

State: Rajasthan

Agriculture Contingency Plan for District: Banswara

1.0 District Agriculture Profile					
1.1	Agro-climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Arid Western Plain-6			
	Agro-climatic Region (Planning Commission)	Central Plateau & Hill Region-8			
	Agro Climatic Zone (NARP)*	Humid Southern Plain Zone (Zone IV b)			
	List all the districts falling under the NARP zone	Banswara, Dungarpur, Pratapgarh & parts of Udaipur.			
	Geographic coordinates of District	Latitude	Longitude	Altitude	
		23°33' N	74°25' E	220 msl	
	Name and address of the concerned ZDRRS/	Dr. G. S. Ameta, Zonal Director Research, Agricultural Research Station, (MPUAT), Borwat Farm, Banswara (Raj.) 327 001			
	Mention the KVK located in the district	KVK, Borwat Farm, Banswara			
1.2	Rainfall	Normal Rain Fall (mm)	Normal Rainy Days (No.)	Normal onset (specify week and month)	Normal cessation (specify week and month)
	SW monsoon (June-Sept.)	862.00	38	25 th Standard Week (3 rd week of June)	37 th Standard Week (2 nd week of Sept.)
	NE Monsoon (Oct.-Dec.)	42.70	02	-	
	Winter (Jan-March)	05.60	0.4	Jan	Occasional
	Summer(April-May)	08.90	0.6	May	Occasional
	Annual	919.20	41.0		

- If a district falls in two NARP zones, mention the zone in which more than 50% area falls

1.3	Land use pattern of the distt.	Geographical area	Cultivable area	Forest area	Land under Non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. trees crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000' ha)	506.25	322.76	113.57	11.60	12.46	29.39	0.18	56.91	6.36	35.48

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Medium black clayey soil	50.87	10.05
	2. Medium brown clayey soil	78.77	15.56
	3. Medium brown loamy soil	109.09	21.55
	4. Medium brown Gravelly loam	68.24	13.48
	5. Red gravelly loamy hilly soils	18.98	3.75
	6. Medium red loamy	108.28	21.39
	7. Shallow red gravelly loam	66.92	13.22
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	240.30	150.34
	Area sown more than once	120.99	
	Gross cropped area	361.29	
1.6	Irrigation	Area ('000 ha)	
	Net irrigated area	102	
	Gross irrigated area	110	
	Rainfed area	130	
	Sources of Irrigation	Number	Area ('000 ha)
	Canals	-	61.02
	Tanks	701	6.82
	Open wells	22869	16.9
	Bore wells	810	3.7
	Lift irrigation	-	11.00
	Micro-irrigation	-	-
			Percentage of total irrigated area
			55.47
			6.2
			15.36
			3.36
			10.0
			-

Other sources	-	10.47	9.51
Total irrigated area	-	109.99	-
Pump sets	16911		
No. of Tractors			
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	-		
Critical	1		
Semi-critical	6		
Safe	1		Safe
Wastewater availability and use			
Ground water quality			

*Over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: < 70%

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

1.7	Field crops		Kharif ('000ha)			Rabi ('000ha)			Summer	Grand Total
			Irrigated	Rainfed	Total area	Irrigated	Rainfed	Total area		
1	Maize	4.672	138.765	143.437	-	-	-			
2	Paddy	0.024	35.853	35.877	-	-	-			
3	Wheat	-	-	-	88.441	2.360	90.801			
4	Kharif pulses	0.005	15.184	15.189	-	-	-			
5	Gram	-	-	-	6.674	9.531	16.205			
	Horticulture crops-Fruits	Total area (ha)								
1	Mango	713								
2	Lime	20								
3	Guava	13								
4	Aonla	6								
5	Pomegranate	5								
	Horticultural crops- Vegetables	Total area (ha)								
1	Ridge gourd	135								
2	Brinjal	66								
3	Tomato	56								
4	Onion	48								

5	Cauliflower	41		
	Medicinal and aromatic crops	Total area		
1	Ajwain	13		
2	Safed Musli	2		
	Plantation crops	Total area		
1	Nil	-		
	Fodder crops	Total area (ha)		
1	Lucerne	571		
2	Fodder Bajra	11		
3	Fodder Maize	3		
4	Fodder Jowar	1		
5	Others	35		
	Total fodder crop area	621		
	Grazing land	-		
	Sericulture etc	NIL		
	Others (specify)	NIL		

*If break-up data (irrigated, rainfed) is not available, give total area

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)	
	Non descriptive Cattle (local low yielding)	-	-	646.9	
	Crossbred cattle	-	-	-	
	Non descriptive Buffaloes (local low yielding)	-	-	276.4	
	Graded Buffaloes	-	-	-	
	Goat	-	-	464.6	
	Sheep	-	-	13.4	
	Others (Camel, Pig, Yak etc.)	-	-	1.4	
	Commercial dairy farms (Number)				
1.9	Poultry	No. of farms	Total No. of birds ('000)		
	Commercial	-	-		
	Backyard	-	362.8		
1.10	Fisheries (Data source: Chief Planning Officer)				
	A. Capture				
	i) Marine (Data Source:	No. of	Boats	Nets	Storage facilities (Ice plants etc.)

Fisheries Department)	fishermen	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	
	-		2		93	
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)		18052		56.66		1023
Others		-		-		-

1.11 Production and Productivity of major crops (2007-08)

1.11	Production & productivity of major crops	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)	
	Maize	202.07	1408	-	-	-	-	202.73	1408	
	Paddy	69.98	1952	-	-	-	-	69.96	1952	
	Soybean	25.01	1116	-	-	-	-	25.01	1116	
	Cotton	18.93	1666	-	-	-	-	18.93	1666	
	Urd	7.51	498	-	-	-	-	7.51	498	
	Wheat	-	-	183.39	2020	-	-	183.39	2020	
	Gram	-	-	18.06	1115	-	-	18.06	1115	
	S. Moong	-	-	-	-	45	300	45	300	
	Major Hort crops	Production (q)	Productivity (kg/ha)							

