

State: Rajasthan
Agriculture Contingency Plan for District: Dungarpur

1.0 District Agriculture Profile					
1.1	Agro-climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Arid Western Plain Zone-VI			
	Agro-climatic Region (Planning Commission)	Central Plateau & Hill Region VIII			
	Agro Climatic Zone (NARP)*	Humid Southern Plain Zone (Zone IV b)			
	List all the districts falling under the NARP zone	Banswara, Dungarpur, parts of Udaipur and Chittorgarh			
	Geographic coordinates of District	Latitude	Longitude	Altitude	
		23°83' N	73°72' E	225 m SL	
	Name and address of the concerned ZRS/	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, Faloj, Dungarpur				
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.)	713.2	30.8	25 th Standard Week (3 rd week of June)	37 th Standard Week (2 nd week of Sept.)
	NE Monsoon (Oct.-Dec.)	33.2	1.7	-	-
	Winter (Jan-March)	4.2	0.3	Jan	Occasional
	Summer (April-May)	9.6	0.5	May	Occasional
	Annual	760.2	33.3		

- 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. (latest statistics)	Geographical	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 (Lakh ha)	3.86	1.92	0.62	0.23	0.35	0.22	0.02	0.71	0.06	0.35

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Deep brown loamy	31.47	8.18
	2. Medium brown loamy	134.82	34.93
	3. Red gravely loam hilly soil	63.57	16.47
	4. Medium red loamy	109.05	28.25
	5. Shallow red gravely loam	46.97	12.17
	Others(specify)		
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	129.35	148.88
	Area sown more than once	63.22	
	Gross cropped area	192.57	
1.6	Irrigation	Area ('000 ha)	
	Net cultivated area	129.35	
	Net irrigated area	39.93	
	Gross cultivated area	192.57	
	Gross irrigated area	42.34	
	Rainfed area	89.42	
	Sources of Irrigation	Number	Area ('000 ha)
	Canals	-	5.98
	Tanks	900	3.75
	Open wells	29780	28.15
	Bore wells	295	1.68
	Lift irrigation	-	-
	Other sources		2.78
			1.44% of Gross cropped area

	Total		42.34	22.00% of Gross cropped area
	Pump sets	11180	21.80	
	Micro-irrigation			
	No. of tractors			
	Groundwater availability and use	No. of blocks	% area	Quality of water
	Over exploited	-		
	Critical	2		
	Semi-critical	2		
	Safe	1		
	Wastewater availability and use			

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

Area under Major field crops & horticulture etc.

1.7	Field crops		Total area		Irrigated		Rainfed	
	1	Maize	73073		9		73064	
	2	Rice	29975		371		29604	
	3	Wheat	41492		37893		3599	
	4	Kharif pulses	11943		0		11943	
	5	Gram	17046		834		16212	
		Horticulture crops-Fruits	Total area		Irrigated		Rainfed	
	1	Mango	391		391		-	
	2	Lime	24		24		-	
	3	Ber	14		14		-	
	4	Guava	10		10		-	
	5	Papaya	5		5		-	
		Horticultural crops-Vegetables	Total area		Irrigated		Rainfed	
	1	Okra	48		48		-	
	2	Tomato	41		41		-	
	3	Brinjal	36		36		-	
	4	Cauliflower	34		34		-	
	5	Onion	29		29		-	

	Medicinal and aromatic crops	Total area	Irrigated	Rainfed
1	-	Nil		
2	-	nil		
	Plantation crops	Total area	Irrigated	Rainfed
1	-	Nil		
2	-	nil		
	Fodder crops	Total area	Irrigated	Rainfed
1	Lucerne	446	446	-
2	Fodder Jowar	88	-	88
3	Fodder Bajra	84	84	-
4	Fodder Maize	68	-	68
5	Others	0		
	Total fodder crop area	686		
	Grazing land	-	-	

