State: ASSAM

Agriculture Contingency Plan for the District: Kamrup

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological zone**			
	Agro Ecological sub-Region (ICAR)	Assam And Bengal Plain, Hot Subhumid To Humid (Inclusion Of Perhumid) Eco-Region(15.2)		
	Agro Climatic Region (Planning commission)	Eastern Himalayan Zone (II)		
	Agro Climatic Zone (NARP)*	Lower Brahmaputra Valley Zone (AS-4)		
	List of all districts falling under the NARP Zones	Kamrup (Metro), Kamrup (Rural), Nalbari, Barpeta, Baksa, Goalpara, Dhubri, Bongaigaon, Chirang and Kokrajhar		
	Geographic coordinates of districts	**Latitude**	**Longitude**	**altitude**
		25 ^{0} 44́ N- 26 ^{0} 51́ N	90 ^{0} 56́ E- 92^{0} 10́ E	64 m above MSL at HRS, Kahikuchi
	Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS	Horticultural Research Station, Assam Agricultural University, Kahikuchi, P.O. Azara, Guwahati-781 017, Kamrup		
	Mention the KVK located in the district	KVK Kamrup, AAU Kahikuchi Campus P.O.: Azara Dist.: Kamrup		
1.2	**Rainfall**	**Annual Average (mm)**	**Normal onset (Specify week and month)**	**Normal Cessation (Specify week and month)**
	SW monsoon (June-Sep.):	1203.7	1st week of June	Continue up to September
	NE Monsoon (Oct-Dec):	141.5	2nd week of October	November
	Winter (Jan-March)	89.2		
	Summer (Apr-May)	361.8		
	Annual	**1796.2**		

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

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
	Area(Lakh ha)	4.345	1.166	0.774	0.212	0.036	0.20	0.203	0.079	0.031

1.4	Major Soils **	Area(' 000 ha)	Per cent (%) of total
	1. Ambari series 1	29.0	16.57
	2. Rangingpara	22.4	12.80
	3. Singra series	18.1	10.34
	4. Nichalamari series	14.3	8.17
	5. Moindra series	14.0	8.00
	Others (Specify): Kamrup series Habilagaon Malita series Nilachal Bharatpur Kheliapara Others(Not reported)	 13.6 11.4 10.5 9.3 6.5 5.6 -	 7.77 6.51 6.00 5.31 3.71 3.20 11.62
1.5	**Agricultural land use**	**Area (' 000 ha)**	**Cropping intensity %**
	Net sown area	175.93 *	120
	Area sown more than once	35.49 *	
	Net irrigated area	4.54	
	Gross cropped area	211.43 *	

Source: * Statistical Handbook, Assam'2009 * * Soils of Assam, National Bureau of Soil Survey

1.6	Irrigation	Area (‘000 ha)	Percent (%)	
	Net cultivated area	175.93	-	
	Net irrigated area (2009-10)	4.54 ***	2.58 (of net cultivated area)	
	Gross cultivated area	211.43	120 (-do-)	
	Rainfed area	203.1	97.42 (-do-)	
	Sources of irrigation	**Number**	**Area(‘000 ha)**	**Area (%)**
	Canals		2.512	4.96
	Tanks		0.693	1.37
	Open wells		0.138	0.27
	Bore wells		41.78	82.53
	Lift irrigation		1.019	2.02
	Other sources		4.480	8.85
	Total		50.622	100
	Pump sets	25787	51.574 ha	
	Micro-irrigation	N.A.	N.A.	
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited	N.A.	N.A.	N.A.
	Critical	N.A.	N.A.	N.A.
	Semi-critical			
	Safe			

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

***Source**: Dept. of Irrigation, G.O.I. **NA=** Not Available

Area under major field crops & horticulture etc.

