State: RAJASTHAN
Agriculture Contingency Plan for District: JAISALMER

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Western Plain, Kachch 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 ^{0} 54 ’44.83N	70 ^{0} 54 ’52.67E	264M	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS	Zonal Director Research, Agricultural Research Station, Bikaner-334001			
	Mention the KVK located in the district	Krishi Vigyan Kendra – P.B.No.42 CAZARI Area Jaisalmer-345001			
1.2	**Rainfall**	Normal RF(mm)	Normal Rainy days	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	146.9	8	2nd week of July	1st week of Sept
	NE Monsoon(Oct-Dec):	-	-	-	-
	Winter (Jan- March)	15.5	3	-	-
	Summer (Apr-May)	5.6	3	-	-
	Annual	168	14	-	-

1.3	**Land use pattern of the district**	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)	3840	734.7	44.6	135.6	103.9	2454	0.27	36.6	59.1	113.3

Major Soils (common names like red sandy loam deep soils (etc.,)*	**Area (000) ha.**
Deep yellowish brown sandy soils	2190.7
Medium light yellowish brown loamy soils	718.2
Medium yellowish brown sandy soils	224.2
Medium light yellowish brown sandy soils	706.9
Total	3840

1.5	Agricultural land use	Area (‘000 ha)	Cropping intensity %
	Net sown area	562.3	113.3
	Area sown more than once	75.2	
	Gross cropped area	637.5	

1.6	Irrigation	Area (‘000 ha)		
	Gross irrigated area	191.8		
	Rainfed area	438.8		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals		141.6	73.8
	Tanks	-	-	-
	Open wells	-	-	-
	Bore wells	30417	50.1	25.8
	Lift irrigation schemes	111	-	-
	Micro-irrigation		-	-
	Other sources (please specify)	-	-	0.2
	Total Irrigated Area		-	
	Pump sets	-		
	No. of Tractors	-		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	2	-	Good
	Critical	-	-	Marginal saline
	Semi- critical	-	-	-
	Safe	1	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	-		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year Av of last 5 Years 2003-04 to 2007-08

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Pearlmillet	4.6	127.8	132.4	-	-	-	-	132.4
	Clusterbean	18.0	277.9	295.9	-	-	-	-	295.9
	Isabgol	-	-	-	8.70	-	8.70	-	8.70
	Gram	-	-	-	33.45	-	33.45	-	33.45
	Mustard	-	-	-	66.30	-	66.30	-	66.30

	Horticulture crops - Fruits	**Area (ha)**		
		Total	**Irrigated**	**Rainfed**
	Guava	18.0	-	-
	Aonla	44.0	-	-
	Ber	32.0	-	-
	Grape	17.0	-	-
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Onion	33.0	-	-
	Tomato	6.0	-	-
	Radish	9.0	-	-
	Medicinal and Aromatic crops-NA	**Total**	**Irrigated**	**Rainfed**
	Isabgol	8700	-	-
	Plantation crops-	**Total**	**Irrigated**	**Rainfed**
	Eg., industrial pulpwood crops etc.	-	-	-
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	-	-	-	-
	Total fodder crop area			-
	Grazing land	-	-	-

	Sericulture etc	-	-	-
	Others (specify)	-	-	-

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	Non descriptive Cattle (local low yielding)	-	-	243.2
	Crossbred cattle	-	-	-
	Non descriptive Buffaloes (local low yielding)	-	-	2.2
	Graded Buffaloes	-	-	-
	Goat	-	-	588.0
	Sheep	-	-	890.1
	Others Horses, Pig, Yak etc.)	-	-	39.6
	Commercial dairy farms (Number)			NA
1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**	
	Commercial	NA	13.0	

1.10	**Fisheries (Data source: Chief Planning Officer) : Not Applicable**						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, 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)	-			-		-

1.11 Production and Productivity of 5 major crops (Average of last 5 years) 2003-04 to 2007-08

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)		
Major Field crops (Crops to be identified based on total acreage)											
	Pearl millet	33.25	251	-	-	-	-	-	-	-	
	Cluster bean	24.65	83	-	-	-	-	-	-	-	
	Mothbean	0.04	345	-	-	-	-	-	-	-	
	Isabgol	-	-	2.70	310	-	-	-	-	-	
	Gram	-	-	19.81	592	-	-	-	-	-	
	Mustard	-	-	49.13	741	-	-	-	-	-	
Major Horticultural crops (Crops to be identified based on total acreage in ha.)											
	Guava	11	611	-	-	-	-	-	-	-	
	Aonla	245	5568	-	-	-	-	-	-	-	
	Ber	890	27812	-	-	-	-	-	-	-	
	Onion	15	454	-	-	-	-	-	-	-	
	Tomato	51	8500	-	-	-	-	-	-	-	

