

## State: Assam

### Agriculture Contingency Plan for District: Goalpara

1.0 District Agriculture profile				
1.1	Agro Climatic/ Ecological Zone			
	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	Altitude
		90 <sup>0</sup> 00 - 91 <sup>0</sup> 15' E	25 <sup>0</sup> 50' - 26 <sup>0</sup> 10' N	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)	1710.1	55	1 <sup>st</sup> week of June	Last week of September
	NE Monsoon (Oct-Dec)	184.6	9	2 <sup>nd</sup> week of October	2 <sup>nd</sup> week of November
	Winter (Jan- Feb)	84.2	-	-	-
	Summer (March-May)	596.4	42	4 <sup>th</sup> week of March	Last week of May
	Annual	2575.3	-	-	-

\* Source: IMD

1.3	Land use pattern of the district (latest statistics)	Geographic 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

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 (Source: Central Ground water Board)	No. of Blocks/Tehsils	(%) area	Quality of water (specify the problem such as 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)							Summer	Grand total
			Kharif			Rabi					
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
	1	Cereal	5.20	51.50	55.35	0.00	0.00	0.00	10.97	67.67	
	2	Pulses	0.00	0.05	0.05	0.10	6.40	6.50	0.00	6.55	
	3	Oilseeds	0.00	0.00	0.00	3.96	4.84	8.80	0.00	8.80	
	4	Fibre	0.00	5.09	5.09	0.00	0.00	0.00	0.00	5.09	
	5	Others	0.00	8.90	8.90	3.99	10.98	14.96	0.00	23.86	

S. No	Horticulture crops-Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
1	Banana	3.80	-	-
2	Mango	0.20	-	-
3	Pineapple	0.50	-	-
4	Assam lemon	0.19	-	-
5	Guava	0.18	-	-
6	Litchi	0.34	-	-
7	Jack fruit	1.54	-	-
8	Orange	0.46	-	-

	<b>Horticulture crops- vegetables</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
1	Kharif vegetable	5.40	-	5.40
2	Rabi vegetable	16.54	12.95	3.50
3	Chilli	0.45	-	-
4	Onion	0.31	-	-
5	Garlic	0.09	-	-
6	Black pepper	0.07	-	-
7	Coriander	0.27	-	-
8	Turmeric	0.32	-	-
9	Ginger	0.51	-	-
	<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>
		Total fodder crop area	Nil		
		Grazing land, reserve areas etc	<b>Nil</b>		

		Availability of unconventional feeds/by products e. g., breweries waste, food processing, fermented feeds bamboo shoots, fish etc			
	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	-	-	-
		Sericulture etc Other agro enterprises (mushrooms cultivation etc specify)			
	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>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	55	50
	<b>B. Culture</b>				
			<b>Water spread Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production</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- 15)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (Kg/ha)	Production ('000 t)	Productivity (Kg/ha)	Production ('000 t)	Productivity (Kg/ha)	Production ('000 t)	Productivity (Kg/ha)	
<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	-

Crop3	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	-	-
Crop3	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	-	-	-	-	-
Crop3	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)	1. Sali rice	2. Summer rice	3. Mustard	4. Wheat	5. Jute
	Kharif- Rainfed	June-July	-	-	-	March-April
	Kharif - Irrigated	-	-	-	-	-
	Rabi - Rainfed	-	-	October-November	-	-
	Rabi - Irrigation	-	-	-	November-December	-
	Summer - irrigated	-	-	-	-	-
	Summer - rainfed	-	December-February	-	-	-

1.13	<b>What is the major contingency the district is prone to? (tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	-	√	-
	Flood	√	-	-
	Cyclone	-	√	-
	Hail storm	-	√	-
	Heat wave	-	-	-

	Cold wave	-	-	-
	Frost	-	-	-
	Sea water intrusion	-	-	-
	Snowfall	-	-	-
	Landslides	-	√	-
	Earthquake	-	-	-
	Pests and disease outbreak (specify)	-	√	-
	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 I

