State: Uttar Pradesh

Agriculture Contingency Plan for District: Saharanpur

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 zone (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)	Meerut, G.B. Nagar, Bulandshahar, Gaziabad, M. Nagar, Bagpat		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		29^0 34' & 30' 21'N	77^0 9' & 78^0 14' E	268 mt.
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS			
	Mention the KVK located in the district with address	K.V.K. Khajuri Bag Near Numaish Kamp New Gopal Nagar Saharanpur 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. University of agric & tech. Meerut		

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)	788.6	55	3rd week of June	2nd week of Sept
	NE Monsoon(Oct-Dec)	40.5	15	2nd week of Dec	4th week of Jan
	Winter (Jan- March)	95.5	22	-	-

	Summer (Apr-May)	24.7	7	-	-
	Annual	949.3	99	-	-

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)	363.791	275.061	33.229	48.616	0.188	0.698	1.390	0.310	2.427	1.872

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total**
	1. sandy loam	95.36	34.67
	2. Loam	121.49	44.35
	3. Clay loam	50.47	18.35
	4.Siltlyloam	3.71	1.35

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	275.061	149.20%
	Area sown more than once	135.335	
	Gross cropped area	410.396	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	257.213		
	Gross irrigated area	374.804		
	Rainfed area	17.848		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		42.148	16.39 %
	Tanks		0	-
	Open wells		-	-
	Bore wells		215.060	83.61%
	Lift irrigation schemes		-	_
	Micro-irrigation		0.002	_
	Other sources (please specify)		0.003	_

	Total Irrigated Area		257.213	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils Block-11	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Gangoh,Nakur 2	10.93,9.09	Not reported
	Critical	Nangal , Sarsawa 2	7.47,9.71	do
	Semi- critical	2		do
	Safe	5	-	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) (2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	51.884	-	51.884	-	-	-	-	51.884
	Wheat	-	-	-	139.35	-	139.35	-	139.35
	Sugarcane	-	-	-	140.825	-	140.825	-	140.825
	Maize	-	5.258	5.258	-	-	-	2.541	7.799
	Barley	-	-	-	-	0.267	0.267	-	0.267
	Mustard	-	-	-	1.061	-	1.061	-	1.061
	Sesame	-	-	-	-	3.516	3.516	-	3.516

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Mango	23.345	14.007	9.338
	Guava	1.690	1.014	0.676
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	3.386		
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**

	Plantation crops	Total	Irrigated	Rainfed
	Eg., industrial pulpwood crops etc.			
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Sorghum	71.532	-	71.532
	Pearl millet	11.123	-	11.123
	Berseem	4.216	4.216	-
	Total fodder crop area	**86.871**	**4.216**	**82.655**
	Grazing land Sericulture etc	**0.188**	**-**	**0.188**

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	46.915	204.594	251.509
	Improved cattle	-	-	-
	Crossbred cattle	11.646	4.014	15.660
	Non descriptive Buffaloes (local low yielding)	90.082	390.798	480.881
	Descript Buffaloes	38.606	167.485	206.091
	Goat	21.379	56.035	77.414
	Sheep Indi + Exotic	8.843+1.157	18.893+1.477	30.370
	Others (Camel, Pig, Yak etc.)			895.796
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	1	0.158	
	Backyard		25.292+32.779=58.071	
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)			
Others	-	-	-

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 to be identified based on total acreage)										
	Rice	118.140	2277	-	-	-	-	118.140	2277	113.42
	Wheat	-	-	412.915	2963	-	-	412.915	2963	515.22
	Sugarcane	-	-	8715.378	61888	-	-	8715.378	61888	1307.30
	Maize	5.331	1014	-	-	2.577	1014	7.908	1014	0.936
	Barley	-	-	0.621	2326	-	-	0.621	2326	0.932
	mustard	-	-	1.195	1126	-	-	1.195	1126	-
	Sesame	-	-	1.280	3.64	-	-	1.280	3.64	1.920
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	242.788	1040	-
	Guava	-	-	-	-	-	-	18.590	1100	-
	Potato	-	-	20.500	2500	--	-	20.500	2500	-
	Flower									

