State: Uttar Pradesh

Agriculture Contingency Plan for District: Gautam Budh Nagar

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain (And Central Highlands) Including Aravallis, Hot Semi-Arid Eco-Region (4.1)		
	Agro-Climatic Zone (Planning Commission)	Upper Gangetic plain (V)		
	Agro Climatic Zone (NARP)	Western plain zone (UP-3)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Meerut, Bulandshahar, Ghaziabad, Bagpat, M. Nagar, Saharanpur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		28^0 24' 14.731" N	77^0 32' 33.870" E	200 mt.
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	-		
	Mention the KVK located in the district with address	K.V.K, Chholas Tehsil Dadri, Gautam Budh Nagar 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, 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)	612	46	2nd week of June	2nd week of September
	NE Monsoon(Oct-Dec)	14	12	3rd week of December	2nd week of January
	Winter (Jan- Feb)	0.7	14	-	-
	Summer (Mar-May)	29	7	-	-
	Annual	656	79	-	-

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)	125.4	82.1	2	24	0.5	2.5	0.4	3.4	2.4	7.8

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%)**
	Clay loam soils	42.7	52%
	Loam soils	19.7	24%
	Sandy loam soils	14.7	18%

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	82.1	154.18%
	Area sown more than once	44.5	
	Gross cropped area	126.6	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	70.4		
	Gross irrigated area	126.6		
	Rainfed area	11.7		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		12.3	48.6%
	Tanks		0.05	0.2%
	Open wells		7.9	31.4%
	Bore wells		4.9	19.4%
	Lift irrigation schemes		_	-
	Micro-irrigation		0.01	0.05%
	Other sources		0.09	3.9%
	Total Irrigated Area		25.4	
	Pump sets			
	No. of Tractors			

	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils Block-4	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Dadri 1	26.5	Not reported
	Critical	-	-	do
	Semi- critical	1	-	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*				
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Rice		-	22					22
	Pearl millet /Maize		1.9	1.9					1.9
	Pigeonpea		0.6	0.6					0.6
	Wheat				55.9		55.9		55.9
	Sugarcane				2.6		2.6		2.6
	Barley					2	2.004		2.004
	Mustard					0.9	0.9		0.9
	Toria					4.9	4.9		4.9

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
	Mango+Ber	10.03	-	10.03
		Total	**Irrigated**	**Rainfed**
	All vegetable crops	20.6	14.2	6.4
	Potato	0.5	0.5	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	Flowers (Marigold+Gladiolus)	0.13	0.13	-
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
	Sorghum	46.3	-	46.3
	Pearl millet	8.1	-	8.1
	Maize	12.2	6.1	6.1

	Berseem	11.2	11.2	-
	Total fodder crop area	54.4	17.3	60.5
	Grazing land	0.01	-	-
	Sericulture etc	0.001	-	-

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	47.9	148.1	196.1
	Improved cattle			
	Crossbred cattle	10.2	31.3	41.6
	Non descriptive Buffaloes (local low yielding)	42.5	213.2	255.7
	Descript Buffaloes	18.2	91.3	109.6
	Goat	6.7	17.3	24.0
	Sheep Indi + Exotic	577+14	782+10	1.3
	Others (Camel, Pig, Yak etc.)			390.8
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	0	0	
	Backyard		3.768+7.101=10.8	

1.10 **Fisheries** (Data source: Chief Planning Officer)

