

State: MADHYA PRADESH
Agriculture Contingency Plan 2010-11 District: KHANDWA

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro ecological Sub Region (ICAR)	Madhya Bharat plateau , western Malwa plateau, eastern Gujarat plain, Vindhyan and Satpura range and Narmada valley		
	Agro-Climatic Region (Planning Commission)	Western Plateau and Hills region (IX)		
	Agro Climatic Zone(NARP)	Nimar valley Agro climatic Zone (MP-11)		
	List all the Districts or part thereof falling under the NARP Zone	East Nimar, West Nimar, Dhar, Harda, Bharwani		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		24 ⁰ 00 10.45 N	80 ⁰ 42 56.94E	432.33M
	Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS	Regional Agricultural Research Station, Khandwa, MP-450001		
Mention the KVK located in the district	KVK, B. M. College of Agriculture campus, Jaswadi Road, East Nimar Khandwa (M.P.)-450001			
1.2	Rainfall	Average	Normal Onset	Normal Cessation
	SW monsoon (June-Sep)	708.4	June 3 rd week 24 MW	September 4th week 39 MW
	NE Monsoon (Oct.-Dec.)	69.0	-	-
	Winter(Jan-March)	0.2	-	-
	Summer(April-May)	-	-	-
	Annual	777.6	-	-

The figures have been corrected as per given in Agriculture Statistics 2009 published by Directorate of Farmers welfare and Agricultural Development , M.P.,Bhopal . pp 60-63

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	Old fallows
	Area (*000 ha)	775.6	302.5	309.2	82.6	54.8	0.2	0.1	8.4	5.7	12.1

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

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Deep soils	377.20	35.48
	Moderately deep soils	195.00	18.34
	Shallow soils	491.20	46.17

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	300.6	128.0
	Area sown more than once	84.2*	
	Gross cropped area	384.8	

Normally it is from irrigated area .However in years when the good rains received in later part of the kharif (end of September or in October-November) then it also include some areas of rainfed .

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	122.8		
	Gross irrigated area	122.8		
	Rain fed area	119.7		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		6.2	5.0
	Tanks	23	10.0	8.1
	Open wells	47224	77.2	62.8
	Bore wells	4036	16.2	13.1
	Lift irrigation schemes	-	-	-
	Micro-irrigation	-	13.2	10.7
	Other sources (please specify)		15.4	12.5
	Total Irrigated Area		122.8	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	Number	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)

	Over exploited	-	-	-
	Critical	-	-	-
	Semi- critical	2	-	good
	Safe	5	59 % of ground water is exploited	good
	Wastewater availability and use	-	-	-
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Area under major field crops & horticulture etc.

1.7	Major field Crops cultivated	Area ('000 ha)					
		Kharif		Rabi		Summer	Total
		Irrigated	Rain fed	Irrigated	Rain fed		
	Soybean	-	154.8	-	-	-	154.8
	Cotton	-	75.8	-	-	-	75.8
	Sorghum	-	20.9	-	-	-	20.9
	Paddy	-	9.4	-	-	-	9.4
	Arhar	-	8.6	-	-	-	8.6
	Maize			-	-	-	6.4
	Wheat	-	-	56.0	-	-	56.0
	Gram	-		17.5	-	-	17.5
	Horticulture Crops-Fruits	Total area		Irrigated		Rain fed	
	Mango	0.246					
	Guava	0.639					
	orange	0.575					
	Sweet Lime	0.025					
	Lemon	0.72					
	Grapes	0.16					
	Pomegranate	0.05					
	Custard Aple	0.14					
	Papaya	0.25					
	Others	0.16					

	Horticulture Crops-Vegetables	Total area	Irrigated	Rain fed
	Tomato	0.115		
	Potato	2.19		
	Ladys Finger	0.268		
	Brinjal	0.196		
	Green Peas	1.65		
	Sakar Kund	1.34		
	Cauliflower	0.133		
	Kaddu Vargoya	0.192		
	Bitter guard	0.06		
	Others	2.856		
	Horticulture Crops-Spices			
	Coriander	3.002		
	Chilly	4.298		
	Garlic	3.7		
	Onion	4		
	Fenugreek seed	2		
	Others	1		
	Medicinal and Aromatic			
	Ashwa Gandha	0.122		
	Ajwain	0.01		
	Isabgol	0.01		
	Basil	0.076		
	kalmegh	0.005		
	Musli	0.002		
	Aaamla	0.12		
	Lemon Grass	0.005		
	Flowers			
	Mari Gold	0.212		
	Gardiya	0.145		
	Bijli	0.035		
	Aster	0.005		
	Guldawadi	0.136		
	Others	0.052		

Source – Department of Horticulture, Indore Division, Indore (M.P.)

