

State: Madhya Pradesh

Agriculture Contingency Plan for District: Damoh

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 (10.1)	
	Agro-Climatic Zone (Planning Commission)	Central Plateau And Hills Region (VIII)	
	Agro Climatic Zone (NARP)	Vindhya Plateau Zone (MP-5)	
	List all the districts or part thereof falling under the NARP Zone	Bhopal, Sehore, Raisen, Vidisha, Sagar, Damoh	
	Geographic coordinates of district headquarters	Latitude	Longitude
		23° 09' to 24° 27' N	79° 03' to 79° 57' E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Sagar	
	Mention the KVK located in the district	Programme Coordinator Krishi Vigyan Kendra, Jaiswal Quarters, Civil Ward No. 2, Distt. Damoh – 470 661	
1.2	Rainfall	Normal RF(mm)	Normal Onset (specify week and month)
	SW monsoon (June-Sep):	1065.4	2 nd week of June
	NE Monsoon(Oct-Dec):	47.9	
	Winter (Jan- Feb)	35.4	-
	Summer (March-May)	21.7	-
	Annual	1170.4	-

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)	728.6	322.6	267.1	32.1	33.9	13.6	0.1	59.2	4.7	6.5

* Net sown area + current fallow + old fallow

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Deep soil	392.2	53.7
	Medium deep soils	166.4	22.8
	Shallow soils	169.4	23.3

Source : NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	311.4	130
	Area sown more than once	94.2	
	Gross cropped area	405.6	

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	115.8		
	Gross irrigated area	118.6		
	Rainfed area	195.6		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	139	14.4	12.1
	Tanks	47	0.8	0.6
	Open wells	15540	28.3	23.7

	Bore wells	7372	29.8	25.03
	Lift irrigation schemes	NA		
	Micro-irrigation	NA		
	Other sources (reservoirs)	476	45.3	38.05
	Total Irrigated Area	-NA	118.6	
	Pump sets (Diesel + Electric)	25,947		
	No. of Tractors	4083		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils 07	Area ('000 ha)	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-		
	Critical	-		
	Semi- critical	-		
	Safe	07	19.163	
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

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

1.7	Major Field Crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Total
		<i>Irrigated</i>	<i>Rainfed</i>	Total	<i>Irrigated</i>	<i>Rainfed</i>	Total		
	Soybean			56.5				-	56.5
	Rice			55.5				-	55.5
	Blackgram			14.9				-	14.9
	Sorghum			4.3				-	4.3
	Pigeonpea			3.8				-	3.8
	Sesame			3.8				-	3.8
	Chickpea						153.8	-	153.8
	Wheat						69.6	-	69.6
	Lentil						19.6	-	19.6
	Pea						6.6	-	6.6
	Linseed						6.3	-	6.3

Total area (ha)		Irrigated	Rainfed	
	Guava	28	-	-
	Mango	6	-	-
	Citrus	7	-	-
	Bananan	2	-	-
	Others (specify)		-	-
Total area (ha)		Irrigated	Rainfed	
	Potato	661	-	-
	Sugar Beet	141	-	-
	Onion	720	-	-
	Tomato	644	-	-
	Okra	233	-	-
	Brinjal	668	-	-
	Others (specify)	327	-	-

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

Medicinal and Aromatic crops	Total area (ha)	Irrigated	Rainfed
Spice	893		

Plantation crops	Total area	Irrigated	Rainfed
	NA		
Others such as industrial pulpwood crops etc (specify)			
Fodder crops	Total area (ha)	Irrigated	Rainfed
Fodder	2161		
Others (specify)			
Total fodder crop area	2161		
Grazing land	33900		
Sericulture etc			

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)

	Non descriptive Cattle (local low yielding)						399.7
	Crossbred cattle						NA
	Non descriptive Buffaloes (local low yielding)						176.5
	Graded Buffaloes						88.9
	Goat						96.4
	Sheep						7.0
	Others (Pig, horse)						10.1
	Commercial dairy farms (Number)						NA
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial	-	16373				
	Backyard						
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)	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		-	-	-		24	
	B. Culture						
		Water Spread Area (ha)	Yield (t/ha)		Production (tons)		
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)						
	ii) Fresh water (Data Source: Fisheries Department)	1271.91 ha	-		1595.8		
	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)	
	Soybean	53.02	918					53.02	918	
	Rice	35.2	720					35.24	720	
	Blackgram	5.70	435					5.70	435	
	Sorghum	5.4	768					5.42	768	
	Pigeonpea	2.1	890					2.10	890	
	Chickpea			140.5	1081			140.5	1081	
	Wheat			106.9	1769			106.9	1769	
	Lentil			9.3	711			9.3	711	
	Pea			3.3	789			3.3	789	
	linseed			2.4	516			2.4	516	
Major Horticultural (Crops to be identified based on total acreage)- NA										