*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)	-	-	40.81
	Crossbred cattle	-	-	-
	Non descriptive Buffaloes (local low yielding)	-	-	64.72
	Graded Buffaloes	-	-	-
	Goat	-	-	375.03
	Sheep	-	-	124.16
	Others (Camel, Pig, Yak etc.)	-	-	2.79
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms		Total No. of birds ('000)
	Commercial	-		-
	Backyard	-		2.00
1.10	Fisheries (Data source: Chief Planning Officer)			
	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	
	-		8		805	
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)		5288	64.11	339		
Others		-	-	-		

1.11	Production & productivity of major crops	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Maize	122.89	1682	Wheat-76.13	1835				
	Paddy	58.86	1964	Gram-19.91	1168				
	Urd	8.98	760	Barley-2.43	2164				
				Mustard-0.62	994				
				-	-				
	Major Hort crops	Production (q)	Productivity (kg/ha)						
	Mango	3229	826						

	Lime	375	1563						
	Papaya	257	5140						
	Guava	152	1520						
	Pomegranate	62	3100						
Others	-	-	-						

1.12	Sowing window for 5 major crops (start and end of sowing period)	Maize	Paddy	Black gram	Wheat	Gram
	Kharif-Rainfed	3 rd week of June To 2 nd week of July	Upland: onset of monsoon to 2 nd week of July or transplanted - 3 rd week of July To 4 th week of July	1 st week of July to 3 rd week of July	-	-
	Kharif-Irrigated		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.

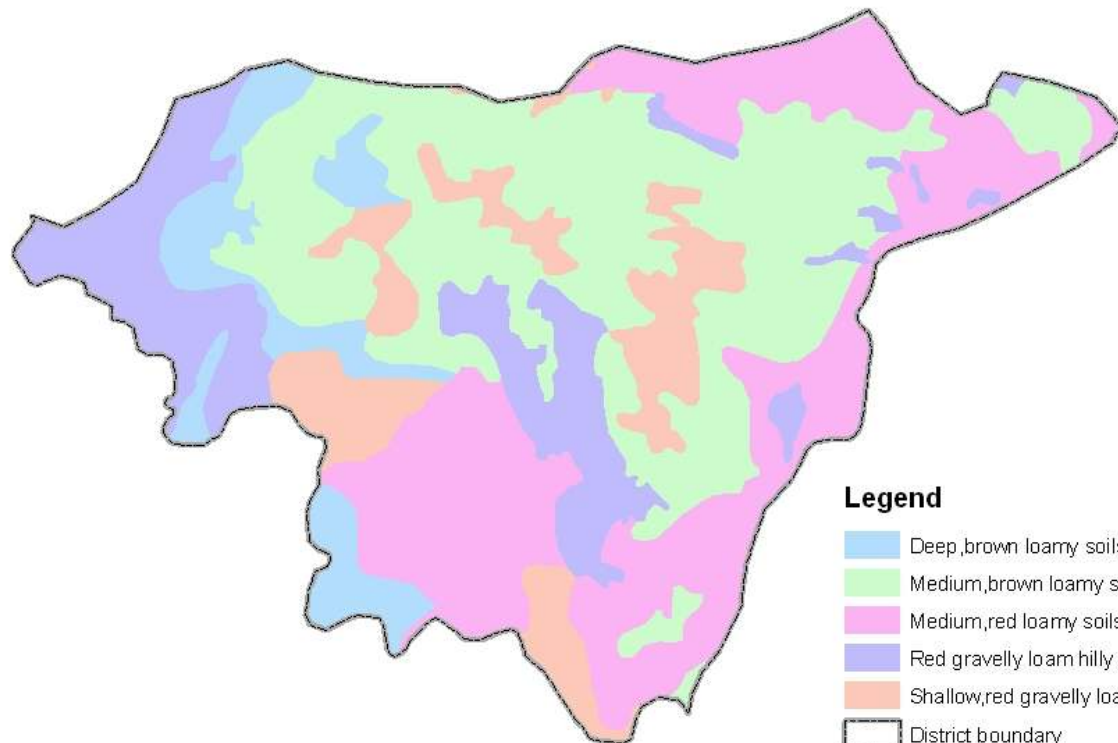
1.13	What is the major contingency the district is prone to?	Regular	Occasional	None
	Drought	√	.	-
	Flood	-	-	√
	Cyclone	-	-	√
	Hail storm	-	-	√

