Agriculture Contingency Plan: BADWANI District

State: MADHYAPRADESH

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, Hot Semi-Arid Eco-Region 6.2		
	Agro-Climatic Region (Planning Commission)	Western Plateau and Hills Region (IX)		
	Agro Climatic Zone (NARP)	Nimar Valley Zone (M P-11)		
	List all the districts or part thereof falling under the NARP Zone	Barwani, East Nimar, West Nimar, Harda		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		22°01'48.00' N	74°54'00.00' E	345.33 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agriculture, Research Station , Khargone-451001		
	Mention the KVK located in the district	Bajtta Farm, Taloon, Badwani 451551(8 km away from district head quarter)		
1.2	**Rainfall** * Source: IMD (2005-2009)	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	762.6	3rd week of June , 26 MW	2nd week of September, 37 MW
	NE Monsoon(Oct-Dec):	62.4	2nd week of October,41MW	3rd week of October, 42MW
	Winter (Jan- March)	0.2	-	-
	Summer (Apr-May)	0	-	-
	Annual	750	-	-

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	529.85	271.6	182.96	25.25	4.33	9.79	0.52	72.27	2.17	3.57

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

1. 4	**Major Soils**	Area (‘000 ha)	Percent (%) of total
	1. Deep Soils	97.40	18.10
	2. Medium Deep soils	87.80	16.24
	3. Shallow soils	355.60	65.66
1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	228.99	118.59
	Area sown more than once	42.57	
	Gross cropped area	271.6	

1.6	**Irrigation**	Area (‘000 ha)	Percent (%)	
	Net irrigated area	84.9		
	Gross irrigated area	84.9		
	Rain fed area	144.1		
	Sources of Irrigation	Number	Area (‘000 ha)	% area
	Canals	109	7.6	2.3
	Tanks	106	5.1	6.6
	Open wells	26728	36.7	39.4
	Bore wells	4970	21.7	26
	Lift irrigation	-	-	-
	Other sources	-	17.9	25.8
	Total	31913	78.6	100
	Pumpsets			
	Micro-irrigation			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-		
	Critical			
	Semi- critical			
	Safe		66%	
	Wastewater availability and use			

*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 (2007-08)	Area ('000 ha)*					
		Kharif		*Rabi*		**Summer**	**Total**
		Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	Cotton	*24.2*	*30..4*				*54.6*
	Sorghum		46.6				46.6
	Maize		32.6				32.6
	Soybean		29.7				29.7
	Groundnut		15.6				15.6
	Sugar cane			2.2			2.2
	Wheat		-	34.4			34.4
	Gram			2.9			2.9

	Horticulture crops - Fruits	**Total area, 000'ha**	**Irrigated**	**Rainfed**
	Mango	0.481		
	Lemon	0.402		
	Papaya	1.330		
	Guava	0.488		
	Anola	0.262		
	Sapota	0.151		
	Banana	1.830		
	Horticulture crops - Vegetables			
	Potato	0.307		
	Onion	3.751		
	Tomato	0.339		
	Lady finger	1.710		
	Brinjal	1.483		
	Cabbage	0.535		
	Colocasia	0.123		
	Cauliflower	0.984		

	Horticulture crops - Spices			
	Coriander	2.374		
	Garlic	0.955		
	Chilly	15.524		
	Ginger	0.655		
	Turmeric	0.368		
	Flowers crops			
	Rose	0.006		
	Medicinal and Aromatic flowers	24.00		
	Plantation crops	**Total area**	**Irrigated**	**Rainfed**
	Neem, mahuwa, mango,etc			
	Fodder crops	**Total area**	**Irrigated**	**Rainfed**
	Total fodder crop area			
	Grazing land	4.33		
	Sericulture etc			
	Others (Specify)			

Source – Economical survey of Madhya Pradesh, 2007-08. Directorate of Economics & Statistics, Madhya Pradesh.

