

**State: Assam**

**Agriculture Contingency Plan for District: Goalpara**

<b>1.0 District Agriculture profile</b>			
1.1	<b>Agro Climatic/ Ecological Zone</b>		
	Agro Ecological Sub Region (ICAR)	Humid Assam Bengal Basin	
	Agro Climatic Zone ( Planning Commission)	Eastern Himalayan Zone	
	Agro Climatic Zone (NARP)	Lower Brahmaputra Valley Zone	
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Kamrup (Metro), Kamrup (Rural), Nalbari, Barpeta, Baksa, Goalpara, Dhubri, Bongaigaon, Chirang and Kokrajhar	
	Geographic coordinated of district headquarters	Latitude	Longitude
		90 <sup>0</sup> 00 - 91 <sup>0</sup> 15' E	25 <sup>0</sup> 50' - 26 <sup>0</sup> 10' N
		Altitude	
		100 - 500 m	
	Name and address of the concerned ZRS/ZARS/RARS/PRTTS	Regional Agricultural Research Station, Assam Agricultural University, Gossaigaon, Kokrajhar, Assam	
	Mention the KVK located in the district with full address	KVK Goalpara, ICAR-NRC on Pig, Dudhnoi – 783124, Assam	
	Name and address of the nearest Agromet Field unit (AMFU, IMD) for agro-advisories in the Zone	Regional Agricultural Research Station, Assam Agricultural University, Gossaigaon, Kokrajhar, Assam	

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)	1710.10	55	1 <sup>st</sup> week of June	Last week of September
	Post Monsoon/ NE Monsoon (Oct-Dec):	184.60	9	2 <sup>nd</sup> week of October	2 <sup>nd</sup> week of November
	Winter (Jan- Feb)	84.20	-	-	-
	Summer (March-May)	596.40	42	4 <sup>th</sup> week of March	Last week of May
	Annual	2575.30			

\* Source: IMD

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
	Areas ('000 ha)	182.40	102.65	36.46	47.41	2.79	7.64	6.75	28.87	0.19	0.37

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Areas ('000 ha)	Percent (%) of total geographical area
	1. Black soil	7.31	4.00
	2. Red soil	37.83	20.74
	3. Sandy soil	8.37	4.59
	4. Sandy loam soil	50.38	27.62
	5. Others	18.40	10.08

(data source: Soil Resource Maps of NBSS & LUP)

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity (%)	
	Net sown area	102.65	157.18%	
	Area sown more than once	58.70		
	Gross cropped area	161.35		
1.6	Irrigation*	Area ('000 ha)		
	Net irrigated area	26.51		
	Gross irrigated area	42.84		
	Rainfed area	118.51		
	Source of irrigation	Number	Area ('000 ha)	Percentage of total irrigation area
	Canals	35	8.39	31.65
	Tanks		2.12	8.00
	Open wells			
	Bore wells	44	13.78	51.98
	Lift irrigation schemes		0.37	1.40
	Micro irrigation		0.36	1.36
	Others (Dug well etc)		1.49	5.62
	Total irrigated Area		26.51	100.00
	Pump sets	7309		
	No. of Tractors**	343		
	Groundwater availability and use	No. of Blocks/Tehsils	(%) area	Quality of water (specify the problem such as

	(Source: Central Ground water Board)			high levels of Arsenic, Flouride, saline etc.,)
	Over exploited			
	Critical			
	Semi-critical			
	Safe	Safe		
	Wastewater availability and use			
	Ground water quality	F and Fe exceeds permissible limits		
*over-exploited : groundwater utilization >100%; critical: 90-100%, semi-critical:70-90%; safe:<70%				

### 1.7 Area under major field crops & horticulture (2013-14)

1.7	S. No.	Major field crops cultivated	Area ('000 ha)							
			<i>Kharif</i>			<i>Rabi</i>			Sum mer	
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		Grand total
	1	Cereal	5.20	51.50	55.35	-	-	-	10.97	67.67
	2	Pulses	-	0.05	0.05	0.10	6.40	6.50	-	6.55
	3	Oilseeds	-	-	-	3.96	4.84	8.80	-	8.80
	4	Fibre	-	5.09	5.09	-	-	-	-	5.09
	5	Others	-	8.90	8.90	3.99	10.98	14.96	-	23.86

S. No	Horticulture crops- Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
1	Banana	3.800		
2	Mango	0.205		
3	Pineapple	0.500		
4	Assam lemon	0.190		
5	Guava	0.180		
6	Litchi	0.340		
7	Jack fruit	1.540		
8	Orange	0.460		
	<b>Horticulture crops- vegetables</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
1	<i>Kharif</i> vegetable	5.400	-	5.400
2	<i>Rabi</i> vegetable	16.544	12.950	3.494
3	Chilli	0.450		
4	Onion	0.305		
5	Garlic	0.085		

6	Black pepper	0.065		
7	Coriander	0.270		
8	Turmeric	0.320		
9	Ginger	0.510		
	<b>Medicinal Aromatic Crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
1	Brahmi	NA		
2	Tulsi	NA		
3	Vach	NA		
4	Arjun	NA		
5	Pippali	NA		
6	Neem	NA		
7	Amla	NA		
8	Stevia	NA		
9	Ghritakumari	NA		
10	Kalmegh	NA		
11	Lukhandi	NA		
12	Sarpagandha	NA		
13	Ashok	NA		
14	Bhatghila	NA		
15	Agar	NA		
16	Chandan	NA		
17	Bael	NA		
	<b>Plantation Crops</b>	<b>Total</b>	<b>Irrigation</b>	<b>Rainfed</b>
1	Rubber	7.05		
2	Tea	1.22		
3	Arecanut	3.360		
4	Coconut	0.640		
	<b>Fodder crops</b>	<b>Total</b>	<b>Irrigation</b>	<b>Rainfed</b>
	Nil			
	<b>Nil</b>			
	Total fodder crop area			
	Grazing land, reserve areas etc			
	Availability of unconventional feeds/by products e. g., breweries waste, food processing, fermented feeds bamboo shoots, fish etc			
	Sericulture etc Other agro enterprises (mushrooms cultivation etc specify)			
1.	Breweries waste (traditional brewing)			
2	Fermented fish			
3	Fermented shoot bamboo			

	4	Pork pickles			
	5	Smoked pork			
	6	Snail products			
	7	Eri worm products			
	1	Sericulture village	244		
	2	No. of rearers	1982		
	3	No. of food plants	437267		
	4	Area under food plants ('000 ha)	0.609		
	5	Fruit and vegetable processing unit (No)	1		
	6	Rice mill (No)	11		
	7	Flour mill (No)	1		
	8	Spice mill (No)	1		
		<b>Others (specify)</b>			

1.8	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>		
	Indigenous cattle			288494		
	Improved/Crossbred cattle			14085		
	Buffaloes (Local low yielding)			7283		
	Improved Buffaloes			23330		
	Goat			135077		
	Sheep			29105		
	Pig			49353		
	Horse and ponies			123		
	Commercial dairy farms (Number)					
1.9	<b>Poultry</b>	<b>No. of Farm</b>	<b>Total No. of birds ('000)</b>			
	Ducks		197682			
	Fowls		875245			
1.10	<b>Fisheries</b>					
	<b>a. Capture</b>					
	<b>i) Marine ((Data source: Fisheries Department)</b>	<b>No. of Fishermen</b>	<b>Boats</b>	<b>Nets</b>	<b>Storage facilities (Ice plants etc)</b>	
			<b>Mechanized</b>	<b>Non- mechanized</b>	<b>Mechanized (Trawl nets, Gill nets)</b>	<b>Non-mechanized (Shore Seines, Stake &amp; trap nets)</b>
	<b>ii) Inland (Data Source: Fisheries Department)</b>	<b>No. Farmer owned ponds</b>	<b>No. of Reservoirs (Beels and Waterlogged area)</b>		<b>No. of Village tanks</b>	
		8862	92		50	
			55			
	<b>B. Culture</b>					
			<b>Water spread Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production ('000 tons)</b>	

	i) Fresh Water (Data source: Fisheries Department)	2166	2.12	4.59
	ii) Hatcheries (Nos)	9 Nos.		117.50 million nos.
	iii) Seed production (Nos)			222.78 lakh

### 1.11 Production and Productivity of major crops (Average of last 5 years: 2011, 12, 13, 14, 15)

1.11	Name of crop	<i>Khariif</i>		<i>Rabi</i>		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)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>										
Crop 1	Rice	9807.75	1177.50	97543	1997	80040.25	3423			
Crop 2	Rapeseed/mustard							2894.5	458	
Crop 3	Nizer							683.75	719	
Crop 4	Linseed							330.25	623.75	
Crop 5	Sesamum							277	509	
Crop 6	Jute							36984.50	1576.75	
Crop 7	Mesta							1294.50	905	
Crop 8	Sugarcane							10444.75	36329.50	
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
Crop 1	Banana							74077		
Crop 2	Orange							4722		
Crop 3	Pineapple							7713		
Crop 4	Assam lemon							724		
Crop 5	Jack fruit							695		
<b>Major Oilseed crops (Crops to be identified based on total acreage)</b>										
Crop 1	Lin seed			0.478	636					
Crop 2	Castor			0.034	540					
Crop 3	Niger			0.826	453					
Crop 4	Sesame			0.289	533					
Crop 5	Rape seed and mustard			3.984	650					