	Heat wave	-	√	-
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pests and diseases (specify)	White fly, Powdery Mildew, Pod Borer	Grasshopper, YMV in pulses, BLB in rice, rhizome rot of ginger	-

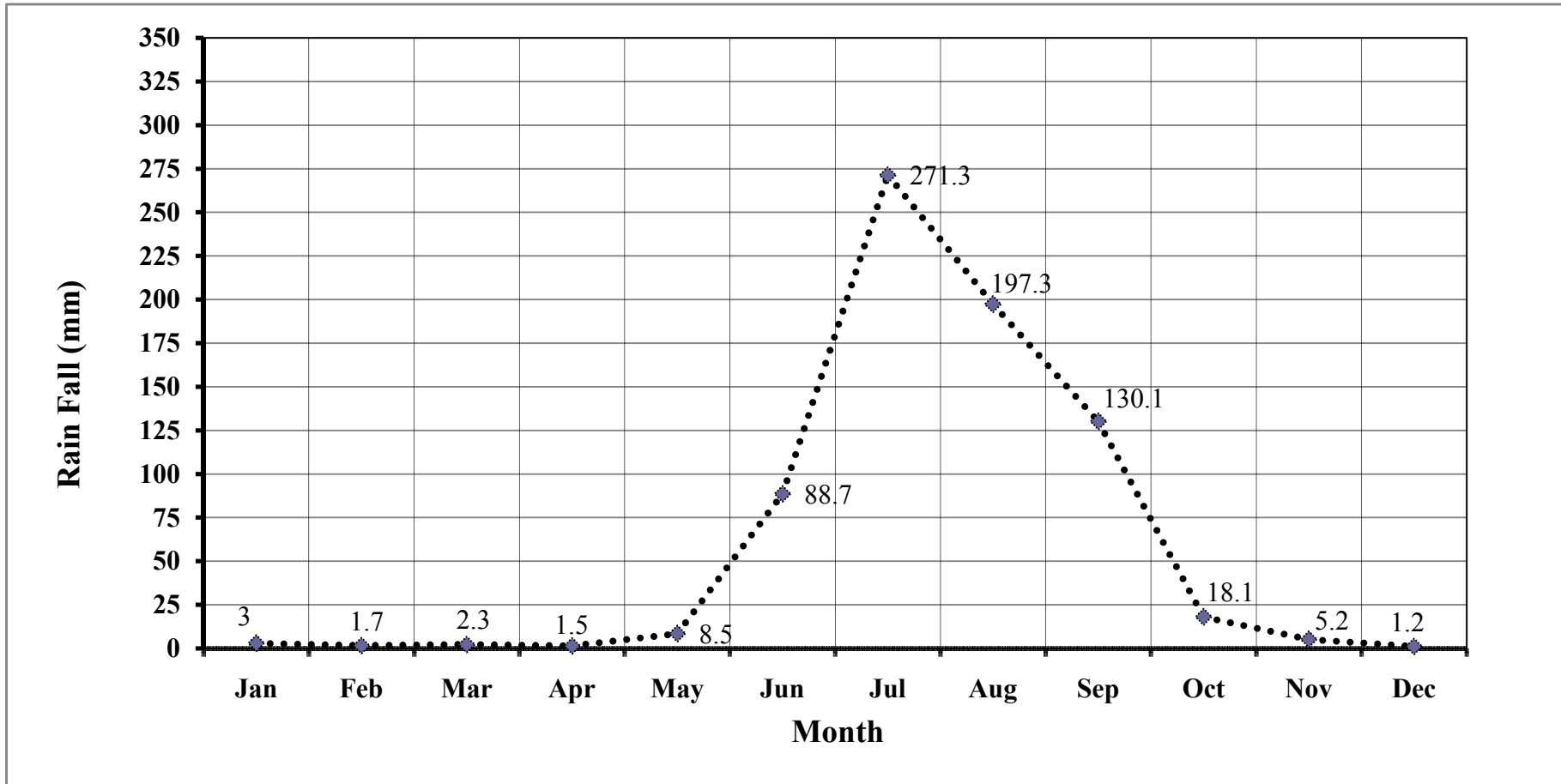
1.14	Include Digital maps of the district for	Location map of district with in State as Annexure 1	Enclosed: Yes/No
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes/No