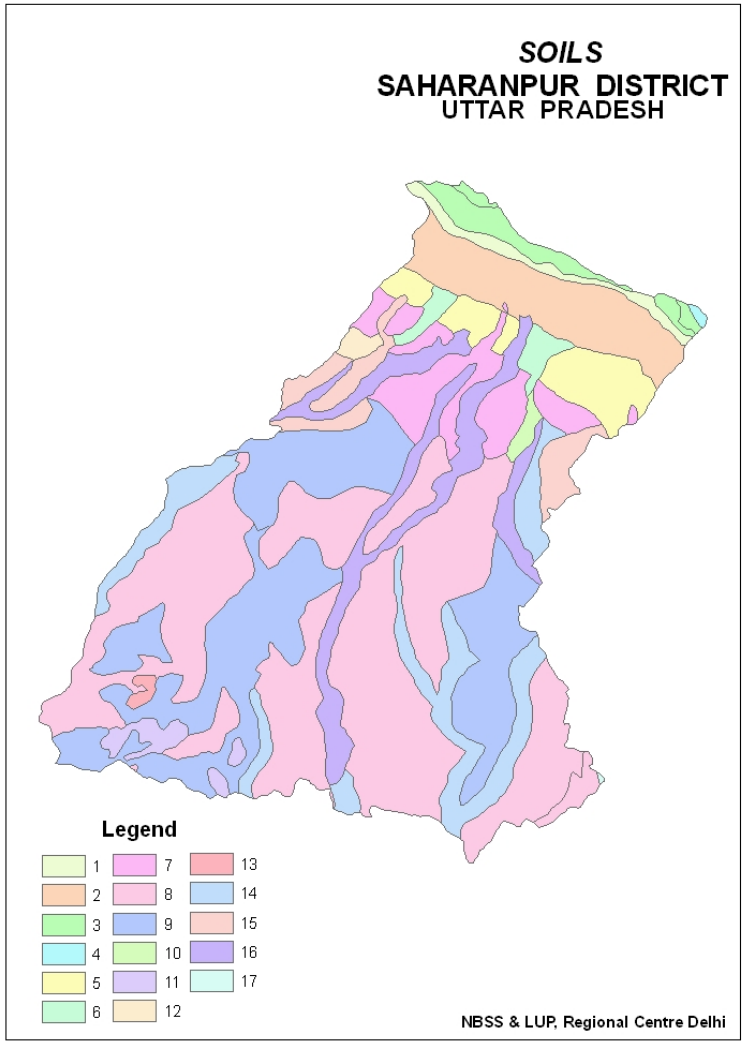
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	Wheat	Sugar Cane	Barley	Mustard
	Kharif- Rainfed	-	-	-	-	-
	Kharif-Irrigated	June-July	-	-	-	-
	Rabi- Rainfed	-	-	-	Oct-Nov	Oct
	Rabi-Irrigated	-	Nov-Dec	April-May	Oct-Nov	Oct-Nov

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	x	√	√
	Flood	x	x	√
	Cyclone	x	x	√
	Hail storm	x	√	x
	Heat wave	x	√	x
	Cold wave	x	√	x
	Frost	x	√	x
	Sea water intrusion	x	x	√
	Pests and disease outbreak (specify) sheath Blight, Stem borer, Pyrilla, white grub, heliothis	√	x	x
	Others (specify)Fog	x	√	x

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: Yes

Annexure I


SHAHRANPUR
District Map
HIMACHAL PRADESH
UTTARAKHAND
HARYANA
N
Badshahrbagh
Raipur
Mohand
Behat
Yamuna
Kalsia
Muzaffarabad
NH - 73
Chilkana
Fatahpur
Sarsawa
Yamuna
Pilkhani
SHAHRANPUR
Nakur
www.mapsofindia.com
Ambahta
Nagal
Jabarheral
Rampur
Gangoh
Lakhnauti
Nanauta
Bhayla
Deoband
Titron
Shalkhan
Muzaffarnagar
LEGEND
State Boundary
District Boundary
National Highway
Major Road
Railway
District Headquarter
Other Town
River
Map not to Scale
Copyright © 2007 Compare Infobase Limited