1.7	**Field Crops**		**Total area^**	**Irrigated**	**Rainfed**
	1	Autumn Rice	15305 ha		
	2	Winter Rice	92570 ha		
	3	Summer Rice	43828 ha		
	4	Rape seed and Mustard	9069 ha		
	5	Wheat	3006 ha		
	6	Pulses (Total)	8088 ha		
	Horticulture crops -Fruits		**Total area ^**	**Irrigated**	**Rainfed**
	1	Banana	3358 ha	-	2922 ha
	2	Pineapple	1825 ha	-	1899 ha
	3	Orange	2875 ha	-	2305 ha
	4	Jack fruit(07-08)	1862 ha	-	1780 ha
	5	Assam Lemon(07-08)	480 ha	-	420 ha
	6	Papaya(07-08)	484 ha	-	429 ha
	Horticultural crops – Vegetables		**Total area**	**Irrigated**	**Rainfed**
	1	Rabi crops ^^	9012 ha	5157 ha	2579 ha
	2	Kharif crops^^	5365 ha	-	5007 ha
	3				
	Medicinal and Aromatic crops		**Total area**	**Irrigated**	**Rainfed**
	1	N.A.			
	Plantation crops		**Total area**	**Irrigated**	**Rainfed**
	1	Areca nut	7300		Entire rainfed
	2	Coconut	2520		Entire rainfed
	3				
	Fodder crops		**Total area**	**Irrigated**	**Rainfed**
	1	N.A.			
		Total fodder crop area			
		Grazing land			

^ **Source**: Statistical Handbook of Assam, 2008^^ **Source**: Directorate of Economics of Statistics, G.O.I. **NA**= Data not available

1.8	**Livestock**	**Number ('000)**		
	Cattle	1397614		
	Buffaloes total	86599		
	Commercial dairy farms	NA#		
	Goat	480613		
	Sheep	NA#		
	Others (Camel, Pig, Yak etc.)	92457		
1.9	**Poultry**			
	Commercial	1992456		
	Backyard	NA#		
1.10	**Inland Fisheries**	**Area (ha)**	**Yield(t/ha)**	**Production(tonnes)**
	Brackish water			
	Fresh water			
	Others	10673	123.8	12174 M.T.

1.11	**Production and Productivity of major crops**	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production (t)	Productivity (kg/ha)	Production (t)	Productivity (kg/ha)	Production (t)	Productivity (kg/ha)	Production (t)	Productivity (kg/ha)
	Autumn Rice	13713	896	-	-	-	-	13713	896
	Winter Rice	-	-	120063	1297.00	-	-	120063	1297.00
	Summer Rice	-	-	-	-	97868	2232.7	97868	2232.7
	Rape seed and Mustard	-	-	5042	556.4	-	-	5042	556.4
	Wheat	-	-	5789	1872.6	-	-	5789	1872.6
	Pulses (Total)	-	-	4634	572.5	-	-	4634	572.5
	Major								

Horticultural crops: Fruits

	Banana							29,775	8847
	Pineapple							34,193	18736
	Orange							25,691	8936
	Jackfruit							17,212	9244
	Assam lemon							15,264	31800
	Papaya							43014	86806

 # NA = Not available

Horticultural crops: Vegetables^^

	Rabi Vegetables							3.362	4346
	Kharif Vegetables							3.734	7458

^ ^ **Source:** Directorate of Economics of Statistics, G.O.I.

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	**Winter Rice**	**Summer Rice**	**Autumn Rice**	**Rape seed and Mustard**	**Pulse**
	Kharif – Rainfed	15^{th} June-15^{th} July				Aug-Sept
	Kharif- irrigated (Summer)		15^{th} Nov- 15^{th} Dec			
	Rabi-Rainfed				15^{th} Oct- 15^{th} Nov.	
	Rabi-irrigated			15^{th} Dec – 15^{th} Jan		

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular			Sporadic (Specify month of occurrence in brackets)			None
		Serve	Moderate	Mild	Serve	Moderate	Mild	
	Drought					√ (July-August)		
	Flood	√(July-August)						
	Cyclone							-
	Hail storm			√ (March-April)				
	Heat wave							-
	Cold wave							-
	Frost							-
	See water inundation							-
	Pests and diseases (Specify)		√(June-August)					

1.14	**Include Digital Maps of the district for**	Location map of district with in State as Annexure 1	Enclosed: Yes.
		Mean annual rainfall as Annexure 2	Enclosed : **Yes**.
		Soil map as Annexure 3	Enclosed : **yes**.