Soils of Dungarpur district,Rajasthan



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



2.0 Strategies for Weather related contingencies

2.1 Drought

2.1.1 Rain fed situation

Condition Early season drought (delayed onset) Delay by 2 weeks (specify month) July 1 st week	Major farming situation	Crop/croppi ng system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on implementation
	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	Maize: PEHM-2, BiO-9681, Mahi Kanchan, Navjot Urd: T-9, Barkha, PU-31,	1. Dry sowing 2. Seed priming/seed hardening	Seed of short duration varieties must be insured through NSC, RSSC and other seed sources
	Brown loamy medium to deep soil	Paddy/Maize	Maize: PEHM-2, BiO-9681, Mahi Kanchan, Navjot Upland Rice: Ashoka-200F, Kalinga-3, Transplanted Rice: Pusa Sugandha-4, Pusa Sugandha-5, IR-64, Mahi Sugandha	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
	Red gravelly loam hilly eroded soil	Maize/Urd/ pigeon pea/ castor	Maize: PEHM-2, BiO-9681, Mahi Kanchan, Navjot Urd: T-9, Barkha, PU-31, Pigeonpea: ICPL-87, BDN-2 Caster :Aruna, GAUCH-1, GSH-4	1. Seed priming.	Seed of short duration varieties must be insured through NSC, RSSC and other seed sources

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 4 weeks (specify month) July 3rd week	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	Urd/Til Or Maize for green cobs/Fodder (African Tall) Urd: T-9, Barkha, PU-31 Sesame: RT-46, RT-125, Maize: 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
	Brown loamy medium to deep soil	Paddy/Maize	Urd//Til/Cluster bean Or Maize for green cobs/Fodder (African Tall) Urd: T-9, Barkha, PU-31 Sesame: RT-46, RT-125, Cluster Bean: RG-936, RGC-1017 Transplanted Rice	<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
	Red gravelly loam hilly eroded soil	Maize/Urd/pigeon pea/castor	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

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 (specify month) Aug 1st week	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd Maize Fodder/Bajra Fodder/Castor/ Minor Millet	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
	Brown loamy medium to deep soil	Maize Fodder/ Bajra Fodder/ Castor/ Minor Millet	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 gravelly loam hilly eroded soil	Maize Fodder/ Bajra Fodder/ Castor/ Minor Millet	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

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 8 weeks (specify month) Aug 3rd week	Red gravelly loam hilly shallow to medium deep soil	Fallow/Fodder	1. Kharif fallow –Torla/Taramira/ Mustard/ Linseed/Castor/ Gram for green pods 2. fodder crop Torla: Bhawani, Sangam Taramira: T-27, RTM-1 Mustard: Pusa Agirani 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
	Brown loamy medium to deep soil	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 Agirani 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
	Red gravelly loam hilly eroded soil	Fallow/Fodder	<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 	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 2 nd wk
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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.	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	<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 inter-cultural operations Removal weeds in time Use of weeds for mulching 	
	Brown loamy medium to deep soil	Paddy/Maize	<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 for paddy and for maize gap filling with Maize/pulses 	<ul style="list-style-type: none"> Removal weeds in time Use of weeds for mulching 25% additional N fertilizer at the time of tillering for paddy 	
	Red gravelly loam hilly eroded soil	Maize/Urd/pigeon pea/cas	<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 Pulses 	<ul style="list-style-type: none"> Creating soils mulch through light inter-cultural 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	Crop/cropping system	Crop Management	Soil nutrient & moisture conservation measures	Remarks on implementation
At vegetative stage (30-40 DAS)	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	<ul 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 at 6-8 intervals for conserving rain water • Remove alternate rows • 7Life saving irrigation if possible. 	<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 	
	Brown loamy medium to deep soil	Paddy/Maize	<ul style="list-style-type: none"> • Clean cultivation through repeated light intercultural operations. • Spray of 2% urea in 800-1000 lit water • Mulching (green leaf)/insitu mulching by removing alternate rows in upland rice. • Maintain only saturated condition for transplanted rice. • Tying of ridges of 6-8 intervals for conserving rain water • Remove alternate rows for maize 	<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 	
	Red gravelly loam hilly eroded soil	Maize/Urd/pigeon pea/cast	<ul 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 	<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 	