On discussion it inferred that about 65-70 % of the cotton sown in the month of May using irrigation water. Thus the cotton area has now divided in irrigated and in rainfed accordingly.

1.8 Livestock	Number ('000)			
	Male	Female	Young stock	Total
Non descriptive Cattle (local low yielding)	217	153	55	425
Crossbred cattle	0.3	1.0	0.5	1.8
Non descriptive Buffaloes (local low yielding)	8.4	94	33.1	135.5
Graded Buffaloes				
Goat	21.5	128.5	45.0	195
Sheep				--
Others (Camel, Pig, Yak etc.)	0.4	0.66	0.3	1.36
Commercial dairy farms (Number)				
1.9 Poultry	No. of farms		Total number of birds	
Commercial	-			
Backyard			94130	

4,72,517 - 2007-08 18th Live stock census

1.10	Fisheries (Data source: Chief Planning Officer)					
A. Capture						
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)	
Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
B. Culture						
		Water Spread Area (ha)		Yield (t/ha)	Production ('000 tons)	
Brackish water (Data Source: MPEDA/ Fisheries Deptt)						
Fresh water (Data Source: Fisheries Department)		69239		0.0162	1.125	

1.11	Production and Productivity of Major crops(Av. of last 3 years)	Kharif		Rabi		Summer		Total	
		Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)
	Cotton	146.9	1212.5 seed cotton	-	-	-	-	146.9	1212.5
	Soybean	182.7	1265.0	-	-	-	-	182.7	1265.0
	Sorghum	30.6	1262.5	-	-	-	-	30.6	1262.5
	Wheat	-	-	122.8	1998.5	-	-	122.8	1998.5
	Gram	-	-	14.8	812.0	-	-	14.8	812.0
	Arhar	11.1	1287.5	-	-	-	-	11.1	1287.5
Major Horticultural crops									
Horticultural crops - Fruits									
	Mango							1.845	7500.00
	Guava							8.307	13000.00
	Orange							7.187	12499.13
	Sweet Lime							0.375	15000.00
	Lemon							11.88	16500.00
	Grapes							0.224	1400.00
	Pomegranate							0.525	10500.00
	Custard Apple							1.4	10000.00
	Papaya							6.25	25000.00
	Others							2.4	15000.00
Horticultural crops - Vegetables									
	Tomato							2.921	25400.00
	Potato							45.99	21000.00
	Ladys Finger							2.417	9020.00
	Brinjal							3.822	19500.00
	Green Peas							3.7125	2250.00
	Sakar Kund							29.48	22000.00
	Cauliflower							3.325	25000.00
	Kaddu Vargoya							2.208	11500.00
	Bitter guard							0.607	10116.67
	Others							22.848	8000.00

Horticultural crops - Spices								
Coriander							4.322	1439.71
Chilly							22.349	5199.86
Garlic							3.7	1000.00
Onion							78	19500.00
Fenugreek seed							78	39000.00
Others							3	3000.00
Medicinal and Aromatic								
Ashwa Gandha							0.17	1393.44
Ajwain							0.01	1000.00
Isabgol							0.015	1500.00
Basil							0.114	1500.00
Lkalmegh							0.0065	1300.00
Musli							0.0048	2400.00
Aaamla							0.919	7658.33
Lemon Grass							0.015	3000.00
Flowers								
Mari Gold							1.102	5198.11
Gardiya							0.652	4496.55
Bijli							0.141	4028.57
Aster							0.0375	7500.00
Guldawadi							1.496	11000.00
Others							0.546	10500.00

Source – Directorate of Horticulture, Bhopal (M.P.)

1.12	Sowing window for 5 major crops (start and end of sowing period)	Cotton	Soybean	Sorghum	Wheat	Gram
	Kharif-Rainfed	3 rd week of June to 1 st week of July 25-27MW	3 rd week of June to 2 nd week of July 25-28MW	3 rd week of June to 2 nd week of July 25-28MW	-	-
	Kharif-Irrigated	1 st week of May to 1 st week of July 19-27MW	-	-	-	-
	Rabi-Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	-	-	1 st week of November to Last week of December 44-52MW	2 nd week of October to 2 nd week of November 41-46MW

However, if good rains received in Oct-Nov. Then gram covered the rainfed area also.

