

State: ASSAM

**Agriculture Contingency Plan for District: BONGAIGAON**

<b>1.0 District Agriculture profile</b>					
1.1	<b>Agro- Climatic/ Ecological Zone</b>	Lower Brahmaputra Valley Zone, Assam			
	<b>Agro Ecological Sub Region (ICAR)</b>	Hot moist humid to per-humid			
	<b>Agro –Climatic Region (Planning Commission)</b>	Eastern Himalayan Region			
	<b>Agro Climatic Zone (NARP)*</b>	Lower Brahmaputra Valley Zone, Assam			
	<b>List all the districts falling under the NARP Zone</b>	Kamrup, Nalbari, Barpeta, Bongaigaon, Baksa, Chirang, Kokrajhar, Dhubri, Goalpara			
	<b>Geographic Coordinates of district</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Altitude</b>	
		26°28' to 26° 54' North	89° to 90°96' East	31 m MSL	
	<b>Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS</b>	Regional Agricultural Research Station, AAU, Gossaigaon			
<b>Mention the KVK located in the district</b>	Krishi Vigyan Kendra, Bongaigaon				
1.2	<b>Rainfall</b>	<b>Average (mm)</b>	<b>Normal Onset (specify week and month)</b>	<b>Normal Cessation (specify week and month)</b>	
	SW monsoon (June-Sep):	2051.0	1 <sup>st</sup> week of June	Last week of September	
	NE Monsoon (Oct-Dec):	193.9			

	Winter (Jan- Feb)	31.4		
	Summer (March-May)	826.1		
	Annual	3102.4		

\*If a district falls in two NARP zones, mention the zone in which more than 50% area falls

1.3	Land use pattern of the district (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land Under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (Lakh ha)	1.99	0.042	0.10	0.15	0.334	0.042	0.086	0.026	

1.4	Major Soils	Area ('000 ha)					Percent (%) of total				
		Manikpur	Dangtol	Boitamari	Srijangram	Tapattari	Manikpur	Dangtol	Boitamari	Srijangram	Tapattari
	1. Light grey	19627	15679	14689	14831	10317	-	-	-	-	-
	2. Red soil (Mixed)	8411	8442	9391	5486	4012	-	-	-	-	-
	3. Sandy soil	4766	2895	3853	3048	3099	-	-	-	-	-
	4. Sandy loam	17384	15920	15411	13409	9600	-	-	-	-	-
	5. Clay loam	5888	5307	4816	3860	1719	-	-	-	-	-
	Others (specify):	-	-	-	-	-	-	-	-	-	-
1.5	Agricultural land use	Area ('000 ha)					Cropping intensity %				
	Net sown area	68.92					167%				
	Area sown more than once	-									
	Net irrigated area	17.164									

<b>Gross cropped area</b>	115.10	
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1.6	<b>Irrigation</b>	<b>Area ('000 ha)</b>	<b>Percent (%)</b>	
	Net cultivated area	68.92	-	
	Net irrigated area	17.164	-	
	Gross cultivated area	115.10	-	
	Gross irrigated area	28.66	-	
	Rainfed area	51.76	-	
	<b>Sources of irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>% area</b>
	Canals/channels	-	-	-
	Tanks	-	-	-
	Open wells / Bore wells	-	0.94	5.48
	STW	-	14.91	86.87
	Lift irrigation	-	1.066	6.21
	Other sources	-	0.248	1.44
	Total	-	17.164	-
	Pumpsets	-	-	-
	Micro-irrigation	-	-	-
	<b>Groundwater availability and use</b>	<b>No. of blocks</b>	<b>% area</b>	<b>Quality of water</b>
	Over exploited	-	-	-
	Critical	-	-	-
	Semi critical	-	-	-
	Safe	-	-	-
	Wastewater availability and use	-	-	-

\*over-exploited: groundwater utilization > 100%; critical:90-100%; semi critical: 70-90%; safe: <70%

**Are under major field crops & horticulture etc.**

<b>1.7</b>	<b>Major field crops</b>	<b>Total area (ha)</b>
	Rice (Sali)	60754
	Rice (Ahu)	34112
	Rice (Boro)	9983
	Rapeseed & mustard	13182
	Sesame	572
	Blackgram	2667
	Lentil	2417
	Wheat	5942
	Jute	2994

<b>1.7</b>	<b>Horticulture crops- Fruits</b>	<b>Total area</b>
	Pineapple	257.0
	Jackfruit	147.0
	Litchi	254.0
	Mango	95.0
	Orange	98.0
	Coconut	549.0
	Banana	682.0
	Assam lemon	252.0
	Guava	52.0
	<b>Horticultural crops- Vegetables</b>	<b>Total area</b>
	Kharif vegetables	1650.00
	Rabi vegetables	2407.00
	<b>Medicinal and Aromatic crops</b>	<b>Total area</b>
	Total Medicinal and Aromatic crops	124.0

	<b>Plantation crops</b>	<b>Total area</b>
	Miscellaneous crop	4.18
	<b>Fodder crops</b>	<b>Total area</b>
	<b>Total fodder crop area</b>	-
	<b>Grazing land</b>	15.01

\*If break up data (irrigated, rainfed) is not available, give total area

<b>1.8</b>	<b>Livestock</b>	<b>Number ('000)</b>		
	Cows	<b>Cross breed: 3.743</b>		<b>Indigenous: 216.236</b>
	Buffaloes total	<b>Cross breed: 1.238</b>		<b>Indigenous: 1.901</b>
	Commercial dairy farms	18		
	Goat	84.023		
	Sheep	30.337		
	Others (Camel, Pig, Yak etc.)	<b>Pig: Cross breed: 4.09</b>		<b>Indigenous: 8.177</b>
<b>1.9</b>	<b>Poultry</b>	<b>Chicken: 496.649</b>		<b>Duck: 137.916</b>
	Commercial	-		
	Backyard	-		
<b>1.10</b>	<b>Inland Fisheries</b>	<b>Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production (tones)</b>
	Brackish water	-	-	-
	Fresh water	-	-	-
	Others (Ponds and Tanks)	494.00	-	-
	Water logged / beels	1794.40	-	-
	Swamps	96.44	-	-
	Low lying areas	43.85	-	-
	Derelict area	14.70	-	-

1.11	Production and productivity of major crops	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Rice	71.0 (Sali rice)	1160.0 (Sali rice)	19.1 <b>(Boro rice)</b>	1913.0 <b>(Boro rice)</b>	32.3 (Ahu rice)	946.0 (Ahu rice)	122.40	1340.0
	Toria	-	-	6.6	501.0	-	-	6.6	501.0
	Jute	-	-	-	-	27.36	1645.0	27.36	1645.0
	wheat	-	-	8.73	1435.0	-	-	8.73	1435.0
	Vegetables	19.19	11630.0	39.48	16400.00	-	-	58.67	14015.0
	-	-	-	-	-	-	-	-	-

1.12	Sowing window for 5 major crops (Start and end of sowing period)	Rice	Toria	Jute	Vegetables	Wheat
	Kharif- Rainfed	3 <sup>rd</sup> week of May- 4 <sup>th</sup> week of September	-	2 <sup>nd</sup> week of March – 2 <sup>nd</sup> week of May	2 <sup>nd</sup> week of Feb to 2 <sup>nd</sup> week of April	-
	Kharif- Irrigated	-	-	-	-	-
	Rabi-Rainfed	-	2 <sup>nd</sup> week of Oct- 2 <sup>nd</sup> week of Nov	-	-	-
	Rabi- irrigated	2 <sup>nd</sup> week of Nov to 2 <sup>nd</sup> week of Jan	-	-	2 <sup>nd</sup> week of October to 30 <sup>th</sup> November	-
	Rabi-Rainfed	-	-	-	-	5 <sup>th</sup> November to 2 <sup>nd</sup> week of

						December
	Rabi- irrigated	2 <sup>nd</sup> week of February to 2 <sup>nd</sup> week of March	-	-	-	-

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular*	Occasional	None
	Drought		√	
	Flood		√	
	Cyclone		√	
	Hail storm		√	
	Heat wave		√	
	Cold wave		√	
	frost			√
	Sea water intrusion			√
	Snowfall			√
	Landslide			√
	Earthquake			√
	Pests and disease outbreak (specify)		√ ( rice stem borer, leaf folder, sheath blight, late blight, aphid)	
	Others (like fog, cloud bursting etc.)			√

\*when contingency occurs in six out of 10years.

