State: ORISSA

Agriculture Contingency Plan for District: PURI

1.0 District Agriculture Profile				
1.1	Agro-Climatic/Ecological Zone	East and South Eastern Coastal Plain Zone (18.4)		
	Agro Ecological Sub Region (ICAR)	Sub-humid to humid Eastern and South Eastern Upland (5)		
	Agro-Climatic Region (Planning Commission)	EASTERN PLATEAU AND HILLS REGION (VII)		
	Agro Climatic Zone (NARP)	East and South Eastern Coastal Plain Zone (OR-4)		
	List all the districts falling under the NARP Zone	Kendra Para , Khurda, Jagatsinghpur, parts of Cutback, Puri, Nayagarh and part of Ganjam		
	Geographic coordinates of district	Latitude	Longitude	Altitude
		19^{o} 47'57.34' N	85 49^{0} 29.56'E	19.3m
	Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS	R R T T S, Bhubaneswar- 751003		
	Mention the KVK located in the district with address	At- Block Colony, Po-Kakatpur ,Dist-Puri, Pin- 752108		
1.2	**Rainfall**	Average (mm)	Normal onset (specify week and month)	Normal Cessation (Specify week and month)
	SW monsoon (June-Sep):	1061.38	3rd week of June	Last week of Sept
	NE Monsoon (Oct-Dec):	234.20	2nd week of October	Last week of December
	Winter (Jan-March):	60.10	4th week of January	3rd week of March
	Summer (Apr-May):	94.00	4th week of April	2nd week of May
	Annual	1449.68	3rd week of June	1st week of December

1.3	**Land use pattern of the district (latest statistics)**	Geographical 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)	348	14	115	9	3	9	8	55	1
1.4	**Major Soils**	Area (‘000 ha)			Percent (%) of total					
	1. Alluvial (Soil)	156.8			52.2					
	2. Laterite Soil	2.4			0.8					
	3. Saline Soil	20.1			6.7					
	4. Acidic Soil	120.7			40.3					
	5.Other soils	-			-					
1.5	**Agricultural land use**	Area (‘000 ha)			Cropping intensity %					
	Net sown area	138.0			207.9 %					
	Area sown more than once	148.9								
	Gross cropped area	287								

Source: SREP (ATMA) of Puri District, 2007-08

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	97.8		
	Gross irrigated area	175.3		
	Rainfed area	40.1		
	Sources of Irrigation	Number	Area (‘000 ha)	% area
	Canals		70.01	78.7
	Tanks			
	Open wells			

	Bore wells/ dug wells		9.92	10.1
	Lift irrigation	297		
	Other sources		10.9	11.2
	Total		97.88	100.0
	Pump sets	1101	1.1	
	Micro-irrigation			
	Groundwater availability and use	No. of Blocks	% area	Quality of water
	Over exploited			
	Critical			
	Semi-critical			
	Safe	11 Blocks	30	Good
	Waster water availability and use			

Source: Orissa Agriculture Statistics, 2008-09
* Source: SREP (ATMA) of Puri District, 2007-08

1.7 Area under major field crops & horticulture etc. (Area in ha.)

	Field crops-	**Total area ('000 ha)**	**Irrigated**	**Rainfed**
	Paddy	170.77	136.84	33.93
	Pulse	62.90	0.22	62.68
	Oilseeds	16.98	4.48	12.50
	Fibers	0.07	-	0.07
	Sugarcane	0.61	0.61	-

	Horticulture crops-Fruits	**Total area ('000 ha)**	**Irrigated**	**Rainfed**
	Coconut	9927	-	9927

	Mango	3562	-	3562
	Banana	1794	1794	-
	Citrus	429	-	429
	Sapota	293	-	293
	Guava	0.12	-	0.12
	Papaya	0.05	0.05	-
	Pineapple	0.02	-	0.02
	Horticulture crops-Vegetables	**Total area ('000 ha)**	**Irrigated**	**Rainfed**
	Brinjal	2312	2312	-
	Potato	0.21	261	-
	Cabbage	251	251	-
	Cauliflower	2356	2356	-
	Okra	3805	3805	-
	Pea	165	165	-
	Tomato	1272	1272	-
	Onion	0.21	212	-
	Sweet potato	75	75	-
	Other vegetable	16.28	6087	-
	Flowers			
	Rose	90	90	-
	Gladioli	100	100	-
	Tube rose	14	14	-
	Marigold	56	56	-

Source: Orissa Agriculture Statistics, Govt of orissa, 2008-09

	Medicinal and Aromatic crops	Total area ('000 ha)	Irrigated	Rainfed
	Aonla	0.01		
	Ginger	0.03		27
	Garlic	157	157	
	Turmeric	0.05		50
	Coriander	0.37	370	
	Plantation crops	**Total area**	**Irrigated**	**Rainfed**
	Fodder crops (ha.)			
	Cow pea	202.5	200.0	2.5
	Perennial grass	70.96	70.96	-
	Total fodder crop area	273.46	270.96	2.5
	Grazing land	11, 000	-	-

Source: Annual report of CDVO office, Puri, 2009-10

1.8	**Livestock**	Number ('000)
	Cattle	612.3
	Buffaloes	33.8
	Commercial dairy farms	-
	Goat	132.7
	Sheep	67.4
	Others (Camel, Pig, Yak etc)	2.1
1.9	**Poultry**	
	Commercial (258 broiler poultry farm)	432.5

	Backyard			
1.10	**Inland Fisheries**	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water	997	1.5	1569
	Fresh water	3117.06	2.6	8223.7
	Others (Marine)	155 km coast line		24714.2

Source: SREP (ATMA) of Puri District, 2007-08

1.11	**Production & productivity of major crops**	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Paddy	154.6	1302	-	-	153.0	2941	307.6	2121.5
	Maize	0.12	688	0.02	780			0.14	734
	Greengram	-	-	8.23	445	-	-	8.23	445
	Blackgram	-	-	18.53	485	-	-	18.53	485
	Groundnut	-	-	25.03	2255	-	-	25.03	2255
	Sesamum	-	-	0.74	261	-	-	0.74	261
	Sunflower	-	-	0.37	580	-	-	0.37	580
	Mustard	-	-	0.33	210	-	-	0.33	210
	Fibres	0.4	1115	-	-	-	-	0.4	1115
	Horticultural crops								
	Brinjal	-	-	-	-	-	-	33.5	14500
	Cabbage	-	-	7.3	29354	-	-	7.3	29354
	Cauliflower	-	-	33.4	14209	-	-	33.4	14209
	Okra	-	-	-	-	-	-	32.4	8518
	Tomato	-	-	17.1	13452	-	-	17.1	13452

	Potato	-	-	3.1	11992	-	-	3.1	11992
	Banana	-	-	-	-	-	-	27.8	15500
	Mango	-	-	-	-	-	-	7.4	2077
	Citrus	-	-	-	-	-	-	3.6	8489
	Coconut	-	-	-	-	-	-	613.6	6182

Source: Orissa Agriculture Statistics, Govt of orissa, 2008-09

*: Source: Annual Report of Directorate of Horticulture, Nayapalli, Bhubaneswar. 2008-09

1.12	**Sowing window for 5 major crops (Start and end of sowing period)**	**Rice**	**Green gram**	**G.Nut**	**Brinjal**	**Cauliflower**
	Kharif- Rainfed	2nd week June to 2nd week July	-	-	-	-
	Kharif-Irrigated	June to Aug	-	-	-	-
	Rabi-Rain fed	-	-	-	-	-
	Rabi-Irrigated	Dec to Jan	1st week Jan to Last week Jan	Oct to Nov	1st week Oct to Last week Oct	1st week Oct to Last week Oct

1.13	**What is the major contingency the district is prone to**	Regular	Occassional	None
	Drought	✓ Mid July		
	Flood	✓ Sept & Oct		
	Cyclone		✓ Sept & Nov	
	Hail storm			✓
	Heat wave	✓ May		

	Cold wave			✓
	Frost			✓
	Sea water inundation	✓ Sept & Oct		
	Pests and diseases (Specify)	Rice Stem borer, Swarming caterpillar Leaf folder, Blast, Neck blast, Brinjal fruit & shoot borer, Red palm weevil & Rhinoceros beetle Tobacco caterpillar in Cabbage, Thrips in chili, YMV in Okra		