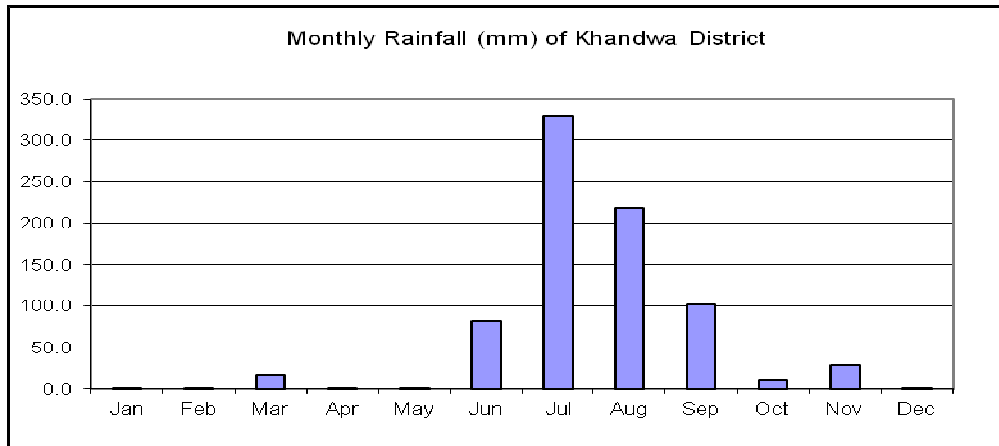
1.13	What is the major contingency is prone to	Regular	Occasional	None
	Drought	-	✓	-
	Flood	-	-	✓
	Cyclone	-	-	✓
	Hail storm	-	-	✓
	Heat wave	-	✓	-
	Cold wave	-	-	✓
	Frost	-	-	✓
	Sea water inundation	-	-	✓
	Pest and diseases(specify)	✓	-	-

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

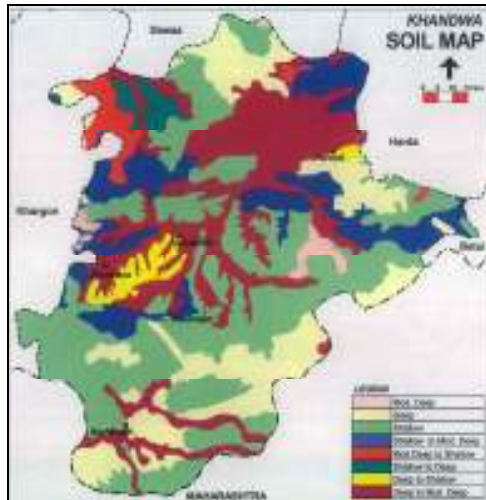
Annexure I
Location Map



Annexure II
Mean Monthly 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	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Delay by 2 weeks (July 1 st wk) 27MW	Shallow soils	Soybean	No change	Sowing of drought resistant early maturing JS 93 05, JS 95 60, JS -335 Making field free of weeds full utilization of water and nutrients by the crops	JNKVV, RVSKVV, Seed corporation)
		Pigeonpea	No change	Sowing of short duration disease resistant variety JKM 189, Making field free of weeds full utilization of water and nutrients by the crops	
		Sorghum	No change	Sowing of dual purpose high yielding Sorghum variety JJ-1022, JJ 1041, Making field free of weeds full utilization of water and nutrients by the crops	
	Moderate Deep Soils	Cotton	No change	Sowing of short duration Bt varieties, Making field free of weeds full utilization of water and nutrients by the crop	Seeds seed corporation, Agriculture universities
		Soybean	No change	Sowing of short duration Varieties(JS 9560) Making field free of weeds full utilization of water and nutrients by the crops,	

