State: MADHYA PRADESH

Agriculture Contingency Plan for District ; RAJGARH

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-Region (10.1)			
	Agro-Climatic Zone (Planning Commission)	Western Plateau And Hills Region I (IX)			
	Agro Climatic Zone (NARP)	Malawa plateau Zone (MP-10)			
	List all the districts or part thereof falling under the NARP Zone	Neemach, Mandsour, Rajgarh, Ujjain,Indore, Dewas, Shajapur, Ratlam,Part of Dhar district (Badanawar and Sardarpu tehsil) and Jhabua district(Petalawad tehsil)			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		22°40" 48.00"N	74° 57' 00.00" E	569 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Under ZARS,RAK College of Agriculture, Sehore 466001			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Rajgarh (PIN: 465661)			
1.2	**Rainfall**	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	774.1	2nd week of June , 24MW	3 rd week of September 38MW	
	NE Monsoon(Oct-Dec):	53.8	-	-	
	Winter (Jan- March)	8.8	-	-	-
	Summer (Apr-May)	1.3	-	-	-
	Annual	838.0	-	-	-

No of rainy days - 51

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)	598.66	423.05	17.63	41.06	67.70	29.95	0.05	29.90	1.70	5.25

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Deep soil	328.25	53.90
	Medium to deep soil	101.82	16.72
	Shallow soils	178.96	29.38

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	423.05	143.65%
	Area sown more than once	184.66	
	Gross cropped area	607.71	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	178.80		
	Gross irrigated area	178.80		
	Rainfed area	428.91		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	36	5.775	3.43
	Tanks	59	3.986	2.43
	Open wells	86281	129.50	73.68
	Bore wells	11002	36.236	20.46
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		0	0
	Total Irrigated Area		178.80	
	Pump sets	84641		
	No. of Tractors	4523		

	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		78% exploited	
	Safe			
	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 (as per latest figures)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Soybean	-	291.8	291.8	-	-	-	-	291.8
	Maize	-	43.9	43.9	-	-	-	-	43.9
	Sorghum	-	34.27	34.27	-	-	-	-	34.27
	Chickpea	-	-	-	58.9	20.0	78.90	-	78.90
	wheat	-	-	-	50.10	-	50.10		50.10
	Lentil pigeon pea Moong, urd	-	11.70		-	5.10	5.10		16.80

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Lemon citrus	1.273	1.273	-
	Mango	0.851	0.851	-
	Guava	0.370	0.370	-
	Others(Papaya,	0.306	0.306	-
	Ber	0.419	-	0.419
	Aonla	1.295	1.295	-
	Anar	0.165	0.165	-
	Custard apple	0.141	-	0.141

	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	coriander	25.000	5.000	20.000
	Potato	1.501	1.501	-
	Onion	1.568	1.568	-
	Cabbage + cauliflower	0.668	0.668	-
	Tomato	0.529	0.529	-
	Garlic	1.374	1.374	-
	Others(lady's finger,arabi , brinjal,chilies, ginger, turmeric, fenugreac, green pea, cucurbits	5.726	5.726	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	Safed Musali	0.006		0.006
	Aswagandh	0.330		0.330
	Isabgaol	0.50		0.50
	Chandrasur	0.006		.0006
	Rosh, lemon	0.002		0.002
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Sorghum	50.853	-	50.853
	Total fodder crop area	50.853	-	50.853
	Grazing land			
	Sericulture etc			
	Others (specify)			

1.8	Livestock		Male (‘000)		Female (‘000)		Young stock Total (‘000)
	Non descriptive Cattle (local low yielding)		145.347		129.046		119.608
	Crossbred cattle		20.000		20.000		20.000
	Non descriptive Buffaloes (local low yielding)		3.858		147.010		121.536
	Graded Buffaloes		0.500		20.000		20.000
	Goat		50.000		115.102		-
	Sheep		2.457		20.000		
	Others Horses, Pig, Yak etc.)		1.000		3.751		
1.9	Poultry		No. of farms		Total No. of birds (‘000)		
	Commercial		21		24.086		
	Backyard		891				
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	
		20		52		388	
	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)	2307		1.616		1.222	
	Others						

