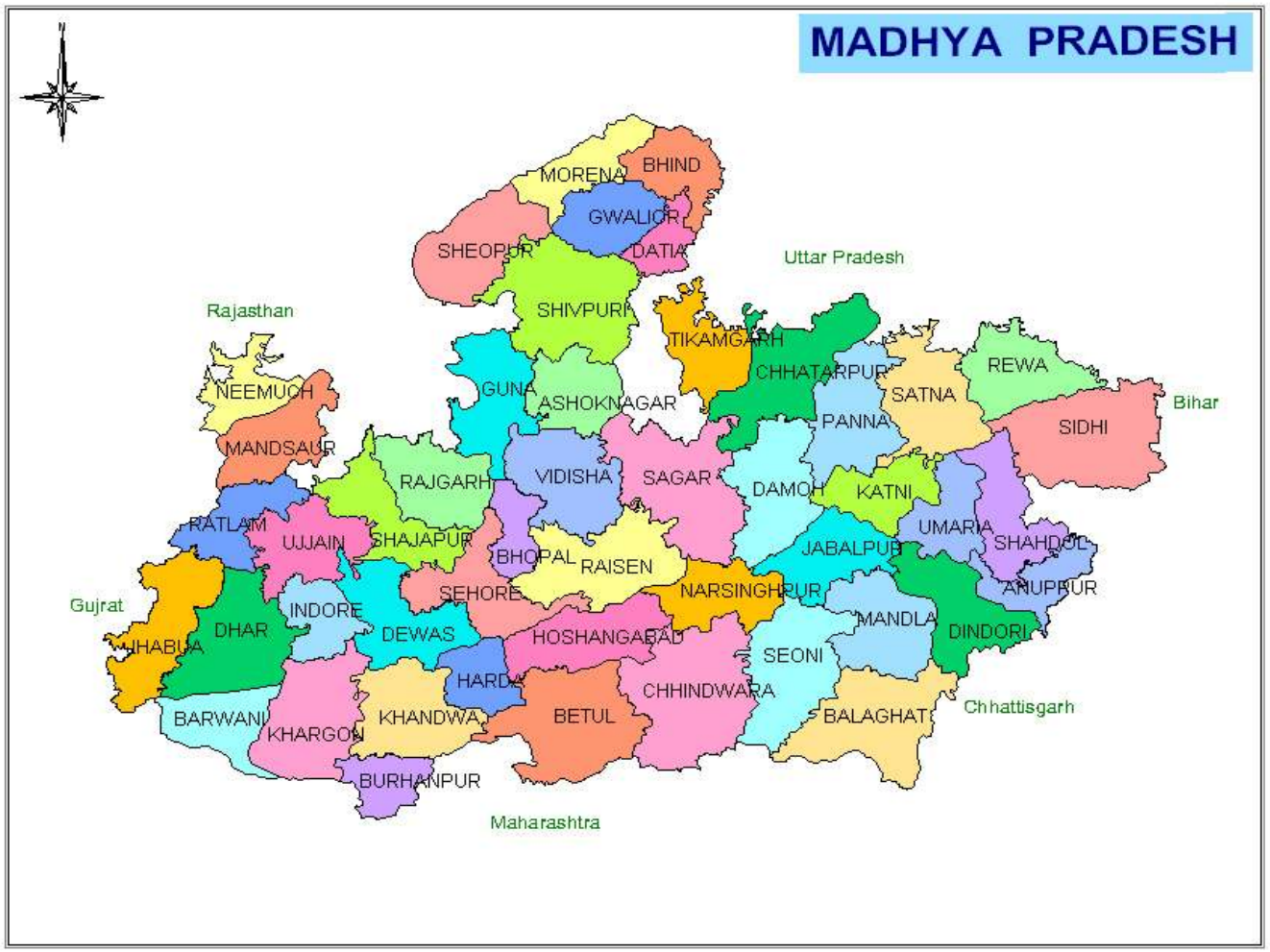
1.11 Production and Productivity of major crops

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
	Blackgram	8.4	203			NA		8.4	203	
	Sesame	14.0	330					14.0	330	
	Soybean	11.8	481					11.8	481	
	Sorghum	13.2	834					13.2	834	
	Rice	6.9	572					6.9	572	
	Wheat			145.9	1547			145.9	1547	
	Chickpea			74.4	897	-	-	74.4	897	-
	Pea			6.6	296			6.6	296	
	Linseed			3.9	372			3.9	372	
	Mustard			3.8	299			3.8	299	
Major Horticultural crops (Crops to be identified based on total acreage) NA										
	Brinjal	-	-	-	-	-	-	-	-	-
	Tomato	-	-	-	-	-	-	-	-	-
	Potato	-	-	-	-	-	-	-	-	-
	Colocasia	-	-	-	-	-	-	-	-	-
	Chilli	-	-	-	-	-	-	-	-	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Blackgram**	**Sesame**	**Soybean**	**Sorghum**	**Rice**
	Kharif- Rainfed	1st to 2nd week of July (up to 10th July)	3rd week of June – 1st week of July	3rd week of June – 1st week of July	3rd week of June – 1st week of July	3rd week of June – 3rd week of July
	Kharif-Irrigated	-	-	-	-	-
		Wheat	**Chickpea**	**Pea**	**Mustard**	**Linseed**
	Rabi- Rainfed	3rd week of October- 1st week of November (up to 10th Nov)	3rd week of October – 2nd week of November	3rd week of October – 2nd week of November	3rd week of October – 2nd week of November	2nd week of October- 4th week of October
	Rabi-Irrigated	2nd week of November - 2nd week of December	2nd week of November – 4th week of November	1st week of November- 3rd week of November	2nd week of October- 4th week of October	3rd week of October- 1st week of November