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Delay by 4 weeks (3 rd week of July)	Shallow soils	Soybean	Maize	Maize varieties like- Chandan makka safed-2, chandan 3, JVM- 421. Making field free of weeds full utilization of water and nutrients by the crops	JNKVV, RVSKVV, Seed corporation)
		Pigeonpea	No change	Sowing of short duration disease resistant variety JKM 189, Making field free of weeds full utilization of water and nutrients by the crops	
		Sorghum	No change	Sowing of dual purpose high yielding Sorghum variety JJ-1022, JJ 1041, Making field free of weeds full utilization of water and nutrients by the crops	
	Moderate Deep Soils	Cotton	No change	Sowing of short duration Bt varieties, Making field free of weeds full utilization of water and nutrients by the crop	Seeds seed corporation, Agriculture universities
		Soybean	Soybean and Maize	Sowing of short duration Varieties(JS 9560). Maize varieties like- Chandan makka safed-2, chandan 3, JVM-421. Making field free of weeds full utilization of water and nutrients by the crops	

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Crop/ cropping system	Change in crop/cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Delay by 6 weeks (1 st week of August)	Shallow soils	Soybean	Fallow / vegetables	Making field free of weeds, sowing of vegetable, full utilization of water and nutrients by the crops	JNKVV, RVSKVV, Seed corporation)
		Pigeonpea	-do-	Sowing of short duration disease resistant variety JKM 189, Making field free of weeds full utilization of water and nutrients by the crops	
		Sorghum	-do-	Sowing of dual purpose high yielding Sorghum variety JJ-1022, JJ 1041, Making field free of weeds full utilization of water and nutrients by the crops	
	Moderate Deep Soils	Cotton	Fallow / vegetables	Sowing of vegetables, Making field free of weeds full utilization of water and nutrients by the crops	Seeds seed corporation, Agriculture universities
		Soybean	-do-	Sowing of vegetables, Making field free of weeds full utilization of water and nutrients by the crops	

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Crop/ cropping system	Change in crop/cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Delay by 8 weeks (3 rd week of August)	Shallow soils	Soybean	Fallow/ plan for rabi crops /green manuring	Adopt moisture conservation practices	Seeds seed corporation, Agriculture universities
		Pigeonpea	-do-		
		Sorghum	-do-		
	Moderate Deep Soils	Cotton	Fallow/ plan for rabi crops /green manuring	-do-	
		Soybean	-do-	-do-	

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/ cropping system	Crop management	Soil nutrient & moisture conservation measures	Remark 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	Soybean	Gap filling with seed , spray 2% solution of DAP water during the dry spell Spraying of PMA@ 3 ppm solution during dry spell	Frequent intercultural operations and mulching with green leaves or other material.	Assured availability of certified seed , MoP/ DAP/ PMA
		Pigeonpea	Gap filling with seed	-do-	Micro irrigation system - Source of water will be from wells /tube wells
		Sorghum	-do-	-do-	
	Moderate Deep Soils	Cotton	Life saving irrigation, Interculture operation Dora , Foliar application of 2% solution of Urea or DAP or plain water during draught period	Making field free of weeds full utilization of water and nutrients by the crops	
		Soybean	-do-	-do-	

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 measures	Remark on implementation
1	2	3	4	5	6
At vegetative stage	Shallow soils	Soybean	Interculture operation Dora , Foliar application of 2% solution of Urea or DAP with water during draught period. Spray profenophos 40EC@2 ml/l of water to control girdle beetle.	Life saving irrigation, Making field free of weeds full utilization of water and nutrients by the crops	Micro irrigation system - Source of water will be from wells /tube wells
		Pigeonpea	Interculture operation Dora , Foliar application of 2% solution of Urea or DAP with water during draught period.		
		Sorghum	-do-		
	Moderate Deep Soils	Cotton	-do-		
		Soybean	-do-		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Crop/ cropping system	Crop management	Soil nutrient & moisture conservation measures	Remark on implementation
1	2	3	4	5	6
At reproductive stage	Shallow soils	Soybean	20% defoliation in soybean and use as mulching Foliar application of 2% DAP solution	Life saving irrigation, Making field free of weeds full utilization of water and nutrients by the crops	Micro irrigation system - Source of water will be from wells /tube wells
		Pigeonpea	-do-		
		Sorghum	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching		
	Moderate Deep Soils	Cotton	Foliar application of 2% DAP solution		
		Soybean	-do-		