A. Capture

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

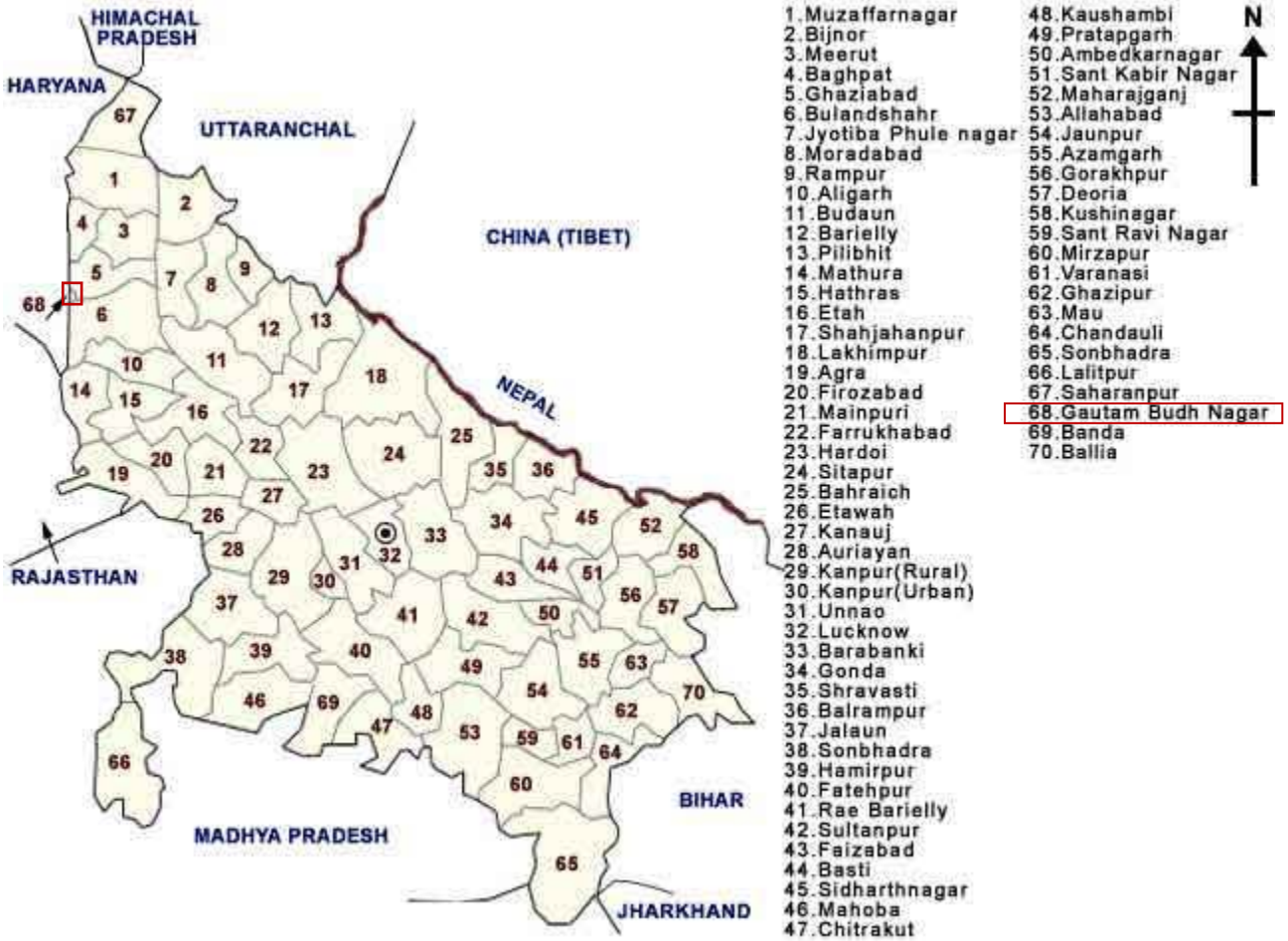
1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops identified based on total acreage)										
	Rice	52.9	2406					52.9	2406	31.7
	Maize	2.9	1500					2.9	1500	
	Wheat			194.5	3477			194.5	3477	233.5
	Sugarcane			161.5	62100			161.5	62100	193.3
	Barley			7.1	3588			7.1	3588	8.6
	Mustard			1	1105			1	1105	
Major Horticultural crops (Crops identified based on total acreage)										
	All fruits							200	1992	
	All vegetables							516.8	2506	
	Potato							189.5	37901	
	Flower							0.3	288.9	

1.12	**Sowing window for 5 major field crops**	**Rice**	**Maize**	**Wheat & Barley**	**Mustard**	**Sugarcane**
	Kharif- Rainfed	-	June to July	-	-	-
	Kharif-Irrigated	June to July	June to July	-	-	-
	Rabi- Rainfed	-	-	October to November	October	-
	Rabi-Irrigated	-	-	November to December	November	October