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Suggested Contingency measures (Details in Annex. I)				
Early season Drought (delayed onset)	**Major Farming Situation***	**Crop/cropping system***	**Change in crop/cropping System***	**Agronomic Measures***	**Remarks on Implementation***
Delay by 2 Weeks(Specify Monthly) **June 3rd week**	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	No change	➢ Normal recommended practices	-
		Banana (plantation) Dwarf cavendish, Borjahji, Malbhog	No change	➢ Use of bio mulching	-
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	➢ Growing of medium duration rice varieties ➢ Supplemental irrigation in the nursery bed of rice.	-Mega seed production programme for field crops
		Ahu rice -Fallow-Rabi vegetable/potato/toria	No change	➢ Growing of short duration *ahu* rice variety like Luit	
		Fallow-Sali Rice - Fallow	No change	➢ Growing of high yielding varieties like Ranjit, Bahadur, Mahsuri, Ketekijoha etc. ➢ Prepare of seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g MOP per bed of 10mx1.25m ➢ Raising of seedling of rice in community nursery	Mega seed production programme for field crops

Condition	Suggested Contingency measures (Details in Annex. I)				
Early season Drought (delayed onset)	**Major Farming Situation***	**Crop/cropping system***	**Change in crop/cropping System***	**Agronomic Measures***	**Remarks on Implementation***
Delay by 4 Weeks(Specify Monthly) **July 1st week**	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	No change	➢ As per normal package of practices	-Lift irrigation from nearby river stream
		Banana (plantation) Dwarf cavendish, Borjahji, Malbhog	No change	➢ Use of bio mulching	Community bund on tributaries for diversion of water flow to crop field
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	➢ Growing of medium duration rice varieties ➢ Supplemental irrigation in the nursery bed of rice. ➢ Growing of short duration vegetables	-Mega seed production programme for field crops
		Ahu rice -Fallow-Rabi vegetable/potato/toria	No change	➢ Growing of short duration ahu rice variety like Luit ➢ Early sowing of rabi crop for efficient utilization of residual soil moisture.	
		Fallow-Sali Rice -Fallow	Fallow-Sali rice-Rapeseed/pea	➢ Growing of high yielding varieties like Ranjit, Bahadur, Mahsuri, Ketekijoha etc. ➢ Prepare of seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g MOP per bed of 10mx1.25m ➢ Inclusion of rabi crop like rapeseed/pea etc	Mega seed production programme for field crops

Condition	Suggested Contingency measures (Details in Annex. I)				
Early season Drought (delayed onset)	**Major Farming Situation***	**Normal crop/cropping system***	**Crop management**	**Agronomic Measures***	**Remarks on Implementation***
Delay by 6 Weeks(Specify Monthly) **July 3rd week**	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	No change	➢ Weeding at critical stages of growth ➢ Line sowing and mixed cropping and intercropping of vegetables ➢ Raising of rice seedling in community nursery ➢ Addition of sufficient organic matter in the soil at the time of land preparation	-Development of water harvesting structure under NREGS for life saving irrigation -Lift irrigation from nearby river stream
		Banana (plantation) Dwarf cavendish, Borjahji, Malbhog	No change	➢ Use of bio mulching ➢ Intercropping of vegetables/ in new plantation	
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	➢ Growing of medium duration rice varieties ➢ Supplemental irrigation in the nursery bed of rice. ➢ Close spacing, increase no. of seedlings per hill, ➢ Development of rain water harvesting structure	-Mega seed production programme for field crops -Community bund on tributaries for diversion of water flow to crop field
		Ahu rice -Fallow-Rabi vegetable/potato/toria	No change	➢ Growing of short duration ahu rice variety like Luit ➢ Early sowing of rabi crop for efficient utilization of residual soil moisture.	

		Fallow-Sali Rice - Fallow	Fallow-Sali rice-Rapeseed/pea	➢ Select delayed planting varieties like Prafulla and Gitesh (60 days old seedlings) ➢ Prepare of seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g MOP per bed of 10mx1.25m ➢ Inclusion of rabi crop like rapeseed/pea etc	Mega seed production programme for field crops