			and retain hardy crop (Ex. Maize out of Pigeonpea + Maize)	- Mulching	
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Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Crop Management	Soil nutrient & moisture conservation measures	Remarks on implementation
At reproductive stage (45-55 DAS)	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	<ul style="list-style-type: none"> Life saving irrigation if possible Maize can be harvested for baby corn if market is available Removal of lower leaves in maize for fodder 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	
	Brown loamy medium to deep soil	Paddy/Maize	<ul style="list-style-type: none"> Life saving irrigation if possible Maintain sub saturated to saturated condition for transplanted rice to avoid soil cracks. In situ mulching of weeds 4.Maize can be harvested for baby corn if market is available 	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 gravelly loam hilly eroded soil	Maize/Urd/pigeon pea/cas	<ul style="list-style-type: none"> Life saving irrigation if possible Maize should be harvested for baby corn if market is available Removal of lower leaves in maize/removal of alternate rows in maize for fodder. 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	

Terminal drought	Major farming situation	Crop/cropping system	Crop Management	Rabi Crop Planning	Remarks on implementation
(Beyond 60-70 DAS)	Red gravelly loam hilly shallow to medium deep soil	Maize/Urd	<ul style="list-style-type: none"> Spray of 2% urea in 800-1000 liter water and can be repeated after 7 days. Removal of lower levels for fodder in maize Life saving irrigation if available Harvesting at physiological maturity stage. Thio urea spray @ 500 ppm Antitranspirants 	Rain water must be harvested in season and can be used during terminal drought on deficit irrigation principles.	<ol style="list-style-type: none"> Early harvesting of <i>kharif</i> crops. Sowing of early varieties of mustard or toria before <i>rabi</i> sowing if rains.
	Brown loamy medium to deep soil	Paddy/Maize	<ul style="list-style-type: none"> Spray of 2% urea in 800-1000 liter water. Life saving irrigation if available Harvesting at physiological maturity stage. Thio urea spray @ 500 ppm 	<ol style="list-style-type: none"> Rain water must be harvested in season and can be used during terminal drought. Transplanted paddy must be kept on saturated soil conditions to avoid soil cracks. 	<p>Early harvesting of <i>kharif</i> crops.</p> <p>Sowing of early varieties of mustard or toria before <i>rabi</i> sowing if rains.</p>
	Red gravelly loam hilly eroded soil	Maize/Urd/pigeon pea/cas	<ul style="list-style-type: none"> Spray of 2% urea in 800-1000 liter water. Removal of lower levels for fodder in maize Harvesting at physiological maturity stage. Removal of susceptible crop for fodder from crop mixtures. Thio urea spray @ 500 ppm 	-	-