Source – Horticulture Department, Indore

1.8	**Livestock**	**Number**
	Cattle	434.35
	Buffaloes total	98304
	Commercial dairy farms	-
	Goat	162150
	Sheep	6448
	Others (Camel, Pig, Yak etc.)	405

1.9	**Poultry**			
	Commercial			
	Backyard			
1.10	**Fisheries**	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water			
	Fresh water			
	Others			

1.11	**Production and Productivity of major crops** (Average of last 3 years: 2006, 07, 08)	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Cotton	39.9	390					39.9	390
	Sorghum	49.6	1046					49.6	1046
	Maize	36.9	1076					36.9	1076
	Soybean	13.5	474					13.5	474
	Wheat	-	-	49.5	1787			49.5	1787
	Groundnut	10. 9	677					10. 9	677
	Sugarcane							5.2	28000
	Wheat							60.30	26000
	Gram							1.70	594
	Major Horticultural crops								
	Horticulture crops - Fruits								
	Mango							14.430	30000
	Lemon							5.628	14000
	Anola							2.620	10000
	Papaya							159.60	120000
	Sapota							11.650	10000

	Guava							8.784	18000
	Banana							146.400	80000
	Horticulture crops - Vegetables								
	Potato							9.210	30000
	Onion							112.530	30000
	Tomato							6.780	20000
	Lady finger							3.420	20000
	Brinjal							37.075	25000
	Cabbage							10.700	20000
	Colocasia							2.46	20000
	Cauliflower							24.600	250000
	Horticulture crops - Spices								
	Coriander							118.70	50000
	Garlic							191.00	20000
	Chilly							2.888	2500
	Ginger							131.00	20000
	Turmeric							7.360	20000
	Flowers crops								
	Rose							0.180	30000
	Medicinal and Aromatic flowers		-						
	Fodder crops	-	-						
	Total fodder crop area								
	Grazing land								
	Sericulture etc								
	Others (Specify)								

Source – Economical survey of Madhya Pradesh, 2007-08. Directorate of Economics & Statistics, Madhya Pradesh.

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

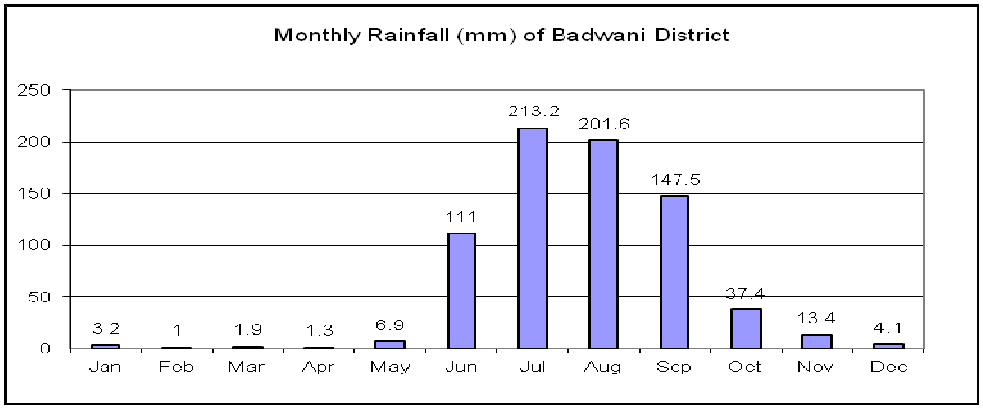
1.12	**Sowing window for 5 major crops (start and end of sowing period)**	Cotton	Sorghum	Maize	Soybean	Wheat
	Kharif- Rainfed	Last week of June to Mid July	Last week of June to Mid July	Last week of June to Mid July	Last week of June to First week of	
	Kharif-Irrigated	Mid May to first week of June	Last week of June to Mid July	Last week of June to Mid July	Last week of June to First week of	
	Rabi- Rainfed					Mid October to Mid December
	Rabi-Irrigated					