1.14	**Include Digital maps of the district for**	Location map of district with in State	Enclosed in the report
		Mean annual rainfall	Enclosed in the report
		Soil map	Enclosed in the report


PURI
(Orissa)
To Khorda Road
To Dhauli
203
CUTTACK
JAGATSINGHPUR
N
KORDHA
Sanakanti
Pipili
Bishwanath Hill
Nimaparha
Daya
Nun
Sakhi Gopal
Gobakund
Kakatpur
Gop
Kadua
Astaranga
Kuruma
Bhargab
Sar Lake
Balighai
Konarka
Raghurajpur
Puri
Brahmagiri
Baliharachandi
Chilika Lake
Kirshnaprasad
Malud
District Boundary
River
National Highway
State Highway
Road
Railway Track
District Headquarter
Taluk Headquarter
Town
Map not to scale
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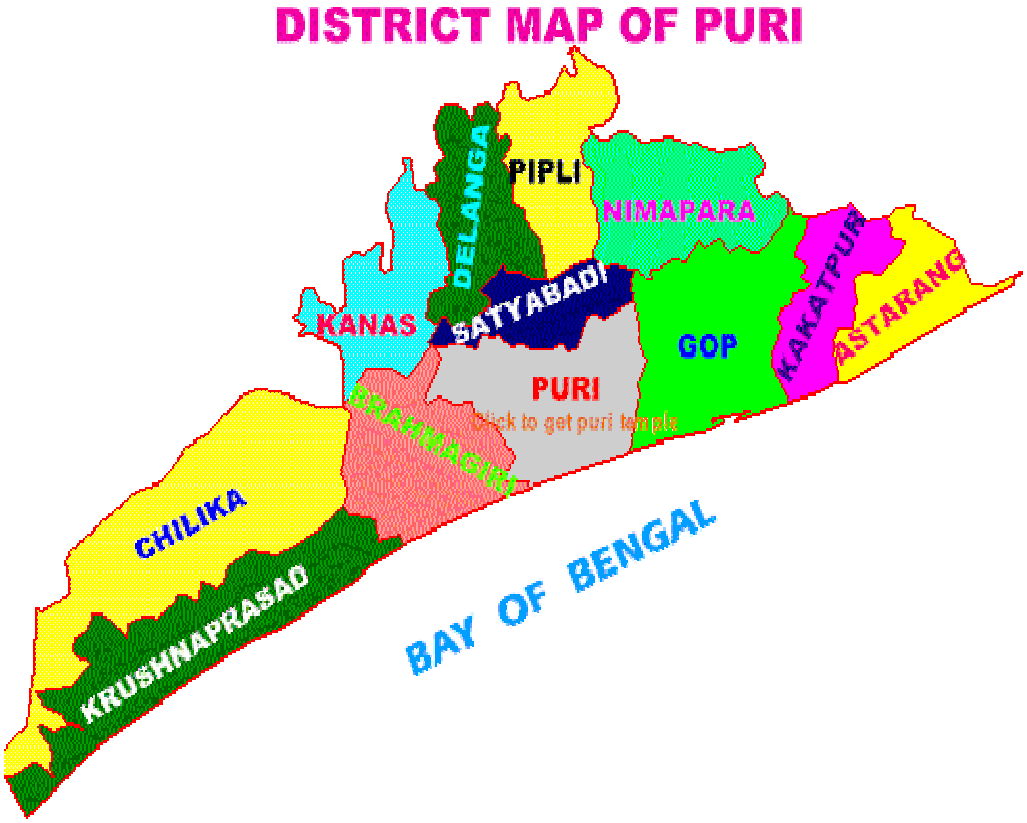
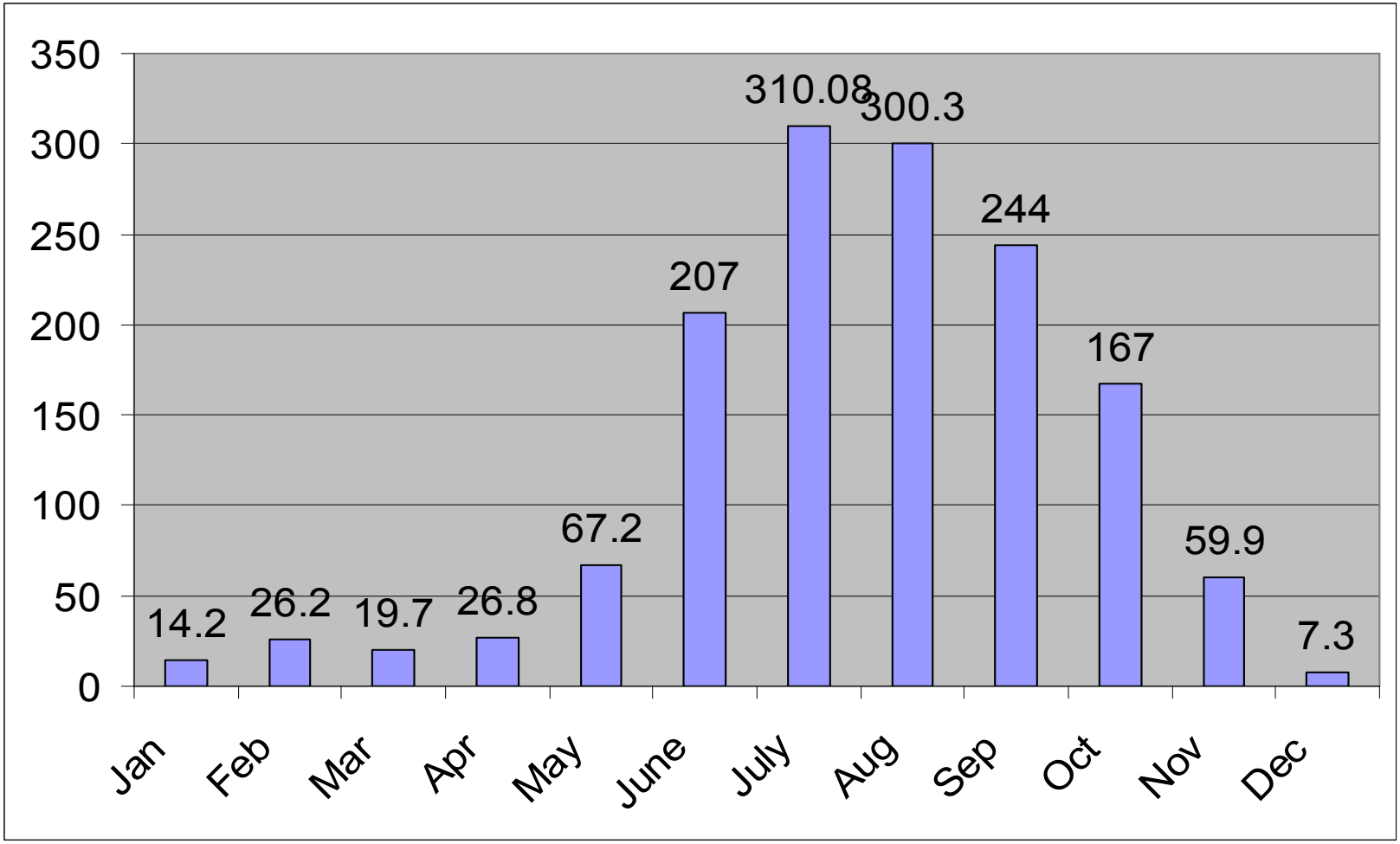
Distribution of Rainfall in Puri District

