

State: MADHYA PRADESH

Agriculture Contingency Plan for District: BHOPAL

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) (52%), Western Plateau And Hills Region (IX) (48%)	
	Agro Climatic Zone (NARP)	Malwa Plateau Zone (MP-10) (46%), Vindhya Plateau Zone (MP-5) (42%)	
	List all the districts or part thereof falling under the NARP Zone	Bhopal, Dewas, Indore, Mandsaur, Neemurch, Rajgarh, Ratlam, Sajapur, Ujjain and Sehore	
	Geographic coordinates of district headquarters	Latitude	Longitude
		23 ⁰ 15' 35.76'' North	77 ⁰ 24'45.41'' East
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station RAK Collegae of Agriculture, Sehore Madhya Pradesh	
	Mention the KVK located in the district	Central Institute of Agricultural Engineering, BPL Krishi Vigyan Kendra, Central Institute of Agricultural Engineering, Nabi Bagh Berasia Road, Bhopal (M.P.) 462 038.	
	Name and address of the nearest Agromet Field Unit for agro- advisories in the zone	Zonal Agricultural Research Station RAK College of Agriculture, Sehore, Madhya Pradesh	

1.2	Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	945.3	2 nd week of June	2 nd Week of September
	NE Monsoon(Oct-Dec):	72.2	-	-
	Winter (Jan- March)	20.9	-	-
	Summer (Apr-May)	41.2	-	-

Annual	1079.6	-	-
--------	--------	---	---

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 (old fallow)
	Area (000'ha)	277.9	153.8	44.1	31.5	33.8	4.7	0.026	3.9	2.9	3.9

Source – Directorate of Farmers welfare and Agriculture, Development of Madhya Pradesh, Bhopal, Agriculture Statistics 2009.

(Source: DACNET 2006-07)

1.4	Major Soils (common names like red sandy loam deep soils (etc.))*	Area ('000 ha)	Percent (%) of total
	Deep soil	167.0	60.3
	Medium deep soil	17.6	6.4
	Shallow soil	92.0	33.2

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	153.8	147
	Area sown more than once	71.8	
	Gross cropped area	225.1	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	88.7		
	Gross irrigated area	88.7		
	Rainfed area	64.6		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	30	5.7	6.4
	Tanks	34	1.2	1.3
	Open wells	14221	28.7	35.3
	Bore wells	11260	27.5	31.0

	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		25.6	28.9
	Total Irrigated Area		88.7 (The area under lift irrigation schemes has been deleted as it was already included in well and tube well irrigation)	
	Pump sets	NA		
	No. of Tractors	NA		
	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	-	-	-
	Critical	-	-	-
	Semi- critical		71%	
	Safe	-	-	-
	Wastewater availability and use	-	-	-
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Commissioner land records, M.P. Gwalior.

1.7 Area under major field crops & horticulture

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			Rabi			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Soybean	-	96.1	96.1	-	-	-		96.1
	Maize		3.0	3.00	-	-	-		3.00
	Chickpea	-	-	-	35.6		35.6		35.6
	wheat	-	-	-	68.2		68.2		68.2
	Horticulture crops - Fruits								
	Mango								0.051
	Papaya								0.009
	Guava								0.006
	Santra								0.003
	Total								0.069

Horticulture crops - Vegetables								
Onion								0.941
Tomato								0.744
Brinjal								0.499
Okra								0.332
Cauliflower								0.189
Sweet potato								0.109
Cabbage								0.002
Others								0.625
Medicinal and Aromatic crops								
Floriculture								0.006
Spices crops								0.397
Chilly								0.127
Garlic								0.274
Coriander								0.945
Fenugreek(seed)								0.0051
Ginger								0.003
Total								1.999
Fodder crops								-
Total fodder crop area								-
Grazing land								-
Sericulture etc								-
Others (specify)								-

Source –Information was provided by Incharge, Fruit Research Station, Ethkhedi, Bhopal, Madhya Pradesh

