State: Uttar Pradesh

Agriculture Contingency Plan for District: Moradabad

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumib (Dry) Eco-Region (9.1)		
	Agro-Climatic Zone (Planning Commission)	Upper Gangetic Plain Region (V)		
	Agro Climatic Zone (NARP)	Bhabar And Terai Zone (UP-2)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Pilibhit, Bareilly, Rampur, Moradabad, Shahjanpur, Badaun, Bijnor, Jyotibaphule Nagar		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		28^0 50’ 33.826” N	78^0 46’ 48.535”E	885 mt.
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	-		
	Mention the KVK located in the district with address	K.V.K, Rushatam Nagar, Bilari, Moradabad of S.V.P.U. A & T, Meerut		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	S.V.P.U. A & T, GB Pant University of Agriculture & Technology, Pantnagar		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep)	815	54	2^{nd} week of June	3^{rd} week of September
	NE Monsoon(Oct-Dec)	38	12	3^{rd} week of December	2^{nd} week of January
	Winter (Jan- March)	66	14	-	-

	Summer (Apr-May)	24	7	-	-
	Annual	943	87	-	-

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	375.979	315.451	0.064	42.449	0.429	1.519	2.368	3.226	2.368	2.386

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total**
	Sandy loam soils	89.43	28.35
	Loam soils	102.71	32.56
	Clay loam soils	101.61	32.21
	Silt loam soils	20.19	6.4

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	315.451	177.80%
	Area sown more than once	245.421	
	Gross cropped area	560.872	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	260.575		
	Gross irrigated area	490.930		
	Rainfed area	54.876		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		10.718	4.11 %

	Tanks		0.120	0.046 %
	Open wells		121.038	46.45 %
	Bore wells		124.337	47.77 %
	Lift irrigation schemes		-	-
	Micro-irrigation		-	-
	Other sources		4.362	1.67 %
	Total Irrigated Area		260.575	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils Block-13	(%) area	Quality of water
	Over exploited	3	6.60, 8.96	Not reported
	Critical	3	7.45,6.86,8.05	do
	Semi- critical	5	-	do
	Safe	2	-	do
	Wastewater availability and use	-	-	do
	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 of 2008-09)

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*			Summer	
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		Grand total
	Rice	102.00	18.321	120.321	38.14	-	-	-	120.321
	Wheat	-	-	-	200.496	-	200.496	-	200.496
	Sugarcane	-	-	-	68.437	-	68.437	-	68.437
	Maize	-	2.148	2.148	-	-	-	-	2.148
	Mustard	-	-	-	3.000	7.400	10.400	-	10.400
	Toria	-	-	-	5.439	8.556	13.995	-	13.995
	Lentil	-	-	-	-	1.590	1.590	-	1.590

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	**Irrigated**	**Rainfed**
	Mango	9.230	5.538	3.692
	Guava	1.590	0.954	0.637
	Horticulture crops - Vegetables			
	potato	9.179	9.179	-
	Cucurbits	7.321	7.321	-
	Pea	0.350	0.350	-
	Medicinal and Aromatic crops			
	Mentha	2.321	2.321	-
	Others	0.567	0.567	-
	Plantation crops			
	Eucalyptus	6.258	-	6.258
	Poplar	9.517	9.517	-
	Fodder crops			
	Sorghum	16.325	4.200	12.125
	Bajra	4.158	-	4.158
	Berseem	4.562	4.562	-
	Total fodder crop area	25.046	8.762	16.283
	Grazing land	0.128	-	0.128
	Sericulture etc	-	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	109.913	255.984	365.897
	Improved cattle & Crossbred cattle	16.715	44.138	60.853
	Non descriptive Buffaloes	126.315	482.786	609.102
	Descript Buffaloes	54.135	206.908	261.043
	Goat	55.947	106.969	162.916
	Sheep(Indigenous + Exotic)	(1.773+.444) 2.217	(3.491+.0333) 3.824	6.041

	Others (Camel, Pig, Yak etc.)			1140.380
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	1	50.00	
	Backyard		(41.231+50.799) 92.030	

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**

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 major crops** (Average of last 5 years: 2008-09)

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)	

