

State: Assam
Agriculture Contingency Plan for District: Darrang

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 Region (II)	
	Agro Climatic Zone (NARP)*		North Bank Plain Zone (AS-1)	
	List all the districts falling under the NARP Zone		Darrang, Udulguri	
	Geographic Coordinates of district		Latitude	Longitude
			20°9' N to 26°95' N	91°45' E to 92°22' E
	Name and Address of the concerned ZRS/ZARS/RARS/RRS/RRTTS		KVK, Darrang, Mangaldai(P.O) Darrang (dt), Assam.784125.	
Mention the KVK located in the district		KVK, Darrang, Mangaldai(P.O) Darrang (dt), Assam.784125		

1.2	Rainfall	Average (mm)	Number of rainy days	Normal Onset	Normal cessation
	SW monsoon (June –Sept)	1254		1 st week of June	4 th week of September
	NE Monsoon (Oct- Dec)	120		1 st week of October	4 th week of November
	Winter (Jan-March)	199		2 nd week of March	-
	Summer (Apr- May)	377		1 st week of April	-
	Annual	1951		-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivated area	Forest area	Land under nonagricultural use	Permanent pastures	Cultivable wasteland	Land under misc tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000ha)	320.68	87.277	207.5	12.434	3.105	3.250	4.760	-	2.362	-

1.4	Major Soils	Area ('000ha)	Percent (%) of total
	Sandy loam soils	67.5	47.46
	Clay loam soils	49.9	35.12
	Silty clay loam soils	22.5	15.63

1.5	Agricultural land use	Area ('000ha)	Cropping intensity%
	Net sown area	73.619	180.30%

	Area sown more than once	59.116	
	Gross cropped area	132.735	

1.6	Irrigation	Area ('000 ha)	Percent (%)	
	Net irrigated area	26.070 ha	100.00	
	Gross irrigated area	-	-	
	Rainfed area	-	-	
	Sources of Irrigation	Number	Area ('000 ha)	% area
	Canals	-	-	-
	Tanks	-	-	-
	Open wells	-	-	-
	Bore wells	-	-	-
	Lift irrigation	3000	7.527	19.97
	Other sources	5930	14.967	39.72
	Pump sets	6000	15.144	40.31
	Micro-irrigation	-	-	-
Groundwater availability and use	No. of blocks	% area	Quality of water	
Over exploited				
Critical				
Semi-critical				
Safe				
Wastewater availability and use				

*Over-exploited: groundwater utilization>100%; critical: 90-100%; Semi-critical: 70-90%; Safe:<70%

Source : District Agriculture Office, Darrang, Assam

1.7 Area under major field crops & horticulture etc.

1.7	Major field crops cultivated	Area ('000 ha)									
		<i>Kharif</i>			<i>Rabi</i>			Summer			
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Grand total
	Sali rice		27.729	27.729							27.729
Summer rice								23.513	23.513	23.513	

1.7	Horticulture crops - Fruits	Total area (ha)	Irrigated	Rainfed
	Banana	2, 550	-	2,550
	Papaya	385	-	385
	Orange	495	-	495
	Pineapple	526	-	526
	Guava	215	-	215
	Litchi	185	-	185
	Jack fruit	1, 318	-	1,318
	Mango	150	-	150
	Other fruits	550	-	550
Horticulture crops - Vegetables		Total area	Irrigated	Rainfed
Total tuber crops (potato, sweet potato, tapioca)		10, 719	-	10, 719
Total spices (chilli, turmeric, ginger, coriendar,garlic, onion,black pepper)		8, 211	-	8, 211
Kharif vegetable		16, 975	-	16, 975
Rabi vegetables		25, 186	-	25, 186
Medicinal and Aromatic crops		Total area	Irrigated	Rainfed
Plantation crops		Total area	Irrigated	Rainfed
Tea		41, 667	41, 667	-
Areca nut		4, 750	-	4, 750
Coconut		981	-	981
Fodder crops		Total area	Irrigated	Rainfed
Total Fodder crop area				
Grazing land				