Location map of Goalpara district within Assam State



## 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 <sup>a</sup>	Normal Crop / Cropping system <sup>b</sup>	Change in crop / cropping system <sup>c</sup> including variety	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
<b>Delay by 2 weeks (Specify month)*</b>  <b>i.e. June 3<sup>rd</sup> Week</b>	<b>1) Farming situation:</b> Rainfed upland	Kharif vegetables (Ridgourd, sponge gourd,) /kharif Pulse (Greengram)/Blackgram/Arhar)	Ridgourd: Selected local var. Pusa Nasdar Sponge gourd: Selected local var. 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) – Fellow - Toria	Colocasia: Kaka kachu and Selected local var. Okra: Pusa Sawani, Arka Anamika and Selected local var.	i) Weeding at critical stages of growth. ii) Addition of sufficient organic matter/compost/Vermicompost in the soil at the time of land preparation iii) Use INM practices including use of biofertilizers.	
	<b>2) Farming situation:</b> Rainfed Medium land/ Medium lowland	Cropping system 1: Rice(Kharif) monocropping	No Change Ranjit, Bahadur, local variety	-Recommended package of practices for normal sowing. i) Seed Treatment with fungicide like Captan, Thiran @ 2.5 g/kg of seed ii) Weeding at critical stages of crop growth. iii) Addition of sufficient organic matter/compost in the soil at the time of land preparation iv) INM including use of biofertilizers like, Azolla, Azotobacter	
		Cropping system 2:	Sali rice: Var. Ranjit, Mahsuri	-Recommended package of practices	

		Sali rice - Rice/ Potato/ Toria/	Potato: Selected local var. and Kufri Jyoti/ Kufri Megha Toria: Var. TS-36/ TS-38	for normal sowing. i) Seed Treatment with fungicide like Captan, Thiran @ 2.5 g/kg of seed ii) Weeding at critical stages of crop growth. iii) Addition of sufficient organic matter/compost in the soil at the time of land preparation iv) INM including use of biofertilizers like, Azolla, Azotobacter	
		Cropping system 3. Jute - Toria / Rabi vegetables (Cabbage, Tomato and Brinjal)	Jute: Var. Bohagi Toria: Var. TS-36/ TS-38 Cabbage: Golden Acre and Drum head Tomato: Pusa Ruby, S-12, Arka Alok Brinjal: Selected local var. (Balijana)	-Recommended package of practices for normal sowing. i) Life saving supplemental irrigation ii) Thinning in Toria to maintain optimum plant population ii) Weeding at critical stages of growth. iii) Supplemental irrigation in the nursery bed of Rabi 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	-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 selling 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	
3. Flood prone		Summer vegetables/Jute -- Toria/Potato/	Summer vegetable: Colocasia (Kaka kachu and Selected local var. Okra: Pusa Sawani, Arka Anamika 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
		Kharif Rice (Kharif) - /Potato/Rabi vegetables	No Change- 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.
			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.
			- 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.
			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.
		For delayed/staggered planting rice		Seedlings should be raised in high

			varieties like Prafulla and Gitesh up to 60 days old seedlings (Sowing in the nursery bed within June) can be grown.	land area.	
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Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay beyond 4 weeks (Specify month) July 1 <sup>st</sup> week	1) Farming situation: Upland	Summer vegetables/ Summer Pulse (Greengram), Sesamum	Greengram: Pratap Sesamum: Var. ST 1683, Panjub Til No. 1	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	-
		Cropping system 2: Torja/Rabi Veg /Rabi pulse (BlackGram)	No change	i) Seed treatment with Rhizobium culture i.e. Kamalabari 1 ii) Life saving supplemental irrigation iii) Weeding at critical stages of growth. iv) Addition of sufficient organic matter/compost /Vermicompost in the soil at the time of land preparation	-
		Cropping system 1: Rice(Kharif) monocropping	No change 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).	-	Tender seedlings should be transplanted (SRI)