1.11 Production and Productivity of major crops (Average of last 5 years: 2003, 04, 05, 06, 07, specify years)

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	266.0	1050	-	-	-	-	266.0	1050	
	Maize	50.05	1177	-	-	-	-	50.05	1177	
	Sorghum	36.3	1070	-	-	-	-	36.3	1070	
	Chickpea	-	-	69.3	1045	-	-	69.3	1045	
	wheat	-	-	118.2	2177	-	-	118.2	2177	
						-	-	-	-	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango							4.25	8000	
	Guava							3.65	9865	
	Lime/mandarin							75.21	13500	
	Coriander			16.32	12250			16.32	12250	
	Potato			17.06	12800			17.06	12800	
	onion			20.07	8968			20.07	8968	
	garlic			12.55	1056			12.55	1056	

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Soybean	Maize	Sorghum	Chickpea	Wheat
	Kharif- Rainfed	20June-5July 25-27MW	20thJune-5July 25-27MW	20thJune-5thJuly 25-27MW	-	-
	Kharif-Irrigated		Second week of June 24MW	-	-	-
	Rabi- Rainfed	-	-	-	25th Sept -5 thOct. 39-45MW	5th Oct.-15thOct. 40-42MW
	Rabi-Irrigated	-	-	-	15th Oct.-15th Nov. 42-46MW	5 thOct.-15 thNov. 40-26MW

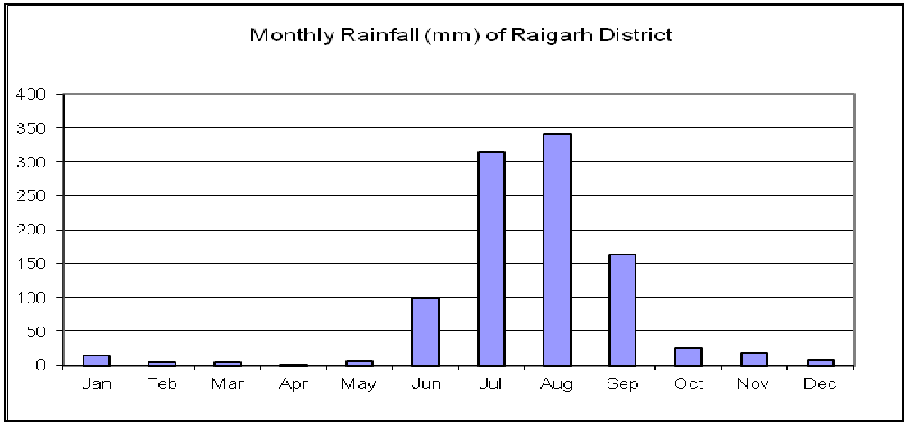
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	Frost		√	
	Sea water intrusion			√
	Pests and disease outbreak (specify)Girdle beetel ,semilooper in soybean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

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

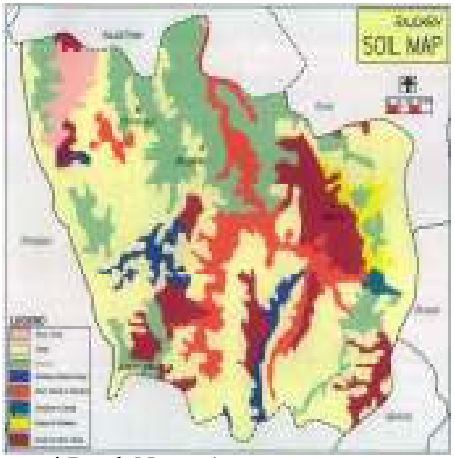
Annexure II

Mean annual rainfall



Annexure III

Soil Map



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

2.0 Strategies for weather related contingencies

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 **(4thweek of June)** **26MW**	Shallow black soils	Sorghum	Black gram (JU86), Sorghum JJ938,JJ1041	-Ridge/BBF sowing of Kharif crops -Seed dressing with Thirum+carbodezim in equal ratio @3g/kg seed -Increase seed rate by 10% and reduce inter row spacing (30cm) -Cultivate the field on receiving pre monsoon showers	LinkSeed village programme, Suraj Dhara, Seed exchange programme , State seed corporation, Cooperative societies for good quality seed. Proper training and guidance to the farmers by KVK/ATMA
		Sorghum+ black gram	Sorghum JJ938,JJ1041+ black gram inter cropping 2 : 4 row ratio		
		Soybean local (JS-335)	Short duration soybean JS 93-05,JS 95-60		
		Maize + black gram	Maize JM-8, JM-12 + black gram JU-86,TPU-4		
		Arhar	Arhar like ICPL-87, Asha		
	Deep black soils	Soybean	Soybean(early)JS 95-60, JS 93 05, / Black gram JU-3		
		Pigeon pea	Pigeon pea(medium)JA4, JKM-189 + Soybean (early)JS 95-60		
		Pigeon pea + Soybean	Sorghum JJ938,JJ1041/Maize , JM-12 + soybean JS 95-60		
		Black gram	Soybean JS 93-05+ black gram Urd : JU-2,JU-3, JU-86,T-9,JBG-623, LBG684, TAU-1,Berkha,PU-30,35,19 (Black gram variety)		