1.8	Livestock	Number (*000)
	Cattle	438.208
	Buffaloes total	122.19

	Commercial dairy farms	0.042		
	Goat	156.893		
	Sheep	39.006		
	Pig	54.618		
1.9	Poultry			
	Commercial			
	Backyard	1670.912		
1.10	Inland Fisheries	Area (ha)	Yield (t/ha)	Production (tones)
	Brackish water			
	Fresh water			

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)
	Field crops								
	Rice	326	2400	256	3770	98	2400	680	2857
	Toria	-	-	19.10	6.59	-	-	19.10	6.59
	Jute	-	-	-	-	20.0	2060	20.0	2060
	Blackgram	-	-	-	-	2.10	544	2.10	544
	Wheat	-	-	6.73	982	-	-	6.73	982
	Sugarcane	-	-	-	-	307.75	35793	307.75	35793
	Major Horticultural crops								
	Banana	63750	15000	-	-	-	-	63750	15000
	Papaya	64000	32000	-	-	-	-	64000	32000
	Assam lemon	29865	16500	-	-	-	-	29865	16500
	Pineapple	26220	13800	-	-	-	-	26220	13800
	Coconut	30901	6300	-	-	-	-	30901	6300
	Arecanut	92035	15800	-	-	-	-	92035	15800
	Kharif vegetables	114252	115					114252	115
	Rabi vegetables	-	--	294550	215	-	-	294550	215

1.12	Sowing window for 5 major crops (start and end of sowing period)	Rice	Jute	Blackgram	Toria	Wheat
	Kharif-Rainfed	June to July	March to May	Mid August to Mid September		-
	Kharif-Irrigated	-	-	-	-	-
	Rabi-Rainfed	-	-	-	Mid October to	1 st week of November to

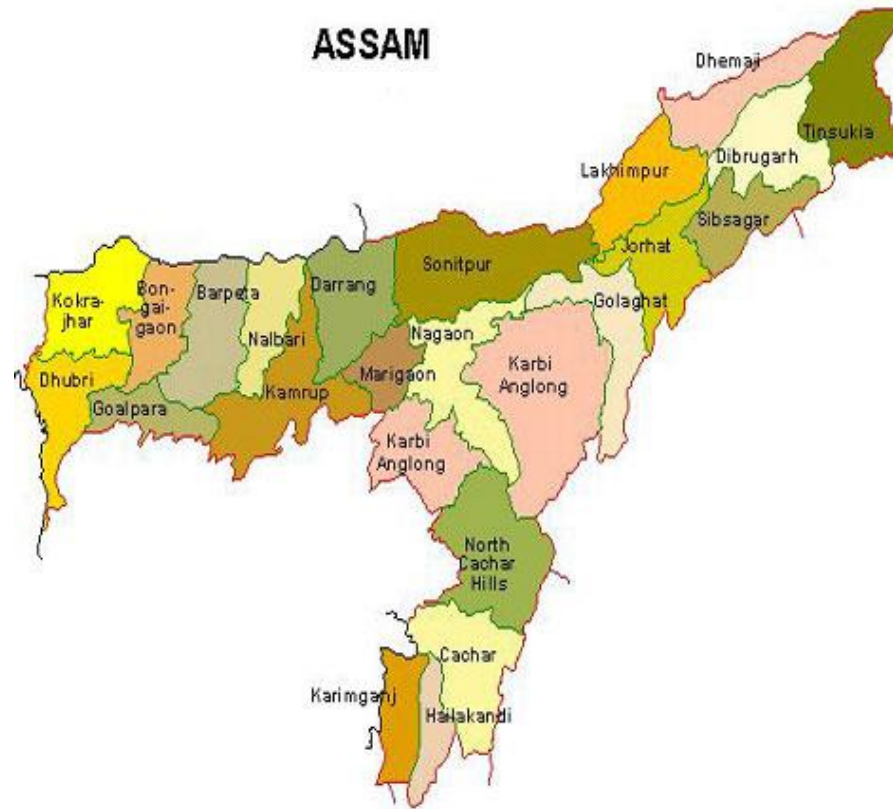
					Mid November	2 nd week of December
	Rabi-Irrigated	November to December	-	-	-	-