1.13	**What is the major contingency the district is prone to?** (Tick mark)		Regular	Occasional	None
	Drought		√	-	-
	Flood		-	-	√
	Cyclone		-	-	√
	Hail storm		-	-	√
	Heat wave		-	√	-
	Cold wave		-	√	-
	Frost		-	√	-
	Sea water intrusion		-	-	√
	Pests and disease outbreak (specify)		-	√	-
	Others (specify)		-	-	√
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes		
		Mean annual rainfall as Annexure 2	Enclosed: Yes		
		Soil map as Annexure 3	Enclosed: Yes		

Annexure I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DINDORI
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BARWANI
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BETUL
BALAGHAT
Chhattisgarh
KHARGON
BURHANPUR
Maharashtra


AGROCLIMATIC ZONES
BUNDELKHAND
CENTRAL NARMADA VALLEY
CHATTISGARH PLAIN BALAGHAT
GRID REGION
JHABUA HILLS
KYMORE PLATEAU SATPURA HILLS
MALWA PLATEAU
NIMAR PLAINS
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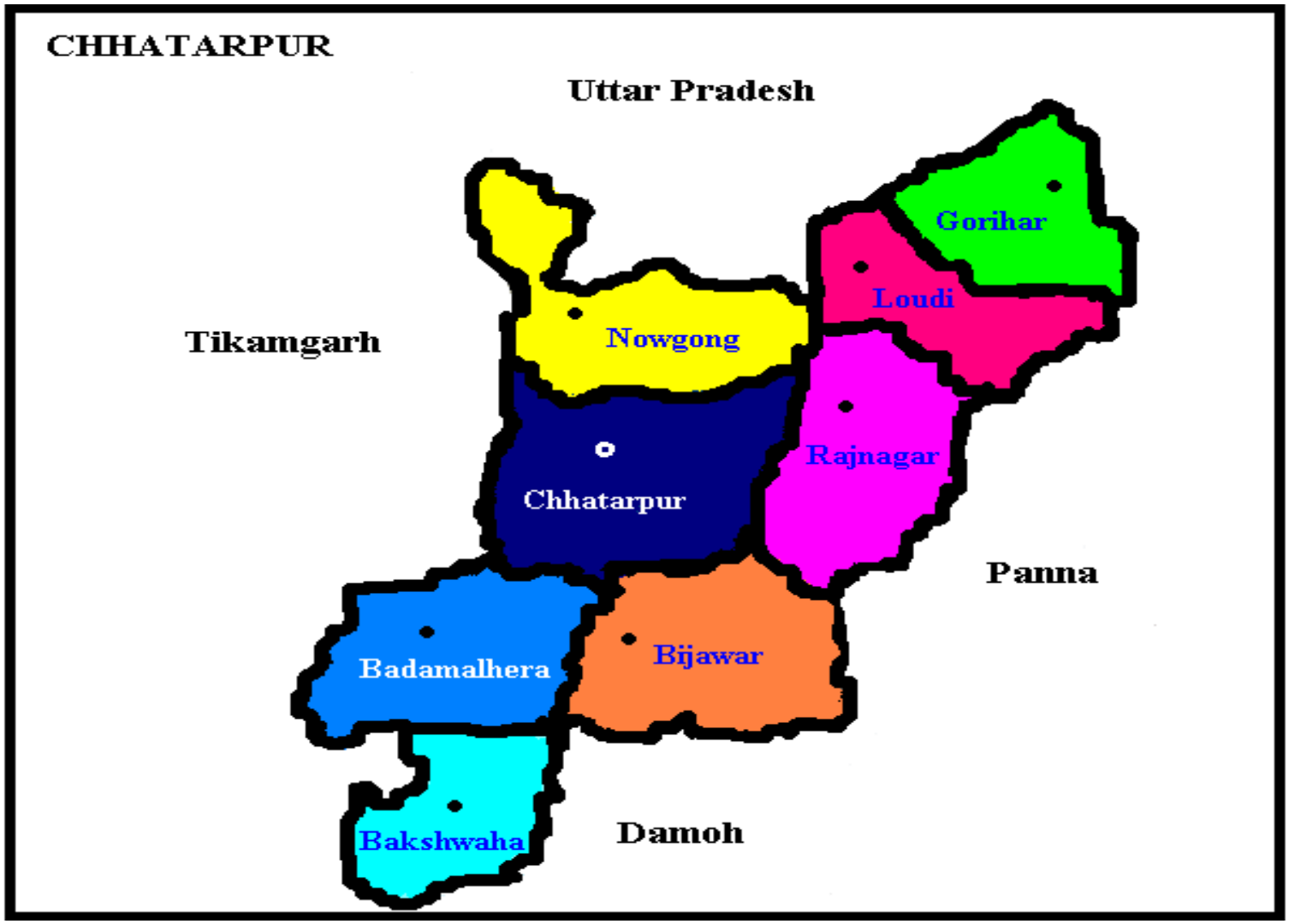
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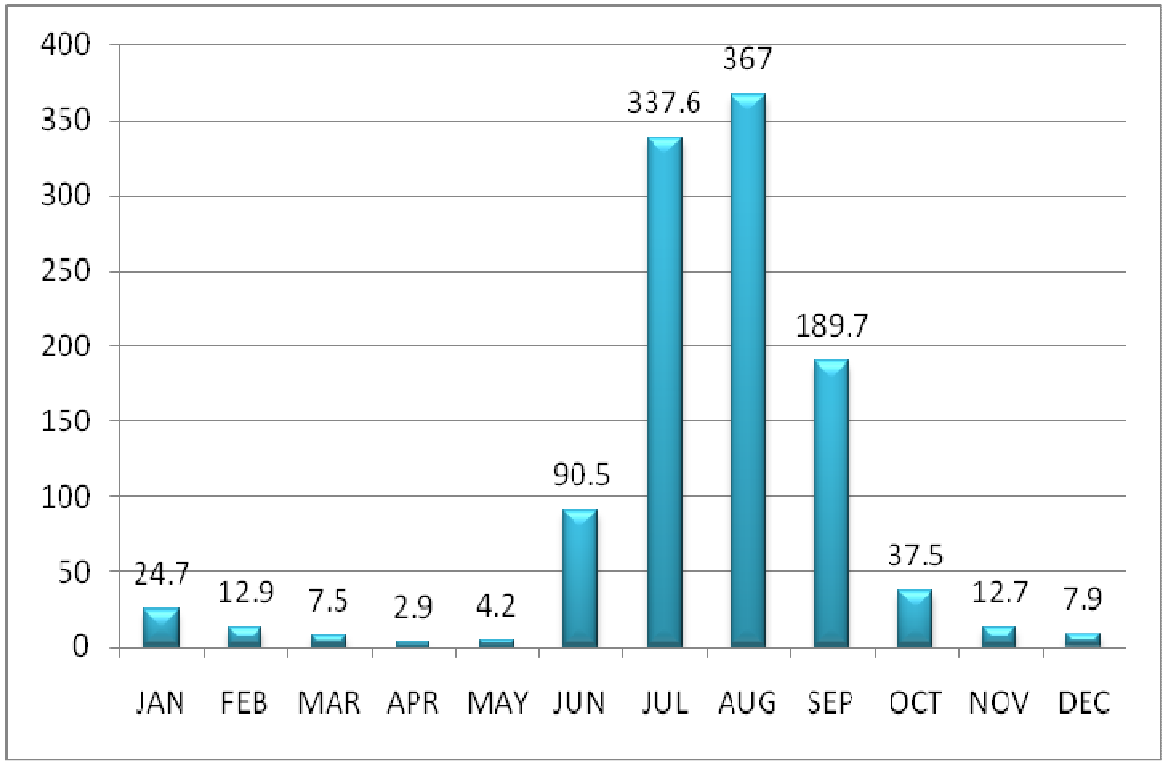
Annexure II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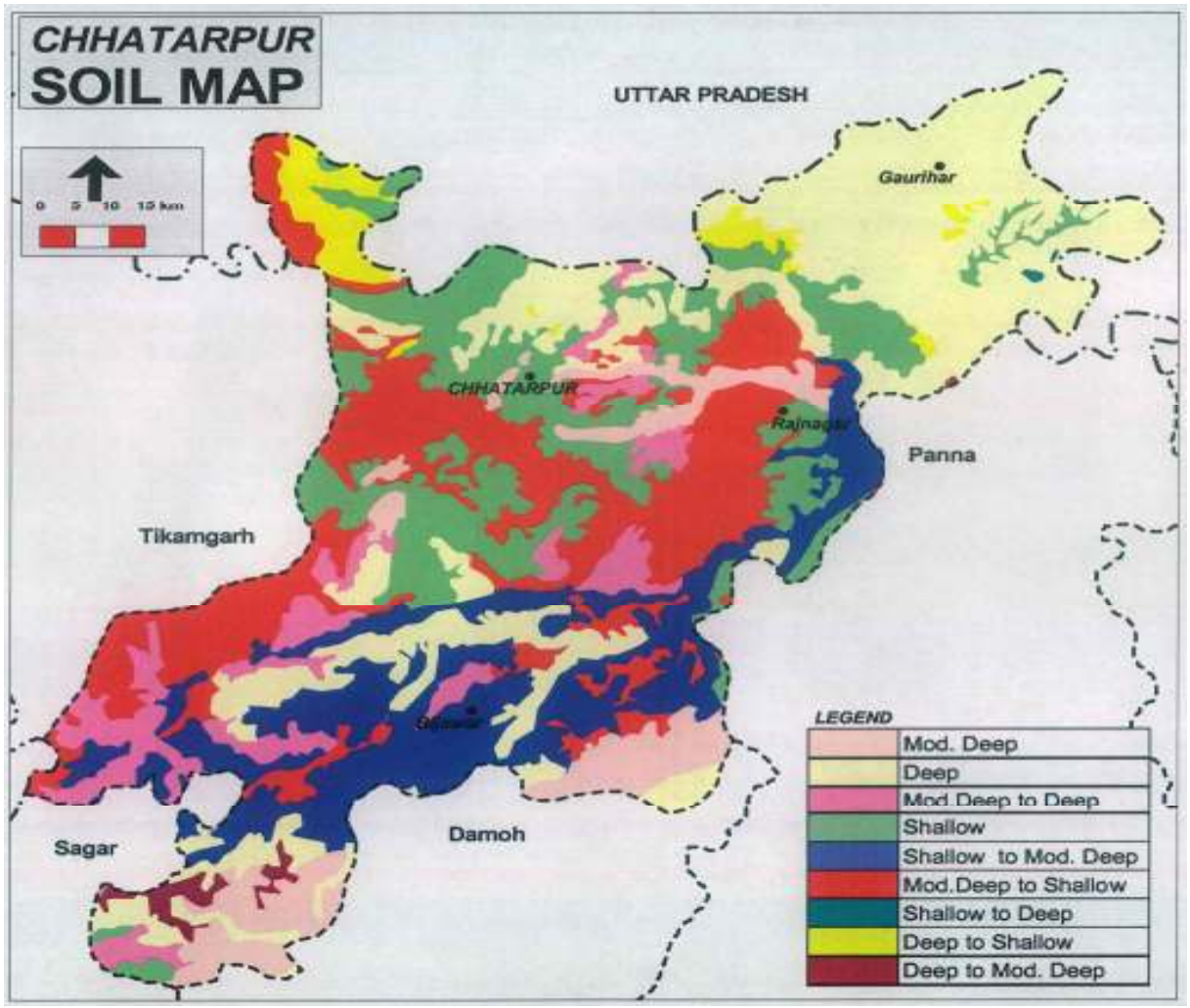
Annexure III



