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)	Malwa plateau, Vindhyan scrupland and Narmada valley		
	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	Altitude
		$23^0$15' 35.76'' North	77^0 24'45.41" East	427m
	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):	1154.2	2nd week of June	September 2nd Week
	NE Monsoon(Oct-Dec):	-	-	-
	Winter (Jan- March)	-	-	-
	Summer (Apr-May)	-	-	-
	Annual	1154.2	-	-

1.3	**Land use pattern of the district** (latest	Geographical area	Cultivable area	Forest area	Land under non-agricultural	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and	Barren and uncultivable land	Current fallows	Other fallows (old

	statistics)				use			groves			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**
	1. Deep soil	167.00	60.31
	2. Medium deep soil	17.60	6.47
	3. Shallow soil	92.00	33.22

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

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	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	6.42
	Tanks	34	1.2	1.35
	Open wells	14221	28.7	35.35
	Bore wells	11260	27.5	31.00
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		25.6	28.90
	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*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand 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 Researech 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 Researech Station, Ethkhedi, Bhopal, Madhya Pradesh

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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
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	9.00	
	Guava			120				120	20.00	
	Papaya			4906				4906	377.38	
	Coriander			444				444	0.38	
	Onion			9545				9545	10.70	
	Garlic			426.1				426.1		

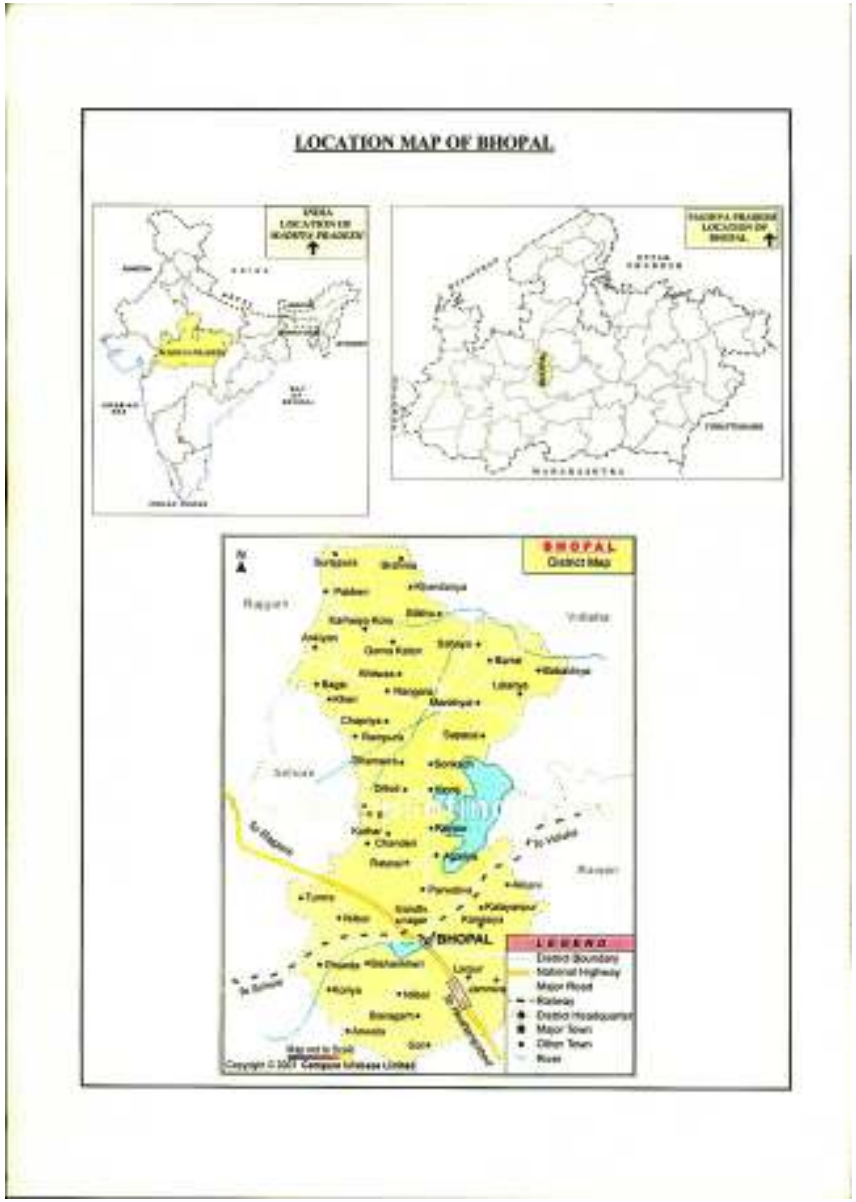
Source – Agriculture Statistics, 2009, Directorate of Farmer welfare and Agriculture Development Madhya Pradesh, Bhopal

