

## State: Madhya Pradesh

### Agriculture Contingency Plan for Gwalior District

1.0 District Agriculture profile					
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>				
	Agro Ecological Sub Region (ICAR)	Madhya Bharat plateau and Bundelkhand uplands			
	Agro-Climatic Zone (Planning Commission)	Agro climatic zone 8.1 ; Region: Gird			
	Agro Climatic Zone (NARP)	Zone VII -Gird			
	List all the districts or part thereof falling under the NARP Zone	Gwalior(1/2 W), Shivpuri, Ashok Nagar, Guna, Bhind, Morena, Sheopur			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		22 <sup>0</sup> 43 ' N	76 <sup>0</sup> 54 E	618 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station (RVSKVV), Near Commissioner office A-B Road , Morena -476001 (M. P.) RARS, College of Agriculture, Gwalior			
	Mention the KVK located in the district	Krishi Vigyan Kendra, RVSKVV, College of Agriculture, Gwalior			
<b>1.2</b>	<b>Rainfall</b>	Average (mm)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	701.7	4 <sup>th</sup> week of June	3 <sup>rd</sup> week of September	
	NE Monsoon(Oct-Dec):	23.0	-	-	
	Winter (Jan- March)	27.7	-	-	-
	Summer (Apr-May)	12.0	-	-	-
	Annual	764.4	-	-	-

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)
	<b>Area ('000 ha)</b>	456.4	195.7	111.1	33.3	13.9	23.2	0.1	50.6	19.0	9.5

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

1.4	Soil	Area ('000 ha)	Per. (%) of Total
	1. Deep soil	277.6	60.94
	2. Medium deep soils	66.40	14.61
	3. Shallow soils	111.20	24.45

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

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	195.7	129
	Area sown more than once	56.1	
	Gross cropped area	251.8	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	106.3		
	Gross irrigated area	137.3		
	Rainfed area	89.4		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha) GROSS	Percentage of total irrigated area
	Canals	3	77.0	56.2
	Tanks	5	0.2	-
	Open wells	15615	43.1	31.4
	Bore wells	5778	11.6	8.4
	Lift irrigation schemes		-	
	Micro-irrigation			
	Other sources (please specify)		5.4	3.9
	Total Irrigated Area		137.3	
	Pump sets			
	No. of Tractors			
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsil	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe		29%	
	Wastewater availability and use			
	Ground water quality			Good

\*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) (year 2006-07)

S.No.	Major field crops cultivated	Area ('000 ha)							Summer	Grand total
		Kharif			Rabi					
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
1	Paddy	15.9	-	15.9	-	-	-		15.9	
2	Bajra	-	5.9	5.9	-	-	-		5.9	
3	Black gram	-	6.2	6.2	-	-	-		6.2	
4	Soybean	1.16	14.74	15.9					15.9	
5	Wheat		-	-	85.9	1.1	87.0		87.0	
Others	Chickpea				6.28	15.62	21.9		21.9	
	mustard				15.5	40.1	55.6		55.6	
S.No.	<b>Horticulture crops - Fruits</b>									
1	<b>Mango</b>									
2	<b>Guava</b>									
3	<b>Lemon</b>									
4	<b>Others(Papaya, ber, amla)</b>									
5	-									
Others										
	<b>Horticulture crops - Vegetables</b>									
1	Potato									
2	Onion									
3	Cabbage+cauliflower									
4	Tomato									
5	Garlic									
Others (specify)	Others(lady's finger, arabi , brinjal, chilies, ginger, turmeric, coriander )									
	<b>Medicinal and Aromatic crops</b>									
1	Safed Musali									
2	Kalmegh									
3	kinwach									
4	Ashwa gandha									
5	Rosh,lemon									
Others (specify)										

S.No.	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	<b>Plantation crops</b>								
1	<b>Sagwan</b>								
2	<b>popular</b>								
3	<b>Eucalyptus</b>								
4									
5									
Others (Specify)	Eg., industrial pulpwood crops etc.								
	<b>Fodder crops</b>								
1									
2									
3									
4									
Others (Specify)									
	<b>Total fodder crop area</b>								
	<b>Grazing land</b>								
	<b>Sericulture etc</b>								
	<b>Others (specify)</b>								