<b>1.14</b>	<b>Include Digital maps of the district for</b>	<b>Location map of district with in State as Annexure I</b>	<b>Enclosed: Yes</b>
		<b>Mean annual rainfall as Annexure 2</b>	<b>Enclosed: Yes</b>
		<b>Soil map as Annexure 3</b>	<b>Enclosed: Yes</b>

## 2.0. Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation:

<b>Condition</b>		<b>Suggested Contingency measures</b>			
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Crop/ cropping system</b>	<b>Change in crop/ cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
<b>Delay by 2 weeks 3<sup>rd</sup> week of June</b>	Rainfed upland (Sandy loam to clay loam)	-Rice (DS)- Toria /Lentil/ Sesamum/ Wheat /Potato/ Rabi vegetables	No change	Recommended package of practices	-
		Summer vegetables/ Blackgram/Sesame (kharif) - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-

	Rainfed medium land/medium low land (Sandy loam to clay loam)	Rice(Kharif)- Toria/ Rabi pulse/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Rice (kharif) as monocropping	No change	Recommended package of practices	-
		Rice (kharif) – rice (rabi/summer)	No change	Recommended package of practices	-
	Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Rice(Kharif) as mono cropping	No change	<p>-If transplanting is possible within July, select suitable varieties like Ranjit, Bahadur, Piolee, Mahsuri, etc.</p> <p>-If flood water recedes early and transplanting can be done by mid August, select varieties like Kushal, Prasadbhog, etc.</p> <p>-Select suitable rice varieties such as Satyaranjan, Basundhara, Luit and Kapilee (transplanting up to last part of August) where flood water is expected recede by the last part of August.</p> <p>-For chronically flood affected</p>	- KVKs, RARSs under AAU, Jorhat are the source foundation & certified seeds

				<p>areas, select submergence tolerant rice varieties such as Jalashree, Jalkuwari and Plaban (12-15 days submergence tolerance) which can be transplanted in June-July.</p> <p>-Spraying of Chloropyriphos or Monochrotophos or Quinolphos @ 2ml/l against case worm and leaf folder infestation in rice.</p> <p>-Where bacterial leaf blight appears in rice, avoid top dressing of N- fertilizer and apply K- fertilizer @ 10 kg /ha as top dressing or 5kg/ha as 3% foliar spray.</p> <p>- Spraying of Chloropyriphos or Quinolphos @ 2ml/l and apply 5 % Malathion dust in field bunds against rice swarming caterpillar.</p>	
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Condition	Major Farming situation	Suggested Contingency measures			
		Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks	Rainfed upland (Sandy loam to	Rice (DS)- Torla/Blackgram/	No change	Recommended package of practices	-

<b>Month: 1<sup>st</sup> week of July</b>	clay loam)	Lentil/ Wheat/Potato/ Rabi vegetables			
		Summer vegetables/ Blackgram/Sesame (kharif) - Torja/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
	Rainfed medium land/medium low land (Sandy loam to clay loam)	Rice (Kharif)- Torja/Lentil/ Wheat/Potato/Rabi vegetables	No change	<ul style="list-style-type: none"> <li>- Growing of medium duration rice varieties such as Satyaranjan, Basundhara, IR-36, etc. (transplanting up to mid August).</li> <li>- Short duration 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 20x15 cm spacing with 4-5 seedlings/hill.</li> <li>- Varieties such as Pankaj, Kushal, Lakhimi can be grown up to August 15 with 45 -50 days old seedlings.</li> <li>- Traditional photosensitive coarse grain varieties like Manohar Sali, Andrew Sali, Salpona etc. can be grown with up to 60 days old seedlings. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill.</li> </ul>	KVKs, RARSs under AAU, Jorhat will be the source of foundation & certified seeds
		Rice (Kharif) monocropping	No change	-If transplanting is possible within July, HYVs like Ranjit, Bahadur, Mahsuri, Piolee, Kushal, Moniram etc can be selected.	KVKs, RARSs under AAU, Jorhat will be the source

				<ul style="list-style-type: none"> <li>- Traditional photosensitive coarse grain varieties like Manohar Sali, Andrew Sali, Salpona etc. can be grown with up to 60 days old seedlings. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill.</li> <li>-Growing of medium duration rice varieties such as Satyaranjan, Basundhara, IR-36, etc. (transplanting up to mid August).</li> <li>- Short duration 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 20x15 cm spacing with 4-5 seedlings/hill.</li> <li>- Varieties such as Pankaj, Kushal, Lakhimi can be grown up to August 15 with 45 -50 days old seedlings.</li> </ul>	of foundation & certified seeds
		Rice ( Kharif) – Rice (Rabi/Summer)	No change	<ul style="list-style-type: none"> <li>- Growing of medium duration rice varieties such as Satyaranjan, Basundhara, IR-36, etc. (transplanting up to mid August).</li> <li>- Short duration 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 20x15 cm spacing with 4-5 seedlings/hill.</li> <li>- Varieties such as Pankaj, Kushal, Lakhimi can be grown up to August 15 with 45 -50 days old seedlings.</li> <li>- Traditional photosensitive coarse grain varieties</li> </ul>	KVKs, RARSs under AAU, Jorhat will be the source of foundation & certified seeds

				like Manohar Sali, Andrew Sali, Salpona etc. can be grown with up to 60 days old seedlings. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill.	
	Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Rice (Kharif) as mono cropping	No change	<p>-If transplanting is possible within July, select suitable varieties like Ranjit, Bahadur, Piolee, Mahsuri, etc.</p> <p>-If flood water recedes early and transplanting can be done by mid August, select varieties like Kushal, Prasadbhog, etc.</p> <p>-Select suitable rice varieties such as Satyaranjan, Basundhara, Luit and Kapilee (transplanting up to last part of August) where flood water is expected recede by the last part of August.</p> <p>-For chronically flood affected areas, select submergence tolerant rice varieties such as Jalashree, Jalkuwari and Plaban (12-15 days submergence tolerance) which can be transplanted in June-July.</p> <p>-Spraying of Chloropyriphos or Monochrotophos or Quinolphos @ 2ml/l against case worm and leaf folder infestation in rice.</p>	KVKs, RARSs under AAU, Jorhat will be the source of foundation & certified seeds

Condition		Suggested contingency measures			
		Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>				
<b>Delay by 6 weeks</b>  <b>3<sup>rd</sup> week of July</b>	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Summer vegetables/ Blackgram/Sesame (Kharif) - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
	Rainfed medium land/ medium low land (Sandy loam to clay loam)	Rice (Kharif)- Toria/Lentil/ Sesamum/ Wheat/Potato/Rabi vegetables	No change	<p>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (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>-Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</p>	<p>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</p> <p>- Seedlings can be grown in Community Nursery</p>