			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.	-
		Rice(Kharif)- Toria/ /Potato / short duration Rabi vegetables/Chilli - Jute	No change -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).	-	-
			- 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.	-
			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.	-
			Short duration rabi vegetables-beans, garden pea(relay), leafy vegetables like coriander	-	-
		Rice (kharif) – Rice (summer)	No change	- Transplanting can be done upto mid August with the following medium duration rice varieties such as Satyaranjan, Basundhara, TTB 404, IR-36, Jaya etc. - Short duration rice varieties such as Luit, Kopili, Dishang etc. can also be	

				<p>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 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.</p>	
	Flood prone	Summer vegetables/Jute – Toria/Rabi vegetables	No Change	-Recommended package of practices for normal sowing.	-
		Rice (Late Kharif) –Wheat/Rabi vegetables	No change -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.	-
			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.	-
			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.	-
			-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	Sprouted seed of 75 kg/ha is to be broadcast in puddle field.	-

			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.		
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Condition	Major Farming situation <sup>a</sup>	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
Early season drought (delayed onset)			Change in crop/cropping system <sup>c</sup>	Agronomic measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Delay by 6 weeks (Specify month)	1) Farming situation: Upland	Summer Pulse (Greengram), Summer oilseed (sesamum) and Toria.	No Change	-Recommended package of practices for normal sowing.	
	2) Farming situation: Medium land/ Medium lowland	Rice(Kharif) monocropping  Relay cropping with field pea, lentil and linseed. Summer pulses(greengram/blackgram) 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 (Kharif)- Toria / Potato / Rabi vegetables	No change - Short duration rice varieties such as Kopili, Luit, 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 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 (kharif) – Rice (summer)	No change Short duration rice varieties such as Luit, 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 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 – Toria/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		
Early season drought (Normal onset)			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
Normal onset followed by 15-20 days dry spell on standing crop.	1)Farming situation: upland	Summer vegetables/ Summer Pulse (Greengram) Kharif pulses and oilseed Toria/ Rabi Veg /Rabi pulse (Blackgram)	No Change Pulse: AAU34, AAU 39, Pant U 19, T-9, KU-301 etc, Toria: 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 (Kharif) – Rabi vegetable	No change <b>Rice-</b> Ranjit, Bahadur, Maniram, Piolee, Kushal etc <b>Potato-</b> Kufri Chandramukhi, Kufri Jyoti, Kufri Megha, Kufri Pukhraj	Life saving supplemental irrigation if possible -Weeding at critical stages of growth.	
		Rice (Kharif) mono-cropping	No change 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.	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 period. -Application of sufficient quantity of organic manure (compost, FYM< etc) in the nursery bed as	

				well as in the main field.	
		Rice (Kharif)- Toria / Potato / Rabi vegetables - Jute	No change	Recommended package of practice	
		Rice (kharif) – Rice (summer)	No change	Recommended package of practice	
	3.Flood prone	Integrated Rice-Fish farming	No Change	Recommended package of practice	
		Rice (Late Kharif) –/Potato/Rabi vegetables	No change 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 Re-sowing of rice seed may also be recommended where germination is severely affected. The seed may be sown after seed treatment with 4% MOP for 24 hrs, followed by drying in shade for 24 hrs	Supplemental irrigation in the nursery bed of rice should also be provided. Gap between two the bed in rice nursery should be converted into channel to supply water. -Application of sufficient quantity of organic matter in the nursery bed and main field.	

