State: CHHATTISGARH

Agriculture Contingency Plan for District: Bastar

<table>
<tr><td colspan="5">1.0 District Agriculture profile</td></tr>
<tr><td rowspan="9">1.1</td><td colspan="4">Agro-Climatic/Ecological Zone</td></tr>
<tr><td>Agro Ecological Sub Region (ICAR)</td><td colspan="3">Eastern (Chhotanagpur) Plateau & Eastern Ghats hot sub-humid eco-region (12.1)</td></tr>
<tr><td>Agro-Climatic Zone (Planning Commission)</td><td colspan="3">Eastern plateau and hills region (VII)</td></tr>
<tr><td>Agro Climatic Zone (NARP)</td><td colspan="3">Bastar Plateau Zone</td></tr>
<tr><td>List all the districts falling under the NARP Zone*
(*>50% area falling in the zone)</td><td colspan="3">Bastar, Dantawada, Bijapur, Narayanpur</td></tr>
<tr><td rowspan="2">Geographic coordinates of district headquarters</td><td>Latitude</td><td>Longitude</td><td>Altitude</td></tr>
<tr><td>19.08</td><td>82.03</td><td>553</td></tr>
<tr><td>Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS</td><td colspan="3">Zonal Agricultural Research Station –Now- SG College of Agriculture & Research Station
Jagdalpur(Bastar) Chhattisgarh</td></tr>
<tr><td>Mention the KVK located in the district with address</td><td colspan="3">KVK Jagdalpur & Dantawada</td></tr>
<tr><td>Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone</td><td colspan="3">Zonal Agricultural Research Station –Now- SG College of Agriculture & Research Station
Jagdalpur (Bastar) Chhattisgarh</td></tr>
</table>

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):	1121.5	55	10-June	Sept-15
	NE Monsoon(Oct-Dec):	114.8	7		
	Winter (Jan- March)	43.3	4	-	-
	Summer (Apr-May)	124.8	9	-	-
	Annual	1404.40	72	-	-

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)	1010.288	52.189	238.8	73.153	40.766	-	0	-	15.778	13.042

Source: Agricultural Statistics 2009, Commissioner land records, Raipur, Govt. of Chhattisgarh

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area (‘000 ha)**	**Percent (%) of total**
	Entisols (Bhata)	132.40	26.6
	Alfisols (Dorsa)	282.49	56.7
	Entisols/ Inceptisols (Matasi)	82.99	16.7
	Bharri	71.00	14.3
	Associated Vertic & Vertisols (Kanhar)	0.0	0.0
	Total	497.88	-

Source: Directorate of Agriculture, Govt. of Chhhattisgarh

1.5 Agricultural land use	Area ('000 ha)	Cropping intensity %
Net sown area	317.293	124.60
Area sown more than once	21.596	
Gross cropped area	338.889	

1.6 Irrigation

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	8.278		
	Gross irrigated area	8.278		
	Rainfed area	-		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	12	292	1.23
	Tanks	124	862	3.63
	Open wells	3055	529	2.23
	Bore wells	1000	7764	32.66
	Lift irrigation schemes	-	-	-
	Micro-irrigation	-	-	-
	Other sources (please specify)	-	14326	60.26
	Total Irrigated Area		23773	
	Pump sets			
	No. of Tractors	1540		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Agriculture Statistics 2009, Commissioner land record, Raipur, Govt. of Chhattisgarh

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year _____ eg., 2008-09)

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*				
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Wheat			-			3.425		3.43
	Paddy			207.510			0.609		208.12
	Sorghum			1.780			0.00		1.78
	Maize			42.260			5.517		47.78
	Kodo-Kutki			14.310			-		14.31
	Chickpea			-			4.595		4.60
	Pea			-			2.505		2.51
	Lentil			-			0.269		0.27
	Pigeonpea			3.390			-		3.39
	Blackgram			23.700			0.281		23.98
	Greengram			0.980			0.415		1.40
	Horsegram			13.840			0.00		13.84
	Soybean			0.000			-		0.00
	Sesame			0.910			0.047		0.96
	Niger			19.090			0.00		19.09
	Sunflower			0.160			0.211		0.37
	Groundnut			0.400			0.052		0.45
	Toria/ Mustard			-			18.832		18.83
	Linseed			-			5.098		5.10
	Safflower			-			0.156		0.16
	Sugarcane						2.876		2.88
	Vegetables			8.250			7.638		15.89

Source: Agriculture Statistics 2009, Commissioner land record, Raipur, Govt. of Chhattisgarh

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
	Mango	5.500		

	Guava	0.500		
	Cashew	3.480		
	Citrus	1.240		
	Custard Apple	0.662		
		48.018		
	Horticulture crops - Vegetables	**Total**		
	Brassica spp.	1.157		
	Brinjal	1.834		
	Tomato	0.810		
	Okra	6.202		
	Potato	0		
	Others (specify)	41.297		
	Medicinal and Aromatic crops	**Total**		
	Lemon Grass	0.225		
	E. citridora	0.120		
	Alovera	0		
	Others (specify)	0.135		
	Plantation crops	**Total**		
	Cashew	3480		
	Eg., industrial pulpwood crops etc.			
	Fodder crops	**Total**		
	Fodder Maize	0.001		
	Total fodder crop area	0.001		
	Grazing land			
	Sericulture etc			
	Others (specify)			