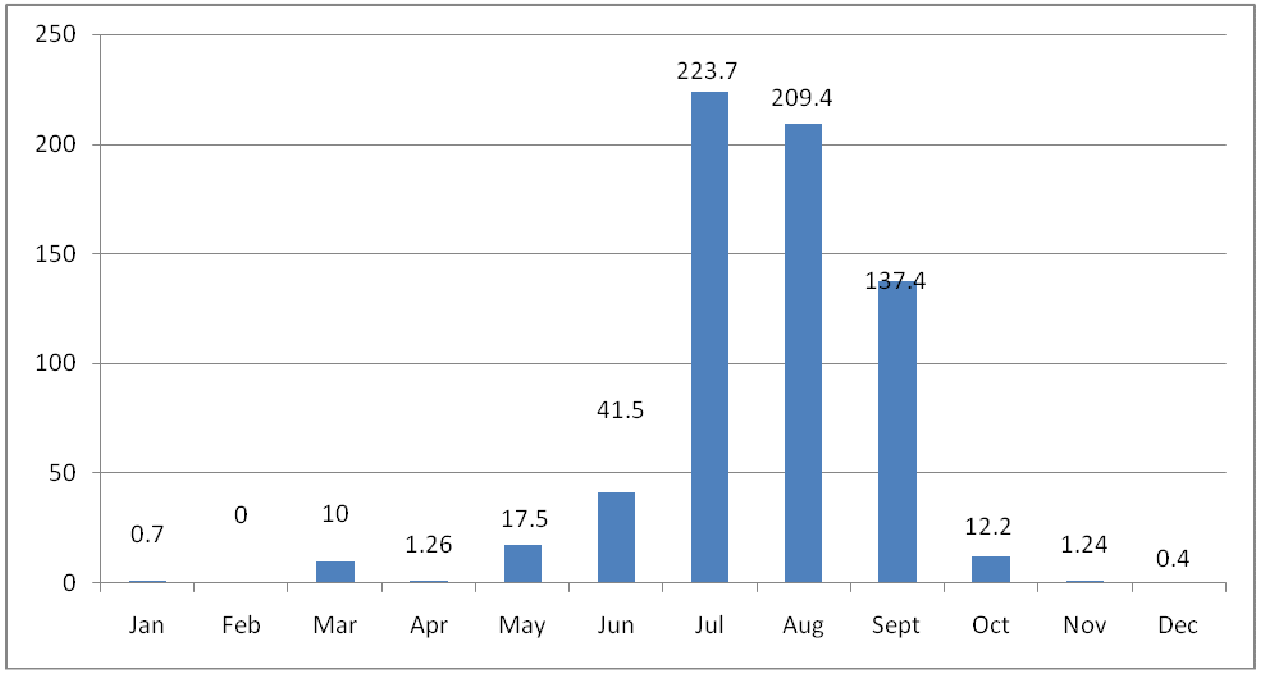
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		√	
	Flood		√	
	Cyclone			√
	Hail storm			√
	Heat wave		√	
	Cold wave		√	
	Frost		√	
	Sea water intrusion			√
	Sheath Blight, Grass hopper, Pyrilla, Neck blast etc	√		
	Fog	√		