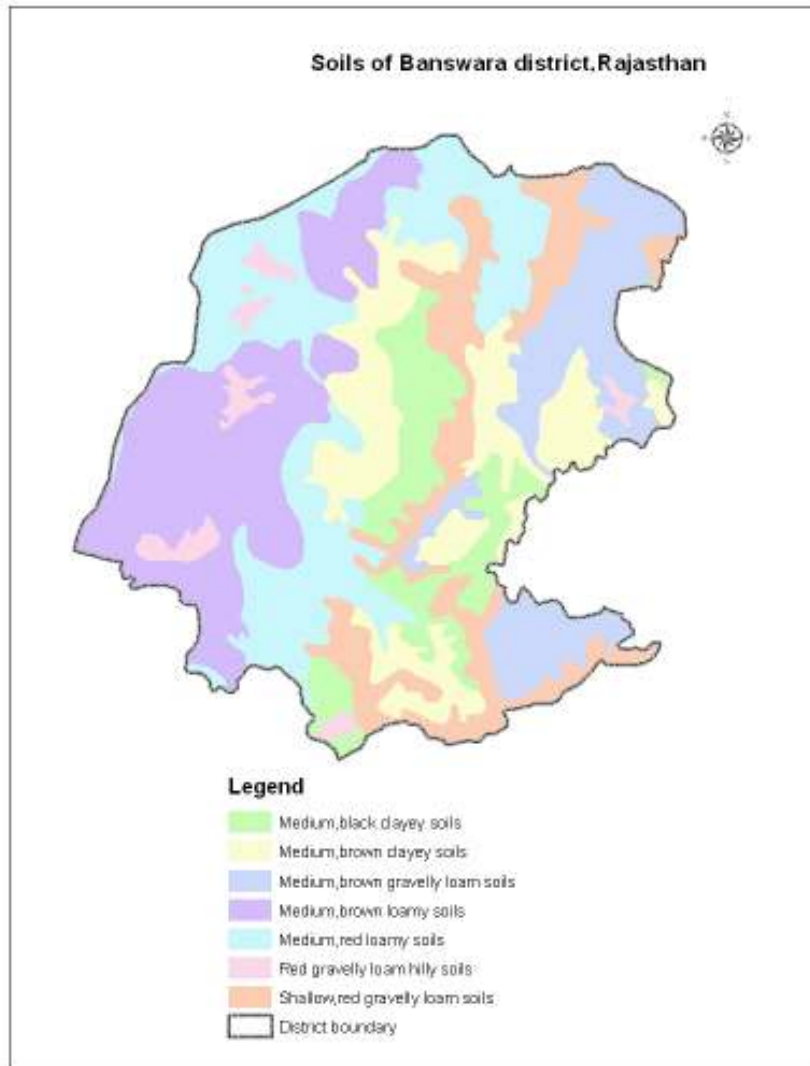
	Mango	70032	9822					70032	9822	
	Lime	1917	9585					1917	9585	
	Aonla	1416	23600					1416	23600	
	papaya	841	21025					841	21025	
	Guava	517	3977					517	3977	
Others	Pomegranate	295	5900					295	5900	

1.12	Sowing window for 5 major crops (start and end of sowing period)	Maize	Soybean	Rice	Wheat	Gram
	Kharif-Rainfed	3 rd week of June To 2 nd week of July	On set of monsoon up to 1 st week of July	Upland → on set of monsoon to 2nd week of July or transplanted - 3 rd week of July To 4 th week of July	-	-
	Kharif-Irrigated	2 nd – 3 rd week of June	2 nd – 3 rd week of June	2 nd - 3 rd week of June (Nursery) Transplanting after 4 weeks		
	Rabi-Rainfed	-	-	-	1 st – 2 nd week of Oct.	1 st – 2 nd week of Oct.
	Rabi-Irrigated	-	-	-	2 nd week of Nov. to last week of Nov.	2 nd week of Oct. to last week of Oct.

1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought	√	.	-
	Flood	-	-	√
	Cyclone	-	-	√

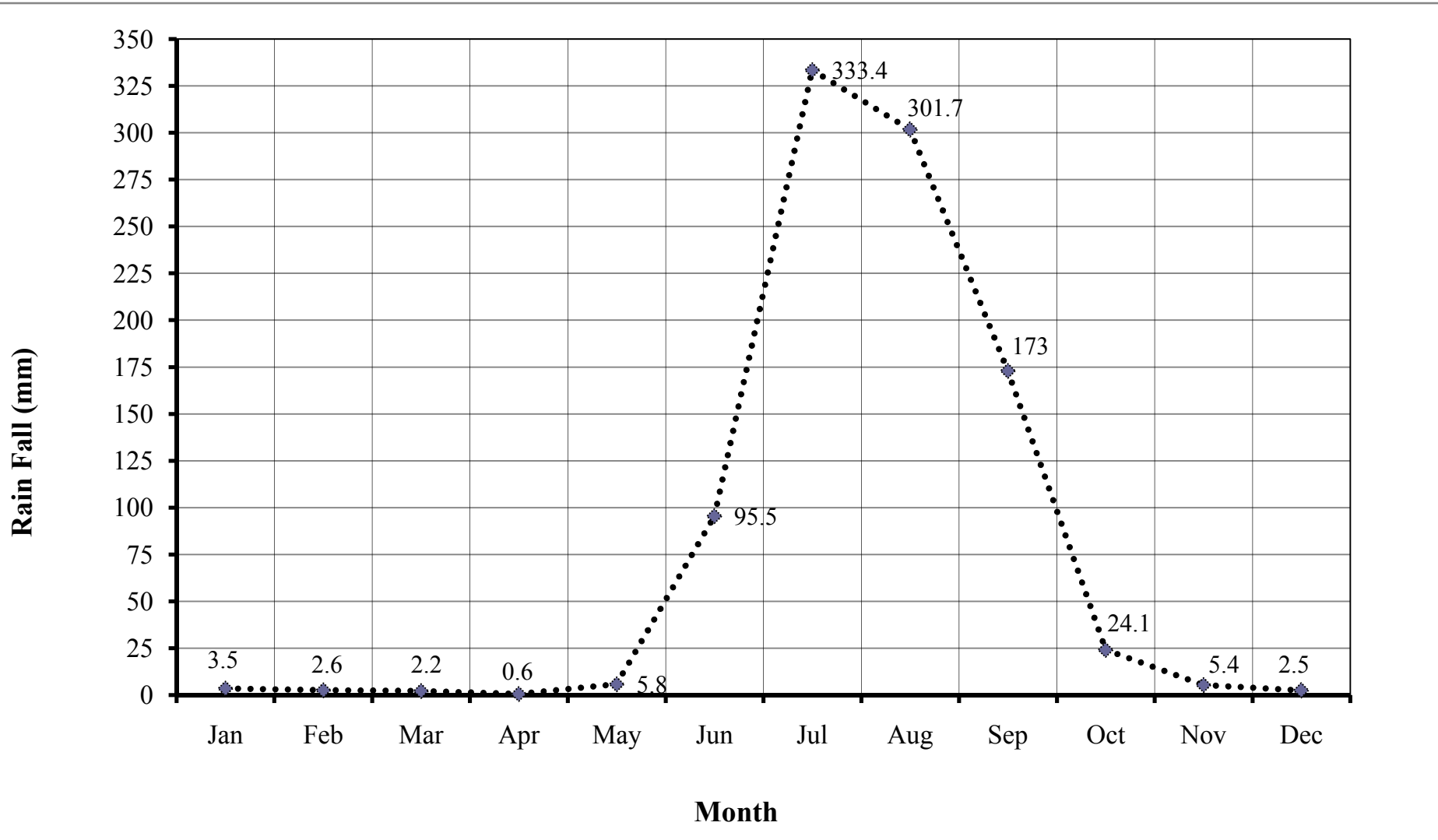
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and diseases (specify)	White fly, Powdery Mildew, Pod Borer	Tobacco Caterpillar in soybean, Grasshopper, YMV in pulses BLB in rice, mealy bug in cotton	-