Condition	**Suggested Contingency measures (Details in Annex. I)**				
Early season Drought (delayed onset)	**Major Farming Situation***	**Normal Crop/cropping system***	**Change in crop/cropping System***	**Agronomic Measures***	**Remarks on Implementation***
Delay by 8 Weeks(Specify Monthly) **August 1st week**	Rainfed upland (Sandy loam to clay loam)	Blackgram/Sesame (kharif) - Toria/rabi pulse /Potato/Rabi vegetables	No change	➢ Life saving supplemental irrigation and weeding at critical stages of growth ➢ Line sowing and mixed cropping and intercropping of vegetables ➢ Supplemental irrigation in the nursery bed of Rabi vegetables ➢ Addition of sufficient organic matter in the soil at the time of land preparation	Development of water harvesting structure under NREGS for life saving irrigation
		Banana /Citrus/Pineapple	No change	➢ Use of Black poly mulch ➢ Use of bio mulching ➢ Intercropping of vegetables in new plantation	

	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	No change	➢ Select delayed planting varieties like Prafulla and Gitesh (60 days old seedlings) ➢ Supplemental irrigation in the nursery bed of rice. ➢ Close spacing, increase no. of seedlings per hill, ➢ Development of rain water harvesting structure	-Mega seed production programme for field crops -Development of water harvesting structure under NREGS for life saving irrigation
		Ahu rice -Fallow-Rabi vegetable/potato/toria	No change	➢ Growing of short duration ahu rice variety like Luit ➢ Early sowing of rabi crop for efficient utilization of residual soil moisture.	
		Fallow-Sali Rice - Fallow	Fallow-Sali rice-Rapeseed/pea	➢ Select delayed planting varieties like Prafulla and Gitesh (60 days old seedlings) ➢ Prepare of seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g MOP per bed of 10mx1.25m ➢ Inclusion of rabi crop like rapeseed/pea etc	Mega seed production programme for field crops -Development of water harvesting structure under NREGS for life saving irrigation

Condition	Suggested Contingency measures				
Early season drought (Normal onset	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measures[d]**	**Remarks on Implementation[e]**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	Gap filling and resowing	➢ Vegetables which are at maturity stage supplement irrigation and harvesting be at physiological maturity stage ➢ Mulching, Conservation furrows	Community bund on tributaries for diversion of water flow to crop field
		Banana /citrus/pileapple	-do-	➢ Use of black poly mulch ➢ Mulching, Conservation furrows ➢ Intercropping of vegetables in new plantation	
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	-do-	➢ Green manuring practice during summer ➢ Prepare dry, well bunded, flat seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g	

		Ahu rice -Fallow-Rabi vegetable/potato/toria	-do-	➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field ➢ Urgent irrigation, Weeding, Thinning of population	
		Fallow-Sali Rice - Fallow	Fallow-Sali rice-Rapeseed/pea	➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field. ➢ Where germination is severely affected, re-sowing of rice seed may also be recommended.	

Condition	Suggested Contingency measures				
Early season drought (Normal onset	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measures[d]**	**Remarks on Implementation[e]**
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) **At vegetative stage**	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	➢ Life saving supplemental irrigation ➢ Weeding at critical stages of growth.	➢ Application of sufficient quantity of FYM or compost in the main field. ➢ Top dressing of additional quantity of K fertilizer in rice. ➢ Mulching, Conservation furrows	Community bund on tributaries for diversion of water flow to crop field
		Banana/citrus/pineapple	➢ Life saving supplemental irrigation	➢ Mulching, Conservation furrows ➢ Intercropping of vegetables in new plantation ➢ Drip irrigation	
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	Weeding at critical stages of growth	➢ Green manuring practice during summer ➢ Prepare dry, well bunded, flat seedbed with adequate FYM(30 kg), ➢ Spraying of 2% KCL solution on leaves of rice ➢ Top dressing of additional quantity of K fertilizer in rice ➢ Application of insecticides against thrips in nursery bed of rice	

		Ahu rice -Fallow-Rabi vegetable/potato/toria	-	➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field ➢ Urgent irrigation, Weeding, Thinning of population ➢ Spraying of 2% KCL solution on leaves of rice if and when drought appears ➢ Top dressing of additional quantity of K fertilizer in rice	
		Fallow-Sali Rice - Fallow	-	➢ 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 ➢ Top dressing of urea may be delayed upto heading stage of rice if drought prevails at the stages of top dressing ➢ Life saving supplemental irrigation at critical stages of crop growth ➢ Application of insecticides against thrips in nursery bed of rice	