(Source : Agriculture Statistics 2009, Directorate of Farmer Welfare and Agriculture Development Madhya Pradesh, Bhopal)

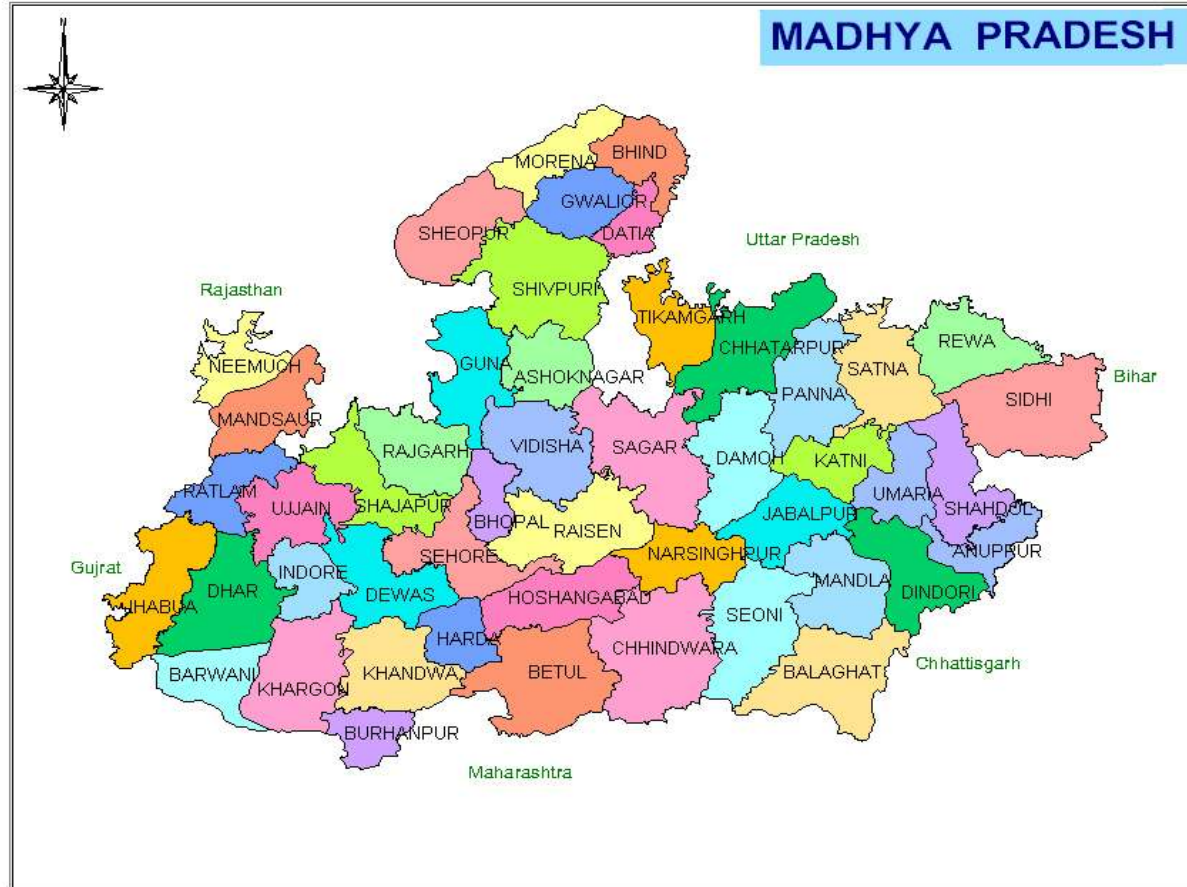
1.12	Sowing window for 5 major field crops	Soybean	Rice	Blackgram	Pigeonpea	Sorghum	Wheat	Chickpea
	Kharif- Rainfed	4 th week of June – 2 nd week of July	Transplanting from 2 nd week of July – 4 th week of July	1 st week of July – 2 nd week of August	3 rd week of June – 2 nd week of July	2 nd week of June – 1 st week of July	-	-
	Kharif-Irrigated	-	-	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-	-	-
	Rabi-Irrigated						2 nd week of November- 2 nd week of	3 rd week of November - 2 nd week of December