1.14	Include Digital maps of the district for	Location map of district with in State as Annexure 1	Enclosed: Yes/No
		Mean annual rainfall as Annexure 2	Enclosed: Yes/No
		Soil map as Annexure 3	Enclosed: Yes/No



Soil map

Mean (1970-2007) Monthly Rain Fall (mm) for Banswara District



2.0 Strategies for Weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset) Delay by 2 weeks (July 1 st week)	Red loam hilly shallow soils	Maize/Urd/Soybean	Maize/Urd/Soybean Maize: PEHM-2, BiO-9681, Mahi Kanchan, Navjot Urd: T-9, Barkha, PU-31 Soybean: JS-335, NRC-37, Pratap Soya-1	1. Dry sowing 2. Seed priming/seed hardening	Seed of short duration varieties must be insured through NSC, RSSC and other seed sources
	Black heavy to medium deep loam/clayey soils	Soybean/Maize/Cotton	Soybean: JS-335, NRC-37, Pratap Soya-1 Maize : PEHM-2, Bio-9681, Mahi Kanchan Bt cotton hybrids identified for the zone: H6, H8, DCH-32	1. Dry sowing 2. Seed priming/seed hardening	Seed of short duration varieties must be insured through NSC, RSSC and other seed sources
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Upland Rice/Maize Transplanted Rice	Upland Rice: Ashoka-200F, Kalinga-3, Transplanted Rice: Pusa Sugandha-4, Pusa Sugandha-5, IR-64, Mahi Sugandha Maize : PEHM-2, Bio-9681, Mahi Kanchan	1. Seed priming 2. Adopt SRI (System of Rice Intensification)	Seed of short duration varieties must be insured through NSC, RSSC and other seed sources
	Hilly eroded	Maize+pigeonpea/	Maize: PEHM-2, BiO-	1. Seed priming.	Seed of short duration varieties

	red loamy shallow soils (sloppy situation)	urd intercropping or cotton + maize intercropping	9681, Mahi Kanchan, Navjot Urd: T-9, Barkha, PU-31 Pigeonpea: ICPL-87, BDN-2		must be insured through NSC, RSSC and other seed sources Appropriate Seed drill for intercropping through RKVY
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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 4 weeks (3 rd week of July)	Red loam hilly shallow soils	Maize/Urd/Soy bean	Urd/Moong/Til Or Maize for green cobs/short duration varieties Urd: T-9, Barkha, PU-31 Moong: K-851, RMG-62, Pusa Vishal, SML-668 Sesame: RT-46, RT-125, Maize for fodder : African Tall	<ul style="list-style-type: none"> Increase seed rate by 10-15% of pulses and sesame Chemical weed control may be preferred 	<ul style="list-style-type: none"> Seed of short duration varieties must be ensured through NSC, RSSC and other seed sources Availability of Breeder Seed from University
	Black heavy to medium deep loam/clayey soils	Soybean/Maize /Cotton	Soybean/Urd/ Moong/Til/ Or Maize for Fodder : African Tall Soybean: JS93-05 Urd: T-9, Barkha, PU-31 Moong: K-851, RMG-62, Pusa Vishal, SML-668 Til: RT-46, RT-125,	<ul style="list-style-type: none"> Increase seed rate by 10-15% of Pulses and sesame Chemical weed control may be preferred 	Seed of short duration varieties must be ensured through NSC, RSSC and other seed sources
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Transplanted Rice Or Black gram/Cluster Bean/ Sesame	Urd//Til/Cluster bean Or Maize for green cobs/Fodder (African Tall) Urd: T-9, Barkha, PU-31 Moong: K-851, RMG-62, Pusa Vishal,	<ul style="list-style-type: none"> Increase seed rate by 10-15% of Pulses and sesame Chemical weed control may be preferred Transplanted Rice to be maintained on SRI 	Seed of short duration varieties must be ensured through NSC, RSSC and other seed sources

			SML-668 Sesame: RT-46, RT-125, ClusterBean: RGC-936, RGC-1017 Transplanted Rice		
	Red loamy shallow hilly eroded soils (sloppy situation)	Maize+pigeonpea/ urd intercropping	Maize Fodder: African Tall Urd: T-9, Barkha, PU-31 Pigeonpea: ICPL-87, BDN-2	<ul style="list-style-type: none"> • Increase seed rate by 10-15% of Pulses and sesame • Chemical weed control may be preferred 	Seed of short duration varieties must be ensured through NSC, RSSC and other seed sources Appropriate Seed drill for intercropping through RKVY

Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset) Delay by 6 weeks (1 st week of August)	Red loam hilly shallow soils	Maize Fodder/Bajra Fodder/Castor/ Minor Milet	Maize Fodder: African Tall Bajra Fodder: Raj-171, Rajco Bajri, Pusa-334 Castor: GAUCH-4, GSH-4, Aruna Green Manuring with Dhaincha/Sunhemp	<ul style="list-style-type: none"> • Chemical weed control may be preferred in castor 	Seed of different fodder crops must be ensured through NSC, RSSC and other seed sources
	Black heavy to medium deep loam/clayey soils	Maize Fodder/Bajra Fodder/Castor/ Minor Milet	Maize Fodder: African Tall Bajra Fodder: Raj-171, Rajco Bajri, Pusa-334 Castor: GAUCH-4, GSH-4, Aruna Green Manuring with Dhaincha/Sunhemp	<ul style="list-style-type: none"> • Chemical weed control may be preferred in castor 	Seed of different fodder crops must be ensured through NSC, RSSC and other seed sources
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Maize Fodder/Bajra Fodder/Castor/ Minor Milet	Maize Fodder: African Tall Bajra Fodder: Raj-171, Rajco Bajri, Pusa-334 Castor: GAUCH-4, GSH-4, Aruna Green Manuring with Dhaincha/Sunhemp	<ul style="list-style-type: none"> • Chemical weed control may be preferred in castor 	Seed of different fodder crops must be ensured through NSC, RSSC and other seed sources

	Red loamy shallow hilly eroded soils (sloppy situation)	Mono culture maize with pigeonpea/urd or cotton + maize and fallow in <i>rabi</i>	<i>Cenchrus</i> grass and <i>stylo</i> seed should be broadcasted to develop grazing area. Fodder Maize/Bajra/Sorghum	<ul style="list-style-type: none"> Sowing of <i>Cenchrus</i> with Seed Palleting Contour bunding for moisture conservation 	Seed of different fodder crops must be ensured through NSC, RSSC and other seed sources Construction of small water harvesting systems through MANREGA/ RKVY
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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 8 weeks (3 rd week of August)	Red loam hilly shallow soils	Fallow/Fodder	Kharif fallow –Torla/Taramira/ Mustard/ Linseed/Castor/ Gram for green pods fodder crop Torla: Bhawani, Sangam Taramira: T-27, RTM-1 Mustard: Pusa Agarni Gram: Pratap Chana-1, Dahod Yellow: Castor: GAUCH-4, GSH-4, Aruna	<ul style="list-style-type: none"> Conservation of rain water for rabi crops by field bunding Grow fodder crops 	Construction of small water harvesting systems through MANREGA/ RKVY
	Black heavy to medium deep loam/clayey soils	Fallow/Fodder	Kharif fallow –Torla/Taramira/ Mustard/ Linseed/Castor/ Gram for green pods fodder crop Torla: Bhawani, Sangam Taramira: T-27, RTM-1 Mustard: Pusa Agarani Gram: Pratap Chana-1, Dahod Yellow: Castor: GAUCH-4, GSH-4, Aruna	<ul style="list-style-type: none"> Conservation of rain water for rabi crops by field bunding Grow fodder crops 	Construction of small water harvesting systems through MANREGA/ RKVY
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Fallow/Fodder	Kharif fallow –Torla/Taramira/ Mustard/ Linseed/Castor/ Gram for green pods fodder crop Torla: Bhawani, Sangam Taramira: T-27, RTM-1 Mustard: Pusa Agarani Gram: Pratap Chana-1, Dahod Yellow:	<ul style="list-style-type: none"> Conservation of rain water for rabi crops by field bunding 	Construction of small water harvesting systems through MANREGA/ RKVY

			Castor: GAUCH-4, GSH-4, Aruna	<ul style="list-style-type: none"> Grow fodder crops 	
	Red loamy shallow hilly eroded soils (sloppy situation)	Fallow/Fodder	<i>Cenchrus</i> grass and <i>stylo</i> seed should be broadcast to develop grazing area. Fodder Maize/Bajra/Sorghum	<ul style="list-style-type: none"> Sowing of <i>Cenchrus</i> with Seed Palleting Contour bunding for moisture conservation 	Construction of small water harvesting systems through MANREGA/ RKVY

Matrix for specifying condition of early season drought due to delayed onset of monsoon (2, 4, 6 & 8 weeks) compared to normal onset (2.1.1)

Normal onset (Month and week)	Month and week for specifying condition of early season drought due to delayed onset of monsoon			
	Delay in onset of monsoon by			
	2 wks	4 wks	6wks	8 wks
June 3 rd wk	July 1 st wk	July 3 rd wk	Aug 1 st week	Aug 3 rd wk

Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			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. (July 1-3 rd week)	Red loam hilly shallow soils	Maize/Urd/Soybean	<ul style="list-style-type: none"> If germination is less than 50 % the farmer should go for re-sowing with early maturing varieties with 25% higher seed rate in maize If population is more than 75% he can go for gap filling with Maize/pulses 	<ul style="list-style-type: none"> Creating soils mulch through light intercultural operations Removal weeds in time Use of weeds for mulching 	
	Black heavy to medium deep loam/clayey soils	Soybean/Maize/. Cotton	<ul style="list-style-type: none"> If germination is approximately 50 % the farmer can go for transplanting /gap filling in cotton If germination in soybean less than 75 	<ul style="list-style-type: none"> Creating soils mulch through light intercultural operations Removal weeds in time 	