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250
200
150
100
50
0
14.2
26.2
19.7
26.8
67.2
207
310.08
300.3
244
167
59.9
7.3
Jan
Feb
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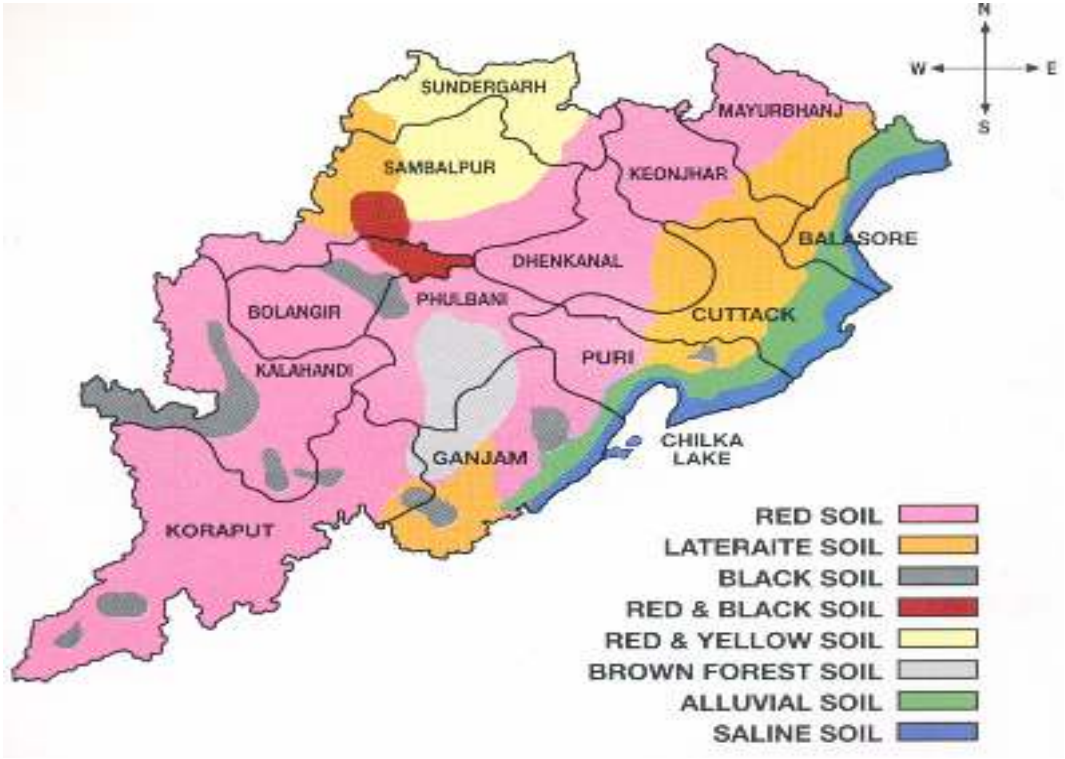
SOIL MAP OF ORISSA



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**	**Crop/cropping system**	**Change in crop/cropping system including variety**	**Agronomic measures**	**Remarks on implementation**
Delay by 2 weeks July 1st week	Upland	Rice, Vegetable	Rice (var. Kalinga-III, Pathara, Khandagiri) , Maize (Navjot), Cowpea (Utkal Manika), Blackgram (PU-30, 19,31,Sarala) Greengram (PDM-11,54, Sujata, Durga), Ragi (Dibyasinha), Sesamum (Uma, Prachi), Pumpkin (Arkachandan, Baidyabati), Sweet Potato (Pusaired, Varsha) Brinjal (Hajari-10, Bluestar, Utkal Keshari), Chilli (Suryamukhi, Pusa Jwala)		Seed village (Pulse & Paddy), NFSM (Pulse), RKVY
	Medium land	Paddy	Lalat, Swarna, Pratikshya, Naveen, Surendra	Delay nursery sowing	Seed village, RKVY
	Low land	Paddy	CR 1009, CR-1018, Pooja, CR-1014, Sarala,Mahanadi,Ramchandi	Delay nursery sowing	Seed village, RKVY

	Shallow salinity	Paddy	Paddy var Lunasampad, Lunasubarna	i. Addition of organic matter ii. Green manuring iii. Gypsum application iv. Zinc application Provide irrigation	Seed village, RKVY
	Flash flood	Paddy	Swarna		Seed village, RKVY

Condition				**Suggested Contingency measures**	
Early season drought (delayed onset)	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system including variety**	**Agronomic measures**	**Remarks on implementation**
Delay by 4weeks July 3rd. week	Upland	Rice	Short duration Rice var. Pathara, Kalinga III, Khandagiri Ragi (Divyasinha), Greengram(PDM-139,K-851,PDM-54), Blackgram(PU-30,PU-19,T-9), Cowpea, Rice bean, Brinjal (Hajari-10, Bluestar, Utkal Keshari),	• When the mortality is less than 50%, gap filling by clonal propagation. • If more than 50% mortality, resow the crop. • Sowing of short duration high yielding low water requiring crops like green gram, black gram, cow pea,	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and Orissa state seed corporation (OSSC).

			Chilli (Suryamukhi, Pusa Jwala)	sesame after receiving the rainfall. Cultivate vegetables like okra, brinjal, and cowpea	
	Medium land	Rice	- Relatively shorter duration varieties like Lalat, Naveen, MTU-1010, Surendra - Nursery raising in wet bed or sprouted seed sowing	i. Water in ponds, reservoirs & water bodies are to be utilized for raising seedling ii. Apply full dose of P, K and 50% N as basal with FYM for early seedling vigour. iii. Planting more number of seedlings per hill iv. Closer spacing v. Application of nitrogen after rainfall	

	Low land	Rice	Rice varieties like Swarna, Pratikshya, Pooja, Ranidhan, Mrunalini	i. Water in ponds, reservoirs & water bodies are to be utilized for raising seedling ii. Community nursery iii. Planting of more number of seedlings per hill iv. Closer spacing v. Application of nitrogen after rainfall vi. Apply full dose of P& K as basal.	

Condition				**Suggested Contingency measures**	
Early season drought (delayed onset)	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
Delay by 6weeks August 1st week	Upland	Rice, Vegetables	-No paddy crop - Growing of crops like Greengram, Blackgram, Cowpea, Rice bean Sesamum with short duration of varieties Brinjal, Okra, Chilli	• Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Addition of organic matter • Spraying of 2% KCl + 0.1 ppm Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage	

				of green gram. • Spray 1% urea in vegetable crops • Organic mulching to check water loss • Green manuring • Remove the pest and disease infected plants from the main field.	
	Medium Land	Rice	Lalat, Surendra, Konark	• Close the drainage hole and check the seepage loss in medium land rice regularly. • Increase the height of bunds. • Withhold N fertilizer • Withhold beushaning • Raise community nursery • Other sources of water is to be utilized for raising nursery.	Seed village, Tractor, power tiller, rotavator under RKVY
	Low land	Rice	Swarna, Pratikshya	• Close the drainage hole and check the seepage loss. • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old.	Seed village, Tractor, power tiller, otavator under RKVY

				• Follow need based plant protection measures against stem borer and blast. • Use tractor, power tiller, otavator for speedy land preparation. • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting	

Condition	**Suggested Contingency measures**				
Early season drought (delayed onset)	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
Delay by 8 weeks (specify month) August 3rd week	Upland	Rice	Greengram, Blackgram, Cowpea, Sesamum, Vegetables, Chilli, Okra	• Provide life saving irrigation • Remove the pest and disease infected plants from the field.	NFSM, RKVY, Seed village scheme
	Medium land	Rice	Lalat, Surendra, Konark	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Provide life saving irrigation. • Weed incorporation through cono weeder.	RKVY, Seed village scheme
	Low land	Rice	Swarna, Pratikshya	• Close the drainage hole and check the seepage loss. • Increase bund height. • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old. • Follow plant protection measures against stem borer and blast in nursery. • Use tractor, power tiller, otavator for speedy land preparation.	Tractor, power tiller, rotavator under RKVY

				• Follow close planting of 4-5 seedling per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation.	
	Low land	Fallow	Boro rice (Var. Lalat, Chandan, Konark, Naveen, Khandagiri)	• Sowing of rice after recession of water	Seed village, RKVY