Source – Agriculture Statistics, 2009, Directorate of Farmer welfare and Agriculture Development Madhya Pradesh, Bhopal

1.8	Livestock	Male ('000)	Female ('000)	Young stock	Total ('000)
	Non descriptive Cattle (local low yielding)	45.5	56.9	68.8	171.2
	Crossbred cattle				
	Non descriptive Buffaloes (local low yielding)	1.2	103.1	48.4	152.7
	Graded Buffaloes				
	Goat				128.2
	Sheep				1.7
	Others Horses, Pig, Yak etc.)				9.3

	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial						
	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	
		21	41	244			
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-		-		-	
	ii) Fresh water (Data Source: Fisheries Department)	2267		1.03		2.341	
	Others						

Source – Information was provided by Incharge, Fruit Research Station, Ethkhedi, Bhopal, Madhya Pradesh

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)	
Major Field crops (Crops to be identified based on total acreage)										
	Soybean	260.4	1185	-	-	-	-	260.4	1185	
	Maize	10.0	1176	-	-	-	-	10.0	1176	
	Sorghum	2.1	1313	-	-	-	-	2.1	1313	

	Chickpea	-	-	30.5	941	-	-	30.5	941	
	wheat	-	-	252.5	2277	-	-	252.5	2277	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango			450				450	9.0	
	Guava			120				120	20.0	
	Papaya			4906				4906	377.3	
	Coriander			444				444	0.3	
	Onion			9545				9545	10.7	
	Garlic			426.1				426.1		

Source – Agriculture Statistics, 2009, Directorate of Farmer welfare and Agriculture Development Madhya Pradesh, Bhopal

1.12	Sowing window for 5 major field crops	Soybean	Maize	Sorghum	Chickpea	Wheat
	Khharif- Rainfed	3 rd week of June-1 st week of July	3 rd week of June-1 st week of July	3 rd week of June-1 st week of July	-	-
	Khharif-Irrigated	-	1 st week of June – 2 nd week of June	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	-	-	3 rd week October – 3 rd week November	3 rd week October-2 nd 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)	Girdle beetle ,semilooper in soybean and gram pod borer in chick pea	✓ Girdle beetle ,semilooper in soybean and gram pod borer in chick pea	-

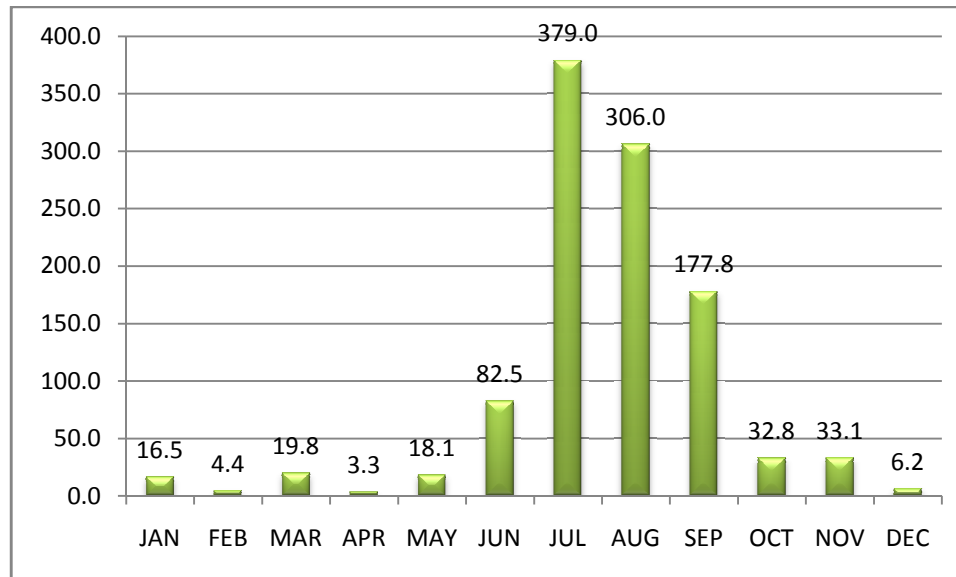
1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