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Crop/ cropping system	Crop management	Soil nutrient & moisture conservation measures	Remark on implementation
1	2	3	4	5	6
	Shallow soils	Soybean	Wherever water resources are available such as pond, wells etc. protective irrigation can be provided to the crop	Repeated interculture operations to keep the field weed free and use of organic mulches <i>Glyricidia</i> leaves, uprooted weeds keeping roots upwards.	Micro irrigation system - Source of water will be from wells /tube wells
		Pigeonpea			
		Sorghum			
	Moderate Deep Soils	Cotton			
		Soybean			

2.1.1 Drought- Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Agonomic measures	Remark on implementation
1	2	3	4	5	6
Delayed release of water in canals due to low rainfall	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
	Moderate Deep Soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
		Cotton	No change	Irrigation at critical growth stage	-

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Limited release of water in canals due to low rainfall	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
	Moderate Deep Soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
		Cotton	No change	Irrigation at critical growth stage	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Non release of water in canals under delayed onset of monsoon in catchment	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
	Moderate deep Soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	
		Cotton	No change	Irrigation at critical growth stage	

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Lack of inflows into tank due to insufficient/delayed onset of monsoon	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
	Moderate deep Soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
		Cotton	No change	Irrigation at critical growth stage	-

Condition	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remark on implementation
1	2	3	4	5	6
Insufficient ground water recharge due to low rainfall	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
	Moderate deep Soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203, Harshita)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization Irrigation at critical growth stage	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Dry sowing Application of IPNM techniques Irrigation at critical growth stages, branching and seed filling stage Inter-culture operation	-
		Cotton	No change	Irrigation at critical growth stage	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
1	2	3	4	5
Soybean	<ul style="list-style-type: none"> • Draining of excess water • Interculture to loosen the soil and to improve aeration • Topdressing with N10-20kg/ha at optimum moisture 	<ul style="list-style-type: none"> • Drain excess water • Interculture to loosen the soil and to improve aeration • Foliar spray with 2% urea/DAP to regain lost vigor 	<ul style="list-style-type: none"> • Drain excess water • Harvesting on a clear sunny day • Shift the produce to safer place 	<ul style="list-style-type: none"> • Maintain optimum moisture content in grain by drying before bagging and marketing
Cotton	<ul style="list-style-type: none"> • Draining of excess water • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Draining of excess water • Intercultivation with small blade harrow • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Draining of excess water 	<ul style="list-style-type: none"> • Harvest cotton bolls in bright sunshine periods.
Sorghum	<ul style="list-style-type: none"> • Draining of excess water • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Draining of excess water • Intercultivation with hoe • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Draining of excess water • Harvest green cobs from dislodged plants for immediate marketing 	<ul style="list-style-type: none"> • Spread the bundles drenched in the rain on the field bunds/ drying floors to quicken drying • Thresh bundles after they are dried properly • Dry the grain to proper moisture content before bagging and storing

Wheat	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour 	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30 kg/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 	-
Chickpea	<ul style="list-style-type: none"> • Drain excess water • Interculture along with earthing to loosen the soil and to improve aeration 	<ul style="list-style-type: none"> • Drain excess water • Interculture along with earthing to loosen the soil and to improve aeration 	<ul style="list-style-type: none"> • Drain excess water • Timely harvest of produce on a clear sunny day 	<ul style="list-style-type: none"> • Shifting to safer place and drying the produce before bagging and storage
Horticulture				
Fruits (Mango, Guava, Pomegranate, papaya etc.)	<ul style="list-style-type: none"> • Application of fungicides to check dumping off (Spray Dithane M-45 3% or Bavistin 1% against anthracnose) 	<ul style="list-style-type: none"> • Immediate drain of water • Application of fertilizers just after drainage 	<ul style="list-style-type: none"> • Earthing and application of fungicides (Spray Dithane M-45 3% or Bavistin 1% against anthracnose) • Harvest on clear weather day 	<ul style="list-style-type: none"> • Store the fruits in well ventilated place before it can be marketed
Vegetables (Onion, Tomato, Cabbage& cauliflower, Cucurbits, Leafy vegetables and others)	<ul style="list-style-type: none"> • Spray mancozeb@3g/lit to check dumping off 	<ul style="list-style-type: none"> • Drain water immediately • Application n-fertilizers just after drainage 	<ul style="list-style-type: none"> • Earthing and application of fungicides • Stop harvesting till weather clear 	<ul style="list-style-type: none"> • Store the v in well ventilated place before it can be marketed
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 at optimum soil moisture to loosen the soil and improve aeration • Foliar spray 2% urea/ DAP to regain lost vigour 	<ul style="list-style-type: none"> • Stop harvesting till weather clear • Drain excess water • Shift the produce to safer place 	Well dry the produce up to 10- 12 % moisture before storage