Legend	Description
1	Shallow loamy soils
2	Medium deep loamy soils
3	Deep loamy soils and slightly shallow loamy-skeletal soils
4,5 &6	Deep loamy soils and stratified loamy soils
7&8	Deep, loamy soils
9	Deep, loamy soils and with silty soils .
10	Deep, silty soils (moderately salinity and sodicity) and loamy soils (moderate salinity and sodicity and water logging)Deep, silty soils and slightly eroded associated with loamy soils slightly saline and slightly sodic .
11	Deep, silty soils and loamy soils
12	Deep, silty soils (slightly saline and moderately sodic) and fine soils(slightly saline and moderately sodic)
13	Deep, loamy soils and loamy soils
14	Deep, silty soils (slight flooding) and loamy soils(slight flooding)
15	Deep, sandy soils (moderate flooding) and loamy soils(slight flooding) .
16	Deep, loamy soils (severe flooding) and loamy soils (moderate 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**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 1st week of July	**Deep soil, yellow colored alluvial loam soils**	**Maize/ Sorghum/ Pearl millet/ 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 **Pearl millet:** Raj-171, WCC-75, Pusa 23, 322 ICMH-451 etc. **Pigeonpea:** UPAS 120, ICPL 151,Pusa 33 etc.	• Conservation furrow • Inter-cultivation • Sowing with multi seed drill • Wider spacing for pigeonpea	• Seed-drill under RKVY • Supply of seed through govt. agencies *ie*. NFSM,RKVY • Re-scheduling of canal calendar
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks 3rd week of July	**Deep soil, yellow colored alluvial loam soils**	**Maize/ Pearl millet/ Sesame/ Blackgram**	**Maize:** Kanchan, Navin Navjyoti, Azad utam,Surya,Meerut pili,Ganga 2,11 Samrat etc **Pearl millet:** 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	**Major Farming**	**Normal Crop/cropping system**	**Change in crop/cropping**	**Agronomic**	**Remarks on**

drought	situation		system	measures	Implementation
Delay by 6 weeks **1st week of August**	**Deep soil, yellow colored alluvial loam soils**	**Blackgram/** **Toria/** **Pearl millet**	**Blackgram:** Pantmoong -2, 3, Narender Greengram -1, 4, SML-668, PDM-11 **Pearl millet:**Raj-171,WCC-75,Pusa 23, 322 icmh-451	• Sowing with multi seed drill	Re-scheduling of canal calendar

Condition			Suggested Contingency measures		
Early season drought	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks **3rd 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**	**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:** PS 4, 5, PB 1, PRH 10 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284 / **Maize:** Kanchan, Sweta, Navin, Surya, Azad uttam, Navjyoti, Jaunpuri, Meerut pili / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2, Pant Chari3, HC 308, 171 / **Pearl millet:** Raj-171,WCC-75,Pusa 23, 322 icmh-451	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:** PS 2,3, PB 1, Sarju 52, Pant 4, Narendra 359, Saket 4 / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284			
	Un irrigated upland	**Maize/Sorghum (**Local Merut pili) / **Pigeonpea:** UPAS 120, ICPL 151			
	Un irrigated lowland	**Pigeonpea:** UPAS 120, ICPL 151 / **Pearl millet:** Local Merut pili			
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Irrigated upland	**Rice:** PS 4, 5, PB 1, PRH 10 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284 / **Maize:** Kanchan, Sweta, Navin, Surya, Azad uttam, Navjyoti, Jaunpuri, Meerut pili **Sorghum (Fodder):** Kanpuri, UP Chari 1,2, Pant Chari3, HC 308, 171 **Pearl millet:** Raj-171,WCC-75,Pusa 23, 322 icmh-451	1. Thining, weeding and gap filling in existing crop. 2. Re sowing 3.Postponement of top dressing 4.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

	Irrigated lowland	**Rice:** PS 2,3, PB 1, Sarju 52, Pant 4, Narendra 359, Saket 4 / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284			irrigation under govt. schemes
	Un irrigated upland	**Maize/Sorghum (**Local Merut pili) / **Pigeonpea:** UPAS 120, ICPL 151			
	Un irrigated lowland	**Maize/ Sorghum/ Pearl millet(** Local Merut pili) / **Sesame:**T-4 ,T-12, T-13, T-78, Shaker, Pergati			

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:** PS 4, 5, PB 1, PRH 10 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284 / **Maize:** Kanchan, Sweta, Navin, Surya, Azad uttam, Navjyoti, Jaunpuri, Meerut pili / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2, Pant Chari3, HC 308, 171 / **Pearl millet:** Raj-171,WCC-75,Pusa 23, 322 icmh-451	1. Thining, weeding and gap filling in existing crop. 2.Life saving irrigation 3. Weeding and weed mulching	• Conservation furrow • Thinning and weeding • Mulching • Urea spray or KCL spray	• Farm ponds through IWSM programme
	Irrigated lowland	**Rice:** PS 2,3, PB 1, Sarju 52, Pant 4, Narendra 359, Saket 4 / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284			