Condition			**Suggested Contingency measures**		
Early season drought (Normal onset)	**Major farming situation**	**Crop/cropping system**	**Crop Management**	**Soil nutrient & moisture conservation measures**	**Remarks on implémentation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Upland	Rice	- When more than 50% mortality, Re sow in the month of July when sufficient rain water have received. - If less than 50% mortality, Gap filling with fresh seedlings. - No beushaning in direct sown rice. - Intercropping & mixed cropping. - Grow low water requirement crops green gram (K-851, Sujata, PDM-54) Blackgram (T-9, PU-19, PU-30, Sarala), Cowpea (SEB-2, Pusa barsati, Utkal Manika) , These crops may be gap filled and re sown with subsequent rains. - Soak the paddy seeds in sodium phosphate solution (358mg/ltr. of water) for 6 hrs. and dry seeds before sowing for better germination and growth of	- In wide as well as closed spaced row sown crops complete hoeing, weeding followed by ridging to the base of the crop rows at 20 days after sowing for in-situ moisture conservation. - Apply portion of FYM in the seed furrows at the time of sowing to conserve moisture for sustaining the seedling from early drought. - Avoid deep tillage. - Provide dust mulch. - Provide organic	• Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tank fed areas under RKVY and NFSM.

			seedlings. - Spray the crop with Potassium silicate (10%) or 10 ppm Cycocel to overcome the drought effect in Rice. - Grow drought tolerant / escaping varieties such as Annada, Pathara, khandagiri, Kalinga-III, Heera, Vandana	mulching. - Provide life saving irrigation. - Provide irrigation at critical stages.	
	Up & Medium lands	Vegetables like Cowpea, Okra & Brinjal		Mulching with dry leaves, plastic mulching, application of organic manures, water in ponds reservoirs and water bodies are to be utilized, micro irrigation like drip irrigation, sprinkle irrigation must be provided.	• Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through NFSM and OSSC.
	Medium & low land	Rice	- If Rice population is less than 50% re sow the crop. Select medium duration (125 days). - Sprouted seeds may be direct seeded or fresh seedlings may be raised for transplanting. - If the rice population is more than 50%, carry out weeding and adjust the plant population by Khelua and clonal propagation. - Raise community nursery of rice at a reliable water source to save time for further delay. - Sow the seeds at 3-5 cm depth by punji method (10-15 seeds) at one point, cover it		Good quality seeds through NFSM and OSSC.

			with a mixture. FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in low land.		
	Saline soil	Rice	- Gap fill the crop by transplanting	- Provide irrigation - Use FYM/organic matter. - Green leaf manuring. - Application of zinc. - Application of gypsum.	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (> 2.5 mm period)	**Major farming situation**	**Crop/cropping system**	**Crop Management**	**Soil nutrient & moisture conservation massues**	**Remarks on implémentation**
At vegetative stage	Upland	Rice	-In direct sown rice beushaning is to be done after receipt of rain with khelua operation. - Weeding operations. - Harvesting of rain water. - Life saving irrigation. -Irrigation at critical stages.	- Top dress the crop after receipt of rain.	Good quality seeds through NFSM and OSSC.
		Green gram	PDM-54, PDM-139, K-851	- Foliar application of 2% urea at pre flowering and flowering stage is helpful	

				to mitigate drought. - Complete hoeing and weeding in crop field to provide dust mulch.	
		Black gram	PU-19, PU-30,PU-31, T-9, Sarala	- Spray 2% KCL+ 0.1 ppm boron to overcome drought. - Complete hoeing and weeding in crop field to provide dust mulch.	
		Sugarcane	- Remove the borer affected tiller/ late formed tillers/ dried leaves and follow wrapping and propping as chains- stripe the lower 4-5 leaves.	- Complete hoeing and weeding in crop field to provide dust mulch	
	Medium & Low land	Rice	- Do not practice Beushaning if the crop is more than 45 days old, weed out the field - Use seedling of same age of clonal tillers for gap filling to have a uniform distribution of plant after rain. - 45 and 60-70 days old seedling can be transplanted in case of medium and late duration varieties respectively.	- Strengthen the field bunds, close the drainage holes and check the seepage loss in direct sown medium land rice regularly. - Apply 50% recommended N at the time of transplanting. - Top dress after receipt of rainfall.	

			- Follow close transplanting using 5-7 seedlings per hill.		

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major farming situation**	**Crop/cropping system**	**Crop Management**	**Soil nutrient & moisture conservation massues**	**Remarks on implémentation**
At reproductive stage	Up land	Rice	Harvest the crop at physiological maturity	- Check drainage, seepage loss. -Provide protective irrigation through recycling of harvested rain water. - Provide life saving irrigation. - Raise the height of bunds. - Recycling of rainwater. - Seed treatment with $CaCl_2$. - K & B application before flowering. - Provide irrigation at critical stages such as flowering, grain filling.	
		Cowpea, Maize, Green gram	- May be harvested for fodder purpose to avoid their failure as grain crops		
		Wide spaced crops like sugarcane , Maize etc.		- Provide irrigation in alternate furrows	

	Medium & Low land	Rice	Harvest the crop at physiological maturity	- Check drainage, seepage loss. - Provide irrigation at critical stages such as flowering, grainfilling. - Provide life saving irrigation. - Raise the height of bunds. - Recycling of rainwater. - Seed treatment with $CaCl_2$. - K & B application before flowering. - Provide irrigation at critical stages such flowering, grain filling.	

Condition			**Suggested Contingency measures**		
	Major farming situation	**Crop/cropping system**	**Crop Management**	**Rabi crop planning**	**Remarks on implémentation**
Terminal drought	Upland, Medium land, Lowland	Rice	- Harvest at physiological maturity stage. - Life saving irrigation. - Irrigation at critical stage. - Paira cropping.	- Grow pulse crops like green gram, black gram, cowpea. - Under situation of complete crop failure dibble the pre-rabi crops in the standing Kharif crop/ dismantle the Kharif crop and prepare the land for pre-rabi crop.	NFSM,RKVY
		Green gram, Cowpea	Grow for fodder		

			purpose		

2.1.2. Drought-Irrigation Situation

Condition				**Suggested Contingency measures**	
Delayed/limited release of water in canals due to low rainfall	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
	Up land	Rice	Pulse crops (Green gram, Black gram, Cow pea)	- Other sources of irrigation. - Check conveyance loss. - Growing of short duration varieties. - Nitrogen application after release of canal water.	RKVY, NFSM
	Medium land	Rice		- Planting of older seedlings - More no of seedling/hill - Apply 50% N at basal - Raise nursery by dapog method - Grow short duration paddy	Irrigation through tanks.

Condition				**Suggested Contingency measures**	
Non release of water in canals under delayed onset of monsoon in catchments	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
	Up land	Rice-Vegetables/Pulse	Short duration paddy varieties like Kalinga III, Heera, Pathara	- Use of ground water. - Irrigation at critical stages. - Application of K & B. - Application of Zinc.	
	Medium land	Rice	Rice varieties like Surendra, Lalata.	- Use of ground water. - Rain water harvesting. - Irrigation at critical stages. - Application of K & B. - Application of Zinc.	

	Lowland	Rice	Use of rice varieties Swarna, Pratikshya	- Use of ground water. - Rain water harvesting. - Irrigation at critical stages. - Application of K & B. - Application of Zinc.	

Condition				**Suggested Contingency measures**	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Major farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
	Upland & Medium land	Rice	Pulse, Vegetables	- Use of other source of water - Raise bund height. - Irrigation at critical stages. - Life saving irrigation. - Mulching. - Weed control through herbicide application.	

Condition				**Suggested Contingency measures**	
	Major farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on implementation**
Insufficient groundwater recharge due to low rainfall	Up land	Rice	Pulse/Oilseed	- Use of other sources of water. - Furrow irrigation raise bed method of sowing - Irrigation at critical stages. - Organic mulching. - Weed control measures. - Use of Anti transpirants like PMA/ Kaoline. - Alternate furrow irrigation.	

				- Ridge & furrow method of irrigation. - Repair of field bunds to check seepage loss. - Harvest at physiological maturity.	
Any other condition					
Water submergence during maturity stage due to release of water in canals	Up & Medium land	Rice		- Provide drainage channel. - Raise the bund dyke to prevent water entry to the field. - Make side channels for release of excess water.	