2.1.2 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-Medium to deep brown loamy soil having high rain fall (>700 mm)	Maize-Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	Wheat area shifted to Toria/ barley/mustard/gram and multicut fodder crops. Toria: Bhawani, Sangam Mustard: Pusa Agirani Gram: Pratap Chana-1, Dahod Yellow, Barley: RD-2052, RD-2035, RD-2508 Wheat : HI 8498, HI-1500	<ul style="list-style-type: none"> • Proper basal dose will increase WUE • 25% increase in seed rate. • Furrow irrigation/check basin method • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. • Grow durum wheat varieties • Grow late sown wheat varieties Raj 3077, Raj 3765 • Apply irrigation at critical growth stages • Pluses (Gram) flowering & pod development • Wheat-CRI & flowering
	Medium to shallow red loam hilly skeletal soil having low rain fall (< 700 mm)	Maize-Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	Toria: Bhawani, Sangam Mustard: Pusa Agarani Gram: Pratap Chana-1, Dahod Yellow: Barley: RD-2052, RD-2035, RD-2508 Wheat : HI 8498, HI-1500	<ul style="list-style-type: none"> • Proper basal dose will increase WUE • 25% increase in seed rate. • Furrow irrigation/check basin method • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. • Grow durum wheat varieties • Grow late sown wheat varieties Raj 3077, Raj 3765 • Apply irrigation at critical growth stages • Pulses (Gram) flowering & pod development • Wheat-CRI & flowering 	Harvested rain water can be used for sowing

Condition			Suggested Contingency measures		
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- Medium to deep brown loamy soil having high rain fall (>700 mm)	Maize- Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of wheat Mustard:Laxmi, Pusa Agirani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ul style="list-style-type: none"> • Sowing with conserved soil moisture in time with short duration varieties of gram • Furrow irrigation/skip furrow irrigation • Use of proper basal dose of fertilizers for higher WUE. • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. • Apply irrigation at critical growth stages • Chemical weed control should be performed. 	Harvested rain water can be used for sowing
	Medium to shallow red loam hilly skeletal soil having low rain fall (< 700 mm)	Maize- Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	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	<ul style="list-style-type: none"> • Sowing with conserved soil moisture in time with short duration varieties of gram • Furrow irrigation/skip furrow irrigation • Use of proper basal dose of fertilizers for higher WUE. • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. • Apply irrigation at critical growth stages • Chemical weed control should be performed. 	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- Medium to deep brown loamy soil having high rain fall (>700 mm)	Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat/gram- S.Moong Blackgram-gram/ mustard	Toria, Mustard, Lin seed, Barley for fodder & safflower instead of wheat Mustard:Laxmi, Pusa Agirani Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508 Durum wheat : HI 8498, HI 1500	<ul style="list-style-type: none"> • Sowing with conserved soil moisture in time with short duration varieties of gram & mustard • Furrow irrigation/skip furrow irrigation • Use of proper basal dose of fertilizers for having higher WUE • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. 	
	Medium to shallow red loam hilly skeletal soil having low rain fall (< 700 mm)	Maize- Wheat/Gram/Mustard/Barley- S.Moong Rice-Wheat/gram- S.Moong Blackgram-gram/ mustard	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	<ul style="list-style-type: none"> • Sowing with conserved soil moisture in time with short duration varieties of gram • Furrow irrigation/skip furrow irrigation • Use of proper basal dose of fertilizers for higher WUE • Inter cropping gram + barley or barley + mustard/toria • Thiourea spray @ 500 ppm at reproductive phase. 	

Condition			Suggested Contingency measures		
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	Major farming situation	Crop/cropping system	Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
	Canal/Lift Irrigated areas- Medium to deep brown loamy soil having high rain fall (>700 mm)	Maize- Wheat/Gram/Mu stard/Barley- S.Moong Rice- Wheat/gram- S.Moong Blackgram-gram/ mustard	Gram, Barley/toria, Linseed, Safflower Gram-Pratap chana-1, Dahod yellow Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ul style="list-style-type: none"> • Proper basal dose for higher WUE • Life saving irrigation from tank through skip furrow irrigation • Crop mixtures (barley+gram), (gram+mustard). • Apply irrigation at critical growth stages with deficit irrigation • Chemical weed control 	
	Medium to shallow red loam hilly skeletal soil having low rain fall (< 700 mm)	Maize- Wheat/Gram/Mu stard/Barley- S.Moong Rice- Wheat/gram- S.Moong Blackgram-gram/ mustard	Gram, Barley/toria, Linseed, Safflower Gram-Pratap chana-1, Dahod yellow Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508	<ul style="list-style-type: none"> • Proper basal dose for higher WUE • Life saving irrigation from tank through skip furrow irrigation • Crop mixtures (barley+gram), (gram+mustard). • Apply irrigation at critical growth stages with deficit irrigation • Chemical weed control 	