Condition	Suggested Contingency measures				
Early season drought (Normal onset	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measures[d]**	**Remarks on Implementation[e]**
Mid season drought (long dry spell) At reproductive stage	Rainfed upland (Sandy loam to clay loam)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	➢ Life saving supplemental irrigation ➢ Harvesting at physiological maturity	➢ Life saving supplemental irrigation ➢ Weeding at critical stages of growth. ➢ Application of sufficient quantity of FYM or compost in the main field. ➢ Top dressing of additional quantity of K fertilizer in rice. ➢ Mulching, Conservation furrows	Community bund on tributaries for diversion of water flow to crop field
		Banana /pineapple/citrus	-	➢ Use of black poly mulch ➢ Mulching, Conservation furrows ➢ Intercropping of vegetables in new plantation ➢ Drip irrigation	

	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	-	➢ Green manuring practice during summer ➢ Prepare dry, well bunded, flat seedbed with adequate FYM(30 kg), 80g urea, 80g SSP and 80g ➢ Spraying of 2% KCL solution on leaves of rice if and when drought appears ➢ Top dressing of additional quantity of K fertilizer in rice	
		Ahu rice -Fallow-Rabi vegetable/potato/toria	-	➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field ➢ Urgent irrigation, Weeding, Thinning of population ➢ Spraying of 2% KCL solution on leaves of rice if and when drought appears ➢ Top dressing of additional quantity of K fertilizer in rice	

		Fallow-Sali Rice - Fallow	Fallow-Sali rice-Rapeseed/pea	➢ 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 ➢ Life saving supplemental irrigation at critical stages of crop growth	
		Ahu rice-Fallow-Toria/Potato/rabi vegetable	-	➢ Green manuring practice during summer ➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field.	

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)	Summer vegetables/ Blackgram/Sesame (kharif) - Toria/ /Potato/Rabi vegetables	Summer vegetable-Green manuring-rabi vegetable/toria/potato	➢ Application of sufficient quantity of FYM or compost in the main field. ➢ Early rabi cropping ➢ Growing of rabi field crops like toria, lentil, wheat in time with presowing irrigation if required	
		Banana /citrus/pineapple	-	➢ Mulching, Conservation furrows ➢ Intercropping with rabi vegetables in new plantation ➢ Drip irrigation	
	Rainfed medium/medium lowland (Sandy loam to clay loam)	Jute/Sali Rice-Toria/Lentil/ Wheat/Potato/Rabi vegetables	-	➢ Growing of rabi vegetables like Cabbage, Cauliflower, Knolkhol, Tomato, Brinjal, Pea, Carrot etc. ➢ Growing of rabi field crops like toria, lentil, wheat in time with presowing irrigation if required.	
		Ahu rice -Fallow-Rabi vegetable/potato/toria	-	➢ Application of sufficient quantity of FYM or compost in the nursery bed and main field	
		Fallow-Sali Rice - Fallow	Fallow-Sali rice-Rapeseed/pea	➢ Growing of rabi vegetables like Cabbage, Cauliflower, Knolkhol, Tomato, Brinjal, Pea, Carrot etc. ➢ Growing of rabi field crops like toria, lentil, wheat in time with presowing irrigation if required.	

2.1.2 Drought - Irrigated situation

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

Some other situations 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[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall	Not applicable				

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	Not applicable				

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment	NA				

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	NA		NA		
Insufficiency of surface water for irrigation	NA				

Condition	Suggested Contingency measures				
Insufficient / Delayed onset of monsoon	**Major Farming situation[s]**	**Crop/cropping system[g]**	**Change in crop/ Cropping System[h]**	**Agronomic Measure[I]**	**Remarks on Implementation[j]**
				➢	
Insufficient groundwater Recharge due to low rainfall	**NA**				