1.13	What is the Major contingency the District is prone to?	Regular	Occasional	None
	Drought		√ (March & October)	
	Flood		√ (August-Sept)	
	Cyclone		√ (March)	
	Hail storm		√ (March-April)	
	Heat wave		√ (June-July)	
	Cold wave		√ (Dec-January)	
	Frost			√

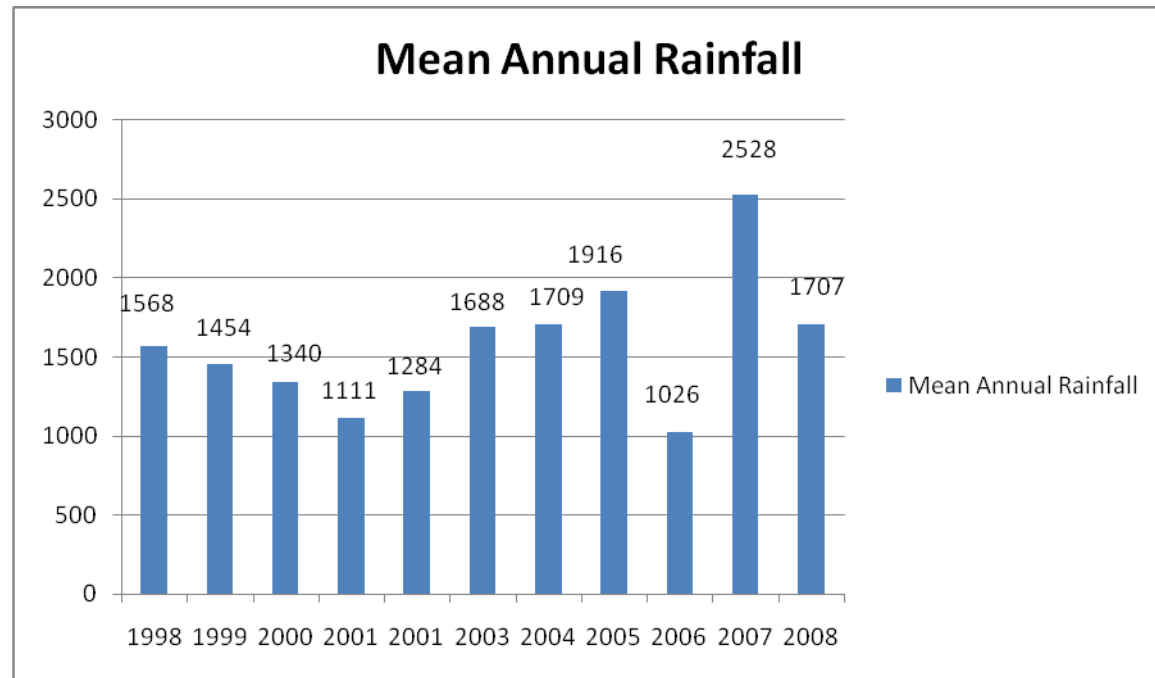
1.14	Include Digital maps of the district for	Location map of district with in State Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	

Annexure-1

ASSAM



Annexure-II Mean Annual Rainfall



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition				Suggested Contingency measures	
Early season drought (delayed onset)	Major Farming situation	Crop/ cropping system	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks	Medium land	Sali rice – rabi oilseeds/ pulses – boro rice	No change	Decrease the spacing in paddy	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
3 rd week of June		Sali rice – rabi oilseeds/ pulses	No change		
		Sali rice – Wheat	No change		
		Sali rice – rabi vegetables	No change		
Delay by 4 week 1 st week of July	Medium land	Sali rice – rabi oilseeds/ pulses – boro rice	Rice: Satyaranjan, Basundhar	For the Sali varieties, sowing can be done up to mid or last part of July	
		Sali rice – rabi oilseeds/ pulses	Rice: Satyaranjan, Basundhar		
		Sali rice – rabi vegetables	Rice: Satyaranjan, Basundhar		
Delay by 6 weeks 3 rd week of July	Upland	Sesame/ kharif blackgram/ Greengram/ Pigeonpea	Sesame/ Pigeonpea	Normal sowing of Pigeonpea & sesame can be done Application of sufficient amount of organic manures before sowing Use higher seed rate Thinning to maintain optimum plant population, Mulching with waste materials	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
	Medium land	Sali rice - boro rice	Sali rice variety like Jaya, IR-36 and also medium duration variety Satyaranjan and Basundhara Late Sali variety like Monahar Sali, Andrew Sali, Salpona, Prasadbhog etc can be chosen		Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.

