State: RAJASTHAN
Agriculture Contingency Plan for District: JODHPUR

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Western Plain, Kachchh And Part Of Kathiawar Peninsula, Hot Arid Eco-Region (2.1)			
	Agro-Climatic Zone (Planning Commission)	Western Dry Region (XIV)			
	Agro Climatic Zone (NARP)	Arid Western Zone (RJ-1)			
	List all the districts or part thereof falling under the NARP Zone	Barmer, Jodhpur, Churu, Jaisalmer			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		26°16'57.11" N	73° 1'25.23"E	268.67	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Director Research, Agricultural Research Station, Mandor, Jodhpur-342304			
	Mention the KVK located in the district	Krishi Vigyan Kendra,CAZRI (ICAR) Campus, Jodhpur-342003			
1.2	**Rainfall** (2003 – 2008 Mean)	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	234	22	1-8 July (week 27)	3-9 September (36)
	NE Monsoon(Oct-Dec):	2	1		
	Winter (Jan- Feb)	13	2		
	Summer (March-May)	14	2		
	Annual	263	27		

1.3	**Land use pattern of the district** (latest statistics) **(2007-08)**	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)	2256.4	1861	6.996	80.1	121.9	40.6	0.08	145.3	283.7	322.7

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Medium Light yellowish brown Sandy	233.0	10.3
	Medium Light yellowish brown Loamy	674.9	29.9
	Deep Yellowish brown Sandy	930.7	41.2
	Shallow Pale brown Gravelly loam	135.3	6.0
	Others (Shallow Light yellowish brown Sandy Deep Light yellowish brown Loamy Medium Yellowish brown Sandy)	287.2	12.3
	Total	2256.4	

1.5	**Agricultural land use (2007-08)**	Area ('000 ha)	Cropping intensity %
	Net sown area	1254.6	110
	Area sown more than once	124	
	Gross cropped area	1378.6	

1.6	**Irrigation (2007-08)**	Area ('000 ha)		
	Gross irrigated area	304.81		
	Rainfed area	1073.87		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	0	0	0
	Tanks	0.01	0	0
	Open wells	19.4	5.0	2.4
	Bore wells	25.5	199.8	95.6
	Lift irrigation schemes	-	-	-
	Micro-irrigation	-	-	-
	Other sources (please specify)Rehat, Mal (included in well)	5.2	1.5	0.5
	Total Irrigated Area		-	10
	Pump sets	7.2	2.3	1.0
	No. of Tractors			
	Groundwater availability and use* (Data	No. of blocks/	(%) area	Quality of water (specify the problem

	source: State/Central Ground water Department /Board)	Tehsils		such as high levels of arsenic, fluoride, saline etc)
	Over exploited	8	-	Saline (126% GW utilization)
	Critical	-	-	-
	Semi- critical	-	-	-
	Safe	1	-	-
	Wastewater availability and use		-	-
	Ground water quality	Saline water		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Rajasthan Agricultural Statistics at a Glance, 2008-09, Commissionerate of Agriculture, Rajasthan, Jaipur

1.7 Area under major field crops & horticulture etc. (2007-08)

1.7	**Major Field Crops cultivated (2007-08)**				**Area ('000 ha)**					
		Kharif			***Rabi***					
	Crop	**Irrigated**	**Rainfed**	**Total**	**Crop**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand Total**
	Pearl millet	26.5	564.3	590.8	Mustard	85.0	0.1	85.1	-	675.9
	Cluster bean	5.3	144.6	149.9	Wheat	41.7	0.04	41.8	-	158.9
	Moth bean	0.4	158.9	159.4	Cumin	31.5	-	31.5	-	190.9
	Green gram	1.0	116.1	117.2	-	-	-	-	-	117.2
	Sesame	0.5	29.9	30.4	-	-	-	-	-	30.4
	Horticulture crops - Fruits	**Total area (000'ha)**								
	Ber	1.1								
	Aonla	0.4								
	Lisoda	0.9								
	Horticultural crops - Vegetables	**Total area**								
	Onion	12.3								
	Chillies	5.9								
	Garlic	4.5								
	Carrot	1.0								
	Medicinal and Aromatic Crops	**Total area**								
	Isabgol	9.0								