1.8	Livestock	Male ('000)	Female ('000)	Young Stock	Total ('000)
	Non descriptive Cattle (local low yielding)	68.1	92.0	83.4	243.5
	Crossbred cattle				
	Non descriptive Buffaloes (local low yielding)	3.4	109.2		84.6
	Graded Buffaloes				197.2
	Goat				198.3
	Sheep				67.3
	Others Horses, Pig, Yak etc.)				37.1
	Commercial dairy farms (Number)				
1.9	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>		
	Commercial				
	Backyard				
1.10	<b>Fisheries</b> (Data source: Chief Planning Officer)				

<b>A. Capture</b>						
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
				07		
<b>B. Culture</b>						
		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)						
<b>Others</b>						

**1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08; 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)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>										
Crop 1	Paddy	32.4	2174	-	-	-	-	32.4	2174	
Crop 2	Bajra	15.7	1892	-	-	-	-	15.7	1892	
Crop 3	Urid	4.8	421	-	-	-	-	4.8	421	
Crop 4	Soybean	29.1	1902			-	-	29.1	1902	
Crop 5	Wheat	-	-			-	-	207.9	2390	
Others	Chickpea					-	-	27.9	1197	
	Rape & mustard							48.6	874	
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
Crop 1	Mango							30.9		
Crop 2	Guava							47.8		
Crop 3	Lime							16.5		

Crop 4	Potato			4712				4712	4712	
Crop 5	onion			581.7				581.7	581.7	
Others	garlic			426.1				426.1	426.1	

<b>1.12</b>	<b>Sowing window for 5 major field crops</b> (start and end of normal sowing period)	Crop 1: Paddy (transplanting)	2: soybean	3: pearl millet	4: wheat	5: Mustard	6: Chickpea
	Khariif- Rainfed		25 June-15July	01 July-20July		-	
	Khariif-Irrigated	10July-10 Aug	-	-	-	-	
	Rabi- Rainfed	-	-	-	-	05 Oct.-05 Nov	15 Oct.- 15 Nov.
	Rabi-Irrigated	-	-	-	15Nov.- 25 Dec.		15 Oct.- 15 Nov.

<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	-	Y	-
	Flood	-	-	-
	Cyclone	-	-	-
	Hail storm	-	Y	-
	Heat wave	Y	-	-
	Cold wave	Y	-	-
	Frost	-	Y	-
	Sea water intrusion	-	-	-
	Pests and disease outbreak (specify)	-	Y	-
	Others (specify)			

<b>1.14</b>	<b>Include Digital maps of the district for</b>	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