			Boro rice like Eri-9, Eri-28, Eri-30, Joymoti, Kanaklata can be chosen		
Delay by 8 weeks 1 st week of August	Upland	Sali rice – rabi oilseeds/ pulses	Sali rice variety like Jaya, IR-36 and also medium duration variety Satyaranjan and Basundhara		Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Sali rice – rabi oilseeds/ pulses	Sali rice variety like Jaya, IR-36 and also medium duration variety Satyaranjan and Basundhara		
		Sali rice – rabi vegetables	Sali rice variety like Jaya, IR-36 and also medium duration variety Satyaranjan and Basundhara		
		SRI - rabi vegetables	Late Sali variety like Monahar Sali, Andrew Sali, Salpona, Prasadbhog etc can be chosen		
	Medium land	Sali rice/ Sesame/kharif blackgram/ Greengram/ pigeonpea	i.Use of late Sali varieties- Monuharsali, Andrewsali, Solpona, Prasadbhog, Gobinbhog ii.Varieties suitable for both normal & delayed sowing & planting conditions- Luit, Kapilee, Dishang, Dikhow iii.Staggered planting Sali varieties- Prafulla & Gitesh		Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.

Condition	Major Farming Situation	Crop/ Cropping System	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early Season drought (Normal onset)	Up land	Sali rice		Application of urea along with manure/FYM in the nursery, Sprinkling of	Supply of rice seeds through NFSM and other

poor germination / crop stand etc.				irrigation water	such programme Supply of weeder under RKVY.
	Medium land	Sali rice	Application of high dose of potassic fertilizer	Application of urea along with manure/FYM in the nursery, Sprinkling of irrigation water	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Sali rice/ Sesame/ kharif blackgram/ Greengram/ Pigeonpea	i.Sprinkle water manually in nursery bed of rice when the area of nursery bed is very small. ii.Re-sowing of rice seeds can be done since sowing time is still available (upto July) iii.Normal sowing of Pigeonpea can be done.	i.Application of sufficient amount of organic manures in nursery bed before sowing ii.Balance fertilization in nursery bed	
	low land	Sali rice	Application of high dose of potassic fertilizer	Application of urea along with manure/FYM in the nursery, Sprinkling of irrigation water	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.

Condition	Major Farming Situation	Crop/ Cropping System	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid Season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Up land	Sali rice/ Sesame/ kharif blackgram/ Greengram/ Pigeonpea		Application of 2 kg urea along with manure/FYM in the field	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
			ii. Weeding iii. Thinning the plant population	i.Application of sufficient amount of organic manures before sowing	-

				ii. Balance fertilization iii. Spray of anti-transpirants iv. Mulching v. Supply of irrigation water at tillering, PI and booting stages	
	Medium land	Sali rice		Application of 2 kg urea along with manure/FYM in the field , Supply of irrigation water at tillering, PI and booting stages	
	low land	Sali rice		Application of 2 kg urea with manure/FYM in the field, Supply of irrigation water at tillering, PI and booting stages	

Condition	Major Farming Situation	Crop/ Cropping System	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid Season drought (long dry spell)					
At reproductive stage	Up land	Sali rice	Application of potassic fertilizer @ 3 kg/ha	Application of 2 kg urea along with manure/FYM in the field , Supply of irrigation water at PI and milking stages	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Sesame/ kharif blackgram/ Greengram/ Pigeonpea		Mulching with crop residues, Spray of anti-transpirants	
	Medium land	Sali rice	Application of potassic fertilizer @ 3 kg/ha	Application of 2 kg urea along with manure/FYM in the field , Supply of irrigation water at PI and milking stages	