1.13	**What is the major contingency the district is prone to (Tick mark)**	Regular	Occasional	None
	Drought	√ August to October	-	√
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	-	√
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	√	√ First week of August to Last September and Mid December to Last week of January	-
	Pests and diseases (specify)			

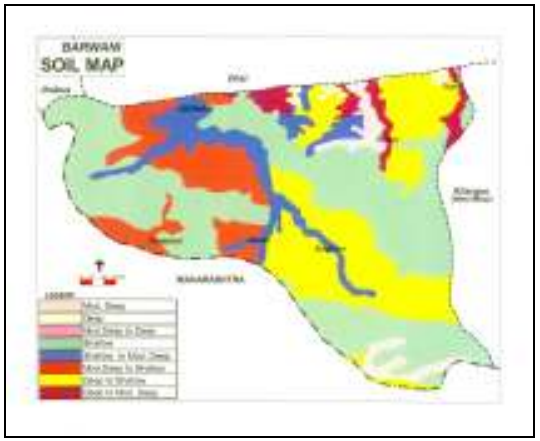
1.14	**Include Digital maps of the district for**	Location map of district with in State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

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**	**Crop/cropping system**	**Change in crop/ cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Delay by 2 weeks 29MW July 16-22	Deep Soils	Cotton	No change	No change	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Maize	No change		
	Medium deep soils	Soybean	No change		
		Cotton	No change		
		Green gram	No change		
		Pigeon pea	JK-189, ICPL-87		
		Maize	No change		
		Sugar cane	Improved varieties		
		Ground nut	JGN-3, Junagad-11		
	Shallow Soils	Soybean	No change		
		Maize	No change		
		Sorghum	No change		

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Delay by 4 weeks 31MW July30-Aug5	Deep Soils	Cotton	Black gram JU-86, JU-3, T-9 ,or Green gram : JM-721 K-851	Increasing seed rate	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Maize	Maize early varieties JVM 421		
	Medium deep soils	Maize	Black gram JU-86, JU-3, T-9 ,or Green gram : JM-721 K-851		
		Green gram / Blackgram	-do-		
		Soybean	Soybean JS-95 60, IS 93 05		
		Pigeon pea	JK-189, ICPL-87		
		Cotton	Bt cotton (short duration varieties)		
		Sugar cane	Improved varieties		
		Ground nut	JGN-3, Junagad-11		
	Shallow Soils	Soybean	Soybean JS-95 60, IS 93 05		
		Maize	Maize early varieties JVM 421		
		Sorghum	JJ-938, JJ-1022		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Delay by 6 weeks 33MW Aug 13-19	Deep Soils	Maize	Maize early varieties JVM 421, JM-216, JM-8 JM-12	Increasing seed rate	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Green gram	Green gram - : JM-721 K-851		
		Black gram	Black gramJU-86, JU-3, T-9 ,		
	Medium deep soils	Maize	Black gramJU-86, JU-3, T-9 ,or Moong : JM-721 K-851		
		Black gram	Black gramJU-86, JU-3, T-9 ,		
		Pigeon pea	JK-189, ICPL-87		
		Green gram	Green gram - : JM-721 K-851		
	Shallow Soils	Maize	Black gramJU-86, JU-3, T-9 ,or Moong : JM-721 K-851		
		Black gram	-do-		
		Green gram	-do-		

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
1	2	3	4	5	6
Delay by 8 weeks 35MW Aug27-Sep2	Deep Soils	Maize	Fallow and preparation for Rabi crops	Increasing seed rate	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Green gram	Fallow and preparation for Rabi crops		
		Black gram	Fallow and preparation for Rabi crops		
	Medium deep soils	Maize	Fallow and preparation for Rabi crops		
		Black gram	Fallow and preparation for Rabi crops		
		Green gram	Fallow and preparation for Rabi crops		
		Pigeon pea	JK-189, ICPL-87		
		Maize	Fallow and preparation for Rabi crops		
	Shallow Soils	Black gram	Fallow and preparation for Rabi crops		
		Green gram	Fallow and preparation for Rabi crops		
		Maize	Fallow and preparation for Rabi crops		