Condition	Major Farming situation	Normal Crop/cropping system <sup>b</sup>	Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (< 2.5 mm))			Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
At vegetative stage June 3 <sup>rd</sup> wk	1) Farming situation: upland	Summer vegetables/ Summer Pulse(Greengram) Toria/ Rabi Veg /Rabi pulse(Black .Gram)	No Change -Weeding at critical stages of growth. Application of post emergnrc herbicides - Thinning to maintain optimum plant population	-Life saving supplemental irrigation -Mulching	
	2) Farming situation: Medium	Rice(Kharif) monocropping	No Change -Top dressing of additional	- Life saving supplemental irrigation at critical stages of crop	

	land/ medium low land		quantities of MOP @ 37.5 kg/ha and	growth -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.	
		Jute / Rice(Kharif)- Toria / Lentil/ / Potato / Rabi vegetables	No Change Spraying of Mancozeb @ 2.5g/l or Edinofenphos 2 ml/l or Carbendazim @ 1g/l against brown spot disease in rice.		
		Rice (kharif) – Rice (summer)	No Change -Weeding at critical stages of growth.		
	3.Flood prone	Summer vegetables /Jute–Toria/ Potato/ Rabi vegetables	No Change	-Supplementary life saving irrigation at critical crop stages	
		Rice (Late Kharif) –/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)-Toria/ Rabi Veg /Rabi 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 (Kharif) monocropping	No change	Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is	
		Rice(Kharif)- Toria /	No change		

		Potato / Rabi vegetables - Jute		recommended in rice before flowering.	
		Rice (kharif) – Rice (summer)	No change	-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 - If crop fails, plan for rabi vegetables, oilseeds, pulses etc.	
	3.Flood prone	Summer vegetables/Jute – Toria/ Wheat/Potato/Rabi vegetables	No Change		
		Rice (Late Kharif) –Wheat/Potato/Rabi vegetables	No change - If crop fails, plan for rabi vegetables, oilseeds, pulses etc.	-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			Suggested Contingency measures		
<b>Terminal drought</b> (Early withdrawal of monsoon)	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Crop management<sup>c</sup></b>	<b>Rabi Crop planning<sup>d</sup></b>	<b>Remarks on Implementation<sup>e</sup></b>
<b>September-</b>	1) <b>Farming</b>	Summer vegetables/	-Life saving irrigation	- Rabi cropping with cole crops	Spraying of 1% KCL

<b>October</b>	<b>situation:</b> Upland	Summer Pulse (Green gram) Toria/Rabi Veg /Rabi pulse (Black Gram)/ Lentil	-Harvesting of kharif crops at physiological maturity stage.	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 rabi field crops like toria, lentil, wheat etc. in time with pre-sowing irrigation if required with recommended varieties and package of practices.	solution at flowering stage and 2% urea at pod initiation stage of pulses respectively.
	2)Farming situation: Medium land	Rice (Kharif) monocropping	-Life saving irrigation - Harvesting of kharif crops at physiological maturity stage.	- Rabi 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. --Growing of rabi field crops like toria, lentil, wheat etc. in time with pre-sowing irrigation if required with recommended varieties and package of practices	
		Jute / Rice(Kharif)-Toriam / Lentil/ Wheat / Potato / Rabi vegetables			
Rice (kharif) – Rice (summer)					
3.Flood prone	Summer vegetables / Jute – Toria/Lentil/Wheat/ Potato/Rabi vegetables  Rice (Late Kharif) –Toriam/Lentil/Wheat/ Potato/Rabi vegetables/ Chilli	-Life saving supplemental irrigation  -- Harvesting of kharif crops at physiological maturity stage.	- Rabi 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 rabi 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	Suggested Contingency measures			Remarks on Implementation <sup>j</sup>
	Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	
Delayed release of water in canals due to low rainfall			NA	
Limited release of water in canals due to low rainfall			NA	
Non release of water in canals under delayed onset of monsoon in catchment			NA	
Lack of inflows into tanks due to insufficient /delayed onset of monsoon			NA	
Insufficient groundwater recharge due to low rainfall			NA	
Any other condition (specify)			NA	

### 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>
Summer rice	-Sowing 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. -Light hoeing and weeding	Drain out the excess rain water through surface drainage channel to avoid submergence	- Drain out the excess rain water through surface drainage channel to avoid submergence -Crop to be harvested at physiological maturity stage.	- To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.