Source: Directorate of Horticulture, Govt. of Chhattisgarh

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			562602
	Improved cattle			7244
	Crossbred cattle			3693
	Non descriptive Buffaloes (local low yielding)			111404
	Descript Buffaloes			139
	Goat			188881
	Sheep			35051
	Others (Camel, Pig, Yak etc.)			81845
	Commercial dairy farms (Number)			3006

1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**
	Commercial		1117.596
	Backyard		

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**
	1695	64	4863

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)	2401.14	3.881	4.224
Others			

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh
Directorate of Fisheries, Govt. of Chhattisgarh
Directorate of vetenary science, 2006-07, Govt. of Chhattisgarh

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 to be identified based on total acreage)										
	Rice	327.5	1284.5	-	-	-	-	327.5	1284.5	-
	Maize	55.5	1321.4	2.9	1391.2	-	-	58.4	2712.6	-
	Blackgram	11.7	457.7	-	-	-	-	11.7	457.7	-
	Niger	6.4	231.1	-	-	-	-	6.4	231.1	-
	Horsegram	6.3	352.6	3.7	344.0	-	-	10.0	696.6	-
	Millets	4.6	265.2	-	-	-	-	4.6	265.2	-
	Rapeseed-Mustard	-	-	6.7	439.0	-	-	6.7	439.0	-
	Linseed	-	-	1.3	323.2	-	-	1.3	323.2	-
	Lathyrus	-	-	1.3	642.8	-	-	1.3	642.8	-
	Chickpea	-	-	2.1	855.4	-	-	2.1	855.4	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Cashewnut	-	-	-	-	-	-	3.2	430	-
	Mango	-	-	-	-	-	-	4.7	3266	-
	Jackfruit	-	-	-	-	-	-	15.7	17600	-
	Coconut	-	-	-	-	-	-	2.5	7003	-
	Aonla	-	-	-	-	-	-	5.0	15600	-
	Ber	-	-	-	-	-	-	6.0	18600	-

Source: **Agriculture Statistics 2009, Commissioner land record, Raipur, Govt. of Chhattisgarh**

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	**Rice**	**Maize**	**Blackgram**	**Niger**	**Horsegram**
	Kharif- Rainfed	3rd week of June to 1st	3rd week of June to	4th week of June to	1st week of	1st week of

		week of July	4th week of June	1st week of July	September to 2nd week of September	September to 2nd week of September
	Kharif-Irrigated	2nd week of June to 3rd week of June	-	-	-	-
	Major Rabi crops	**Rapeseed-mustard**	**Linseed**	**Maize**	**Lathyrus**	**Chickpea**
	Rabi- Rainfed	-	1st week of November to 3rd week of November	-	3rd week of October to 4th week of October	-
	Rabi-Irrigated	2nd week of November to 3rd week of November	-	2nd week of December to 3rd week of December	-	2nd week of November to 3rd week of November

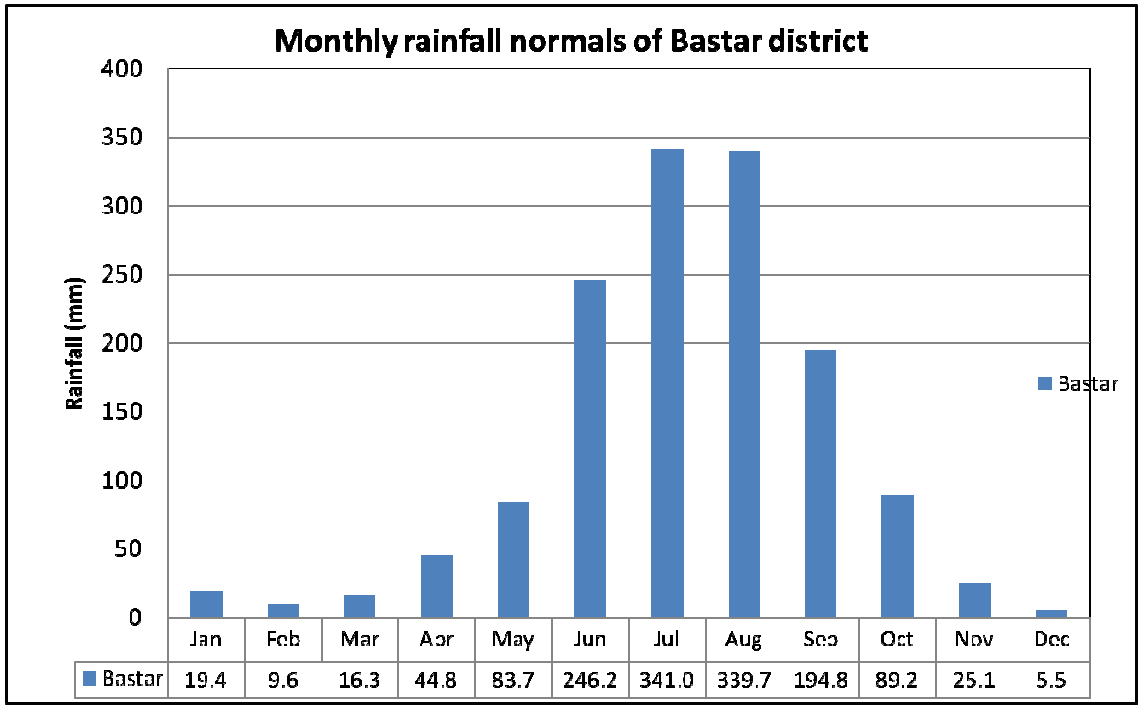
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	✓		
	Flood			
	Cyclone			×
	Hail storm			×
	Heat wave		✓	×
	Cold wave		✓	
	Frost		✓	
	Sea water intrusion	×	×	×
	Pests and disease outbreak (specify)	✓		
	Others (specify)			