1.12 Sowing window (start and end of sowing period)

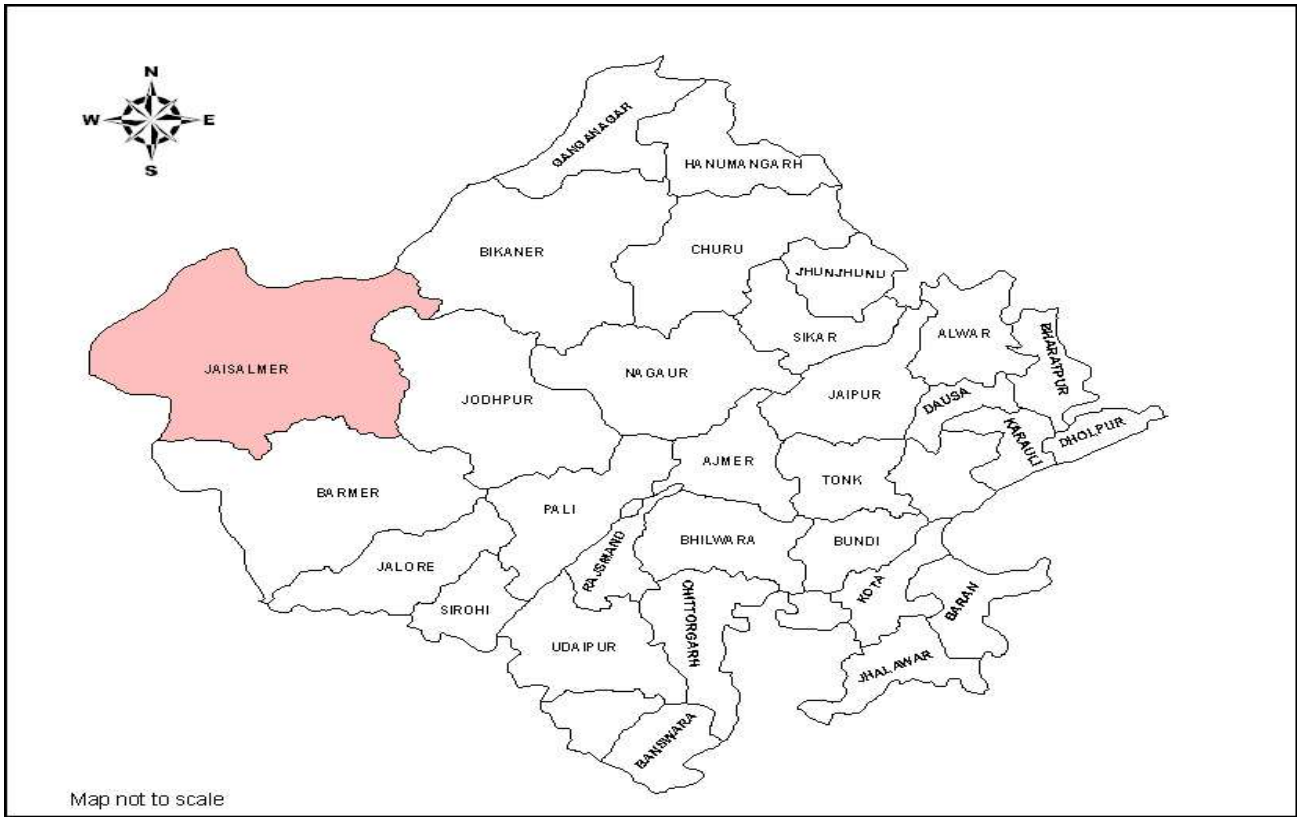
1.12		Bajra	Guar	Moth	Fodder Jowar
	Kharif- Rainfed	15th June - 15th July	1st July - 30 th July	1st July-15th August	-
	Kharif-Irrigated	15th June - 15th July	1st July - 15th July	-	1st Feb. - 1st March
	Rabi- Rain fed	Gram(1st week of Oct - last week of Oct)	Mustard (1st week of Oct – 1st week of Nov)	Taramira(1st week of Oct- last week of Oct)	-
	Rabi-Irrigated	Wheat (1st Nov – 10th Dec)	Barley (1st Nov - 30th Nov)	Gram (1st week of Oct- last week of Oct	