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**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.	Deep Soils	Maize	Re-sowing of Maize JVM 421	Sowing of crops in furrow irrigation ridge bed systems (FIRBs) Follow moisture conservation practices Remove weeds Mulching practices should be done	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Cotton	No change		
		Soybean	Re-sowing of Soybean cv. (JS 9305, JS 95-60)		
	Medium deep soils	Maize	Re-sowing of Black gram cv. T 9, JU 86,		
		Sugarcane	Gap filling		
		Ground nut	Gap filling with maize seed		
		Black gram	Re-sowing of Black gram . T 9, JU- 86,		
		Soybean	Re-sowing of Soybean cv. (JS 95-60)		
		Pigeon pea	Gap filling		
		Cotton	No change		
	Shallow Soils	Soybean	Re-sowing of Soybean cv. JS 9560		
		Maize	Re-sowing of Black gramcv. T 9, JU 86,		
		Sorghum			

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**	**Remarks on Implementation**
1	2	3	4	5	6
At vegetative stage	Deep Soils	Maize	Maize + soybean intercropping	1% N Spraying, use dora and life saving irrigation in FIRBs, if available, mulching of Polythene sheet, drip irrigation system facilities developed	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Cotton	Cotton + Soybean intercropping		
		Soybean	Re-sowing of Soybean cv. (JS 9305, JS 95-60)		
	Medium deep soils	Maize	Maize + Black gram intercropping		
		Sugarcane	Black gram		
		Ground nut	Gap filling with maize seed		
		Green gram / Black gram	Cotton + Soybean intercropping		
		Soybean	Re-sowing of Soybean cv. JS 9560		
		Pigeon pea	Life saving irrigation / water spray		
		Cotton	Life saving irrigation / water spray		
	Shallow Soils	Soybean	Re-sowing of Soybean cv. JS 9560		
		Maize	Re-sowing of Black gramcv. T 9, JU 86		
		Sorghum	Gap filling with seed , spray 2% solution of DAP water during the dry spell Spraying of PMA@ 3 ppm solution during dry spell		

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 reproductive stage	Deep Soils	Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching	1% N Spraying and life saving irrigation in FIRBs, if available, mulching of Polythin sheet , drip irrigation system facilities developed	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Cotton	Foliar application of 2% DAP solution		
		Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
	Medium deep soils	Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching		
		Sugarcane	-do-		
		Ground nut	-do-		
		Green gram / Black gram	-do-		
		Pigeon pea	Life saving irrigation / water spray		
		Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
		Cotton	Foliar application of 2% DAP solution		
	Shallow Soils	Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
		Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching		
		Sorghum	-do-		

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
1	2	3	4	5	6
	Deep Soils	Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching	1% N Spraying, and life saving irrigation if available, shell green cobs (dough stage) and green fodder for cattle's.	Linkage with seed corporation, Agriculture universities, JNKVV, RVSKVV for supply of seed and CIAE to procure improved ridge and furrow maker and adjustable with seed cum fertilizer drill.
		Cotton	Foliar application of 2% DAP solution		
		Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
	Medium deep soils	Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching		
		Sugarcane	-do-		
		Ground nut	-do-		
		Green gram / Black gram	-do-		
		Pigeon pea	Life saving irrigation / water spray		
		Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
		Cotton	Foliar application of 2% DAP solution		
	Shallow Soils	Soybean	- 20% defoliation in soybean and use as mulching -Spray of 2% solution of MOP/DAP/ water during the dry spell -Spraying of PMA @3 ppm solution during the dry spell		
		Maize	Delay the spray of urea till optimum soil moisture availability 20% defoliation of lower leaves and use as mulching		
		Sorghum	-do-		

2.1.2 Irrigated situation

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
Delayed release of water in canals due to low rainfall	Shallow soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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)	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	-
	Deep soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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	-