Winter rice	-Sowing of rice seed in raised nursery bed with 30 cm gap between two beds for drain out the excess water. - Excess rain water to be drained out through surface drainage to avoid submergence in the main field. -Light hoeing and weeding	Drain out the excess rain water through surface drainage channel to avoid submergence	-Excess rain water to be drained out through surface drainage channel to avoid submergence. -Crop to be harvested at physiological maturity stage	- To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.
Sesame	-Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m -Light hoeing and weeding	Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m	-Excess rain water to be drained out through surface drainage channel of 25cm wide, 15cm deep spaced at 6 m. -Crop to be harvested at physiological maturity stage.	-To maintain optimum moisture percentage in paddy grain i.e. 12-14% for storage, proper drying of grains is necessary.
Jute	- Drainage 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.,	Drainage	Drainage	Proper drying of fibre
Sesamum	Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall.	Drainage - Make trenches/furrows to facilitate drainage of excess water during high rainfall.	Drainage- -Make trenches/furrows to facilitate drainage of excess water during high rainfall.	Drainage
<b>Horticulture</b>				
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.
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.
Bitter gourd	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage

Tomato	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage.
Okra	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop	Drainage	Shifting of the produce to drier place, Cold storage
Papaya	Drainage	Drainage, foliar application of hormones, micronutrients to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage
other Vegetables	- Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall. - Application of nutrient, sprays fungicides and antibiotics to prevent diseases.	- Inter space can be utilize for drainage  - Application of nutrient, sprays to prevent flower drop.	Drainage	- Proper drying of the produce. - Store the produce in cold storage.
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Summer rice	-Sow rice seed in raised nursery bed with 30cm 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
Jute	- 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., - Growing of green manure crops like Dhaincha along the border as wind barrier.	-Propping: crop should be provided mechanical support to prevent lodging if line sowing is followed. - Growing of green manure crops like Dhaincha along the border as wind barrier.	-Propping: crop should be provided mechanical support to prevent lodging	-Proper rotting and drying of fibre
Sesamum	Drainage	Drainage	Drainage	Drying of produces to optimum moisture level Seed treatment with insecticide like malathion 5% dust and fungicide like bevestin @1g/kg seeds against insects-pest & diseases respectively during



				the period of storage Treated seeds be kept in polythene bags with outer covering of gunny bags
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.	Drying of produces to optimum moisture level Seed treatment with insecticide like malathion 5% dust and fungicide like bevestin @1g/kg seeds against insects-pest & diseases respectively during the period of storage Treated seeds be kept in polythene bags with outer covering of gunny bags
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>				
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
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.
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.
Papaya	Earthing up, Bamboo stacking, Planting Wind break tree.	Drainage, foliar application of hormones, micronutrients	Drainage	Shifting of the produce to drier place, Cold storage,

		to prevent flower drop.		packing in transparent and nontransparent polythene bags.
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.
Bottle gourd	Drainage	Drainage, Application of hormones, nutrient, sprys to prevent flower drop.	Drainage	Shifting of the produce to drier place, Cold storage.
Bitter gourd	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.
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>				
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 should not be allowed	-	-Insect pest and disease infested seed/grains should be discarded

		to enter disease free field.		
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
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.
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> <li>- Against damping off, root rot and seedling blight, apply carbendazim @ 1g/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, aphids, flee beetle, leaf folder, spray Malathion 50 EC @ 2 ml/l of water.</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
<b>Horticulture</b>				
Potato	<ul style="list-style-type: none"> <li>-Depending on the weather condition, Mancozeb @ 2.5 g/l should be sprayed as prophylactic measures against late blight.</li> <li>-Against late blight, 6 spraying with Mancozeb 2.5g/l of water at an interval</li> </ul>			-Discard disease and insect infested tubers.