							December	
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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)			

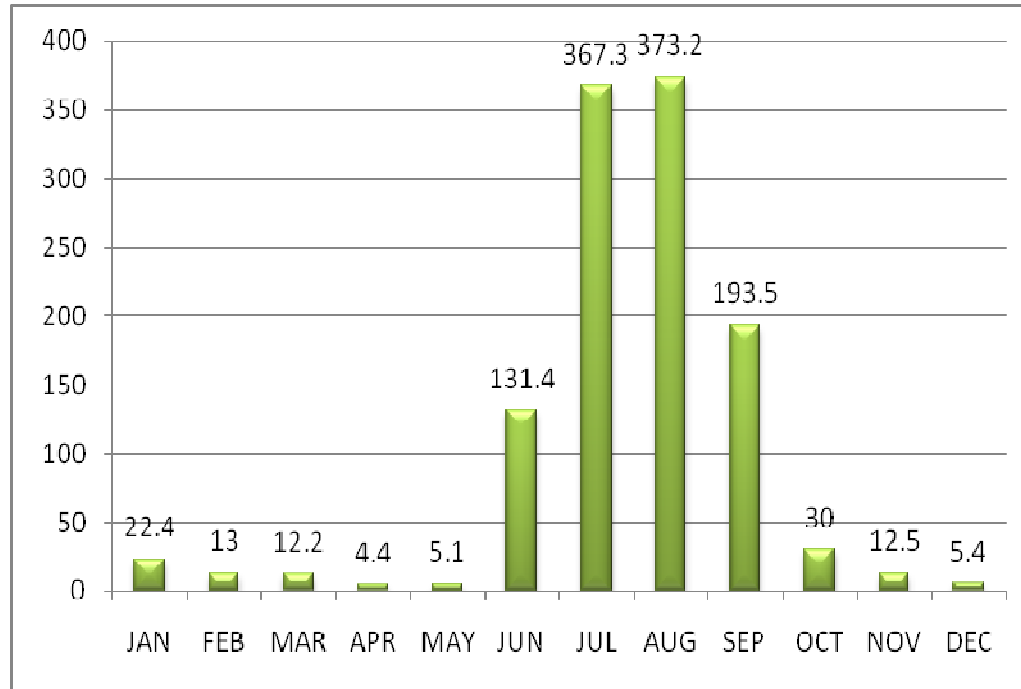
1.14	Include Digital maps of the district for		
		Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure I