**Annexure I
Location map**

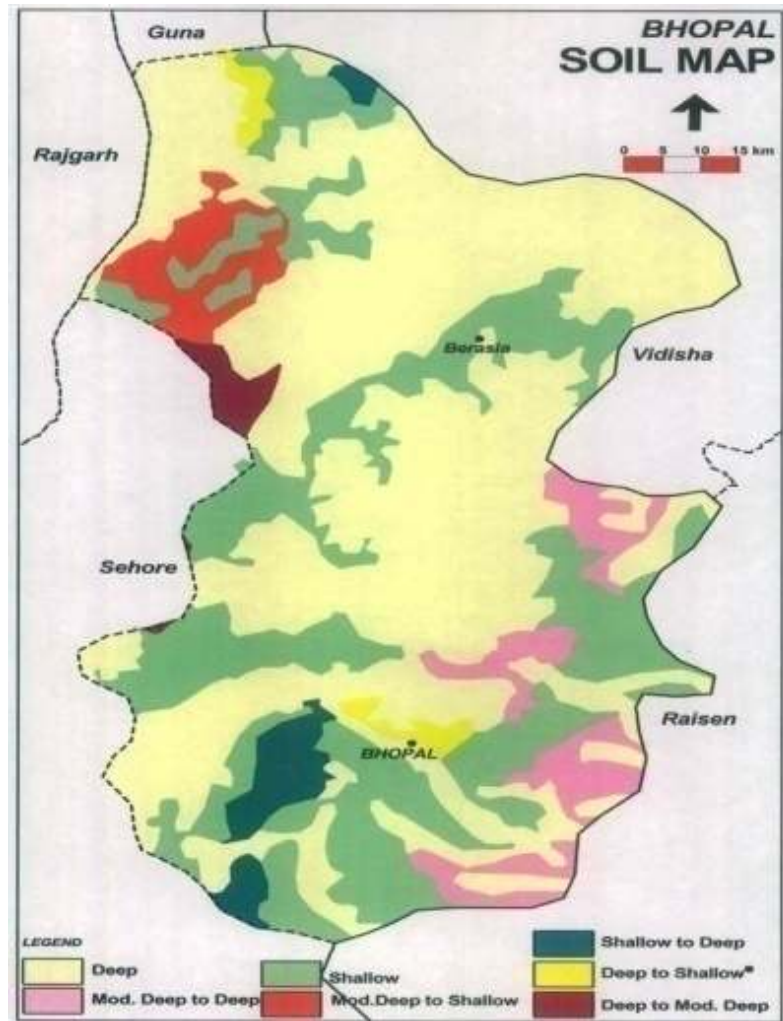




Annexure II
Mean annual rainfall (mm)



Annexure III
Soil map



(Source: NBSS&LUP, Nagpur)

2.0 Strategies for weather related contingencies (Bhopal)

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks 4 th week of June	Deep black soils	Soybean	Soybean (early)- JS 95-60, JS 93-05	<ul style="list-style-type: none"> Follow ridge/BBF method of sowing in soybean Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed Increase the seed rate by 10% and reduce the inter-row spacing (30 cm) 	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/ Agril. University and seed corporations for supply of seed and with RKVY for seed drills
		Maize	JM-216, JM-8, JM-12)		
	Shallow black soils	Soybean	Soybean (early)- JS 95-60, JS 93-05		
		Maize	Maize- (JM-216, JM-8, JM-12)		