	of 12 days. -Use of sticker is essential in the spray solution for spraying during rainy weather. -Drainage of excess water			
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 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	
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,	-Make trenches/furrows in between rows to facilitate	-Make trenches/furrows in between rows to facilitate	-Make trenches/furrows in between rows to facilitate	

	propping.	drainage of excess water, propping.	drainage of excess water, propping.	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 or drier place.
Kharif 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		No problem	No problem	No problem
Pulses	Crop cannot survive			
Oilseed	-do-	-do-	-do-	
<b>Horticulture</b>				
Assam lemon	Crop cannot survive.	No problem	Flower drop	-
Kharif vegetables	do			
Sea water inundation <sup>3</sup>				
Crop 1 (specify)				

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

Extreme event type	Suggested contingency measure <sup>f</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave <sup>p</sup>	-	-	-	-
Horticulture	-	-	-	-
Cold wave <sup>q</sup>	-	-	-	-
Horticulture	-	-	-	-
Frost	-	-	-	-
Horticulture	-	-	-	-

<b>Hailstorm</b>	-	-	-	-
<b>Horticulture</b>	-	-	-	-
<b>Cyclone</b>	-	-	-	-
<b>Horticulture</b>	-	-	-	-

## 2.5 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>• Cultivation of perennial fodder</li> <li>• Collaborative approach with line departments for utilization of waste lands for fodder cultivation.</li> <li>• Encouragement for hay making</li> <li>• Silage preparation</li> <li>• Making facility for feed-block</li> <li>• Utilization of waste lands for fodder cultivation.</li> <li>• Improvement of yield &amp; quality of non-conventional fodder available in drought prone areas.</li> <li>• Selection and plantation of deep rooted, drought tolerant bushes, trees &amp; grasses for feeding livestock.</li> <li>• Quality up gradation of inferior quality roughages like paddy straw, wheat straw etc. with urea treatment.</li> <li>• Awareness on creation of concentrate feed and fodder bank</li> <li>• Mass awareness on feeding the livestock unconventional feeds and various byproducts.</li> <li>• Awareness on establishment of feed manufacturing units to meet the demands of concentrate feed</li> <li>• Popularizing the concept of animal insurance and its implementation.</li> </ul>	<ul style="list-style-type: none"> <li>• Feeding fodders from perennial trees.</li> <li>• Feeding already prepared silage and hay.</li> <li>• Providing feed blocks, unconventional feeds and various byproducts.</li> <li>• Feeding of concentrate feed, molasses, vitamins &amp; mineral mixtures</li> <li>• Providing urea treated straw.</li> <li>• Harvesting &amp; use of all failed field crops as animal feed.</li> <li>• Adopting special care and feed management measures for lactating, pregnant &amp; productive animals</li> </ul>	<ul style="list-style-type: none"> <li>• Availing insurance</li> <li>• Culling of affected and unproductive animals.</li> <li>• Cultivation of short duration fodder crops (sorghum, maize)</li> <li>• Fodder rejuvenation</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>• Identification of natural water resources and their use in a planned way.</li> <li>• Storing water in tanks for the hard period</li> <li>• Rain water harvesting for water conservation.</li> <li>• Use of drip irrigation in agriculture to prevent wastage of ground water.</li> </ul>	<ul style="list-style-type: none"> <li>• Offering stored water to the livestock.</li> <li>• Water should be disinfected before offering.</li> <li>• Animals not to be exposed outside</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of place/ area for establishment of drinking water reserves</li> </ul>