			per cent farmer can go for gap filling with maize.	<ul style="list-style-type: none"> Use of weeds for mulching 	
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Upland Rice/Maize Transplanted Rice	<ul style="list-style-type: none"> If germination is less than 50 % the farmer should go for re-sowing with early maturing varieties with 25% higher seed rate. If population is more than 75% he can go for gap filling with pre germinated seeds 	<ul style="list-style-type: none"> Removal weeds in time Use of weeds for mulching 25% additional N fertilizer at the time of tiller in 	
	Red loamy eroded hilly shallow soils (sloppy situation)	Maize+pigeon pea/ urd intercropping or cotton + maize intercropping	<ul style="list-style-type: none"> If germination is less than 50 % the farmer should go for re-sowing or gap filling with early maturing varieties of Urd. Gap filling by transplanting or by seed in cotton 	<ul style="list-style-type: none"> Creating soils mulch through light intercultural operations Removal weeds in time Use of weeds for mulching 	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5mm period))	Major farming situation	Normal Crops & cropping system	Crop Management	Soil nutrient & moisture conservation measures	Remarks on implementation
At vegetative	Red loam hilly shallow soils	Maize/Urd/ Soybean	<ol style="list-style-type: none"> Clean cultivation through repeated light intercultural operations. Mulching (green leaf)/insitu mulching by removing alternate rows in maize Remove susceptible crop for fodder and retain hardy crop among the crop mixtures Use of antitransparent /removing lower leaves in maize Tying of ridges of 6-8 intervals for conserving rain water Remove alternate rows Life saving irrigation. 	<ul style="list-style-type: none"> Earthing in maize at 30-35 DAS and spray of 2% urea in 800-1000 lit water Foliar spraying of nutrients Mulching 	

stage (30-40 DAS)	Black heavy to medium deep loam/clayey soils	Soybean/Maize/ Cotton	1. Clean cultivation through repeated light intercultural operations. 2. Insitu mulching by weeds 3. Remove susceptible crop for fodder and retain hardy crop among the crop mixtures.	<ul style="list-style-type: none"> • Earthing in cotton at 30-35 DAS & spray of 2% urea in 800-1000 lit water • Foliar spraying of nutrients • Mulching 	
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Upland Rice/Maize Transplanted Rice	1. Clean cultivation through repeated light intercultural operations. 2. Spray of 2% urea in 800-1000 lit water 3. Mulching (green leaf)/insitu mulching by removing alternate rows in upland rice. 4. Maintain only saturated condition for transplanted rice.	<ul style="list-style-type: none"> • Foliar spraying of nutrients • Mulching 	
	Red loamy eroded hilly shallow soils (sloppy situation)	Maize+pigeonpea/ urd intercropping or cotton + maize intercropping	1. Clean cultivation through repeated light intercultural operations. 2. Mulching (green leaf)/insitu mulching by removing alternate rows in maize 3. Remove susceptible crop for fodder and retain hardy crop (Ex. Maize out of Pigeonpea + Maize or Cotton + Maize)	<ul style="list-style-type: none"> • Earthing in maize/cotton at 35 DAS & spray of 2% urea in 800-1000 lit water • Foliar spraying of nutrients • Mulching 	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major farming situation	Crop/cropping system	Crop Management	Soil nutrient & moisture conservation measures	Remarks on implementation
At reproductive stage (45-55 DAS)	Red loam hilly shallow soils	Maize/Urd/Soybean	1. Life saving irrigation if possible 2. Maize should be harvested for baby corn if market is available 3. Removal of lower leaves in maize for fodder 4. In situ mulching of weeds	Rain water harvesting and it's re-use for crop saving 2% urea spray in 800-1000 lit water Thio urea @ 500 ppm spray Use of anti transpirants	

	Black heavy to medium deep loam/clayey soils	Soybean/Maize/Cotton	1. Life saving irrigation if possible 2. In situ mulching of weeds	Rain water harvesting and it's re-use for crop saving 2% urea spray in 800-1000 lit water Thio urea @ 500 ppm spray Use of anti transpirants	
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Upland Rice/Maize Transplanted Rice	1. Life saving irrigation if possible 2. Maintain sub saturated to saturated condition for transplanted rice to avoid soilcracks. 3. In situ mulching of weeds	Rain water harvesting and it's re-use for crop saving 2% urea spray in 800-1000 lit water Thio urea @ 500 ppm spray Use of anti transpirants	
	Red loamy eroded hilly shallow soils (sloppy situation)	Maize+pigeonpea/ urd intercropping or cotton + maize intercropping	1. Life saving irrigation if possible 2. Maize should be harvested for baby corn if market is available 3. Removal of lower leaves in maize/removal of alternate rows in maize for fodder. 4. In situ mulching of weeds	2% urea spray in 800-1000 lit water Thio urea @ 500 ppm spray Use of anti transpirants	

Condition			Suggested Contingency measures		
Terminal drought	Major farming situation	Crop/cropping system	Crop Management	Rabi Crop Planning	Remarks on implementation

(Beyond 60-70 DAS)	Red loam hilly shallow soils	Maize/Urd /Soybean	<ol style="list-style-type: none"> 1. Spray of 2% urea spray in 800-1000 liter water and can be repeated after 7 days. 2. Removal of lower levels for fodder in maize 3. Life saving irrigation if available 4. Harvesting at physiological maturity stage. 5. Thio urea spray @ 500 ppm 6. Antitranspirants 7. Termite management 	Rain water must be harvested in season and can be used during terminal drought on deficit irrigation principles.	<ol style="list-style-type: none"> 1. Early harvesting of <i>kharif</i> crops. 2. Sowing of early varieties of mustard or toria before <i>rabi</i> sowing if rains.
	Black heavy to medium deep loam/clayey soils	Soybean/Maize / Cotton	<ol style="list-style-type: none"> 1. Spray of 2% urea spray in 800-1000 liter water. 2. Life saving irrigation if available 3. Harvesting at physiological maturity stage. 4. Thio urea spray @ 500 ppm 	Rain water must be harvested in season and can be used during terminal drought on deficit irrigation principles.	Early harvesting of <i>kharif</i> crops and preparing for catch crops.
	Black heavy to medium deep loam/clayey soils (Low lying areas)	Upland Rice/Maize Transplanted Rice	<ol style="list-style-type: none"> 1. Spray of 2% urea spray in 800-1000 liter water. 2. Life saving irrigation if available 3. Harvesting at physiological maturity stage. 4. Thio urea spray @ 500 ppm 	<ol style="list-style-type: none"> 1. Rain water must be harvested in season and can be used during terminal drought. 2. Transplanted paddy must be kept on saturated soil conditions to avoid soil cracks. 	Early harvesting of <i>kharif</i> crops. Sowing of early varieties of mustard or toria before <i>rabi</i> sowing if rains.
	Red loamy eroded hilly shallow soils (sloppy situation)	Maize+pigeonpea/ urd intercropping or cotton + maize intercropping	<ol style="list-style-type: none"> 1. Spray of 2% urea spray in 800-1000 liter water. 2. Removal of lower levels for fodder in maize 3. Harvesting at physiological maturity stage. 4. Removal of susceptible crop for fodder from crop mixtures. 5. Thio urea spray @ 500 ppm 6. Termite Management 	-	-