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: Yes
		Soil map as Annexure 3	Enclosed: No

Annexure 1


Bastar
Kanker
Keskal
Narainpur
Kondagaon
Dantewada
Jagdalpur
ORISSA
N
Map not to Scale
District Boundary
River
National Highway
State Highway
Road
Railway Track
Trekking Routes
District Headquarter
Town

Annexure 2


Monthly rainfall normals of Bastar district
Rainfall (mm)
400
350
300
250
200
150
100
50
0
Bastar
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Bastar 19.4 9.6 16.3 44.8 83.7 246.2 341.0 339.7 194.8 89.2 25.1 5.5

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop / Cropping system[b]**	**Change in crop / cropping system[c] including variety**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks 4th week of June	Slopy Upland (Marhan) Upland Bunded (Tikra)	Rice fallow – (Local variety , Broad casting)	Rice fallow Early duration varieties Aditya(90days), Vanprabha(90 days), Poornima (105 days), Danteshwari (105 days).	• Herbicide like Fenoxaprep P. Ethyl 9 EC @ 60 ml. a.i/ ha. Chlorimura+Metsulfuran 20% @ 4 gms. ai/ ha. Almix @ 8gm and whipsuper 250 ml dissolved in 10 ltrs of water for 1 acre./Butachlor 1.5 kg ai/ha PE. Weeding by upland weeder. • 60:40:30 N: P: K full dose of P & K and ½ dose of N should be applied basal remaining N should be top dressed at tillering and PI stage.	• Percolation tank should be excavated on the upper corner for recharge/ life saving irrigation. • Trenches should be dug out on the upper side and lower side of field for *in situ moisture* conservation

	Midland (mal)	Rice fallow – (Local variety , Transplanting without planting geometry)	Poornima(105 days), Annada,(105 days), Danteshwari(105days), Samleshwari (110days), MTU 1001(120 days), MTU 1010(110 days), Karma Mahsuri(125 days) , Madhuri(125 days).	• Line Transplanting. • Herbicide like Fenoxaprop P. Ethyl 9 EC @ 60 ml. ai/ ha. Chlorimura+Metsulfuran 20%@ 4 gms. ai/ ha. Almix @ 8 g and whipsuper 250 ml dissolved in 10 ltrs of water for 1 acre./Butachlor 1.5 kg ai/ha PE. Weeding by upland weeder. • 60:40:30 N: P: K full dose of P & K and ½ dose of N should be applied basal remaining N should be top dressed at tillering and PI stage.	• Percolation tank should be excavated on the upper corner for recharge/ life saving irrigation. • Trenches should be dug out on the upper side and lower side of field for *in situ moisture* conservation
	Lowland (Gabhar)	Rice	Bamleshwari (140 days), Swarna(145 days), Jaldoobi(140 days), Indira Sugandhit Dhan-1(130 days), Pusa Basmati (130 days).	• Herbicide like Fenoxaprep P. Ethyl 9 EC @ 60 ml. a.i/ha.Chlorimura+Metsulfuran 20%@ 4 gms. ai/ ha. Almix @ 8g and whipsuper 250 ml dissolved in 10 ltrs of water for 1 acre/Butachlor 1.5 kg ai/ha PE. • 80:60:40 N: P: K full dose of P & K and ½ dose of N should be applied basal remaining N should be top dressed at tillering and PI	• Farm pond for water storage/ irrigation. • Trenches should be dug out on the lower side of field for *in situ* moisture conservation

				stage.	
	Upland & Midland	Maize (Local)	Maize improved variety like : JM-216 (80-85 days), Chandan safed makka -2 (75 days), Chandan makka -3 (95 days), Navjot (90 days).	• Line sowing, recommended dose of fertilizers & weed management. • Manual earthing up at 25-30 DAS • Herbicide: Atrazine 50% 2.5kg/ha or Pendimethalin 30 EC 2.5lit/ha or oxyflurophin 23.5 EC 425 ml/ha in 750 liters of water. • 80:50:30 N: P: K kg/ha. • 50% N basal and 50% N as top dressing at knee high & silking stage	• One life saving irrigation
		Maize + Pigeonpea (4:2)	Maize JM-216 (80-85 days), Chandan maize-1(105 days), Chandan safed maize-2 (75 days), Chandan maize-3 (95 days), Navjot (90 days), Composite NAC-6004 (125 days) Pigeonpea	• One hand weeding at 25-30 DAS • One earthing in maize • Pendimethalin 1 kg ai /ha • Sowing across the slope • 2 intercultural operations at 20 & 40 DAS • Opening of furrow between rows of pigeon pea	