1.12	<b>Sowing window for 5 major field crops</b> (start and end of normal sowing period)	Crop 1: Paddy	2: Rapeseed	3:Jute	4: wheat	5: Blackgram
	<i>Khariif</i> - Rainfed	June-July	-	March- April		Mid Aug-Mid Sept
	<i>Khariif</i> -Irrigated	-	-	-	-	-

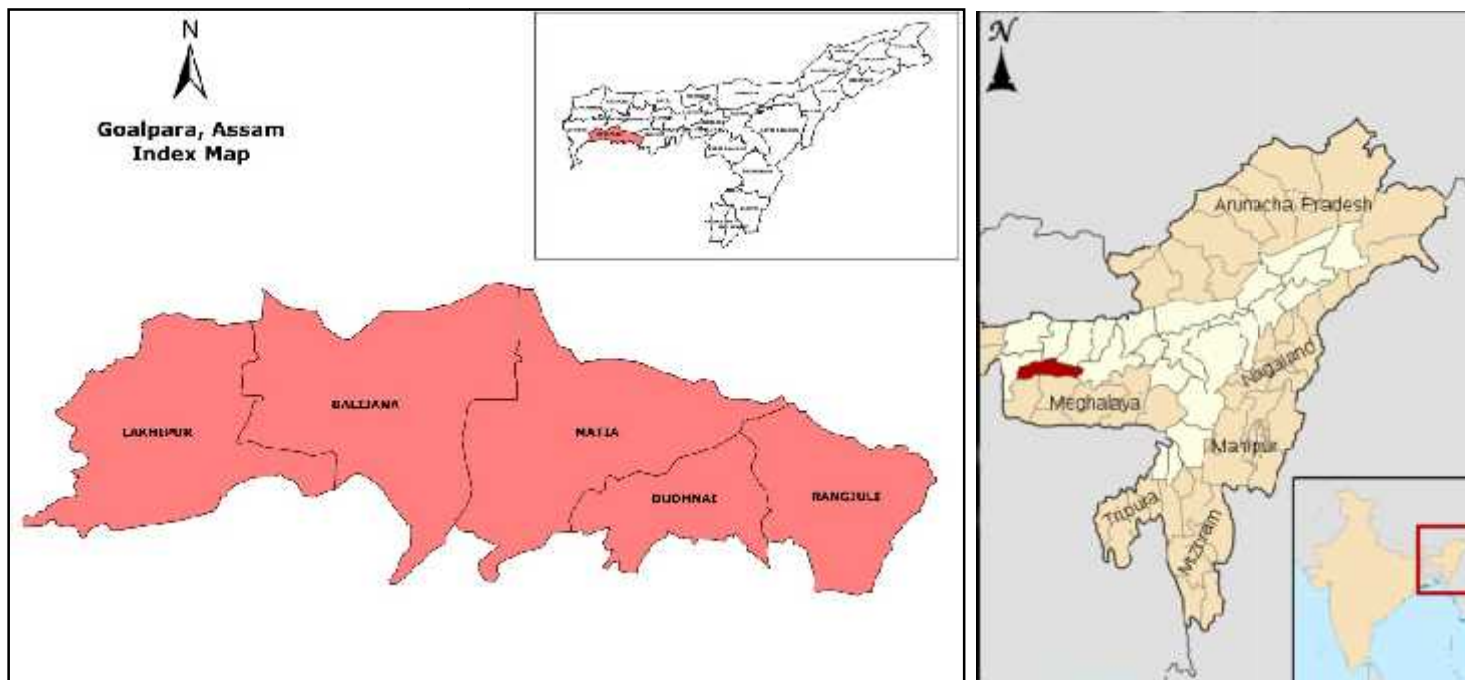
<i>Rab--irrigated</i>				November- December	
Autumn paddy	Sep-Oct	15 <sup>th</sup> Oct-15 <sup>th</sup> Nov	-	-	-
Summer paddy (Boro rice)	March- April		-	-	-

1.13	What is the major contingency the district is prone to? (tick mark)	Regular	Occasional	None
	Drought		ð	
	Flood	ð		
	Cyclone		ð	
	Hail storm		ð	
	Heat wave			
	Cold wave			
	Frost			
	Sea water intrusion			
	Landslides		ð	
	Earthquake			
	Pests and disease outbreak (specify)		ð	
	Rice	Hispa, stem borer, Caseworm, Leaf folder, Gandhi bug, Blast, Sheath rot, Brown spot, Gall midge, BLB, Bakane, Root knot nematode, BPH, GPH, False smut, swarming caterpillar (army worm) and rodent		
	Wheat	Loose smut and rodent		
	Rapeseed mustard	Aphid and saw fly		
	Black gram	YMV, Aphid, Jassid, Pod borer, Pod bug, and Flea leaf beetle		
	Banana	Panama wilt, cercospora leaf spot, fruit scaring beetle		
	Arecanut	Ganoderma and white grub		
	Jute	Fungal wilt, Stem rot, Semilooper, Caterpillar		
	Jack fruit	Fruit rot		
	Vegetables	Bacterial wilt, Fungal wilt, Damping off, Late blight in potato, Anthracnose in chili, White grub, Fruit and Shoot borer, Collar rot		

\*When contingency occurs in six out of 10 years

1.14	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: no
		Soil map as Annexure 3	Enclosed: no

**Annexure – 1: LOCATION MAP OF GOALPARA DISTRICT IN ASSAM**





## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### A. Drought-Pre-Monsoon (Last week of March to First week of April) Normal

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop /cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
<b>Delayed by 2 weeks ( 2<sup>nd</sup> to 3<sup>rd</sup> week of April)</b>	<b>1)Farming situation:</b> Rainfed upland	<b><u>Cropping system</u></b> <b>1:</b> Summer vegetables /Summer Pulse (Greengram/ Blackgram)	No Change Growing high yielding varieties <b>Greengram</b> -SGC-16, SGC 20, Sonai (SG 21-5) T44,K 851,IPM-1-2, Pratap <b>Blackgram</b> - Sonkush (SB 23-5) SBC 40, SBC 47 Pant U 19, T-9, KU-301 etc Lentil-M	Follow recommended package of practices for different crops i) Weeding at critical stages of growth. ii) Addition of sufficient organic matter in the soil at the time of land preparation	Provision supply of seeds/inputs through RKVY and other Central/State schemes

#### Normal onset of Pre-monsoon

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	<b>2)Farming situation:</b> Rainfed Medium land/ Medium lowland	<b><u>Cropping system</u></b> <b>1:</b> Rice (Early ahu and normal ahu) monocropping	No Change in crops Use HYV of short duration rice Luit, Kolong,Kapilee,Dishang,Dikhow ,IR 36,Culture 1 etc	1.Weeding at critical stages of growth 2 Irrigation as per requirement 3.Proper plant protection measures as and when required 4.Foliar application of 1% MOP	Provision for supply of seeds/inputs through RKVY and various Central/State schemes

		<b>Cropping system</b> <b>2:</b> Boro Rice	No Change Grow high yielding varieties like – Joymoti, Swarnabh, Kanaklata, Dinanath	1. Weeding at critical stages of growth 2. Irrigation as per requirement 3. Proper plant protection measures as and when required 4. Foliar application of 1% MOP	
		<b>Cropping system</b> <b>3:</b> Jute	No Change Grow high yielding varieties like – Sonali, Reshma, Shyamali, Navin, Bahagi, Tarun, Apeswarae etc	1. Weeding at critical stages of growth 2. Irrigation as per requirement 3. Proper plant protection measures as and when required 4. Foliar application of 1% MOP	

### 2.1.1 Rainfed situation

Condition	Major Farming situation <sup>a</sup>	Normal Crop / Cropping system <sup>b</sup>	Suggested Contingency measures		
			Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Early season drought (delayed onset)					
Delay by 2 weeks (Specify month)*  i.e. June 3 <sup>rd</sup> Week	1) Farming situation: Rainfed upland	<i>Kharif</i> vegetables (Ridgegourd, sponge gourd, )/ <i>kharif</i> pulse (greengram/blackgram/arhar)	Ridgegourd: local varieties, improved varieties like Pusa Nasdar Sponge gourd: Selected local varieties, Improved varieties like. Pusa Chikni Greengram/Blackgram: Var. Pratap AAU 39 Arhar: Selected local var.	-Recommended package of practices for normal sowing. i) Weeding at critical stages of crop growth. ii) Addition of sufficient organic matter/ compost/Vermicompost in the soil at the time of land preparation iii) INM including use of biofertilizers like Azotobacter, PSB iv) Seed Treatment of pulses with Rhizobium culture	Same cropping system can be followed upto 4 weeks delay
		Cropping system 2: Summer vegetable (Colocasia, okra) –	Colocasia: Kaka kachu and Selected local var. Okra: Pusa Sawani, Arka Anamika and Selected	Follow recommended package of practices for different crops- i) Weeding at critical stages of growth.	

