State: Uttar Pradesh

Agriculture Contingency Plan for District: BAREILLY

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumib (Dry) Eco-Region (9.2)		
	Agro-Climatic Zone (Planning Commission)	Uppar Gangatic plain (V)		
	Agro Climatic Zone (NARP)	Mid Western plain zone (UP-4)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Pilibhit, Moradabad, Shahjanpur, Badaun, Bijnor, Rampur, Jyotibaphule Nagar		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		27.35" N	79, 37^0 E	171 mt.
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Nil		
	Mention the KVK located in the district with address	K.V.K, Bareilly, IVRI Izzat Nagar Bareilly		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	IVRI Bareilly, G.B.P. University, Pantnagar		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep):	959.7	68	2nd week of June	3rd week of September
	NE Monsoon(Oct-Dec):	49.2	14	3rd week of December	2nd week of January
	Winter (Jan- March)	70.7	15	-	-
	Summer (Apr-May)	27.7	7	-	-

	Annual	1107.3	104	-	-

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)	406.915	327.183	0.285	51.219	0.336	1.664	2.598	7.114	13.451	3.065

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area (‘000 ha)**	**Percent (%) of total**
	Sandy loam	86.93	26.57
	Loam	125.18	38.26
	Clay loam	67.89	20.75
	Silt loam	36.81	11.25
	Others (specify):		

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	327.183	162.99%
	Area sown more than once	206.104	
	Gross cropped area	533.287	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	291.432		
	Gross irrigated area	491.417		
	Rainfed area	35.751		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals		31.756	10.90%
	Tanks		1.034	0.35%
	Open wells	NA	-	-
	Bore wells		251.621	86.34%

	Lift irrigation schemes	NIL		-
	Micro-irrigation			-
	Other sources (please specify)		7.021	2.41%
	Total Irrigated Area		**291.432**	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils Block-15	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	Not reported
	Critical	1	-	do
	Semi- critical	9	-	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	149.116	-	149.116	-	-	-	-	149.116
	Wheat	-	-	-	191.256	-	191.256	-	161.256
	Sugarcane	-	-	-	97.487	-	97.487	-	97.487
	Pearl millet	-	14.979	14.979	-	-	-	-	14.979
	Blackgram	-	3.109	3.109	-	-	-	1.820	4.929
	Sesamum	-	3.677	3.677	-	-	-	-	3.677
	Mustard	-	-	-	-	18.868	18.868	-	18.868
	Toria	-	-	-	10.996	-	10.996	-	10.996
	Pigeonpea	-	-	-	16.582	-	16.582	-	16.582
	Lentil	-	-	-	-	5.467	5.467	-	5.467

	Horticulture crops - Fruits	**Area ('000 ha)**		
		Total	**Irrigated**	**Rainfed**

	Mango	9.650	9.650	-
	Guava	0.530	0.530	-
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	6.030	6.030	-
	Pea	0.699	0.699	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	Fenugreek	9.342	9.342	-
	Other	1.462	1.462	-
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
	Eucalyptus	5.462	-	5.462
	Poplar	18.467	18.467	-
	Eg., industrial pulpwood crops etc.			
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Sorghum	34.345	15.145	19.200
	Pearl millet	23.721	-	23.721
	Berseem	4.858	4.858	-
	Total fodder crop area	**62.924**	**20.003**	**42.921**
	Grazing land	0.112	-	0.112
	Sericulture etc	-	-	-
	Others (specify)	-	-	-

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	Non descriptive Cattle (local low yielding)	103.291	260.168	363.459
	Crossbred cattle& Improved cattle	1.590	7.615	9.205
	Non descriptive Buffaloes (local low yielding)	93.084	355.068	448.153
	Descript Buffaloes	39.893	125.172	192.065
	Goat	58.135	137.906	196.041
	Sheep (Indigenous + Exotic)	918+8	2726+11	3.663

	Others (Camel, Pig, Yak etc.)			987.366
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	4	5.605	
	Backyard		32.057+42.843=74.900	