			ICPL -87(150-160), No. 148 (180 – 200 days), BDN-2(160 – 180 days), ICPL -87(150-160), Rajeev lochan (180- 190 days).		
	Finger millet	Finger millet	VR-708 (80-84 days), PES-400(90-92days), GPU-66 , HR-911, GPU-28	• One hand weeding at 25-30 DAS • Sowing across the slope • Opening of furrow at 10-15 m interval • Intercultural operations at 12 DAS and 21 DAS for thinning and removal of weeds.	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks (Specify month) 2nd week of June	Midland (mal)	Rice	Rice-Lehi system Line sowing method Poornima(105 days), Annada,(105 days), Danteshwari(105days), Samleshwari (110days), MTU 1001(120 days), MTU 1010(110 days), Karma Mahsuri(125 days), Madhuri(125 days)	• Herbicide like Fenoxaprep P. Ethyl 9 EC @ 60 ml. a.i/ ha. Chlorimura+Metsulfuran 20%@ 4 gms. ai/ ha. Almix @8gm and whipsuper 250 ml dissolved in 10 ltrs of water for 1 acre./Butachlor 1.5 kg ai/ha PE. Weeding by upland weeder. • 60:40:30 N: P: K full dose of P & K and ½ dose of N	• Percolation tank should be excavated on the upper corner for recharge/ life saving irrigation. • Trenches should be dug out on the upper side and lower side of field for *in situ*

				should be applied basal remaining N should be top dressed at tillering and PI stage. • Weeding by implement(Hand Hoe)	*moisture* conservation
	Lowland	Rice	Rice - Lehi system Line sowing method Bamlesh-wari (140 days) Swarna(145 days), Jaldoobi(140 days), Indira Sugandhit Dhan-1(130 days), Pusa Basmati (130 days)	• Herbicide like Fenoxaprep P. Ethyl 9 EC @ 60 ml. a.i/ha.Chlorimura+Metsulfuran 20%@ 4 gms. ai/ ha. Almix @ 8g and whipsuper 250 ml dissolved in 10 ltrs of water for 1 acre/Butachlor 1.5 kg ai/ha PE. • 80:60:40 N: P: K full dose of P & K and ½ dose of N should be applied basal remaining N should be top dressed at tillering and PI stage. • Weeding by implement (Ambika Paddy Weeder & Cono Weeder)	• Farm pond for water storage/ irrigation. • Trenches should be dug out on the lower side of field for *in situ* moisture conservation
		Finger millet –(Local variety)	Finger millet improved varieties like : VR-708 (80-84 days) PES-400 (90-92days) GPU-66	• Line sowing with recommended dose of fertilizers. • One hand weeding at 25-	

			HR-911 ML-365	30 DAS • Sowing across the slope • Opening of furrow at 10-15 m interval Intercultural operations at 12 DAS and 21 DAS for thinning and removal of weeds	
		Sesame	Sesame - Early variety RT-54 TKG- 55 TKG-21 Local (c)	• One hand weeding at 25-30 DAS • Sowing across the slope	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (Specify month) 4th week of July	Lowland	Rice	Blackgram	• Sowing across the slope with good drainage • Improved variety, Line sowing with recommended fertilizers & weed management.	
		Little millet Local Variety Broad casting with out fertilizers	Little millet – improved variety like : OLM-37(80-82 days) OLM-203(110-150 days) JK-8(60-70 days)	• Spraying of Isoproturon @ 0.5kgai /ha Pre emergence • Hand weeding 30	

			Birsa gundhali-1(70-75 days) TNAU-63(90-95 days) RPMB-1(95-100 days)	DAS Thinning at 15 days after germination • 40:20:10 N: P: K Kg/ha. •For line sowing one part seed & 20 part sand/FYM mixes with properly. • Two inter-cultural operations at 15-20 DAS • Summer ploughing • Use of FYM 1tonne/ha after every three years	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 8 weeks (Specify month) 2nd week of August	Lowland	Niger	Niger -Improved variety IGP-76(105-110 days) JNS-1 (90-100 days) JNS-6 (90-100 days)	• Summer ploughing • 20:20:10 N:P:K kg/ha • One hand weeding at 15-20 DAS • Pendimethiline/ Alachlore @1.5kg ai/ha mix with 500 lit.	

				water • Intercultural operations at 12 DAS and 21 DAS for thinning	
		Horsegram Local varieties used	Horsegram:HPK-4(77 days), AK-21(80-90 days) HPK-4 (76days), VLGH-1(80 days), Birsa Kulthi(81 days), A.K.-21 (83 days), Bastar Kali(95 days)	• Sowing across the slope • Two inter culture operations at 20 and 40 DAS • Life saving irrigation • Summer ploughing • 20:40:20 NPK kg/ha full dose at the time of sowing • 15-20 DAS , 1-2 hand weeding • Thiram @ 3 gm/kg. seed,PSB culture @ 5 g/kg seed. • Rhizobium culture 5g/kg seed • Line sowing of horse gram should be followed.	