		Rice (Kharif) monocropping	No change	<ul style="list-style-type: none"> <li>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill</li> <li>-Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</li> <li>- Seedlings can be grown in Community Nursery</li> </ul>
		Rice ( Kharif) – Rice (Rabi/Summer)	No change	<ul style="list-style-type: none"> <li>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill</li> <li>-Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</li> <li>- Seedlings can be grown in Community Nursery</li> </ul>
	Flood prone (loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Rice (winter) as mono cropping	No change	<ul style="list-style-type: none"> <li>-If transplanting is possible within July, select suitable varieties like Ranjit, Bahadur, Piolee, Mahsuri, etc.</li> <li>-If flood water recedes early and transplanting can be</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp;</li> </ul>

				<p>done by mid August, select varieties like Satyaranjan, Basundhara etc. which can be transplanted up to last part of August.</p> <ul style="list-style-type: none"> <li>- Short duration rice varieties like Luit , Kapilee, Kalong etc can be transplanted up to last part of August</li> <li>- Manohar Sali, Biraj, Prasadbhog, Govindbhog etc. and traditional coarse grain photosensitive varieties with 45-60 days old seedlings can be transplanted with 6-8 seedlings per hill up to last part of August.</li> <li>- Select delayed planting varieties like Prafulla and Gitesh (60 days old seedlings)</li> <li>-For chronically flood affected areas, select submergence tolerant rice varieties such as Jalashree, Jalkuwari and Plaban (12-15 days submergence tolerance) which can be transplanted in June-July.</li> <li>-Spraying of Chloropyriphos or Monochrotophos or Quinolphos @ 2ml/l against case worm and leaf folder infestation in rice.</li> <li>-Where bacterial leaf blight appears in rice, avoid top dressing of N- fertilizer and apply K-fertilizer @ 10 kg /ha as top dressing or 5kg/ha as 3% foliar spray.</li> <li>- Spraying of Chloropyriphos or Quinolphos @ 2ml/l and apply 5 % Malathion dust in field bunds against rice swarming caterpillar.</li> </ul>	certified seeds
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Condition		Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks  1 <sup>ST</sup> Week Of August	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
		Summer vegetables/ Blackgram/ Sesame (Kharif) - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	Recommended package of practices	-
	Rainfed medium land/medium low land (Sandy loam to clay loam)	Rice (Kharif)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	<ul style="list-style-type: none"> <li>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill</li> <li>- Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</li> <li>- Direct seeding (wet seeding) of extra short duration high yielding varieties such</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</li> <li>- Seedlings can be grown in Community Nursery</li> </ul>

				as Luit, Kolong, Dichang etc	
		Rice (Kharif) monocropping	No change	<ul style="list-style-type: none"> <li>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill</li> <li>-Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</li> <li>- Direct seeding (wet seeding) of extra short duration high yielding varieties such as Luit, Kolong, Dichang etc</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</li> <li>- Seedlings can be grown in Community Nursery</li> </ul>
		Rice ( Kharif) – Rice (Rabi/Summer)	No change	<ul style="list-style-type: none"> <li>- Select suitable short duration rice varieties such as Luit, Kapilee, Kolong etc. (transplanting up to last part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill</li> <li>-Traditional coarse grain photosensitive varieties (upto 60 days old seedlings) like Manohar Sali, Andrew Sali, etc. can be grown. About 10 kg seed/ha is required with closer spacing (20 cm x 20 cm) and 6-8 seedlings/hill</li> </ul>	<ul style="list-style-type: none"> <li>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</li> <li>- Seedlings can be grown in Community Nursery</li> </ul>

				- Direct seeding (wet seeding) of extra short duration high yielding varieties such as Luit, Kolong, Dichang etc	
Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change		Recommended package of practices	-
	Sali (Kharif) as mono cropping	No change		<p>-If flood water recedes early and transplanting can be done by mid August, select varieties like Satyaranjan, Basundhara etc. which can be transplanted up to last part of August.</p> <p>- Short duration rice varieties like Luit , Kapilee, Kalong etc can also be transplanted up to last part of August. Crop should be transplanted at closer spacing with recommended dose of fertilizer as basal.</p> <p>- Manohar Sali, Biraj, Prasadbhog, Govinda bhog etc. and traditional coarse grain photosensitive varieties with 45-60 days old seedlings can be transplanted with 6-8 seedlings per hill up to last part of August.</p> <p>- Select delayed planting varieties like Prafulla and Gitesh (60 days old seedlings)</p> <p>-For chronically flood affected areas, select submergence tolerant rice varieties</p>	KVKs, RARSs under AAU, Jorhat will be the source of foundation & certified seeds

				<p>such as Jalashree, Jalkuwari and Plaban (12-15 days submergence tolerance) which can be transplanted in June-July.</p> <p>-Spraying of Chloropyriphos or Monochrotophos or Quinolphos @ 2ml/l against case worm and leaf folder infestation in rice.</p> <p>-Where bacterial leaf blight appears in rice, avoid top dressing of N- fertilizer and apply K-fertilizer @ 10 kg /ha as top dressing or 5kg/ha as 3% foliar spray.</p> <p>- Spraying of Chloropyriphos or Quinolphos @ 2ml/l and apply 5 % Malathion dust in field bunds against rice swarming caterpillar.</p>	
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Condition	Major Farming situation	Suggested Contingency measures			
		Crop/ cropping system	Change in crop/ cropping system	Soil nutrient & moisture conservation measures	Remarks on Implementation
<b>Early season drought (Normal onset)</b>					
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor</b>	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Rabi pulse / Wheat/Potato/Rabi vegetables	No change	<p>-Life saving supplemental irrigation</p> <p>-Weeding and thinning at critical stages of growth.</p> <p>-Application of sufficient quantity of FYM or compost in the main field.</p>	<p>- Water harvesting structures under NREGA for life saving irrigation</p> <p>- Arrangement</p>

<b>germination/ crop stand etc.</b>					of pumpsets from RKVY and NFSM
		Summer vegetables/ Blackgram/Sesame (Kharif) - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Life saving supplemental irrigation -Weeding at critical stages of growth. - Application of sufficient quantity of FYM or compost in the main field -Two to three spraying of Dimethoate or Endosulfan @ 2ml/l starting from 10 days after germination at 15 days interval against YMV	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM
	Rainfed medium land/ medium low land (Sandy loam to clay loam)	Rice (winter)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Supplemental irrigation in the nursery bed of rice. -Application of sufficient quantity of FYM or compost in the nursery bed and main field.	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM
		Rice (winter) monocropping	No change	-Where germination is severely affected, re-sowing of rice seed may also be recommended	
		Rice (winter) – rice (Autumn/summer)	No change	-Spraying of Mancozeb @ 2.5g/l or Edinophos 2 1ml/l or Carbendazim @ 1g/l against brown spot disease in rice -Spraying of phosphamidon @ 1-1.5 ml/l against rice mealy bug	
	Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Supplementary life saving irrigation at critical crop stages	- Water harvesting structures under NREGA for life

					saving irrigation
		Sali rice as mono cropping	No change	<p>-Prepare dry, well bunded, flat seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g MOP per bed of 10mx1.25m</p> <p>-The gap of 30 cm between two beds may be converted into channel to supply water to keep the raised beds moist in the event of drought occurs.</p> <p>-Seed treatment with 4% MOP (600ml/kg of seed) for 24 hrs, dry it in shade for 24 hrs and sowing</p> <p>-Supplemental irrigation in the nursery bed of rice.</p> <p>-Application of sufficient quantity of FYM or compost in the nursery bed and main field.</p> <p>-Where germination is severely affected, re-sowing of rice seed may also be recommended.</p> <p>-Supplementary life saving irrigation at critical crop stages</p> <p>-In chronically flood affected areas where high silt deposition occurs, there may not be any need of fertilizer application. However, in occasionally flood affected areas, a basal application of fertilizer @ 40:20:20 kg/ha for semi-dwarf varieties and 20:10:10 kg/ha for</p>	<p>- Water harvesting structures under NREGA for life saving irrigation</p> <p>- KVKs, RARSs under AAU, Jorhat will be the source of foundation &amp; certified seeds</p>