2.1.2 Drought-Irrigated situation

Condition		Suggested Contingency measures			
Delayed /limited release of water in canals due to low rainfall	Major farming situation	Crop/cropping system	Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
	Canal/Lift Irrigated areas- Fine texture red loam to deep clay soils having high rain fall (>800 mm)	Maize- Wheat/Gram/Mustard/B arley-S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Wheat and rabi maize area shifted to Toria/ barley/mustard/gram and multicut fodder crops. Torina: Bhawani, Sangam Mustard: Pusa Agarni Gram: Pratap Chana-1, Dahod Yellow, Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Proper basal dose will increase WUE 2. 25% increase in seed rate. 3. Seed treatment with Azoto. & PSB & cultures 4. Furrow irrigation/check basin method 5. Inter cropping gram + barley or barley + mustard/toria 6. Thiourea spray @ 500 ppm at reproductive phase. 7. Grow durum wheat 8. Grow late sown wheat varieties 9. Short duration varieties eg. Pratap chana-1 10. Apply irrigation at critical growth stages Pulses: Gram-flowering & pod development Wheat-CRI & flower	Harvested rain water can be used for sowing
	Coarse to medium texture moderately deep undulated hilly situation having average rain fall (600-800 mm)	Maize- Wheat/Gram/Mustard/B arley-S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Torina: Bhawani, Sangam Mustard: Pusa Agarni Gram: Pratap Chana-1, Dahod Yellow: Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Proper basal dose will increase WUE 2. 25% increase in seed rate. 3. Seed treatment with Azoto. & PSB & cultures 4. Furrow irrigation/check basin method 5. Inter cropping gram + barley or barley + mustard/toria 6. Thiourea spray @ 500 ppm at reproductive phase. 7. Grow durum wheat 8. Grow late sown wheat varieties 9. Short duration varieties eg. Pratap chana-1 10. Apply irrigation at critical growth stages Pulses: Gram-flowering & pod development Wheat-CRI & flower	Harvested rain water can be used for sowing

Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
Limited release of water in canals due to low rainfall	Canal/Lift Irrigated areas- Fine texture red loam to deep clay soils having high rain fall (>800 mm)	Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of rabi maize/wheat Mustard:Laxmi, Pusa Agarani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Sowing with conserved soil moisture in time+ Short duration varieties of gram 2. Furrow irrigation/skip furrow irrigation 3. Use of proper basal dose of fertilizers 4. Inter cropping gram + barley or barley + mustard/toria 5. Thiourea spray @ 500 ppm at reproductive phase. 6. Apply irrigation at critical growth stages 7. Use sprinkler & drip irrigation method 8. Chemical weed control. 	Harvested rain water can be used for sowing

	Coarse to medium texture moderately deep undulated hilly situation having average rain fall (600-800 mm)	Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of rabi maize/wheat Mustard:Laxmi, Pusa Agarani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Sowing with conserved soil moisture in time+ Short duration varieties of gram 2. Furrow irrigation/skip furrow irrigation 3. Use of proper basal dose of fertilizers 4. Inter cropping gram + barley or barley + mustard/toria 5. Thiourea spray @ 500 ppm at reproductive phase. 6. Apply irrigation at critical growth stages 7. Use sprinkler & drip irrigation method 8. Chemical weed control. 	Harvested rain water can be used for sowing
Condition			Suggested Contingency measures		
Non-release of water in canals under delayed onset of monsoon in catchment	Major farming situation	Crop/cropping system	Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
	Canal/Lift Irrigated areas- Fine texture red loam to deep clay soils having high rain fall (>800 mm)	Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of rabi maize/wheat Mustard:Laxmi, Pusa Agarani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Sowing on conserved soil moisture in time with short duration varieties of gram 2. Furrow irrigation/skip furrow irrigation 3. Use of proper basal dose of fertilizers 4. Inter cropping gram + barley or barley + mustard/toria 5. Thiourea spray @ 500 ppm at reproductive phase. 6. Apply irrigation at critical growth stages 7. Use sprinkler & drip irrigation method 	

	Coarse to medium texture moderately deep undulated hilly situation having average rain fall (600-800 mm)	Maize-Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat-S.Moong Soybean-Wheat	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of rabi maize/wheat Mustard:Laxmi, Pusa Agarani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ol style="list-style-type: none"> 1. Sowing on conserved soil moisture in time with short duration varieties of gram 2. Furrow irrigation/skip furrow irrigation 3. Use of proper basal dose of fertilizers 4. Inter cropping gram + barley or barley + mustard/toria 5. Thiourea spray @ 500 ppm at reproductive phase. 6. Apply irrigation at critical growth stages 7. Use sprinkler & drip irrigation method 	
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Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	Tank bed farming situation	Maize-Wheat/Gram/Mustard/Barley-S.Moong	Gram, Barley/toria, Linseed, Safflower	<ol style="list-style-type: none"> 1. Proper basal dose 2. Seed treatment with Azoto., PSB + Rhizo. 3. Life saving irrigation from tank through skip furrow irrigation 4. Crop mixtures. 5. Sprinkler & drip irrigation method 6. Apply irrigation at critical growth stages 7. Chemical weed control 	
	Fine texture red loam to deep clay soils having high rain fall (>800 mm)	Rice-Wheat-S.Moong Soybean-Wheat			

