

State: Assam
Agriculture Contingency Plan for District: Jorhat

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. (15.4)	
	Agro-Climatic Zone (Planning Commission)	Eastern Himalayan Region (II)	
	Agro Climatic Zone (NARP)	Upper Brahmaputra Valley Zone (AS-2)	
	List all the districts or part thereof falling under the NARP Zone	Jorhat, Sivsagar, Golaghat, Tinsukia, Dibrugarh	
	Geographic coordinates of district headquarters	Latitude	Longitude
		20°10' N – 27°20' N	93°37' E – 93°57' E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Altitude	
		80 – 200 msl	
	Mention the KVK located in the district	KVK, Jorhat, Kaliapani	

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	2100	119	June 2 nd week	4 th week of September
	NE Monsoon(Oct-Dec):	-	-	Oct 2 nd week	3 rd week of December
	Winter (Jan- March)	15	7		
	Summer (Apr-May)	149	15		
	Annual	2262	141		

1.3	Land use pattern of the district (latest statistics)	Geographical area ('000 ha)	Cultivable area ('000 ha)	Forest area ('000 ha)	Land under non-agricultural use ('000 ha)	Permanent Pastures ('000 ha)	Cultivable wasteland ('000 ha)	Land under Misc. tree crops and groves ('000 ha)	Barren and uncultivable land ('000 ha)	Current Fallows ('000 ha)	Other fallows ('000 ha)	Land put or non agricultural use
	Area ('000 ha)	368.8	152.90	28.54	71.7	4.4	41.57	6.7	27.8	34.87	-	-

1.4	Major Soils	Area ('000 ha)	Percent (%)
	Loam Soils	12.50	8.16
	Sandy loam Soils	89.07	58.25
	Sandy Soils	15.17	9.92
	Silty clay Soils	23.54	15.40
	Clay Soils	12.62	8.26
	Total	152.9	

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	59.60	149.5
	Area sown more than once	93.3	
	Gross cropped area	152.9	

1.6	Irrigation	Area ('000 ha)	
	Net irrigated area	4.5	
	Gross irrigated area	5.51	
	Rainfed area	147.58	
	Sources of Irrigation	Number	Area ('000 ha) % of total irrigated area

Canals			
Tanks			
Open wells			
Bore well			
Lift irrigation schemes			
Micro-irrigation			
Other sources (please specify)			
Total Irrigated Area	5.51		
Pump sets			
No. of Tractors	200		
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)**	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
Over exploited	None		
Critical	None		
Semi- critical	None		
Safe	All blocks(8nos)	2.81	High iron, sporadic arsenic contamination
Wastewater availability and use			
Ground water quality	High iron, sporadic arsenic contamination		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%			

** information not available

1.7 Area under major field crops & horticulture

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Winter Rice	-	83.10	83.10	-	-	-	-	83.10
	Blackgram	-	21.89	21.89	-	-	-	-	21.89

Greengram	-	0.28	0.28	-	-	-	-	0.28
Sugarcane		0.26	0.26					0.26
Sesame	-	0.07	0.07					0.07
Wheat	-	-	-	NIL	22.89	22.89		22.89
Rapeseed	-	-	-	-	11.41	11.41	-	11.41
Autumn Rice	-	-	-	-	-	-	6.19	6.19
Summer Rice	-	-	-	2.70	-	2.70	-	2.70
Potato	-	-	-	-	3.18	3.18	-	3.18
Pea	-	-	-	-	1.41	1.41	-	1.41
Lentil					0.05			0.05

Horticulture crops - Fruits	Total	Irrigated	Rainfed ('000 ha)
Kharif Vegetables	3.6	-	3.6
Rabi Vegetables	6.5	6.5	-
Banana	3.12	-	3.12
Pineapple	0.108	-	0.108
Lemon	0.9	-	0.9
Medicinal and Aromatic crops	-	-	-
Plantation crops			