*** Under Khadin Conditions**

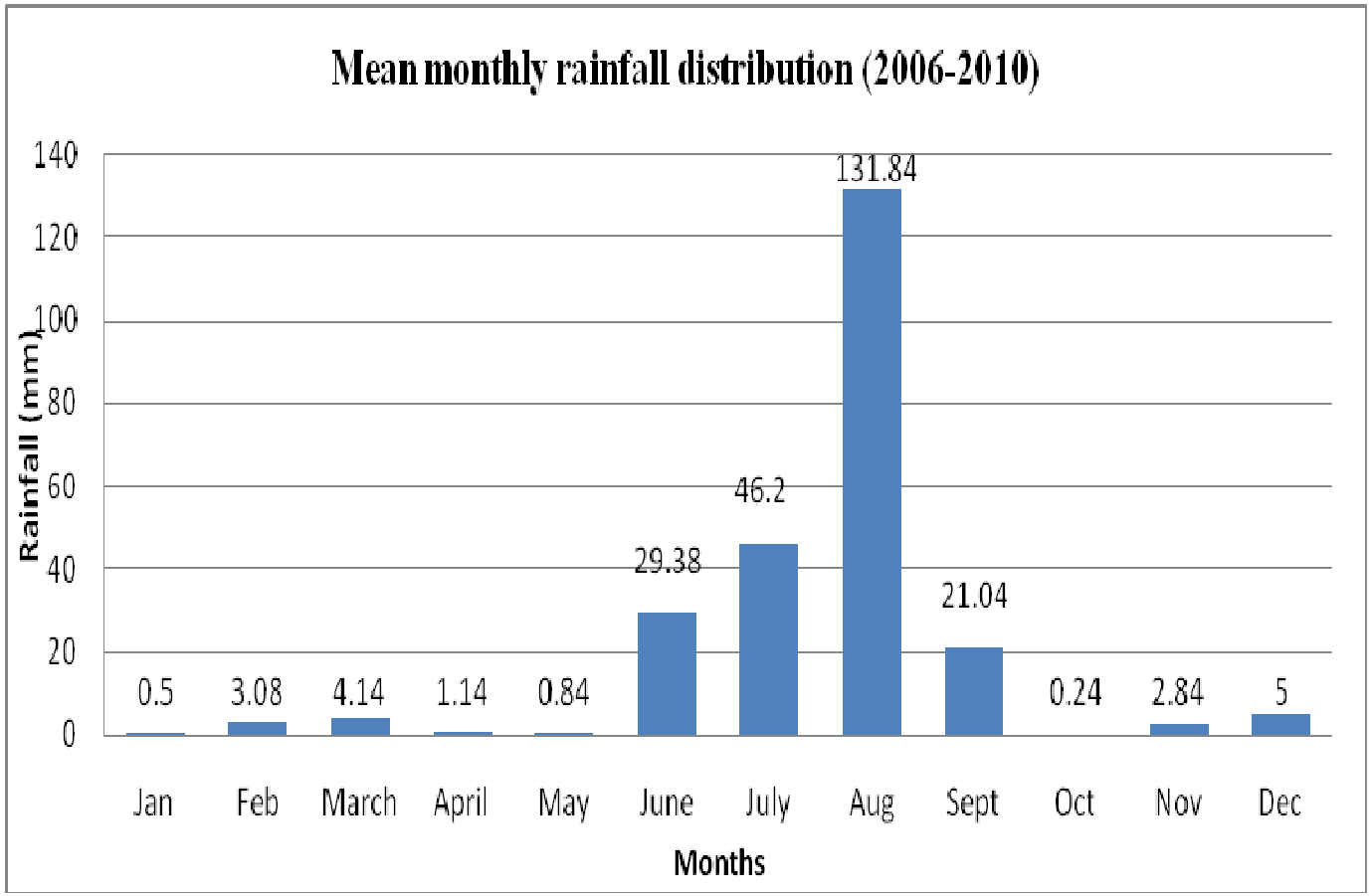
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	√	-	-
	Floods	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	√	-
	Frost	-	√	-
	Sea water intrusion	-	-	-
	Windstorm	-	√	-
	Pests and disease outbreak (specify)	-	√	-