				tall varieties of N: P: K is recommended.	
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Condition		Suggested Contingency measures			
Mid season drought (long dry spell, consecutive 2 weeks rainless (> 2.5 mm) period)	Major Farming situation	Crop/ cropping system	Change in crop/ cropping system	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Life saving supplemental irrigation -Weeding at critical stages of growth. -Application of sufficient quantity of FYM or compost in the main field.	- Water harvesting structures under NREGA for life saving irrigation
		Summer vegetables/ Blackgram (Kharif)/Sesame - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Life saving supplemental irrigation -Weeding at critical stages of growth. - Application of sufficient quantity of FYM or compost in the main field - Thinning to maintain optimum plant population. -Two to three spraying of Dimethoate or Endosulfan @ 2ml/l starting from 10 days after germination at 15 days interval against YMV in blackgram/ greengram	- Water harvesting structures under NREGA for life saving irrigation
	Rainfed medium land/medium	Rice (Kharif)- Toria/Lentil/ Wheat/Potato/Rab	No change	Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice	- Water harvesting structures under

	low land (Sandy loam to clay loam)	i vegetables		- Gap filling if required	NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM
		Rice (Kharif) monocropping	No change	-Spraying of 2% KCL solution on leaves of rice if and when drought appears.	
		Rice (Kharif) – Rice (Autumn/Summer )	No change	-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 -Spraying of Mancozeb @ 2.5g/l or Edinophos 2 1ml/l or Carbendazim @ 1g/l against brown spot disease in rice. -Spraying of phosphamidon @ 1-1.5 ml/l against rice mealy bug.	
	Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Supplementary life saving irrigation at critical crop stages	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM
		Rice (Kharif) as mono cropping	No change	-Application of sufficient quantity of FYM or compost in the nursery bed and main field. -Supplementary life saving irrigation at critical crop stages	- Water harvesting structures under NREGA for life saving

				<ul style="list-style-type: none"> <li>-Top dressing of additional quantities of MOP @ 37.5 kg/ha and incorporation is recommended in rice</li> <li>-Spraying of 2% KCL solution on leaves of rice if and when drought appears.</li> <li>-Top dressing of urea may be delayed upto heading stage of rice if drought prevails at the stages of top dressing</li> </ul>	irrigation - Arrangement of pumpsets from RKVY and NFSM
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Condition		Suggested Contingency measures			
Mid season drought (long dry spell)	Major Farming situation	Crop/ cropping system	cropping system	Soil nutrient & moisture conservation measures	Remarks on Implementation
At reproductive stage	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	<ul style="list-style-type: none"> <li>-Life saving supplemental irrigation</li> <li>-Weeding at critical stages of growth.</li> </ul>	<ul style="list-style-type: none"> <li>- Water harvesting structures under NREGA for life saving irrigation</li> <li>- Arrangement of pumpsets from RKVY and NFSM</li> </ul>
		Summer vegetables/ Blackgram (Kharif)/Sesame - Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	<ul style="list-style-type: none"> <li>-Life saving supplemental irrigation</li> <li>-Weeding at critical stages of growth.</li> <li>- Thinning to maintain optimum population.</li> <li>-Two to three spraying of Dimethoate or Endosulfan @ 2ml/l starting from 10 days after germination at 15 days interval against YMV in blackgram/ greengram</li> <li>- Mulching with crop residues in horticultural crops</li> </ul>	<ul style="list-style-type: none"> <li>- Water harvesting structures under NREGA for life saving irrigation</li> <li>- Arrangement of pumpsets from RKVY and NFSM</li> </ul>

	Rainfed medium land/ Medium low land (Sandy loam to clay loam)	Rice (Kharif)- Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-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 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	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM
		Rice (Kharif) monocropping	No change	-Control measure should be taken against brown spot of rice	
		Rice (Kharif) – Rice (Autumn/Summer)	No change		
	Flood prone (Loamy to clay loam soil)	Summer vegetables – Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	-Supplementary life saving irrigation at critical crop stages	- Water harvesting structures under NREGA for life saving irrigation
		Rice (Kharif) as mono cropping	No change	-Application of sufficient quantity of FYM or compost in the nursery bed and main field. -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.	- Water harvesting structures under NREGA for life saving irrigation

				-Top dressing of urea may be delayed upto heading stage of rice if drought prevails at the stages of top dressing	
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Condition		Suggested Contingency measures			
Terminal drought	Major Farming situation	Crop/ cropping system	Crop management	Rabi crop planning	Remarks on Implementation
	Rainfed upland (Sandy loam to clay loam)	Rice (DS)- Toria/Lentil/ Wheat/Potato/ Rabi vegetables	-Life saving supplemental irrigation - Pre-sowing irrigation for nursery raising and life saving irrigation after transplanting	- Growing of Tomato, Brinjal, and Leafy vegetables like Spinach, Radish etc. with improved package of practices - Growing of mid season cole crops such as Cauliflower (varieties – Improved Japaneses, Pusa Synthetic, Pusa snowball etc. ) and Cabbage ( Varieties – Golden acre, Pride of India, Pusa Mukta etc.), Knolkhol (White viena) etc. -Growing of rabi field crops like toria, lentil, buckwheat, niger, wheat in time with presowing irrigation if required.	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM - Arrangement of seeds under HMNEH
		Summer vegetables/ Blackgram/ Sesame (Kharif) - Toria/Lentil/ Wheat/Potato/	-Life saving supplemental irrigation -Harvesting of kharif crops at physiological maturity stage. - Pre-sowing irrigation for nursery raising and life saving irrigation after transplanting	- Growing of Tomato, Brinjal, and Leafy vegetables like Spinach, Radish etc. with improved package of practices - Growing of mid season cole crops such as Cauliflower (varieties – Improved Japaneses, Pusa Synthetic, Pusa snowball etc. ) and Cabbage ( Varieties – Golden acre, Pride of	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM

		Rabi vegetables		India, Pusa Mukta etc.), Knolkhol (White viena) etc. -Growing of rabi field crops like toria, lentil, buckwheat, niger, wheat in time with presowing irrigation if required.	- Arrangement of seeds under HMNEH
Rainfed medium land/ Medium low land (Sandy loam to clay loam)	Rice (Kharif)- Toria/Rabi pulses/ Wheat/Potato/ Rabi vegetables	-Life saving supplemental - irrigation - Pre-sowing irrigation for nursery raising and life saving irrigation after transplanting - Harvesting of kharif crops at physiological maturity stage - Conservation tillage	- Growing of mid season cole crops such as Cauliflower (varieties – Improved Japaneses, Pusa Synthetic, Pusa snowball etc. ) and Cabbage ( Varieties – Golden acre, Pride of India, Pusa Mukta etc.), Knolkhol (White viena) etc. - Growing of rabi field crops like toria, lentil, buckwheat, niger, wheat in time with presowing irrigation if required - Sufficient organic matter should be incorporated - Mulching in Rabi crops	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM - Arrangement of seeds under HMNEH	
	Rice (Kharif) monocropping				
	Rice (Kharif) – Rice (Autumn/ Summer)				
Flood prone (Loamy to clay loam)	Summer vegetables – Toria/Lentil/ Wheat/Potato/ Rabi vegetables	-Life saving supplemental irrigation - Pre-sowing irrigation for nursery raising and life saving irrigation after transplanting - Harvesting of kharif crop at physiological maturity	- Growing of Tomato, Brinjal, and Leafy vegetables like Spinach, Radish etc. with improved package of practices - Growing of mid season cole crops such as Cauliflower (varieties – Improved Japaneses, Pusa Synthetic, Pusa snowball etc. ) and Cabbage ( Varieties – Golden acre, Pride of India, Pusa Mukta etc.), Knolkhol (White viena) etc.	- Water harvesting structures under NREGA for life saving irrigation - Arrangement of pumpsets from RKVY and NFSM - Arrangement of seeds under	
	Sali (Kharif) as mono cropping				

				-Growing of rabi field crops like toria, lentil, buckwheat, niger, wheat in time with presowing irrigation if required.	HMNEH
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### 2.1.2 Drought - Irrigated situation

As the source of irrigation is basically STW and there is no report on ground water depletion in the district; hence the question of drought in irrigated situation does not arise.