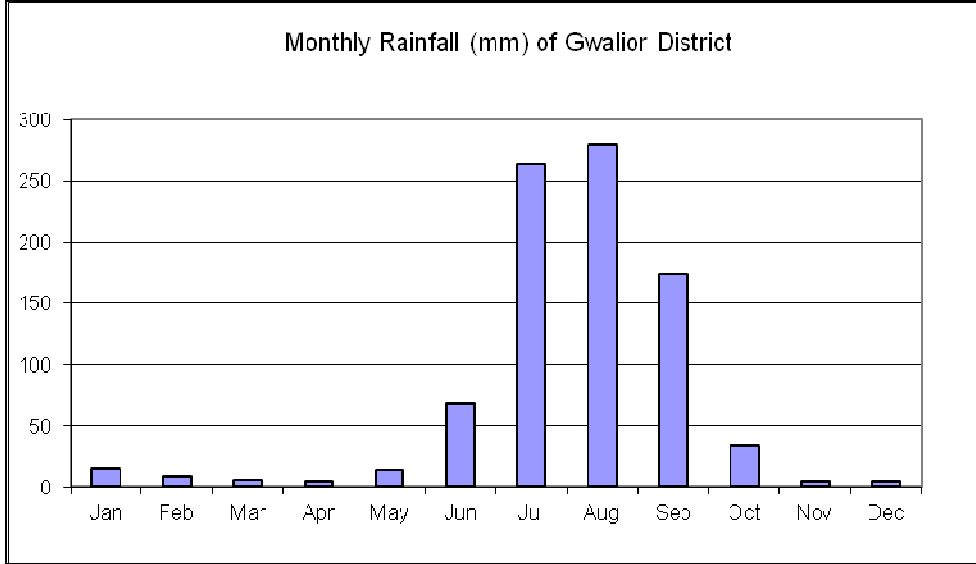
**Annexure I**

**Location map of Gwalior district**



**Annexure II**

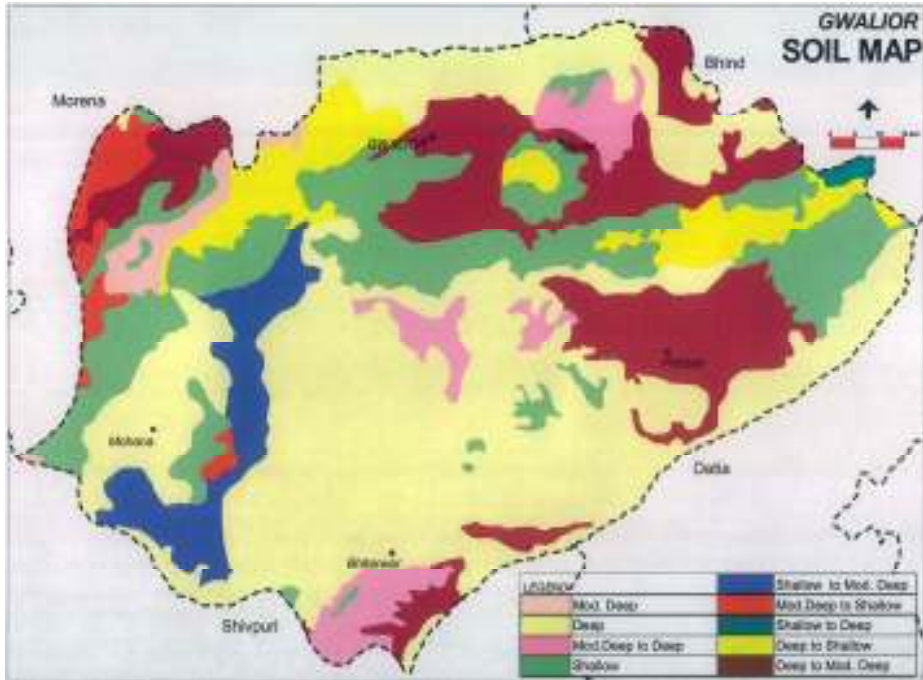
**Mean annual rainfall**





**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	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation
1	2	3	4	5	6
<b>Delay by 2 weeks</b> <b>2<sup>nd</sup> week of July</b>	Deep soils	Fallow	green gram- TJM 3, TM 99-37/ black gram – JU 86, RBU 38 /sesamum TKG 8	-Line sowing with seed drill - Use certified seed of improved varieties -Adopt INM, IWM and IPM measures	Conversance with Agricultural universities/ NSC/ SSC/ RKVY and NFSM for quality seed of improved varieties Promote seed societies for assured availability of quality seed. Convergence with NAREGA for rural employment generations
		Pearl millet	Pearl millet – JBV 3, JHB 467 / sesamum- TKG 8		
		Soybean	Soybean- JS 95-60, JS 93-05		
		Pigeon pea + green gram/ black gram/ Sesamum	Pigeon pea- (early) + green gram / black gram/ Sesamum		
	Moderate deep soils	Fallow	Green gram/ black gram/ Sesamum		
		Pearl millet	Pearl millet – JBV 3, JHB 467 + Pigeon pea		
		Sesamum/Green Gram/ Black gram	Pearl millet/ Pigeonpea		
		Pigeon pea + green gram/ black gram/ Sesamum	Green gram/ black gram + Pigeonpea - TJT-501		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation
1	2	3	4	5	6
Early season drought (delayed onset)  Delay by 4 weeks 4 <sup>th</sup> week of July	Deep soils	Fallow	Green gram- TJM 3, TM 99-37/ black gram – JU 86, RBU 38 /sesamum TKG 8	-Line sowing with seed drill - Use certified seed of improved varieties -Adopt INM, IWM and IPM measures	Conversance with Agricultural universities/ NSC/ SSC/ RKVY and NFSM for quality seed of improved varieties  Promote seed societies for assured availability of quality seed.  Convergence with NAREGA for rural employment generations
		Pearl millet	Pearl millet – JBV 3, JHB 467 / sesamum- TKG 8		
		Pigeon pea + green gram/ black gram/ Sesamum	Pigeon pea- (TJT 501, RVICPH 2671 ) + green gram / black gram/ Sesamum		
	Moderate deep soils	Fallow	Green gram/ black gram/ Sesamum		
		Pearl millet	Pearl millet – JBV 3, JHB 467 + Pigeon pea		
		Sesamum/Green Gram/ Black gram	Pearl millet/ Pigeonpea /Guar (HG 563)		
		Pigeon pea + green gram/ black gram/ Sesamum	Green gram/ black gram + Pigeonpea - TJT-501		

Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation
Delay by 6 weeks 2 <sup>nd</sup> week of August	Deep soils	Fallow	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)	Moisture conservation for Rabi crops through repeated shallow cultivation with blade harrow	Convergence with NAREGA for rural employment generations  Convergence with centrally sponsored schemes for agricultural implements
		Pearl millet	Green manuring (Sunhamp, Daincha, Green gram)		
		Soybean	Green manuring		
		Pigeon pea + green gram/ black gram/ Sesamum	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)		
	Moderate deep soils	Fallow	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)		
		Pearl millet	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)		
		Sesamum/Green Gram/ Black gram	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)		
		Pigeon pea + green gram/ black gram/ Sesamum	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)		

Condition			Suggested Contingency measures				
1	2	3	4	5	6		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation		
		1	2	3	4	5	6
		Delay by 8 weeks 4 <sup>th</sup> week of August	Deep soils	Fallow	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)	Moisture conservation for Rabi crops through repeated shallow cultivation with blade harrow	Convergence with NAREGA for rural employment generations Convergence with centrally sponsored schemes for agricultural implements
				Pearl millet			
	Soybean						
	Pigeon pea + green gram/ black gram/ Sesamum						
	Moderate deep soils	Fallow	Fallow- Plan for rabi crops (Mustard, Wheat, Gram)				
		Pearl millet					
Sesamum/Green Gram/ Black gram							
Pigeon pea + green gram/ black gram/ Sesamum							

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal 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	Fallow	NA	Life saving irrigation through micro irrigation techniques  Organic Mulching	Convergence for micro irrigation system with centrally sponsored schemes
		Pearl millet	Adopt moisture conservation practices		
		Soybean			
		Pigeon pea + green gram/ black gram/ Sesamum			
	Moderate deep soils	Fallow	NA		
		Pearl millet	Adopt moisture conservation practices		
		Sesamum/Green Gram/ Blackgram			
		Pigeon pea + green gram/ black gram/ Sesamum			

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop / Cropping system	Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period  At vegetative stage	Deep soils	Fallow	NA	Postpone top dressing of N in pearl millet  Spray 2% solution of MOP/DAP/Water in soybean  Life saving irrigation in pearl millet and soybean	Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Pearl millet	Inter culture for weed management		
		Soybean	Inter culture for weed management and mulching		
		Pigeon pea + green gram/ black gram/ Sesamum	Inter culture for weed management		
	Moderate deep soils	Fallow	NA		
		Pearl millet	Inter culture for weed management		
		Sesamum/Green Gram/ Black gram	Inter culture for weed management		
		Pigeon pea + green gram/ black gram/ Sesamum	Inter culture for weed management		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measures	Remarks on Implementation
1	2	3	4	5	6
<b>Mid season drought (long dry spell, consecutive 2 weeks rainless (&gt;2.5 mm) period)</b>  <b>At flowering/ fruiting stage</b>	Deep soils	Fallow	NA	Use mulches for moisture conservation in soybean	Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Pearl millet	Life saving irrigation		
		Soybean	-		
		Pigeon pea + green gram/ black gram/ Sesamum	Inter culture operations for moisture conservation		
	Moderate deep soils	Fallow	NA	-do-	
		Pearl millet	Life saving irrigation		
		Sesamum/Green Gram/ Black gram	Inter culture operations for moisture conservation		
		Pigeon pea + green gram/ black gram/ Sesamum	Inter culture operations for moisture conservation		