Arecanut	3.09	-	3.09
Fodder crops			
Grazing land	43.60	-	-

1.8	Livestock (in number)	Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)	-	-	474.89		
	Crossbred cattle	-	-	13.00		
	Non descriptive Buffaloes (local low yielding)	-	-	13.94		
	Graded Buffaloes	-	-	-		
	Goat	-	-	170.00		
	Sheep	-	-	0.33		
	Others (Camel, Pig, Yak etc.)					
	(i) Pig	-	-	264.06		
	(ii) Mithun	-	-	-		
	Commercial dairy farms (Number)					
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial		27.96			
	Backyard		1135.50 (including duck)			
1.10	Fisheries (Data source: Chief Planning Officer of district)					
	A. Capture					
	i) Marine (DataSource: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized		
	Sericulture (plantation)	0.780				0.780

ii) Inland (Data Source: Fisheries Department)	Farmer owned ponds (Ha)	Reservoirs (Beels, swamp area and wetlands)	No. of village tanks
	607 ha	28557 ha	NA
B. Culture			
	Water Spread Area (ha)	Yield (t/ha)	Production (tons)
i) Brackish water (Data Source: MPEDA/ Fisheries Department)		-	-
ii) Fresh water (Data Source: Fisheries Department)	42287	1.86	1518

1.11 Production and Productivity of major crops (Average of last 5 years: 2004 -08)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops identified based on total acreage)										
	Rice	249.28	3000	5.66	2094	15.47	2500	270.41	2531.33	
	Wheat			0.42	1200			0.42	1200	
	Rapeseed			9.7	850			9.7	850	
	Green gram	0.17	600					0.17	600	
	Blackgram	1.13	600					1.13	600	
	Potato			23.88	7500			23.88	7500	
	Pea			0.86	594			0.86	594	

	Sesame	0.04	520	-	-			-	520	
	Lentil			0.03	520			0.03	520	
	Sugarcane	0.87	3375					0.87	3375	
Major Horticultural crops (Crops identified based on total acreage)										
	Vegetables	52.68	15646	97.40	14785			150.08	15215	
	Banana	30.54	14293					30.54	14293	
	Potato			23.88	7500			23.88	7500	
	Assam Lemon	3.43	6525					3.43	6525	
	Orange			1.45	11954			1.45	11954	
	Pineapple	1.67	15488					1.67	15488	
	Ginger					2.95	6807	2.95	6807	
	Turmeric					0.13	630	0.13	630	
	Chilli	0.07	542					0.07	542	

1.12	Sowing window for 5 major field crops	Rice	Blackgram/ Greengram	Rapeseed/ mustard
	Khariif- Rainfed	June to July	March to April	
	Khariif-Irrigated			
	Rabi- Rainfed		September to October	October to November
	Rabi-Irrigated	November to December		

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		✓	
	Flood	✓ (20% of the district)	✓ (10% of the district affected)	
	Cyclone		✓	
	Hail storm		✓	

	Heat wave			✓
	Cold wave			✓
	Frost			✓
	Sea water intrusion			✓
	Pests and disease outbreak	✓		