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 July** **28MW**	Shallow black soils	Sorghum	Black gram (JU86), Sorghum JJ938,JJ1041	-Select short duration crops - Ridge/BBF sowing of Kharif crops -Seed dressing with Thirum+carbodezim in equal ratio @3g/kg seed -increase seed rate by 25% and reduce inter row spacing (30cm) -Cultivate the field on receiving pre monsoon showers	LinkSeed village programme, Suraj Dhara, Seed exchange programme , State seed corporation, Cooperative societies for good quality seed. Proper training and guidance to the farmers by KVK/ATMA
		Sorghum+ black gram	Sorghum JJ938,JJ1041+ black gram inter cropping 2 : 4 row ratio		
		Soybean local (JS-335)	Short duration soybean JS 93-05,JS 95-60		
		Maize + black gram	Maize JM-8, JM-12 + black gram JU-86,TPU-4		
		Arhar	Arhar like ICPL-87, Asha		
	Deep black soils	Soybean	Soybean(early)JS 95-60, JS 93 05, / Black gram JU-3		
		Pigeon pea	Pigeon pea(medium)JA4, JKM-189 + Soybean (early)JS 95-60		
		Pigeon pea + Soybean	Sorghum JJ938,JJ1041/Maize , JM-12 + soybean JS 95-60		
		Black gram	Soyabean: JS-335, JS 95-60, JS 93-05, NRC-7, Urd : JU2,JU-3, JU-86,T-9,JBG-623,LBG684,TAU-1,Berkha,PU-30,35,19(Black gram variety)		

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 30MW	Shallow black soils	Sorghum	Maize for cobs JM-8, Jm-12	-Select short duration crops - Ridge/BBF sowing of Kharif crops Seed dressing with Thirum+carbodezim in equal ratio @3g/kg seed -increase seed rate by 25% and reduce inter row spacing (30cm) -Cultivate the field on receiving pre monsoon showers	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills
		Sorghum+ black gram	Maize for fodder African tall		
		Soybean local (JS-335)			
		Maize + black gram			
		Arhar			
	Deep soils	Soybean	Sesamum TKJ-55 - late sown wheat (GW 173,DL 788-2)		
		Pigeon pea	Maize JM-8, Jm-12- Potato Chipsona-1,2		
		Pigeon pea + Soybean	Hy. Maize-wheat		
		Black gram	Kharif onion		

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 **3rd week of Aug**	Deep black soils	Sorghum	Green manure crops like Sunnhemp, Sanai, Dancha, Blackgram, toria and Greengram	Straw Mulching Increase seed rate upto 20% Use bio-fertilizer and moisture conservation practises	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills
		Sorghum+ black gram			
		Soybean local (JS-335)			
		Maize + black gram			
		Arhar			
	Shallow black soils	Soybean			
		Pigeon pea			
		Pigeon pea + Soybean			
		Black gram			

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
1	2	3	4	5	6
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Shallow soils	Sorghum	-Weed management inrows using *doura.* -Thinning, if needed Gap filling with improved varieties with plant population is around 70-75% of optimum	- Mulching in crop rows -Frequent intercultural operations Spray 2% urea or MOP during the dry spell Life saving irrigation by sprinkler system	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills Link watersheds and MGREGS for the support of farm pond technology
		Sorghum+ black gram			
		Soybean local (JS-335)			
		Maize + black gram			
		Arhar			
	Deep soil	Soybean Pigeonpea Pigeonpea + Soybean Black gram/maize			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
1	2	3	4	5	6
At vegetative stage	Shallow soils	Sorghum Sorghum+ black gram Soybean local(JS-335) Maize+Black gram Arhar	-Weed management through doura -Spraying of PMA @3 ppm solution -Girdle beetle control by spraying of Quinalphos@2 ml /l water	- Mulching in crop rows -Frequent intercultural operations Spray 2% urea or MOP during the dry spell Life saving irrigation by sprinkler system	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills Link watersheds and MGREGS for the support of farm pond technology
	Deep soil	Soybean Pigeonpea Pigeonpea + Soybean Black gram			