	Un irrigated upland	**Maize/ Sorghum (**Local Merut pili) / **Pigeonpea:** UPAS 120, ICPL 151			
	Un irrigated lowland	**Maize/Sorghum/Pearl millet (**Local Merut pili) / **Sesame:**T-4 ,T-12, T-13, T-78, Shaker, Pergati			

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Crop management**	**Rabi crop planning**	**Remarks on Implementation**
Terminal drought (Early withdrawal of monsoon)	Irrigated upland	**Rice:** PS 4, 5, PB 1, PRH 10 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284 / **Maize:** Kanchan, Sweta, Navin, Surya, Azad uttam, Navjyoti, Jaunpuri, Meerut pili / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2, Pant Chari3, HC 308, 171 / **Pearl millet:** Raj-171,WCC-75,Pusa 23, 322 icmh-451	1.Life saving irrigation 2. Picking/harvesting of pods/ear 3.Harvest at physiological maturity stage 4.Harvest for fodder	• Toria/mustard • Potato • Pea/gram • Barseem/oat • Land labeling	• 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:** PS 2,3, PB 1, Sarju 52, Pant 4, Narendra 359, Saket 4 / **Sorghum (Fodder):** Kanpuri, UP Chari 1,2 / **Sugarcane:** 64, 88230, 92254, 95255, COS 767, 8432, 97284			
	Un irrigated upland	**Maize/ Sorghum/ Pigeonpea(**UPAS 120, ICPL 151)			
	Un irrigated lowland	**Pearl millet:** Local Merut pili / **Sesame:**T-4 ,T-12, T-13, T-78, Shaker, Pergati			

1.1.2. Drought Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	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 Pearl millet: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	Pearl millet/Blackgram/ Greengram- 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 Kanchan, Sweta, Navin, Surya Pearl millet (Fodder): 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	• Seed through KSSC and NFSM • Adequate supply of electricity/diesel should be ensured by the Govt. agencies.
		Sorghum Fodder-Wheat	Pearl millet-Wheat		
		Sugarcane-Ratoon-Wheat	No change required		
Condition			**Suggested Contingency measures**		

	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**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	• Light irrigation with tube well water at critical stages only e.g CRI, tillering &.Flowering stage • 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.
		Sorghum (Fodder)/Maize-Potato/ Wheat	No change		
		Sugarcane +cucurbits –Ratoon-Wheat	No change		
	Lowland clay loam soils	Rice-wheat	No change	• Light irrigation with tube well water at critical stages only e.g CRI, tillelring &.Flowering stage • Follow alternate wetting and drying schedule of irrigation in rice • Alternate Furrow irrigation • Mulching in sugarcane	• Supply of inter cultural implements through RKV • Adequate supply of electricity/diesel should be ensured by the Govt. agencies.
		Sorghum Fodder-Wheat	No change		
		Sugarcane-Ratoon-Wheat	No change		
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Upland tube well irrigated canal sandy loam soil	Basmati rice	Maize/Arabic Rice	• Limited irrigation • Alternate Furrow irrigation • Drip irrigation • Mulching	• Seed through KSSC and NFSM • Supply of inter cultural implements through RKVY •
		Sorghum/Maize	Pearl millet /Pigeonpea/Blackgram		
		Sugarcane +cucurbits	Sugarcane		
	Lowland tube well irrigated canal clay loam soil	Rice	Pearl millet/Blackgram/Greengram	• Limited irrigation • Alternate Furrow irrigation • Drip irrigation • Mulching	• Seed through KSSC and NFSM • Harvesting and threshing
		Sorghum Fodder	Pearl millet/Sorghum Fodder		
		Sugarcane + cucurbits	Sugarcane		

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				• Alternate furrow irrigation	implements through RKVY

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon		**Cropping system 1:**	NA	NA	NA

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Upland tube well irrigated canal sandy loam soil	Basmati rice	Maize/Arabic Rice /Vegetable (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	Pearl millet /Pigeonpea/Blackgram		
		Sugarcane +cucurbits	Sugarcane		
	Lowland tube well irrigated canal clay loam soil	Rice	Pearl millet/Blackgram/Greengram	• Limited irrigation • Alternate Furrow irrigation • Drip irrigation • Mulching • Alternate furrow irrigation	• Seed through KSSC and NFSM • Micro/drip/sprinkler irrigation under govt. schemes • Supply of inter cultural implements through RKVY
		Sorghum Fodder	Pearl millet/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**	**Flowering stage**	**Crop maturity stage**	**Post harvest**