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Sali paddy	Clearing of water ways by destroying waterhyacinth and ipomia	Drainage and PP*	Harvest at physiological maturity stage	Development Community threshing floor
Ahu paddy	Clearing of water ways by destroying waterhyacinth and ipomia	Drainage and PP*	Spraying of Diquat 0.05% or Praquat 0.1% or Common salt 10% at earhead @ 1000 lts.ha 20 days after 50% flowering	Development Community threshing floor
Summer rice	Clearing of water ways by destroying waterhyacinth and ipomia	Drainage and PP*	Spraying of Diquat 0.05% or Praquat 0.1% or Common salt 10% at earhead @ 1000 lts.ha 20 days after 50% flowering	Development Community threshing floor
Toria	Drainage	Drainage and PP*	Drainage	Development Community threshing floor
Sesamun	Drainage	Drainage	Drainage	Development Community threshing floor
Horticulture				
Banana	Drainage	Drainage	Drainage	
Assam lemon	Drainage	Drainage	Drainage	
Coconut/ Arecanut	Drainage	Drainage	Drainage	

Kharif vegetables	Drainage	Drainage	Drainage	
Rabi vegetables	**Drainage**	**Drainage**	**Drainage**	
Heavy rainfall with high speed winds a short span[2]				
Sali paddy	K application	-	-	
Ahu paddy	K application	-	-	
Summer rice	K application	-	-	
Toria	K application	-	-	
Sesamun	K application	-	-	
Horticulture				
Banana	Drainage and staking	Drainage and staking	Drainage and staking	-
sam lemon	Drainage	Drainage	Drainage	-
Coconut/ Arecanut	Drainage	Drainage	Drainage	-
Kharif vegetables	Drainage	Drainage	Drainage	-
Rabi vegetables	Drainage	Drainage	Drainage	-
Outbreak of pests and diseases due to unseasonable rains				
Sali paddy	PP*	PP*	PP*	
Ahu paddy	PP*	PP*	PP*	
Summer rice	PP*	PP*	PP*	
Toria	PP*	PP*	PP*	
Sesamun	PP*	PP*	PP*	
Horticulture				
Banana	PP*	PP*	PP*	-
Assam lemon	PP*	PP*	PP*	-
Coconut/ Arecanut	PP*	PP*	PP*	-
Kharif vegetables	PP*	PP*	PP*	-
Rabi vegetables	PP*	PP*	PP*	-

*** PP= Plant protection**

2.3 Floods

Condition	Suggested contingency measure [0]			
Transient water logging / partial inundation[1]	**Seedling / nursery stage**	**Vegetable stage**	**Reproductive stage**	**At harvest**
Sali paddy	Drainage of the Nursery bed, If not possible go for re -sowing	Apply 50% N + 50% K2O as top dressing during the tillering stage. In partially damaged field. gap filling may be done by redistributing the tillers. Wet seeding of sprouted seeds (@75-80 kg/ha) of tolerant varieties Jalashree, Jalkunwari (tolerant upto 15 day submergence) Management of pests & diseases	If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops. Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of vegetables after receding flood water	Harvest crop immediately Arrange for quick drying Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of vegetables after receding flood water
Ahu paddy	Drainage		Drainage	-
Summer rice	Drainage		Drainage	-
Toria	Drainage	-	Drainage	-
Sesamun	Drainage	Drainage	Drainage	-
Horticulture				
Banana	Drainage	Drainage		-
Assam lemon	Drainage	Drainage		-
Vegetables (Kharif)	Drainage and PP*	Drainage and PP*	Drainage and PP*	-
Continuous submergence for more than 2 days[2]				

Sali paddy	Drainage	Drainage	Drainage	
Ahu paddy	Drainage	Drainage	Drainage	
Summer rice	Drainage	Drainage	Drainage	
Toria	Drainage	-	-	
Sesamun	Drainage	-	-	
Horticulture				
Banana	Drainage	Drainage	Drainage	
Assam lemon	Drainage	Drainage	Drainage	
Vegetables (Kharif)	Drainage and PP*	Drainage and PP*	Drainage and PP*	
Sea water inundation[3]	Not applicable			

*** PP= Plant protection**

2.4 Extreme events: Heat wave / Cold wave /Frost /Hailstorm /Cyclone : Not applicable

Extreme event type	Suggested contingency measure[1]			
	Seedling /nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave[p]	Not applicable			
Cold wave[q]				
Hailstorm				
Frost				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