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)	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)	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	-
	Deep soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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	-

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)	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)	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	
	Deep soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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	-

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)	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)	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	-
	Deep soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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	-

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)	Preferred pre sowing Irrigation (Palewa) Balanced fertilization	-
		Chickpea	Chickpea (JG 130, JG 16, JAKI 9218)	Irrigation at critical growth stage 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)	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	-
	Deep soils	Wheat	Wheat (HW 2004, HI 1554, HI 1500, MP 1203)	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	-

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed 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
Cotton	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth.	Drainage channels make and joint to main drainage channel, after proper drainage giving urea for good flower formation. Spray planofix for flower drop control.	Drainage channels make and joint to main drainage channel, if rain fall forecast then picking should be done before rains come.	Protect the harvest crop to rains
Maize	-do-	-do-		
Sorghum	-do-	-do-		
Green gram / Black gram	-do-	-do-		
Ground nut	-do-	-do-		
Pigeon pea	-do-	-do-		
Soybean	-do-	-do-		
Sugarcane	-do-	-do-		
Horticulture				
Chilli	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth. One spray of mencozeb 75WP 2gm/l for root rot control.	Drainage channels make and joint to main drainage channel, Spray planofix for flower drop control, and One spray of mencozeb 75WP 2gm/l for root rot	Drainage channels make and joint to main drainage channel, picking the matured fruits and shall it.	-
Onion	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth. One spray of mencozeb 75WP 2gm/l for root rot control.	Drainage channels make and joint to main drainage channel, one spray of mencozeb 75WP 2gm/l for root rot control.	Harvest the crop and shall it as soon as possible.	-
Lady finger	-do-	-do-	-do-	-
Brinjal	-do-	-do-	-do-	-
Coriander	-do-	-do-	-do-	-

Garlic	-do-	-do-	-do-	-
Cauliflower	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth. One spray of mencozeb 75WP 2gm/l for root rot control.	Drainage channels make and joint to main drainage channel, Spray planofix for flower drop control, and One spray of mencozeb 75WP 2gm/l for root rot	Drainage channels make and joint to main drainage channel, picking the matured fruits and shall it.	-
Heavy rainfall with high speed winds in a short span				
Cotton	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth.	Drainage channels make and joint to main drainage channel, after proper drainage giving urea for good flower formation. Spray planofix for flower drop control.	Drainage channels make and joint to main drainage channel, if rain fall forecast then picking should be done before rains come.	Protect the harvest crop to rains
Maize	-do-	-do-	-do-	Protect the harvest crop to rains, after rains proper drying of crop harvest in threshing floor and thresh.
Sorghum	-do-	-do-		
Green gram / Black gram	-do-	-do-		
Ground nut	-do-	-do-		
Pigeon pea	-do-	-do-		
Soybean	-do-	-do-		
Sugarcane	-do-	-do-		
Soybean	-do-	-do-	-do-	-do-
Horticulture				
Chilli	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth. One spray of mencozeb 75WP 2gm/l for root rot control.	Drainage channels make and joint to main drainage channel, Spray planofix for flower drop control, and One spray of mencozeb 75WP 2gm/l for root rot	Drainage channels make and joint to main drainage channel, picking the matured fruits and shall it.	-
Onion	-do-	-do-	Harvest the crop and shall it as soon as possible.	-
Lady finger	-do-	-do-	-do-	