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
1	2	3	4	5	6
At flowering /fruiting stage	Shallow soils	Sorghum Sorghum+ black gram Soybean local(JS-335) Maize+Black gram Arhar	-20% defoliation in soybean, and sorghum/maize -Spraying of PMA @3ppm solution -Insecticidal spray for control of green semi looper in soybean and late shoot borer in sorghum	-1 life saving irrigation in Kharif crops. . Practice of doura/Kulpha/Hand hoe in between rows. 3. Use of FYM and vermicompost at the time of sowing 4. Ridges are made after 15-20 lines of crops for the moisture conservation. 5. Adaption of plant protection measures	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills Link watersheds and MGREGS for the support of farm pond technology
	Deep soils	Soybean Pigeonpea Pigeonpea + Soybean Black gram			

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
1	2	3	4	5	6
	Shallow soils	Sorghum Sorghum+ black gram Soybean local(JS-335) Maize+Black gram Arhar	Life saving irrigaion -Reduce the plant population in sorghum by uproot the plants from alternate row Harvest at physiological maturity	If the damage is severe,pan for land preparation of rabicrops like Toria, chickpea, mustard, coriander seed priming i.e Sowing of soaked seed of gram/ Coriander	Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations, RKVY, NFSM, ISOPAM for supply of seed and with RKVY for seed drills Link watersheds and MGREGS for the support of farm pond technology
	Deep soil	Soybean Pigeonpea Pigeonpea + Soybean Black gram			

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	Shallow soils	Chickpea	Chickpea	Selection of short duration drought tolerant varieties Sowing of crop in ridges and furrows -Dry sowing followed by irrigation Irrigation at critical stages of crop growth stages Use of drip/sprinkler systems for irrigation if feasible -Balanced fertilization -Application of wormi compost @3-4 t/ha .	Proper training and guidance to the farmers byKVK/ATMA
		Wheat (Lok-1)	Wheat :HW 2004, Harshita		
	Deep soil	Chickpea	Chickpea JG 130		
		Wheat	Wheat HW 2004, Harshita		
		Coriander	Coriander		

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	Shallow soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita	- Selection of short duration drought tolerant varieties Sowing of crop in ridges and furrows -Dry sowing followed by irrigation Irrigation at critical stages of crop growth stages Use of drip/sprinkler systems for irrigation if feasible -Balanced fertilization -Application of wormi compost @3-4 t/ha .	Proper training and guidance to the farmers by KVK/ATMA
		Wheat Lok-1	Lentil (JL-3)		
	Deep soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita		
		Wheat	Safflower (JSI-7) (JSF-1) (JSI-73, JSI-99, JSI-97)		
		Coriander	Coriander		

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	Shallow soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita	Dry sowing followed by irrigation Use of drip/sprinkler systems for irrigation if feasible Give irrigation at critical growth stages of crop -Application of wormi compost@3-4 t/ha Use of organic manures Use of bio-fertilizers	Proper training and guidance to the farmers by KVK/ATMA
		Wheat Lok-1	Lentil (JL-3)		
	Deep soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita		
		Wheat	Safflower (JSI-7) (JSF-1) (JSI-73, JSI-99, JSI-97)		
		Coriander	Coriander		

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	Shallow soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita	-Mulching in kharif and rabi crops -Supplemental irrigation by sprinkler if available Use of organic manures Use of bio-fertilizers	Proper training and guidance to the farmers by KVK/ATMA
		Wheat Lok-1	Lentil (JL-3)		
	Deep soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita		
		Wheat	Safflower (JSI-7) (JSF-1) (JSI-73, JSI-99, JSI-97)		
		Coriander	Coriander		

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	Shallow soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita	-Mulching in kharif and rabi crops -Supplemental irrigation by sprinkler if available Use of organic manures Use of bio-fertilizers	Proper training and guidance to the farmers by KVK/ATMA
		Wheat Lok-1	Lentil (JL-3)		
	Deep soils	Chickpea	Chickpea JG 412 Wheat :HW 2004, Harshita		
		Wheat	Safflower (JSI-7) (JSF-1) (JSI-73, JSI-99, JSI-97)		
		Coriander	Coriander		