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures			
			Crop management	Rabi Crop Planning	Remarks on Implementation	
1	2	3	4	5	6	
<b>Terminal drought (Early withdrawal of monsoon)</b>						
	Deep soils	Fallow	NA	Try to sow Rabi crop namely mustard/ chickpea immediately after harvest of soybean	Convergence with Agricultural universities/ NSC/ SSC/ RKVY and NFSM, ISOPOM for quality seed of improved varieties Promote seed societies for assured availability of quality seed	
		Pearl millet	Harvest at physiological maturity			
		Soybean	Harvest at physiological maturity Life saving irrigation in early seed setting stage of the crop			
		Pigeon pea + green gram/ black gram/ Sesamum	-			
	Moderate deep soils	Fallow	NA			
		Pearl millet	Harvest at physiological maturity			
		Sesamum/Green Gram/ Black gram	-			
		Pigeon pea + green gram/ black gram/ Sesamum	-			

**2.1.2 Drought - Irrigated situation**

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
1	2	3	4	5	6
Delayed release of water in canals due to low rainfall	Deep soils	Paddy	Paddy, Sesamum	Prepare paddy nursery with available water sources	Link Seed farms agriculture universities NSC, (NREGS), (IWMP), (RKVY), (NFSM), for the support of good quality seed Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Soybean	Sesamum	Use certified seed of improved variety	
		Sugarcane	Early variety of sugarcane CO 86039	Earthing and Mulching, Delayed top dressing of Nitrogen, Adopt Skip furrow irrigation	
	Moderate deep soils	Paddy	Paddy, Sesamum	Prepare paddy nursery with available water sources	
		Soybean	Sesamum	Use certified seed of improved variety	

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
1	2	3	4	5	6
Limited release of water in canals due to low rainfall	Deep soils	Paddy	Paddy	Prepare paddy nursery with available water sources Transplant seedlings in SRI system	Link Seed farms agriculture universities NSC, (NREGS), (IWMP), (RKVY), (NFSM), for the support of good quality seed  Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Soybean	No change	-	
		Sugarcane	Early variety of sugarcane CO 86039	Earthing and Mulching, Delayed top dressing of Nitrogen, Adopt Skip furrow irrigation	
	Moderate deep soils	Paddy	Paddy	Prepare paddy nursery with available water sources Transplant seedlings in SRI system	
		Soybean	No change	-	



Condition			Suggested Contingency measures		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	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
	Deep soils	Paddy	Paddy, Sesamum	Prepare paddy nursery with available water sources	Link Seed farms agriculture universities NSC, (NREGS), (IWMP), (RKVY), (NFSM), for the support of good quality seed Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Soybean	Sesamum	Use certified seed of improved variety	
		Sugarcane	Early variety of sugarcane CO 86039	Earthing and Mulching, Delayed top dressing of Nitrogen, Adopt Skip furrow irrigation	
	Moderate deep soils	Paddy	Paddy, Sesamum	Prepare paddy nursery with available water sources	
		Soybean	Sesamum	Use certified seed of improved variety	

Condition			Suggested Contingency measures		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	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
	Deep soils	Paddy (Kharif)	Paddy/Fallow in Kharif Wheat (MP 1203, MP 4010, GW 173, HD 2864)/ Mustard(Pusa Jai Kishan, Rohani, Pusa Agrani, JM 3, JM 1)/ Gram (JG 16, JG 11, JG 130) in Rabi season	Prepare paddy nursery with available water sources Transplant seedlings in SRI system	Link Seed farms agriculture universities NSC, (NREGS), (IWMP), (RKVY), (NFSM), for the support of good quality seed Convergence for water lifting devices, micro irrigation system and inter culture implements with centrally sponsored schemes
		Fallow - wheat	Wheat (MP 1203, MP 4010, GW 173, HD 2864)/ Mustard(Pusa Jai Kishan, Rohani, Pusa Agrani, JM 3, JM 1)/ Gram (JG 16, JG 11, JG 130)	Adopt integrated Production technologies and certified seed Apply irrigation in critical stage with micro irrigation system	
		Vegetables	Potato (S 1, Kufri Chip sona 1) /Pea(Arkil, PSM 3, AP 3)/Cucurbits		
	Moderate deep soils	Paddy	Paddy	Prepare paddy nursery with available water sources Transplant seedlings in SRI system	
		Fallow - wheat	Wheat (MP 1203, MP 4010, GW 173, HD 2864)/ Mustard(Pusa Jai Kishan, Rohani, Pusa Agrani, JM 3, JM 1)/ Gram (JG 16, JG 11, JG 130)	Adopt integrated Production technologies and certified seed Apply irrigation in critical stage with micro irrigation system	