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**

Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland	Rice	• Foliar Spray of Urea 2-3 % solution in place of top dressing during moisture stress condition. • Life saving irrigation should be given so that crops can be saved. • Gundhi BugControl (Malathion+ DDVP@ 45ml + 5 ml) • Green leaf hopper (At PI stage BPMC @ 1 ml/litre of water)	• In the standing crops hand weeding should be done so that moisture remaining within soil may be conserved to the maximum extent possible • Small percolation pits for storing 1 cum of water at the corner of the field.	
	Midland	Rice	• Under Broadcasting situation *biasi* should be done at 30-35 DAS followed by *saghan chalai*	• Percolation tank should be excavated on the upper corner for recharge/ life saving. • Trenches should be dug out on the upper side and lower side of field for *in situ moisture* conservation.	
	Lowland	Rice	• Life saving irrigation should be given so that crops can be saved. • Weedicide like Fenoxaprep P. Ethyl 9 EC should be used @ 60 ml. active ingredient/ ha.		

			• Chlorimura+Metsulfuran 20 percent should be used @ 4 gms. active ingredient/ ha. and application should be done in 500-600 litres of water.) • If farmers want to do biasi operation, narrow sized plough should be used for biasi operation. Ploughing should be done at wider spacing. Chalai operation should be done immediately after biasi operation and plants should be uniformly distributed and fertilizers should be applied.		
		Maize	• One life saving irrigation. •Early duration maize crop varieties (up to 110 days) should be sown. For this, Pusa early variety is appropriate. • Herbicide: Attrazine 50% 2.5kg/ha or Pendimethalin 30 EC 2.5lit/ha or oxyflurophin 23.5 EC 425 ml/ha in	• Earthing up by manual 25-30 DAS • Trenches should be dug out on the upper side and lower side of field for in situ moisture conservation.	

			750 liter of water. •50% N basal and 50% N as top dressing at knee high & silking stage		

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[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At vegetative stage	Upland	Rice	• Foliar spray of Urea 2-3 % solution in place of top dressing during moisture stress condition. • Life saving irrigation should be given so that crops can be saved. • Green leaf hopper (At PI stage BPMC @ 1 ml/litre of water) • Under Broadcasting situation *biasi* should be done at 30-35 DAS followed by *saghan chalai* as per availability of sufficient Moisture.	• In the standing crops the hand weeding/ Mulching should be done so that moisture remaining within soil may be conserved to the maximum extent possible. • Trenches should be dug out on the upper side and lower side of field for *in situ moisture* conservation.	

		Rice	• Life saving irrigation should be given so that crops can be saved. • In the standing crop of rice, 2 per cent of urea solution should be sprayed at an interval of 5 days. • Under Broadcasting situation *biasi* should be done at 30-35 DAS followed by *saghan chalai* as per availability of sufficient moisture.	• In the standing crops the hand weeding/ Mulching should be done so that moisture remaining within soil may be conserved to the maximum extent possible. • Trenches should be dug out on the upper side and lower side of field for *in situ moisture* conservation	
	Upland	Kodo Millet	• Improved variety with recommended dose of fertilizer • Two intercultural operations at 15-20 DAS	• Contour bunding on full length of field for interception of runoff • Hand weeding should be done	
		Little Millet	• Improved variety with recommended dose of fertilizer • Thinning at 15 days after germination • Life saving irrigation should be given so that crops can be saved.	• Trenches should be dug out on the upper side and lower side of field for in situ moisture conservation. Hand weeding should be done.	
		Finger Millet	• Improved variety with recommended dose of fertilizer • Intercultural operations at	• Remaining 50% N in two splits at branching & PI stage • Sowing across the	

			12 DAS and 21 DAS for thinning and removal of weeds • Remaining 50% N in two splits at branching & PI stage	slope • One handweeding at 25-30 DAS	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
	Upland & mid land plantation crop	Mango Sapota Guava	Intercultural operations at 45 DAP and 60 DAP for thinning and removal of weeds.	Near root zones of the trees, one feet long and 2.5" diameter PVC pipe should be laid and as per water requirement of the plants, moisture/ water should be transferred to root zone.	Time to time, mulching around the plants should also be done.

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Rabi Crop planning[d]**	**Remarks on Implementation[e]**

		Rice	• Niger • Improved Variety With recommended fertilizer • Intercultural operations at 12 DAS and 21 DAS for thinning • One hand weeding @15-20 DAS	• Sowing across the slope. • Summer ploughing • Pendimethilin/ Alachlore @1.5kg ai/ha mix with 500 lit. water	
		Rice	• Horsegram • Improved Variety With recommended fertilizer • 1-2 hand weeding. • life saving irrigation should be given so that crops can be saved.	• 20:40:20 NPK kg/ha full dose at the time of sowing 15-20 DAS. • Sowing across the slope. •Two inter culture operations at 20 and 40 DAS •0.5 ml Calyxin (0.05 %) spray to control powdery mildew.	
		Rice	• Horsegram • Improved variety with recommended fertilizer • Two Intercultural operations at 12 DAS and 21 DAS for thinning • 1-2 hand weeding • life saving irrigation	• 20:40:30 NPK Kg /ha. •Summer ploughing • One hand weeding 15-20@ DAS. • Sowing across the slope.	

			should be given so that crops can be saved.		