	Plantation crops	**Total area**
	Mahandi (Hina)	1.7
	Others such as industrial pulpwood crops	-
	Fodder crops	**Total area**
	Sorghum	17.7
	Bajra fodder	0.9
	Guar fodder	1.0
	Lucerne	1.9
	Total fodder crop area	-
	Grazing land	-
	Sericulture etc	-
	Others Fiber crop cotton	7.2

1.8	**Livestock – 2003 (P)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	-	-	519.9
	Crossbred cattle	-	-	-
	Non descriptive Buffaloes (local low yielding)	-	-	180.0
	Graded Buffaloes	-	-	-
	Goat	-	-	1036.6
	Sheep	-	-	884.1
	Others (Camel, Pig, Yak etc.)	-	-	
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	36.7	
	Backyard	-	-	
1.10	**Fisheries** (Data source: Chief Planning Officer) **Information not available**			
	A. Capture			
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**	**Nets**	**Storage facilities (Ice plants etc.)**

			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		-	-	-	-	-	-
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		-		-		-	

	B. Culture			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-	-	-
	ii) **Fresh water** (Data Source: Fisheries Department)	-	-	-
	Others	-	-	-

1.11 Production and Productivity of major crops (Average of last 5 years: 2003-04, 2004-05, 2005-06, 2006-07 & 2007-08)

1.11	Name of crop	**Kharif-2009**		**Rabi -2009**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Pearl millet	316.7	532	-	-	-	-	316.7	532	-
	Mung	27.1	290	-	-	-	-	27.1	290	-
	Moth	35.8	195	-	-	-	-	35.8	195	-
	Guar	26.3	164	-	-	-	-	26.3	164	-
	Sesame	9.4	275	-	-	-	-	9.4	275	-
	Mustard	-	-	88.4	1181	-	-	88.4	1181	-
	Wheat	-	-	81.4	2182	-	-	81.4	2182	-
	Isabgol	-	-	3.0	392	-	-	3.0	392	-
	Cumin	-	-	9.4	389	-	-	9.4	389	-
	Onion	-	-	135.3	1195	-	-	135.3	1195	-
Major Horticultural crops (Crops to be identified based on total acreage Area '000)										
	Ber	1.1	-	-	-	-	-	1.1	-	-