		Fallow - Toria	local var.	<p>ii) Addition of sufficient organic matter/compost/Vermicompost in the soil at the time of land preparation</p> <p>iii) Use INM practices including use of biofertilizers.</p>
<p><b>2) Farming situation:</b>  Rainfed Medium land/ Medium lowland</p>		Cropping system 1: Rice( <i>kharij</i> ) monocropping	Ranjit, Bahadur, local variety	<p>-Recommended package of practices for normal sowing.</p> <p>i) Seed Treatment with fungicide like Captan, Thiran @ 2.5 g/kg of seed ii) Weeding at critical stages of crop growth.</p> <p>iii) Addition of sufficient organic matter/compost in the soil at the time of land preparation</p> <p>iv) INM including use of biofertilizers like, Azolla, Azotobacter</p>
		Cropping system 2: Sali Rice - rice/ potato/ Toria/	<p>Sali rice: Var. Ranjit, Mahsuri</p> <p>Potato: Selected local var. and Kufri Jyoti/ Kufri Megha</p> <p>Toria: Var. TS-36/ TS-38</p>	<p>-Recommended package of practices for normal sowing.</p> <p>i) Seed Treatment with fungicide like Captan, Thiran @ 2.5 g/kg of seed ii) Weeding at critical stages of crop growth.</p> <p>iii) Addition of sufficient organic matter/compost in the soil at the time of land preparation</p> <p>iv) INM including use of biofertilizers like, Azolla, Azotobacter</p>
		Cropping system 3. Jute - toria / <i>rabi</i> vegetables (cabbage, tomato and brinjal)	<p>Jute: Var. Bohagi</p> <p>Toria: Var. TS-36/ TS-38</p> <p>Cabbage: Golden Acre and Drum head</p> <p>Tomato: Pusa Ruby, S-12, Arka Alok</p> <p>Brinjal: Selected local var.</p>	<p>-Recommended package of practices for normal sowing.</p> <p>i) Life saving supplemental irrigation</p> <p>ii) Thinning in Toria to maintain optimum plant population</p> <p>ii) Weeding at critical stages of growth.</p> <p>iii) Supplemental irrigation in the nursery</p>

			(Balijana)	bed of <i>Rabi</i> vegetables iv) Addition of sufficient organic matter/compost /Vermicompost in the soil at the time of land preparation
		Jute - Late Sali	Jute: Var. Bohagi Late Sali: Monohar Sali, Satyaranjan, Basundhara, TTB 404 (Shraboni), Swarna Short duration rice varieties such as Luit, Kolong, Dishang etc.	-Recommended package of practices for normal sowing. Growing of medium duration rice varieties such as Monohar Sali, Satyaranjan, Basundhara, TTB 404 (Shraboni), Swarna etc (transplanting up to 1 <sup>st</sup> week August). - Short duration rice varieties such as Luit, Kolong, Dishang etc. can also be selected (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 15x15 cm spacing with 4-6 seedlings/hill. -Rice varieties that can be grown as late Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona, Prafulla and Gitesh up to 60 days old sowing with Closer spacing of (15 cm x 15 cm) and 6-8 seedlings/hill is recommended
		Relay cropping of lathyrus / field pea	Lathyrus: Var. Ratan, Prateek Field pea: Var. Aman, Prakash, Vikash, Adarsh	i) Seed treatment of Lathyrus and field pea viz. priming, soaking, etc. ii) Weeding at critical stages iii) Recommended plant protection measures
3. Flood prone	Summer vegetables/jute-toria/potato/	Summer vegetable: Colocasia (Kaka kachu and Selected local var.) Jute: Var. Bohagi  Toria: Var. TS-36/ TS-38 Potato: Selected local var. and Kufri Jyoti/ Kufri Megha		-Recommended package of practices for normal sowing. i) Grow Short duration summer vegetables - Okra: Pusa Sawani, Arka Anamika and Selected local var. ii) Thinning and weeding of jute and toria iii) Seed treatment of potato with Mancozeb/ Diethene M-45 iv) Incorporation of organic matter and mulching

		<i>khari</i> f rice ( <i>khari</i> f) -/potato/ <i>rabi</i> vegetables	No Change	<p>-Growing of submergence tolerant rice varieties such as Jalashree, Jalkuwari, Swarna Sub 1, Ranjit Sub 1 which can tolerate 12-15 days submergence (transplanting within July). Seedlings should be raised in non flood prone or high land area.</p> <p>-If flood water recedes early and transplanting can be done by mid August, select varieties like Satyaranjan, Basundhara, IR - 36, Jaya etc. Seedlings should be raised in high land area.</p> <p>- If transplanting is possible during last part of August, short duration varieties such as Luit, Kolong, Dishang etc. can also be selected (transplanting up to last week of August). 20-25 days old seedling should be transplanted at the spacing of 20x15 cm with 4-5 seedlings/hill.</p> <p>The rice variety Manohar Sali, Andrew Sali, Salpona etc. and traditional photosensitive coarse grain can be grown in chronically flood affected areas up to 60 days old seedlings in last part of August. A seed rate of 60 kg seed/ha is required with closer spacing (15 cm x15 cm) and 6-8 seedlings/hill. Community nursery may be raised in non- flood prone or high land for raising of rice seedlings.</p> <p>For delayed/staggered planting rice varieties like Prafulla and Gitesh up to 60 days old seedlings (Sowing in the nursery bed within June) can be grown. Seedlings should be raised in high land area.</p>	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (delayed</b>	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Change in crop/cropping system<sup>c</sup></b>	<b>Agronomic measures<sup>d</sup></b>	<b>Remarks on Implementat</b>

onset)					ion <sup>e</sup>
<p><b>Delay beyond 4 weeks (Specify month)</b> <b>July 1<sup>st</sup> week</b></p>	<p><b>1) Farming situation:</b> <b>Upland</b></p>	<p>Summer vegetables/ Summer pulse (greengram), sesamum</p>	<p>Greengram: Pratap Sesamum: Var. ST 1683, Panjab Til No. 1</p>	<p>-Recommended package of practices for normal sowing. i) Life saving supplemental irrigation ii) Weeding at critical stages of growth. iii) Supplemental irrigation in the nursery bed of Summer vegetables iv) Addition of sufficient organic matter/compost /Vermicompost in the soil at the time of land preparation</p>	
		<p>Cropping system 2: toria/<i>rabi</i> veg /<i>rabi</i> pulse (green/blackGram)</p>	<p><b>Toria</b> varieties like TS-36, TS-38, TS-67, TS-46 <b>Pulse</b> varieties like AAU 34, AAU 39</p>	<p>i) Seed treatment with Rhizobium culture i.e. Kamalabari 11) Life saving supplemental irrigation ii) Weeding at critical stages of growth. iv) Addition of sufficient organic matter/compost /Vermicompost in the soil at the time of land preparation</p>	
	<p>2) Farming situation: <b>Medium land/</b> <b>Medium low land</b></p>	<p>Cropping system 1: Rice(<i>kharif</i>) monocropping</p>	<p>No change</p>	<p>Growing of medium duration rice varieties such as Satyaranjan, Basundhara, TTB 404 (Shraboni), IR-36, etc (transplanting up to 1<sup>st</sup> week of August). Short duration rice varieties such as kopili, Luit, Kolong, Dishang etc. can also be selected (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill. -Rice varieties that can be grown as late Sali up to first week of September viz. Manohar Sali, Andrew Sali, Salpona, Prafulla and Gitesh etc. Traditional photosensitive coarse grain varieties can be grown up to 60 days old seedlings. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and higher number of seedling i.e. 6-8 seedlings/hill.</p>	<p>Tender seedlings should be transplanted (SRI)</p>

		Rice( <i>Kharif</i> )- Toria/ /potato / short duration <i>rabi</i> vegetables/chilli - Jute	No change	<p>-Growing of medium duration rice varieties such as Satyaranjan, Basundhara, TTB 404, IR-36, Jaya etc (transplanting up to 1<sup>st</sup> week August).</p> <p>- Short duration rice varieties such as Luit, Kopili, Dishang etc. can also be selected (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.</p> <p>--Rice varieties that can be grown as late Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona,Prafulla,Gitesh etc. and traditional photosensitive coarse grain varieties up to 60 days old seedlings. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings/hill.</p> <p>Short duration <i>rabi</i> vegetables-beans, garden pea(relay), leafy vegetables like coriander</p>	
		Rice ( <i>kharif</i> ) – Rice (summer)	No change	<p>- Transplanting can be done upto mid August with the following medium duration rice varieties such as Satyaranjan, Basundhara, TTB 404, IR-36, Jaya etc.</p> <p>- Short duration rice varieties such as Luit, Kopili, Dishang etc. can also be selected (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.</p> <p>- Rice varieties such as Pankaj, Kushal, Lakhimi can be grown up to August 15 with 45 -50 days old seedlings.</p> <p>--Rice varieties that can be grown as late Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona etc. Whereas, traditional photosensitive coarse grain</p>	

				varieties can be grown with 60 days old seedlings. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings/hill.	
	Flood prone	Summer vegetables/jute – toria/ <i>rabi</i> vegetables	No Change	-Recommended package of practices for normal sowing.	
		Rice (Late <i>Kharif</i> ) –wheat/ <i>rabi</i> vegetables	No change	<p>--If there is early recession of flood water, transplanting can be done by mid August with the rice varieties like Satyaranjan, Basundhara, TTB 404, IR -36, Jaya etc. Seedlings should be raised in non flood prone area.</p> <p>- If transplanting is possible during last part of August, short duration rice varieties such as Luit, Kopili, Dishang etc. can also be selected (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.</p> <p>- For chronically flood affected areas, Manohar Sali, Andrew Sali, Salpona etc. and traditional photo-period sensitive coarse grain rice varieties with up to 60 days old seedlings can be grown up to last part of August. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings /hill. Community nursery may be raised in non- flood prone or high land for raising of rice seedlings.</p> <p>-If flood damages crop during last part of August and there is no time to raise seedlings, direct seeding (wet seeding) of extra short duration suitable varieties such as Luit, Kolong, Dishang etc or any traditional photo period sensitive coarse grain varieties can also be done up to 1<sup>st</sup> week of September. Sprouted seed of 75 kg/ha is to be broadcast in puddle field.</p>	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (delayed</b>	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Change in crop/cropping system<sup>c</sup></b>	<b>Agronomic measures<sup>d</sup></b>	<b>Remarks on Implementat</b>