Source: NBSS & LUP, Nagpur

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delayed 2 weeks 1st week of July	Deep black soils	Blackgram	No change. Blackgram varieties – JU-2, JU-3 ,JU-86, T-9, JBG-623, LBG684, TAU-1, Berkha, PU-30,35,19	• Blade harrowing (Bakhar) for moisture conservation • Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. • Intercultivation • Adopt of recommended package of practices for higher production. • Late maturing varieties recommended for heavy soil	Seed source SAU;s, NSC, Beej Nigam
		Greengram	No change. Greengram: PDM-139,HUM-1		
		Sesame	No change. Sesame : TKG-306, TKG-35, JGS-8, JT-21, JT-22, JT-55,PKTS-11,PKTS-12, JT-1		
		Soybean	No change. Soybean- JS-335, JS 80-21, JS 97-52, JS 94-60, JS 93-05,PK-472,JS- 80-21,NRC-12,NRC-37,JS97-42		
		Sorghum	No change		
		Rice	No change		
		Pigeonpea	No change Pigeonpea-Pragti, Jagrati, Asha , Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi) , JKM-189		

		Ground nut	**Groundnut**–JGM-23,TG-37,JGN-3, JG-24		
	Medium deep black soils	Blackgram	No change		
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Rice			
		Pigeonpea			
		Ground nut			
	Shallow sandy loam soils	Blackgram	No change.	• 1.For early maturing varieties, adopt 15x15 cm geometry but seedlings are not more than 18 to 21 days old • Blade harrowing (Bakhar) for moisture conservation • 3.Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. • 4.Intercultivation	
		Greengram			
		Sesame			
		Soybean			
		Sorghum			

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delayed 4 weeks 3rd week of	Deep black soils	Blackgram	Blackgram varieties : JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha,PU-30,35,19	• Blade harrowing (Bakhar) for moisture conservation	Seed source SAU;s,