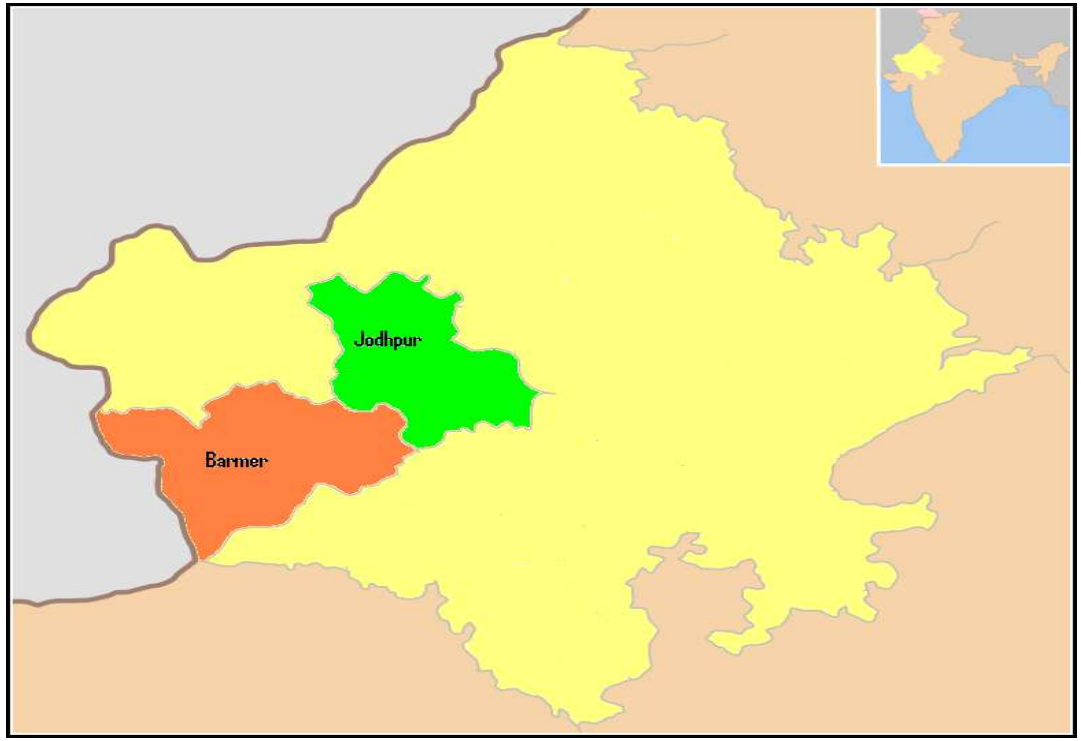
	Lisoda	0.9	-	-	-	-	-	0.9	-	-
	Aonla	0.4	-	-	-	-	-	0.4	-	-
	Garlic	-	-	4.5	-	-	-	4.5	-	-
	Carrot	-	-	1.0	-	-	-	1.0	-	-
	Col crops	-	-	0.8	-	-		0.8	-	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Pearl millet	Moong	Cluster bean	Moth	Sesame
	Kharif- Rainfed	1st July – 30th July	1st July-21 July	1st July- 7th Aug	1st July- 7th Aug	1st July- 7th Aug
	Kharif-Irrigated	15th June- 30th June	1st July -15th July	15th July - 30th July	15th July – 30th July	15th July – 30th July
	Rabi- Rainfed	30th Sept-15th Oct (Mustard)	15th Sept – 30th Sept (Sorghum fodder)	-	-	-
	Rabi-Irrigated	1st Oct -15th Oct (Mustard)	15th Nov - 7th Dec (Wheat)	1st Nov – 31st Nov (Isabgol)	7th Nov- 21st Nov (Cumin)	15th Dec-15th Jan (Onion)

1.13	**What is the major contingency the district is prone to?** (Tick mark)	Regular	Occasional	None
	Drought	√	-	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	√	-	-
	Cold wave	-	√	-
	Frost	-	√	-
	Sea water intrusion	-	-	√
	Pests and disease outbreak (specify)	Pearl millet: Downy mildew	Moong & Moth: Leaf curl mosaic	Sesame: Macrophomina, phyllody
	Others (specify)	-	-	-