2.1.2 Drought - Irrigated situation - 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]**
Delayed release of water in canals due to low rainfall	Farming situation	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]**
Limited release of water in canals due to low rainfall	Farming situation	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]**
Non release of water in canals under delayed onset of monsoon in catchment	1) Farming situation:	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]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	1) Farming situation:	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	1) Farming situation:	NA			

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]**
Rice	• Drainage of excess water, • management of blast (tricyclozol 6 g/10 l of water) Do not apply urea as top dressing	• Drainage of excess water, management of blast (tricyclozol 6 g/10 l of water) and stem borer (Chlorpyriphos @ 1.5 ml/l of water)	Drainage of excess water,	Cover the harvested produce in farm yard.
Maize	• Drainage of excess water • Disease & pest management	• Drainage of excess water • Pest & disease	• Drainage of excess water • Protection against pest &	• Drainage • Shifting of produce

		management	diseases	to gowdon or safer place protecting from stored grain pest & disease
Blackgram	• Drainage of excess water Disease & pest management	• Drainage of excess water • Pest & disease management	• Drainage of excess water • Protection against pest & diseases	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Niger	• Drainage of excess water Disease & pest management	• Drainage of excess water Pest & disease management	• Drainage of excess water • Protection against pest & diseases	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Horsegram	• Drainage of excess water Disease & pest management	• Drainage of excess water • Pest & disease management	• Drainage of excess water • Protection against pest & diseases	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Horticulture				
Tomato	• Drainage of excess water • Disease & pest management • Gap filling	• Drainage of excess water • Disease & pest management • Staking of plants	• Drainage of excess water • Disease & pest management • harvesting	• Drainage • Shifting produce to safer places • Grading & packing
Brinjal	• Excess water drainage • Disease & pest management	• Drainage of excess water • Disease & pest management • Staking of plants	• Drainage of excess water • Disease & pest management • harvesting	• Drainage • Shifting produce to safer places • Grading & packing
Mango	• Drainage of excess water	• Drainage of excess water	• Drainage of excess water	• Drainage

	• Disease & pest management	• Pest & disease management	• Protection against pest & diseases	• Shifting produce to safer places • Grading & packing
Heavy rainfall with high speed winds in a short span[2]				
Rice	• Drainage of excess water • Management of blast (0.2% Edifelphos), leaf blight(0.01% streptocyclin) and stem borer (0.2% trizaphos)	• Drainage of excess water • Management of blast (0.2% Edifelphos), leaf blight(0.01% streptocyclin) and stem borer (0.2% trizaphos)	• drainage of excess water • Protection against pest like GLH & BPH (Imidachloprit 0.025%) and disease like Blast preventing crop from logging, harvesting in physiological maturity stage.	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Maize	• Drainage of excess water • Disease & pest management • Earthing up to prevent logging	• Drainage of excess water • Pest & disease management	• Drainage • Protection against pest & diseases • Preventing crop logging & harvesting	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Blackgram	• Drainage of excess water • Disease & pest management • Earthing up to prevent logging	• Drainage of excess water • Pest & disease management	• Drainage of excess water • Pest & disease management	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Niger	• Drainage of excess water • Disease & pest management • Earthing up to prevent logging	• Drainage of excess water • Pest & disease management	• Drainage of excess water • Pest & disease management	• Drainage • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Horsegram	• Drainage of excess water • Disease & pest management • Earthing up to prevent logging	• Drainage of excess water • Pest & disease	• Drainage of excess water • Pest & disease management	• Drainage • Shifting of produce to gowdon or safer place protecting

		management		from stored grain pest & disease
Horticulture				
Tomato	• Drainage of excess water • Disease & pest management • Gap filling	• Drainage of excess water • Disease & pest management • Staking of plants	• Drainage of excess water • Disease & pest management • harvesting	• Drainage • Shifting produce to safer places • Grading & packing
Brinjal	• Excess water drainage • Disease & pest management	• Drainage of excess water • Disease & pest management • Staking of plants	• Drainage of excess water • Disease & pest management • Preventing crop lodging • Harvesting of fruit	• Drainage • Shifting produce to safer places • Grading, packing & marketing
Mango	• Drainage of excess water • Disease & pest management •	• Drainage of excess water • Pest & disease management • Spraying of regulatory hormones like NAA to avoid flower drop	• Drainage of excess water • Protection against pest & diseases • Spraying of regulatory hormones like NAA to avoid fruit drop	• Drainage • Shifting produce to safer places • Grading packing & marketing
Outbreak of pests and diseases due to unseasonal rains				
Rice	• Management of blast (0.2% Edifelphos), leaf blight(0.01% streptocyclin) and stem borer (0.2% trizaphos)	• Management of blast (0.2% Edifelphos), leaf blight(0.01% streptocyclin) and stem borer (0.2% trizaphos)	• protection against pest like GLH & BPH (Imidachloprit 0.025%) and disease like Blast preventing crop from logging, harvesting in physiological maturity stage. • Protect against grain discolouration	• Quick drying to prevent grain discolouration • Shifting of produce to gowdon or safer place protecting from stored grain pest & disease
Maize	• Spray imidachloprit 0.3 ml/l or Dimethoate 1.0 ml/l to control leaf hopper	• Foliar application of Mancozeb @0.25 - 0.4% at 8-10 days	• Trichoderma mixed with FYM @ 10 g/kg at 10 days prior to its use in the field can	-

		interval to control *Turcicum* leaf blight	be applied to control stalk rot incidence which is likely during post flowering	
Blackgram	-	• Foliar application of Carbendazim @ 0.5 g/l & sulphur @ 3 g/l against leaf spot & powdery mildew respectively	-	-
Horticulture				
Mango	• Spray Imidachloprit 0.3 ml or Dimethoate 1 ml/l to control leaf hopper • Drench the seedlings with COC 0.3 % against root rot	• Spray Imidachloprit 0.3 ml or Dimethoate 1 ml/l to control leaf hopper	• Spray Dithane M 45 2 g/l or Carbendazim 1 g/l against anthracnose • Spray Sulphur 0.5% to control powdery mildew	• Maintain aeration in storage to prevent fungal infection & blackening of fruits