2.2 Unusual rains (Untimely, unseasonable etc) (for the both rain fed 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**
Rice	- Provide drainage - K application @ 10 kg/ha after cessation of rain - N application to be stopped - Spraying of Chloropyriphos @ 0.02% to control leaf folder. - Application of Chloropyriphos dust around the field bund, spraying of Chloropyriphos @ 3.5 ml/lit of water.	- Provide drainage - K application @ 10 kg/ha after cessation of rain - Application of Chloropyriphos dust around the field bund, spraying of Chloropyriphos @ 3.5 ml/lit of water.	- Provide drainage - Make alleyway - Harvesting at physiological maturity - Spraying of chemical to check sprouting - Application of Chloropyriphos dust around the field bund, spraying of Chloropyriphos @ 3.5 ml/lit of water.	- Cover the produce. - Sun drying of the grains & keep the moisture level to < 14% -Application of EDB ampoules to control rice weevil & Angoumis grain moth during storage.
Pulses-Green gram, Black gram, Cowpea	- Provide drainage - Spraying of 2% DAP	- Provide drainage	- Provide drainage - Harvest the produce & carry to safer place & keep the	- Cover the produce. - Sun drying of the grains & keep the moisture level to

			produce spreading	< 14% - Application of Neem oil/ Mustard oil @ 3 ml/kg of seed, Dried leaves of Neem, Begunia to control pulse beetle during storage.
Oilseeds Groundnut, Sunflower	- Provide drainage - Fertilizer to be applied after cessation of rain.	- Provide drainage	- Provide drainage - Harvesting & carrying to safer place & keep the produce spreading	- Cover the produce. - Sun drying of the grains & keep the moisture level to < 14% - Polythene lined bags should be used to prevent from moisture absorption during storage.
Horticulture				
Coconut	- Provide drainage - Heaping around the plant - Spraying of Malathion @ 0.02 % to control leaf eating caterpillar.	- Provide drainage - Cleaning of the planting site - Heaping around the plant	- Provide drainage - Heaping around the plant	-
Mango	- Provide drainage - Heaping around the plant -Application of 75gm nitrogen, 110 gm. of P and 55gm. K per plant	- Provide drainage - Heaping around the plant - Spraying of endosulfan @ 0.02% to control mango hoppers	_ Harvesting must be done immediately	- Harvested fruits are kept in a well ventilated room wrapping with banana leaves.
Banana	- Provide drainage - Heaping around the plant - Spraying ridomil-M-Z(25gm) & Steptocycline(1.5gm) per 10 liters of water to avoid wilt	- Provide drainage. - Heaping around the plant. - Spraying ridomil-M-Z(25gm) & Steptocycline (1.5gm) per 10 liters of water to avoid wilt	- Provide drainage - Heaping around the plant -Harvesting should be done immediately	- Harvested fruits are kept in a well ventilated room wrapping with banana leaves.
Cauliflower	- Provide drainage - Spraying of Malathion @ 0.02	- Provide drainage. - Heaping around the plant.	- Provide drainage - Harvesting should be done	Produce must be shifted to a well ventilated godown &

	% at 10-15 days intervals to control aphid, caterpillar. - Spraying ridomil-M-Z(25gm) & Streptocycline (1.5gm) per 10 liters of water to avoid wilt	- Spraying ridomil-M-Z(25gm) & Steptocycline (1.5gm) per 10 liters of water to avoid wilt	immediately	should be marketed as quickly as possible.
Okra	- Provide drainage. - Heaping around the plant. - Spraying of Imidachloprid @ 4ml/ 10 lits of water to control white fly. - Spraying ridomil-M-Z(25gm) & Streptocycline (1.5gm) per 10 liters of water to avoid wilt	- Provide drainage. - Heaping around the plant. - Spraying of Endosulfan @ 0.02 % to control fruit borer of okra. - Spraying Pesticides like ridomil-M-Z(25gm) & Streptocycline (1.5gm) per 10 liters of water to avoid wilt	- Provide drainage. - Heaping around the plant. - Spraying of Endosulfan @ 0.02 % to control fruit borer of okra.	Produce must be shifted to a well ventilated godown & should be marketed as quickly as possible.
Brinjal	-Provide drainage. - Heaping around the plant. - Spraying Ridomil-M-Z(25gm) & Streptocycline (1.5gm) per 10 liters of water to avoid wilt - Spraying of endosulfan @ 0.05% to control epilachna beetle. - Spraying of 0.03 % methyl parathion to control mite.	-Provide drainage. - Heaping around the plant. - Spraying Ridomil-M-Z(25gm) & Streptocycline (1.5gm) per 10 liters of water to avoid wilt - Spraying of Cartap Hydrochloride @ 0.02 % to control shoot & fruit borer.	- Provide drainage. - Heaping around the plant. -Harvesting should be done immediately	- Produce must be sold in the local market. - When huge amount is produced it should be transferred to well ventilated godown.
Heavy rainfall with high speed winds in a short span				
Rice	- Provide drainage - P & K application - Boron spray - Application of zinc	- Provide drainage - P & K application - Boron spray - Application of zinc	- Provide drainage - P & K application - Boron spray - Application of zinc	- Cover the produce. - Sun drying of the grains & keep the moisture level to < 14%

	- Application of Phospho Gypsum	- Application of Phospho Gypsum	- Application of Phospho Gypsum - Spraying of chemical against sprouting	- Application of Neem oil/ Mustard oil @ 3 ml/kg of seed, Dried leaves of Neem, Begunia to control pulse beetle during storage.
Horticulture				
Coconut	- Provide drainage - Mounding of soil around the plant	- Provide drainage - Mounding of soil around the plant. - Cutting down of broken leaves, cleaning around base & manuring with 500gm urea, 1kg SSP, 500 gm Potash, 100 gm micronutrient/plant	- Provide drainage - Mounding of soil around the plant. - Cutting down of broken leaves, cleaning around base & manuring with 500gm urea, 1kg SSP, 500 gm Potash, 100 gm micronutrient/plant & harvesting should be done	Cutting down of broken leaves, cleaning around base & manuring with 500gm urea, 1kg SSP, 500 gm Potash, 100 gm micronutrient/palnt & harvesting should be done
Mango	- Provide drainage - Heaping around the plant - Staking of young plants -Application of 75gm nitrogen, 110 gm. of P and 55gm. K per plant	- Provide drainage - Heaping around the plant	Harvesting must be done immediately	Harvested fruits are kept in a well ventilated room wrapping with banana leaves.
Banana	- Provide drainage - Mounding of soil around the plant. - Propping should be done, cutting of the broken parts, cleaning of plantation site, manuring with 60gm urea, 120gm potash	- Provide drainage - Mounding of soil around the plant. - Propping should be done, cutting of the broken plant parts, cleaning of plantation site	- Provide drainage - Mounding of soil around the plant. - Harvesting should be done immediately, cutting of the broken plant parts, cleaning of plantation site	-
Cauliflower	- Provide drainage - Removal of damaged seedlings, heaping should be	- Provide drainage - Removal of damaged plant - Heaping should be done around	- Provide drainage - Mounding of soil around the plant.	Produce must be kept in a well ventilated room and should be marketed as soon

	done around the seedlings, - Gap filling must be done.	the plant	- Harvesting should be done immediately, removal of damaged plant.	as possible.
Okra	- Provide drainage - Mounding of soil around the plant. - Removal of damaged seedlings - Gap filling must be done.	- Provide drainage - Mounding of soil around the plant. - Cleaning of the field, Spraying of Bavistin 0.2 % + Steptocycline 0.001 % - Manuring should be done	- Provide drainage - Mounding of soil around the plant. - Harvesting should be done immediately, - Cleaning of the field, Spraying of Bavistin 0.2 % + Steptocycline 0.001 %	Produce must be kept in a well ventilated room and should be marketed as soon as possible.
Brinjal	- Provide drainage - Removal of damaged seedlings, heaping should be done around the seedling - Gap filling must be done.	- Provide drainage - Cleaning of the field, Spraying of Bavistin 0.2 % + Steptocycline 0.001 % to control wilt. - Spraying Car tap Hydrochloride @ 0.02 % to control shoot & fruit borer	- Provide drainage Harvesting should be done immediately, Spraying of Bavistin 0.2 % + Steptocycline 0.001 % to control wilt.	Produce must be kept in a well ventilated room and should be marketed as soon as possible.
Outbreak of pests and diseases due to unseasonal rains				
Rice	- To control stem borer & leaf folde,r spray the crop with chlorpyriphos/ Triazophos/ Profenphos @2ml/ltr. of water. - To control sheath blight spray, Hexaconazole @ 0.012 %. - To control blast spray with Tricyclazole @ 0.01%. - To control swarming caterpillar field bunds should be dusted with Chloropyrophos @ 25	- To control stem borer, leaf folder spray the crop with chlorpyriphos/ Triazophos/ Profenphos @2ml/ltr. of water. - To control sheath blight spray Hexaconazole @ 0.012 %. - To control blast spray with Tricyclazole @ 0.01%. - To control swarming caterpillar field bunds should be dusted with Chloropyrophos @ 25 kg/ha, spraying with	- Spraying of Imidachloprid @ 4ml/10 lit of water to control BPH. - To control swarming caterpillar field bunds should be dusted with Chloropyrophos @ 25 kg/ha, spraying with Chloropyrophos @ 0.035 % in the evening hours.	- Cover the produce. - Sun drying of the grains & keep the moisture level to < 14% -Application of EDB ampoules to control rice weevil & Angoumis grain moth during storage.