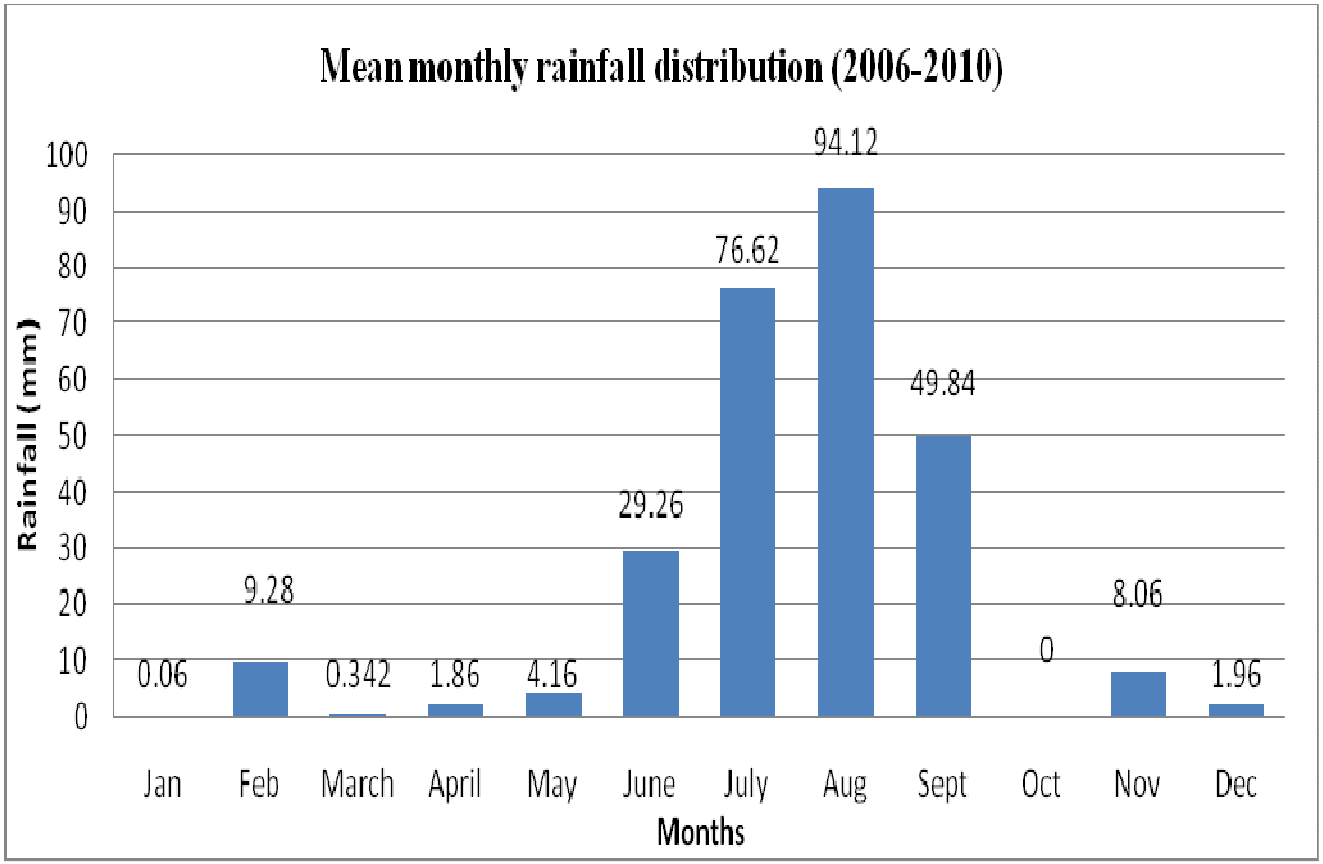
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure – I
Location map of Jodhpur district