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	266.321	1786	-	-	-	-	266.321	1786	319.56
	Wheat	-	-	571.090	2986	-	-	571.090	2986	696.73
	Sugarcane	-	-	5514.085	56564	-	-	5514.085	56564	827.15
	Pearl millet	21.264	1420	-	-	-	-	21.264	1420	34.022
	Blackgram	4.081	828	-	-	-	--	4.081	828	5.920
	Sesamum	0.375	102	-	-	-	-	0.375	102	-
	Mustard	-	-	15.185	805	-	-	15.185	805	-
	Toria	-	-	10.094	918	-	-	10.094	918	-
	Lentil	-	-	4.488	821	-	-	4.488	821	6.508
	Pigeonpea	17.245	1040	-	-	-	-	17.245	1040	-
	Others									
Major Horticultural crops (Crops to be identified based on total acreage)										
	Potato	-	-	117.760	19529	-	-	117.760	19529	
	Pea	-	-	1.178	16855	-	-	1.178	16855	
	Mango	-	-	-	-	-	-	106.150	1100	
	Guava	-	-	-	-	-	-	3.975	750	

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Wheat**	**Rice**	**Sugarcane**	**Mustard**	**Toria**	**Lentil**	**Pearl millet**	**Potato**	**Black gram**	**Sesamum**
	Kharif- Rainfed	-	-	-	-	-	-	July	-	Jun-July	July

	Kharif-Irrigated	-	-	Oct	-	-	-	July-Aug	Sep-Oct	Jun-July	-
	Rabi- Rainfed	-	-	-	Oct	Sep	Nov-Dec	-	-	-	-
	Rabi-Irrigated	Nov-Dec	June-july	March-April	Oct-Nov	Sep	Nov-Dec	-	-	-	-

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	x	√	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)Stemborer,Sheath blight, Pyrilla, White grub etc.	√	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


BAREILLY
District Map
UTTRAKHAND
N
Darau
Baheri
Rampur
Shisgharh
Richha
Shergarh
Diyoraniyam
Vijauriya
To Pilibhit
Shahi
Sethal
Mirganj
Bhojipura
Sarauli
Rithanra
Fatehganj West
www.mapsofindia.com
Gaini
BAREILLY
Pilibhit
Umedhphur Bhutah
Bhamora
Tisua
Budaun
Fatehganj Sharki
Shahjahanpur
LEGEND
State Boundary
District Boundary
National Highway
Major Road
Railway
District Headquarter
Other Town
River
Map not to Scale
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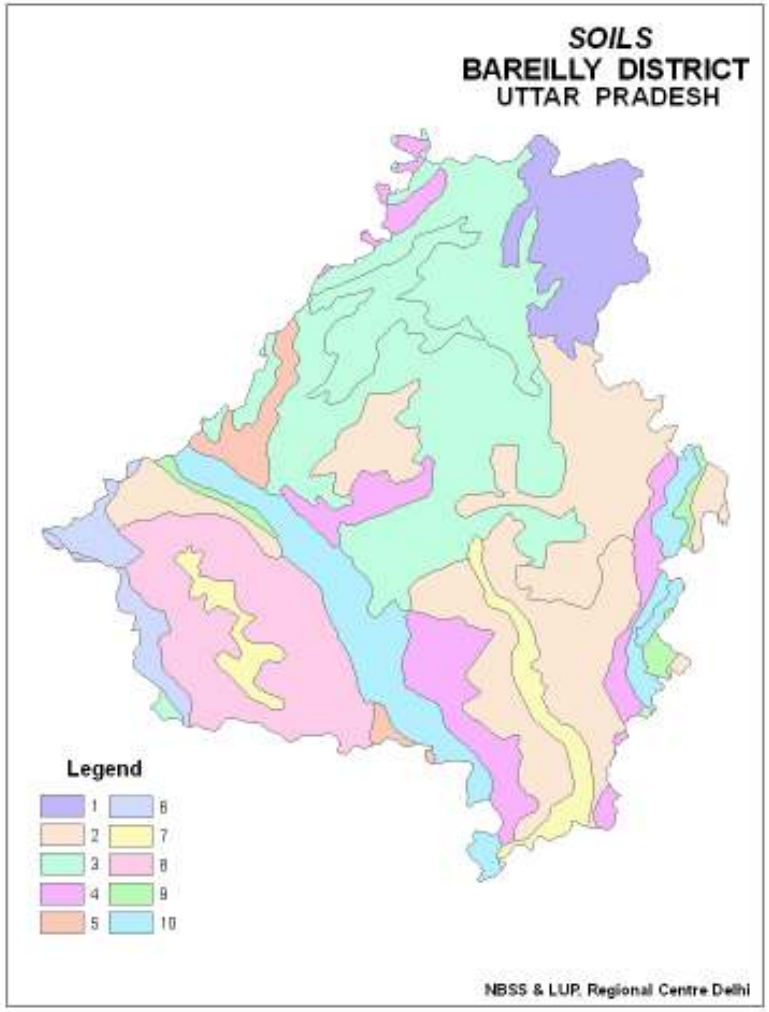