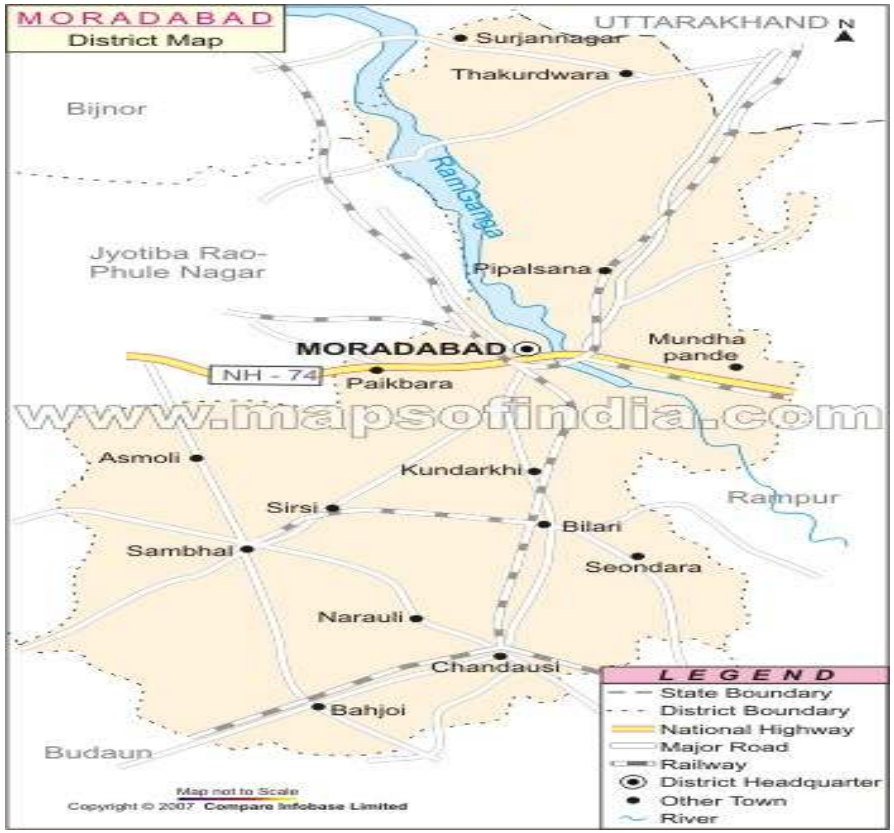
Major Field crops (Crops identified based on total acreage)										
	Rice	279.506	2323	-	-	-	-	279.506	2323	290.69
	Maize	3.209	1494	-	-	-	-	3.209	1494	1.80
	Wheat	-	-	646.600	3225	-	-	646.600	3225	808.25
	Sugarcane	-	-	4085.141	596920	-	-	4085.141	596920	612.77
	Mustard	-	-	11.220	1079	-	-	11.220	1079	-
	Toria	-	-	12.846	918	-	-	12.846	918	-
Major Horticultural crops (Crops identified based on total acreage)										
	Lentil	-	-	1.242	781	-	-	1.242	781	1.74
	Mentha	-	-	0.214	162	-	-	0.214	162	-
	Mango	-	-	-	-	-	-	115.609	12525	-
	Potato	-	-	235.294	25634	-	-	235.294	25634	-
	Pea	-	-	5.337	15250	-	-	5.337	15250	-
	Cucurbits	118.97	162500	-	-	-	-	118.97	162500	-

1.12	**Sowing window for 5 major field crops**	**Rice**	**Wheat**	**Sugarcane**	**Toria/ Mustard**	**Mentha**
	Kharif- Rainfed	June-July	-	-	-	-
	Kharif-Irrigated	June-July	-	October	-	-
	Rabi- Rainfed	-	November - December	-	September-October	-
	Rabi-Irrigated	-	November - December	March-April	October	January-March

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		√	
	Flood		√	
	Cyclone			√
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	Frost		√	
	Sea water intrusion			√
	Sheath Blight, Stemborrer, Pyrilla Loos smut, Heliothis, Rust etc white grub.	√		
	Fog			

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- II	Enclosed: Yes
		Soil map as Annexure- III	Enclosed: Yes