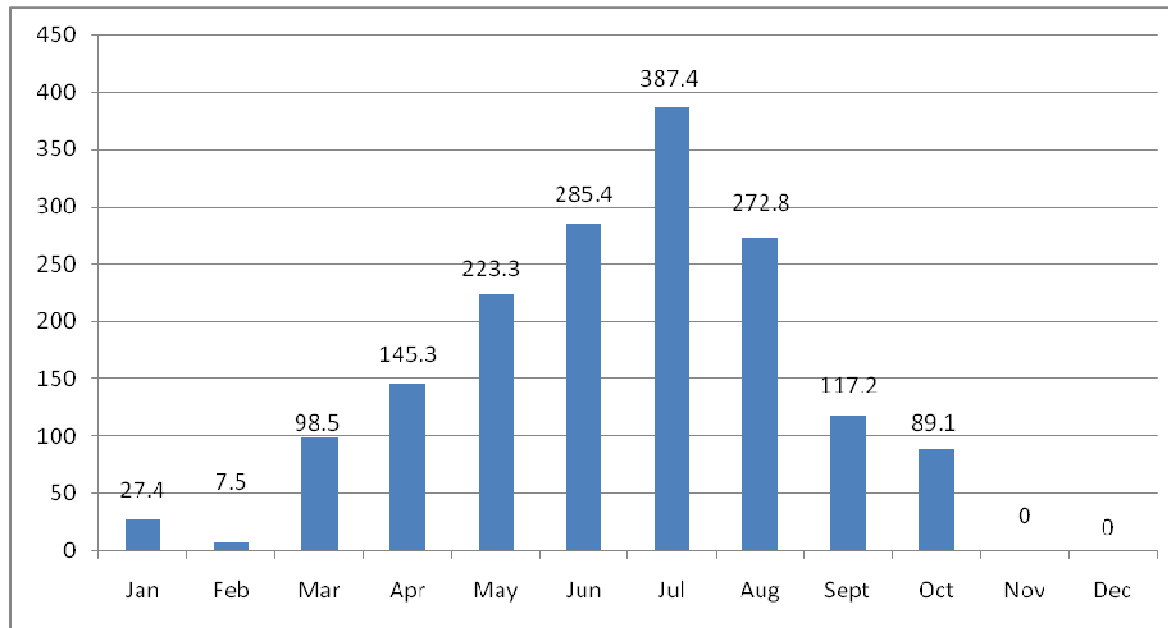
1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

Annexure I

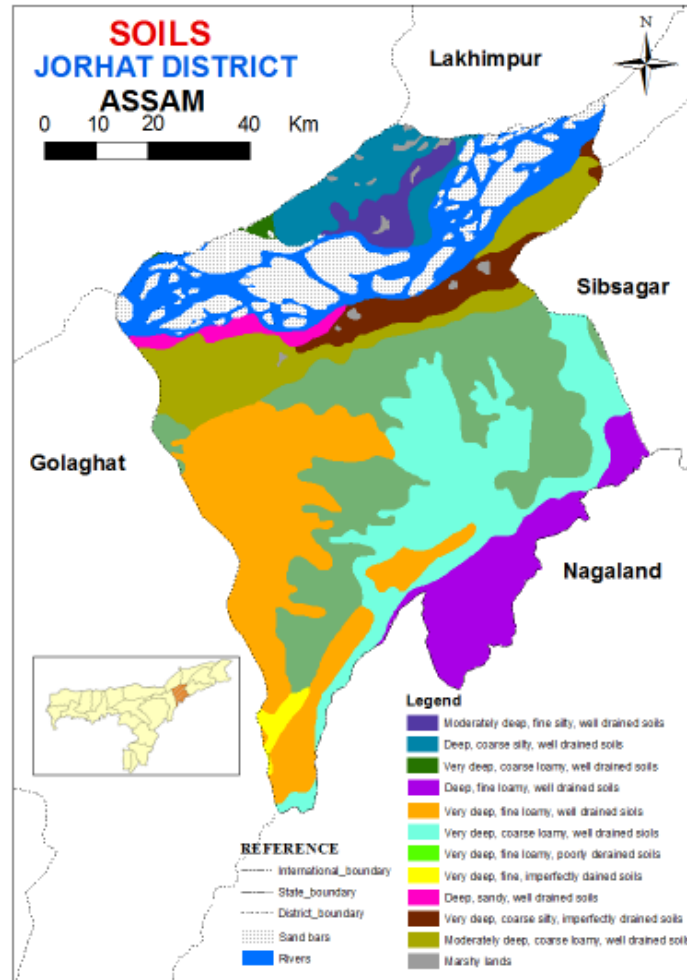
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Annexure II
Month wise rainfall pattern