	Low land	Sali rice	Application of potassic fertilizer @ 3 kg/ha	Application of 2 kg urea along with manure/FYM in the field, Supply of irrigation water at PI and milking stages	
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Condition	Major Farming Situation	Crop/ Cropping System	Suggested Contingency measures		
			Crop management	Rabi crop planning	Remarks on Implementation ^e
Terminal drought	1 Up land	Sali rice		Rabi Crop planning: Toria variety TS-36, TS-38 Potato variety Kufri Jyoti, Kufri Pokhraj can be selected Boro Rice (Joymati, Kanaklata, IRRI-8, IRRI-28, IRRI-29) Jute variety Tarun or Nabin	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Sali rice/ Blackgram /Greengram/Sesame/ Pigeonpea Cropping System: Blackgram/ Greengram/ Sesame/ Pigeonpea - Rabi crops		Rice Rabi Crop planning: Toria variety TS-36, TS-38 Potato variety Kufri Jyoti, Kufri Pokhraj can be selected Boro Rice (Joymati, Kanaklata, IRRI-8, IRRI-28, IRRI-29) Jute variety Tarun or Nabin	
	2 Medium and Low land	Sali rice		Rice Rabi Crop planning: Toria variety TS-36, TS-38 Potato variety Kufri Jyoti, Kufri Pokhraj can be selected Boro Rice (Joymati, Kanaklata, IRRI-8, IRRI-28, IRRI-29) Jute variety Tarun or Nabin	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.

2.1.2 Drought - Irrigated Situation

Condition			Suggested Contingency measures		
Condition	Major Farming Situation	Crop/ Cropping System	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation
Delayed /limited release of water in canals due to low rainfall	Upland	Sequence cropping: Kharif pulses/oilseeds-Rabi pulses/ oilseeds	Sequence cropping: Kharif Blackgram/Green gram/Sesame- Toria/ Niger/ Linseed/Lathyrus/ Lentil	i.Mulching ii.Thinning iii.Weeding iv.Life saving irrigation	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
	Medium land	Sequence cropping: Sali rice-boro rice	Sequence cropping: Sali rice- Toria/ Niger/ Linseed/ Lathyrus, Lentil	i.Mulching ii.Thinning iii.Weeding iv.Life saving irrigation	
	Low land	Sequence cropping: Sali (winter) rice-Jute	Sequence cropping: Sali rice- Toria/ Niger/ Linseed/ Lathyrus, Lentil		

Condition			Suggested Contingency measures		
Condition	Major Farming Situation	Crop/ Cropping System	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Upland	Sequence cropping: Kharif pulses/oilseeds-Rabi pulses/ oilseeds	Sequence cropping: Kharif Blackgram/Green gram/Sesame- Toria/ Niger/ Linseed/Lathyrus/ Lentil	i. Mulching ii.Thinning iii.Weeding iv.Spray of anti-transpirants in vegetative & reproductive stages of crop growth.	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
	Medium land	Sequence cropping: Sali rice-boro rice	Sequence cropping: Sali rice- Toria/ Niger/ Linseed/ Lathyrus, Lentil	i. Mulching ii.Thinning iii.Weeding iv.Spray of anti-transpirants in vegetative & reproductive stages of crop growth.	
Condition			Suggested Contingency measures		
Condition	Major Farming Situation	Crop/ Cropping System	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tank due to low rainfall					

	Upland	Sequence cropping: Kharif pulses/oilseeds-Rabi pulses/ oilseeds	Sequence cropping: Kharif Blackgram/Green gram/Sesame- Toria/ Niger/ Linseed/Lathyrus/ Lentil	i. Mulching ii. Thinning iii. Weeding iv. Spray of anti-transpirants in vegetative & reproductive stages of crop growth.	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
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Condition			Suggested Contingency measures		
Insufficient/delayed onset of monsoon	Major Farming Situation	Crop/ Cropping System	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation
	Upland	Kharif pulses/oilseeds-rabi pulses/ oilseeds	Summer pulses-rabi crops	Provide need based irrigation water.	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
	Medium land	Sali rice, boro rice, jute, toria, wheat, lentil, pea, blackgram, green gram, rajmah/ Sali rice-boro rice	Use of Sali rice var.: Monuharsali, Andrewsali, Solpona, Prasadbhog, Gobinbhog, Sonamukhi, Luit, Kapilee, Dishang, Dikhow, Prafulla & Gitesh/ Kharif pulses/oilseeds-Boro rice & Kharif pulses/oilseeds-other rabi crops	i. Provide need based irrigation water. ii. Timely sowing of boro rice & other rabi crops-	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Watermelon, Apple melon, bottlegourd, bittergourd, Sweet corn, Baby corn	Use of watermelon, Apple melon, bittergourd, Sweet corn, Baby corn	Supplemental irrigation and use of OM.	