Annexure I


MORADABAD
District Map
UTTARAKHAND
N
Surjannagar
Thakurdwara
Bijnor
Ramganga
Jyotiba Rao-
Phule Nagar
Pipalsana
MORADABAD
Mundha
pande
NH - 74
Paikbara
www.mapsofindia.com
Asmoli
Kundarkhi
Rampur
Sirsi
Bilari
Sambhal
Seondara
Narauli
Chandausi
LEGEND
State Boundary
District Boundary
National Highway
Major Road
Railway
District Headquarter
Other Town
River
Bahjoi
Budaun
Map not to Scale
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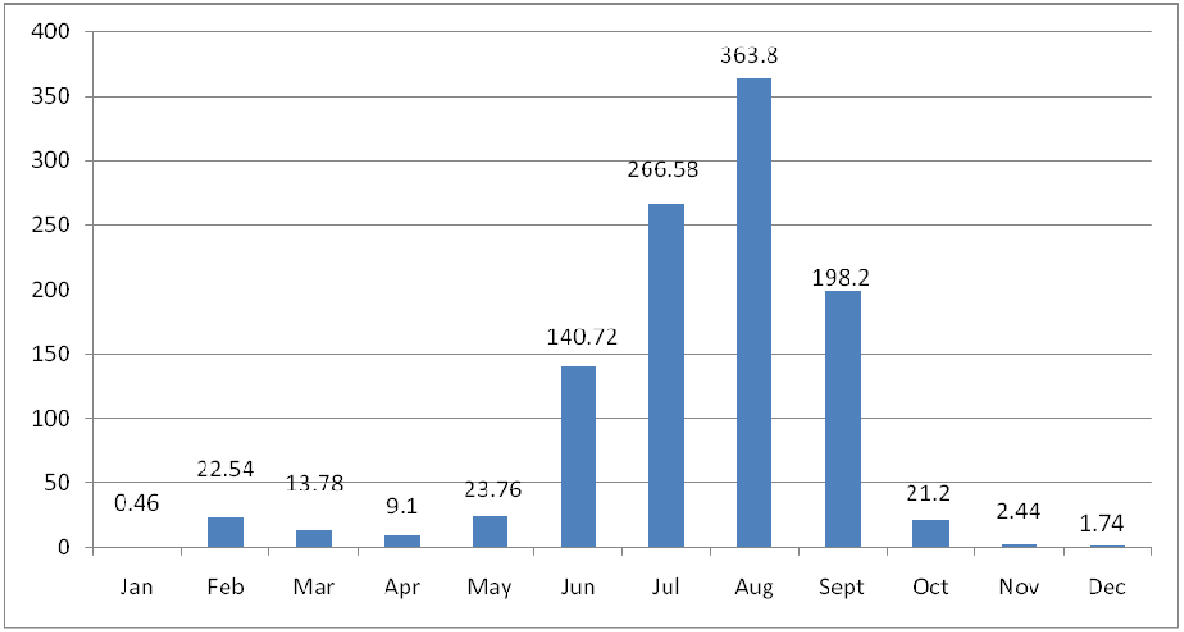
Annexure II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363.8
198.2
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Jan
Feb
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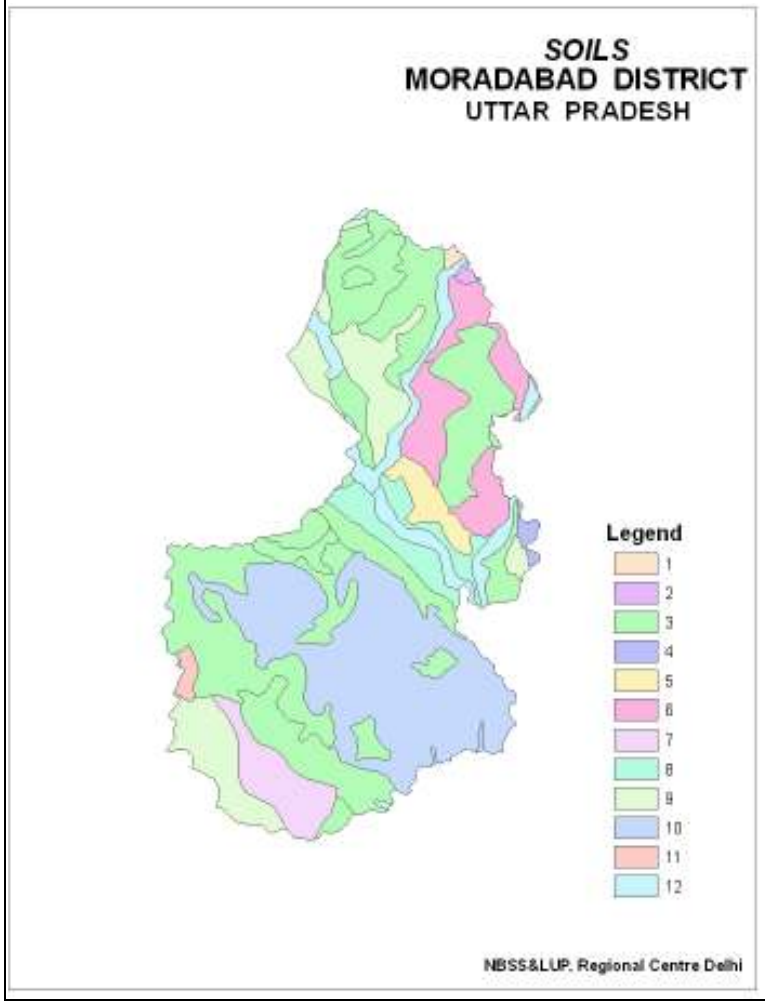
Annexure III



Tarai (1-3% slope)

1. Deep, loamy soils and slightly eroded associated with loamy over sandy skeletal soils
2. Deep, loamy soils and slightly eroded

Alluvial plain (0-1% slope)

3. Deep, loamy soils and slightly eroded .
4. Deep, loamy soils and slightly eroded associated with silty soils .
5. Deep, fine soils and slightly eroded associated with loamy soils .
6. Deep, loamy soils, moderate salinity and sodicity associated with loamy soils with moderate salinity and strong sodicity
7. Deep, loamy soils and slightly eroded associated with loamy soils with moderate salinity and sodicity and moderate water logging.
8. Deep, silty soils associated with loamy soils slightly eroded .

Old Alluvial plain with river left out channels/Oxbows/point bars (1-3% slope)

9. Deep, loamy soils and slightly eroded associated with stratified loamy soils slightly eroded

Old Alluvial Plain with occasional sandunes (1-3% slope).

10. Deep, loamy soils and slightly eroded associated with sandy soils and moderately eroded
11. Deep, loamy soils and slightly eroded associated with loamy over sandy soils and moderately eroded

Active Flood Plain (1-3% slope)