onset)					ion <sup>e</sup>
<b>Delay by 6 weeks (Specify month)</b>	<b>1) Farming situation: Upland</b>	Summer Pulse (Greengram), Summer oilseed (sesamum) and. Toria.	No Change	-Recommended package of practices for normal sowing.	
	<b>2) Farming situation: Medium land/ Medium lowland</b>	Rice ( <i>Kharif</i> ) monocropping  Relay cropping with field pea, lentil and linseed.  Summer pulses (greengram/black gram) and oilseed (Sesamum)	No change	- Short duration rice varieties such as Kopili, Luit, Kolong, Dishang etc. can also be transplanted up to last part of August. 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.  --Rice varieties that can be grown as late Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona, Prafulla and Gitesh etc. and traditional photo-period sensitive coarse grain varieties with up to 60 days old seedlings. About 62 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings/hill.	
		Jute / Rice ( <i>Kharif</i> ) - Toria / Potato / <i>Rabi</i> vegetables	No change	- Short duration rice varieties such as Kopili, Luit, Dishang etc. can also be transplanted up to last part of August and 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.  --Rice varieties that can be grown as late Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona etc. and traditional photo-period sensitive coarse grain varieties with up to 60 days old seedlings. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings/hill.	
		Rice ( <i>kharif</i> ) – Rice (summer)	No change	- Short duration rice varieties such as Luit, Dishang etc. can also be transplanted up to last part of August and 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/ hill.  --Rice varieties that can be grown as late	

				Sali up to last part of August are Manohar Sali, Andrew Sali, Salpona etc. and traditional photosensitive coarse grain varieties with up to 60 days old seedlings. About 60 kg seed/ha is required with closer spacing (15 cm x 15 cm) and 6-8 seedlings/hill.	
	3.Flood prone	Summer vegetables/Jute –Torja/Lentil/Wheat/Potato/Rabi vegetables	No Change	-Recommended package of practices for normal sowing.	

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measues <sup>d</sup>	Remarks on Implementat ion <sup>e</sup>
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell on standing crop.	1)Farming situation: upland	Summer vegetables/ Summer Pulse (Greengram) <i>Kharif</i> pulses and oilseed Toria/ <i>Rabi</i> Veg / <i>Rabi</i> pulse (Blackgram)	No Change Pulse: AAU34, AAU 39, Pant U 19, T-9, KU-301 etc, Torja: Ts 36, TS 38 -Weeding in critical growth stage.	-Life saving irrigation -Mulching -2% urea spray during branching stage.	
	2)Farming situation: Medium land	Rice ( <i>Kharif</i> ) – <i>Rabi</i> vegetable	<b>Rice-</b> Ranjit, Bahadur, Maniram, Piolee, Kushal. <b>Potato-</b> Kufri Chandramukhi, Kufri Jyoti, Kufri Megha, Kufri Pukhraj -Weeding in critical growth stage.	Life saving supplemental irrigation if possible	
		Rice ( <i>Kharif</i> ) mono-cropping	<b>Rice-</b> Ranjit, Bahadur, Maniram, Piolee, Kushal etc	Provision of irrigation through STW /farm pond in the nursery bed of rice. -The gap of 30 cm between two beds may be converted into channel to supply water to keep the raised beds moist during drought	

				<p>period.</p> <p>-Application of sufficient quantity of organic manure (compost, FYM&lt; etc) in the nursery bed as well as in the main field.</p> <p>Re-sowing of rice seed may also be recommended in case of germination is severely affected. Spraying of Mancozeb @ 2.5g/l lit of water or Ediphenphos 2 1ml/l litre of water or Carbendazim @ 1g/l lit of water against fungal diseases in rice.</p>	
		Rice ( <i>Kharif</i> )- Toria / Potato / <i>Rabi</i> vegetables - Jute	No change	Recommended package of practice	
		Rice ( <i>kharif</i> ) – Rice (summer)	No change	Recommended package of practice	
	3.Flood prone	Integrated Rice-Fish farming	No Change	Recommended package of practice	
		Rice (Late <i>Kharif</i> ) –/Potato/ <i>Rabi</i> vegetables	<p>No change</p> <p>-The seed may be sown after seed treatment with 4% MOP for 24 hrs, followed by drying in shade for 24 hrs</p> <p>-Re-sowing of rice seed may also be recommended where germination is severely affected.</p>	<p>Rice nursery is raised in upland/ non flood prone areas to grow recommended rice varieties as late Sali Prafulla,Gitesh, Manohar Sali, Andrew Sali, Salpona, with higher seedling age in chronically flood affected areas</p> <p>Supplemental irrigation in the nursery bed of rice should also be provided.</p> <p>Gap between two the bed in rice nursery should be converted into channel to supply water.</p> <p>-Application of sufficient quantity of organic matter in the nursery bed and main field.</p>	

Condition	Major Farming situation	Normal system <sup>b</sup>	Crop/cropping	Suggested Contingency measures		
				Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Mid season drought (long dry spell, consecutive 2 weeks rainless (< 2.5 mm))						
At vegetative	1) Farming	Summer vegetables/	Summer	No Change	-Life saving supplemental irrigation	

stage June 3 <sup>rd</sup> wk	situation: upland	Pulse(Greengram) Toria/ Rabi Veg /Rabi pulse(Black .Gram)	-Weeding at critical stages of growth. Application of post emergence herbicides - Thinning to maintain optimum plant population.	-Mulching	
	2)Farming situation: Medium land/ medium low land	Rice( <i>Kharif</i> ) monocropping	No Change	- Life saving supplemental irrigation at critical stages of crop growth -Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice -Spraying of 2% KCl solution on leaves of rice if and when drought appears. -Top dressing of urea may be delayed upto heading stage of rice if drought prevails at tillering stage. -Spraying of Mancozeb @ 2.5g/l or Edinofenphos 2 ml/l or Carbendazim @ 1g/l against brown spot disease in rice. -	
		Jute / Rice( <i>Kharif</i> )- Toria / Lentil/ / Potato / Rabi vegetables	No Change		
		Rice ( <i>kharif</i> ) – Rice (summer)	No Change  Weeding at critical stages of growth.		
	3.Flood prone	Summer vegetables/Jute –Torina/ Potato/Rabi vegetables	No Change	-Supplementary life saving irrigation at critical crop stages	
		Rice (Late <i>Kharif</i> ) –/Potato/Rabi vegetables	No change	-Supplementary life saving irrigation at critical crop stages --Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice -Spraying of 2% KCl solution on leaves of rice if and when drought appears. -Top dressing of urea may be delayed upto heading stage of rice if drought prevails at the stages of top dressing	

Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measues <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At flowering/ fruiting stage	1. upland	Summer vegetables/ Summer Pulse (Greengram)-Torina/ <i>Rabi</i> Veg / <i>Rabi</i> pulse (Black Gram)	No change	-Life saving supplemental irrigation Spraying of 1% KCl solution at flowering stage and 2% urea spray at pod initiation stage of pulses	
	2 Medium land	Rice ( <i>Kharif</i> ) monocropping	No change	Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice before flowering. -Spraying of 2% KCL solution on leaves of rice if and when drought appear before flowering. -Top dressing of urea may be delayed up to heading stage of rice if drought prevails at the stages of top dressing -Life saving supplemental irrigation at critical stages of crop growth -	
		Rice( <i>Kharif</i> )- Toria / Potato / <i>Rabi</i> vegetables - Jute	No change		
		Rice ( <i>kharif</i> ) – Rice (summer)	No change  If crop fails, plan for <i>rabi</i> vegetables, oilseeds, pulses etc.		
	3.Flood prone	Summer vegetables/Jute –Torina/ Wheat/Potato/ <i>Rabi</i> vegetables	No Change		
		Rice (Late <i>Kharif</i> ) –Wheat/Potato/ <i>Rabi</i> vegetables	No change	-Supplementary life saving irrigation at critical crop stages --Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice -Spraying of 2% KCL solution on leaves of rice if and when drought appears. -Top dressing of urea may be delayed upto heading stage of rice if drought prevails at the stages of top dressing	

Condition	Major Farming situation <sup>a</sup>	Normal system <sup>b</sup>	Crop/cropping	Suggested Contingency measures		
				Crop management <sup>c</sup>	Rabi Crop planning <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Terminal drought (Early withdrawal of monsoon)						
September-October	1) Farming situation: Upland	Summer vegetables/ Summer Pulse (Green gram) Toria/Rabi Veg /Rabi pulse (Black Gram)/ Lentil	-Life saving irrigation -Harvesting of <i>kharif</i> crops at physiological maturity stage.  Spraying of 1% KCl solution at flowering stage and 2% urea at pod initiation stage of pulses respectively.	- <i>Rabi</i> cropping with cole crops such as Cabbage, knoll-khol (mid season varieties). Growing of Tomato, Brinjal, pea, potato and Leafy vegetables like Spinach, Amaranthus etc. with package of practices.  --Growing of <i>rabi</i> field crops like toria, lentil, wheat etc. in time with pre-sowing irrigation if required with recommended varieties and package of practices.		
	2) Farming situation: Medium land	Rice ( <i>Kharif</i> ) monocropping	-Life saving irrigation - Harvesting of <i>kharif</i> crops at physiological maturity stage.	- <i>Rabi</i> cropping with cole crops such as Cabbage, Knol-khol (mid season varieties). -Growing of Brinjal, Tomato, potato, pea and Leafy vegetables like Amaranthus, Spinach, etc. with recommended varieties and package of practices.		
		Jute / Rice( <i>Kharif</i> )- Toria / Lentil/ Wheat / Potato / <i>Rabi</i> vegetables				