July		Greengram	Greengram : Pusa vishal, K851, JM721, Jawahar 99 -37, Hum-1, Hum-2, Tarme-	• Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. • Intercultivation • Adopt of recommended package of practices for higher production. • Late maturing varieties recommended for heavy soil and Short duration varieties for double crop in light soil.	NSC, Beej Nigam
		Sesame	Sesame : TKG-306, TKG-35, JGS-8, JT-21, JT-22, JT-55,PKTS-11,PKTS-12, JT-1		
		Soybean	Don't sow soybean (Can be sow upto 10th july) Prefer Blackgram/ Greengram and sesame Sesame: TKG-21,TKG-22,JTS-8,TKG-306 Blackgram: LBG-20,Azad-1,Azad-3 Greengram: PDM-139,HUM-1		
		Sorghum	Dont sow sorghum after 2nd week of July. Prefer any alternate crops like Niger, Sesame, kodo etc.,		
		Rice	Rice : Pusa-1121,JR-201		
		Pigeonpea	Pigeonpea- Pragti ,Jagrati, Asha , Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi), JKM-189		
		Ground nut	Groundnut–JGM-23,TG-37,JGN-3, JG-24		
	Medium deep black soils	Blackgram	Blackgram : JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha,PU-30,35,19		
		Greengram	Greengram : Pusa vishal, K851, JM721, Jawahar 99 -37, Hum-1, Hum-2, Tarme-		
		Sesame	Sesame : TKG-306, TKG-35, JGS-8, JT-21, JT-22, JT-55,PKTS-11,PKTS-12, JT-1		
		Soybean	Don't sow soybean (Can be sow		

			upto 10th july) Prefer Blackgram/ Greengram		
		Sorghum	Dont sow sorghum after 2nd week of July. Prefer any alternate crops like Niger, Sesame, kodo etc.,		
		Rice	Rice : Pusa-1121,JR-201		
		Pigeonpea	Pigeonpea- Pragti ,Jagrati, Asha , Number-148, JKM-7, JA-4, ICPL-85063 (Laxmi), JKM-189		
		Ground nut	Ground nut : JM-24		
	Shallow sandy loam soils	Blackgram	Blackgram : JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha,PU-30,35,19		
		Greengram	Greengram : Pusa vishal, K851, JM721, Jawahar 99 -37, Hum-1, Hum-2, Tarme-		
		Sesame	Sesame : TKG-306, TKG-35, JGS-8, JT-21, JT-22, JT-55,PKTS-11,PKTS-12, JT-1		
		Soybean	Don't sow soybean (Can be sow upto 10th july) Prefer Blackgram/ Greengram		
		Sorghum	Dont sow sorghum after 2nd week of July. Prefer any alternate crops like Niger, Sesame, kodo etc.,		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delayed 6 weeks 1st week of August	Deep black soils	Blackgram	Avoid soybean (Can be sown up to 10th July only), Maize, Blackgram, Greengram, Sesame, Sorghum, Groundnut and Pigeonpea. Prefer to sow Kodo, Castor, Niger **Kodo :** Vamban-1,GPUK-3	• Blade harrowing (Bakhar) for moisture conservation. • Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. • Intercultivation. • Adopt of recommended package of practices for higher production. • Late maturing varieties recommended for heavy soil and Short duration varieties for double crop in light soil.	Seed source SAU;s, NSC, Beej Nigam
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Ground nut			
		Pigeonpea			
		Rice	**Rice :** Pusa-1121,JR-201 Or Prefer to sow Kodo, Niger, Finger millet		
	Medium deep black soils	Blackgram	Avoid soybean (Can be sow upto 10th july), Maize, Blackgram, Greengram and Sesame, Sorghum, Groundnut and pigeonpea. Prefer to sow Kodo, Castor, Niger, Cluster bean, Finger millet		
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Pigeonpea			

		Ground nut	**Cluster bean(gaur):** Bundel Gaur-1. Bundel Gaur-2,AGFRI-212-9, AGFRI-2365-2,Durgapur Safed **Finger millet(Mandua):** JNR-852 **Kodo :** Vamban-1,GPUK-3 **Kakun** : ISC-201		
		Rice	**Rice :** Pusa-1121,JR-201 Prefer to sow Kodo, Niger, Finger millet		
	Shallow sandy loam soils	Blackgram	Prefer any alternate crop like Niger, Sesame, Kodo, Castor, Cluster bean and Finger millet **Cluster bean (gaur):** Bundel Gaur-1. Bundel Gaur-2,AGFRI-212-9, AGFRI-2365-2,Durgapur Safed **Finger millet (Mandua):** JNR-852 **Kodo :** Vamban-1,GPUK-3 **Kakun** : ISC-201		
		Greengram			
		Sesame			
		Soybean			
		Sorghum			