12. Deep, sandy soils with moderate flooding associated with stratified loamy soils and slight flooding .

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[a]**	**Normal Crop / Cropping system[b]**	**Change in crop / cropping system[c] including variety**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks 4th week of June	Deep soil, yellow color alluvial loam soils	Maize/ Sorghum/ Bajra/ Pigeonpea	**Maize:** Kanchan, Navin Navjyoti, Azad utam,Surya,Meerut pili,Ganga 2,11 Samrat etc **Sorghum:** CSH 14, 16, CSB 13, 15, SPB 1338 etc **Bajra:**Raj-171,WCC-75,Pusa 23, 322 ICMH-451 **Pigeonpea:** UPAS 120, ICPL 151,Pusa 33	Conservation furrow, Inter-cultivation, Sowing with multi seed dril,l Wider spacing for pigeonpea	Seed-drill under RKVY, Supply of seed through govt. agencies *ie*. NFSM, RKVY
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks 2nd week of July	Deep soil, yellow color alluvial loam soils	Maize/ Bajra/ Sesame/Blackgram	**Maize:** Kanchan, Navin Navjyoti, Azad utam,Surya,Meerut pili,Ganga 2,11 Samrat etc **Bajra:**Raj-171,WCC-75,Pusa 23, 322 ICMH-451 **Sesame:** Pergati, shekar, TA-78, TA-12 **Blackgram:** Narender Blackgram-1, Pant U-30, 19, 35 etc	Conservation furrow, Inter-cultivation, Sowing with multi seed drill	Seed-drill under RKVY, Supply of seed through govt. agencies *ie*. NFSM
Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation**
Delay by 6 weeks 4th week of July	Deep soil, yellow colored alluvial loam soils	Blackgram/Greengram / Bajra	**Blackgram:** Narender Blackgram-1, Pant U-30, 19, 35 **Greengram:** Pant Mung bean -2, 3, Narender mung -1, 4, SML-668, PDM-11	Sowing with multi seed drill	

			Bajra: Raj-171,WCC-75,Pusa 23, 322 ICMH-451		
Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation[a]**		**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 8 weeks 2nd week of August	Deep soil, yellow colored alluvial loam soils	Toria	**Toria:** P.T.-30, 507, 303, Bhawani, T-9	Conservation furrow, Inter-cultivation, Sowing with multi seed drill	Seed-drill under RKVY, Supply of seed through govt. agencies *ie*. NFSM

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop / Cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Irrigated upland	Rice/ Sugarcane/ Maize/ Sorghum (Fodder)	1. Thining, weeding and gap filling in existing crop. 2. Re sowing 3. Selection/nursery sowing of short duration rice cultivar	Inter cultivation, Conservation furrow, Thinning and weeding, Mulching	Supply of inter cultural implements through RKVY, Farm ponds through IWSM programme, Pulse crop seeds supply through NFSM
	Irrigated lowland	Rice/ Sugarcane/ Sorghum (Fodder)			
	Un irrigated upland	Maize/ Sorghum/ Pigeonpea			
	Un irrigated lowland	Blackgram/ Greengram			
Condition			**Suggested Contingency measures**		
Mid season	**Major**	**Normal Crop/cropping**	**Crop management**	**Soil nutrient & moisture**	**Remarks on Implementation**

drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Farming situation**[a]	**system**[b]		**conservation measures**	
At vegetative stage	Irrigated upland	Rice/ Sugarcane/ Maize/ Sorghum (Fodder)	Thinning, weeding and gap filling in existing crop, Re sowing, Postponement of top dressing of Urea, Life saving irrigation	Inter cultivation, Conservation furrow, Thinning and weeding, Mulching	Supply of inter cultural implements through RKVY, Farm ponds through IWSM programme, Pulse crop seeds supply through NFSM, Micro/drip/sprinkler irrigation under govt. schemes
	Irrigated lowland	Rice/ Sugarcane/ Sorghum (Fodder)			
	Un irrigated upland	Maize/ Sorghum/ Pigeonpea			
	Un irrigated lowland	Maize/ Sorghum/ Bajra/ Til/ Pigeonpea			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Irrigated upland	Rice/ Sugarcane/ Maize/ Sorghum (Fodder)	Thining, weeding and gap filling in existing crop, Life saving irrigation, Weeding and weed mulching	Conservation furrow, Thinning and weeding, Mulching, Urea spray	Farm ponds through IWSM programme
	Irrigated lowland	Rice/ Sugarcane/ Sorghum (Fodder)			

	Un irrigated upland	Maize/ Sorghum/ Pigeonpea			
	Un irrigated lowland	Bajra/ Til			

Condition			**Suggested Contingency measures**		
	Major Farming situation[a]	**Normal Crop/cropping system[b]**	**Crop management**	**Rabi crop planning**	**Remarks on Implementation**
Terminal drought (Early withdrawal of monsoon)	Irrigated upland	Rice/ Sugarcane/ Maize/ Sorghum (Fodder)	Life saving irrigation, Picking/harvesting of pods/ear, Harvest at physiological maturity stage , Harvest for fodder	Toria/mustard, Potato, Pea/Chickpea, Barseem/oat	Farm ponds through IWSM programme, Supply of seed through ISOPM, Harvesting and threshing implements through RKVY, Supply of land lazer labeler through CLDP or RKVY
	Irrigated lowland	Rice/ Sugarcane/ Sorghum (Fodder)			
	Un irrigated upland	Maize/ Sorghum/ Pigeonpea			
	Un irrigated lowland	Pigeonpea/ Bajra/ Til			

1.1.2. Drought -Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/ cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/ cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall	Upland sandy loam soils	Rice (Basmati)-Wheat	Replace rice with maize or aerobic rice Use short duration varieties e.g. Rice: PS 4, 5, PB 1, PRH 10 Maize: Kanchan, Sweta, Navin, Surya Bajra:WCC-75, Raj-171, Pusa-23, Pusa-322	Light irrigation with tube well water, Follow alternate wetting and drying schedule of irrigation in rice, Alternate Furrow irrigation, Mulching in sugarcane/ maize	• Seed through KSSC and NFSM • Adequate supply of electricity/ diesel should be ensured by the Govt. agencies.
		Sorghum (Fodder)/Maize-Potato/ Wheat	Bajra/Greengram/ Blackgram - Potato/ Wheat		
		Sugarcane +cucurbits – Ratoon-Wheat	No change		
	Lowland clay loam soils	Rice-wheat	Basmati rice –Wheat Use short duration varieties e.g. Rice: PS 4, 5, PB 1, PRH 10	Light irrigation with tube well water, Follow alternate wetting and drying schedule of irrigation in rice, Alternate Furrow irrigation, Mulching in sugarcane	
		Sorghum fodder-Wheat	Bajra-Wheat Bajra:WCC-75, Raj-171, Pusa-23, Pusa-322		
		Sugarcane-Ratoon-Wheat	No change		