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks 2 nd week of July	Deep black soils	Soybean	Sweet corn/ Sunflower(Modern) / Pigeon pea	<ul style="list-style-type: none"> Seed dressing with Thiram+carbendazim in equal ratio @3g/kg seed for sunflower 	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills
		Maize	Sunflower (Modern)		
			Brinjal , tomato, sponge guard, Kharif onion (Red agri found)/ Maize for cobs-potato		
	Shallow black soils	Soybean	Black gram (JU-86)		
		Maize	Sunflower (Modern)/ Sesame-(TKG 55,TKG 8)		

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks	Deep black soils	Soybean	Kharif onion (Red agri found) Black gram (JU86) Sunflower (Modern) Sesame-(TKG 55,TKG 8)	<ul style="list-style-type: none"> Provide supplemental irrigation (with sprinklers) harvested rain water / bore well / open well water by sprinkler Weed management during early stages of crop 	<ul style="list-style-type: none"> Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills Link watersheds and NRGES for the support of farm pond technology
4 th week of July	Shallow black soils	Maize			

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks	Deep black soils	Soybean	Horse gram/ Sunflower (Modern)/ Maize for fodder (African Tall)/ Black gram(JU-86).	<ul style="list-style-type: none"> Provide supplemental irrigation (with sprinklers) harvested rain water / bore well / open well water by sprinkler Weed management during early stages of crop 	<ul style="list-style-type: none"> Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills Link watersheds and NRGES for the support of farm pond technology
2 nd week of August	Shallow black soils	Maize			

Condition	Suggested contingency measures				Remarks on Implementation
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination /crop stand etc.	Deep black soils	Soybean	<ul style="list-style-type: none"> Weed management through intercultural operation between rows using <i>doura</i> Resowing with improved variety if the population is <75% of optimum. Take up gap filling with the seed of the same variety If possible provide one come-up irrigation for good germination and establishment 	-	-
	Shallow black soils	Maize			

Condition	Suggested contingency measures				Remarks on Implementation
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	
At vegetative stage	Deep black soils	Soybean	<ul style="list-style-type: none"> Weeding and interculture Spray 2% solution of Murate of potash (MOP) Girdle beetle control by spraying of Quinalphos@2 ml / 1 water in Soybean 	<ul style="list-style-type: none"> Frequent interculture Supplemental irrigation through farm pond water/other sources Adopt earthing up in maize 	-
	Shallow black soils	Maize			

Condition	Suggested contingency measures				Remarks on Implementation
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	
At flowering /fruiting stage	Deep black soils	Soybean	<ul style="list-style-type: none"> Insecticidal spray for control of green semi looper in soybean 	<ul style="list-style-type: none"> Supplemental irrigation through farm pond water/other sources 	-
	Shallow black soils	Maize			

Condition	Suggested contingency measures				Remarks on Implementation
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	
	Deep black soils	Soybean	<ul style="list-style-type: none"> Incase of severe drought reduce the plant population by uprooting the plants from alternate row and use as green fodder and sell the green cobs. Supplemental irrigation if available Harvest at physiological maturity 	<ul style="list-style-type: none"> Prepare land for chickpea/safflower Seed priming of chickpea & safflower (as recommended) before sowing 	-
	Shallow black soils	Maize			