Drought	Suggested contingency measures		
	Before the event	During the event	After the event
Feed and fodder availability	1. Govt. Fodder Farm 2. Cultivated under various schemes 3. Natural source 4. Fodder bank 5. Growing of dual purpose Maize	1. Availability from the source before event. 2. Action to be taken for fodder cultivation 3. Treated fodder to be used	1. Arrange from the available source till the situation normalizes. 2. Action to be taken for fodder cultivation.
Drinking water	1. Available in natural source	1. Available in natural source	1. Available in natural source.
Health and disease management	1. Treatment and preventive measures are taken regularly	1. Arrange for stocking of sufficient medicines and vaccines 2. Care to be taken according to the disease condition.	1. Arrange for treatment and preventive measures according to the situation

Floods	Suggested contingency measures		
	Before the event	During the event	After the event
Feed and fodder availability	1. Govt. Fodder Farm 2. Cultivated under various schemes	1. Availability from the source before event. 2. Relief measures in terms of fodder and concentrated feed in the affected areas	1. Arrange from the available source till the situation normalizes.

	3. Natural source 4. Fodder bank		
Drinking water	1. Available in natural source	1. Arrange for disinfected / medicated water in shelter areas	1.Arrange for sufficient disinfection and medication of water in shelter areas
Health and disease management	1. Arrangement for treatment and vaccination programme	1. Arrange for treatment and medicines according to the condition 2. Flood action plan prepared and mobilized the team to meet up the urgency 3. Arrangement of fumigation and mosquito net	1. Arrange for treatment and preventive measures according to the situation
Cyclone	Suggested contingency measures		
	Before the event	During the event	After the event
Heat wave and cold wave	Suggested contingency measures		
	Before the event	During the event	After the event

2.5.2 Poultry

Drought	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**
Shortage of Feed ingredients	1. Storage of adequate feed	1. Availability from storage 2. Action to be taken from relief	1. Arrange from the available source till the situation normalizes
Drinking water	1. Water reservoirs	1. Storage/ reservoir making in shelter places	1. Arrange from the available source till the situation normalizes
Health and disease management	1. Treatment and preventive measures are taken regularly	1. Arrangement for stocking of sufficient medicines and vaccines 2. Care to be taken according to the disease condition	1. Arrange for treatment and preventive measures according to the situation
Floods	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**
Shortage of feed ingredients	1. Storage of adequate feed	1. Availability from the source before event. 2. Relief measures in the affected areas	1. Arrange from the available source till the situation normalizes

Drinking water	1. Available in natural source	1. Arrange for disinfected / medicated water in shelter areas	1. Arrange for sufficient disinfection and medication of water in shelter areas
Health and disease management	1. Arrangement for treatment and vaccination programme	1. Arrange for treatment and preventive measures according to the situation 2. Flood Action Plan prepared and mobilize the team to meet up the urgency 3. Immediate vaccination of poultry	1. Arrange for treatment and preventive measures according to the situation
Cyclone	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**
Heat wave and cold wave	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**

[s] based on forewarning wherever available

2.5.3 Fisheries

Drought	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**
Shallow water in ponds due to Insufficient rain/inflows	Provision of water pump (5 HP capacities) or shallow tube well nearby pond is necessary	Provide water to a level of 1.2 m depth from other sources	Advanced fingerling (5"-6") or yearling may be stocked for production of table fish
Impact of heat and salt load build up in ponds / change in water quality	Impact of heat and salt load in our district does not arise. Water quality is to be monitored regularly with the help of water quality testing kit.	As per change in chemical parameters, actions are to be taken with respect to a. change in dissolved oxygen b. change in total alkalinity c. change in total hardness d. change in free CO_2 etc.	Based on change in different chemical parameters, different species of fishes are to be stocked for production purpose.
Floods	**Suggested contingency measures**		
	Before the event[s]	**During the event**	**After the event**