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	Upland sandy loam soils	Rice (Basmati)-Wheat	No change	Follow alternate wetting and drying schedule of irrigation in rice, Alternate Furrow irrigation, Mulching in sugarcane/ maize	• Adequate supply of electricity/diesel should be ensured by the Govt. agencies. • Supply of inter cultural implements through RKV
		Sorghum (Fodder)/Maize-Potato/ Wheat	No change		
		Sugarcane +cucurbits – Ratoon-Wheat	No change		
	Lowland clay loam soils	Rice-wheat	No change	Follow alternate wetting and drying schedule of irrigation in	
		Sorghum Fodder-Wheat	No change		

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/ cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
		Sugarcane-Ratoon-Wheat	No change	rice, Alternate Furrow irrigation, Mulching in sugarcane/ maize	.

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	Upland tube well irrigated canal sandy loam soil	Basmati rice	Maize/Aerobic Rice	Limited irrigation, Alternate furrow irrigation, Drip irrigation, Mulching	• Seed through KSSC and NFSM • Supply of inter cultural implements through RKVY
		Sorghum/Maize	Bajra /Pigeonpea/Blackgram		
		Sugarcane +cucurbits	Sugarcane		
	Lowland tube well irrigated canal clay loam soil	Rice	Bajra/Blackgram/Greengram	Limited irrigation Alternate furrow irrigation Drip irrigation Mulching	
		Sorghum Fodder	Bajra/Sorghum Fodder		
		Sugarcane + cucurbits	Sugarcane		

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon		Not Applicable			

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Upland tube well irrigated canal sandy loam soil	Basmati rice	Maize/Aerobic Rice /Vegetables (Tomato, Brinjal, cucrbits etc)	Limited irrigation Alternate furrow irrigation Drip irrigation Mulching	Seed through KSSC and NFSM, Harvesting and threshing implements through RKVY
		Sorghum/Maize	Bajra /Pigeonpea/Blackgram		
		Sugarcane +cucurbits	Sugarcane		
	Lowland tube well irrigated canal clay loam soil	Rice	Bajra/Blackgram/Greengram	Limited irrigation, Alternate furrow irrigation, Drip irrigation, Mulching	
		Sorghum Fodder	Bajra/Sorghum Fodder		
		Sugarcane + cucurbits	Sugarcane		

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Maize + Blackgram / Greengram /cucurbits	Provide drainage	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Sugarcane	Provide drainage		Drain out excess water and harvest the lodged crop as early as possible	Supply to sugar mills /crusher as early as possible or shift to safer place and cover the cane with trash materials
Blackgram or Greengram	Provide drainage	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage.	Safe storage against storage pest and disease
Horticulture				
Okra	Provide drainage	Provide drainage	Picking of vegetables at	Shift to safer place &

			physiological maturity stage	dispose of produce as early as possible
Cucurbits	Provide drainage	Provide drainage	Drain out excess water & Harvesting at physiological maturity stage and picking of cucurbits crop.	Shift to safer place & dispose of produce as early as possible
Brinjal	Provide drainage	Provide drainage	Picking at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Tomato	Provide drainage	Provide drainage	Picking at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Mango	-	-	Spray of 2% urea + Carbendazim 0.02% solution	-
Guava	-	-	Spray of 2% urea + Carbendazim 0.02% solution	-
Heavy rainfall with high speed winds in a short span[2]				
Sugarcane	Earthing up Tying		Drain out excess water and harvest the lodged crop as early as possible	Supply to sugar mills /crusher as early as possible or shift to safer place and cover the cane with trash materials
Maize/Sorghum	Provide drainage	Provide drainage, Use wind breaks	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Blackgram/ Greengram	Provide drainage	Provide drainage, Use wind breaks	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Rice basmati	Provide drainage	Provide drainage	Drain out excess water, Harvesting	Shift to safer place &

			at physiological maturity stage	dispose of produce as early as possible
Pigeonpea	Provide drainage, Sowing on raised bed	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Horticulture				
Okra	Provide drainage, Sowing on raised bed	Provide drainage	Drain out excess water ,Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Brinjal	Provide drainage, Sowing on raised bed	Provide drainage	Drain out excess water ,Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Tomato	Provide drainage, Sowing on raised bed, Stacking	Provide drainage, Use wind breaks, Stacking	Drain out excess water , Harvesting at physiological maturity stage, Stacking	Shift to safer place & dispose of produce as early as possible
Cauliflower	Provide drainage, Sowing on raised bed	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Cucurbits	Provide drainage, Sowing on raised bed	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Mango	Use Wind breaks	Use of NAA spray	Use of NAA spray	-
Guava	Use Wind breaks	Use of NAA spray	Use of NAA spray	-
Outbreak of pests and diseases due to unseasonal rains				
Rice basmati	Need based plant protection	Need based plant	Do not use strong pesticide at	Shift to safer place &