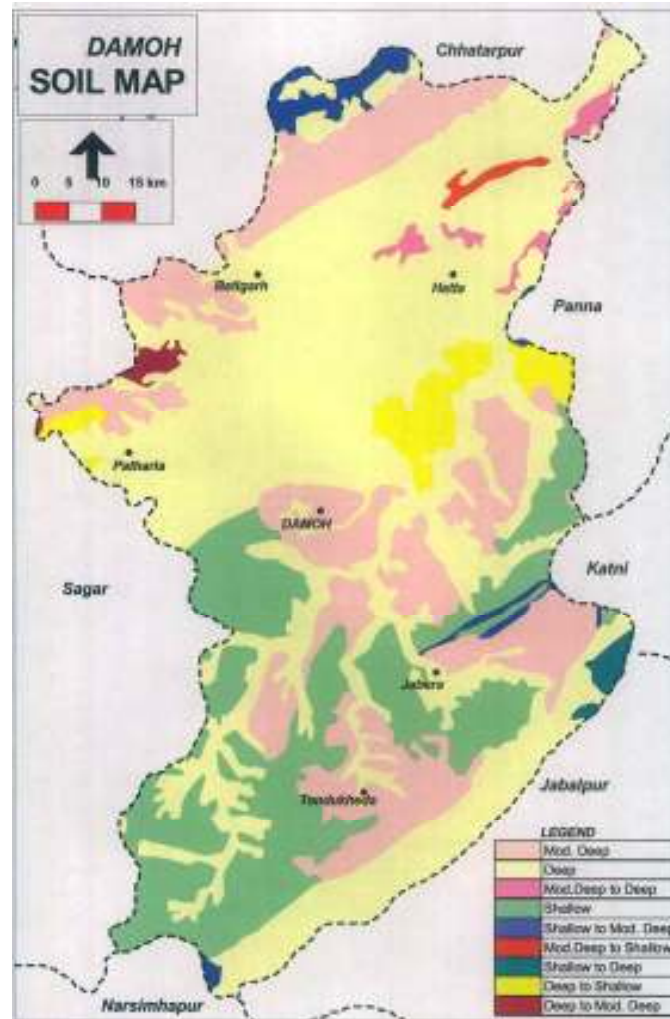




Annexure II



Annexure III



Source: NBSS & LUP, Nagpur

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks 4 th week of June	Deep to medium deep black soils	Soybean-wheat /Chickpea/lentil/ linseed Rice-wheat/ Maize-wheat/ Blackgram- Linseed/ Mustard/ Sesame-Chickpea/ Pigeonpea/ Soybean+ Pigeonpea (4:2)	No change Prefer Maize –Hybrid varieties : Ganga -12, Ganga Safed-2, JKM-175 Prefer maize composite varieties: HPQM-1, Jawahar Maize-12, Jawahar Maize-8 , Jawahar Maize-216, Jawahar Maize-13, JVM-421	Takeup sowing of soybean, pigeonpea, greengram and blackgram on ridges and furrows	Source of Seed: MP Seed Corporation Seed Cooperative Society
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	No change	-	-

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					

Delay by 4 weeks 2nd week of July	Deep to medium deep black soils	Soybean-wheat /Chickpea/lentil/ linseed Rice-wheat/ Maize-wheat/ Blackgram-Linseed/ Mustard/ Sesame-Chickpea/ Pigeonpea/ Soybean+ Pigeonpea (4:2)	Don't sow soybean, maize and sorghum Prefer to sow Pigeonpea, Greengram, Blackgram, Sesame in place of soybean, maize and sorghum Pigeonpea- Pragati , Jagriti, Asha, Number-148, JKM-7, JA-4, Type-21-Pusa- 855, ICPL-85063 (Laxmi), JKM-189 Greengram- Pusa vishal,K851,JM721,Jawahar 99 -37,Hum-1, Hum-2, Tarme-1 L.G.450, T.M.98-50, JM-98-90, PDM 11, 54 and 139 Blackgram – JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha, Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1	<ol style="list-style-type: none"> 1. Increase seed rate 25 % under late sowing condition. 2. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed followed by treated with biofertilizers 4. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 5. Blade harrowing (Bakhar) for moisture conservation and destroy of weed in late onset of monsoon 	MP Seed Corporation Seed Cooperative Society
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	Prefer to sow Pigeonpea, Greengram, Blackgram, Sesame Pigeonpea- Pragati , Jagriti, Asha, Number-148, JKM-7, JA-4, Type-21-Pusa- 855, ICPL-85063 (Laxmi), JKM-189 Greengram- Pusa vishal,K851,JM721,Jawahar 99 -37,Hum-1, Hum-2, Tarme-1 L.G.450, T.M.98-50, JM-98-90, PDM 11, 54 and	<ol style="list-style-type: none"> 1. Sowing of crops against the slope in ridge and furrow methods 2. Blade harrowing (Bakhar) for moisture conservation and destroy of weed in late onset of monsoon 	

			139 Blackgram – JU-2,JU-3,JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha, Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1	
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Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks 4 th week of July	Deep to medium deep black soils	Soybean-wheat /Chickpea/lentil/ linseed Rice-wheat/ Maize-wheat/ Blackgram-Linseed/ Mustard/ Sesame-Chickpea/ Pigeonpea/ Soybean+ Pigeonpea (4:2)	Sowing of niger/ sesame, instead of soybean, rice, maize, pigeonpea Greengram- Pusa vishal, K851, JM721, Jawahar 99 - 37,Hum-1, Hum-2, Tarme-1L. G.450, T.M.98-50, JM-98-90, PDM 11, 54 and 139 Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1	1. Blade harrowing (Bakhar) for moisture conservation and destroy of weeds in late onset of monsoon 2. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 3. Application of biofertilizer and potash fertilizer under late sown condition	Source of Seeds:- MP Seed Corporation Seed Cooperative Society
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	Sowing of niger/ sesame, instead of sorghum, maize, pigeonpea, blackgram Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12,JT-1		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks 2 nd week of August	Deep to medium deep black soils	Soybean-wheat /Chickpea/lentil/ linseed Rice-wheat/ Maize-wheat/ Blackgram-Linseed/ Mustard/ Sesame-Chickpea/ Pigeonpea/ Soybean+ Pigeonpea (4:2)	Sowing of niger/ sesame, instead of sorghum, maize, pigeonpea Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12, JT-1	1. Blade harrowing (Bakhar) for moisture conservation and destroy of weeds in late onset of monsoon 2. Timely weeding is done and use of weeds as mulch between row of crops for moisture conservation 3. Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed followed by treated with biofertilizers	Source of Seeds:- MP Seed Corporation Seed Cooperative Society
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	Sowing of niger/ sesame, instead of sorghum, maize, pigeonpea Sesame - TKG -306, TKG-35 , JGS-8, JT-21, JT-22, JT-55, PKTS-11, PKTS-12, JT-1		