		Rice ( <i>kharif</i> ) – Rice (summer)		--Growing of <i>rabi</i> field crops like toria, lentil, wheat etc. in time with pre-sowing irrigation if required with recommended varieties and package of practices.	
3.Flood prone	Summer vegetables / Jute – Toria/Lentil/Wheat/ Potato/ <i>Rabi</i> vegetables  Rice (Late <i>Kharif</i> ) –Toria/Lentil/Wheat/ Potato/ <i>Rabi</i> vegetables/ Chilli		-Life saving supplemental irrigation  -- Harvesting of <i>kharif</i> crops at physiological maturity stage.	- <i>Rabi</i> cropping with cole crops such as Cauliflower, Knol-khol (mid season varieties Growing of Tomato, Brinjal, pea, potato and Leafy vegetables like Spinach, Amaranthus etc. with recommended package of practices.  --Growing of <i>rabi</i> field crops like toria, lentil, wheat etc. in time with pre-sowing irrigation with recommended package of practices.	

## 2.1.2 Drought - Irrigated situation

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Delayed release of water in canals due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; <b>tankfed medium deep black soils</b>	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Limited release of water in canals due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; <b>tankfed medium deep black soils</b>	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Suggested Contingency measures		
			Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Non release of water in canals under delayed onset of monsoon in catchment	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; <b>tankfed</b>	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			



Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
	<b>medium deep black soils</b>				
	2) Farming situation:	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; <b>Tube well irrigated medium red soils</b>	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition			Suggested Contingency measures		
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>
Insufficient groundwater recharge due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; <b>tankfed medium deep black soils</b>	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
Any other condition (specify)					

## 2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition	Suggested Contingency Measures			
Continuous high rainfall in a short span leading to water logging	Vegetative stage <sup>k</sup>	Flowering stage <sup>l</sup>	Crop maturity stage <sup>m</sup>	Post harvest <sup>n</sup>
Crop1 Summer rice	<p>-Sow rice seed in raised nursery bed with 30 cm gap between two beds which can be utilized to drain out excess water.</p> <p>- Excess rain water to be drained out through surface drainage channel to avoid submergence in the main field.</p> <p>-Light hoeing and weeding</p>	Drain out the excess rain water through surface drainage channel to avoid submergence	<p>- Drain out the excess rain water through surface drainage channel to avoid submergence</p> <p>-Crop to be harvested at physiological maturity stage.</p>	<p>- To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.</p>
Crop2 Winter rice	<p>-Sowing of rice seed in raised nursery bed with 30 cm gap between two beds for drain out the excess water.</p> <p>- Excess rain water to be drained out through surface drainage to avoid submergence in the main field.</p> <p>-Light hoeing and weeding</p>	Drain out the excess rain water through surface drainage channel to avoid submergence	<p>-Excess rain water to be drained out through surface drainage channel to avoid submergence.</p> <p>-Crop to be harvested at physiological maturity stage</p>	<p>- To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.</p>
Crop3 Sesame	<p>-Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m</p> <p>-Light hoeing and weeding</p>	Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m	<p>-Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m.</p> <p>-Crop to be harvested at physiological maturity stage.</p>	<p>- To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.</p>
Crop 4 Jute	<p>- Drainage</p> <p>- If top dressing of N fertilizer is not possible, foliar spray of 3% urea (11.5 kgN/ha i.e. 30 g urea/l of water) at 40-45 days and 55-60 days after sowing.,</p>	Drainage	Drainage	Proper drying of fibre
Crop 5 Sesamum	<p>- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.</p>	Drainage - Make trenches/furrows to facilitate drainage of excess water during high	Drainage-  -Make trenches/furrows to facilitate drainage of excess	Drainage

		rainfall.	water during high rainfall.	
<b>Horticulture</b>				
Crop1 Brinjal	-Drainage  - Plant protection measures against cut worm and bacterial wilt	-Drainage  - Application of nutrient, sprays insecticide to prevent shoot borer	-Drainage  -Plant protection measures against fruit borer  -Crop to be harvested at physiological maturity stage.	-Transfer the produce in dry place.  - Sell the produce immediately.  - Store the produce in cold storage
Crop2 Potato	- Furrows can be utilize for drainage  -Proper plant protection measure against early blight and cut worm  -Earthing up at 25 and 60 days after planting.	- Furrows can be utilize for drainage  -Proper plant protection measure against late blight	- Furrows can be utilize for drainage  -Harvesting of tuber by animal drawn potato digger	-proper drying of the produce.  - Store the produce in cold storage.
Crop 3 Bitter gourd	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage
Crop 4 Tomato	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage.
Crop 5 Okra	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop	Drainage	Shifting of the produce to drier place, Cold storage

Crop 6 Papaya	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage
Crop 7 other Vegetables	<ul style="list-style-type: none"> <li>- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.</li> <li>- Application of nutrient, sprays fungicides and antibiotics to prevent diseases.</li> </ul>	<ul style="list-style-type: none"> <li>- Inter space can be utilize for drainage</li> <li>- Application of nutrient, sprays to prevent flower drop.</li> </ul>	Drainage	<ul style="list-style-type: none"> <li>- Proper drying of the produce.</li> <li>- Store the produce in cold storage.</li> </ul>
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Crop1 Summer rice	<ul style="list-style-type: none"> <li>-Sow rice seed in raised nursery bed with 30cm gap between two beds which can be utilized to drain out excess water.</li> <li>- Excess rain water to be drained out through surface drainage channel to avoid submergence in the main field.</li> </ul>	<ul style="list-style-type: none"> <li>- Excess rain water to be drained out through surface drainage channel to avoid submergence in the main field</li> </ul>	-Crop to be harvested at physiological maturity stage.	-Proper drying of grains to maintain optimum moisture percentage (12-14%) for storage
Crop 2 Jute	<ul style="list-style-type: none"> <li>- If top dressing of N fertilizer is not possible, foliar spray of urea (11.5 kgN/ha i.e. 30 g urea/l of water) at 40-45 days and 55-60 days after sowing.,</li> <li>- Growing of green manure crops like Dhaincha along the border as wind barrier.</li> </ul>	<ul style="list-style-type: none"> <li>-Propping: crop should be provided mechanical support to prevent lodging if line sowing is followed.</li> <li>- Growing of green manure crops like Dhaincha along the border as wind barrier.</li> </ul>	-Propping: crop should be provided mechanical support to prevent lodging	-Proper rotting and drying of fibre
Crop 3 Sesamum	Drainage	Drainage	Drainage	Drying of produces to optimum

				<p>moisture level</p> <p>Seed treatment with insecticide like malathion 5% dust and fungicide like bevestin @1g/kg seeds against insects-pest &amp; diseases respectively during the period of storage</p> <p>Treated seeds be kept in polythene bags with outer covering of gunny bags</p>
Crop 4 Blackgram/Arhar	- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.	-- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.	- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.	<p>Drying of produces to optimum moisture level</p> <p>Seed treatment with insecticide like malathion 5% dust and fungicide like bevestin @1g/kg seeds against insects-pest &amp; diseases respectively during the period of storage</p> <p>Treated seeds be kept in polythene bags with outer covering of gunny bags</p>
Crop5 Winter rice	-Sow rice seed in raised nursery bed with 30 cm gap between two beds which can be utilized to drain out excess water. - Excess rain water to be drained out through surface drainage channel to avoid submergence in the main field.	- Excess rain water to be drained out through surface drainage channel to avoid submergence in the main field	-Crop to be harvested at physiological maturity stage.	-Proper drying of grains to maintain optimum moisture percentage (12-14%) for storage

<b>Horticulture</b>				
Crop1 Banana	Make trenches/furrows in between ridges to facilitate drainage of excess water.	Make trenches/furrows in between ridges to facilitate drainage of excess water, propping.	Make trenches/furrows in between ridges to facilitate drainage of excess water, propping.	Shifting of the produce to drier place
Crop 2 Guava	Earthing up, Bamboo stacking, Planting Wind break tree.	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Crop3 Okra	Drainage	Application of hormones, nutrient, sprays to prevent flower drop.	Drainage	Shifting of the produce to drier place ,Harvesting should be done before rain as far as possible, Drying to remove excess moisture of produce.
Crop 4 Papaya	Earthing up, Bamboo stacking, Planting Wind break tree.	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Crop 5 Assam Lemon	Earthing up, Bamboo stacking	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Crop 6. Bottle gourd	Drainage	Drainage, Application of hormones, nutrient, sprys to prevent	Drainage	Shifting of the produce to drier place,Cold storage.