Some other situation like pre monsoon flood and hailstorm often experienced for which contingency plans are necessary and mentioned under

### 2.2.3

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Not applicable				
Limited release of water in canals due to low rainfall					
Non release of water in canals under delayed onset of monsoon in catchment					
Lack of inflows	NA				

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
into tanks due to insufficient /delayed onset of monsoon					
Insufficiency of surface water for irrigation					
Insufficient groundwater recharge due to low rainfall					

### 2.1.3 Pre monsoon flood and hailstorm under irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Pre monsoon flood	Medium / medium low /lowland land (sandy loam to clay loam)	Summer rice/ Early ahu with long duration local cultivars and hybrid rice variety	- Adoption of Short duration rice varieties like Luit, Kolong, dichang etc in case of summer rice/ early ahu rice	-Provision for drainage channel to remove excess water. - If crop attains maturity stage, harvest the crop at physiological maturity stage.	Preparation of drainage channel under MGNREGA

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Upland (sandy loam to clay loam)	Summer vegetables	- Summer vegetables - If crop fails, plan for rabi crops	Provision for drainage channel to remove excess water.	Preparation of drainage channel under MGNREGA
		Fruits (banana, citrus etc)	-Fruits (bananana, citrus etc - If crop fails, replanting of crops	Provision for drainage channel to remove excess water.	Preparation of drainage channel under MGNREGA

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Hail storm under irrigated condition	Medium / medium low /lowland land (sandy loam to clay loam)	Summer rice/ Early ahu with long duration local cultivars and hybrid rice variety	Adoption of Short duration rice varieties like Luit Kolong, Dichang etc.	-	-
	Upland (sandy loam to clay loam)	Summer vegetables	Summer vegetables/ high valued vegetable crops	- Installation of hail net - Plantation of wind break - Protected cultivation of high valued vegetable crops	-Departmental schemes like HMNEH, NFSM, RKVY for protected cultivation.
		Fruits (banana, citrus etc)	Malbhog banana cultivation	- Installation of hail net - Plantation of wind	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
				break	

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

Condition	Suggested contingency measures			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Maize	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	Proper drying of grains to maintain optimum moisture percentage for storage
Black gram/ 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	Proper drying of grains to maintain optimum moisture percentage for storage
Rice (Summer)	Sow rice seed in raised nursery bed with 30cm gap between two beds. -Light hoeing and weeding	Excess rain water to be drained out through surface drainage channel to avoid submergence	- Excess rain water to be drained out through surface drainage channel to avoid submergence - Harvesting at	Proper drying of grains to maintain optimum moisture percentage (12-14%) for storage

			physiological maturity	
Rice (Winter)	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. -Light hoeing and weeding	Excess rain water to be drained out 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	-Proper drying of grains to maintain optimum moisture percentage (12-14%) for storage
Vegetables	-Adoption of proper measures to drain out excess water -Light hoeing and weeding - Adoption of plant protection measures against Anthracnose disease	- Adoption of proper measures to drain out excess water - Adoption of plant protection measures against Anthracnose disease	- Adoption of proper measures to drain out excess water - Harvesting at physiological maturity - Adoption of plant protection measures against Anthracnose disease	-Drying of the produce - Immediate sale of the produce - Shifting of the produce to drier place/cold storage
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Maize	- Proper drainage - Provision for wind breaks	- Proper drainage - Provision for wind breaks	-Crop to be harvested at physiological maturity stage.	Proper drying
Rice (Summer)	-Sow rice seed in raised nursery bed with 30cm gap between two beds which can	- Excess rain water to be drained out through surface drainage channel to avoid	-Crop to be harvested at physiological maturity stage.	-Proper drying of grains to maintain optimum moisture percentage

	<p>be utilized to drain out excess water.</p> <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>	submergence in the main field		(12-14%) for storage
Rice (Winter)	<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>	<ul style="list-style-type: none"> <li>- Crop to be harvested at physiological maturity stage.</li> </ul>	<ul style="list-style-type: none"> <li>- Proper drying of grains to maintain optimum moisture percentage (12-14%) for storage</li> </ul>
Banana	<ul style="list-style-type: none"> <li>- Make trenches/furrows in between ridges to facilitate drainage of excess water</li> <li>- Propping</li> </ul>	<ul style="list-style-type: none"> <li>- Make trenches/furrows in between ridges to facilitate drainage of excess water</li> <li>- Propping</li> </ul>	<ul style="list-style-type: none"> <li>- Make trenches/furrows in between ridges to facilitate drainage of excess water</li> <li>- Propping</li> </ul>	Shifting of the produce to drier place
Vegetables	<ul style="list-style-type: none"> <li>- Make trenches/furrows to facilitate drainage of excess water</li> <li>- Proper support for climbers</li> </ul>	<ul style="list-style-type: none"> <li>- Make trenches/furrows to facilitate drainage of excess water</li> <li>- Application of hormones, nutrients to prevent flower drop</li> </ul>	<ul style="list-style-type: none"> <li>- Make trenches/furrows to facilitate drainage of excess water</li> </ul>	<ul style="list-style-type: none"> <li>- Shifting of the produce to drier place/Cold storage</li> </ul>

<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice (Summer)	<p>Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer, leaf folder, case worm.</p> <p>-Adoption IPM module.</p> <p>-Alternate flooding and drying against case worm.</p> <p>-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.</p>	<p>-Rouging if infected plant ,</p> <p>- Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer</p> <p>-Adoption IPM module against stem borer</p> <p>-Spraying of pesticide should not coincide pollination time.</p> <p>-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.</p>	-	-Insect pest and disease infested seed/grains should be discarded
Rice (Winter)	<p>Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer, leaf folder, case worm.</p> <p>-Adoption IPM module.</p> <p>-Alternate flooding and drying against case worm.</p> <p>-Application of carbendazim @ 1g/l against blast and sheath blight. Water from the sheath</p>	<p>-Rouging if infected plant ,</p> <p>- Application of pesticides like chloropyriphos or Monochrotophos @ 2 ml/lit against stem borer</p> <p>-Adoption IPM module against stem borer</p> <p>-Spraying of pesticide should not coincide pollination time.</p> <p>-Application of carbendazim</p>	-	Insect pest and disease infested seed/grains should be discarded

	blight infested field should not be allowed to enter disease free field.	@ 1g/l against blast and sheath blight. Water from the sheath blight infested field should not be allowed to enter disease free field.		
Black gram	<p>Against YMV, spray Dimethoate @ 2ml/l (2 -3 spraying)</p> <p>- Against jassids, aphids, flee beetle, leaf folder, spray Malathion 50 Ec @ 2 ml/l of water.</p> <p>- Against damping off, root rot and seedling blight, apply carbendazim @ 1g/l of water.</p>	<p>- Against YMV, spray Dimethoate @ 2ml/l (2 -3 spraying)</p> <p>- Against jassids, aphids, flee beetle, leaf folder, spray Malathion 50 Ec @ 2 ml/l of water.</p>	- Against pod borer & pod bug, spray Malathion 50 EC @ 2 ml/l of water.	Insect pest and disease infested seed/grains should be discarded
Vegetables	<p>Depending on the weather condition, Mancozeb @ 2.5 g/l should be sprayed as prophylactic measures against late blight.</p> <p>-Against late blight, 6 spraying with Mancozeb 2.5g/l of water at an interval of 12 days.</p> <p>-Use of sticker is essential in the spray solution for spraying during rainy weather.</p> <p>-Drainage of excess water</p>	-	-	-Discard disease and insect infested tubers.