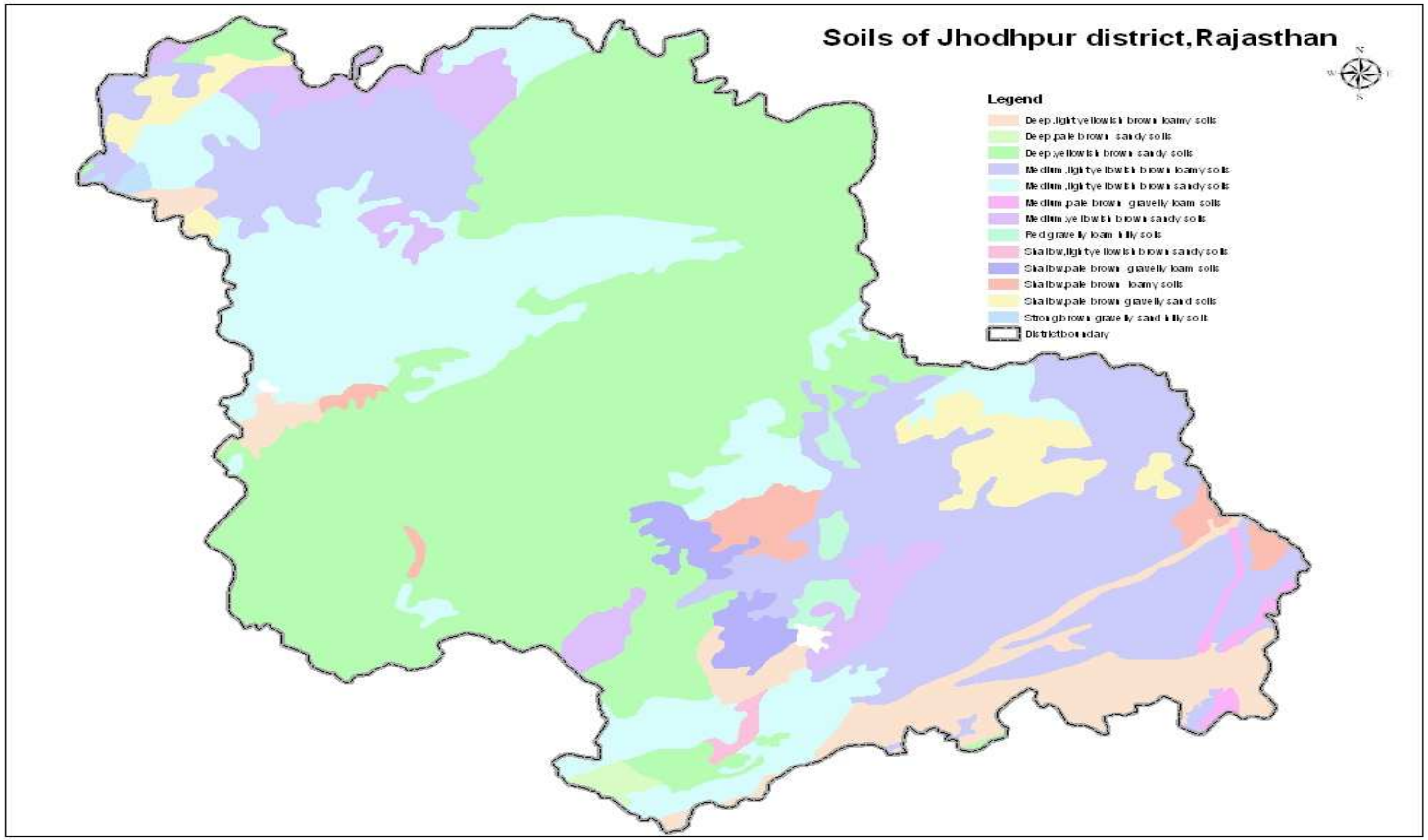


Annexure –II

Mean monthly rainfall graph



Annexure –III
Soil map



Source: NBSS&LUP, Regional Centre, Udaipur

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (3rd week July)	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	No change	• Use press wheel behind tine to secure good germination. • Seed soaking with thiourea (0.05%) for four hours	• Use certified seed from NSC, RSSC, SAU • Provide subsidy by Ag. Dept. under RKVY for press wheel device
		Sesame	No change	-	
		Mothbean	No change	Seed soaking with thiourea (0.05%) for four hours.	
		Greengram	No change	Seed soaking with thiourea (0.05%) for four hours.	
		Cluster bean	No change	Seed soaking with thiourea (0.05%) for four hours.	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (1st week of August)	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	No change Use extra early hybrids viz. HHB 67, ICMH 356 GHB 358	• Reduce <u>25% acreage</u> Sowing at 60 cm & use press wheel • Mix cropping with moth & guar	• Use certified seed from NSC, RSSC, SAU • Provide subsidy by Ag. Dept. under RKVY for press wheel device
		Sesame	No change Use RT 127 & RT 346	-	
		Mothbean	No change Use RMO 40, RMO 257	• Seed priming with 0.05% thiourea • Increase seed rate of by 10-15%	
		Greengram	moth and guar	• Seed priming with 0.05% thiourea	

				• Increase seed rate of by 10-15%	
		Cluster bean	No change Use RGC 936, RGC 1003 & RGM 112	• Seed priming with 0.05% thiourea • Increase seed rate of by 10-15%	

Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks 2nd week of August	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	Guar, moth and Sorghum fodder crops	• Seed priming with 0.05% thio-urea in moth and guar • Increase seed rate by 15-20 %.	Use certified seed from NSC, RSSC, SAU Provide subsidy for thiourea
		Sesame	moth and guar	Increase seed rate by 15-20 %.	
		Mothbean	No change Use RMO 40	• Seed priming with 0.05% thio-urea • Increase seed rate of by 15-20 %.	
		Greengram	moth & guar	Increase seed rate by 15-20 %.	
		Cluster bean	No change Use RGC 936	• Seed priming with 0.05% thio-urea • Increase seed rate of by 15-20 %.	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks End of August	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	Keep fallow	Conserve soil moisture by *Bhakhar* & planking and utilize residual soil moisture for rabi crops like taramira (RTM 314), & fodder sorghum (Raj Chari 2)	• Use certified seed from NSC, RSSC, SAU • Provide subsidy for farm implements
		Sesame	-do-		
		Mothbean	-do-		
		Greengram	-do-		
		Cluster bean	-do-		

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	Timely weed control by whell hand hoe	Vegetative and dust mulching	Link RKVY for CIAE wheel hand hoe for inter-culture operation
		Sesame	-do-	-do-	
		Mothbean	-do-	-do-	
		Greengram	-do-	-do-	
		Clusterbean	-do-	-do-	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	Remove 25% within row Timely weed control by wheel hand hoe	Dust and vegetative mulch • Delay top dressing urea • Provide life saving irrigation if available. • Spray of thiourea at 500 ppm	Water harvesting structures be constructed with larger catchment area under MGNREGA, NHM, RKVY, NFSM, ISOPOM etc Provide subsidy for thiourea
		Sesame	Timely weed control	• Spray of Urea (2%), Provide life saving irrigation. • Weeding, using dust & vegetative mulch	
		Mothbean	Timely weed control by hoe-	• Spray of thiourea at 500 ppm at vegetative. • Weeding, using dust & vegetative mulch	
		Greengram	Timely weed control by hoe	• Spray of thiourea at 500 ppm at vegetative • Weeding, using dust & vegetative	

				mulch	
		Cluster bean	Timely weed control by hoe	• Spray of thiourea at 500 ppm at vegetative • Weeding, using dust & vegetative mulch	
Reproductive phase	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed)	Pearl millet	Timely weed control by hoe	Spray of thiourea at 500 ppm Provide life saving irrigation	
		Sesame	Timely weed control by hoe	Spray of urea (2%), Provide life saving irrigation	
		Moth	Timely weed control by hoe	Spray of thiourea at 500 ppm at reproductive stage. Life saving irrigation	
		Mothbean	Timely weed control by hoe	Spray of thiourea at 500 ppm at reproductive stage. Life saving irrigation	
		Greengram	Timely weed control by hoe	Spray of thiourea at 500 ppm at reproductive stage. Life saving irrigation	

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning measues**	**Remarks on Implementation**
(Early withdrawal of monsoon)	Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils	Pearl millet	Life saving irrigation if feasible If damage will be severe, harvest for fodder	Sowing of Barley using poor quality water in Luni basin	Link watersheds, NREGS for water harvesting technology
		Sesame	Life saving irrigation if feasible If damage will be severe, harvest for fodder	-	

	(Rainfed)	Moth	-do-	-	
		Moong	-do-	-	
		Cluster bean	-do-	-	

2.1.2 Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	**Not applicable**				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures[i]**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	**Not applicable**				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	**Not applicable**				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Not applicable**				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Irrigated conditions	Groundnut	Reduce area under Groundnut Cotton castor,	Use low water requiring cultivars Use sprinkler or drip irrigation system,	• Use certified seed of from NSC, RSSC, SAU • Provide subsidy for MIS
		castor	Castor	-do-	
		cotton	cotton	-do-	
		chilli	Chilli/Taramira	-do-	
		Wheat	Sowing of early maturing and drought tolerant varieties of	-do-	
		Mustard	Sowing of early maturing and drought tolerant varieties of Mustard (Bio 902),	-do-	
		Cumin	Cumin RZ 209 or Taramira (RTM 314) with limited irrigation can be grown if conserved moisture is available because of late season rain fall	-do-	
		Isabgol	Isabgol (RI 1)	-do-	