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

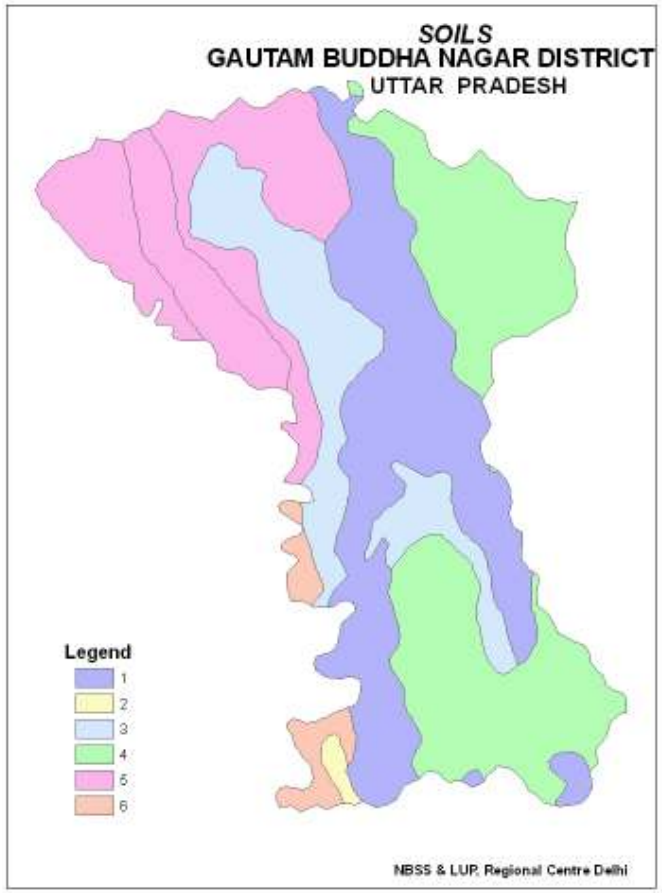
Annexure I


HIMACHAL PRADESH
HARYANA
UTTARANCHAL
CHINA (TIBET)
NEPAL
RAJASTHAN
MADHYA PRADESH
BIHAR
JHARKHAND
N
1.Muzaffarnagar
2.Bijnor
3.Meerut
4.Baghpat
5.Ghaziabad
6.Bulandshahr
7.Jyotiba Phule nagar
8.Moradabad
9.Rampur
10.Aligarh
11.Budaun
12.Barielly
13.Pilibhit
14.Mathura
15.Hathras
16.Etah
17.Shahjahanpur
18.Lakhimpur
19.Agra
20.Firozabad
21.Mainpuri
22.Farrukhabad
23.Hardoi
24.Sitapur
25.Bahraich
26.Etawah
27.Kanauj
28.Auriayan
29.Kanpur(Rural)
30.Kanpur(Urban)
31.Unnao
32.Lucknow
33.Barabanki
34.Gonda
35.Shravasti
36.Balrampur
37.Jalaun
38.Sonbhadra
39.Hamirpur
40.Fatehpur
41.Rae Barielly
42.Sultanpur
43.Faizabad
44.Basti
45.Sidharthnagar
46.Mahoba
47.Chitrakut
48.Kaushambi
49.Pratapgarh
50.Ambedkarnagar
51.Sant Kabir Nagar
52.Maharajganj
53.Allahabad
54.Jaunpur
55.Azamgarh
56.Gorakhpur
57.Deoria
58.Kushinagar
59.Sant Ravi Nagar
60.Mirzapur
61.Varanasi
62.Ghazipur
63.Mau
64.Chandauli
65.Sonbhadra
66.Lalitpur
67.Saharanpur
68.Gautam Budh Nagar
69.Banda
70.Ballia

Annexure II


250
200
150
100
50
0
0.7
0
10
1.26
17.5
41.5
223.7
209.4
137.4
12.2
1.24
0.4
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec

Annexure III



Alluvial plain (0-1% slope)

1. Deep, loamy soils and slightly
2. Deep, loamy soils and slightly eroded associated with silty soils
3. Deep, fine soils moderately saline and sodic associated with loamy soils, slightly eroded
4. Deep, silty soils and slightly eroded associated with loamy soils slightly saline and slightly sodic

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

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

Recent Alluvial Plain (1-3% slope)

6. Deep, loamy soils, slight salinity and sodicity associated with loamy soils are slightly eroded

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[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks 4th week of June	Deep soil , yellow , alluvial loamy 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	
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks 2nd week of July	Deep soil, yellow, alluvial loamy soils	Maize/ Pearl millet/ Til/ 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 **Til:** 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**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks 4th week of July	Deep soil, yellow , alluvial loamy soils	Blackgram/ Greengram / Toria/ Pearl millet	**Blackgram:** Narender Blackgram-1, Pant U-30, 19, 35 **Greengram:** Pant mung -2, 3, Narender mung -1, 4, SML-668, PDM-11 **Pearl millet:**Raj-171,WCC-75,Pusa	• Sowing with multi seed drill	

			23, 322 ICMH - 451		
Condition			**Suggested Contingency measures**		
Early season drought	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks 2nd week of August	Deep soil, yellow , alluvial loamy 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 *i.e*. 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.	Alluvial loamy soils	Rice/ Maize/ Blackgram/ Sorghum (Fodder)	Thinning, weeding and gap filling in existing crop. Re sowing Sowing of short duration rice cultivar	• Inter cultivation • Conservation furrow • Mulching	• Supply of inter cultural implements through RKVY • Farm ponds through IWSM programme
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**

At vegetative stage	Alluvial loamy soils	Rice/ Sugarcane/ Blackgram/ Maize/ Sorghum (Fodder)	Thining, weeding and gap filling in existing crop. Postponement of top dressing Life saving irrigation	• Inter cultivation • Conservation furrow • Mulching	• Supply of inter cultural implements through RKVY • Farm ponds through IWSM programme • Micro/drip/sprinkler irrigation under govt. schemes

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	Alluvial loamy soils	Rice/ Sugarcane/ Maize/ Sorghum (Fodder)/ Blackgram/ Pearl millet	Thinning, weeding and gap filling in existing crop, Life saving irrigation, Weeding and weed mulching	Conservation furrow, Mulching, Urea spray	Farm ponds through IWSM programme