Condition			Suggested Contingency measures		
Insufficient groundwater recharge due to low	Major Farming Situation	Crop/ Cropping System	Change in Crop/ cropping system	Agronomic measures	Remarks on Implementation

rainfall	Medium land	Sequence cropping :	Sequence cropping :	i.Adoption of micro irrigation system ii.Thinning iii.Mulching iv.Weeding v.Provide need based irrigation vi. Boro rice cultivation by SRI method	Supply of rice seeds through NFSM and other such programme Supply of weeder under RKVY.
		Sali rice-Boro rice Sali rice-Rabi crops	Summer pulses-rabi crops Jute-Rabi crops Kharif pulses/oilseeds - Rabi crops		
		Watermelon, Apple melon, Bottlegourd, Bittergourd, Sweet corn, Baby corn	Use of watermelon , Apple melon, Bittergourd, Sweet corn, Baby corn	Mulching, thinning.	

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 shorth span leading to water logging				
Rice	Provide drainage	Provide drainage	Provide drainage	i.Harvesting should be done before rain as per as possible ii.Drying of produces before storage to optimum moisture level iii.Seed treatment with insecticide and fungicide against insects & diseases respectively during the period of storage Treated seeds be kept in polythene bags with outer covering of gunny bags iv.Timely sowing to avoid rain during harvesting period.
Jute	Provide drainage	Provide drainage	Provide drainage	
Boro Rice	Provide drainage	Provide drainage	Provide drainage	
Horticulture				
Tomato	Provide Drainage	Provide Drainage ,Application of hormones,nutrient sprys to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage.
Okra	Provide Drainage	Provide Drainage, Application of hormones,nutrient sprays to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage.
Apple Melon	Provide Drainage	Provide Drainage ,Application of hormones,nutrient sprys to prevent	Provide Drainage	Shifting of the produce to drier place, Cold storage.

		flower drop.		
Bitter gourd	Provide Drainage	Provide Drainage ,Application of hormones,nutrient sprys to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage.
papaya	Provide Drainage	Provide Drainage ,Application of hormones,nutrient sprys to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage.
Heavy rainfall with high speed winds in a short span²				
Rice				Harvesting should be done before rain as far as possible Drying of produces to optimum moisture level Seed treatment with insecticide and fungicide against insects-pest & diseases respectively during the period of storage Treated seeds be kept in polythene bags with outer covering of gunny bags
Sesame	Provide Drainage	Provide Drainage	Provide Drainage	
Blackgram/Pigeonpea	Provide Drainage	Provide Drainage	Provide Drainage	
Jute	Foliar application of urea instead of top dressing is advocated Propping: provide mechanical support to prevent lodging	Propping: provide mechanical support to prevent lodging	Propping: provide mechanical support to prevent lodging	-
Sugarcane	Provide Drainage, First & second earthing up, Make trenches/furrows in between ridges to facilitate drainage of excess water during high rainfall, Striping & propping	Provide Drainage Striping & propping	Provide Drainage Striping & propping	Harvesting should be done before rain , Drying to remove excess moisture of canes
Horticulture				
Apple melon	Drainage, make trenches/furrows in between ridges to facilitate drainage of excess water, propping.	Provide Drainage , Application of hormones, nutrient sprays to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage.
Banana	Earthing up, Bamboo stacking, Planting Wind break tree.	Provide Drainage , Application of hormones, nutrient sprays to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage,packing in transparent and nontransparent polythene bags.
Papaya	Earthing up, Bamboo stacking, Planting Wind break tree.	Provide Drainage , Application of hormones, nutrient sprays to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage,packing in transparent and nontransparent polythene bags.