	kg/ha, spraying with Chloropyrophos @ 0.035 % in the evening hours.	Chloropyrophos @ 0.035 % in the evening hours.		
Green gram, Black gram	Spray neem formulation @ 5ml/lt. when population of aphids is low or, dimethoate @ 2ml/lt. or imidachloprid @ 1ml/4lt. of water when population is high	Spray neem formulation @ 5ml/lt. when population of aphids is low or, dimethoate @ 2ml/lt. or imidachloprid @ 1ml/4lt. of water when population is high. Spray mancozeb @ 0.3% against cercospora leaf spot	Spray neem formulation @ 5ml/lt. when population of aphids is low or, dimethoate @ 2ml/lt. or imidachloprid @ 1ml/4lt. of water when population is high. Spray mancozeb @ 0.3% against cercospora leaf spot	- Cover the produce. - Sun drying of the grains & keep the moisture level to < 14% - Application of Neem oil/ Mustard oil @ 3 ml/kg of seed, Dried leaves of Neem, Begunia to control pulse beetle during storage.
Horticulture				
Coconut	-	- Application granular insecticides mixed with sand to control red palm weevil & Rhinoceros beetle	- Application granular insecticides mixed with sand to control red palm weevil & Rhinoceros beetle	
Mango	-Application of Chloropyriphos dust to control leaf eating beetle	-Application of Chloropyriphos dust to control leaf eating beetle - Application of Chloropyriphos @ 0.02% to control leaf webber	-Application of poison bait trap(Methyl Eugenol with Malathion & gur) and pheromone trap -Spraying of Mancozeb @ 0.03% to control anthracnose	- Harvested fruits should be kept in a well ventilated room to avoid fruit rotting.
Banana	Panama wilt- Spraying insecticide like ridomil-M-Z(25gm) & Steptocycline(1.5gm) per 10 liters of water to avoid wilt	Panama wilt- Spraying insecticide like ridomil-M-Z(25gm) & Steptocycline(1.5gm) per 10 litres of water to avoid wilt	Harvesting should be done immediately	Harvested fruits should be kept in a well ventilated room wrapping with banana leaves
Cauliflower	- Spraying of endosulfan 2gm/lt to control leaf eating caterpillar, Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 liters of water to control root rot.	Spraying of Endosulfan 2gm/lt to control leaf eating caterpillar, Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 liters of water to control root rot	Harvesting should be done immediately	-

	- Perform soil drenching to the base of the plant with a solution of Carbendazim (0.15%) & Streptocycline (0.015%) at 10DAP, 25 DAP, & 40 DAP coinciding with intercultural operaration.			
Okra	- Spraying of Endosulfan 2gm/lt to control leaf eating caterpillar, YMV, Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 litres of water to control wilt. - Perform soil drenching to the base of the plant with a solution of Carbendazim (0.15%) & Streptocycline(0.015%) at 10DAP, 25 DAP, & 40 DAP coinciding with intercultural operaration.	Spraying of Endosulfan 2gm/lt to control leaf eating caterpillar, YMV, Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 litres of water to control wilt	Harvesting should be done immediately, spraying of triazophos 2ml/lt to control YMV	Spraying of triazophos 2ml/lt to control YMV
Brinjal	Spraying of endosulfan 2gm/lt to control leaf eating caterpillar, epilachna beetle Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 litres of water to control wilt. If total crop is damaged replace the crop & mix the soil with stable bleaching powder @15 kg /ha at the time of final land preparation & transplant the seedlings after 5-7 days. Seedling root dip for 15 min. in 0.015% Streptocycline or, 0.15% plantomycine. Perform soil drenching to the	Spraying of endosulfan 2gm/lt to control leaf eating caterpillar, epilachna beetle Spraying of Blitox -50 (30gm) & Steptocycline(1.5gm) per 10 litres of water to control wilt	Harvesting should be done immediately,	

	base of the plant with a solution of Carbendazim (0.15%) & Streptocycline(0.015%) at 10DAP, 25 DAP, & 40 DAP coinciding with intercultural operaration.			
Cucurbits	-	Spray Ridomil MZ 0.15% against downy mildew	Spray Ridomil MZ 0.15% against downy mildew	-

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/partial inundation	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice	- Provide drainage - Raisedbed nursery - Raised dapog method of nursery to transplant wherever possible - Maintain a buffer nursery in the backyard/high land area to ensure adequate plant population in the field after flood damage	- Provide drainage - If damage is > 50% retransplant rice crop - In partially damaged fields allow rice plants to stand upright – Do not go for Beushaning - Weed out rice field, make gap filling & top dress to boost the growth	- Provide drainage - Apply N & K after recession of water - Management for swarming caterpillar & leaf folder	- Provide drainage - Make alleyway - Harvesting & carrying to safer place & keep the produce spreading
Horticulture				
Coconut	- Provide drainage -Mounding should be done	- Provide drainage -Mounding should be done - Manuring with 500 gm urea, 1 kg SSP & 1 kg MOP should be made	- Provide drainage -Mounding should be done - Manuring with 500 gm urea, 1 kg SSP & 1 kg MOP should be made	- Provide drainage -Mounding should be done - Manuring with 500 gm Urea ,1 kg SSP & 1 kg MOP should be made

Mango	- Provide drainage -Mounding should be done - Staking in young plants - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done	- Provide drainage Harvesting must be done immidiately
Banana	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Harvesting must be done immidiately
Cauliflower	- Raised bed planting. - Provide drainage -Mounding should be done - Gap filling should be done. - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Harvesting must be done immidiately
Okra	- Raised bed planting. - Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Harvesting must be done immidiately
Brinjal	- Raised bed planting. - Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Harvesting must be done immediately
Continuous	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**

submergence for more than 2 days				
Rice	- Provide drainage -If damaged again make fresh nursery - Broadcasting/ line sowing of sprouted seed of relatively short duration rice varieties in soft puddle	- Provide drainage - Transplant 40 to 65 days old seedlings after flood water recedes - Makeup plant population by transplanting clonal tillers detaching from the old clumps - Apply moderate dose of fertilizers - Reduce N application & apply recommended P & K as basal to increase flood resistance - Top dress N & K in flood affected areas if situation permits	- Provide drainage - Apply N & K after recession of water - If crop is completely damaged, incorporate & go for rabi crops	- Provide drainage - Make alleyway - Harvesting & carrying to safer place & keep the produce spreading
Horticulture				
Coconut	- Provide drainage	- Provide drainage drainage channel should be made, earthing up must be done	- Provide drainage drainage channel should be made, earthing up must be done	- Provide drainage - Drainage channel should be made, earthing up must be done
Mango	- Provide drainage -Mounding should be done - Staking in young plants - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done - Spraying with Ridomil-MZ 0.25 % and Steptocycline 0.001 % to control wilt.	- Provide drainage -Mounding should be done	- Provide drainage Harvesting must be done immidiately
Banana	- Provide drainage -Earthing up should be done, Spraying with Ridomil MZ @ 0.15%	- Staking of the plants - Provide drainage -Earthing up should be done,	- Provide drainage - Staking of the plants -Earthing up should be done,	- Provide drainage. - Earthing up should be done, Harvesting should be