Condition			Suggested Contingency measures		
Insufficient groundwater recharge due to low rainfall	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
	Deep soils	Fallow-Mustard	Mustard(Pusa Jai Kishan, Rohani, Pusa Agrani, JM 3, JM 1)	Adopt integrated Production technologies and certified seed  Apply irrigation in critical stage with micro irrigation system  Use six /three row potato planter	Link Seed farms agriculture universities NSC, (NREGS), (IWMP), (RKVY), (NFSM), for the support of good quality seed  Convergence with central/state government schemes for potato planter
		Pearl millet –Wheat/Gram	Pearl millet –Gram (JG 16, JG 11, JG 130)		
		Pearl millet – Potato- Wheat	Pearl millet (JBV 3) –Gram (JG 16, JG 11, JG 130)		
	Moderate deep soils	Fallow-Mustard	Mustard(Pusa Jai Kishan, Rohani, Pusa Agrani, JM 3, JM 1)		
		Pearl millet –Wheat/Gram	Pearl millet –Gram(JG 16, JG 11, JG 130)		
		Pearl millet – Potato- Wheat	Pearl millet –Gram(JG 16, JG 11, JG 130)		

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
1	2	3	4	5
<b>Continuous high rainfall in a short span leading to water logging</b>				
<b>Pear millet</b>	Drain out excess water Inter cultivation to increase aeration Top dressing of 20kg N/ha after receding water	Drain out excess water Inter cultivation to increase aeration Top dressing of 20kg N/ha after receding water	Drain out excess water Harvest the produce on clear sunny day	dry the produce up to 10-12% moisture level before storage
Soybean	---do---	---do---	---do---	---do---
Wheat	NA	NA	NA	---do---
Mustard	NA	NA	NA	---do---
Chickpea	NA	NA	NA	---do---
<b>Horticulture</b>				
Fruits (Aonla, Ber, etc )	Proper nutrition and protect of trees from insect pest and disease	Immediate made provision of drainage of water *Application n-fertilizers just after drainage , if need apply plant hormones	Fruit harvest at proper stage. Care from insect pest and disease. proper nutrition and irrigation .	Grading, shorting and produce placed in proper way to avoid rotten .
Vegetables (Potato, Brinjal, Chilly, etc)	Proper nutrition and protect of crops from insect pest and disease	Immediate made provision of drainage of water *Application n-fertilizers just after drainage , if need apply growth hormones and micronutrient.	Crop harvest at proper stage according to market need . Care from insect pest and disease. Proper nutrition and irrigation .	Stored properly .Timely send to market to avoid quality deteriorations
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Pearl millet	Drain excess water Inter cultivation to increase aeration Ridge and furrow system of planting Top dressing of 20kg N/ha after receding water	Drain excess water Inter cultivation to increase aeration Ridge and furrow system of planting Top dressing of 20kg N/ha after receding water	Drain excess water Harvest the produce on clear sunny day	dry the produce up to 10-12%moisture level before storage
Soybean	Drain excess of water. Earthing at 20 DAS Line sowing Gap filling	Gap filling Wind breaks Top dressing of N after	Gap filling Wind breaks Top dressing of N after water	Gap filling Wind breaks Top dressing of N after water

	Wind breaks	water receding	receding	receding
wheat	-do-	-do-	-do-	-do-
Mustard	-do-	-do-	-do-	-do-
chickpea	-do-	-do-	-do-	-do-
<b>Horticulture</b>				
Fruits	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
<b>Outbreak of pests and diseases due to unseasonable rains</b>		<b>NA</b>		
Pearl millet	NA			
Sorghum	-	-	-	-
wheat	-	-	-	-
Mustard	-	-	-	-
chickpea	-	-	-	-
<b>Horticulture</b>	-	-	-	-