Legend	Description
1 &3	Deep, loamy soils and silty soils
2&5	Deep, loamy soils
4	Deep, fine soils and loamy soils
6&10	Deep, loamy soils and sandy soils
7	Deep, loamy soils and fine soils
8	Deep, loamy soils and (slight saline/sodic)
9	Deep, sandy soils and loamy soils

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 (Specify month)* 4th week of June	Deep soil, yellow colored alluvial loam soil	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 Pigeonpea: UPAS 120, ICPL 151,Pusa 33,	• 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
Delay by 4 weeks (Specify month) 2nd week of July	Deep soil, yellow colored alluvial loam soil	Maize/ Pearl millet/ Sesamum/ 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 Sesamum: Pergati, Shekar, TA-78, TA-12 Blackgram: Narender, urd-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

Delay by 6 weeks 4th week of July	Deep soil, yellow colored alluvial loam soil	Blackgram/ Grengram/ Toria/ Pearl millet	Blackgram: Narender urd-1, Pant U-30, 19, 35 Greengram: Pantmoong -2, 3, Narender mung -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
Delay by 8 weeks 2nd week of August	Deep soil, yellow colored alluvial loam soil	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: PS -4, 5, PB 1, PRH- 10/Sugarcane: 64, 88230, 92254, 95255, COS 767, 8432, 97284/Pearl millet: WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS-120, ICPL- 151/Blackgram: T 9, PU 19,30,35/Sesamum: Pergati, Shekar, TA-78, TA-12	1. Thinning, 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	Pearl millet :WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151			
	Un irrigated lowland	Pigeonpea: UPAS 120, ICPL 151/Pearl millet: Local, Meerut pili/Sesamum: T-4 ,T-12, T-13, T-78, Shekar, Pergati			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**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/Pearl millet: WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151/Blackgram: T 9, PU 19,30,35/Sesamum: Pergati, shekar, TA-78, TA-12	1. Thinning, 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 irrigation under govt. schemes
	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	Pearl millet : WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151			
	Un irrigated lowland	Pigeonpea: UPAS 120, ICPL 151/Pearl millet : Local, Meerut pili			

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**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/Pearl millet : WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151/Blackgram: T 9, PU 19,30,35/Sesamum: Pergati, shekar, TA-78, TA-12	1. Thinning, 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	Pearl millet :WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151			
	Un irrigated lowland	Pearl millet :Local Merut pili/Sesamum:T-4 ,T-12, T-13, T-78, Shekar, Pergati			

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	Irrigated upland	Rice: PS 4, 5, PB 1, PRH 10/Sugarcane: 64, 88230, 92254, 95255, COS 767, 8432, 97284/Pearl millet: WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS	1.Life saving irrigation 2. Picking/harvesting of pods/ear 3.Harvest at	• Toria/mustard • Potato • Pea/Gram	• Farm ponds through IWSM

of monsoon)		120, ICPL 151/Blackgram: T 9, PU 19,30,35/Sesamum: Pergati, shekar, TA-78, TA-12	physiological maturity stage 4.Harvest for fodder	• Berseem/Oat • Land labeling	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	Pearl millet: WCC-75,Raj-171, Pusa-322, Pusa-23, ICMH-451/Pigeonpea: UPAS 120, ICPL 151			
	Un irrigated lowland	Pigeonpea: UPAS 120, ICPL 151/Pearl millet :Local, Meerut pili/Sesamum:T-4 ,T-12, T-13, T-78, Shekar, Pergati			

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]**
Delayed release of water in canals due to low rainfall	Upland sandy loam soils	Rice (Basmati)-Wheat	Replace rice with maize or aerobic rice Rice: PS 4, 5, PB 1, PRH 10 Maize: Kanchan, Sweta, Navin, Surya	• Use short duration varieties • 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 /Greengram/ Blackgram - Potato/ Wheat Pearl millet :WCC-75,Raj-171,Pusa-23,Pusa-322		