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)	Alluvial loamy soils	Rice/ Maize/ Sorghum/ Blackgram/ Pigeonpea/ Pearl millet / Sesame	Life saving irrigation, Picking/harvesting of pods/ear, Harvest at physiological maturity stage , Harvest for fodder	Toria/Mustard Potato Pea/Chickpea Berseem/oat	Farm ponds through IWSM programme, Harvesting and threshing implements through RKVY, Supply of land lazer labeler through CLDP or RKVY

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 loamy soils	Rice (Basmati)-Wheat	Replace rice with maize Maize: Kanchan, Sweta, Navin, Surya Pearl millet:WCC-75, Raj-171, Pusa-23, Pusa-322	Light irrigation with tube well water, Alternate Furrow irrigation, Mulching in maize	Seed through KSSC and NFSM
		Sorghum (Fodder)/ Maize-Potato/ Wheat	Pearl millet/Greengram/ Blackgram - Potato/ Wheat		
		Sugarcane +cucurbits – Ratoon-Wheat	No change		
	Lowland clay loamy 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	Seed through KSSC and NFSM,
		Sorghum Fodder-Wheat	Pearl millet-Wheat Pearl millet:WCC-75, Raj-171, Pusa-23, Pusa-322		
		Sugarcane-Ratoon-Wheat	Sugarcane-Ratoon-Wheat		
Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Upland sandy loamy soils	Rice (Basmati)-Wheat	Rice (Basmati)-Wheat	Follow alternate wetting and drying schedule of irrigation in rice, Alternate Furrow irrigation, Mulching in Sugarcane/ maize	
		Sorghum/ Maize-Potato/Wheat	Sorghum/ Maize- Potato/Wheat		
		Sugarcane +cucurbits – Ratoon-Wheat	Sugarcane +cucurbits –Ratoon-Wheat		
	Lowland clay loamy soils	Rice-wheat	Rice-wheat	Follow alternate wetting and drying schedule of irrigation in rice, Alternate Furrow irrigation,	Supply of inter cultural implements through RKV
		Fodder Sorghum Wheat	Sorghum Fodder-Wheat		
		Sugarcane-Ratoon-Wheat	Sugarcane-Ratoon-Wheat		

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 loamy soils	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 soils	Rice	Pearl millet/ Blackgram/ Greengram	Limited irrigation, Alternate furrow irrigation, Drip irrigation, Mulching	
		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		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 Micro/drip/sprinkler irrigation under govt. schemes, Supply of inter cultural
		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	
		Sorghum Fodder	Pearl millet/Sorghum Fodder		

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	Sugarcane	Drip irrigation Mulching	implements through RKVY

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 /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 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	Shift to safer place &

			maturity stage	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 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 excess water ,Harvesting at physiological maturity stage	Shift to safer place & dispose of produce as early as possible
Brinjal	Provide drainage, Sowing on raised	Provide drainage	Drain out excess water ,Harvesting at physiological	Shift to safer place & dispose of produce as

	bed		maturity stage	early as possible
Tomato	Provide drainage, Sowing on raised bed, Stacking	Provide drainage, Use Wind breaks, Stacking	Drain out excess water ,Harvesting at physio-logical 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 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 spray 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	**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				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	• Provide drainage	• Provide drainage	Shift to safer place & dispose of produce as early as possible

	bed			
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 • Re transplanting	• Provide drainage	• Provide drainage	Shift to safer place & dispose of 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				
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,,, Exposure of crop to smoke by burning waste material during night time	Light irrigation, Exposure of crop to smoke by burning waste material during night time	Light irrigation, Exposure of crop to smoke by burning waste material during night time	Exposure of crop to smoke by burning waste material during night time

Horticulture				
Potato	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Harvesting
Tomato	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	
Pea	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival Exposure of crop to smoke by burning waste material during night time	Light irrigation for survival, Exposure of crop to smoke by burning waste material during night time	Harvesting
Mango	Irrigation	Irrigation	Irrigation	--
Guava	Irrigation	Irrigation	Irrigation	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 • 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 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 permagnate.

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 resource • 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 resource	
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	• Making sufficient provision of shelter to protect live stock from	• Keep the birds in appropriate shelter	• Making of modern shelter sheds	

management	heat and cold waves • Establishment of alternate resource for water supply. • Modern shelter sheds.	• 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.	• 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	

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.
B. Aquaculture			
(i) Shallow water in ponds due to	• Adopt appropriate measures to	• Ensure the Oxygen availability	• Maintain appropriate level of water

insufficient rains/inflow	reduce water seepage or infiltration from ponds • Avoid any kinds of water pollution and maintain water pH	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	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	• 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

	at bund		
(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
Ii) 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