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.	Deep to medium deep black soils	Soybean- Chickpea	Maintain optimum plant population by gap filling.	Use of green leaves or dust for Mulching	
			Use of hand hoe for interculture between the rows		
	Rice – Wheat	Gap filling			
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	Maintain optimum plant population by gap filling.		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Deep to medium deep black soils	Soybean- Chickpea	-Application of antitranspirant kaoline @4% -Inter culture -Life saving irrigation	1. Hand hoeing (Dora/ Kulpha) for interculture operation in between rows and use of removed weeds use as mulch for moisture conservation 2. Apply FYM and vermicompost at the time of sowing for increase of water holding capacity 3. Ridges are made after 15-20 lines of crops for the moisture conservation 4. Use of green leaf or dust for Mulching	-
		Rice – Wheat	Maintain optimum plant population.		
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea		1.Hand hoeing (Dora/ Kulpha) for interculture operation in between rows and use of removed weeds use as mulch for moisture conservation 2. Mulching	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Deep to medium deep black soils	Soybean- Chickpea	Defoliation of soybean about 20%..	1.Hand hoeing (Dora/ Kulpha) for interculture operation in between rows and use of removed weeds use as mulch for moisture conservation 2. Mulching 3. Provide life saving irrigation	-
		Rice – Wheat	Plant protection		
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	-	1.Hand hoeing (Dora/ Kulpha) for interculture operation in between rows and use of removed weeds use as mulch for moisture conservation 2. Mulching	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Crop management	Rabi Crop planning	
Terminal drought (Early withdrawal of monsoon)	Deep to medium deep black soils	Soybean- Chickpea	<ul style="list-style-type: none"> Moisture conservation practice adopt and destroy the weed under early withdrawal of monsoon for <i>Rabi</i> season Plan for early rabi crops Lentil, Linseed, Chickpea, irrigated and un-irrigated wheat Increase seed rate up to 25% in late sown condition Line sowing of Lentil, Linseed, Chickpea in moisture zone Seed treatment with mixture of Thiram (1.5g)+ Carbendazim (1.5g) /kg seed thereafter treated with biofertilizers Sowing of small seeded grains mix with FYM and vermicompost Apply light irrigation to <i>Kharif</i> crops for proper grain filling if required, this will helpful in field preparation for <i>Rabi</i> crops 		
		Rice – Wheat			
		Rice – Wheat			
	Shallow soils	Blackgram/Sorghum/ Maize/ Sesame/ Pigeonpea	Line sowing of early crops like Lentil, Linseed in moisture zone		

2.1.2 Irrigated situation

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		Remarks on Implementation ^j
			Change in crop/cropping system ^h	Agronomic measures ⁱ	
Delayed/ Limited release of water in canals due to low rainfall	Deep to medium deep black soils	Soybean- Chickpea Rice – Wheat	Sowing of early duration varieties of oilseeds ex. Linseed – JLS-67, JLS-66, JLS-9, Padmini, NL-97	Reduce the usage of fertilizer (<25%) Adopt water saving methods like direct seeded rice, SRI Cultivation, Aerobic rice Prefer early maturing	
			Mustard – Pusa, Jaikisan, Pusa bold, Varuna		
			Pulses – Lentil JL-3, Noorie		
			Chickpea – JG-11,12,14		
			Pea – Rachna, JP-885		
		Rice – Wheat			

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
				Cultivars. Irrigate at critical stages	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Deep to medium deep black soils	Soybean- Chickpea Rice – Wheat	Use of short duration varieties of Soybean (JS-95-60) or Blackgram, Greengram, sesame etc. Prefer dual purpose sorghum at large scale	High seed rate (25% more) with seed treatment Raised bed sowing Less fertilizer (25%) Weed management with weedicides Imazethapyr @ 750 ml/ha in soybean. Use of Pendimethaline @ 1kg/ha as PPI/PRE in Blackgram and greengram. Use of Alachlor @ 1kg/ha as PRE in sesame	