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

	Continuous high rainfall in a short span leading to water logging			
Condition	**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	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation and at optimum soil moisture condition to loosen and aerate the soil and to control weeds Earthen up the crop for anchorage Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for Pink stem borer, sheath blight and	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Spray KNO_3 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for sheath blight and post flowering stalk rots	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Harvest the cobs after they are dried up properly. Dry the grain to optimum moisture condition before storing

	Turcicum leaf blight			
Sorghum	Drain excess water with proper drainage Intercultivation with hoe to improve aeration of the soil Apply 20-30 kg N/ha to regain lost vigor at optimum moisture condition	Drain excess water with proper drainage Intercultivation with hoe to improve aeration of the soil Apply 20-30 kg N/ha to regain lost vigor at optimum moisture condition	Drain excess water with proper drainage Harvest the earheads after they are dried properly or use ear head drier	Dry the grain at optimum moisture content before bagging and marketing
wheat	Drain excess water with proper drainage Intercultivation with hoe to improve aeration of the soil Apply 20-30 kg N/ha to regain lost vigor at optimum moisture condition	Drain excess water with proper drainage Intercultivation with hoe to improve aeration of the soil Apply 20-30 kg N/ha to regain lost vigor at optimum moisture condition	Drain excess water as early as possible Harvest earheads after they are dried completely	dry the grain –d0- up to 10- 12 %moisture
chickpea	-do-	-do-	-do	-do
Horticulture				
Fruits	Proper drainage and removal of excess water from root zone Staking of plants Nutrient application at optimum moisture for better growth	Proper drainage and removal of excess water from root zone Staking of plants Nutrient application at optimum moisture for better growth	Proper drainage and removal of excess water from root zone Spray fungicide like Bavastin @1gm/lit of water after rain as a preventive measure to control fungus disease Go for staking if needed Harvest mature produce on clear sunny day Fallen fruits may be collected, graded and marketed if feasible	Store fruits in well ventilized temporary structures before marketing Market the fruits as early as possible
Vegetables	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zon Spraying the crop with cypermithrin@0.1% to contron fruit borer	Proper drainage and removal of excess water from root zone	
Heavy rainfall with high speed winds in a short span				
Soybean	Drain excess water Ridge and furrow system of planting Top dressing with N 10-20 kg/ha at	Drain excess water Intercultivation to loosen the soil and improve aeration	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

	optimum soil moisture Intercultivation to loosen the soil and to improve aeration	Foliar spray with 2% urea/DAP to regain lost vigour		
Maize	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 Earthling up of crop for anchoring	Drain excess water Intercultivation to loosen the soil and improve aeration Foliar spray with 2% urea/DAP toregain lost vigour Earthling up of crop for anchoring	Stop harvesting till weather clear Harvest green cobs from dislodged plants for immediate marketing	Harvest the cobs after they are dried up completely Well dry the produce up to 10-12 %moisture before storage
Sorghum	-do-	-do-	Stop harvesting till weather clear Harvest s ear heads from dislodged plants for immediate marketing	Shift the produce to safer place dry the produce up to 10- 12 %moisture before storage
Wheat		Immediate made provision of drainage of water	Stop harvesting till weather clear	Well dry the produce up to 10-12 %moisture before storage
Chickpea	Immediate made provision of drainage of water	Immediate made provision of drainage of water	Stop harvesting till weather clear	Well dry the produce up to 10-12 %moisture before storage
Horticulture				
Fruits	Proper drainage and removal of excess water from root zone Staking of plants Nutrient application at optimum moisture for better growth	Proper drainage and removal of excess water from root zone Staking of plants Nutrient application at optimum moisture for better growth	Proper drainage and removal of excess water from root zone Spray fungicide like Bavastin @1gm/lit of water after rain as a preventive measure to control fungus disease Go for staking if needed Harvest mature produce on clear sunny day Fallen fruits may be collected, graded and marketed if feasible	Store fruits in well ventilized temporary structures before marketing Market the fruits as early as possible
Vegetables	Proper drainage and removal of excess water from root zone	Proper drainage and removal of excess water from root zon Spraying the crop with cypermithrin@0.1% to control fruit borer	Proper drainage and removal of excess water from root zone	
Outbreak of pests and diseases due to unseasonable 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	Spray of insecticides & fungicide for protecting from fungus	
Maize	Spray imidachloprit 0.3 ml/l or Dimethoate 1.0 ml/l to control leaf hopper	Foliar application of Mancozeb @0.25 - 0.4% at 8-10 days interval to control *Turcicum* leaf blight	Trichoderma mixed with FYM @ 10 g/kg at 10 days prior to its use in the field can be applied to control stalk rot incidence which is likely during post flowering	
Sorghum	Whorl application of phorate 10G or carbofuran 3 G @ 8-10 kg/ha to control shoot borer attack	Spray of mancozeb @ 0.25-0.4% at 8-10 days interval to control *Turcicum* leaf blight	Trichoderma mixed with FYM @10g/kg at 10 days prior to its use in the field can be applied to control stalk rot incidence which is likely during post flowering	
wheat	Wheat rust. Spray 0.2% mancozeb 76% WP to control wheat rust	Wheat rust. Spray 0.2% mancozeb 76% WP to control wheat rust	Wheat rust. Spray 0.2% mancozeb 76% WP to control wheat rust	
chickpea	Spray trizophos 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 Quinolphas 25 EC or Chlorpyriphos 20 EC C or Methyle Parathiyan 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 per hectare with duster	Spray trizophos 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 Quinolphas 25 EC or Chlorpyriphos 20 EC C or Methyle Parathiyan 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 per hectare with duster	Spray trizophos 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 Quinolphas 25 EC or Chlorpyriphos 20 EC C or Methyle Parathiyan 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 per hectare with duster	
Horticulture				
Coriander	Control of stem gall	Control of stem gall	Control of stem gall	