Condition	Major farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in Crop / Cropping system	Agronomic measures	Remarks on implementation
Insufficient groundwater recharge due to low rainfall	Canal/Lift Irrigated areas- Medium to deep brown loamy soil having high rain fall (>700 mm)	Maize- Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	Rabi crops of low water requirement mustard, toria, barley, gram, lin seed etc may be cultivated instead of wheat Drought tolerant short duration varieties of different crops. Gram-Pratap chana-1, Dahod yellow Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508 Mustard: Pusa Agarani, Laxmi, Bio-902 Durum wheat : HI 8498, HI 1500	<ul style="list-style-type: none"> • Proper basal dose of fertilizer for higher WUE. • Adopt deficit irrigation or skip row irrigation methods. • Crop mixtures • (Barley + Mustard), (Gram + Barley) • Adopting improved method of micro irrigation. • Deep sowing • Irrigation at critical stages • Special care for termite management. 	
	Medium to shallow red loam hilly skeletal soil having low rain fall (< 700 mm)	Maize- Wheat/Gram/Mustard/Barley-S.Moong Rice-Wheat/gram-S.Moong Blackgram-gram/mustard	Rabi crops of low water requirement mustard, toria, barley, gram, lin seed etc may be cultivated instead of wheat. Drought tolerant varieties of different crops. Gram-Pratap chana-1, Dahod yellow Toria : Bhavani, Sangam Barley: RD-2052, RD-2035, RD-2508 Mustard: Pusa Agarani, Laxmi, Bio-902	<ul style="list-style-type: none"> • Proper basal dose of fertilizer for higher WUE. • Adopt deficit irrigation or skip row irrigation methods. • Crop mixtures • (Barley + Mustard), (Gram + Barley) • Adopting improved method of micro irrigation. • Eg. Sprinkler & drip irrigation method • Deep sowing • Irrigation at critical stages • Special care for termite management. 	
Any other condition(specify)					

2.2 Unusual rains (untimely, unseasonable etc.) (For both rain fed and irrigated situations)

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
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 rain
Crop 2 Kharif pulses	Opening water out lets for quick drainage.	Drainage	Drainage	Drainage Drying of the produce immediately after rain
Crop 3 Wheat	Very-very uncommon phenomenon	Avoid irrigation	Drainage	Drainage Drying of the produce immediately after rain
Crop 4 Gram	Very-very uncommon phenomenon	Avoid irrigation	Drainage	Drainage Drying of the produce immediately after 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 & promotes 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 & promotes 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	Harvest crop at physiological maturity stage & promote raw vegetable products
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Heavy rainfall with high speed winds in a short span²	NA			
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	Harvest cobs at physiological maturity	
Crop 2 Kharif Pulses	Proper drainage & raise bed planting	Proper drainage	Proper drainage	
Crop 3 Wheat	Not a common phenomena			
Crop 4 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 kerri pudina(Panna)	Promote raw fruit products eg. mango squash replaced by kerri 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 kerri pudina(Panna)	Promote raw fruit products eg. mango squash replaced by kerri 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	Harvest crop ^v at physiological maturity stage & promote raw vegetable products
Outbreak of pests and diseases due to unseasonal rains				
Gram	Plant protection measures for pod borer			
Horticulture				
Crop 1(Specify)				