		flower drop.		
Crop 7. Bitter gourd Crop 8. Guava	Drainage and earthing up	Drainage, Application of hormones, nutrient, sprys to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Crop 9 Other Vegetable	Drainage, make trenches/furrows in between ridges to facilitate drainage of excess water, propping.	Drainage, Application of hormones, nutrient, sprays to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage.
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Crop1 summer rice	-Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer, leaf folder, case worm. -Adoption IPM module. -Alternate flooding and drying against case worm. -Application of carbendazim @ 1g/l against blast and sheath blight. Water from the sheath blight infested field should not be allowed to enter disease free field.	Adoption IPM module -Rouging of infected plant , - Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer -Adoption IPM module against stem borer -Spraying of pesticide should not coincide pollination time. -Application of carbendazim @ 1g/l against blast and sheath blight. Water from the sheath blight infested field	-	-Insect pest and disease infested seed/grains should be discarded

		should not be allowed to enter disease free field.		
Crop2 Winter rice	<ul style="list-style-type: none"> <li>-Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer, leaf folder, case worm.</li> <li>-Adoption IPM module.</li> <li>-Alternate flooding and drying against case worm.</li> <li>-Application of carbendazim @ 1g/l against blast and sheath blight. Water from the sheath blight infested field should not be allowed to enter disease free field.</li> </ul>	<ul style="list-style-type: none"> <li>-Rouging if infected plant ,</li> <li>- Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer</li> <li>-Adoption IPM module against stem borer</li> <li>-Spraying of pesticide should not coincide pollination time.</li> <li>-Application of carbendazim @ 1g/l against blast and sheath blight. Water from the sheath blight infested field should not be allowed to enter disease free field.</li> </ul>	-	Insect pest and disease infested seed/grains should be discarded
Crop3 Jute	<ul style="list-style-type: none"> <li>- Jute hairy caterpillar, semi looper etc. are to be hand picked and destroyed by putting in kerosinazed water.</li> <li>- Alternatively, apply Fenitrothion 50 EC @ 1ml/l(3 sprayings)</li> <li>- In case of root rot, stem rot, seedling blight, apply carbendazim @ 1g/l of water. Application of potash should be increased up to 50 kg/ha</li> </ul>	-	-	-Discard insect pest and disease infested plants to maintain the quality.
Crop 4 Black gram	<ul style="list-style-type: none"> <li>- Against YMV, spray Dimethoate @ 2ml/l (2 -3 spraying)</li> <li>- Against jassids, aphids, flee beetle, leaf folder, spray Malathion 50 EC @ 2 ml/l of water.</li> </ul>	<ul style="list-style-type: none"> <li>- Against YMV, spray Dimethoate @ 2ml/l (2 -3 spraying)</li> <li>- Against jassids,</li> </ul>	- Against pod borer & pod bug, spray Malathion 50 EC @ 2 ml/l of water.	Insect pest and disease infested seed/grains should be discarded



	- Against damping off, root rot and seedling blight, apply carbendazim @ 1g/l of water.	aphids, flea beetle, leaf folder, spray Malathion 50 EC @ 2 ml/l of water.		
<b>Horticulture</b>				
Crop1 Potato	-Depending on the weather condition, Mancozeb @ 2.5 g/l should be sprayed as prophylactic measures against late blight. -Against late blight, 6 spraying with Mancozeb 2.5g/l of water at an interval of 12 days. -Use of sticker is essential in the spray solution for spraying during rainy weather. -Drainage of excess water			-Discard disease and insect infested tubers.
Crop2 Tomato	-Depending on the weather condition, Mancozeb @ 2.5 g/l should be sprayed as prophylactic measures against late blight. -Against late blight, 6 spraying with Mancozeb 2.5g/l of water at an interval of 12 days. -Use of sticker is essential in the spray solution for spraying during rainy weather. -Drainage of excess water			-Discard disease and insect infested fruits.

### 2.3 Flood

Condition		Suggested Contingency Measures <sup>0</sup>			
Transient water logging/partial inundation <sup>1</sup>	Seeding/ nursery stage	Vegetative stage	Reproductive stage	At harvest	
Crop1 Summer rice	-Raised nursery bed with 30 cm gap in between two beds so that	-Drainage of excess water through surface and sub	- Drainage of excess water through surface and sub	Harvesting at physiological	

	excess water can be removed.	surface method.	surface method.	maturity stage, tying the harvested head and transferred to dry place for drying
Crop2 Winter rice	-Raised nursery bed with 30 cm gap in between two beds so that excess water can be removed.	-Drainage of excess water through surface and sub surface method.	- Drainage of excess water through surface and sub surface method.	Harvesting at physiological maturity stage, tying the harvested head and transferred to dry place for drying
Crop3 Jute	-Drainage of flood water	-Drainage of excess water through surface and sub surface method. -Foliar application of urea instead of top dressing is advocated	-	-Harvested plants should be made in bundles and to be kept in standing position for 2-4 days.
<b>Horticulture</b>				
Crop1 Banana	-Make trenches/furrows in between rows to facilitate drainage of excess water, propping.	-Make trenches/furrows in between rows to facilitate drainage of excess water, propping.	-Make trenches/furrows in between rows to facilitate drainage of excess water, propping.	-Make trenches/furrows in between rows to facilitate drainage of excess water, propping.
Crop 2 Pineapple	-Make trenches/furrows in between rows to facilitate drainage of excess water, propping.	Earthing up.	drainage	Shifting of the produce to drier place
Crop 3 Arecanut	Make trenches/furrows in between rows to facilitate drainage of excess water	Make trenches/furrows in between rows to facilitate drainage of excess water	Make trenches/furrows in between rows to facilitate drainage of excess water	-
Crop 4. Assam lemon	Making trenches/furrows in between ridges to drain out the excess water.	Earthing up.	Earthing up	Shifting of the produce to drier place
<i>Kharif</i> vegetables	Crop cannot survive.	-	-	-
<b>Continuous submergence for more than 2 days<sup>2</sup></b>				

Rice	Growing of submergence tolerant rice varieties like Swarna Sub 1, Jalkunwari, Jalashree			
Jute	NA	NA	NA	NA
Pulses	Crop cannot survive			
Oilseed	-do-	-do-	-do-	
<b>Horticulture</b>				
Assam lemon	Crop cannot survive.	NA	Flower drop	-
<i>Kharif</i> vegetables	do			
Sea water inundation <sup>3</sup>				

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

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave<sup>p</sup></b>	NA	NA	NA	NA
<b>Horticulture</b>	NA	NA	NA	NA
<b>Cold wave<sup>q</sup></b>	NA	NA	NA	NA
<b>Horticulture</b>	NA	NA	NA	NA
<b>Frost</b>	NA	NA	NA	NA
<b>Horticulture</b>	NA	NA	NA	NA
<b>Hailstorm</b>	NA	NA	NA	NA
<b>Horticulture</b>	NA	NA	NA	NA
<b>Cyclone</b>	NA	NA	NA	NA
<b>Horticulture</b>	NA	NA	NA	NA

## Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event <sup>s</sup>	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>Increasing cultivation of perennial fodder and feed reserves in district</li> <li>Establishment of fodder banks with inclusion of drought tolerant fodders</li> <li>Training and preparation of hay and silage</li> <li>Making facility for block feed and UMMB licks</li> <li>Raising drought tolerant perennial grasses, trees, shrubs &amp; bushes in field boundaries</li> <li>Quality up-gradation of inferior quality roughages like paddy straw, wheat straw etc. with urea treatment.</li> <li>Preventing the practice of burning paddy straw, maize stover and sugarcane tress.</li> <li>Encouraging production of Azolla for animal feed.</li> <li>Mass awareness on feeding the livestock with unconventional feeds and various byproducts.</li> <li>Mass awareness on utilization of crop byproducts like sugarcane tops and bagasse for animal feeding with method demonstration on urea treatment of straw.</li> </ul>	<ul style="list-style-type: none"> <li>Feeding fodders from perennial trees.</li> <li>Feeding already prepared silage, hay, UMMB lick</li> <li>Providing feed blocks, unconventional feeds and various byproducts.</li> <li>Providing urea treated straw.</li> <li>Use of harvested tree/top of fodder as feed for livestock animals.</li> <li>Feeding of grains damaged during processing, milling by products &amp; use of all failed field crops during the drought period as animal feed.</li> </ul>	<ul style="list-style-type: none"> <li>Culling of affected and unproductive animals.</li> <li>Fodder rejuvenation and cultivation of fodder crops (Oat, Maize etc.)</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>Storing water in tanks for the hard period</li> <li>On farm /Roof top water harvesting/</li> <li>Identification of natural water resources and their use in a planned way.</li> </ul>	<ul style="list-style-type: none"> <li>Offering stored water to the livestock.</li> <li>Preventing wastage of water</li> <li>Animals not to be exposed outside</li> </ul>	<ul style="list-style-type: none"> <li>Culling of affected and unproductive animals.</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Popularizing the concept of animal insurance and its implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Immediate treatment of the sick animals.</li> </ul>	<ul style="list-style-type: none"> <li>Availing insurance</li> <li>Culling of unproductive livestock</li> </ul>