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

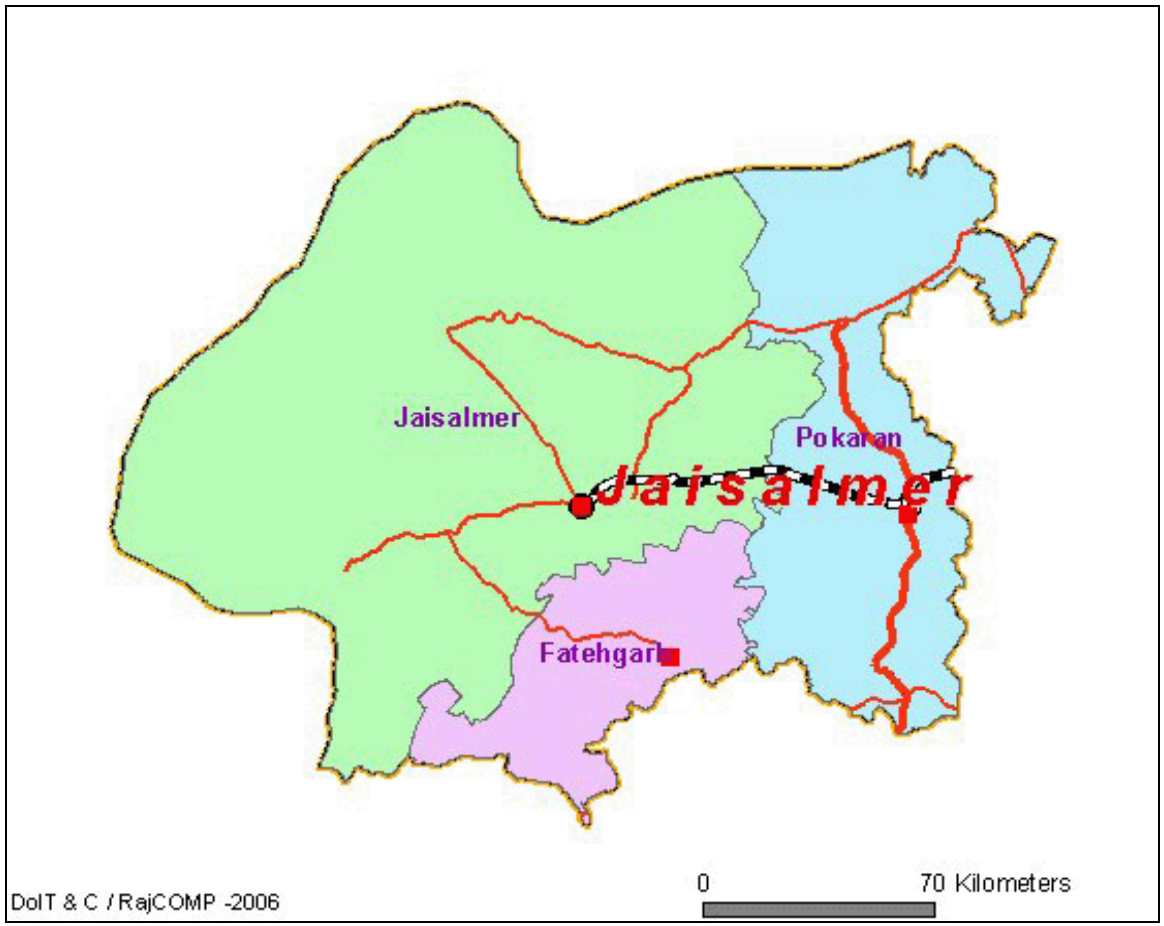
Annexure – I
Location map of Jaiselmer district