Health and disease management	<ul style="list-style-type: none"> <li>• Recognition of endemic and epidemic animal diseases and timely vaccination against them.</li> <li>• Veterinary preparedness like storing required medicines and other accessories</li> <li>• De-worming of animals to minimize the parasitic burden and improve the productivity of farm livestock.</li> <li>• Mass awareness programme on management of livestock during draught.</li> <li>• Collaborative approach with line departments for constituting an efficient team of workers to act as a Rapid Action Force during emergencies</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> <li>• Establishing well-organized quarantine facilities for disease suspected and affected animals.</li> <li>• Balanced feeding of the productive animals by inclusion of suitable concentrates to maintain sound health condition.</li> <li>• Regular health monitoring of the animal herd within the affected areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Organising animal health camps wherever necessary.</li> <li>• Vaccination of animals against endemic diseases.</li> <li>• Culling of unproductive livestock to improve economic status of livestock owners.</li> <li>• Availing insurance</li> </ul>
<b>Floods</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>• Maintenance of fodder bank in community land</li> <li>• Silage preparation</li> <li>• Quality up gradation of inferior quality roughages like paddy straw, wheat straw etc. with urea treatment.</li> <li>• Awareness on creation of concentrate feed and fodder bank</li> <li>• Mass awareness on feeding the livestock unconventional feeds and various byproducts.</li> <li>• Stocking of concentrated feed in sufficient quantity.</li> <li>• Awareness on establishment of feed manufacturing units to meet the demands of concentrate feed</li> <li>• Popularizing the concept of animal insurance and its implementation.</li> <li>• Awareness on creation of raised platform</li> </ul>	<ul style="list-style-type: none"> <li>• Providing Silage, hay, feed blocks, unconventional feeds and various byproducts to the animals of flood affected area.</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> <li>• Health check-up and vaccination</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>• Storing water in tanks for the hard period</li> <li>• Insurance</li> </ul>	<ul style="list-style-type: none"> <li>• Offering stored water to the livestock.</li> <li>• Water should be disinfected before offering.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment of drinking water.</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>• Timely vaccinations against various diseases.</li> <li>• Veterinary preparedness like storing required medicines and other accessories</li> <li>• Collaborative approach with line departments for constituting an efficient team of workers to act as a Rapid Action Force during emergencies</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> <li>• Regular health monitoring of the animal herd within the affected</li> </ul>	<ul style="list-style-type: none"> <li>• Organising animal health camps wherever necessary.</li> <li>• Vaccination of animals against endemic diseases.</li> </ul>

	<ul style="list-style-type: none"> <li>• Mass awareness programme on management of livestock during draught.</li> </ul>	areas.	<ul style="list-style-type: none"> <li>• Culling of unproductive livestock to improve economic status of livestock owners.</li> <li>•</li> </ul>
<b>Cyclone</b>	-	-	-
Feed and fodder availability	-	-	-
Drinking water	-	-	-
Health and disease management	-	-	-
<b>Heat wave and cold wave</b>	-	-	-
Shelter/environment management	-	-	-
Health and disease management	-	-	-

### 2.5.2 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	Insurance Storage of feed	Offering stored feed	Availing Insurance Culling unproductive birds.	-
Drinking water	Preserving water in tank	Offering stored water	Culling unproductive birds.	-
Health and disease management	Timely vaccinations against various diseases. Veterinary preparedness Mass awareness programme on management of poultry during draught.	Immediate treatment of the sick animals. Conducting animal health camps during the period.	Culling of unproductive birds Availing insurance	-
<b>Floods</b>				
Shortage of feed ingredients	Insurance Storage of feed	Immediate treatment of the sick birds	-	-



Drinking water	Preserving water in tank	Immediate treatment of the sick birds	-	-
Health and disease management	Timely vaccinations against various diseases. Veterinary preparedness Mass awareness programme on management of poultry during flood	Immediate treatment of the sick birds	-	-
<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	-	-	-	-