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks **3rd week of August**	Deep black soils	Blackgram Greengram Sesame Soybean Sorghum Pigeonpea Ground nut	Avoid soybean (Can be sown up to 10th July only), Maize, sesame and groundnut. Prefer to sow Kodo, Castor, Niger, Cluster bean, Finger millet and cowpea. **Cluster bean (gaur):** Bundel Gaur-1. Bundel Gaur-2,AGFRI-212-9, AGFRI-2365-2,Durgapur Safed **Finger millet (Mandua):** JNR-852 **Kodo :** Vamban-1,GPUK-3 **Kakun** : ISC-201 **Fodder sorghum**: MP Chari,Jawahar Chari-6,Jawahar Chari-69,Pusa chari-23 **Cow pea** : C-152,Pusa dofasali,Pusa faguni	• Blade harrowing (Bakhar) for moisture conservation • Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers. • Intercultivation • Adopt of recommended package of practices for higher production. • Selection of crop varieties according to field condition. Late maturing varieties recommended for heavy soil and Short duration varieties for double crop in light soil.	Seed source SAU;s, NSC, Beej Nigam
		Rice	**Fodder sorghum**: MP Chari,Jawahar Chari-6,Jawahar Chari-69,Pusa chari-23 **Finger millet (Mandua):** JNR-852		

	Medium deep black soils	Blackgram	Avoid soybean (Can be sown up to 10th July), Maize, sesame and groundnut. Prefer to sow Kodo, Castor, Niger, Cluster bean, Finger millet **Cluster bean(gaur):** Bundel Gaur-1. Bundel Gaur-2,AGFRI-212-9, AGFRI-2365-2,Durgapur Safed **Finger millet(Mandua):** JNR-852 **Kodo :** Vamban-1,GPUK-3 **Kakun** : ISC-201 **Fodder sorghum**: MP Chari,Jawahar Chari-6,Jawahar Chari-69,Pusa chari-23		
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Pigeonpea			
		Ground nut			
		Rice	**Fodder sorghum**: MP Chari,Jawahar Chari-6,Jawahar Chari-69,Pusa chari-23 **Finger millet(Mandua):** JNR-852		
	Shallow sandy loam soils	Blackgram	Prefer Kodo, Kutki, Niger, Finger millet, Cluster bean and cowpea **Finger millet(Mandua):** JNR-852 **Cluster bean(gaur):** Bundel Gaur-1. Bundel Gaur-2,AGFRI-212-9, AGFRI-2365-2,Durgapur		
		Greengram			
		Sesame			
		Soybean			

		Sorghum	Safed **Cow pea** : C-152,Pusa dofasali,Pusa faguni		

Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Normal onset followed by 10-20 days dry spell after sowing leading to poor germination / cropstand	Deep black soils	Blackgram	Line sowing of short duration varieties if the plant population <30% Thinning to maintain plant population Weeding and interculture	Weeding With hand wheel hoe; Interculture for dust mulching; Application of the farm yard manure in case of resowing	Seed source SAU;s, NSC, Beej Nigam
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Ground nut			
		Rice	Weeding and interculture; Gap filling		
		Pigeonpea	Thinning /Gap filling Resowing if the plant population is < 30%.		
	Medium deep black soils	Blackgram	Line sowing of short duration varieties if the plant population <30% Thinning to maintain plant population Weeding and interculture		
		Greengram			
		Sesame			
		Soybean			

		Sorghum	Resowing if the plant population is < 30%.		
		Ground nut			
		Rice			
		Pigeonpea			
	Shallow sandy loam soils	Blackgram			
		Greengram			
		Sesame			
		Soybean			
		Sorghum			

Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Mid season drought (long dry spell consecutive 2 weeks rainless > 2.5mm period) **At vegetative stage**	Deep black soils	Blackgram	Weeding and interculture; Maintain optimum plant population Adopt plant protection measures	Weeding with hand wheel hoe; Interculture for dust mulching Conservation furrows Life saving irrigation Use of uprooted weeds as mulch for moisture conservation. Ridges are made after 15-20 lines of crops for the moisture conservation	Seed source SAU;s, NSC, Beej Nigam
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Ground nut			
		Rice			

		Pigeonpea			
	Medium deep black soils	Blackgram			
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Ground nut			
		Rice			
		Pigeonpea			
	Shallow sandy loam soils	Blackgram			
		Greengram			
		Sesame			
		Soybean			
		Sorghum			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Deep black soils	Blackgram	Weeding and interculture;	Weeding with hand wheel hoe;	Seed source SAU;s,
		Greengram			

		Sesame	Adopt plant protection measures	Interculture for dust mulching Conservation furrows Give life saving/ supplemental irrigation if available Ridges are made after 15-20 lines of crops for the moisture conservation Intercultivation	NSC, Beej Nigam
		Soybean			
		Sorghum			
		Ground nut			
		Rice			
		Pigeonpea			
	Medium deep black soils	Blackgram			
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Ground nut			
		Rice			
		Pigeonpea			
	Shallow sandy loam soils	Blackgram			
		Greengram			
		Sesame			
		Soybean			
		Sorghum			