Annexure –II
Mean monthly rainfall graph of Jaiselmer district



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**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (4th week of July)	Deep yellowish brown sandy soils (low rainfall)	Bajra	No change	Sow at 45-60 cm Use press wheel behind tyne to obtain good germination Seed priming with thiourea (0.05%) for four hours.	Link NSC, RSSC, SAU for quality seed. Implement may be procured under RKVY
		Mothbean	No change	Normal sowing	
		Clusterbean	-do-	-do-	
		Mungbean	-do-	-do-	
	Medium light yellowish brown loamy soils (medium rainfall)	Bajra	No change	Sow at 45-60 cm Use press wheel behind tyne to obtain good germination Seed priming with thiourea (0.05%) for four hours.	
		Mothbean	No change	Normal sowing	
		Clusterbean	-do-	-do-	
		Mungbean	-do-	-do-	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (2nd week of August)	Deep yellowish brown sandy soils (low rainfall)	Bajra	No Change Prefer varieties like HHB 67, ICMH 356 (extra early)	Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering. Sow Pearl millet at 60 cm Use press wheel Prefer mothbean +guar intercropping.	Link NSC, RSSC, SAU for quality Seed Thiourea be procured under NFSM
		Mothbean	No change	Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering. Increase seed rate of mothbean and guar by 10-15%	
		Clusterbean	Prefer varieties like Guar-RGC 936, RGC 1003.	Increase seed rate of moth and guar by 10-15% Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering.	
		Mungbean	Mothbean and guar	Increase seed rate of moth and guar by 10-15% Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering	
	Medium light yellowish brown Loamy soils (medium rainfall)	Bajra	No Change Prefer varieties like HHB 67, ICMH 356 (extra early)	Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering. Sow Pearl millet at 60 cm Use press wheel Prefer mothbean +guar intercropping.	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Mothbean	No change	Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering. Increase seed rate of mothbean and guar by 10-15%	
		Clusterbean	Prefer varieties like Guar-RGC 936, RGC 1003.	Increase seed rate of moth and guar by 10-15% Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering.	
		Mungbean	Mothbean and guar	Increase seed rate of moth and guar by 10-15% Seed priming with 0.05% thiourea followed by foliar spray at vegetative & flowering	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks 3rd week August	Deep yellowish brown sandy soils (low rainfall)	Bajra	Grow bajra for fodder (Raj.Chari-2) Replace bajra area by mothbean	-	Link NSC, RSSC, SAU for quality seed
		Mothbean	RMO 40	Seed priming with 0.05% thio urea followed by foliar spray of 0.05%thio urea at vegetative and flowering stage. Increase seed rate by 15-20 %.	
		Clusterbean	Guar (RGC 936)	-do-	
		Mungbean	Mothbean	-do--	
	Medium light yellowish brown	Bajra	Grow bajra for fodder (Raj.Chari-2)	-	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	loamy soils) (medium rainfall)		Replace bajra area by mothbean		
		Mothbean	RMO 40	Seed priming with 0.05% thio urea followed by foliar spray of 0.05%thio urea at vegetative and flowering stage. Increase seed rate by 15-20 %.	
		Clusterbean	Guar (RGC 936)	-do-	
		Mungbean	mothbean	-do--	

Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks 1st week of September	Deep yellowish brown sandy soils (low rain)	Bajra	Keep fallow	Conserve soil moisture by *Bhakhar* and planking and utilize residual soil moisture for rabi crops like taramira (RTM 314), gram(RSG 888)	Link NSC, RSSC, SAU for quality seed
		Moth bean	Keep fallow	-do-	
		Cluster bean	Keep fallow	-do-	
		Mungbean	Keep fallow	-do-	
	Medium light yellowish brown loamy soils) (medium rainfall)	Bajra	Keep fallow	Conserve soil moisture by *Bhakhar* and planking and utilize residual soil moisture for rabi crops like taramira (RTM 314), gram(RSG 888)	
		Moth bean	Keep fallow	-do-	
		Cluster bean	Keep fallow	-do-	
		Mungbean	Keep fallow	-do-	

Condition			Suggested Contingency measures		
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil Nutrient and moisture conservation measures**	**Remarks on Implementation**
	Deep yellowish brown sandy soils (low rainfall)	Bajra	Timely weed control. Gap fill with transplanted seedlings	Hoeing to create dust mulch Green / organic mulch in crop rows	Implements for hoeing & weeding be procured under RKVY Link NSC, RSSC, SAU for quality seed
		Moth bean	Gap fill with the seed to maintain optimum plant population	-do-	
		Cluster bean	-do-	-do-	
		Mung bean	-do-	-do-	
	Medium light yellowish brown loamy soils (medium rainfall)	Bajra	Timely weed control Gap fill with transplanted seedlings	Hoeing to create dudt mulch Green / organic mulch in crop rows	
		Moth bean	Gap fill with the seed to maintain optimum plant population	-do-	
		Cluster bean	-do-	-do-	
		Mung bean	-do-	-do-	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)			**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Deep yellowish brown sandy soils (low rainfall)	Bajra	➢ Thinning of 20-25 % plants with in the row, ➢ Timely weed control through hoeing or interculture	➢ Life saving irrigation if possible. ➢ Spray of thiourea @ 500 ppm With held top dressing of urea Organic/green mulch in crop rows Spay urea 2% after the dry spell Or	Water harvesting structure with larger catchment area under MANREGA Link NSC, RSSC,

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)			**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
				Apply10-15kg N/ha at optimum moisture	SAU for quality seed
		Moth bean	Spray of thiourea at 500 ppm at vegetative stage Timely weed control through hoeing or interculture	-do-	
		Cluster bean	-do-	-do-	
		Mung bean	-do-	-do-	
	Medium light yellowish brown Loamy soils (medium rainfall)	Bajra	➢ Thinning of 20-25 % plants with in the row, ➢ Timely weed control through hoeing otrinterculture	➢ Life saving irrigation if possible. ➢ Spray of thiourea @ 500 ppm With held top dressing of urea Organic/green mulch in crop rows Spay urea 2% after the dry spell Or Apply10-15kg N/ha at optimum moisture	
		Moth bean	Spray of thiourea at 500 ppm at vegetative stage Timely weed control through hoeing or interculture	-do-	
		Cluster bean	-do-	-do-	
		Mung bean	--do-	-do-	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
At reproductive	Deep yellowish brown sandy soils	Bajra	If the damage will be severe, harvest for fodder	➢ Spray of thiourea @ 500 ppm	Link MANREGA for the support of water harvesting