### 2.5.3 Fisheries/ Aquaculture

	<b>Suggested contingency measures</b>		
	<b>Before the event<sup>a</sup></b>	<b>During the event</b>	<b>After the event</b>
<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>• Restrict release of water from reservoir.</li> <li>• Water harvesting structure using polythene lining to supply water during the event</li> </ul>	<ul style="list-style-type: none"> <li>• Add water in the pond</li> <li>• Fingerlings and brood fishes, if caught, to be released back to safe waters</li> <li>• Shift fish stock to deeper water, especially in case of pens</li> <li>• Drying of fish or production of value added fish products from the over harvested stock</li> </ul>	<ul style="list-style-type: none"> <li>• Re stocking, wherever possible.</li> <li>• Digging of pond to increase the depth.</li> </ul>
(ii) Changes in water quality	<ul style="list-style-type: none"> <li>• Thinning out of stock against reduced dissolved oxygen and</li> </ul>	<ul style="list-style-type: none"> <li>• Proper aeration</li> </ul>	<ul style="list-style-type: none"> <li>• Remove aquatic vegetation</li> </ul>

	space • Removal of aquatic weeds		
(iii) Any other	-	-	-
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> <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>• Insurance</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>• 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>• Extended seed production</li> <li>• Restock the pond.</li> <li>• 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> <li>• Paddy cum fish culture</li> </ul>
(ii) Impact of salt load build up in ponds / change in water quality	-	-	-
(iii) Any other	-	-	-
<b>2) Floods</b>	-	-	-
<b>A. Capture</b>	-	-	-
Marine	-	-	-
Inland	-	-	-
(i) No. of boats / nets/damaged	-	-	-
(ii) No.of houses damaged	-	-	-
(iii) Loss of stock	-	-	-
(iv) Changes in water quality	-	-	-
(v) Health and diseases	-	-	-
<b>B. Aquaculture</b>			

(i) Inundation with flood water	<ul style="list-style-type: none"> <li>• Insurance</li> <li>• Repairing, turfing and compaction of peripheral embankments.</li> <li>• Horticulture on the embankment to prevent erosion.</li> <li>• Sufficient bamboo poles and nylon nets <b>to be kept ready.</b></li> <li>• ‘High stocking multiple harvesting’ can be taken up.</li> <li>• Sell out the fishes attaining marketable size to minimize loss.</li> <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>• 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>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Desilting.</li> <li>• Restock the pond if original stock escapes.</li> <li>• Integrated fish farming</li> <li>• Short duration culture of species that are fast growing and can be marketed at small size.</li> <li>• Claim compensation with support of record and documents.</li> <li>• Removal of unwanted/ predatory fish from pond before stocking.</li> <li>• Paddy cum fish culture</li> <li>•</li> <li>•</li> <li>•</li> </ul>
(ii) Water contamination and changes in water quality (iii) Health and diseases	<ul style="list-style-type: none"> <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>• Apply lime regularly as per recommendation.</li> </ul>	<ul style="list-style-type: none"> <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>
(iv) Loss of stock and inputs (feed, chemicals etc)	-	-	-
(v) Infrastructure damage (pumps, aerators, huts etc)	-	-	-
(vi) Any other	-	-	-
<b>3. Cyclone / Tsunami</b>	-	-	-
A. Capture	-	-	-
Marine	-	-	-
(i) Average compensation paid due to loss of fishermen lives	-	-	-
(ii) Avg. no. of boats / nets/damaged	-	-	-
(iii) Avg. no. of houses damaged	-	-	-
Inland	-	-	-
B. Aquaculture	-	-	-
(i) Overflow / flooding of ponds	-	-	-

(ii) Changes in water quality (fresh water / brackish water ratio)	-	-	-
(iii) Health and diseases	-	-	-
(iv) Loss of stock and inputs (feed, chemicals etc)	-	-	-
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	-
(vi) Any other	-	-	-
<b>4. Heat wave and cold wave</b>	-	-	-
<b>A. Capture</b>	-	-	-
Marine	-	-	-
Inland	-	-	-
<b>B. Aquaculture</b>			
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> <li>Apply lime regularly as per recommendation.</li> <li>Apply preventive agents (eg. CIFAX) before on set 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> </ul>	<ul style="list-style-type: none"> <li>Apply lime regularly as per recommendation.</li> </ul>
(ii) Health and Disease management	-	-	-
(iii) Any other	-	-	-

<sup>a</sup> based on forewarning wherever available