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		Remarks on Implementation
			Change in crop/cropping system	Agronomic measures	
Delayed/limited release of water in canals due to low rainfall	Deep black soils	Soybean-Chickpea/Wheat	Chickpea JG 130, JG-16, Jaki-92-18	<ul style="list-style-type: none"> -Dry sowing followed by irrigation -Application of vermi compost @ 3-4 t/ha . -Follow ridge/BBF method of sowing in <i>Kharif</i> crops -Seed dressing with Thiram+carbendazim in equal ratio @3g/kg seed -Water harvesting and use collected water as life saving irrigation -Cultivate the field on receiving pre monsoon showers -Provide supplement irrigation by sprinkler method 	Management of seed under RKVY, NFSM, ISOPAM etc
			Wheat HW 2004, Harshita, JW-173		
	Shallow black soils	Chickpea	Wheat HW 2004, Harshita, JW-173		
		Wheat Lok-1	Chickpea JG 130, JG-16, Jaki-92-18		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Deep black soils	Soybean- Chickpea/ Wheat	Fallow-Chickpea/ Linseed/ Lentil In case of soybean one pre sowing irrigation and if necessary one irrigation at critical stage at pod development to be given	-Seed priming in water for 12-15 hrs -Provide supplement irrigation by sprinkler method -	Awareness needed; Trainings in ATMA,FTC
	Shallow black soils	Chickpea Wheat Lok-1			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Deep black soils	Chickpea Wheat	Fallow-Chickpea/ safflower Linseed/ Lentil Chickpea JG 130, JG-16, Jaki-92-18 Safflower (JSF-7, JSF-73, JSF-97) Lentil (JL-3 & JL-1)	<ul style="list-style-type: none"> Mulching in kharif and rabi crops Supplemental irrigation by sprinkler and using other sources of water available 	Awareness needed; Trainings in ATMA, FTC
	Shallow black soils	Chickpea Wheat Lok-1			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater (open wells and borewells) recharge due to	Deep black soils	Chickpea Wheat	Chickpea should be sown with residual moisture after harvest of soybean or give pre sowing irrigation to chickpea Prefer short duration low water	<ul style="list-style-type: none"> Pre sowing irrigation if available Mulching with crop residue Supplemental irrigation by sprinkler 	Awareness needed; Trainings in ATMA, FTC
	Shallow black soils	Chickpea Wheat Lok-1			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
low rainfall			requirement varieties of wheat. Protective irrigation at CRI stage in wheat.		

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

Condition- Continuous high rainfall in a short span leading to water logging				
	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Soybean/ Maize	<ul style="list-style-type: none"> • Drain excess water • Ridge and furrow system of planting • Top dressing with N 10-20 kg/ha at optimum soil moisture • Intercultivation to loosen the soil and to improve aeration 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour 	<ul style="list-style-type: none"> • Drain excess water • Harvesting on a clear sunny day • Shift the produce to safer place 	Dry the produce up to 10- 12 % moisture before storage
Wheat	<ul style="list-style-type: none"> • Drain excess water • Ridge and furrow system of planting • Top dressing with N 20-30 kg/ha at optimum soil moisture to regain vigour • Intercultivation to loosen the soil and to improve aeration 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour 	<ul style="list-style-type: none"> • Drain excess water • Harvesting on a clear sunny day • Shift the produce to safer place 	Dry the produce up to 10- 12 % moisture before storage
Chickpea	<ul style="list-style-type: none"> • Drain excess water • Ridge and furrow system of planting • Top dressing with N 10-20 kg/ha at optimum soil moisture • Intercultivation to loosen the soil and to improve aeration 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour 	<ul style="list-style-type: none"> • Drain excess water • Harvesting on a clear sunny day • Shift the produce to safer place 	Dry the produce up to 10- 12 % moisture before storage
Horticulture				