## 2.3 Floods

Condition	Suggested contingency measures			
	Seedling/ Nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
<b>Rice</b>	-Raised nursery bed with 30 cm gap in between two beds so that excess water can be removed.	-Drainage of excess water	-Drainage of excess water	Harvesting at physiological maturity stage, tying the harvested head and transferred to dry place for drying
<b>Maize</b>	Ensure drainage facility, sowing should be done in ridges. If crop is damaged then re-sow.	Drain out the excess water, Make ridge & furrows.	Ensure drainage, Make ridge & furrows.	Harvest the cobs at physiological maturity
<b>Pulses and Oilseeds</b>	Make provision for drainage, re-sow the seeds if time permits	Ensure drainage facility.	Drain out the excess water.	-Harvest the crop at physiological maturity - If the crop is fully damaged go for upland crops during rabi season
<b>Banana</b>	-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

<b>Vegetables</b>	-Drainage of flood water -Hoeing in between lines for aeration in root zone after flood	-Drainage of flood water -Hoeing in between lines for aeration in root zone after flood	-Drainage of flood water -Hoeing in between lines for aeration in root zone after flood	-Harvesting of produce as early as possible
<b>Continuous submergence for more than 2 days<sup>2</sup></b>				
<b>Rice (Summer)</b>	-Raised nursery bed with 30 cm gap in between two beds so that excess water can be removed.	-Drainage of excess water	-Drainage of excess water	Harvesting at physiological maturity stage, tying the harvested head and transferred to dry place for drying
<b>Rice (Winter)</b>	-Raised nursery bed with 30 cm gap in between two beds so that excess water can be removed. -If seedlings are damaged by flood water, resowing may be done with the flowing varieties- -If transplanting can be done by mid August, select varieties like Satyaranjan, Basundhara, IR -36, Jaya etc. Seedlings should be raised in non flood prone or high land area.	-Drainage of excess water -If crop is damaged by flood, the nursery may be raised with the following varieties- - 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 part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.  -If flood damages crop during	-Drainage of excess water	Harvesting at physiological maturity stage, tying the harvested head and transferred to dry place for drying

	- 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 part of August). 20-25 days old seedling should be transplanted at 20x15 cm spacing with 4-5 seedlings/hill.	last part of August and there is no time to raise seedlings, direct seeding (wet seeding) of extra short duration high yielding varieties such as Luit, Kolong, Dichang etc or any traditional photo period sensitive coarse grain varieties can also be done up to 1st week of September. Sprouted seed of 75 kg/ha is to be broadcast in puddle field.		
<b>Sesame</b>	-Drainage of flood water - Re sowing may required if crop is damaged by flood. -Hoeing in between lines for aeration in root zone after flood	- Drainage of flood water  -Hoeing in between lines for aeration in root zone after flood.	- Drainage of flood water  -Hoeing in between lines for aeration in root zone after flood.	-Harvesting at physiological maturity stage. -Proper drying of produce
<b>Black gram</b>	-Drainage of flood water - Re sowing may required if crop is damaged by flood. -Hoeing in between lines for aeration in root zone after flood	- Drainage of flood water  -Hoeing in between lines for aeration in root zone after flood.	- Drainage of flood water  -Hoeing in between lines for aeration in root zone after flood.	-Harvesting at physiological maturity stage. -Proper drying of produce
<b>Banana</b>	-Make trenches/furrows in between rows to facilitate drainage of excess water - Propping -Replanting if crop is	-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

	damaged by flood			
<b>Vegetable</b>	-Drainage of flood water - Re sowing may required if crop is damaged by flood. -Hoeing in between lines for aeration in root zone after flood	-Drainage of flood water -Hoeing in between lines for aeration in root zone after flood	-Drainage of flood water -Hoeing in between lines for aeration in root zone after flood	-Harvesting of produce as early as possible

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

Extreme event type	Suggested contingency measures			
	Seedling/Nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	NA			
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

### 2.5 Contingent strategies for Livestock, Poultry & Fisheries

#### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	-Encourage fodder cultivation during rainy season. On boundaries of agricultural field, fodder trees or shrubs	-Utilizing fodder from perennial trees and fodder bank reserves. -Transporting excess fodder from adjoining districts. -Use of unconventional livestock feed such as paddy	-Avail insurance facility Supplementary feeding of remaining livestock

	<p>like Sesbania, Subabul, etc. should be planted. Encourage cultivation of fodder grass like napier, Oat, Gunie &amp; Dinanath and excess fodder may be stored as hay/silage.</p> <p>-Establishment of fodder bank by excess production of improved variety of fodder grass in nearby forest areas.</p> <p>-Improvement of mineral content of paddy straw by treatment with Urea &amp; Molasses.</p> <p>-Encourage cultivation of Azolla in artificial pond as well as in paddy field.</p> <p>- Silage and hey making</p> <p>-Training &amp; awareness camp among extension personnel for needful at time of exigencies.</p> <p>-Insurance of Livestock.</p>	<p>straw, rice bran, banana plant, crop residues, edible weeds and other tree leaves etc.</p> <p>- Feeding of silage and hey</p> <p>-Using Urea -Molasses treated straw, urea-molasses mineral block etc to feed the livestock.</p> <p>-Provision for health care.</p>	<p>and the replacement stock</p> <p>-Provision for health care</p> <p>- Fodder rejuvenation programme</p> <p>- Culling of affected and unproductive animals</p>
Drinking water	<p>Preserve water in community tanks, ponds etc. with sanitization, Wells or dug wells may be constructed in advance, Training &amp; awareness camp among extension personnel</p>	<p>-Animals not to be exposed to outside rather they should be commonly fed.</p> <p>-Provide drinking water from the sources created before the occurrence of the event.</p> <p>-Provision for health care.</p>	<p>Culling of affected and unproductive animals</p>
Health and diseases management	<p>- Veterinary preparedness with vaccines &amp; medicines.</p> <p>-Training &amp; awareness camp among</p>	<p>-Organise animal health camps and treating the affected animals.</p> <p>-Supplementation of mineral and vitamin mixtures.</p>	<p>-Culling of unproductive livestock,</p> <p>-Proper disposal of dead</p>

	<p>extension personnel including NGOs, SHGs and Gopal Mitras.</p> <ul style="list-style-type: none"> <li>- Timely vaccination</li> <li>- Insurance of livestock</li> </ul>		<p>animals</p> <ul style="list-style-type: none"> <li>- Availing insurance</li> </ul>
<b>Floods</b>			
Feed and fodder availability	<p>–Encourage fodder cultivation during rainy season. On boundaries of agricultural field, fodder trees or shrubs like Sesbania, Subabul, etc. should be planted</p> <ul style="list-style-type: none"> <li>- Excess fodder may be stored as hay/silage</li> <li>-Establish fodder bank near forest areas,</li> <li>- Raised platform for safety of the animals</li> <li>- Stocking of concentrate feed in sufficient quantity</li> <li>- Training &amp; awareness camp among extension personnel for needful at time of exigencies.</li> <li>–Insurance of Livestock.</li> </ul>	<p>–Utilizing fodder from perennial trees and fodder bank reserves.</p> <ul style="list-style-type: none"> <li>–Transporting excess fodder from adjoining flood free areas.</li> <li>–Use of unconventional livestock feed such as paddy straw, rice bran, banana plant, crop residues, and other tree leaves etc.</li> <li>–Improve quality of poor roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them</li> <li>- Keep animals in safe place</li> <li>–Provision for health care.</li> </ul>	<ul style="list-style-type: none"> <li>- Provision of supplementary feeding (concentrate / Roughage) with vitamin &amp; minerals</li> <li>- Health check-up</li> <li>- Culling of diseased and unproductive animals</li> <li>- Availing insurance</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>–Preserve safe drinking water in community tanks.</li> <li>–Provision for chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats &amp;</li> </ul>	Provide clean and safe drinking water to the animals.	<ul style="list-style-type: none"> <li>- Provision of clean drinking water</li> <li>- Avail insurance</li> </ul>