	<p>Tank bed farming situation</p> <p>moderately deep undulated hilly situation having average rain fall (600-800 mm)</p>	<p>Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat-S.Moong Soybean-Wheat</p>	<p>Gram, Barley/toria, Linseed, Safflower</p>	<ol style="list-style-type: none"> 1. Proper basal dose 2. Seed treatment with Azoto., PSB + Rhizo. 3. Life saving irrigation from tank through skip furrow irrigation 4. Crop mixtures. 5. Sprinkler & drip irrigation method 6. Apply irrigation at critical growth stages 7. Chemical weed control 	
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Condition			Suggested Contingency measures		
Insufficient groundwater recharge due to low rainfall	Major farming situation	Crop/cropping system	Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
	Lift irrigated/Well irrigated	1. Maize/urd-Wheat/gram/Mustard/Barley -S.Moong 2. Rice-Wheat/gram 3. Rice-S.Moong 4. Soybean-wheat 5. Cotton-Wheat 6.Urd/maize-rabi maize	Rabi crops of low water requirement mustard, toria, barley, gram, lin seed etc may be cultivated instead of wheat & rabi maize Drought tolerant varieties of different crops.	1. Proper basal dose of fertilizer through placement 2. Seed treatment & use high seed rate. 3. Adopt deficit irrigation of skip row irrigation methods. 4. Crop mixtures (Barley + Mustard) (Gram + Barley) 5. Improved method of micro irrigation. Eg. Sprinkler & drip irrigation method 6. Deep sowing 7. Irrigation at critical stages	
	Lift irrigated/Well irrigated	1. Maize/urd-Wheat/gram/Mustard/Barley -S.Moong 2. Rice-Wheat/gram 3. Rice-S.Moong 4. Soybean-wheat 5. Cotton-Wheat 6.Urd/maize-rabi maize	Rabi crops of low water requirement mustard, toria, barley, gram, lin seed etc may be cultivated instead of wheat & rabi maize Drought tolerant varieties of different crops.	1. Proper basal dose of fertilizer through placement 2. Seed treatment & use high seed rate. 3. Adopt deficit irrigation of skip row irrigation methods. 4. Crop mixtures (Barley + Mustard) (Gram + Barley) 5. Improved method of micro irrigation. Eg. Sprinkler & drip irrigation method 6. Deep sowing 7. Irrigation at critical stages	
Any other condition(specify)					

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Crop 1 Maize	Raised bed planting Sowing in flat beds followed by earthing at 30 DAS in maize facilitates quick drainage	Drainage Broadcast of urea after water removal	Picking of green cobs Broadcast of urea after water removal	Drainage Drying of the produce immediately after stop of rain
Crop 2 Soybean	Opening water out lets for quick drainage.	Drainage	Drainage	Drainage Drying of the produce immediately after stop of rain
Crop 3 Kharif Pulses	-do-	Drainage	Drainage	Drainage Drying of the produce immediately after stop of rain
Crop 4 Wheat	Very-very uncommon phenomenon	Avoid irrigation	Skip irrigation	Drainage Drying of the produce immediately after stop of rain
Crop 5 Gram	Very-very uncommon phenomenon	Avoid irrigation	Skip irrigation	Drainage Drying of the produce immediately after stop of rain
Horticulture				
Crop 1 Mango - Lime	Earthing up to 30 cm around the trunk Opening water outlets for quick drainage	Earthing up up to 30 cm around the trunk Opening water outlets for quick drainage	Crop harvested at physiological maturity stage & promote raw fruits products eg. mango squash replaced by keri pudina(Panna)	Crop harvested at physiological maturity stage & promote raw fruits products eg mango squash replaced by keri pudina (Panna)
Crop 2 Guava- Papaya	Earthing up up to 30 cm around the trunk Opening water outlets for quick drainage	Earthing up up to 30 cm around the trunk Opening water outlets for quick drainage	Crop harvested at physiological maturity stage & promote raw fruits products eg. mango squash replaced by keri pudina(Panna)	-do-

Crop 3 Vegetable	Proper drainage	Proper drainage Promote semi indeterminate type of vegetables Promote climber type of cucurbits with adequate support (eg. Parwal & bitter gourd)	Proper drainage Crop harvested at physiological maturity stage & promote raw vegetable products	Crop harvested at physiological maturity stage & promote raw vegetable products
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Heavy rainfall with high speed winds in a short span²				
Crop 1 Maize	Sowing in flat beds followed by earthing at 30-35 DAS provide mechanical support to the plant.	Ridging crop rows during early vegetative phase will help crop to with stand high wind speed Tying of 4-5 plants together	Harvest cobs at physiological maturity	
Crop 2 Soybean	Proper drainage & raise bed planting	Proper drainage	Proper drainage	
Crop 3 Kharif Pulses	Proper drainage & raise bed planting	Proper drainage	Proper drainage	
Crop 4 Wheat	Not a common phenomena			
Crop 5 Gram	Not a common phenomena			
Horticulture				
Crop 1 Mango - Lime	Use of wind break plants Promote dwarf varieties Proper drainage	Use of wind break plants Promote dwarf varieties Proper drainage	Promote raw fruit products eg. mango squash replaced by keri pudina(Panna)	Promote raw fruit products eg. mango squash replaced by keri pudina (Panna)
Crop 2 Guava- Papaya	Use of wind break plants Promote dwarf varieties Proper drainage	Use of wind break plants Promote dwarf varieties Proper drainage	Promote raw fruit products eg. mango squash replaced by keri pudina(Panna)	Promote raw fruit products eg. mango squash replaced by keri pudina (Panna)

Crop 3 Vegetable	Proper drainage Promote semi indeterminate type of vegetables Promote climber type of cucurbits with adequate support (eg. Parwal & bitter gourd)	Proper drainage Promote semi indeterminate type of vegetables Promote climber type of cucurbits with adequate support (eg. Parwal & bitter gourd)	Crop harvested at physiological maturity stage & promote raw vegetable products	Crop harvested at physiological maturity stage & promote raw vegetable products
Outbreak of pests and diseases due to unseasonal rains	Pest	Control		
Crop 1 Soybean	Plant protection measures for tobacco caterpillar			
Crop 2 Gram	Plant protection measures for pod borer			
Horticulture				
Crop 1(Specify)				