2.1. Un-timely (unseasonal) rains

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post Harvest**
Pearlmillet	• Drain excess water as early as possible • Inter cultivation with hoe • Apply 20 kg additional N /	• Drain excess water as early as possible • Inter cultivation with hoe • Apply 20 kg additional N / ha	• Drain excess water as early as possible • Harvest at physiological	Dry the grain to optimum moisture content before storage

	ha after • draining of excess water	after draining of excess water	maturity	

Horticulture				
Condition	**Suggested contingency measure**			
Heavy rainfall with high speed winds in a short span	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post Harvest**
Mustard	Drain excess water with proper drainage mechanism Use 10-15kg N/ha to regain lost vigor Improve aeration of soil with hoe	Drain excess water with proper drainage mechanism Use 10-15kg N/ha to regain lost vigor Improve aeration of soil with Bhakhar Use multi nutrient spray or planofix to promote flowering	Drain excess water Spraying of 0.2 % *Trichoderma hamatum* + *T.Viride* for control of stem rot	Drying of the produce immediately after stoppage of rain
Wheat	Drain excess water with proper drainage Interculture to loosen the soil, control weeds and to improve aeration at optimum moisture content Top dress 10-15kg N/ha to regain lost vigor	Drain excess water Spray 2% urea Hormonal spray is advised to induce flowering	Stop irrigation in lodged crop Drain excess water as early as possible Harvest the crop on clear sunny day	Drying of the produce immediately after stoppage of rain
Horticulture				
Ber	N.A.	Foliar spray of NAA 50 ppm	-	Dispose of the dropped fruits or prepare value added products
Outbreak of pests and diseases due to un-seasonal rains				
Cumin		Blight	Spraying 0.2% Mancozeb/ carbendazim Spray of wettable sulphur/ sulphur dusting	Dry the produce before storage to prevent storage pest and fungal infection
Mustard	Useoxydemeton,methyl25EC or Dimethotate 30 EC @625,850 and 1000ml dissolved in 625,850,1000lit of	Mechanical control. And spray the crop with malathion 50EC at 1000ml in 500liters of water/ha	To prevent stem rot disease spray 0.2% Carbendizim	-do-

	water/harespectively and 3 sprays at 15 days interval to control aphids	to control Bihar hairy caterpilla		

2.3 Floods Not Applicable

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Crop1	N.A.	N.A.	N.A.	N.A.
Continuous submergence for more than 2 days	N.A.	N.A.	N.A.	N.A.
Sea water inundation	N.A.	N.A.	N.A.	N.A.

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Wheat	N.A.	N.A.	Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage	-
Mustard	-	-	Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage	-
Chickpea	N.A.	N.A.	Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage	-
Cotton	N.A.	-	Spray with 2% KNO_3	N.A.
Horticulture				
Kinnow	N.A.	N.A.	N.A.	N.A.
Cold wave				
Mustard	N.A.	N.A.	Spray of 0.1% H_2SO_4 , apply light surface irrigation or spray 500 ppm thiourea	N.A.
Chickpea	N.A.	N.A.	Spray of 0.1% H_2SO_4 , apply light surface irrigation or	N.A.