1.12	Sowing window for 5 major field crops	Soybean	Maize	Sorghum	Chickpea	wheat
	Kharif- Rainfed	3rd week of June-I st week of July	3rd week of June-I st week of July	3rd week of June-I st week of July	-	-
	Kharif-Irrigated		First week of June - Second week of June	-	-	-
	Rabi- Rainfed	-	-	-	Second week of Oct.- Second week of Nov	Second week of Oct.- Second week of Nov.
	Rabi-Irrigated	-	-	-	3rd week Oct -3rd week Nov	3rd week Oct.- Second week of Nov.

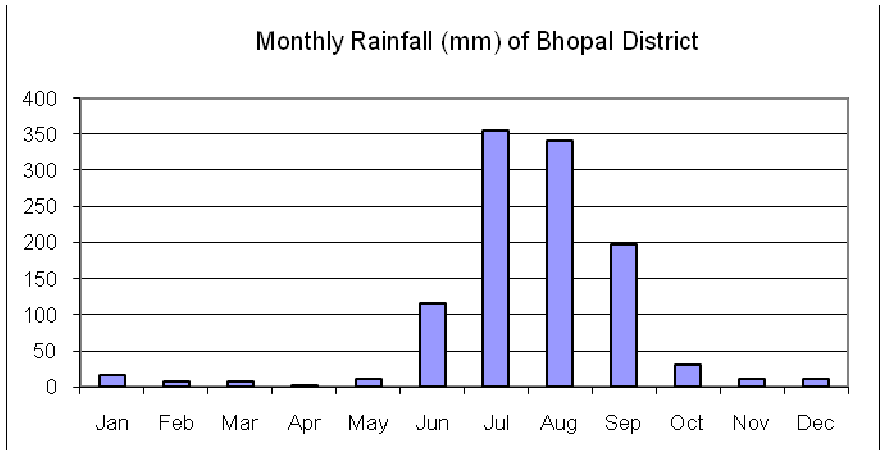
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood			✓
	Cyclone			✓
	Hail storm		✓	
	Heat wave			✓
	Cold wave		✓	
	Frost		✓	
	Sea water intrusion			✓
	Pests and disease outbreak (specify)	Girdle beetel ,semilooper in soybean and gram pod borer in chick pea	✓ Girdle beetel ,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

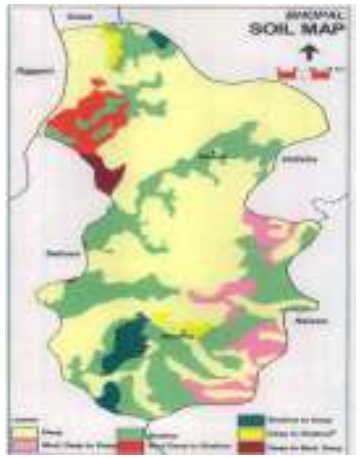
Annexure I
Location map



Annexure II
Mean annual rainfall



Annexure III
Soil map



(Source: NBSS&LUP, Amravati Road, Nagpur)

2.0 Strategies for weather related contingencies (Bhopal)

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**
1	2	3	4	5	6
Delay by 2 weeks **4th week of June**	Deep black soil	Soybean	Soybean(early) JS 95-60, JS 93-05	• Ridge/BBF sowing of soybean • Seed dressing with Thiram + carbendazim in equal ratio @3g/kg seed • Increase the seed rate by 10% and reduce the interrow 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	Maize (JM-216, JM-8, JM-12)		
	Shallow black soil	Soybean	Soybean(early) JS 95-60, JS 93-05		
		Maize	Maize (JM-216, JM-8, JM-12)		

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**
1	2	3	4	5	6
Delay by 4 weeks **2nd week of July**	Deep black soil	Soybean	Sweet corn/ Sunflower(Modern) / Pigeon pea	• Seed dressing with Thiram+carbendazim in equal ratio @3g/kg seed for sunflower • Increase seed rate by 10% of optimum and maintain inter row spacing of 30cm	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 soil	Soybean	Black gram(JU86)		
		Maize	Sunflower (Modern)/ Sesamum-(TKG 55,TKG 8)		