2.3 Floods – Not applicable

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

2.4 Extreme events: Heat wave (Cold wave/Frost/Hailstorm/Cyclone are not common in district)

Extreme event type	Suggested contingency measure			
	Seedling/nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Crop 1 S. Moong	Not common	Keep the soil moist through light irrigations	Keep the soil moist through light irrigations	Crop should be harvested at

				physiological maturity
Crop 2 Spring Maize	Not common	1.Keep the soil moist through light irrigations 2.Use of thiourea spray @ 500 ppm	1.Keep the soil moist through light irrigations 2.Use of thiourea spray @ 500 ppm at reproductive stage	
Horticulture				
Crops: Mango, Guava, Papaya and vegetable	1. Use of wind breaks plants. 2. Covered the main trunk of plants. 3. White wash plant trunk. 4. Spray of water to save from heat. 5. Maintain moisture in field.			
Cold Wave				
Crops: Mango, Guava, Papaya and vegetables		1. Create smokes during night 2. Covered the plants by bajra, maize etc. 3. Spray of sulphuric acid 0.1%. 4. Use of permanent wind break/shelter plant.		
Frost	N/A			
Hailstorm	N/A			
Cyclone	N/A			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Drought	Suggested contingency measures		
	Before the event	During the event	After the event
Feed and fodder availability	1. Formation of fodder depot in a nucleus of 10-20 villages 2. Enriching feed and fodder of low grades. 3. Formation of task force to supply feed and fodder with no cost or low cost	1. Formation task force of veterinary and animal scientist to assess gravity of drought and its effects on animal life. 2. Supply of feed and fodder to livestock owner on loan or low cost basis. 3. Press, radio and other media to know public for measures adopted by govt. machinery	1. Promotion of fodder crop cultivation. 2. Plantation of useful shrubs as animals feed.

Drinking water	1. Formation of water tanks near water resource like tube well, hand pump at public places. 2. Rain water harvesting structure to conserve water for drinking to livestock.	1. Filling the water tank through tankers. 2. Mobile task force may operate to extend relief to highly affected area.	1. Task force to assess the gravity of the event and planning to create basic drinking water facilities to live stock
Health and disease management	1. Formation of task force of veterinary and animal scientist in a nucleus of 10-20 village 2. Exploring possibilities of health effect due to drought. 3. Awareness in public through press, radio and other media	1. Assessment of disease investigation with mobile equipped unit to extend services at signal.	1. Isolation of affected animal and treating them Till normal situation is not attained. 2. Awareness in public to combat after effect of drought through press, radio and other media for extended services by Govt. or service organization.

Floods	NA		
Cyclone	NA		
Heat wave and cold wave			
Shelter/environment management	1. Awareness to public to combat heat and cold wave stress. 2. Formation of task force to create awareness for hot & cold wave and their effect.	1. Awareness to public to combat heat and cold wave storm. 2. Intend facilities to provide drinking water and temporary shelter to combat cold wave.	1. Awareness to public to combat heat and cold wave.
Health and disease management	1. Perhaps little effect on disease but health hazard due to heat storm.	1. Task force may operate where much heat and cold storm occurred.	1. Perhaps little effect on health

Based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Rural poultry/backyard poultry is reared on scavenging system therefore there is no need to prepare contingent plan with respect to feed and fodder.	Ensure supplementary feeding through kitchen waste/available grain.	Follow normal feeding routine.
Drinking water	Provision of sufficient waters/water pots.	Ensure sufficient water availability	Follow normal

		to birds.	routine practices.
Health and disease management	<ol style="list-style-type: none"> 1. Follow proper vaccination program. 2. Use deworming schedule. 3. Surveillance and disease monitoring programme should be followed. 	<ol style="list-style-type: none"> 1. Treatment and vaccination camp should be organized. 2. Establishment of mobile emergency vety. Medical unit. 	Follow routine health & disease management programme.
Floods	N/A	N/A	N/A
Cyclone	N/A	N/A	N/A
Heat wave and cold wave			
Shelter/environment management	<ol style="list-style-type: none"> 1. Construction/provision of proper shelter to poultry birds. 2. Put gunny bags/curtains on windows to prevent birds from cold/hot waves. 	Keep the birds in sheds in extreme weather	Follow routine practices.
Health and disease management	<ol style="list-style-type: none"> 1. Follow proper vaccination programme 2. Use deworming schedule. 3. Surveillance and disease monitoring programme should be followed. 	<ol style="list-style-type: none"> 1. Treatment and vaccination camp should be organized. 2. Establishment of mobile emergency vety. Medical unit. 	Follow routine health & disease management programme.

Based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture	-	-	-
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Harvest the available fish stock. Either market it if marketable size or stock in pond with sufficient water.	Desalination of ponds on drying. Weed clearance from pond bottom & embankments.	Stocking of fish seed on arrival of sufficient rain water.
(ii) Changes in water quality	Assess physic-chemical condition of water.	Use buffering agent like lime/alum based on water analysis.	Repeat water quality assessment.
(iii) Any other			
B. Aquaculture			
2) Floods	NA		
A. Capture			
Marine	NA		
Inland			
B. Aquaculture			
3. Cyclone / Tsunami	NA	NA	NA
4. Heat wave and cold wave			
A. Capture			
Marine	NA		
Inland	Selection of suitable species i.e. common carp and IMC for culture Sufficient water is to be maintained and assess water quality	Changing feeding regimes. De-stocking Add water to maintain temperature. Stop manuring	Maintain water level
B. Aquaculture			
(i) Changes in pond environment (water quality)	Selection of suitable species i.e. common carp and IMC for culture Sufficient water is to be maintained and assess water quality	Increase water depth. Providing oxygen supplementation. Changing feeding regimes Recalculating water. Add water to maintain temperature.	Maintain water level

		Stop manuring.	
(ii) Health and Disease management	Assess water quality and health status of soil biomass	Use recommended treatment against disease (if identified)	Routine management
(iii) Any other			

based on forewarning wherever available