			spray 500 ppm thiourea	
Castor	N.A.	N.A.	Spray of 0.1% H_2SO_4 , apply light irrigation or spray 500 ppm thiourea	N.A.
Horticulture				
Aonla	N.A.	N.A.	Spray of 0.1% H_2SO_4 or spray 500 ppm thiourea	-
Frost				
Mustard	N.A.	N.A.	Spray of 0.1% H_2SO_4 , smoking at night, apply light irrigation	N.A.
Chickpea	N.A.	Apply surface irrigation, Spray of 0.1% H_2SO_4 , or spray 500 ppm thiourea	Spray of 0.1% H_2SO_4 , smoking at night, apply light surface irrigation	N.A.
Castor	N.A.	N.A.	Spray of 0.1% H_2SO_4 , smoking at night, apply light surface irrigation	N.A.
Horticulture				
Aonla	N.A.	N.A.	Spray of 0.1% H_2SO_4 , or spray 500 ppm thiourea	-
Hailstorm				
Wheat	N.A.	N.A.	-	-
Mustard	N.A.	N.A.	-	-
Chickpea	N.A.	N.A.	-	-
Horticulture				
Kinnow	N.A.	N.A.	-	-
Cyclone	**N.A.**	**N.A.**	**N.A.**	**N.A.**

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and Fodder availability	As the district frequently prone to drought, it should have some feed and fodder reserves at any point of the year for mobilization to the drought affected villages, Hence the under mentioned feed reserves should be created at district head quarter Urea molasses mineral bricks (UMMB):50-100 t Hay:100-250 t Concentrates: 20-50 t Minerals and vitamin supplements mixture:5-10 t Available crop residues especially Bajra Karabi, Wheat/barley straw/ Chopped sewan/Dhaman/Bharut/ Dry leaves of Jharberi/ Groundnut bhusa should be stored properly in the farm of hay at individual farmer level. Harvest the top fodder (Khejari, Neem, Subabul, Acasia, Pipol etc) and create fodder banks at village level Establishment of silvi-pastoral system in CPRs with ***Stylosanthus hamata*** and ***Cenchrus ciliaris*** as grass with ***Leucaena leucocephala*** as tree component Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production Increase area under short duration fodder crops of	Harvest and use all the failed crop (Sorghum, Mothbean, Clusterbean, Greengram Wheat, Groundnut etc.,) material as fodder and feed the Livestock. Use judiciously the karabi, Preserved sewan /Dhaman /Bharut, Wheat straw, Lopped Khejari High productive animals should be Supplemented with tree fodder Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals **In case of Severe drought:** UMMB, hay, concentrates and vitamin & mineral mixture should be transported to the drought affected villages All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS Herd should be split and supplementation should be given only to the highly productive and breeding animals Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive & breeding stock) Available kitchen waste should be mixed with dry fodder while feeding Arrangements should be made for mobilization of small ruminants across the districts where no drought exits Unproductive livestock should to be culled during severe drought Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals) Subsidized loans should be provided to the livestock	Flushing the stock to recoup Replenish the feed and fodder banks

	sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 etc.,) on farmers fields with some input subsidy Avoid burning of wheat straw Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon Proper drying, bailing and densification of harvested grass Capacity building and preparedness of the stakeholders and official staff for the extreme events	keepers for procurement of feed	
Heat & Cold wave	Arrangement for protection from **heat wave** i) Provision shed with bamboo/thatched material ii) Plantation around the shed iii) H_2O sprinklers / foggers in the shed **iv)** Application of white reflector paint on the roof **Cold wave :** Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow the animals early in the morning or late in the evening for grazing during heat waves Allow for grazing between 10AM to 3PM during cold waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Put on the foggers / sprinkerlers during heat weaves and heaters during cold waves In severe cases, vitamin 'C' and electrolytes should be added in H_2O during severe heat waves. Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Health and Disease management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and

	Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures. Procure and stock multivitamins & area specific mineral mixture	any outbreak Restricting movement of livestock in case of any epidemic Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals
Drinking water	Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Restrict wallowing of animals in water bodies/resources Provide clean drinking water	Bleach (0.1%) drinking water / water sources Provide clean drinking water

2.5.2 Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like wheat, sorghum, bajra etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the

			bird's requirement
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with line powder in pit
Heat wave			
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and IBD	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed
Cold wave			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Arrangement for protection from chilled air	Supplementation of grains Antibiotics in drinking water to protect birds from pneumonia	Routine practices are followed

2.5.3 Fisheries: Not Applicable.