Inundation with flood waters	1. Provision of bana (bamboo fencing) along with mosquito nets are to be kept. If it is a frequent/regular problem, the height of band or embankment may be raised for precautionary measures.	1. Bana and net are to be fixed to prevent escape of fish. 2. Provide sufficient feed to the pond to prevent escape of fish	1. If there are stocked fish in the pond, liming and $KMnO_4$ are to be supplied to the pond. 2. If fish escape for pond, then advanced fingerling or yearling are to be stocked for quick growth in shorter span of time.
Water contamination and changes in BOD	1. Raise embankment of pond to stop inflow of water to the pond.	1. Apply sufficient lime as per schedule to neutralize the contaminated water and to lower down the BOD level of the pond. 2. Control the application of fertilizer/manure to the pond. 3. Pump out the contaminated water up to 30% and replace the same with uncontaminated water.	1. Based on tasted quality of water, apply lime and other inputs to control the pollution level.
Health and disease management	Regular application of lime at prescribed level. Trial netting to check disease occurrence etc.	Application of CIFAX or Sukrena WS for sanitation of pond water. Apply Potassium permanganate as per scheduled rate as prequationary quarantine measures.	Treat the pond water according to the disease occurrence. Try to replace 20% water from pond with uncontaminated source of water.
Cyclone			
Overflow /flooding of ponds			
Change in fresh/brackish water ratio			
Health and disease management			
Heat wave and cold wave			
Management of ponds environment			

Health and disease management			

ANNEXURE - I

Generally monsoon starts on first week of June in Assam excluding the pre monsoon shower during April/May.

Monsoon delayed by 2 weeks

i) Nursery bed preparation and rice seed sowing should be quickly taken up.
ii) Kharif vegetables-mid season varieties of all kharif vegetables such as cucurbits, okra etc. may be grown.
iii) For flood prone areas short duration rice cv. Luit, Kolong, Disang, Kapilee may be transplanted up to 1st week of September or germinated seeds of these varieties may be sown in puddle soil up to 1st week of September or germinated seeds of these varieties may be sown in puddle soil up to 10th September.

Monsoon delayed by 4 weeks

i) Medium duration rice varieties such as Satyaranjan, Basundhara to be sown in nursery during 1st week of July and to be transplanted in the normal season.
ii) Growing of Kharif vegetables such as Cucurbits, okra may be done.

Monsoon delayed by 6 weeks

i) Medium duration rice varieties such as Satyaranjan, Basundhara may be sown in nursery in mid July and be transplanted within 15th August. Short duration rice varieties such as Lachit, Chilaray, IR 36, IR 50 may be sown in nursery up to 3rd week of July and transplanted with 20th August. Spacing of 15x15 cm may be maintained during transplanting.
ii) Monohar Sali and other local rice varieties such as Moinagiri, Phulpukhuri, etc. may be tried for late season transplanting up to 1st week of September.
iii) If rice seedlings of Sali varieties such as Ranjit, Bahadur etc. is available with growers they may go for transplanting of these varieties taking the advantage of late monsoon shower.

iv) Aged seedlings of Prafulla, Gitesh up to 2 month old raised by use of pond water or in marshy land may be transplanted up to end of July.
v) Upland and medium land area may be utilized by growing Kharif pulse (Black gram cv. KU 301, T9 and Green gram cv. Pratap), oil seed such as sesamum (cv. AST-1, AT 1683, Gauri, Madhavi etc.) in stead of going for late Sali cultivation.
vi) Growing of kharif and early varieties of Rabi vegetables such as Raddish can be done.

Monsoon delayed by 8 weeks

i) Short duration of rice such as Luit may be raised in nursery bed during last week of July or 1st week of August and 21 days old seelings may be transplanted.
ii) Rice cv. Satyranjan, Basundhara may be transplanted in closer spacing (20x20cm) with higher number of seedlings (4-5 no.) per hill.
iii) Aged seedling of Rice varieties Prafulla, Gitesh up to 60 days old may be transplanted in closer spacing of 20 x 15 cm with higher no. of seedlings (4-5 no.) per hill.
iv) For upland and medium land area Sali rice may be replaced by growing of other crop for late season. Kharif pulse such as Black gram var. KU 301, T9, Green gram variety Pratap and oil seed crop such as sesamum variety AST-1, AT 1683, Gauri, Madhavi may be grown during Mid August.
v) Growing of early Rabi vegetable such as early cauliflower, sak can be done.

Normal onset followed by 15-20 dry spell

In Sali rice, potash @ 3 kg/ bigha may be applied. In pulse crop life saving irrigation should be done. At vegetable crop, life saving irrigation and mulching should be done.

Flood free plain

In paddy crop top dressing of potash @ 3 kg/ha should be applied. Life saving irrigation can also be done. In other such pulse and vegetable crop, irrigation should be done.