Cotton	<ul style="list-style-type: none"> • Draining of excess water • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Drain of excess water • Intercultivation with hoe • Apply 25 kg additional N/ha after draining of excess water 	<ul style="list-style-type: none"> • Drain of excess water 	
Wheat	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour 	<ul style="list-style-type: none"> • Drain excess water • Top dressing of nitrogenous fertilizers 20-30 kg/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 	<ul style="list-style-type: none"> • Maintain optimum moisture of grain by drying
Chickpea	<ul style="list-style-type: none"> • Drain excess water • Foilar spray with 2% urea after cessation of rains 	<ul style="list-style-type: none"> • Drain excess water • Foilar 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 	<ul style="list-style-type: none"> • Shifting to safer place and drying thr produce before bagging and storage
Horticulture				
Fruits (Mango, Guava, Sapota, Pomegranate, papaya etc.)	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> • Store in well ventilized temporary structures before marketing • Market the produce as early as possible
Vegetables (Tomato, Potato, Cabbage & cauliflower, Cucurbits, Leafy vegetables, green peas and others)	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> • Proper drainage and removal of excess water from root zone 	<ul style="list-style-type: none"> •
Outbreak of pests and diseases due to unseasonal rains				
Soybean	<ul style="list-style-type: none"> • Early planting to minimize the incidence of girdle beetle and green semilooper 	<ul style="list-style-type: none"> • Monitor moth activity of spodoptera through pheromone traps (10 traps/ha) 	-	Well dry the produce up to 10- 12 % moisture before storage

	<ul style="list-style-type: none"> Foliar spray of Triazophos followed by profenophos for the control of girdle beetle and green semilooper 	<ul style="list-style-type: none"> Apply Quinalphos 25EC 2ml/l or Emameetin benzoate 5 SG 4 g/10 lit to control spodoptera 		
Cotton	Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest	<ul style="list-style-type: none"> Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest To control new wilt, drenching of 1% urea solution 	Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest	
Sorghum	Timely sowing of sorghum to control Shootfly and seed treatment by Thiomethixom 25 WG. Use of carbo furodon granules 3G 8-10kg/ha to control stem borer	Spray of Quinolphos/ trizophos for the control of ear head bug	Use of insecticide as dusting with carbrabryl powder(25kg/ha) to control ear head bug Spaying of Earhead bug, web worm, grain mold	Quick drying to prevent molds
Pigeonpea	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	-

Wheat	Spray 0.1% Hexaconezol against wheat rust.	Spray 0.1% Hexaconezol against wheat rust.	Spray 0.1% Hexaconezol against wheat rust.	Well dry the produce up to 10- 12 % moisture before storage
Gram	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 Methyle Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Quinolphos 1.5 WP 20-25 per hectare 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 Methyle Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Quinolphos 1.5 WP 20-25 per hectare 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	Well dry the produce up to 10- 12 % moisture before storage Store in well ventilated temporary structures before marketing
Horticulture				
Fruits (Mango, Guava, Sapota, Pomegranate, papaya etc.)	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
Vegetables – Chilli, Onion, Colecassia	Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper	Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper	Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper	Maintain aeration in storage to prevent fungal infection and blackening of fruits

2.3 Floods – Not Occurs

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
1	2	3	4	5
Heat Wave				
Wheat	Light irrigation Provision of Wind breaks	Light irrigation	Light irrigation	Harvest at physiological maturity
Chickpea	-do-	-do-	-do-	-do-
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 arrund the base of trunk of the tree	-Bordeaux paste to exposed bark . branches of the tree to protect from Sun scorching -Mulching arrund 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	-do-	-do-	-do-	-do-
Horticulture				
Fruits	-Protect the seedlings by providing the shed net	-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 net	Light irrigation morning / evening time	Application of N-fertilizers	Harvest and marketed as early as possible
Frost				
Wheat	-do-	-do-	-do-	Harvest at physiological maturity
Chick pea	-do-	-do-	-do-	-do-
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	-do-	-do-	-do-	Harvest and marketed as early as possible
Hailstorm				
Wheat	-	-	Protect the crop from rodents attack	Keep the produce in protected area preferably under the roof
Chick pea	-	-	-do-	-do-
Horticulture				-do-
Fruits	Provide the shed	-	-	-do-
Vegetables	-do-	-	-	-do-
Cyclone : Not occur in the district				
Horticulture				
(specify)				