Condition			Suggested Contingency measures		
	Major Farming situation ^f	Normal Crop/cropping system ^g	Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Lack of inflows into tanks due to insufficient /delayed onset of	Deep to medium deep black soils	Soybean- Chickpea Rice – Wheat	Black gram-Mustard/ Green gram- Linseed/ Maize-Lentil	Rice- Adopt water saving methods like direct seeded rice, SRI Cultivation, Aerobic	

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
monsoon				rice Blackgram/ Greengram: Adopt <i>in-situ</i> moisture conservation practices at 30DAS	

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 (open wells and borewells) recharge due to low rainfall	Deep to shallow soils	Rice	Replace upland rice with lesser water required crops viz., Soybean, Blackgram, Sesame Plan for relay or utera cropping with any short duration pulse	Rice- Adopt water saving methods like direct seeded rice, SRI Cultivation, Aerobic rice	
		Soybean-Chickpea Maize-Wheat	Chickpea should be sown under residual moisture immediately after harvest of soybean or give pre sowing irrigation to chickpea Prefer short duration low water requirement varieties of wheat. Protective irrigation at CRI stage in wheat.	Adopt furrow irrigation and use of micro-irrigation system	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				

Soybean	Provide drainage, care should be taken that rain water does not stagnate in the field.	e care should be taken that rain water does not stagnate in the field.	Care should be taken that rain water does not stagnate in the field. - 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 flown sun dry of the produce.
Wheat	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Proper drainage should be provided and adopt all plant protection measure. 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 flown . sun dry of the produce.
Chickpea	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Proper drainage should be provided and adopt all plant protection measure. 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 flown . sun dry of the produce.
Horticulture	Not applicable			
Heavy rainfall with high speed wind in a short span- Not applicable				
Horticulture	Not applicable			
Out break of pests and diseases due to unseasonal rains				
Soybean	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	-
Wheat	Spray 0.2 % mancozeb 76% WP against wheat rust.	Spray 0.2 % mancozeb 76% WP against wheat rust.	Carry out critical survey of fields for disease attack in crops	
Chickpea	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · “T” shaped pegs placed in late sown chickpea field for biological control of	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · “T” shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out critical survey of fields for insect and disease attack in	-

	pod borer and for chemical control spraying of quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathiyam 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of fenvalerate 0.4% or quinalphos 1.5 WP 20-25 per hectare with duster.	quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathiyam 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of fenvalerate 0.4% or quinalphos 1.5 WP 20-25 per hectare with duster.	crops	
Horticulture	Not applicable			

2.3 Floods

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

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone-

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable			
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	Give light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave	Protect the crop with the help of light irrigation; Smoke generation at night time to rise temperature	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary	Harvest at physiological maturity

	in regular	wind breaks are necessary where cold and heat wave in regular	where cold and heat wave in regular	
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	<p>As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem</p> <p>Sowing of cereals (fodder varieties of Sorghum/ Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Collection of soybean and chick pea stover for use as feed supplement during drought</p> <p>Preserving the green maize fodder as silage</p> <p>Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp</p>	<p>Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc.,) material as fodder</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals and vitamin to prevent infertility.</p> <p>Encourage mixing available kitchen waste with</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input subsidy</p> <p>Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon</p> <p>Encourage growing fodder crops like Berseem in winter and Juar in summer season</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>

		dry fodder while feeding to the milch animals	
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>De-silting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in sandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
Health and diseases management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures</p> <p>Procure and stock multivitamins & 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>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>
Floods	NA		
Cyclone	NA		
Heat wave and cold			

wave			
Heat wave	<ul style="list-style-type: none"> i) Plantation around the shed ii) H₂O 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 	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers /fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H₂O during heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
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)	<p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
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	<p>Supplementation only for productive birds with house hold grain</p> <p>Supplementation of shell grit (calcium) for</p>	Supplementation to all survived birds

		laying birds Culling of weak 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 management	De-worming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed

2.5.3 Fisheries/ Aquaculture

Suggested contingency measures			
	Before the event	During the event	After the event

Drought			
Shallow water in ponds due to insufficient rains/inflow	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Prepare to release water into the habitat 	<ol style="list-style-type: none"> 1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. 	<ol style="list-style-type: none"> 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