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**
1	2	3	4	5	6
Delay by 6 weeks **4th week of July**	Deep black soil	Soybean	Kharif onion (Red agri found)	Need based irrigation using harvested rain / bore well / open well water by sprinkler	• 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
		Maize	-do-		
	Shallow black soil	Soybean	Black gram(JU86)	• Cultivate the field as when pre monsoon showers received • Select short duration crop/varieties	
		Maize	Sunflower (Modern)/ Sesamum-(TKG 55,TKG 8)		

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**
1	2	3	4	5	6
Delay by 8 weeks **2nd week of August**	Deep black soil	Soybean	Horse gram	Need based irrigation using harvested rain / bore well / open well water by sprinkler	• 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
		Maize	Sunflower (Modern)		
			Maize for fodder (African Tall)		
	Shallow black soil	Soybean	Black gram(JU86)	• Select short duration varieties • Increase seed rate by10% and decrease spacing (30cm)	
		Maize	Maize/sweet corn for cobs		

Condition	**Suggested contingency measures**			
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
1	2	3	4	5
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination /crop stand etc.	Deep black soil	Soybean	• Weed management through intercultural operation between rows using *doura* • Gap filling with improved variety if the population is <75% of optimum • Resow the crop if the damage will be severe	• Dust mulching • Green leaf mulch in between crop rows
		Maize		
	Shallow black soil	Soybean		
		Maize		

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**
1	2	3	4	5
At vegetative stage	Deep black soil	Soybean	• Weed management through intercultural operation between rows • Spray 2% solution of Muriate of potash • Girdle beetle control by spraying of Quinalphos@2 ml / l water in Soybean	• Dust mulching through frequent interculture • Green leaf mulch in between crop rows • Supplemental irrigation through farm pond water/other sources
		Maize		
	Shallow black soil	Soybean		
		Maize		

Condition		Suggested contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**
1	2	3	4	5
At flowering /fruiting stage	Deep black soil	Soybean	• 20% defoliation in soybean • Insecticidal spray for control of green semi looper in soybean • Spray of anti transparent -	• Dust mulching through frequent interculture • Green leaf mulch in between crop rows • Supplemental irrigation through farm pond water/other sources
		Maize		
	Shallow black soil	Soybean		
		Maize		

Condition			Suggested contingency measures	
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Rabi Crop planning**
1	2	3	4	5
	Deep black soil	Soybean	• Reduce the plant population by uproot the plants from alternate row • Supplemental irrigation • Harvest at physiological maturity	• Prepare land either for rabi chickpea/safflower • Seed priming i.e Sowing of soaked seed of safflower/Chickpea
		Maize		
	Shallow black soil	Soybean		
		Maize		

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/ cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Delayed release of water in canals due to low rainfall	Deep black soil	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18	-Dry sowing followed by irrigation -Balanced fertilization -Application of vermi compost @3-4 t/ha . -Ridge/BBF sowing of Kharif crops -Select short duration varieties for sowing -Seed dressing with Thirum+carbodezim in equal ratio @3g/kg seed -Water harvesting and use collected water as life saving irrigation -Cultivate the field on receiving pre monsoon showers -Need based irrigation by sprinkler	Management of seed under RKVY, NFSM, ISOPAM etc
		Wheat	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			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Limited release of water in canals due to low rainfall	Deep black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18	Dry sowing followed by irrigation -Balanced fertilization -Application of wormi compost @3-4 t/ha -Select short duration varieties for sowing -Seed dressing with Thirum + carbodezim in equal ratio @3g/kg seed -Water harvesting and use collected water as life saving irrigation -Cultivate the field on receiving pre monsoon showers -Need based irrigation by sprinkler - Give irrigation using own source of available water plus tank water (conjunctive use)	Management of seed under RKVY, NFSM, ISOPAM etc
		Wheat	Wheat HW 2004, Harshita		
	Shallow black soils	Chickpea	Wheat HW 2004, Harshita		
		Wheat Lok-1	Chickpea JG 130, JG-16, Jaki-92-18		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Non release of water in canals under delayed onset of monsoon in catchment	Deep black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18	-Seed priming in water for 12-15 hrs - Give irrigation using own source of available water plus tank water (conjunctive use)	Awareness needed; Trainings in ATMA,FTC
		Wheat	Safflower (JSF-7, JSF-73, JSF-97)		
	Shallow black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18		
		Wheat Lok-1	Lentil (JL-3 & JL-1)		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Deep black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18	• Mulching in kharif and rabi crops • Supplemental irrigation by sprinkler and using other sources of water available	Awareness needed; Trainings in ATMA, FTC
		Wheat	Safflower (JSF-7, JSF-73, JSF-97)		
	Shallow black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18		
		Wheat Lok-1	Lentil (JL-3 & JL-1)		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Insufficient groundwater recharge due to low rainfall	Deep black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18	• Mulching in kharif and rabi crops • Supplemental irrigation by sprinkler • - Give irrigation using own source of available water plus tank water (conjunctive use)	Awareness needed; Trainings in ATMA, FTC
		Wheat	Safflower (JSF-7, JSF-73, JSF-97)		
	Shallow black soils	Chickpea	Chickpea JG 130, JG-16, Jaki-92-18		
		Wheat Lok-1	Lentil (JL-3 & JL-1)		