	<ul style="list-style-type: none"> <li>• Creation of repositories to store a sizeable stock of veterinary medicines for emergencies</li> <li>• Prompt recognition of endemic animal diseases and timely vaccination against them.</li> <li>• Mass awareness programme on management of livestock during drought.</li> <li>• Regular de-worming of animals to minimize the parasitic burden and improve the productivity of farm livestock.</li> <li>• Constituting efficient team of workers to act as a Rapid Action Force during emergencies</li> <li>• Collaboration with local and district veterinary officials to handle endemic animal diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• Organizing mass animal health check up camps wherever necessary.</li> <li>• Providing anthelmintics and mineral mixtures to productive animals.</li> <li>• Segregation of suspicious and disease animals from the herd and their early treatment.</li> </ul>	<p>to improve economic status of livestock owners.</p> <ul style="list-style-type: none"> <li>• Organizing need based animal health check up camps</li> <li>• Minimizing cases of anestrus and repeat breeding in productive animals by organizing mass animal fertility camps.</li> </ul>
<b>Floods</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>• Increasing cultivation of perennial fodder and feed reserves in district</li> <li>• Establishment of community fodder banks with inclusion of flood tolerant fodder variety.</li> <li>• Encouraging preparation of hay making and silage preparation</li> <li>• Making facility for block feed and UMMB licks</li> <li>• Preventing the practice of burning paddy straw, maize stover and sugarcane tress and quality up gradation of inferior quality roughages like paddy straw, wheat straw etc. with urea treatment.</li> <li>• Encouraging production of Azolla for animal feed.</li> <li>• Mass awareness on feeding the livestock with unconventional feeds and various byproducts.</li> <li>• Mass awareness on utilization of crop byproducts like sugarcane tops and bagasse for animal feeding with method demonstration of urea treatment of straw.</li> <li>• Erection of raised platform for feed storage and animals</li> </ul>	<ul style="list-style-type: none"> <li>• Making fodders available from community fodder banks</li> <li>• Feeding already prepared silage, hay, UMMB lick feed blocks, unconventional feeds and various byproducts.</li> <li>• Providing urea treated straw.</li> <li>• Use of harvested tree/top of fodder as feed for livestock animals.</li> <li>• Keep animals in safe place like raised plate form/upland</li> </ul>	<ul style="list-style-type: none"> <li>• Availing insurance</li> <li>• Culling of affected and unproductive animals.</li> <li>• Fodder rejuvenation</li> </ul>

Drinking water	<ul style="list-style-type: none"> <li>• Storing water in tanks</li> </ul>	<ul style="list-style-type: none"> <li>• Offering stored water to the livestock.</li> </ul>	<ul style="list-style-type: none"> <li>• Treating of drinking water.</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>• Popularizing the concept of animal insurance and its implementation</li> <li>• Prompt recognition of endemic animal diseases and timely vaccination against them.</li> <li>• Creation of repositories to store a sizeable stock of veterinary medicines for emergencies</li> <li>• Mass awareness programme on management of livestock during floods.</li> <li>• Regular de-worming of animals to minimize the parasitic burden and improve the productivity of farm livestock.</li> <li>• Constituting trained team of workers to act as a Rapid Action Force during emergencies</li> <li>• Involvement of the local veterinary officials to handle endemic animal diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• Immediate treatment of the sick animals.</li> <li>• Conducting animal health camps during the period.</li> </ul>	<ul style="list-style-type: none"> <li>• Availing insurance</li> <li>• Organizing need based animal health check up camps and vaccination</li> <li>• Culling of unproductive livestock to improve economic status of livestock owners.</li> <li>• Minimizing cases of anestrus and repeat breeding in productive animals by organizing mass animal fertility camps.</li> </ul>
<b>Cyclone</b>	NA	NA	NA
Feed and fodder availability	NA	NA	NA
Drinking water	NA	NA	NA
Health and disease management	NA	NA	NA
<b>Heat wave and cold wave</b>	NA	NA	NA
Shelter/environment management	NA	NA	NA
Health and disease management	NA	NA	NA

### 2.7.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event <sup>a</sup>	During the event	After the event	
<b>Drought</b>				
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>• Culling of unproductive poultry for efficient utilization of poultry feed.</li> <li>• Storage of household grains like broken rice, maize, pulses, oilseeds etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Offering stored feed and use of non conventional source of feed like broken grains, brewery wastes, etc.</li> <li>• Supplementation of shell grit/ calcium to the laying birds</li> <li>• Immediate marketing of the meat type birds</li> <li>• Arrangement of good quality poultry feed</li> </ul>	<ul style="list-style-type: none"> <li>• Culling unproductive birds.</li> <li>• Providing of good quality poultry feed to obtain optimum growth</li> </ul>	RKVY
Drinking water	<ul style="list-style-type: none"> <li>• Preserving water in tank</li> </ul>	<ul style="list-style-type: none"> <li>• Judicious use of stored water</li> </ul>	<ul style="list-style-type: none"> <li>• Developing drinking water storage facilities.</li> </ul>	
Health and disease management	<ul style="list-style-type: none"> <li>• Culling of weak and diseased birds.</li> <li>• Timely de-worming.</li> <li>• Vaccination against endemic diseases especially Ranikhet disease.</li> <li>• Arrangement of brooding facilities for young chicks</li> <li>• Construction of good quality poultry houses or farms to minimize disease incidences and to avoid predation by carnivores.</li> <li>• Proper waste disposal system in poultry farms possessing large flocks.</li> <li>• Provision for balanced feeding of productive birds</li> <li>• Veterinary preparedness</li> <li>• Mass awareness programme on management of poultry during drought.</li> <li>• Popularizing poultry insurance and</li> </ul>	<ul style="list-style-type: none"> <li>• Immediate segregation of disease affected and suspicious birds from the flock.</li> <li>• Immediate treatment of the sick animals.</li> <li>• Conducting animal health camps during the period.</li> <li>• Maintenance of proper hygiene and sanitation in the commercial poultry farms.</li> <li>• Regular cleaning of poultry houses to minimize disease incidence.</li> <li>• Restricting trade of poultry, poultry meat and eggs during outbreak of a disease having potential to take an epidemic form.e.g. Bird flu.</li> <li>• Restriction against needless movement of individuals in the farm premises</li> </ul>	<ul style="list-style-type: none"> <li>• Culling of unproductive birds</li> <li>• Availing insurance wherever required</li> <li>• Maintenance of proper hygiene and sanitation in the poultry sheds.</li> <li>• Disposal of dead birds by burning or by deep burial with lime in pits of optimum sizes.</li> <li>• Timely vaccination of all the birds.</li> <li>• Timely marketing of meat type poultry and poultry eggs to minimize losses due to mortality.</li> <li>• Mass awareness programme on management of poultry during drought.</li> </ul>	

	its implementation.			
<b>Floods</b>				
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>Procurement and storage of sufficient good quality feed ingredients in flood prone areas</li> </ul>	<ul style="list-style-type: none"> <li>Supply feed ingredient to the affected poultries</li> </ul>	<ul style="list-style-type: none"> <li>Culling unproductive birds.</li> <li>Use of good quality poultry feed to obtain optimum growth</li> </ul>	
Drinking water	<ul style="list-style-type: none"> <li>Preserving water in tank</li> </ul>	<ul style="list-style-type: none"> <li>Arrangement of safe drinking/medicated water from outside</li> </ul>	<ul style="list-style-type: none"> <li>Treating drinking water</li> </ul>	
Shelter management	<ul style="list-style-type: none"> <li>Popularizing poultry sheds on raised bamboo/ pucca structures to protect birds/sheds from flood water, occurrence of diseases and storage of feed</li> <li>Identification of sites/areas not prone to inundation during floods for erecting poultry sheds and feeds storage units</li> </ul>	<ul style="list-style-type: none"> <li>Shifting of birds and feed to raised sheds and storage units respectively</li> </ul>	<ul style="list-style-type: none"> <li>Sterilization of vacant poultry sheds before bringing back the batch of birds</li> </ul>	<ul style="list-style-type: none"> <li>Insure poultry units and avail gov. programs for the same</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Vaccination against endemic diseases especially Ranikhet disease.</li> <li>Stocking of emergency medicine for prevalent diseases</li> <li>Mass awareness programme on management of poultry and zoonotic diseases.</li> </ul>	<ul style="list-style-type: none"> <li>Conducting animal health camps during the period</li> <li>Immediate segregation of disease affected and suspicious birds from the flock and treatment of the sick birds</li> <li>Maintenance of proper hygiene and sanitation in the commercial poultry farms</li> <li>Restricting trade of poultry meat and eggs during outbreak of a disease having potential to take an epidemic form.e.g. Bird flu.</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance of proper hygiene and sanitation in the poultry sheds.</li> <li>Disposal of dead birds by burning or by deep burial with lime in pits at proper depth</li> <li>Timely marketing of meat type poultry and poultry eggs to minimize losses due to mortality</li> </ul>	
<b>Cyclone</b>	-	-	-	-
Shortage of feed ingredients	-	-	-	-
Drinking water	-	-	-	-



Health and disease management	-	-	-	-
<b>Heat wave and cold wave</b>	-	-	-	-
Shelter/environment management	-	-	-	-
Health and disease management	-	-	-	-

### 2.7.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>1) Drought</b>	-	-	-
<b>A. Capture</b>	-	-	-
Marine	-	-	-
<b>Inland</b>	-	-	-
(i) Shallow water depth due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>• Stop over-exploitation</li> <li>• Judicious or planned release of water from reservoir/tanks which are used for fisheries in drought prone areas</li> <li>• Water harvesting structure using polythene lining to supply water during the event</li> <li>• Harvesting and marketing of all large fish except brood stock</li> </ul>	<ul style="list-style-type: none"> <li>• Prioritize the ponds for rescuing from drought</li> <li>• Supplement water in the pond with ground water to maintain optimum depth in identified ponds</li> <li>• Drying of fish or production of value added fish products from the over harvested stock</li> <li>• Shift fish stock to deeper water, especially in case of pens</li> <li>• Restrict release of water from reservoir/tanks which are used for fisheries</li> <li>• Fingerlings and brood fishes, if caught, to be released back to safe waters</li> <li>• Stock water bodies with desirable species for culture</li> </ul>	<ul style="list-style-type: none"> <li>• Restocking, wherever possible.</li> <li>• Digging of pond to increase the depth.</li> <li>• Fertilization, manuring and rewatering of pond</li> <li>• Use feed supplement to increase the growth rate</li> </ul>