Sugarcane	IPDM for Rice/pluses	protection IPDM for Rice/pluses	maturity stage	dispose of produce as early as possible
Sorghum fodder				
Blackgram/ Greengram				
Pigeonpea				
Horticulture				
Okra	Need based plant protection IPDM for Rice/pluses	Need based plant protection IPDM for Rice/pluses	Do not use strong pesticide at maturity stage	Shift to safer place & dispose of produce as early as possible
Brinjal				
Tomato				
Cucurbits				
Cauliflower				

2.3 Floods

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice (basmati)	• Re sowing of nursery • Direct sowing of rice • Sowing of nursery on raised bed	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Sugarcane	• Direct sowing	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Sorghum fodder	• Direct sowing	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Blackgram/ Greengram	• Direct sowing	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Pigeonpea	• Direct sowing	• Provide drainage	• Provide drainage	Shift to safer place & dispose of

				produce as early as possible
Horticulture				
Okra	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Brinjal	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Tomato	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Continuous submergence for more than 2 days[2]				Shift to safer place & dispose of produce as early as possible
Rice	• Re sowing of nursery • Direct sowing of rice • Sowing of nursery on raised bed	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Horticulture				
Okra	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Brinjal	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Tomato	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible
Mango	• Re sowing of nursery • Sowing of nursery on raised bed	• Provide drainage	• Provide drainage	Shift to safer place & dispose of

	• Re transplanting			produce as early as possible
Sea water intrusion	Not Applicable			

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

Extreme event type	**Suggested contingency measure[r]**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]				
Rice basmati	• Re sowing of nursery • Light and frequent irrigation during night	• Irrigation interval should be decreased	• Irrigation interval should be decreased	Light and frequent irrigation
Sugarcane	• Mulching	• Irrigation interval should be decreased	• Irrigation interval should be decreased	Light and frequent irrigation
Sorghum fodder	• Re sowing	• Irrigation interval should be decreased	• Irrigation interval should be decreased	Make silage
Blackgram /Greengram	• Re sowing • Mulching	• Light irrigation for survival	• Light irrigation for survival	• Pod picking
Pigeonpea	• Re sowing • Mulching	• Light irrigation for survival	• Light irrigation for survival	• Pod picking
Horticulture				
Okra	• Re sowing of nursery • Re transplanting • Mulching • Light watering during night	• Light irrigation for survival	• Light irrigation for survival	• Harvesting of fruits
Brinjal	• Re sowing of nursery • Re transplanting • Mulching • Light watering during night	• Light irrigation for survival	• Light irrigation for survival	• Harvesting of fruits

Tomato	• Re sowing of nursery • Re transplanting • Mulching of nursery beds • Light irrigation during night	• Light irrigation for survival	• Light irrigation for survival	• Harvesting of fruits
Mango	• Spray of water	• Spray of water	• Spray of water	
Guava	• Spray of water	• Spray of water	• Spray of water	
Cold wave[q]				
Wheat	Light irrigation	Light irrigation	Light irrigation	Light irrigation
Sugarcane		• Light irrigation for survival	--	Harvesting of cane
Horticulture				
Tomato		• Light Sprinkler irrigation	• Light Sprinkler irrigation	Harvesting of fruits
Pea		• Light Sprinkler irrigation	• Light Sprinkler irrigation	Harvesting of fruits
Potato		• Light Sprinkler irrigation	--	Harvesting
Frost				
Sugarcane	• Light irrigation	• Light irrigation	• Light irrigation	Harvesting of cane
Pigeonpea	• Grow as inter crop • Smoke at night	• Light irrigation • Smoke at night	• Light irrigation • Smoke at night	Smoke at night
Horticulture				
Potato	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	Harvesting
Tomato	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	De halming
Pea	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	•Light irrigation for survival •Smoke at night	• Harvesting

Mango	• Irrigation &Smoking during night	•Irrigation &Smoking during night	•Irrigation &Smoking during night	--
Guava	•Irrigation &Smoking during night	•Irrigation &Smoking during night	•Irrigation &Smoking during night	Harvesting
Hailstorm				
All the crops	Re sowing	Re sowing of catch crop	Harvest for fodder	Pre Harvesting
Horticulture				
All the Vegetable crops	Re sowing	Re sowing of Catch crop	Harvest for fodder	Pre Harvesting
All the Fruit crops	Use anti hail net, Spray of fungicide with 2% urea solution	Use anti hail net Spray of fungicide with 2% urea solution	Use anti hail net, Spray of fungicide with 2% urea solution	Harvest the damaged fruits Spray of fungicide with 2% urea solution
Fog				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			