Condition			Suggested Contingency measures		
Terminal Drought	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Rabi crop planning**	**Remarks on Implementation**
	Deep black soils	Blackgram	Give life saving/ supplemental irrigation if available	Plan to sow for rabi crops like wheat if pre sowing irrigation is available (JW-17,HW-2004) **Lentil(**JL-3,DPL-62,Pea-JM-6) **Pea-**JM-6 Line sowing of Lentil, Linseed, Chickpea in moisture zone Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed followed by treated with biofertilizers Sowing of small seeded grains mix with FYM and vermicompost	Seed source SAU;s, NSC, Beej Nigam
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Pigeonpea			
		Ground nut			
		Rice			
	Medium deep black soils	Blackgram	Give life saving/ supplemental irrigation if available	Plan to sow for Rabi mustard (short duration varieties- Pusa Agarani), Linseed (JLS-9)	
		Greengram			
		Sesame			
		Soybean			
		Sorghum			
		Pigeonpea			
		Ground nut			
		Rice			
	Shallow sandy	Blackgram	Give life saving/ supplemental	Plan for wheat, if pre sowing irrigation is	

	loam soils	Greengram Sesame Soybean Sorghum	irrigation if available	available (JW-17,HW-2004) Mustard short duration varieties- Pusa Agarani	

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall	Deep black soils	Wheat- Blackgram Wheat- sesame Wheat- Soybean	Plan to sow for rabi crops like wheat if pre sowing irrigation is available (JW-17,HW-2004) **Lentil(**JL-3,DPL-62,Pea-JM-6) **Pea-**JM-6		
	Shallow sandy loam soils	Mustard- Soybean Mustard-Groundnut Mustard-Sesame	Plan for wheat, if pre sowing irrigation is available (JW-17,HW-2004) Mustard short duration varieties- Pusa Agarani		
	Medium deep black soils	Chickpea- Black gram Chickpea-soybean Chickpea- Sesame	Plan to sow for Rabi mustard (short duration varieties- Pusa Agarani) ,Linseed (JLS-9,vegetables) Wilt resistant variety of Chickpea JG130 JG 14		

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	NA				
Non release of water in canals under delayed onset of monsoon in catchment	NA				
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	NA				

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Deep black to shallow black soils	Black gram	LBG-20, Azad-1, PU-19, PDU-1	Adopt spacing of 30X10 cm, Apply 20:60:20: NPK Kg/ha+Rhizo+PSB@2.5 Kg/ha Follow the seed @15Kg/ha	-
		Green gram	PDM-139,HUM-1	Adopt spacing of 30X10 cm, Apply 20:60:20: NPK Kg/ha+Rhizo+PSB@2.5 Kg/ha Follow the seed @15Kg/ha	-
		Sesame	TKG-21,TKG-22,JTS-8,TKG-306	Adopt spacing of 30X10 cm, Apply 20:60:20: NPK Kg/ha+Rhizo+PSB@2.5	-

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
				Kg/ha Follow the seed @15Kg/ha	
		Sorghum	JS 1041, CHS -15	Adopt spacing of 45x10cm Apply 80 : 40 : 20 NPK Kg/ha Follow the seed @15Kg/ha	-

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Sesame/ Blackgram	Provide drainage care should be taken that rain water does not stagnate in the field in all the oil seeds and pulse crop -Planting on ridge and furrow.	Care should be taken that rain water does not stagnate in the field. Interculture operation to improve soil aeration.	-Drain excess rain water. -Harvesting of crop in clear weather. -Keep the harvested produce in safe place.	Produce should be placed under shade. or protect the produce by tarpaulin kept in T floor. Sun Dry of the produce.
Rice	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Take up suitable plant protection Measures in anticipation of pest	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease out breaks	Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% on panicles to prevent germination and spoilage of straw from

	& disease out breaks			moulds Thresh after drying the sheaves properly Ensure proper grain moisture before storing
Wheat	Care should be taken that rain water does not stagnate in the field. -top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field. Interculture operation to improve soil aeration.	Drain excess rain water. -Harvesting of crop in clear weather. -Keep the harvested produce in safe place.	- Produce should be placed under shade. Protect the produce by tarpaulin kept in T floor. Sun dry of the produce.
Chickpea	Care should be taken that rain water does not stagnate in the field. -Planting in ridge and furrow. -Interculture operation for aeration.	Care should be taken that rain water does not stagnate in the field. -Planting in ridge and furrow. -Interculture operation for aeration. - Spray of 2% DAP.	Drain excess rain water from field. -Harvesting of crop in clear weather. -Keep the harvested produce in safe place.	- Produce should be placed under shade. Protect the produce by tarpaulin kept in T floor. Sun dry of the produce.
Horticulture	-			
Heavy rainfall with high speed wind in a short span	NA			

Outbreak of pests and diseases due to unseasonable rains				
Rice	Control Rice hispa by clipping of seedlings Tips- to remove eggs masses of stem borers and rice hispa-or apply cholorpyriphos 20 EC @500 ml/ha. **Disease**- control bacterial leaf blight, leaf streak, brown spot, by applying streptocycline	For same pest apply trichogramma or crysopha @ 40000-50000 eggs/ha. Use NPV 250 LE/ha Use Bt formulations 1 lt./ha. **Disease** control of bacterial leaf blight, leaf streak, brown spot by applying streptocycline (250ppm).	Control of important Disease viz. rice blast Brown spot, false smut etc by applying Propiconzol (0.6ml/lit)/ Henzconazole(0.2%) etc.	Well drying prior to storage place should be of moisture proof rodent proof etc.