	should be done to avoid wilt	Spraying with Ridomil MZ @ 0.15% should be done to avoid wilt	Spraying with Ridomil MZ @ 0.15% should be done to avoid wilt	done immediately.
Cauliflower	- Raised bed system of planting - Provide drainage - Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomycin @ 1gm/lit of water should be done to avoid wilt - In case of partial damaged gap filling must be done. - In case of complete damage fresh nursery must be prepared	- Provide drainage - Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomycin @ 1gm/lit of water should be done to avoid wilt	- Provide drainage -Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomycin @ 1gm/lit of water should be done to avoid wilt	Harvesting must be done
Okra	- Raised bed system of planting - Provide drainage -Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt - In case of partial damaged gap filling must be done.	- Provide drainage - Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt	- Provide drainage - Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt	Harvesting must be done
Brinjal	- Raised bed system of planting - Provide drainage - Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt - In case of partial damage gap filling must be done. - In case of complete damage fresh nursery must be prepared	- Provide drainage -Heaping should be done Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt	- Provide drainage -Heaping should be done, Spraying with Dithane-M-45 @ 5gm along with Plantomicyne @ 1gm/lit of water should be done to avoid wilt	Harvesting must be done
Sea water	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**

inundation				
Rice	-Provide drainage - Addition of organic matter - Green manuring -Application of gypsum -Application of zinc	-Provide drainage - Addition of organic matter - Green manuring -Application of gypsum -Application of zinc	-Provide drainage - Addition of organic matter - Green manuring -Application of gypsum -Application of zinc	-Provide drainage - Addition of organic matter - Green manuring -Application of gypsum -Application of zinc
Horticulture				
Coconut	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum
Mango	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum
Banana	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum
Cauliflower	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum
Okra	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum
Brinjal	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum	-Provide drainage - Addition of organic matter -Application of gypsum

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

Condition	Suggested contingency measure			
Extreme event type	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat wave				
Rice	Provide irrigation	Provide irrigation	Provide irrigation	
Horticulture				
Coconut	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Sprinkling with water, Irrigation should be done
Mango	-Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	-Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	-Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	-Sprinkling with water Irrigation should be done
Banana	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Sprinkling with water, Irrigation & mulching should be done
Cauliflower	Spraying with water, Irrigation should be provided, mulching must be done at the base of the	Spraying with water, Irrigation should be provided, mulching must be done at the base of the	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant,	Harvesting must be done as early as possible, Spraying with water

Condition	Suggested contingency measure			
Extreme event type	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
	plant, organic manure like vermicompost, NADEP compost must be applied in the field	plant, organic manure like vermicompost, NADEP compost must be applied in the field	organic manure like vermicompost, NADEP compost must be applied in the field	
Okra	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Harvesting must be done as early as possible, Spraying with water
Brinjal	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermicompost, NADEP compost must be applied in the field	Harvesting must be done as early as possible, Spraying with water
Frost				
Hailstorm				
Cyclone				
Rice	- Provide drainage - P & K application - Application of phospho gypsum - If damaged make fresh nursery - Broadcasting/ line sowing of sprouted seeds of relatively short duration varieties	- Provide drainage - Transplant with older seedlings with 5 to 7 seedling/ hill - Apply 50% N and full P & K at basal	- Provide drainage - If crop is damaged incorporate and go for rabi crops	- Provide drainage - If crop is damaged incorporate and go for rabi crops

Condition	Suggested contingency measure			
Extreme event type	**Seedling/nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Horticulture				
Coconut	- Provide drainage -Uproot the damaged seedlings - Gap filling - Staking of the seedlings	- Provide drainage	- Provide drainage -Clean the damaged parts -Apply 500 gm urea, 1 kg super phosphate, 500gm potash/ plant	Clean the damaged parts - Apply 500 gm urea, 1 kg super phosphate, 500gm potash/ plant
Mango	- Provide drainage - Mounding around the plants - Gap filling - Staking of the seedlings - Planting of wind breaks around the orchad	- Provide drainage - Mounding around the plants - Manuring the plants with 75gm. N, 110gm. P and 55 gm. K per plant	- Provide drainage -Clean the damaged parts -Mounding around the plants	- Provide drainage -Clean the damaged parts -Mounding around the plants - harvesting should be done
Banana	- Provide drainage -Uproot the damaged seedlings - Gap filling - Staking of the seedlings	- Provide drainage -Staking of the plant -Manuring with 60 gm urea, 120 gm potash along with vermicompost	- Provide drainage -Staking of the plant -Manuring with 60 gm urea, 120 gm potash along with vermicompost	Harvesting must be done as early as possible
Cauliflower	- Provide drainage -Uproot the damaged seedlings - Gap filling	- Provide drainage - Application of N&K @ 62.5 & 25 kg/ha respectively	- Provide drainage - Intercultural operation like cleaning, hoeing must be done	Harvest the crop immediately
Okra	- Provide drainage -Uproot the damaged seedlings - Gap filling	- Provide drainage - Application of N&K @ 56 & 45 kg/ha respectively	- Provide drainage -Intercultural operation like cleaning, hoeing must be done	Harvest the crop immediately
Brinjal	- Provide drainage -Uproot the damaged seedlings - Gap filling - Staking of the seedlings	- Provide drainage -Apply fertilizer in the field - Application of N&K @ 62.5 & 55 kg/ha respectively	- Provide drainage -Intercultural operation like cleaning, hoeing must be done	Harvest the crop immediately

2.5 Contingent Strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	- Awareness generation among farmers about management of feed & fodder - Advise farmers to preserve forage as silage& UTPS (Urea treated Preserved Silage) , Encourage to produce to more cereal forage crops -Livestock insurance	Feeding animal with enriched fodder, common salt mineral mixture at recommended level only with maintenance ration.	-Feeding schedule to be normal adequate maintenance, production and pregnancy growth ration. -Availing insurance
Drinking water	Establish or renovate tube well & other source like Public vats.	Providing animals with ORS. Fill the vats with fresh, clean & cold water round then clock.	Proving clean water as per requirement of the animals.
Health and disease management	-Creating awareness among farmers about health care and disease controls - Preventive measure like mass vaccination, deworming, and Serological analysis of possible infection. Storage of sufficient medicine to take care of sunstroke/ hyperthermia, indigestion. Provision to be made for shade to animal house.	Providing shady, well ventilated housing, taking immediate step to check sunstroke, Diarrhea and other ailments of livestock in consultation with veterinary doctor.	Normal health care to be maintained
Floods			
Feed and fodder availability	-Storage of feed & fodder at safe place - Shifting of livestock to elevated place. -Awareness to farmers about the care	Feeding the animals with maintenance ration only.	Normal ration as per the need of animals to be provided.

	& management of animals during flood time.		
Drinking water	Renovation of tube well at the elevated places to make available the clean drinking water to animals	Arrangements to be made to make available the clean drinking water to animals round the clock during flood time.	Sufficient clean water to be made available as per requirement
Health and disease management	-Awareness to be made among farmers on management of outbreak of possible disease during flood time & health care. - Prevention of disease may be made by mass vaccination and deworming. Sufficient medicine must be stored on possible disease of livestock.	Farmers are to be supplied with medicines of disease like Diarrhea and other disease.	Provision for care ness disposal in to be made from preventing outbreak of contagious diseases, on health care doctors were to be consulted after receding of flood water.
Cyclone			
Feed and fodder availability	-Storage of feed & fodder at safe place - Shifting of livestock to elevated place.	Feeding the animals with maintenance ration only.	Normal ration as per the need of animals to be provided.
Drinking water	Renovation of tube well at the elevated places to make available the clean drinking water to animals	Arrangements to be made to make available the clean drinking water to animals round the clock during cyclone time.	Sufficient clean water to be made available as per requirement
Health and disease management	-Awareness to be made among farmers on management of outbreak of possible disease during cyclone. - Prevention of disease may be made by mass vaccination and deworming. Sufficient medicine must be stored on possible disease of livestock.	Farmers are to be supplied with medicines of disease like Diarrhea and other disease.	Provision for care ness disposal in to be made from preventing outbreak of contagious diseases, on health care.
Heat wave and cold wave			
Shelter/environment management	- Provision should be made for willing fan in animal shed.	- Gunny bags to be made wett at the time of requirement/ as per need.	Inner animal shed temperature should be maintained at 25’ C as per

	- Plantation of shady trees round the animal house - Hanging wet gunny bags on the window to make the inner environment cool. Provide adequate ventilation so that inner temp to be maintained at 25'C - Before preparation of animal house, orientation to be made so that direct sunlight is prevented. - Providing green bed cover around the farm. - Awareness to be made on the shelter making of the animal shed to farmers well ahead.	- Fans should run round the clock to make the animal shed cool. - Shed should be will ventilated.	requirement by running far or welting the gunny bags.
Health and disease management	- Awareness generation among farmers about management of feed & fodder - Advise farmers to preserve forage as silage & UTPS (Urea treated Preserved Silage) , Encourage to produce to more cereal forage crops	Feeding animal with enriched fodder, common salt mineral mixture at recommended level only with maintenance ration.	Feeding schedule to be normal adequate maintenance, production and pregnancy growth ration.