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			
1	2	3	4	5
	Vegetative stage	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Soybean	• 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	• Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour	• 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
Maize	• -do-	• -do-	• -do-	-do-
Wheat	• 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	• Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour	• 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	• 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	• Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour	• 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	• 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	• 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	• Drain excess water • Harvest mature fruits as soon as possible • Spray of Wettable Sulphur@ 5 gm/l to reduce the incidence of powdery mildew	• 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	• Drain excess water • Top dressing with N 10-20 kg/ha at optimum soil moisture	• Drain excess water • Intercultivation to loosen the soil and improve aeration • Foliar spray with 2% urea/DAP to regain lost vigour	• 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	• -do-	• -do-	• -do-	-do-
Wheat	• Drain excess water • Top dressing of nitrogenous fertilizers 20-30kg/ha at optimum soil moisture to gain vigour	• Drain excess water • Top dressing of nitrogenous fertilizers 20-30kg/ha at optimum soil moisture to gain vigour • Adopt need based plant protection measures	• Drain excess water • Adopt need based plant protection measures • Harvest on a clear sunny day	Maintain optimum moisture of grain by drying
Chickpea	• Drain excess water • Foliar spray with 2% urea after cessation of rains	• Drain excess water • Foliar spray with 2% urea after cessation of rains	• 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	• 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)	• 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	• Drain excess water • Harvest mature fruits as soon as possible • Spray of Wettable Sulphur@ 5 gm/l to reduce the incidence of powdery mildew	• 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	• Early planting to minimize the incidence of girdle beetle and green semilooper • Foliar spray with 5% NSKE or dimethoate 30EC 1 ml/l to protect against semilooper	• 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	-	-
Maize	-do-	-do-		

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 Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 kg /ha with duster.	• 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 Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 kg/ha with duster.	• 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: NA

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days				
Sea water intrusion	NA			

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	NA			
Cold wave				
Wheat	• Light irrigation • Smoking during night	• Light irrigation • Smoking during night	• Light irrigation • Smoking during night	Harvest at physiological maturity
Chickpea	-do-	-do-	-do-	-do-
Horticulture				
Mango	• Light irrigation • Smoking during night	• Light irrigation • Smoking	• Light irrigation • Smoking	• Harvesting of crop as early as possible and marketed or keep in cold store • Store the produce in shed or safe place.
Frost				
Wheat	-do-	-do-	-do-	Harvest at physiological maturity
Chickpea	-do-	-do-	-do-	-do-
Horticulture				
Mango	• Light irrigation • Smoking during night	• Light irrigation • Smoking during night	• Light irrigation • Smoking during night	• Harvesting of crop as early as possible and marketed or keep in cold store • Store the produce in shed or safe place.
Hailstorm				
Wheat	Re-sowing in case of severe damage	Light and frequent irrigation	• Apply 10% additional nitrogen • Light and frequent irrigation	Timely harvesting and shifting of produce to safer place in case of early forewarning
Chickpea	-do-	-do-	-do-	-do-
Cyclone	NA			