Mango	<ul style="list-style-type: none"> • Drain excess water • Intercultivation at optimum soil moisture to loosen the soil and improve aeration • Spray 2% urea 2-3 times at 7-10 days interval 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation at optimum soil moisture to loosen the soil and improve aeration • Spray 2% urea 2-3 times at 7-10 days interval 	<ul style="list-style-type: none"> • Drain excess water • Harvest mature fruits as soon as possible • Spray of Wettable Sulphur@ 5 gm/l to reduce the incidence of powdery mildew 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place before it can be marketed • Spray Dithane M-45 3% or Bavistin 1% against anthracnose
Condition-Heavy rainfall with high speed wind in a short span				
Soybean	<ul style="list-style-type: none"> • Drain excess water • Top dressing with N 10-20 kg/ha at optimum soil moisture 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour 	<ul style="list-style-type: none"> • Drain excess water • Harvesting on a clear sunny day • Shift the produce to safer place 	Maintain optimum moisture content in grain by drying before bagging and marketing
Maize	<ul style="list-style-type: none"> • -do- 	<ul style="list-style-type: none"> • -do- 	<ul style="list-style-type: none"> • -do- 	-do-
Wheat	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30kg/ha at optimum soil moisture to gain vigour 	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30kg/ha at optimum soil moisture to gain vigour • Adopt need based plant protection measures 	<ul style="list-style-type: none"> • Drain excess water • Adopt need based plant protection measures • Harvest on a clear sunny day 	Maintain optimum moisture of grain by drying
Chickpea	<ul style="list-style-type: none"> • Drain excess water • Foliar spray with 2% urea after cessation of rains 	<ul style="list-style-type: none"> • Drain excess water • Foliar spray with 2% urea after cessation of rains 	<ul style="list-style-type: none"> • Drain excess water • Timely harvest of produce on a clear sunny day 	Shifting to safer place and drying of the produce before bagging and storage
Horticulture				
Mango	<ul style="list-style-type: none"> • Drain excess water • Intercultivation at optimum soil moisture to loosen the soil and improve aeration • Spray 2% urea 2-3 times at 7-10 days interval • Staking to provide good anchorage to the plants (upto 2-3 years of planting) 	<ul style="list-style-type: none"> • Drain excess water • Intercultivation at optimum soil moisture to loosen the soil and improve aeration • Spray 2% urea 2-3 times at 7-10 days interval 	<ul style="list-style-type: none"> • Drain excess water • Harvest mature fruits as soon as possible • Spray of Wettable Sulphur@ 5 gm/l to reduce the incidence of powdery mildew 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place before it can be marketed • Spray Dithane M-45 3% or Bavistin 1% against anthracnose

Outbreak of pests and diseases due to unseasonal rains				
Soybean/ Maize	<ul style="list-style-type: none"> • Early planting to minimize the incidence of girdle beetle and green semilooper • Foliar spray with 5% NSKE to protect against semilooper 	<ul style="list-style-type: none"> • Monitor adult moth activity of Spodoptera through pheromone traps (10 traps/ha) • Apply Quinalphos 25 EC 2ml/l or Emamectin benzoate 5 SG 4g/10 lit to control spodoptera 	-	-
Wheat	Spray 0.2 % mancozeb 76% WP against wheat rust.	Spray 0.2 % mancozeb 76% WP against wheat rust	Spray 0.2 % mancozeb 76% WP against wheat rust	-
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 pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used.	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 Quinalphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used.	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 crops	-
Horticulture				
Mango	Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper Drench the seedlings with COC 0.3% against root rot	Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper	Spray Dithane M-45 3 g/l or carbendazim 1 g/l against anthracnose spray sulphur 0.5% to control powdery mildew	Maintain aeration in storage to prevent fungal infection and blackening of fruits

2.3 Floods: Not Applicable

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

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not Applicable			
Cold wave				
Chick pea Wheat	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Harvest at physiological maturity
Horticulture				
Mango	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Harvesting of crop as early as possible and marketed or keep in cold store • Store the produce in shed or safe place.
Frost				
Chickpea, Lentil, Pigeonpea	Give 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
Horticulture				
Mango	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Light irrigation • Smoke generation at night time to rise temperature 	<ul style="list-style-type: none"> • Harvesting of crop as early as possible and marketed or keep in cold store

				<ul style="list-style-type: none"> • Store the produce in shed or safe place.
Hailstorm				
Wheat/ Chickpea	Re-sowing in case of severe damage	Light and frequent irrigation	<ul style="list-style-type: none"> • Apply 10% additional nitrogen • Light and frequent irrigation 	Timely harvesting and shifting of produce to safer place in case of early forewarning
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</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</p>

		<p>for high productive animals during drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals and vitamin to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	banks
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>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</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-</p>

	Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	any epidemic Tick control measures be undertaken to 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	September so that the peak milk production does not coincide with mid summer
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	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 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