(ii) Changes in water quality	<ul style="list-style-type: none"> <li>• Thinning out of stock against reduced dissolved oxygen and space</li> <li>• Removal of aquatic weeds</li> </ul>	<ul style="list-style-type: none"> <li>• Provide aeration</li> </ul>	<ul style="list-style-type: none"> <li>• Remove aquatic vegetation</li> </ul>
(iii) Any other	<ul style="list-style-type: none"> <li>• As a long-term measure, deepening and regular de-silting of ponds and tanks in drought prone areas should be taken up</li> </ul>	-	-
<b>B. Aquaculture</b>	-	-	-
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>• Capturing some amount of fishes and keeping few to minimize quantity of fishes in the pond</li> <li>• Digging of ponds to increase depth</li> <li>• Follow measures like addition of cow dung etc. to stop/minimize downward percolation of water</li> <li>• Enquiring alternative water sources to add to the pond</li> <li>• For pond construction select soils with sufficient clay for retention of water.</li> <li>• Apply sufficient organic manure during preparation to minimize water loss through seepage.</li> <li>• Educating for Insurance and apply</li> <li>• Excavation of bore wells</li> <li>• Reduce biomass and stocking density through partial harvesting.</li> <li>• Sell out the fishes attaining marketable size to minimize loss.</li> <li>• Stock fishes that can thrive low water depth, like air breathing fishes.</li> <li>• Maintenance of proper record for claiming compensation, especially in schemes assisted by Govt. or financial institutes.</li> <li>• Planning for rain water harvest.</li> </ul>	<ul style="list-style-type: none"> <li>• Digging of ponds/ middle of ponds to increase depth for saving life of the fishes</li> <li>• Minimizing quantity of fishes</li> <li>• Pump in water from other water source (nearby spring, stream, rivers etc) or ground water, if any.</li> <li>• Reduce food for minimum metabolism.</li> <li>• Restrict fertilizer for preventing algal bloom and minimum stress.</li> <li>• Dig deep trench in convenient part of the pond to save brood fishes.</li> <li>• Careful observation on daily basis.</li> <li>• Scare away birds and other animals (attracted by shallow water to catch fish) – may be vector for diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• Cleaning and digging of ponds to increase depth</li> <li>• Use of clay material in pond beds to minimize water loss through percolation</li> <li>• Extended seed production</li> <li>• Restock the pond.</li> <li>• Promoting area specific Integrated fish farming</li> <li>• Short duration culture of species that are fast growing in initial stage and can be marketed at small size (minor and medium carps).</li> <li>• Air breathing fish culture</li> <li>• Claim compensation with support of record and documents.</li> </ul>

(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> <li>Identify risks associated with the suspected outbreak of pathogens and be ready with suitable remedial measures</li> </ul>	-	<ul style="list-style-type: none"> <li>Partial water exchange to optimize salinity</li> </ul>
(iii) Any other	<ul style="list-style-type: none"> <li>Repairing/ arrangement of alternate safe place to keep pumps, aerators, etc</li> <li>Store the feeds in a proper place</li> </ul>	-	-
<b>2) Floods</b>	-	-	-
<b>A. Capture</b>	-	-	-
Marine	-	-	-
Inland	-	-	-
(i) No. of boats / nets/damaged	<ul style="list-style-type: none"> <li>Arrangement of boats, nests, etc in surplus</li> </ul>	-	-
(ii) No.of houses damaged	-	-	-
(iii) Loss of stock	<ul style="list-style-type: none"> <li>Thin out population</li> </ul>	<ul style="list-style-type: none"> <li>Use FAD, feed attractant</li> </ul>	<ul style="list-style-type: none"> <li>Use of disinfectant</li> </ul>
(iv) Changes in water quality			
(v) Health and diseases	<ul style="list-style-type: none"> <li>Use of disinfectant</li> </ul>		
<b>B. Aquaculture</b>			
(i) Inundation with flood water	<ul style="list-style-type: none"> <li>Dyke should be strongly constructed/renovated above the expected flood level.</li> <li>Insurance</li> <li>Repairing, turfing and compaction of peripheral embankments.</li> <li>Growing horticultural crops on the embankment to prevent erosion.</li> <li>Sufficient bamboo poles and nylon nets to be kept ready.</li> <li>Construction of earthen nursery ponds in upland areas</li> <li>'High stocking multiple harvesting' can be taken up.</li> <li>Sell out the fishes attaining marketable size to minimize loss.</li> </ul>	<ul style="list-style-type: none"> <li>Encircling the fishery with fish net to prevent the escaping of fishes</li> <li>Surround the pond with nets supported by bamboo poles to prevent escape of fish.</li> <li>Supply sufficient food to fishes to reduce tendency of escaping from the pond.</li> <li>Fixing nets with appropriate size to reduce the loss of stock</li> <li>Turbidity need to be controlled</li> </ul>	<ul style="list-style-type: none"> <li>Dyke should be renovated strongly above the maximum flood level.</li> <li>Sampling of fishes and water for disease analysis</li> <li>Desilting</li> <li>Restock the pond if original stock escapes.</li> <li>Promotion of suitable Integrated fish farming</li> <li>Short duration culture of species that are fast growing and can be marketed at small size.</li> </ul>

	<ul style="list-style-type: none"> <li>Maintenance of proper record for claiming compensation, especially in schemes assisted by Govt. or financial institutes.</li> </ul>	<ul style="list-style-type: none"> <li>Collection of naturally bred seeds (spawn/ fry/ fingerlings) from flooded water</li> </ul>	<ul style="list-style-type: none"> <li>Claim compensation with support of record and documents.</li> <li>Removal of unwanted/ predatory fish from pond before stocking.</li> </ul>
(ii) Water contamination and changes in water quality	<ul style="list-style-type: none"> <li>Dyke should be strongly constructed above the expected flood level.</li> <li>Prevent entry of water from outside.</li> <li>Precaution to prevent entry of pesticide/insecticide laden water from nearby agricultural land.</li> <li>Apply lime regularly as per recommendation.</li> </ul>	<ul style="list-style-type: none"> <li>Use disinfectant</li> <li>Apply lime regularly as per recommendation.</li> </ul>	<ul style="list-style-type: none"> <li>Use disinfectant, Remove all unwanted exotic fishes</li> <li>Apply lime regularly as per recommendation.</li> <li>Remove muck and debris, if entered with flood.</li> <li>Apply preventive agents (eg. CIFAX) before on set of winter.</li> </ul>
(iii) Health and diseases	<ul style="list-style-type: none"> <li>Provided vitamin, mineral with feed</li> <li>Arrangement of medicines and chemical stocks</li> </ul>	<ul style="list-style-type: none"> <li>Provided vitamin, mineral, protein with feed, use bactericide</li> </ul>	<ul style="list-style-type: none"> <li>Use bactericide and disinfectant and feed with balance diets.</li> </ul>
(iv) Loss of stock and inputs (feed, chemicals etc)	<ul style="list-style-type: none"> <li>Dyke should be strongly constructed above the maximum flood level.</li> </ul>	<ul style="list-style-type: none"> <li>Catch the some amount of fishes to reduce the stock.</li> </ul>	<ul style="list-style-type: none"> <li>Dyke should be strongly renovated and apply disinfectant and fish out the unwanted exotic fishes</li> </ul>
(v) Infrastructure damage (pumps, aerators, huts, etc)	NA	NA	NA
(vi) Any other	NA	NA	NA
<b>3. Cyclone / Tsunami</b>	NA	NA	NA
A. Capture	NA	NA	NA
Marine	NA	NA	NA
(i) Average compensation paid due to loss of fishermen lives	NA	NA	NA
(ii) Avg. no. of boats / nets/damaged	NA	NA	NA
(iii) Avg. no. of houses damaged	NA	NA	NA
Inland	NA	NA	NA

B. Aquaculture	NA	NA	NA
(i) Overflow / flooding of ponds	NA	NA	NA
(ii) Changes in water quality (fresh water / brackish water ratio)	NA	NA	NA
(iii) Health and diseases	NA	NA	NA
(iv) Loss of stock and inputs (feed, chemicals etc)	NA	NA	NA
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	NA	NA	NA
(vi) Any other	NA	NA	NA
<b>4. Heat wave and cold wave</b>	NA	NA	NA
<b>A. Capture</b>	NA	NA	NA
Marine	NA	NA	NA
Inland	NA	NA	NA
<b>B. Aquaculture</b>	NA	NA	NA
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> <li>Reduction of biomass by partial harvest in the event of heat as the DO levels will be very low.</li> <li>Apply lime regularly as per recommendation.</li> <li>Apply preventive agents (eg. CIFAX) before onset of winter.</li> </ul>	<ul style="list-style-type: none"> <li>Apply lime regularly as per recommendation.</li> <li>Restrict application of fertilizer as per requirement.</li> <li>Deep pool refuge based aquaculture to provide shelter and growth during summer and winter season</li> </ul>	<ul style="list-style-type: none"> <li>Exchange water upto 2/3rd and take suggestion from expert</li> <li>Apply lime regularly as per recommendation.</li> </ul>
(ii) Health and Disease management	-	-	-
(iii) Any other	-	-	---