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient and moisture conservation measures**	**Remarks on Implementation**
stage	(low rainfall)			➢ Life saving irrigation	structure technology
		Moth bean	-do-	➢ Spray of thiourea @ 500 ppm ➢ Life saving irrigation	
		Cluster bean	-do-	➢ Spray of thiourea @ 500 ppm ➢ Life saving irrigation	
		Mung bean	-do-	Life saving irrigation	
	Medium light yellowish brown loamy soils) (medium rainfall)	Bajra	-d0-	➢ Spray of thiourea @ 500 ppm ➢ Life saving irrigation	
		Moth bean	-do-	➢ Spray of thiourea @ 500 ppm ➢ Life saving irrigation	
		Cluster bean	-do-	➢ Spray of thiourea @ 500 ppm ➢ Life saving irrigation	
		Mung bean	-do-	Life saving irrigation Spray 2% urea	

Condition	Suggested Contingency measures				
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
Early withdrawal	Deep yellowish brown sandy soils (low rainfall)	Bajra	Life saving irrigation with farm pond water If the damage will be severe harvest for fodder	Sowing of barley using poor quality water	Link MANREGA for the support of water harvesting structure technology
		Moth bean	-do-	-do-	

Condition	Suggested Contingency measures				
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
		Custer bean	-do-	-do-	
		Mung bean	-do-	-do-	
	Medium light yellowish brown loamy soils (medium rainfall)	Bajra	Life saving irrigation with farm pond water If the damage will be severe harvest for fodder	-do-	
		Moth bean	-do-	-do-	
		Custer bean	-do-	-do-	
		Mung bean	-do-	-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	Canal IGNP Irrigated area	Ground nut	No Change ➢ Prefer short duration varieties of groundnut like TG 37 A, TBG-39. ➢ Reduce area under groundnut	Irrigation at critical crop growth stages Adopt sprinkler/micro irrigation systems Pressurized irrigation method.	Link Govt. Schemes to procure sprinkler systems
		Guar	No Change ➢ Prefer varieties like RGC-986, RGC 1017, RGC 1003 ➢ Area from groundnut may be allocated	-do-	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Cotton	No Change ➢ Prefer varieties like (RST-9,Bikaneri nerma, Ganganagar ageti, Rs 2013)and ➢ RG-8,RG-18 ➢ Reduce area under cotton	Irrigation at critical crop growth stages Alternate furrow irrigation in cotton Adopt drip irrigation method.	
		Mungbean	No Change ➢ Prefer varieties like RMG-344, RMG 268 ➢ Reduce area under groundnut	-do-	

Condition Delayed release of water in canals due to low rainfall	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Canal Irrigated areas	Wheat	No Change Prefer Short duration Varieties, Wheat (Raj-3765,Raj 4083),	Irrigate by sprinkler method at critical stages. Spray 0.05 % Thiourea at reproductive stage.	Thiourea and Sprinkler system can be obtained under NFSM
		Gram	No Change Prefer varieties like (RSG 888, RSG 807, RSC 44)	-do-	
		Mustard	No Change Prefer varieties like Mustard(Laxmi, Bio-902 ,RGN 48)	-do-	

Condition Delayed release of	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Canal Irrigated areas	Groundnut	No Change Prefer varieties like TG-37 A, TBG-39, Reduce area	Irrigation at critical crop growth stages Adopt Pressurized irrigation method, (Sprnkler/drip systems)	
		Guar	No Change Prefer varieties like RGC-986, RGC 1017, RGC 1003 Area of groundnut or cotton may be put under this crop	-do-	
		Cotton	No Change Prefer varieties like A. cotton RST-9,Bikaneri nerma, Ganganagar ageti, Rs 2013 D. Cotton RG-8,RG-18 Reduce area under the crop	Alternate furrow irrigation in cotton	
		Mungbean	RMG-344, RMG 268 Area of groundnut or cotton may be put under this crop	Irrigation at critical crop growth stages Adopt micro irrigation systems	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Canal Irrigated areas	Wheat	No Change Prefer varieties like Raj-1482,Raj,3077,Raj 3765,Raj 3777, Raj 4083	➢ Irrigate by sprinkler at only at critical stages. ➢ Spray 0.05 % Thiourea at reproductive stage. ➢ Reduce area under wheat	Sprinkler may be obtained under Govt schemes