	(250ppm).			
Blackgram	Greater incidence of semi looper and cattter piller for control apply Choloropyriphos 20 EC @ 500 ml/ ha. Apply Dithane M-45 @ 2.5 gm/lt. of water to control cercospora disease	-	-	-
Soybean	Control of semi looper, girdle betle, stem Fly by applying Trizopphas 40 EC or Profenofos 50 EC @ 800 ml/ha	Incidence of tobacco caterpillar, bihar hairy caterpillar. Trichogramma @ 40000-50000 eggs/ha. Use NPV 250 LE/ha Use Bt formulations 1. lit./ha	Control of pod borer and Cercospora, bacterial blight	Well drying prior to storage place should be of moisture proof rodent proof etc.
Pigeonpea	Soil drenching with Ridomil; Incidence of leaf Webber, blister beetle and girdle beetle etc. and incidence of phytopthera Disease Quinalphos 1.5% or cholorpyriphos 1.5% Endosulphon 2% or methyl parathion 2%	Incidence of pod fly, pod borer, pod bug and plume moth. *Bacillus thuringeinsis* @ 1.5 kg /ha HaNPV@ 500 LE/ ha + 0.1% UV retardant + 0.% jaggery	Incidence of pod fly, pod borer, Pod bugs and plume moth Against pod fly Dimethoate 30 EC @ 0.03% Against gram pod borer Dusting @ 20-25 kg/ha Fenvalerate 0.4% or quinalphos 1.5% Or Cholorpyriphos 1.5% Endosulphan 2% or methyle Parathion 2%	
Sesame	Sesame leaf rollor, Sesame hawk moth, bihar hairy caterpillar, apply choloropyriphos 20EC @ 500 ml/ ha, Quinalphos 50 EC @ 800 ml/ha	Capsule borer Gall fly	Capsule borer, gall fly, apply Triazophos 40 EC or Profenofos 50 EC @ 800mli/ha	
Horticulture				
Tomato	Avoid water stagnation	Stacking of plants		

2.3 Floods

Condition	Suggested contingency measure[o]			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days[2]	Not applicable			
Sea water intrusion[3]				

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				
Blackgram, Pigeonpea, Sesame	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
Rice	Light and repeated irrigation at the appearance of hair line cracks in soil surface, Correct iron deficiency with 0.5% iron sulphate spray.	Repeated irrigation at the appearance of hair line cracks in soil surface, pounding of water for 15 days after transplanting to check Fe deficiency and for crop establishment.	Repeated irrigation at the appearance of hairline cracks in soil surface	Harvest crop at physiological maturity
Horticulture				
Vegetables	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
Cold wave				
Chick pea Wheat	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Harvest at physiological maturity
Frost				

Chickpea, Lentil, Pigeonpea	Protect the crop with the help of light irrigation; Smoke generation at night time to rise temperature ; Wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature ; Wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature ; Wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
Hailstorm	Not applicable			
Cyclone	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem Sowing of cereals (fodder varieties of Sorghum/ Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Collection of soybean and chick pea stover for use as feed supplement during drought Preserving the green maize fodder as silage Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp	Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc.,) material as fodder Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input subsidy Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon Encourage growing fodder crops like Berseem in winter and Juar in summer season Flushing the stock to recoup Replenish the feed and fodder banks

		drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder Continuous supplementation of minerals and vitamin to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources De-silting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in sandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and diseases management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with

	management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	mid summer
Floods	**NA**		
Cyclone	NA		
Heat wave and cold wave			
Heat wave	i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinklers /fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. De-worming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	**NA**		
Cyclone	NA		
Heat wave and cold wave			
Shelter/environment management	**Heat wave:** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease	De-worming and vaccination against RD and	Supplementation of house hold grain	Routine practices are followed

management	fowl pox	Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shallow water in ponds due to insufficient rains/inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks have to be developed. 3. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season
Impact of heat & salt load build up in ponds / change in water quality	1. Prepare to release water into the habitat	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms
Floods	**NA**		
Cyclone	**NA**		
Heat wave and cold wave			
Management of pond environment	Good water quality to be maintained, Water depth to be maintained	Recirculation of water and pruning	Water treatment with lime
Health and diseases management	Prophylactic measures to be taken	Maintain good quality water in ponds	Treatment of pond water with lime and medicines