2.3 Floods

Condition	**Suggested contingency measure [o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	Drain out the excess water at the earliest apply boster dose of 50 kg N/ha Micronutrient deficiency correction for Zn & Fe foliar application of 0.2% ZnSO4, FeSO4 2-3 times at 4-5 days interval Maintain weed free condition	Drain out excess water at the earliest Take up gap filling either with available nursery or by splitting the tillers from the surviving hills Apply booster dose of 50 kg N/ha Spray ZnSO4 0.2% if it is less than 45 DAT	Drain out the excess water at the earliest Take up need based plant protection measure	Drain out water. Spread sheaves loosely in field or field bunds where there is no water stagnation. Spray common salt @ 5% on panicles to prevent germination and spoilage of straw from moulds. Threash after drying the sheaves properly. Ensure proper grain

				moisture before storage
Horticulture				
Mango	Drain the excess water from orchard Spray urea 2% solution for 2-3 times at 7-10 days interval	Drain the excess water from orchard Spray urea 2% solution for 2-3 times at 7-10 days interval	Drain the excess water from orchard Spray urea 2% solution for 2-3 times at 7-10 days interval	Drain excess water as soon as possible Harvest the mature fruits as soon as possible Store the fruit in well ventilated place temproraly before it can be marketed Market the fruit as soon as possible Spray dithane M 45 3% or bavistin 1% against anthracnose
Continuous submergence for more than 2 days[2]				
Horticulture				
Sea water intrusion[3]	NA			

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

Extreme event type	**Suggested contingency measure[r]**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]				
Rice	○ Irrigating frequently	○ Increase irrigation frequency ○ Intercultural operation	○ Provide deficit irrigation ○ Quick harvesting to prevent moisture loss	○ Shifting the produce at shade and safe place
Maize	○ Frequent irrigation and mulching	○ Intercultural operation followed by frequent irrigation and mulching	○	○ Shifting the produce at shade and safe place

Greengram	○ Frequent irrigation	○ Increase irrigation frequency ○ Intercultural operation	○ Provide deficit irrigation ○ Quick harvesting to prevent moisture loss	○ Shifting the produce at shade and safe place
Horticulture				
Mango	○ Wind break ○ Growing in poly house watering twice daily	○ Shading to the small plants at field ○ Pitcher irrigation, Continuous irrigation with drip method	○ Wind break ○ Protective irrigation ○ Quick harvesting	○ Storing in cool dry place ○ Grading packing ○ Quick disposal for marketing
Cold wave[q]				
Maize	Frequent irrigation	Frequent irrigation	Frequent irrigation	Frequent irrigation
Rapeseed-Mustard	Frequent irrigation	Frequent irrigation	Frequent irrigation	Frequent irrigation
Horticulture				
Tomato	• Raising of seedling in Poly house, resowing if damaged	• Disease and pest control, care for chilling injury or replanting	• Quick harvesting	• Grading, quick disposal for marketing
Potato	• Raising of seedling in Poly house, resowing if damaged	• Disease and pest control	• Harvesting, disease management	• Store in cold storage or quick disposal for marketing
Chilli	• Raising of seedling in Poly house, resowing if damaged	• Disease and pest control, care for chilling injury or replanting	• Harvesting, disease management	• Store in cold storage or quick disposal for marketing
Frost	NA			
Horticulture				
Hailstorm	NA			
Horticulture				
Cyclone	NA			
Horticulture				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[$]	**During the event**	**After the event**
Drought			
Feed and fodder availability	Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage Supply of molasses to cattle feed plants.	Arrangement of feeds and fodder from adjoining areas, exploitation of non conventional feed resources, use of urea treated straw and feed blocks.	Promotion of fodder seed production, cultivation and storage establishment of fodder block making machines in fodder surplus areas.
Drinking water	Repairs of tube wells, clear of the sludge in the canals and local water catchments and clean the water tanks, large ponds and lakes	Harvesting water through the existing reservoirs and exploitation of groundwater.	To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.
Health and disease management	Mass vaccination and deworming	Provide shades to animals and water as much as possible. treatment of diseased animals and proper disposal of carcasses.	Treatment of diseased animals and provide vitamin and mineral supplement to regain strength and vigour.
Floods			
Feed and fodder availability	Conservation of the fodder in the form of hay and silage.	Feeding of feed blocks and silages	Provide treated feed and fodder to animals against moulds and fungi.
Drinking water	Regular inspection of ponds and canals for any obstruction.	Provide drinking water in small through and plastic bucket.	Disinfection of contaminated water especially for drinking purpose.