2.3 Flood – 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			
Horticulture				
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	<ul style="list-style-type: none"> • Keep the soil moist through light irrigations • Use of thiourea spray @ 500 ppm 	<ul style="list-style-type: none"> • Keep the soil moist through light irrigations • Use of thiourea spray @ 500 ppm at reproductive stage 	
Horticulture				
Crops: Mango, Guava, Papaya and vegetable	<ul style="list-style-type: none"> • Use of wind break plants. • Covered the main trunk of plants. • White wash plant trunk. • Spray of water to save from heat. • Maintain moisture in field. 	N/A	<ul style="list-style-type: none"> • N/A 	
Cold Wave				
Crops: Mango, Guava, Papaya and vegetables		<ul style="list-style-type: none"> • Create smokes during night • Cover the plants by bajra, maize stover etc. • Spray of sulphuric acid 0.1%. • Use of permanent wind break/shelter plant. 		
Frost	N/A			
Hailstorm	N/A			
Horticulture	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	<ul style="list-style-type: none"> • Formation of fodder depot in a nucleus of 10-20 villages • Enriching feed and fodder of low grades. • Formation of task force to supply feed and fodder with no cost or low cost 	<ul style="list-style-type: none"> • Formation task force of veterinary and animal scientist to assess gravity of drought and its effects on animal life. • Supply of feed and fodder to livestock owner on loan or low cost basis. • Press, radio and other media to know public for measures adopted by govt. machinery 	<ul style="list-style-type: none"> • Promotion of fodder crop cultivation. • Plantation of useful shrubs as animals feed.
Drinking water	<ul style="list-style-type: none"> • Formation of water tanks near water 	<ul style="list-style-type: none"> • Filling the water tank through tankers. 	<ul style="list-style-type: none"> • Task force to assess the

	<p>resource like tube well, hand pump at public places.</p> <ul style="list-style-type: none"> • Rain water harvesting structure to conserve water for drinking to livestock. 	<ul style="list-style-type: none"> • Mobile task force may operate to extend relief to highly affected area. 	<p>gravity of the event and planning to creative basic drinking water facilities to live stock</p>
Health and disease management	<ul style="list-style-type: none"> • Formation of task force of veterinary and animal scientist in a nucleus of 10-20 village • Exploring possibilities of health effect due to drought. • Awareness in public though press, radio and other media 	<ul style="list-style-type: none"> • Assessment of disease investigation with mobile equipped unit to extend services at signal. 	<ul style="list-style-type: none"> • Isolation of affected animal and treating them Til normal situation is not attained. • 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	<ul style="list-style-type: none"> • Awareness to public to combat heat and cold wave stress. • Formation of task force to create awareness for hot and cold wave and their effect. 	<ul style="list-style-type: none"> • Awareness to public to combat heat and cold wave storm. • Intend facilities to provide drinking water and temporary shelter to combat cold wave. 	<ul style="list-style-type: none"> • Awareness to public to combat heat and cold wave.
Health and disease management	<ul style="list-style-type: none"> • Perhaps little effect on disease but health hazard due to heat stork. 	<ul style="list-style-type: none"> • Task force may operate where much heat and cold storm occurred. 	<ul style="list-style-type: none"> • 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 to birds.	Follow normal routine practices.
Health and disease	1. Follow proper vaccination program.	• Treatment and vaccination camp	Follow routine

management	2. Use deworming schedule. 3. Surveillance and disease monitoring programme should be followed.	should be organized. • Establishment of mobile emergency vety. Medical unit.	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	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	1. Follow proper vaccination programme 2. Use deworming schedule. 3. Surveillance and disease monitoring programme should be followed.	• Treatment and vaccination camp should be organized. • 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			
(vi) Any other			
3. Cyclone / Tsunami	NA	NA	NA
A. Capture			
Marine	NA		
Inland			
B. Aquaculture	NA		
(vi) Any other			
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.	Increase water depth.	Maintain water level

	common carp and IMC for culture Sufficient water is to be maintained and assess water quality	Providing oxygen supplementation. Changing feeding regimes Recalculating water. Add water to maintain temperature. 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