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				and allocate area under mustard, barley / gram / isabgol	
		Gram	No Change Prefer varieties like RSG 888, RSG 807, GNG 663,	➢ Irrigate by sprinkler at only at critical stages. ➢ Replace wheat area by gram	
		Mustard	No Change Prefer varieties like T59,Bio 902,Pusa bold, Aravali, RGN 13, RGN 48, Laxmi,	➢ Irrigate by sprinkler at only at critical stages. ➢ Spray 0.05 % Thiourea at reproductive stage. ➢ Replace area of wheat by mustard	

Condition			Suggested Contingency measures		
	Major Farming situation	**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	Canal Irrigated areas	Ground nut	Mothbean (RMO 40, RMO 257,RMO 435), guar (RGC 936,1003) or bajra (HHB 67-I), ICMH 356) Bajra Fodder	Seed priming with 0.05% thiourea foliar spray at vegetative and reproductive stage in mothbean and guar	Use of NSC, RSSC, SAU quality seed
		Cotton	In saline water area poogal/Khajuwal sowing of cotton in limited area may be done	Rain waterharvesting and reuse at crtical crop growth stages	Link watershed NREGs for the support of water harvesting structure technology
		Guar	No Change Prefer varieties like RGC 936	Seed priming with 0.05% thiourea and foliar spray at vegetative and reproductive stage	Use of NSC, RSSC, SAU quality seed

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Mungbean	No Change Prefer varieties like RMG 344,RMG 268	-	-do-

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	Canal Irrigated areas	Wheat	Taramira/chickpea/mustard in khadin area	➢Dust mulching, ➢Rainwater harvesting and re use ➢Mulching in crop rows	Link watershed NREGs for the support of water harvesting structure technology
		Gram	Gram, mustard, barley or taramira if conserved moisture is available specially in khadin area because of late season rain fall	-do-	
		Mustard	-do-	➢Dust mulching, ➢Spray 0.05 % Thiourea at reproductive stage.	

Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**N.A.**

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Tube well area	Ground nut	Reduce area under groundnut, prefer short duration varieities (TG 37 A and TBG 39).	Dust mulch by harrowing Mulching in crop rows Irrigation at critical crop	Link watershed NREGs for the support of water harvesting structure

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			Allocate groundnut area to low water requiring crops viz. mothbean (RMO 40, RMO 257) guar RGC 936,RGC 1003) Bajra (HHB 67 I,ICMH 356)	growth stages with micro irrigation systems if feasible or Alternate furrow method	technology. Create awareness and skill improvement of farmers through KVKs
		Cotton	A. Cotton(RST-9,Bikaneri nerma, Ganganagar ageti, Rs 2013 D. Cotton RG-8,RG-18	Irrigate by drip irrigation, critical stages Furrow irrigation system	
		Guar	No Change Prefer varieties like RGC-986, RGC 1017, RGC 1003	Irrigate by pressurized irrigation, at critical stages Seed pricing with 0.05% thiourea followed by foliar spray at vegetative & foliar stage.	
		Mungbean	No Change Prefer varieties like RMG-62, RMG 268	Irrigate by pressurized irrigation, Irrigate at critical growth stages	

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	Canal Irrigated areas	Wheat	Reduce area depending upon water availability Prefer Raj 3077,Raj 3765,Raj 3777, Raj 4083	Irrigate crop by sprinkler irrigation at critical stages Dust mulching	Create awareness and skill improvement of farmers through KVKs

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			Allocate wheat area to gram/taramira(RTM-314), Isaggol (RI 1)		
		Gram	Reduce area. Prefer of early maturing and drought tolerant varieties viz. RSG 888, RSG 807, RSG 44, GNG 663	Irrigate crop by sprinkler irrigation at critical stages Dust mulching	
		Mustard	Reduce area. Prefer Bio 902,Pusa bold, Aravali, RGN 13, RGN 48	Irrigate crop by sprinkler irrigation at critical stages Dust mulching Spray 0.05 % Thiourea at vegetative and reproductive stage.	