Health and disease management	Storage of medicines	Treatment of injured animals	Disposal of dead animals.
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Construction of wind breaks, shed should have sufficient over hangs, fixing of sprinklers, provide thatch on the roof. Construction of wind breaks, keep curtains ready, arrange for heating devices.	Construct wind breaks keep animals under shade during hot hours of the day, provide cooling fans in shades and also sprinkle water at regular intervals. Construction wind breaks, put gunny bags on all openings of shed.	
Health and disease management		Grazing should be allowed during night and early hours of the day, vaccination and veterinary checkup time to time.	

[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	Storage of feed	Provide non conventional feed, supplement anti oxidant and anti stress		
Drinking water	Storage of water in tanks	Add Vit-C and other anti stress ingredient with water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one	Disposal of dead birds	
Floods				
Shortage of feed ingredients	Storage of feed in safe storage bins to avoid mould and fungi	Use pellet feeding		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one, proper litter management and addition of lime as per need	Disposal of dead birds	
Cyclone	NA			
Shortage of feed ingredients	Storage of feed	Use stored feed carefully avoiding dampness		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management		Vaccination and treatment of diseased one, proper litter management	Disposal of dead birds	
Heat wave and cold wave	NA			
Shelter/environment	Construction of wind	Provide cooling fans in shades and		

management	breaks, poultry shed should have sufficient over hangs fixing of sprinklers on the roofs, provide thatch on the roof, decrease stocking density, decrease litter depth. Construction of wind breaks, keep curtains ready, arrange for heating devices, increase stocking density, decrease litter depth.	also sprinkle water on the roof at regular intervals. Use of wind breaks, put gunny bags on all openings of shed , use heating devices.		
Health and disease management	Routine health care	Reduce energy content and increase protein content in feed, add anti stress factors, provide cool drinking water. Increase energy content in food		

[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	1. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters. 3. Provision for Rainwater harvesting 4. Deepening/Desilting of existing water bodies.	1. Harvest all the fish. 2. Stock water bodies with desirable species for culture. 3. Shallow derelict waters can stocked with stunted fish seed for culture. 4. Pens of 0.2 to 0.5 ha may facilitate easy operation of culture.	1. Stocking and management of grow out water bodies to improve growth of stock
(ii) Changes in water quality	1.Monitor water quality 2. Avoid polluting materials entry into water body.	1. Monitor water quality as small water bodies have less tolerance to environmental changes leading to algal blooms and fish mortality.	1. Advent of monsoon will mitigate the water shortage and normal stocking and culture practice may be adopted.
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	1. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters with at least one meter depth. 3. Go for low stocking density. 4. Provision for Rainwater harvesting 5. Deepening/Desilting of existing water bodies. 6. Removal of debris and compaction of pond bunds.	1. Harvest all the fish. 2. Stock ponds with desirable species for culture. 3. Transfer the brood stock to deep water ponds if the existing ponds cannot be filled with bore well water. 4. Postpone breeding operations till the first heavy rains or 5. Start breeding if sufficient bore well water is available. 6. Start pond preparations, like deweeding, desilting & repair of dykes.	1. Start breeding operation with full preparations. 2. Undertake nursery and rearing operations. 3. Stocking and management of grow out ponds to improve growth of stock.
(ii) Impact of salt load build up in ponds / change in water quality	1. Add bore well water and if available, canal-water	1. Add bore well/ canal water if available or else harvest the stock. 2. Implement standard water	1. Exchange pond water with fresh surface runoff water.

		conservation management practices.	
(iii) Any other			
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No. of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality		1. Drainage of excess water need to be done. 2. Erect pens to protect the stock 3. Harvest big fish	1. Repair the embankments. 2. Restock with fish
(v) Health and diseases			1.Treat symptomatically
B. Aquaculture			
(i) Inundation with flood water	1. Dyke level shall be 0.5 m higher than highest flood level. Dyke walls should be checked for its strength specially compactness. 2. Inlets & outlets with proper sieves need to be maintained properly. 3. Pens may be erected to check fish stock loss in the periphery of	1. Round the clock watch in is necessary. 2. Hapas should be installed in ponds to take care of spawn in case sudden or natural breeding occurs.	1. Check the brood stock condition. 2. Segregate male & female and various fish sizes. 3. Application of bleaching powder or liming must be done to avoid decaying of various organisms.

	small ponds.		
(ii) Water contamination and changes in water quality	-	1. Turbidity need to be controlled	1. Application of lime/ bleaching powder be done to avoid rotting and decaying of organisms.
(iii) Health and diseases	-	1. Apply lime/ bleaching powder as a prophylactic measure.	1. Apply bleaching powder. 2. Remove severely diseased & injured fishes. 3. Treat the remaining fishes as per symptoms.
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
(vi) Any other			
3. Cyclone / Tsunami	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	NA		
(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	-	1. Harvest the stock.	1. Stock with fingerlings with the advent of rains.
B. Aquaculture			
(i) Changes in pond environment (water quality)	-	1. Add bore well water and if available, canal-water.	1. Exchange pond water with fresh surface runoff water.
(ii) Health and Disease	-	1. Provide shelter (weeds) in a small area of the pond to	1. Remove weeds. 2. Liming or bleaching powder

management		prevent sun burn.	need to be added.
(iii) Any other			

[a] based on forewarning wherever available