Feed and fodder availability	• Fodder crop Insurance • Making of feed blocks • Encourage farmers to allocate some lands for cultivating perennial fodder (Napier grass, Subabul), specially on bunds and wasteland • Establishing fodder banks, encouraging fodder crops in irrigated area • Making silage or hay of excess fodder. • Statistics regarding feed/fodder availability and requirement should be updated by the concerned deptt. • Seed production and development of drought resistant crops and their varieties of fodder crops. • Encourage farmers to adopt sprinkler irrigation system. • Training to the farmers and extension functionaries for production and long term storage of feed and fodder.	• Utilizing fodder from perennial trees/shrubs/fodder bank reserves for small ruminant. • Utilizing stored fodder as silage, hay, feed blocks & mixture etc. • Migration of herd /flock to other places. • Establishment of communication and linkage with other state agencies.	• Availing crop insurance • Cultivation of fast growing green fodder crops. • Development of drought resistance fodder. • Increase the no. of fodder Banks for future use.
Drinking water	• Preserving water in the pond/tank for drinking purpose. • Excavation of bore well/creation of tanks or ponds. • De-silting of village ponds on regular basis and adopt water harvesting techniques through water shed approach. • Filling of the ponds with canal/tube well water during lean period.	• Using preserved water in the tanks for drinking • Available ground water should be used for drinking on priority basis.	• Recharge of well/ Tanks etc.
Health and disease management	• Farmers should be encouraged to avail livestock insurance	• Conduction mass animal health camp and treating the effected animals.	• Availing insurance benefits.

	• Training to livestock owners regarding natural calamities. • Veterinary preparedness with medicines and vaccines. • Vaccination	• Mass campaigning though different media regarding possible outbreak of diseases and their management.	• Followed standard Livestock management practices. • Proper health care & treatment.
Floods			
Feed and fodder availability	• Fodder crop Insurance • Making of feed blocks • Encourage farmers to allocate some lands for cultivating perennial fodder (Napier grass, Subabul), specially on bunds and wasteland • Establishing fodder banks, encouraging fodder crops. • Making silage or hay of excess fodder and that should be stored on up land. • Statistics regarding feed/fodder availability and requirement should be updated by the concerned deptt. • Seed production and development of crops and their varieties of fodder crops for water logged conditions. • Training to the farmers and extension functionaries for production and long term storage of feed and fodder.	• Utilizing fodder from perennial tress/shrubs/fodder bank reserves. • Use of feed mixture/block hay etc • Migration of flock /herds • Establishment of communication and linkage with other state agencies	• Availing crop insurance • Cultivation of fast growing green fodder crops

Drinking water	• Making suitable provision for safe drinking surface water including excavation of bore well/hand pump (India mark—II) at community level. • Make farmers aware not to use contaminated/ flood water for drinking purpose.	• Contaminated flood water should not be used for drinking.	• Open sources of drinking water (tank/well) should be further treated with potassium per magnate.
Health and disease management	• Live stock Insurance • Training to livestock owners regarding natural calamities. • Veterinary preparedness with medicines and vaccines. • Vaccination	• Conduction mass animal health camp and treating the effected animals. • Training to livestock owners regarding natural calamities. • Establishment of Co-ordination with other Agencies. • Use of mass media to spread expat advice	• Culling sick animals • Availing insurance benefits. • Culling unproductive livestock • Proper disposal of corpse of dead bodies to prevent the spread of contagious diseases.
Cyclone	Not Applicable		
Heat wave and cold wave			

Shelter/environment management	• Avoid use of GI sheet for roofing in the animal shed • Create adequate sources for additional supply of water to protect the animals from heat waves. • Establishment of modern shelter sheds. • As far as possible grow shade trees such as Neem, Pilkhan, Karanj etc near the animal sheds. • Make provision for adequate no. of fans/coolers /heaters according to the situation, if possible	• Provide the thatches/ tarpaulins/ rags in the animal sheds to protect against direct entry of hot/ cold waves • Provide proper bedding to prevent from cold and proper ventilation to prevent from heat. • Provide drinking water to animal frequently during heat wave • Watch the forecast of weather department. • As for as possible the animal should be allowed to wallow in pounds/ canals/ river or give bath once or twice in a day during heat waves	• Repair and maintenance of additional facilities
Health and disease management	• Insure the animals • Training to livestock owners/ para-vets regarding preventive measure against extreme weather conditions • Veterinary preparedness with medicines and vaccines etc. • Vaccination against FMD &Cold	• Organize village level animal health camps • Consult veterinary officer immediately if any adverse symptoms are noticed • Use of ITKs for food supplements	• Proper after care of animals. • Availing insurance benefits. • Proper disposal of corpse of dead bodies to prevent the spread of contagious diseases.

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	

Drought				
Shortage of feed ingredients	• Making and storage of feed concentrates • Awareness regarding traditional feed banks. • Feed requirement data should be generated • Prepare the feed requirement data base of poultry farm. • Store the feed ingredients	• Use of feed concentrates/ mixture/blocks etc • Establishment of communication with other state agencies. • Use of locally available feed recourses. • Import the feed recourse form other states.	• Availing insurance • Increase the no. of feed banks for future use	
Drinking water	• Making extra facility for drinking water. • Repair & maintenance of water resources	• Frequent supply of drinking water		
Health and disease management	• Veterinary preparedness with medicines and vaccines. • Vaccination • Training to poultry Growers regarding natural calamities.	• Treatment of affected poultry birds	• Culling of flock • Availing insurance benefits • Proper disposal of corpse of dead bodies to prevent the pared of contagious diseases	
Floods				
Shortage of feed ingredients	• Sufficient quantity of feed ingredients should be stored	• Use of stored feed in balanced form • Prevent the feed from moisture.	• Cleaning of feed store & repair if any. • Moist feed should be dried &treated as per requirement	