Assam Lemon	Earthing up	Provide Drainage , Application of hormones, nutrient sprays to prevent flower drop.	Provide Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Guava	Earthing up	Provide Drainage , Application of hormones, nutrient sprays to prevent flower drop	Provide Drainage	Shifting of the produce to drier place, Cold storage, packing in transparent and nontransparent polythene bags.
Outbreak of pests and diseases due to unseasonal rains				
Rice	Recommended prophylactic measures	Recommended prophylactic measures	Recommended prophylactic measures	i. Proper drying and storage of the harvest. ii. Fumigation and other protective measures to prevent growth of storage grain pest
Boro Rice	Recommended prophylactic measures	Recommended prophylactic measures	Recommended prophylactic measures	i. Proper drying and storage of the harvest. ii. Fumigation and other protective measures to prevent growth of storage grain pest
Toria	Recommended prophylactic measures	Recommended prophylactic measures	Recommended prophylactic measures	i. Proper drying and storage of the harvest. ii. Fumigation and other protective measures to prevent growth of storage grain pest
Sugarcane	Recommended prophylactic measures	Recommended prophylactic measures	Recommended prophylactic measures	Ensure quick despatch and selling of the product immediately after harvest.
Wheat	Recommended prophylactic measures	Recommended prophylactic measures	Recommended prophylactic measures	i. Proper drying and storage of the harvest. ii. Fumigation and other protective measures to prevent growth of storage grain pest

2.3 Floods

Condition	Suggested Contingency Measures			
	Seeding/ nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/partial inundation				
Toria	Hoeing in between lines for aeration in root zone after flood.	Hoeing in between lines for aeration in root zone after flood.	Hoeing in between lines for aeration in root zone after flood.	-
Pulses	-do-	-do-	-do-	-
Horticulture				
Assam lemon	Making trenches/furrows in between ridges	Earthing up.	Earthing up	Shifting of the

	to drain out the excess water.			produce to drier place
Pineapple	Do	Earthing up.	drainage	Shifting of the produce to drier place
Continous submergence for more than 2 days				
Pulses	<ul style="list-style-type: none"> • Crop cannot survive • If survive provide aeration in root zone by hoeing 			
Oilseed	-do-	-do-	-do-	
Sea water inundation	Not Applicable			

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

Extreme event type	Suggested Contingency Measures ^r			
	Seeding/ nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Not applicable			
Cold Wave	Not applicable			
Frost	Not applicable			
Hailstorm				
Boro rice	Selection of lodging resistant varieties	Potash application at 25 and 45 DAT	-	-
Horticulture				
Banana	Provision of nursery shed	Propping	Propping and bunch bagging	
Pumpkin			Bagging of fruits	
Mango			Covering of tree by net	
Litchi			Covering of tree by net	
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested Contingency Measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Concentrate feed, hay, fodder, silage and paddy straw	Concentrate feed, hay, fodder, silage and paddy straw and unconventional feed and fodder	Concentrate feed, hay, fodder, silage and paddy straw
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming
Floods			

Feed and fodder availability	Concentrate feed, hay, fodder, silage and paddy straw	Concentrate feed, hay, fodder, silage and paddy straw and unconventional feed and fodder	Concentrate feed, hay, fodder, silage and paddy straw
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming. Proper scientific disposal of carcass. Collection of materials for microbiological investigation	Treatment of diseased animal and vaccination and deworming. Proper scientific disposal of carcass. Collection of materials for microbiological investigation
Cyclone			
Feed and fodder availability	Concentrate feed, hay, fodder, silage and paddy straw	Concentrate feed, hay, fodder, silage and paddy straw and unconventional feed and fodder	Concentrate feed, hay, fodder, silage and paddy straw
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming Proper scientific disposal of carcass. Collection of materials for microbiological investigation	Treatment of diseased animal and vaccination and deworming Proper scientific disposal of carcass. Collection of materials for microbiological investigation
Heat wave and cold wave			
Shelter/environment management	Sprinkling of cold water during hot period and supply of bedding material during cold period	Sprinkling and cold water during hot period and supply of bedding material during cold period	Sprinkling and cold water during hot period and supply of bedding material during cold period
Health and disease management	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming	Treatment of diseased animal and vaccination and deworming