2.3 Floods: Not applicable

Condition	Suggested contingency measure			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days[2]				
Sea water intrusion[3]	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				
Wheat	Light irrigation Provision of Wind breaks	Light irrigation	Light irrigation	Harvest at physiological maturity
Chickpea	Light irrigation	Light irrigation	Light irrigation	Harvest at physiological
Horticulture				
Fruits	-Protect the seedlings by providing the shed -Arrangement of wind breaks	-Bordeaux paste to exposed bark .branches of the tree to protect from Sun scorching - Mulching around the base of trunk of the tree	-Bordeaux paste to exposed bark . branches of the tree to protect from Sun scorching -Mulching around the base of trunk of the tree	Harvesting of crop as early as possible and marketed or keep in cold store -Store the produce in shed or safe place.
Vegetables	-Protect the seedlings by providing the shed -Arrangement of wind breaks	Light irrigation at night hours	Application of N-fertilizers	Harvest and marketed as early as possible
Cold wave				
Chick pea	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
wheat	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
Horticulture				
Fruits	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.
Vegetables	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest and marketed as early as possible
Frost				
Wheat	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
Chick pea	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest at physiological maturity
Horticulture				
Fruits	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.
Vegetables	Light irrigation Smoking during night	Light irrigation Smoking during night	Light irrigation Smoking during night	Harvest and marketed as early as possible
Hailstorm				
Wheat	-	-		
Chick pea	-	-		
Horticulture				
Fruits	Provide the shed	-	-	Keep the produce in protected area preferably under the roof
Vegetables	Provide the shed	-	-	Keep the produce in protected area preferably under the roof
Cyclone : Not occur in the district				
Horticulture				

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**
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 • Use unconventional feeds as a source of roughage, • use urea treated roughage, • use urea molasses block as a source of nitrogen and energy. • Use low quality processed with mild acid and alkali treatment.	• Feeding green feed/ fodder and conventional feed. • Regularly Sprinkling of water on live stock body . • Use of wet *bhusa*. • Availing the insurance. • Separation of unproductive livestock. .
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 • Water treated with quick lime
Health and disease management	• Deworming , • regular vaccination of HS , BQ and FMD • provision of mineral mixture ,	• Treatment of sick animal through camp. • Isolation of sick animals	• Culling of sick animal • Vaccination & deworming