2.5.2 Poultry

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Arrangement should be made to store unconventional feed substitutes like dry leaf meal, DORBI Dehisked oil Rice Bran)	Poultry should be fed with the unconventional feed substitutes	Normal feeding of the poultry should be made.
Drinking water	Infrastructure to be created to check wastage of drinking water i,e provision of nipple drinkers	Clean, fresh and cold water to be provided to the birds through nipple drinkers to check/minimize wastage of drinking water.	Watering can be made by channels, nipple drinkers as per need by birds.
Health and disease management	-Awareness among farmers to be made on the health care and disease management of the birds. - Disposal pits should be made wear the poultry farm. - Vaccination and deworming should be made as preventive. - Adequate medicines should be kept to deal with any emergency situation.	- Keep watch on the health status of the birds or any casuality in the farm house. - Proper disposal of the dead birds should be made. - Keep the farm cool, well ventilated. - Don't change the litter in the house populated with birds to check dusting problem.	Regular check up of health of birds to be done by a Veterinary doctor to avoid any further diseases.
Floods			
Shortage of feed ingredients	Ensure procurement of feed ingradients/compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting roads	supply the compound feed to poultry farm under submergence area	Supply will continued till the situation is under control
Drinking water	protect water sources from submergence	Attempt will be made to provide sanitized drinking water	water will be sanitized with bleaching powder or any water sanitizer
Health and disease management	Procurement of vaccines and medicines. Feeding antibiotics.	Continue feeding antibiotics. Prevent entrance of flood water to the shed.	Disinfection of farm premises. Feeding antibiotics and deworming. Replace

	Procurement of litter materials	Replace wet litter, Proper disposal of dead birds if any.	wet litter. Disinfection of sheds. Proper disposal of dead birds if any
Cyclone			
Shortage of feed ingredients	Procurement of feed	Supply the compound feed to the poultry farm under cyclone affected area	Supply will continued till the situation is normal/ control
Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will be sanitized with bleaching powder or any water sanitizer
Health and disease management	Procurement of medicine and vaccines	Vaccination of birds against different diseases. Provision should be made for available of sanitized water	Water sources will be sanitized with bleaching powder or any water sanitizer
Heat wave and cold wave			
Shelter/environment management	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories. Providing shed to poultry houses. Providing proper ventilation	Attempt will be made for cooling of poultry shed by adapting different cooling methods. Thickness of litter should be reduced. Ventilation to the house should be increased by providing ceiling fans and exhaust fans	Provision should be made to ensure proper ventilation to the house
Health and disease management	Procurement of antis tress drugs	Supplementation of the antis tress drugs in drinking water. Vaccination with fowl pox	Vaccination of birds against RD / IBD

2.5.3 Fisheries / Aquaculture

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
Drought			
A. Capture			
Marine	-	-	-
Inland	-	-	-
Shallow water in ponds due to insufficient rains/inflows	- Restricted release of water from the reservoir. - Supplementary water harvest structures like pond and tanks has to be developed. Renovation and maintenance of existing water harvest structures - Species : (Indian Major Carps (IMC), i.e., Rohu, Mrigal and Catla + Exotic carps (Silver carp and Grass carp @ 5000 fingerlings/ha	Application of rice bran + Groundnut oil cake + vitamins or 80 kg, urea + 40 kg SSP/ha/year: Raw cow dung @ 5 t/ha + micronutrient to enhance the production of phyto plankton and zoo plankton.	Using CIFAX @ 1 lit/ha or lime and turmeric powder 10:1 ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epicortical ulcerative syndrome (EUS)
Changes in water quality	- Prepare to release water into the habitat. - Leveling of farm bunds , testing of water body - Development high stocking density	Mixing of water from the water harvest structure like ponds and tanks into the fish habitat	Monitoring the water quality and health of aquatic organisms
B. Aquaculture			
Shallow water in ponds due to insufficient rains/inflows	Building deep ditches in culture ponds for shelter of the fish to overcome high temperature	Recharge the ponds with bore well water or water from other sources Partial harvesting of the stock to reduce stocking density Artificial shelter by putting aquatic floating weeds in 1/3 rd area	-
Impact of heat and salt load build up	Application of organic manure in	Recharge the ponds with bore well	Application of organic manure in

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
in ponds/change in water quality	culture system	water or water from other sources	culture system
Floods			
A. Capture			
Marine	-	-	-
Inland	-	-	-
Average compensation paid due to loss of human life	Construction of human shelter. Storage of sand filled bags for emergency use. Repair and maintenance of bundles. Preparedness for relief. Insurance coverage provision for life and property.	Timely broadcast and telecast and other types of announcement warning. About the danger level with respect to water level. Evacuation of people to flood shelter areas. Relief operation	Relief operation will continue. Care and health of affected people. Settlement of insurance. Financial support to other people.
No of boats/ nets damaged	The boats have to be secured safely to river / reservoir banks. Non operation of fixed bag nets in streams and rivers. Insurance coverage for nets and boats	Checking of the safety of the boats/ nets. An inventory log books with name of crew members should be maintained. No. of crew and load should be much below the marked tonnage	Maintenance of boats and nets. Assessment and settlement of insurance
No of houses damaged	Insurance coverage for houses	-	Settlement of insurance
Loss of stock	-	-	Assessment of stock (fish population) and replenishment if stock is depleted. Habitat restoration for the stock remaining
Changes in water quality	-	-	Application of lime in tanks. Application of fertilizer.
Health and diseases	-	-	Observation of health status of fish and accordingly control measures should be taken. Control on transport of brooders and

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
			seeds
B. Aquaculture			
Inundation with flood waters	Strengthening and increase in dyke height. This should be constructed with inlet and outlet facility	Net enclosure should be provided over the dyke to prevent the escape of fish from the pond	Repair and strengthening of dyke if required
Water contamination and changes in BOD	Application of lime	-	Application of lime and geolite. Application of Alum. Application of KMnO4.
Health and disease management	Application of lime	-	Application of lime and KMnO4. Assessment of health status of fish and accordingly control measure should be taken. Control on transport of brooders and seeds
Cyclone			
Overflow/flooding of ponds	Strengthening and increase in dyke height. This should be constructed with inlet and outlet facility.	Net enclosure should be provided over the dyke to prevent the escape of fish from the pond	Repair and strengthening of dyke if required
Change in fresh/brackish water ratio	-	-	-
Health and disease management			Application of lime and KMnO4. Assessment of health status of fish and accordingly control measure should be taken. Control on transport of brooders and

	Suggested contingency measure		
	Before the event	**During the event**	**After the event**
			seeds
Heat wave and cold wave			
Management of pond environment	During hot waves adequate water depth should be maintained	During hot waves mixing water with fresh water should be done. The culture system should be provided with aeration to avoid oxygen depletion due to high temperature. Partial harvesting can be done to avoid loss.	-
Health and disease management	Application of lime and turmeric	Feeding should be stopped If cold wave persist EUS outbreak takes place	Application of CIFAX to control EUS disease in fish