2.5.2 poultry

	Suggested Contingency Measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Concentrate feed	Concentrate feed and unconventional feed	Concentrate feed and unconventional feed
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased bird and vaccination and deworming	Treatment of diseased bird and vaccination and deworming	Treatment of diseased bird and vaccination and deworming
Floods			
Shortage of feed ingredients	Concentrate feed	Concentrate feed and unconventional feed	Concentrate feed and unconventional feed
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased bird and vaccination and deworming	Treatment of diseased bird and vaccination and deworming.	Treatment of diseased bird and vaccination and deworming.

		Proper scientific disposal of carcass. Collection of materials for microbiological investigation	Proper scientific disposal of carcass. Collection of materials for microbiological investigation
Cyclone			
Shortage of feed ingredients	Concentrate feed	Concentrate feed and unconventional feed	Concentrate feed and unconventional feed
Drinking water	Fresh and wholesome water	Fresh and wholesome water	Fresh and wholesome water
Health and disease management	Treatment of diseased bird and vaccination and deworming.	Treatment of diseased bird and vaccination and deworming. Proper scientific disposal of carcass. Collection of materials for microbiological investigation	Treatment of diseased bird and vaccination and deworming Proper scientific disposal of carcass. Collection of materials for microbiological investigation
Heat wave and cold wave			
Shelter/environment management	Proper ventilation and supply of bedding material during cold period	Proper ventilation and supply of bedding material during cold period	Proper ventilation and supply of bedding material during cold period
Health and disease management	Treatment of diseased bird and deworming	Treatment of diseased bird and deworming	Treatment of diseased bird and deworming

2.5.3 Fisheries

	Suggested Contingency Measures		
	Before the event ^a	During the event	After the event
Drought			
Shallow water in ponds due to insufficient rains/inflows	<ol style="list-style-type: none"> 1. Selection of fish spp. which can tolerate low water level 2. Treat the pond bottom heavily with organic manure 3. Arrange aerators 	<ol style="list-style-type: none"> 1. Aerate water mechanically 2. Try to shade the pond water temporarily 	<ol style="list-style-type: none"> 1. Increase stocking density based on availability of seed and water depth 2. Harvest the fish 3. Deepen the pond scientifically based on previous years drought experience
Impact of heat and salt load build up in ponds/ change in water quality	<ol style="list-style-type: none"> 1. Arrange aerators 2. Be ready with turbidity reduction measures like Gypsum, Chopped straw etc. 3. If possible arrange Thermostat 	<ol style="list-style-type: none"> 1. Start aeration continuously 2. Use turbidity reduction measures 3. Use thermostat if required 4. Test water parameters frequently 	<ol style="list-style-type: none"> 1. Check the health condition of fish by test netting 2. Test water parameters frequently
Floods			
Inundation with flood waters	<ol style="list-style-type: none"> 1. Strengthen and increase the height of the embankment 2. Arrange nylon nets sufficiently to prevent the escape of fish 	<ol style="list-style-type: none"> 1. Encircle the ponds/farm with nylon net 	<ol style="list-style-type: none"> 1. Check the health condition of fish by test netting 2. Test water parameters frequently

Water contamination and changes in BOD	<ol style="list-style-type: none"> 1. Be ready with soil and water testing kit 2. Arrange aerators 	<ol style="list-style-type: none"> 1. Test the water quality 2. If BOD is high try to aerate the water and remove the undecomposed and semi decomposed matter from the pond 	<ol style="list-style-type: none"> 1. Check the health condition of fish by test netting 2. Test water parameters frequently
Health and disease management	<ol style="list-style-type: none"> 1. Be ready with good fishing nets 	<ol style="list-style-type: none"> 1. Segregation of healthy fish. 	<ol style="list-style-type: none"> 1. Check the health condition of fish by test netting, examining in laboratory and take corrective measures accordingly 2. Apply KMnO₄ to disinfect the pond
Cyclone	Not Applicable		
Heat wave and cold wave	Not Applicable		

^a based on forewarning wherever available