2.2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Drought	Suggested contingency measures		
	Before the event	During the event	After the event
1	2	3	4
Feed and fodder availability	<ul style="list-style-type: none"> • Adoption of fodder bank , • Use of surplus fodder for silage , • Urea treatment: 4kg Urea 75 litter of water 100 kg fodder. • Insurance 	<ul style="list-style-type: none"> • Use of reserve fodder • Use of stored silage • Balance ration • Use of chaffed fodder • Transportation of fodder from adjoining 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. 	<ul style="list-style-type: none"> • Feeding green feed/ fodder and conventional feed. • Regularly sprinkling of water on live stock body. • Use of wet <i>bhusa</i>. • Availing the insurance. • Separation of unproductive livestock. .
Drinking water	<ul style="list-style-type: none"> • Provision of hygienic supply of water . • Storage of water in the tank for drinking • Excavations of bore wells . 	<ul style="list-style-type: none"> • Judicious use of stored water . • Use of potassium permanganate 1ppm , • Heat treatment of Water before use. 	<ul style="list-style-type: none"> • Ensure the cleanliness of drinking water • Water treated with quick lime
Health and disease management	<ul style="list-style-type: none"> • Deworming , • Regular vaccination of HS , BQ and FMD • Provision of mineral mixture 	<ul style="list-style-type: none"> • Treatment of sick animal through camp. • Isolation of sick animals 	<ul style="list-style-type: none"> • Culling of sick animal • Vaccination & deworming
Drinking water	Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps	Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps	Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps
Health and disease management	Vaccination should be done well in advance. The hygiene should be given top priority	Keep animals under shade to the extent possible. The hygiene should be given top priority	Keep animals under shade to the extent possible. The hygiene should be given top priority

Cyclone Not Occurs	-	-	-
Heat wave and cold wave	-	-	-
Cold wave			
Shelter/environment management	<ul style="list-style-type: none"> • House of animal should be N-S direction • Plan of proper housing , • Collection of waste gunny bags for shelter 	<ul style="list-style-type: none"> • Availability of full sun rays in animal shed, keep animal body warm • Use of gunny bags to cover the windows during night hours 	<ul style="list-style-type: none"> • Adopt curative measures to obtain the milk production level • Keep environment uniformly to recover animal
Health and disease management	<ul style="list-style-type: none"> • Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event • Storage for balanced ration 	<ul style="list-style-type: none"> • Treatment of sick animals • Balanced ration • Use of warm water • Inhalation of <i>Eucalyptus</i> water 	Vaccination & deworming Culling of sick animals
Heat wave			
Shelter/environment management	<ul style="list-style-type: none"> • Provision of proper shade • Provision of trees • Reflector paints over roof, two times bathing of animals. 	<ul style="list-style-type: none"> • Provision of cold water • Keep environment uniformly to recover animal 	<ul style="list-style-type: none"> • Vaccination & deworming
Health and disease management	<ul style="list-style-type: none"> • 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	

based on forewarning wherever available.

2.5.2 Poultry

	Suggested contingency measure		
	Before the event ^s	During the event	After the event
1	2	3	4
Drought			
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	<ul style="list-style-type: none"> • 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

2.5.3 Fisheries

1	Suggested contingency measures		
	Before the event 2	During the event 3	After the event 4
1) Drought			
A. Capture	NA		
Marine	NA	-	-
Inland	NA		
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> • All the fish should be marketed • Shifting of small sized fishes to i small storage water bodies such as Plastic or cemented structures 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • - 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	<ul style="list-style-type: none"> • 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	-	Aeration	Rain Gun (Oxygen)
(ii) Impact of salt load build up in ponds / change in water quality	-	-	-
2) Floods			
NA			

B. Aquaculture			
(i) Inundation with flood water	Keeps net in waste weir 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	-do-	-do-	-do-
(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.	-
3. Cyclone / Tsunami : No any possibilities of event in the district			
NA	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	Net-shed	-	-
B. Aquaculture			
(i) Changes in pond environment (water quality)	Showring of water by pump for proper O ₂ in water	Showring 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	-