Drinking water	• Make provision of ground water for drinking	• Use only Ground water obtained from India Mrka II or Tubewell	• Repair, maintenance and cleaning of water recourse • Sanitation of open Wells	
Health and disease management	• Veterinary preparedness with medicines and vaccines • Vaccination	• Migration of flock if required	• Availing insurance benefits. • Culling of unproductive flock	
Cyclone	Not Applicable			
Shortage of feed ingredients	• Storage and making of feed concentrates • Proper feed requirement data base	• Establishment of communication with other state agencies • Use of stored feed ingredient • Import of feed from other areas	• Repair and maintenance of feed store	
Drinking water	• Make provision of ground water for drinking	• Use only Ground water obtained from India Mrka II or Tubewell	• Repair and maintenance of water recourse	
Health and disease management	• Training to poultry growers regarding natural calamities. • Veterinary preparedness with medicines and vaccines.	• Treatment of injured poultry birds.	• Culling of flock • Availing insurance benefits. • Proper disposal of corpse of dead bodies to prevent the pared of contagious diseases.	
Heat wave and cold wave				
Shelter/environment management	• Making sufficient provision of shelter to protect live stock from heat and cold waves • Establishment of alternate resource	• Keep the birds in appropriate shelter • Provide proper bedding to prevent from cold and proper ventilated to	• Making of modern shelter sheds • Increase the plantation of	

	for water supply. • Modern shelter sheds.	prevent from heat • Provide drinking water to birds frequently. • Adopted proper management practices. • Watch the fore cast of weather department.	trees	
Health and disease management	• Insurance • Veterinary preparedness with medicines and vaccines • Training to poultry growers regarding natural calamities	• Provide proper treatment as per requirement • Treatment of injured poultry	• Availing insurance benefits • Culling of unproductive flock • Proper disposal of corpse of dead bodies to prevent the pared of contagious diseases	

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	_	_	_
Inland			
(i) Shallow water depth due to insufficient rains/inflow	• Adopt appropriate measures to reduce water seepage or infiltration	• Harvest the crop partially	• Re stock
(ii) Changes in water quality	• Regular observation to check the water quality and remove the	• Add oxy-flow to improve oxygen • Churning of pond water	• Maintain appropriate level of water if possible

	pollutants if any.		• Check the water quality and remove the pollutants if any.
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	• Adopt appropriate measures to reduce water seepage or infiltration from ponds • Avoid any kinds of water pollution and maintain water pH	• Ensure the Oxygen availability into ponds for the survival of fish • Avoid any kind of water pollution • Add oxy-flow to improve oxygen into ponds. • Churning of pond water	• Maintain appropriate level of water in ponds • Check the water quality and remove the pollutants if any.
(ii) Impact of salt load build up in ponds / change in water quality	• Add some fresh water from other source like cannel etc	• Add oxy-flow to improve oxygen into ponds. • Churning of pond water • Add fresh water into pond for life saving and to reduce salt load	• Add fresh water into pond for life saving and to reduce salt load • Maintain appropriate level of water in ponds • Check the water quality and remove the pollutants if any.
2) Floods			
A. Capture			
Marine	--	--	--
Inland			
(i) No. of boats / nets/damaged	• Boats, nets etc should be taken out from water bodies	• Close supervision of flood condition	• Damaged boat or nets should be repaired
(ii) No. of houses damaged	_	_	• Repair the damaged house.
(iii) Loss of stock	_	_	• Sanitation and proper disposal of corpse
(iv) Changes in water quality	• Increase the height of bunds.	--	--
(v) Health and diseases	--	• Treatment if possible	--
B. Aquaculture			

(i) Inundation with flood water	• Repair the bunds to prevent the inflow of water • If inflow water is not polluted then place the net at inlet and outlet • Raise the height of bunds • Plan a proper drainage system at farm • Plantation of soil binding plants at bund	• Avoid inflow of flood water from outside. • If inflow water is not polluted that can be permitted to flow through net placed at inlet and outlet of pond. • Fencing of net required in case of overflow to avoid the migration of fish	• Repair the damaged bunds • Check water quality • Change the water if it is polluted
(ii) Water contamination and changes in water quality	• Limeing @300 kg/ha	• Stop inflow of contaminated water	• Maintain appropriate level of water in ponds • Check the water quality and remove the pollutants if any.
(iii) Health and diseases	• Limeing @300 kg/ha • Vaccination	• Diagnostic measures and provide appropriate medicines	• Limeing and medication as per requirement • Use Cifex to control ulcerative syndromes
(iv) Loss of stock and inputs (feed, chemicals etc)	• Marketable stock should be sold	• Immediately remove the dead fishes from ponds and do sanitation	• After sanitation add new stock
(v) Infrastructure damage (pumps, aerators, huts etc)	• Dommageable infrastructures should be secured	• Do not supplié Electric in flood éd area	• Repaire and service the damage infrastructure
3. Cyclone / Tsunami	Not Applicable		
4. Heat wave and cold wave			
A. Capture			
Marine	--	--	--

Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)	• Maintain appropriate level of water in ponds *ie.* 1.75m in 2m deep ponds • Check the water quality and remove the pollutants if any	• Maintain appropriate level of water in ponds *ie.* 1.75m in 2m deep ponds • Check the water quality and remove the pollutants if any	• Maintain appropriate level of water in ponds *ie.* 1.75m in 2m deep ponds • Check the water quality and remove the pollutants if any
i) Health and Disease management	• Limeing@300kg/ha	• Medication as per requirement	• Remove the dead fishes from ponds and add new stocks to compensate the production

[a] based on forewarning wherever available