2.2 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**
Bajra	• Drain excess water as early as possible • Intercultivation with hoe • Apply 20 kg additional N / ha after draining of excess water	• Drain excess water as early as possible • Intercultivation with hoe • Apply 20 kg additional N / ha after draining of excess water	• Drain excess water as early as possible • Harvest at physiological maturity	Dry the grain to optimum moisture content before storage
Moth bean	Provide drainage to drain excess water	Provide drainage to drain excess water	Timely harvest of produce at maturity stage	Shifting to safer place and drying the produce
Guar	Provide drainage to drain excess water	Provide drainage to drain excess water	Timely harvest of produce at maturity stage	Shifting to safer place and drying the produce

Horticulture	**N.A.**			
Heavy rainfall with high speed winds in a short span				
Chickpea	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	Control heliothis by spraying chemicals like Indoxacarb 14.5 SC 0.1% or Spinosad 45 SC 0.03%. To control fungal diseases spray 0.2% carbendazim Tie the plants with the help of its leaves to protect from lodging	Dry the produce before storage to prevent the attack of storage pest and fungal infection
Condition	**Suggested contingency measure**			
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	Drain excess water in the basins of plants Stir the soil in the basin at optimum moisture to loosen the soil and to improve aeration	Drain excess water in the basins of the trees Stir the soil in the basin to loosen the soil and to improve aearation	Harvest the produce on clear sunny day Need based plant protection measures	Dispose of the dropped fruits or prepare value added products

		Apply recommended nutrents at optimum moisture content Foliar spray of NAA 50 ppm		
Outbreak of pests and diseases due to unseasonal rains				
Chickpea	Spray trizophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphas 25 EC or Chlorpyriphos 20 EC C or Methyle Parathiyan 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 per hectare with duster.	Spray trizophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphas 25 EC or Chlorpyriphos 20 EC C or Methyle Parathiyan 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 per hectare with duster.	Spray trizophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out critical survey of fields for insect and disease attack in crops	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 water/harespectively and 3 sprays at 15 days interval to control aphids	Mechanical control. And spray the crop with malathion50EC@1000mi in 500liters of water/ha to control Bihar hairy caterpilla	To prevent stem rot disease spray 0.2% Carbendizim	-do-
Wheat	Spray 0.2 % mencozeb 76% WP against wheat rust.	Spray 0.2 % mencozeb 76% WP against wheat rust.	Carry out critical survey of fields for disease attack in crops	-do-

2.3 Floods

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

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Wheat	Light irrigation Provision of wind breaks	Light irrigation	Apply irrigation, spray 1000 ppm thiourea at grain filling stage	Harvest at physiological maturity
Mustard	.Light irrigation Provision of wind breaks	Light irrigation	Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage	-do-
Chickpea	.Light irrigation Provision of wind breaks	Light irrigation	Apply irrigation	-do-
Cotton	-	-	Spray with 2% KNO_3	-
Horticulture				
Kinnow	-	-		-
Cold wave				
Mustard	Light irrigation Smoking during night	Light irrigation Smoking during night	ApplyLight irrigation Smoking during night	N.A
Chickpea	-do-	-do-	-do-	N.A
Castor	-do-	-do-	-do-	N.A
Horticulture				
Aonla	Apply light irrigation Smoking during night	-	Apply light irrigation Smoking during night	Harvest the crop as early as possible Keep the produce in cold storage or market it

Frost				
Mustard	Apply light irrigation Smoking during night	Apply light irrigation Smoking during night	Smoking at night, apply light irrigation	N.A.
Chickpea	Apply light irrigation Smoking during night	Apply irrigation, Spray of 0.1% H_2SO_4,	-do-	N.A.
Horticulture				
Aonla	Apply light irrigation Smoking during night	Apply light irrigation Smoking during night	Apply irrigation, Spray of 0.1% H_2SO_4,	Harvest the crop as early as possible Keep the produce in cold storage or market it
Hailstorm				
Wheat	Resowing in case of severe damage.	Light and frequent irrigation	Apply 105 of additional nitrogen Light and frequent irrigation	Timely harvesting and shifting the produce to safer place in case of ealy forewarning
Mustard	**N.A.**	**N.A.**	-	-
Chickpea	**N.A.**	**N.A.**	-	-
Horticulture			-	-
Kinnow	**N.A.**	**N.A.**	-	-
Cyclone	**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 is severely affected with 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 sorghum/bajra/maize(UP chari, MP	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 keepers for procurement of feed	Flushing the stock to recoup Replenish the feed and fodder banks

	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		
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 Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught	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 any outbreak Restricting movement of livestock in case of any epidemic Rescue of sick and injured animals and their treatment	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does

	management to be given to VAS, Jr.VAS, LI with regard to health & management measures. Procure and stock multivitamins & area specific mineral mixture	Organize with community, daily lifting of dung from relief camps	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	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house

	against RD and IBD		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.