Floods			
Feed and fodder availability	• Adoption of fodder bank • Hay and silage making • Insurance. • Repair of animal shed • Shifting of animals from the flood area	• -Use unconventional feeds • -Use of reserve fodder • -Balance ration • -Use of chaffed fodder • -use roughages processed with mild acid and alkali • -Transportation excess fodder from adjoining district	• -Regularly Sprinkling of water on live stock body . • -Feeding green feed/ fodder and conventional feed • -use of wet bhusa. • -Availing the insurance. Separation of unproductive livestock.
Drinking water	• Ensure availability of clean hygienic water • Water be treated with quick lime lime	• 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 , • Deworming	• Treatment of sick animal through camp. • Isolation of sick animals. • Treatment of sick animals in houses	• -Culling of sick animal • -use antidote in poisoning case
Cyclone	**(Not occur in the district)** NA		
Feed and fodder availability	• -	•	•
Drinking water	• -	•	•
Health and disease management	• -	•	•
cold wave			
Shelter/environment management	• House of animal should be N-S direction • Plan of proper housing ,	• availability of full sun rays in animal shed, keep animal body warm • Use of gunny bags to cover the windows	• -Adopt curative measures to obtain the milk production level

	• Collection of waste gunny bags for shelter	during night hours	• -Keep environment uniformly to recover animal
Health and disease management	• Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event • Storage for balanced ration	• Treatment of sick animals • Balanced ration • Use of warm water • Inhalation of *Eucalyptus* water	• Vaccination & deworming • Culling of sick animals
Heat wave	•	•	•
Shelter/environment management	• Provision of proper shade • Provision of trees • Reflector paints over roof • , two times bathing of animals.	• Provision of cold water • Keep environment uniformly to recover animal	• Vaccination & deworming
Health and disease management	• -Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event • -Use suitable drugs depending on condition.	• Vaccination & deworming	•

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	
Drought	• Insurance of birds	**Keep watch on mortality and adopt measures**	**Materialized the benefit of insurance**	
Shortage of feed ingredients	-Storage of food ingredients	Mineral mixture feeding, use unconventional feed in feeding of poultry ration, use animal protein source like fish meal, silk worm pupa, blood meal by products of slaughter house etc, ration should be made from locally available feed ingredients.	Feeding high quality balance fee	
Drinking water	-Storage of Sanitized drinking water	Judicious use of stored water	Fresh drinking water	
Health and disease management	Deworming Vaccination Deticking of shed Provision of rapid growing strain	Use of high weight gain breeding stock Treatment of sick birds	Vaccination and deworming 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	Open the curtain for proper aeration and drying of litter. Optimum feeding to maintain egg production and proper weight	
Drinking water	Storage of clean drinking water			

Health and disease management	Provision of Vaccination Deworming	Proper Vaccination and deworming, use anti fungal and liver tonic during feeding and drinking	Culling of sick birds Vaccination and deworming	
Cyclone:	**Not applicable**			
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 -Storage of local available food grains/feed ingredients	-Down the curtain of windows -lighting in the shed in cold condition -maintain the temperature of shed	Feeding high quality balance feed	Culling of sick birds
Health and disease management	Deworming Vaccination	Vaccination and deworming, use anti stress drugs and liver tonic during feeding and drinking.	Vaccination and deworming	
		Deworming		
		Deticking		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	All the fish should be marketed Shifting of small sized fishes to 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 Dry ponds should be treated with lime	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. After onset of monsoon and ponds fill with water seedling the fish seed
(ii Impact of heat and salt load build up in ponds / change in water quality	Apply the lime to neutralize the concentrated water	Apply the lime to neutralize the concentrated water	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. After onset of monsoon and ponds fill with water seedling the fish seed
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	Keeps net in west wear of ponds	Protect the fish to flow with runoff water	
(ii) Water contamination and changes in water quality	Lime treatment should be done.	Lime treatment and $KMnO_4$ treatment 2 ppm	No seedling of new fish seed
(iii) Health and diseases	Lime treatment should be done.	Lime treatment and $KMnO_4$ treatment 2 ppm	No seedling of new fish seed
(iv) Loss of stock and inputs (feed, chemicals etc)	Manufactured feed should be given in ponds	Manufactured feed should be given in ponds	Natural feed should be available in ponds
(v) Infrastructure damage (pumps, aerators, huts etc)	Dust and debris should be clean in west wear.	Continuous Dust and debris cleans in west wear.	-
(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)	Showering of water by pump for proper O_2 in water	Showering of water by pump for proper O_2 in water	-
(ii) Health and Disease management	$KMnO_4$ treatment 2 ppm	$KMnO_4$ treatment 2 ppm	-
(iii) Any other	-	-	-