Brinjal	-do-	-do-	-do-	
Coriander	-do-	-do-	-do-	
Garlic	-do-	-do-	-do-	
Cauliflower	Crop sowing in FIRB system, drainage channels make and joint to main drainage channel, after proper drainage giving urea for better vegetative growth. One spray of mencozeb 75WP 2gm/l for root rot control.	Drainage channels make and joint to main drainage channel, Spray planofix for flower drop control, and One spray of mencozeb 75WP 2gm/l for root rot	Drainage channels make and joint to main drainage channel, picking the matured fruits and shall it.	
cauliflower	-do-	-do-	Drainage channels make and joint to main drainage channel, picking the matured fruits and shall it.	-
Outbreak of pests and diseases due to unseasonal rains				
Cotton	Control of sucking pest, stem borer fly, American caterpillar, control of root rot and collar rot disease	Control of pink wall worm, sucking pest etc. and control of flower drop.	Control of pink wall worm, sucking pest etc. and control of flower drop.	Proper storage of crop harvest and timely marketing.
Maize	Application of proper insecticides to control of sucking pest , stem borer and Bihar hairy caterpillar	Use of fungicides to control stalk rot	Use sulphur spray for control of fungal infection	Proper drying of seed or grains before storage. use EDB ampoules (one ampoule / q)
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	• Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. • T" shaped pegs placed in late sown chickpea field for	• Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. • Carry out critical survey of fields for insect and	-

	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.	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.	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
Soybean	Control of semi looper, blue beetle and girdle beetle	Control of semi looper, blue beetle, girdle beetle, tobacco caterpillar	Control of tobacco caterpillar, control of fungal infection use sulphur dust.	Proper drying of seed or grains before storage.
Horticulture				
Chilli	Control the sucking pest, stem borer and root rot and anthracnose disease	Control the sucking pest, caterpillar and root rot and anthracnose disease and flower drop.	Control the fungal infection.	Proper drying of chilli and store it.

Onion	Control of white grub and fungal disease	Control of white grub and fungal disease	Control the rotting of bulbs. Harvest the crop and proper dying it.	Proper drying the crop and store it proper way.
Cauliflower	One spray of mencozeb 75WP 2gm/l for root rot control, control of sucking pests and stem borer.	Control the root rot and early blight, control of sucking pests and stem borer and fruit borer control the flower drop.	Picking the mature fruits and sold. Control the fruit drop. Control the late blight	-
Tomato	Control the sucking pest, stem borer and root rot and anthracnose disease	Control the sucking pest, caterpillar and root rot and anthracnose disease and flower drop.	Control the fungal infection.	Proper drying of chilli and store it.
Brinjal	Control the sucking pest, stem borer and root rot and anthracnose disease	Control the sucking pest, caterpillar and root rot and anthracnose disease and flower drop.	Control the fungal infection.	Proper drying of chilli and store it.

2.3 Floods- NA

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

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	Light irrigation Provision of Wind breaks if available	Light irrigation	Light irrigation	Harvest at physiological maturity
Cold wave	-	-	-	-
Frost	-	-	-	-
Hailstorm	-	-	-	-
Cyclone	-	-	-	-

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Drought	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
1	2	3	4
Feed and fodder availability	Hay and silage making, storage of locally available roughage	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.
Drinking water	Water treated with quick lime	Use sanitized water	Water treated with quick lime
Health and disease management	Vaccination & deworming	Mineral mixture feeding, keep animals in favorable environment	Vaccination & deworming
Floods			
Feed and fodder availability	Hay and silage making,	Use unconventional feeds; avoid spoiled fodder feeding, use roughages processed with mild acid and alkali.	Feeding green feed/ fodder and conventional feed.
Drinking water	Water and quick lime	Use sanitized water	Water and quick lime
Health and disease management	Vaccination & deworming	Vaccination & deworming , avoid food poisoning by spoiled feed, keeping catles in dry and airable place	Vaccination & deworming, use antidote in poisoning case
Cyclone			
Feed and fodder availability	Hay and silage making,	Use unconventional feeds; avoid spoiled fodder feeding, use roughages processed with mild acid and alkali.	Feeding green feed/ fodder and conventional feed.
Drinking water	Water treated with quick lime	Use sanitized water	Water treated with quick lime
Health and disease management	Vaccination & deworming	Vaccination & deworming , avoid food poisoning by spoiled feed, keeping cattles in dry and airable place	Vaccination & deworming, use antidote in poisoning case
Heat wave and cold wave			
Shelter/environment management	House of animal should be N-S direction, availability of plenty water, animal house window should have provision of curtain to maintain cold and heat wave	Provide favorable environment during heat/ cold wave Heat: availability of plunty of cold water to drink. Keep animal on cool places, two times bathing of animals. Cold: availability of full sun rays in animal shed, keep animal body warm.	Keep environment uniformly to recover animal.
Health and disease management	Availability of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc.	Use suitable drugs depending on condition.	Vaccination & deworming,