2.3 Floods: NA

Condition	Suggested contingency measure <sup>o</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
Soybean	-			
maize, sorghum				
<b>Horticulture</b>				
Fruits				
Vegetables				
<b>Continuous submergence for more than 2 days</b>				
Soybean				
maize, sorghum				
<b>Horticulture</b>				
Fruits				
Vegetables				
<b>Sea water intrusion<sup>3</sup></b>				

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

Condition	Suggested contingency measure			
	Vegetative stage <sup>k</sup>	Flowering stage <sup>l</sup>	Crop maturity stage <sup>m</sup>	Post harvest <sup>n</sup>
<b>Continuous high rainfall in a short span leading to water logging</b>				
Paddy	NA	NA	Harvest at physiological maturity	Shift the product in safer place and dry for threshing Well dry the produce up to 10-12% moisture level before storage
Pearl millet	Deep ploughing, addition of Organic manure, cleaning and straightening of natural drains, proper slope in the field ,ridge &furrow system of planting are some of the preventive measures			Well dry the produce up to 10-12% moisture level before storage
Soybean	- do -			- do -
Wheat	Proper drainage provision ;selection of proper method of irrigation			- do -
Mustard	Proper drainage provision			
Chickpea	Proper drainage provision			
<b>Horticulture</b>				
Fruits (Aonla, Ber, etc )	Proper nutrition and protect of trees from insect pest and disease Proper application of irrigation	Immediate made provision of drainage of water *Application n-fertilizers just after drainage , if need apply plant hormones	Fruit harvest at proper stage . Care from insect pest and disease. Proper nutrition and irrigation .	Grading , shorting and produce placed in proper way to avoid rotten .
Vegetables (Potato, Brinjal, Chilly, etc)	Proper nutrition and protect of crops from insect pest and disease .Proper application of irrigation	Immediate made provision of drainage of water *Application n-fertilizers just after drainage , if need apply growth hormones and micronutrient.	Crop harvest at proper stage according to market need . Care from insect pest and disease. Proper nutrition and irrigation.	Stored properly .Timely send to market to avoid quality deteriorations
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Pearl Millet	Remove excess water from the field	Remove excess water from the field	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage
Paddy				
Soybean	Earthing at 20 DAS Line sowing (East- West) maintained plant population. Used wind brake.	Line sowing (East- West) maintained plant population. Used wind brake.	Line sowing (East- West) maintained plant population. Used wind brake.	Well dry the produce up to10- 12 %moisture before storage
wheat	Remove excess water from the	Remove excess water from the field	Remove excess water from the	Well dry the produce up to 10- 12

	field.Maintained plant population . Balance fertilizer. Used wind brake.	Used wind brake.	field	%moisture before storage
Mustard	Remove excess water from the field. maintained plant population . Balance fertilizer Used wind brake.	Remove excess water from the field	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage
chickpea	Remove excess water from the field . maintained plant population . Balance fertilizer Used wind brake.	Remove excess water from the field	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage
<b>Horticulture</b>				
Fruits (Aonla, Ber, etc )	Remove excess water from the field . maintained plant population . Balance fertilizer Used wind brake	Remove excess water from the field	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage
Vegetables (Potato, Brinjal, Chilly, etc)	Remove excess water from the field . maintained plant population . Balance fertilizer Used wind brake	Remove excess water from the field	Remove excess water from the field	Well dry the produce up to 10- 12 %moisture before storage
<b>Outbreak of pests and diseases due to unseasonable rains</b>				
Bajra	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation .	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	
Sorghum	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	
Wheat	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	



Mustard	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	
chickpea	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	
<b>Horticulture</b>				
Fruits (Aonla, Ber, etc )	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	Clean cultivation .Proper monitoring , Used of light trap , Pheromone trap ,Used control measure according to situation	