Maize + Blackgram/Greengram ,bean/cucurbits	Provide drainage	Provide drainage	Drain out excess water and harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Sugarcane	Provide drainage	NA	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/Greengram	Provide drainage	Provide drainage	Drain out excess water and harvesting at physiological maturity stage.	Safe storage against storage pest and disease
Horticulture				
Okra	Provide drainage	Provide drainage	Picking of vegetables at physiological maturity stage	Shift to safer place & 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 • Tying	NA	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 and 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 and 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 and harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible

Pigeonpea	• Provide drainage • Sowing on raised bed	Provide drainage	Drain out excess water and 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 and 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 and 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 and harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Cauliflower	• Provide drainage • Sowing on raised bed	Provide drainage	Drain out excess water and 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 and 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 Sugarcane Sorghum fodder Blackgram/ Greengram Pigeonpea	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
Horticulture				
Okra Brinjal Tomato Cucurbits Cauliflower	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

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**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
Sugarcane	• Direct sowing	• Provide drainage	• Provide drainage •	Shift to safer place
Sorghum fodder	• Direct sowing	• Provide drainage	• Provide drainage •	Shift to safer place
Blackgram, Greengram	• Direct sowing	• Provide drainage	• Provide drainage •	Shift to safer place
Pigeonpea	• Direct sowing	• Provide drainage	• Provide drainage	Shift to safer place
Horticulture				
Okra	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Brinjal	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Tomato	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Continuous submergence for more than 2 days[2]				
Rice	• Re sowing of nursery • Direct sowing of rice • Sowing of nursery on raised bed	• Provide drainage	• Provide drainage	Shift to safer place
Horticulture				
Okra	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Brinjal	• Re sowing of nursery • Sowing of nursery on raised bed	• Provide drainage	• Provide drainage	Shift to safer place

	• Re transplanting			
Tomato	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Mango	• Re sowing of nursery • Sowing of nursery on raised bed • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place
Sea water intrusion	NA	NA	NA	NA

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
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	•Light irrigation for survival	•Light irrigation for survival	•Harvesting of fruits

	• Mulching of nursery beds • Light irrigation during night			
Mango	• Spray of water	•Spray of water	•Spray of water	•-
Guava	• Spray of water	•Spray of water	•Spray of water	•-
Cold wave				
Wheat	Light irrigation	Light irrigation	Light irrigation	Light irrigation
Sugarcane	• Mulching	•Light irrigation for survival	--	•Harvesting of cane
Horticulture				
Tomato	Grow some inter crop	• Light Sprinkler irrigation	--	•Harvesting of fruits
Pea	Grow some inter crop	• Light Sprinkler irrigation	--	•Harvesting of fruits
Potato	Grow some inter crop	• Light Sprinkler irrigation	--	•Harvesting
Frost				
Sugarcane	• Light irrigation	•Light irrigation	•Light irrigation	•Harvesting of cane
Pigeonpea	• Grow as inter crop • Smoke at night	• Light Sprinkler irrigation • Smoke at night	• Light irrigation for survival • 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	•
Hailstorm				
All the crops	Re sowing	Re sowing of Catch crop	Harvest for fodder	Pre Harvesting
Horticulture				
All the crops	Re sowing	Re sowing of Catch crop	Harvest for fodder	Pre Harvesting
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. • Followed standard Livestock

	• 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.	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 **N.A**	**N.A**	**N.A**	**N.A**
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 • Treatment	• Availing insurance benefits. • Culling of unproductive flock	
Cyclone	NA	NA	NA	
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 for water supply. • Modern shelter sheds.	• Keep the birds in appropriate shelter • Provide proper bedding to prevent from cold and proper ventilated to prevent from heat • Provide drinking water to birds frequently. • Adopted proper management practices. • Watch the fore cast of weather department.	• Making of modern shelter sheds • Increase the plantation of 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 pollutants if any.	• Add oxy-flow to improve oxygen • Churning of pond water	• Maintain appropriate level of water if possible • Check the water quality and remove the pollutants if any.
(iii) Any other	_	_	_
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.
(iii) Any other	_	_	--
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 hight 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)	• Damageable infrastructures should be secured	• Do not supplié Electric in flood éd area	• Repaire and service the damage infrastructure
(vi) Any other			
3. Cyclone / Tsunami	NA	NA	NA

4. Heat wave and cold wave			
A. Capture			
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 *i.e.* 1.75m in 2m deep ponds • Check the water quality and remove the pollutants if any	• Maintain appropriate level of water in ponds *i.e.* 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