2.5.2 Fisheries/ Aquaculture - NA

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1	2	3	4
1) Drought	-	-	-
A. Capture	-	-	-
Marine	-	-	-
Inland			
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.
Changes in water quality	Apply the lime to neutralize the concentrated water	Apply the lime to neutralize the concentrated water	-
Any other	-	-	-
B. Aquaculture	-	-	-
Shallow water in ponds due to insufficient rains/inflow	-	-	-
Impact of salt load build up in ponds / change in water quality	-	-	-
Any other	-	-	-
2) Floods	-	-	-
A. Capture	-	-	-
Marine	-	-	-
Inland	-	-	-
Average compensation paid due to loss of human life	-	-	-
No. of boats / nets/damaged	-	-	-
No.of houses damaged	-	-	-
Loss of stock	-	-	-
Changes in water quality	-	-	-
Health and diseases	-	-	-

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

2.5.3 Poultry

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1	2	3	4
Drought			
Shortage of feed ingredients	Storage of local available food grains/feed 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 feed.
Drinking water	Fresh drinking water	Sanitized drinking water	Fresh drinking water
Health and disease management	Vaccination and deworming	Vaccination and deworming	Vaccination and deworming
Floods			
Shortage of feed ingredients	Storage of local available food grains/feed ingredients,	Feed should be protected by fungus, down the curtain of window	Feeding high quality balance feed. Open the curtain for proper aeration and drying of litter.
Drinking water	Fresh drinking water	Sanitized drinking water	Fresh drinking water with quick lime.
Health and disease management	Vaccination and deworming	Vaccination and deworming, use anti fungal and liver tonic during feeding and drinking.	Vaccination and deworming
Cyclone			
Shortage of feed ingredients	Storage of local available food grains/feed ingredients,	Feed should be protected by fungus, down the curtain of window	Feeding high quality balance feed. Open the curtain for proper aeration and drying of litter.
Drinking water	Fresh drinking water	Sanitized drinking water	Fresh drinking water
Health and disease management	Vaccination and deworming	Vaccination and deworming, use anti fungal and liver tonic during feeding and drinking.	Vaccination and deworming
Heat wave and cold wave			
Shelter/environment management	Storage of local available food grains/feed ingredients,	Down the curtain of window, maintain the temperature of shed , lighting in the shed in cold condition	Feeding high quality balance feed.
Health and disease management	Vaccination and deworming	Vaccination and deworming, use anti stress drugs and liver tonic during feeding and drinking.	Vaccination and deworming

2.5.3 Fisheries - NA

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1	2	3	4
Drought	**-**	**-**	**-**
Shallow water in ponds due to insufficient rains/inflows	-	-	-
Impact of heat and salt load build up in ponds / change in water quality	-	-	-
Floods	-	-	-
Inundation with flood waters	-	-	-
Water contamination and changes in BOD	-	-	-
Health and disease management	-	-	-
Loss of stock and inputs (feed, chemicals etc.)	-	-	-
Infrastructure damage	-	-	-
Cyclone	-	-	-
Overflow / flooding of ponds	-	-	-
Change in fresh/brackish water ratio	-	-	-
Health and disease management	-	-	-
Loss of stock and inputs (feed, chemicals etc.)	-	-	-
Infrastructure damage	-	-	-
Heat wave and cold wave	-	-	-
Management of pond environment	-	-	-
Health and disease management	-	-	-