#### 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
<b>Heat Wave</b>				
Wheat	Live saving irrigation Provision of Wind breaks (Interval will be decided - according to climatic condition)	Light irrigation	Light irrigation	Harvest at physiological maturity
Chickpea	Light irrigation	-do-	-do-	-do-
<b>Horticulture</b>				
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	-Bordeaux paste to exposed bark. branches of the tree to protect from Sun scorching -Mulching arround 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.

		arrund the base of trunk of the tree		
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
<b>Cold wave</b>				
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-
<b>Horticulture</b>				
Fruits	-do-	-do-	-do-	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
<b>Frost</b>	-do-	-do-	-do-	
Wheat	-do-	-do-	-do-	Harvest at physiological maturity
Chick pea	-do-	-do-	-do-	-do-
<b>Horticulture</b>	-do-	-do-	-do-	
Fruits	-do-	-do-	-do-	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
<b>Hailstorm</b>				
Wheat	-	-	Protect the crop from rodents attack	Keep the produce in protected area preferably under the roof
Chick pea	-	-	Protect the crop from rodents attack	Keep the produce in protected area preferably under the roof
<b>Horticulture</b>				

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
<b>Cyclone : Not occur in the district</b>				
<b>Horticulture</b>				

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

<b>Drought</b>	<b>Suggested contingency measures</b>		
	<b>Before the event<sup>s</sup></b>	<b>During the event</b>	<b>After the event</b>
Feed and fodder availability	Adoption of fodder bank. Use of surplus fodder for silage. Urea treatment : 4 kg Urea + 75 litter of water solution spray on 100 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 <i>bhusa</i> . 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
<b>Floods</b>			
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 ad joining district	Regularly Sprinkling of water on live stock body Feeding green feed/ fodder and conventional feed use of wet <i>bhusa</i> . Availing the insurance. ---- Separation of unproductive livestock
Drinking water	Ensure availability of clean hygienic water	Clean water Water after boiling / alum treatment	Ensure the cleanliness of drinking water

	Water be treated with quick lime lime		
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. solation of sick animals. Treatment of sick animals in houses	Culling of sick animal -use antidote in poisoning case
<b>Cyclone</b>	<b>(Not occur in the district) NA</b>		NA
Feed and fodder availability	-		
Drinking water	-		
Health and disease management	-		
<b>cold wave</b>			
Shelter/environment management	<ul style="list-style-type: none"> <li>House of animal should be N-S direction</li> <li>Plan of proper housing ,</li> <li>Collection of waste gunny bags for shelter</li> </ul>	<ul style="list-style-type: none"> <li>availability of full sun rays in animal shed, keep animal body warm</li> <li>Use of gunny bags to cover the windows during night hours</li> </ul>	Adopt curative measures to obtain the milk production level -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 <i>Eucalyptus</i> water	Vaccination & deworming Culling of sick animals
<b>Heat wave</b>			
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 <sup>a</sup>	During the event	After the event	
<b>Drought</b>	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	
<b>Floods</b>				
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	
<b>Cyclone: Not occur in the district</b>				
Shortage of feed ingredients	-	-	-	
Drinking water	-	-	-	
Health and disease management	-	-	-	

<b>Heat wave and cold wave</b>				
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 <sup>a</sup>	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	All the fish should be marketed Shifting of small sized fishes into 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
(iii) Any other	-	-	-

<b>B. Aquaculture</b>			
(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			
<b>2) Floods</b>			
<b>A. Capture</b>			
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>B. Aquaculture</b>			
(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 <sub>4</sub> treatment 2 ppm	No seedling of new fish seed
(iii) Health and diseases	Lime treatment should be done.	Lime treatment and KMnO <sub>4</sub> 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			

<b>3. Cyclone / Tsunami : No any possibilities of event in the district</b>			
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	-	-	-
<b>4. Heat wave and cold wave</b>			
A. Capture			
Marine	-	-	-
Inland	Net-shed	-	-
B. Aquaculture			
(i) Changes in pond environment (water quality)	Showering of water by pump for proper O <sub>2</sub> in water	Showering of water by pump for proper O <sub>2</sub> in water	-
(ii) Health and Disease management	KMnO <sub>4</sub> treatment 2 ppm	KMnO <sub>4</sub> treatment 2 ppm	-
(iii) Any other	-	-	-