	<p>shelter places</p> <p>–Training &amp; awareness camp among extension personnel</p> <p>- Insurance of the livestock</p>		
Health and diseases management	<p>–Construction of shelter places in elevated points</p> <p>–Vaccination of livestock</p> <p>–Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for tourniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers, Potassium permanganate, Acriflvin, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, Treacle, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint) &amp; the like.</p>	<p>–Engage one veterinarian for 3 to 4 villages to work with the help of local volunteers.</p> <p>–The team should be well equipped with contingent items like bandages, tourniquet ropes, drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc.</p> <p>–Keep the animals loose in paddock (sheltered or unsheltered)</p> <p>–Release animals from the unnatural and harmful position or situation, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs.</p>	<p>–Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners.</p> <p>–Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. – Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals.</p> <p>–Improving shed hygiene especially in the farmers household through cleaning and disinfection</p> <p>- Culling of unproductive animals</p>

			- Avail insurance
<b>Cyclone</b>		NA	
<b>Heat wave and cold wave</b>		NA	

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

### 2.5.2 Poultry

	<b>Suggested contingency measures</b>		
	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>Drought</b>			
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>-Procurement of feed ingredients well ahead of time</li> <li>-Establish feed serve bank</li> <li>-Insurance of Poultry farms</li> <li>-Production of feed ingredients locally</li> </ul>	<ul style="list-style-type: none"> <li>-Feed utilization from feed bank</li> <li>-Provision for supplementation of feed</li> <li>-Mixing feed as per norms with locally available ingredients.</li> </ul>	<ul style="list-style-type: none"> <li>-Avail insurance as per the norms</li> <li>-Make feed ingredient or compound feed available to the farmers</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>-Identify water source for ensuring sufficient potable water during draught</li> <li>-Preserve safe drinking water in community tank.</li> </ul>	Provide sanitized drinking water	Plan accordingly for the next year
Health and diseases management	<ul style="list-style-type: none"> <li>-Procurement of vaccines and medicines and antistress agent.</li> <li>-Feeding antibiotics</li> <li>-Procurement of low cost litter materials</li> </ul>	<ul style="list-style-type: none"> <li>-Administration of vaccines timely</li> <li>-Continue feeding of antistress agent</li> </ul>	Culling of affected birds
<b>Floods</b>			

Shortage of feed ingredients	Ensure procurement of feed ingredients / compound feed well ahead	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control
Drinking water	<ul style="list-style-type: none"> <li>–Preserve safe drinking water in community tanks.</li> <li>–Provision for chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats &amp; shelter places</li> </ul>	Provide sanitized drinking water along with preventive dose of water soluble antibacterial agent	Sanitization of water sources with bleaching powder or any water sanitizer
Health and diseases management	<ul style="list-style-type: none"> <li>–Procurement of vaccines and medicines.</li> <li>–Feeding antibiotics</li> <li>–Procurement of litter materials</li> </ul>	<ul style="list-style-type: none"> <li>–Continue feeding antibiotics</li> <li>–Replace wet litter</li> <li>–Proper disposal of dead birds if any</li> </ul>	<ul style="list-style-type: none"> <li>–Disinfection of the farm premises.</li> <li>–Feeding antibiotics and deworming agent</li> <li>Replace wet litter</li> <li>–Disinfection of sheds.</li> <li>Proper disposal of dead birds if any</li> </ul>
<b>Cyclone</b>	<b>NA</b>		
<b>Heat wave and cold wave</b>	<b>NA</b>		

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

### 2.5.3 Fisheries

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			

Marine	-	-	-
Inland			
(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 to supply water during the event</li> </ul>	<ul style="list-style-type: none"> <li>- Stop over exploitation</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 space</li> <li>- Removal of aquatic weeds</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>
(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</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> </ul>	<ul style="list-style-type: none"> <li>- Extended seed production</li> <li>- Restock the pond.</li> <li>- Integrated fish</li> </ul>

	<p>water loss through seepage.</p> <ul style="list-style-type: none"> <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>- 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>	<p>farming</p> <ul style="list-style-type: none"> <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	<ul style="list-style-type: none"> <li>- Removal of aquatic weeds</li> <li>- Thinning out of stock against reduced dissolved oxygen and space</li> </ul>	<ul style="list-style-type: none"> <li>- Recirculation of water and/or aeration.</li> <li>- Careful observation on daily basis.</li> </ul>	- -
(iii) Any other	-	-	-
<b>2) Floods</b>			

<b>A. Capture</b>			
Marine	-	-	-
Inland	<ul style="list-style-type: none"> <li>- Preparation for pen and cage culture</li> </ul>	<ul style="list-style-type: none"> <li>- Pen &amp; cage culture</li> <li>- Can get engaged in other related activities like net and gear making.</li> </ul>	<ul style="list-style-type: none"> <li>- Desilting &amp; weed removal if possible</li> </ul>
(i) No. of boats / nets/damaged			
(ii) No.of houses damaged			
(iii) Loss of stock			<ul style="list-style-type: none"> <li>• Pen &amp; cage culture</li> </ul>
(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 to be kept ready.</li> <li>- 'High stocking multiple harvesting' can be taken up.</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> </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</li> </ul>

	<ul style="list-style-type: none"> <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>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	<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>
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			<ul style="list-style-type: none"> <li>- After possible repairing of the</li> </ul>

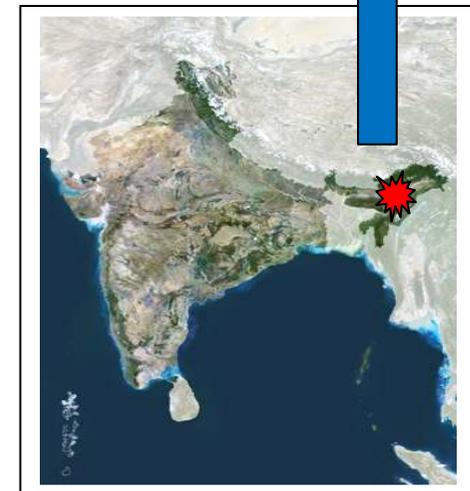
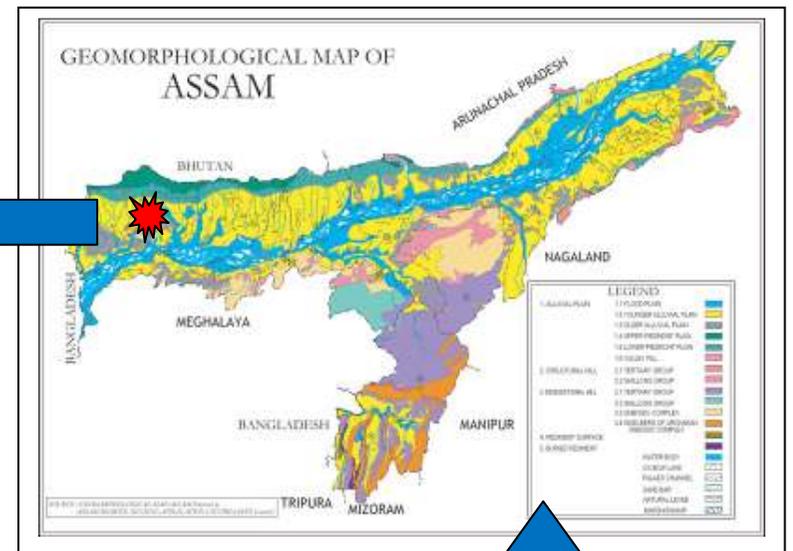
			physical damage, take up late seed rearing to be stocked in the next year.
(v) Infrastructure damage (pumps, aerators, huts etc)			
(vi) Any other			– Small scale homestead ornamental fish production, depending on the market.
<b>3. Cyclone / Tsunami</b>			
A. Capture	-	-	-
Marine	-	-	-
(i) Average compensation 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)	– Apply lime regularly as per recommendation.	– Apply lime regularly as per recommendation.	– Apply lime regularly as per recommendation.
(ii) Health and Disease management	– Apply preventive agents (eg. CIFAX) before on set of winter.	– Restrict application of fertilizer as per requirement.	