2.5 **Contingent strategies for Livestock, Poultry & Fisheries**

2.5.1 Livestock

Drought	**Suggested contingency measures**		
	Before the event	**During the event**	**After the event**
Drinking water	• Provision of hygienic supply of water . • Storage of water in the tank for drinking • Excavations of bore wells .	• Judicious use of stored water . • Use of potassium permanganate 1ppm , • Heat treatment of Water before use.	• Ensure the cleanlinell of drinking water
Health and disease management	• De-worming , • regular vaccination of HS , BQ and FMD • provision of mineral mixture	• Treatment of sick animal through camp. • Isolation of sick animals	• Culling of sick anima
Floods			
Feed and fodder availability	Adoption of fodder bank Insurance. Repair of animal shed Shifting of animals from the flood area	Use of reserve fodder Balance ration Use of chaffed fodder Transportation excess fodder from ad joining district	Regularly Sprinkling of water on live stock body .use of wet bhusa. Availing the insurance . Separation of unproductive livestock farm .
Drinking water	Ensure availability of clean hygienic water	Clean water Water after boiling / alum treatment	Ensure the cleanliness of drinking water
Health and disease management	• Regular vaccination of HS , BQ and FMD • provision of mineral mixture , • preparation of water proof shed • provision of dry fodder , • De-worming	• Treatment of sick animal through camp. • Isolation of sick animals. • Treatment of sick animals	Culling of sick animal
Cyclone	NA	NA	NA
Feed and fodder availability			
Drinking water			
Health and disease management			
cold wave			
Shelter/environment management	• Plan of proper housing , • Collection of waste gunny bags for shelter.	• Use of gunny bag to cover the window.	• To obtain the milk production level with curative measure

Health and disease management	• Vaccination • Storage of balanced ration Storage of medicine	• Treatment of sick animals • Balanced ration • Use of warm water • Inhalation of *Eucalyptus* water	Culling of sick animals
Heat wave			
Feed and fodder availability	• Adoption of fodder bank , • use of surplus fodder for silage , • urea treatment :4kg Urea 75 litter of water 100 kg fodder. Insurance	• Use of reserve fodder • Use of stored silage • Balance ration • Use of chaffed fodder • Transportation of fodder from ad joining districts if excess there	• Regularly Sprinkling of water on live stock body . • Use of wet *bhusa*. • Availing the insurance . • Separation of unproductive livestock .
Shelter/environment management	Provision of proper shade Provision of trees Reflector paints over roof	Provision of cold water	
Health and disease management			

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought	• Insurance of birds		**Materialized the benefit of insurance**	
Shortage of feed ingredients	• Storage of food ingredients			
Drinking water	• Storage of drinking water			
Health and disease management	De-worming Vaccination De-ticking of shed Provision of rapid growing strain	Use of high weight gain breeding stock Treatment of sick birds	Culling of sick birds	
Floods				
Shortage of feed ingredients	Storage of poultry feed Storage of mineral mixture	Use of stored feed Offer dry feed Avoid dampness in feed to minimize the chances of aflotoxins	Optimum feeding to maintain egg production and proper weight	
Drinking water	Storage of clean drinking water			
Health and disease management	Provision of Vaccination De-worming	Proper Vaccination	Culling of sick birds	
Cyclone				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter / environment management	Repair of sheds Use of sprinklers for maintenance of temperature	Protection of birds from heat		Culling of sick birds
Health and disease management	De-worming , Vaccination	Vaccination		
		De-worming		
		De-ticking		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	• Harvesting of fish • Shifting of small sized fishes to in small storage water bodies such as Plastic or cemented structures	• Harvesting of fish • Shifting of small sized fishes to in small storage water bodies such as Plastic or cemented structures • Provision of net-shed over the tank	• Safe disposal of first event of runoff for storage of only clean water • Waste ware should be protected by net for stay of fishes in the tank.
(ii) Changes in water quality	Apply the lime to neutralize the concentrated water	Apply the lime to neutralize the concentrated water	-
(iii) Any other	-	-	-
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water			

(ii) Water contamination and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
(vi) Any other			
3. Cyclone / Tsunami : No any possibilities of event in the district			
A. Capture	-	-	-
Marine	-	-	-
(i) Average compensation paid due to loss of fishermen lives	-	-	-
(ii) Avg. no. of boats / nets/damaged	-	-	-
(iii) Avg. no. of houses damaged	-	-	-
Inland	-	-	-
B. Aquaculture	-	-	-
(i) Overflow / flooding of ponds	-	-	-
(ii) Changes in water quality (fresh water / brackish water ratio)	-	-	-
(iii) Health and diseases	-	-	-
(iv) Loss of stock and inputs (feed, chemicals etc)	-	-	-
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	-
(vi) Any other	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	Net-shed	-	-
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			