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 + Cucurbits –Ratoon-Wheat	No change required		
	Lowland clay loam soils	Rice-wheat	Basmati rice –Wheat Rice: PS 4, 5, PB1, PRH 10 Maize:Kanchan, Sweta, Navin, Surya	• Use short duration varieties • 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	Sorghum-Wheat Sorghum (Fodder): WCC-75, Raj-171,Pusa-23,Pusa-322		
		Sugarcane-Ratoon-Wheat	No change required		
Limited release of water in canals due to low rainfall	Upland sandy loam soils	Rice (Basmati)-Wheat	No change required	• 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 required		
		Sugarcane + Cucurbits – Ratoon-Wheat	No change required		
	Lowland clay loam soils	Rice-wheat	No change required	• Light irrigation with tube well water at critical	• Supply of inter cultural
		Sorghum Fodder-Wheat	No change required		

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 required	stages only e.g CRI, Tillering &.Flowering stage • Follow alternate wetting and drying schedule of irrigation in rice • Alternate Furrow irrigation • Mulching in sugarcane	implements through RKV • Adequate supply of electricity/diesel should be ensured by the Govt. agencies.

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	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 • Harvesting and threshing implements through RKVY
		Sorghum Fodder	Pearl millet /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	1) Farming situation:	Cropping system 1:	NA	NA	NA

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 /Vegetable (Tomato, Brinjal, Cucurbits 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		
Any other condition					

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	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 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 up • 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 & 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 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 & 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 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 Harvesting at physio-logical maturity stage	Shift to safer place & dispose of produce as early as possible
Tomato	• Provide drainage	Provide drainage	Drain out Harvesting at physio-	Shift to safer place &

	• Sowing on raised bed • Stacking	Use Wind breaks Stacking	logical maturity stage Stacking	dispose of produce as early as possible
Cauliflower	• Provide drainage • Sowing on raised bed	Provide drainage	Drain out Harvesting at physio-logical maturity stage	Shift to safer place & dispose of produce as early as possible
Cucurbits	• Provide drainage • Sowing on raised bed	Provide drainage	Drain out Harvesting at physio-logical 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 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
Sugarcane				
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	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	Provide drainage	Provide drainage	Shift to safer place & dispose of produce as

	bed • Re transplanting			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				Shift to safer place & dispose of produce as early as possible
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 • Re transplanting	Provide drainage	Provide drainage	Shift to safer place & dispose of produce as early as possible
Sea water intrusion[3]	NA	NA	NA	NA
Crop1				
Crop2				

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	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[q]				
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	Light Sprinkler irrigation	Harvesting of fruits
Pea	Grow some inter crop	Light Sprinkler irrigation	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 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 crops	Re sowing	Re sowing of Catch crop	Harvest for fodder	Pre Harvesting
Horticulture				
All Vegetable crops	Re sowing	Re sowing of Catch crop	Harvest for fodder	Pre Harvesting
All 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				
Sugarcane				
Pigeonpea				
Wheat				
Horticulture				
Potato				
Cauliflower				
Tomato				

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	• 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	• Availing crop insurance • Cultivation of fast growing green fodder crops. • Development of drought resistance fodder. • Increase the no. of Fodder Banks for future use.

	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 department. • 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.	linkage with other state agencies.	
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 • Training to livestock owners regarding natural calamities. • Veterinary preparedness with medicines and vaccines. • Vaccination	• Conduction mass animal health camp and treating the effected animals. • Mass campaigning though different media regarding possible outbreak of diseases and their management.	• Availing insurance benefits. • Followed standard Livestock management practices. • Proper health care & treatment.
Floods			
Feed and fodder	• Fodder crop Insurance	• Utilizing fodder from perennial	Availing crop insurance

availability	• 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 department. • 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.	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	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 mangnate.
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 expert 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.

[$] 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 number 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	• Keep the birds in appropriate shelter • Provide proper bedding to prevent from cold and proper	• Making of modern shelter sheds • Increase the plantation of trees	

	resource for water supply. • Modern shelter sheds.	ventilated to prevent from heat • Provide drinking water to birds frequently. • Adopted proper management practices. • Watch the fore cast of weather department.		
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 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	• Liming @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	• Liming @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)	Domageable infrastructures should be secured	Do not supply Electric in floodéd area	Repaire and service the damage infrastructure
(vi) Any other			
3. Cyclone / Tsunami	NA	NA	NA
A. Capture	--	--	--
Marine			

(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland	--	--	--
B. Aquaculture	--	--	--
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
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 *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	• 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	• Liming@300kg/ha	• Medication as per requirement	• Remove the dead fishes from ponds and add new stocks to compensate • the production

(ii) Any other			

[a] based on forewarning wherever available