(iii) Any other	-	-	-

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

Annexure I

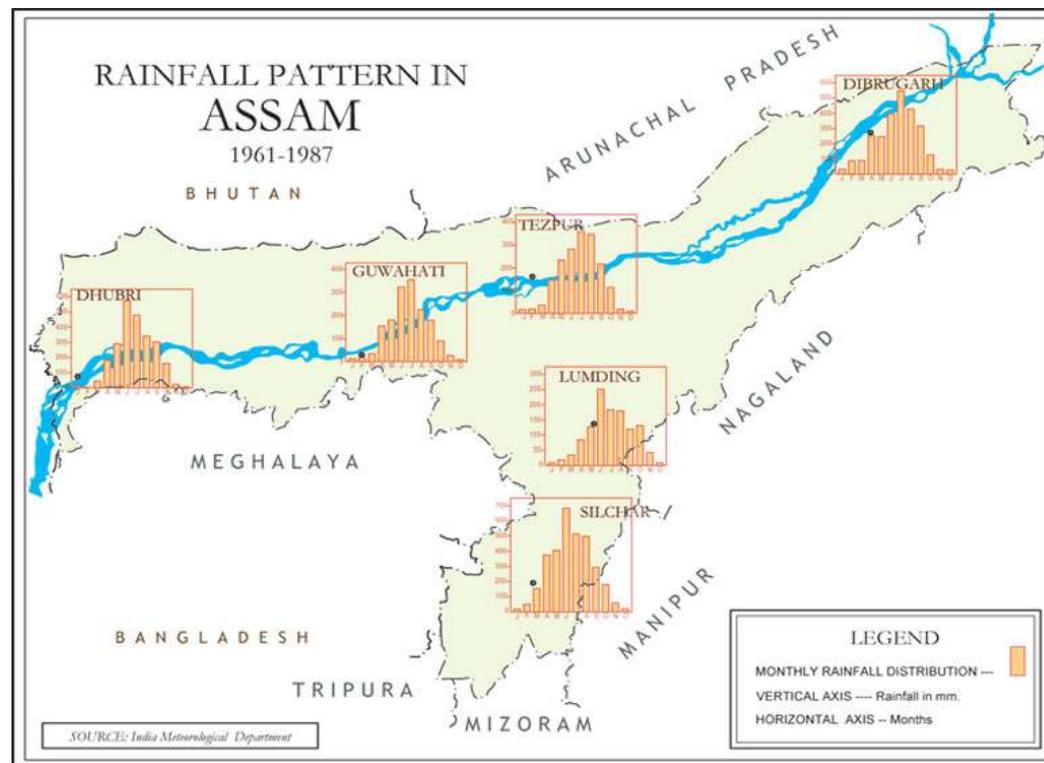


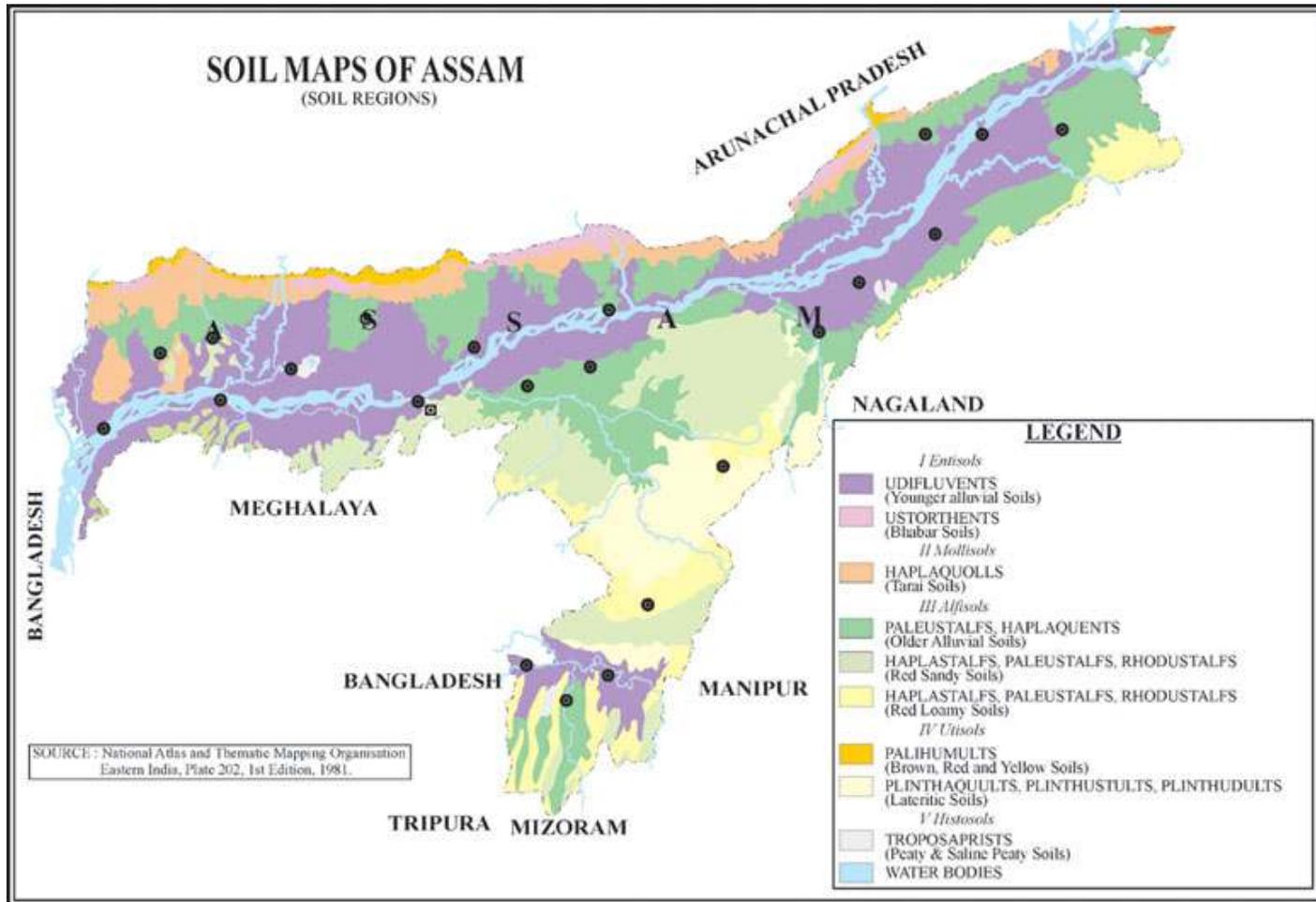
**DIGITAL MAP OF BONGAIGAON DISTRICT OF ASSAM**

**ANNEXURE II**

**ANNUAL RAINFALL MAP OF ASSAM, INDIA**

**ANNEXURE III**





**SOIL MAP OF ASSAM ANNEXURE-III**