Annexure-III



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks	Medium and Low Land (High rainfall, loamy, sandy loam soil, acidic soil)	Rice	No change	Irrigate the seedbed	Collaboration with TM for Horticultural crops
June 3 rd week	Upland (High rainfall, loamy, sandy loam soil, acidic soil)	Summer vegetables (standing crop) Var. Okra, Cucumber, Ridge gourd, Bitter gourd etc	No change	Irrigation, mulching	
		Banana (standing crop) Var . Duarf cavendish, Borjahji, Malbhog	No change	Mulching, Drip Irrigation	
		Lemon (standing crop) Var Assam lemon	No change	Drip Irrigation, mulching, spray of antitranspirants	
	Hill slope (High rainfall, sandy loam soil, slightly eroded acidic soil)	Orange var. Khashi Mandarin	No change	Mulching	
		Pineapple var. Kew, Queen	No change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks	Medium and Low Land (High rainfall,	Rice	No change	Irrigate the seedbed and nursery raising in	Collaboration with TM for Hort crop, RKVY

July 1 st week	loamy sandy loam soil, acidic soil)			community basis	Breeder seed RARS, Titabor, AAU, Jorhat
	Upland(High rainfall, loamy, sandy loam soil, acidic soil)	Summer vegetables	No change	Irrigation, mulching	
		Banana	No change	Mulching, Drip Irrigation	
		Lemon	No change	Drip Irrigation, Mulching, Spray of antitranspirants	
	Hill slope(High rainfall, sandy loam soil, slightly eroded acidic soil)	Orange	No change	Mulching	
		Pineapple	No change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought(delayed onset) Delay by 6 weeks July 3 rd week	Medium and Low Land (High rainfall, loamy, sandy loam soil, acidic soil)	Rice	Rice(Photo sensitive traditional var. Manohar Sali, Andrew Sali)	Close spacing, increase no. of seedlings per hill, irrigation	Collaboration with NFSM, RKVY Collaboration with NHM
	Upland(High rainfall, loamy, sandy loam soil, acidic soil)	Summer vegetables	Sesame Var.1683	Line sowing and mixed cropping with pulse (Greengram blackgram)	
		Banana	No change	Mulching and fertigation	
		Lemon	No change	Mulching and fertigation	
	Hill slope(High rainfall, sandy loam soil, slightly eroded acidic soil)	Orange	No change	Mulching and fertigation	
		Pineapple	No change	Mulching and fertigation	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)					
Delay by 8 weeks August 1 st week	Medium and Low Land (High rainfall, loamy, sandy loam soil, acidic soil)	Rice	Photo sensitive short duration var. Luit	Broad casting of sprouted seeds, irrigation	Collaboration with NFSM, RKVY
	Upland (High rainfall, loamy, sandy loam soil, acidic soil)	Summer végétales	Skipped the summer vegetables and ready for early <i>rabi</i> vegetables viz. Cabbage, Radish	-	-
		Banana (standing crop)	Pumpkin	Cultivation in pits with sufficient compost	-
	Hill slope (High rainfall, sandy loam soil, slightly eroded acidic soil)	Orange	No change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					

Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Medium and Low Land (High rainfall, loamy sandy loam soil, acidic soil)	Kharif vegetables-winter Rice Winter Rice-rapeseed Winter Rice-summer Rice	In Rice if germination is very poor re sowing needed. For kharif vegetables which are in maturity stage supplement irrigation and harvesting should be at physiological maturity stage Delayed planting of summer Rice to be harvested at physiological maturity.	Mulching, Conservation furrows	
	Upland(High rainfall, loamy, sandy loam soil, acidic soil)	Kharif vegetables- Rabi Vegetables Autumn rice(Direct seeded)- Vegetable	If germination of winter Rice is very poor resowing needed Standing kharif vegetable crop so apply irrigation. Harvesting of rice at physiological maturity.		
	3. Hill slope(High rainfall, sandy loam soil, slightly eroded acidic soil)	Fruits-Vegetables	Life saving Irrigation in vegetables Irrigation, drip irrigation		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measues	Remarks on Implementation
At vegetative stage	<p>1. Medium and Low Land (High rainfall, loamy sandy loam soil, acidic soil)</p> <p>2. Upland(High rainfall, loamy, sandy loam soil, acidic soil)</p> <p>3. Hill slope(High rainfall, sandy loam soil, slightly eroded acidic soil)</p>	<p>Kharif vegetables-winter Rice Winter Rice-rapeseed Winter Rice-summer Rice</p> <p>Kharif vegetables- Rabi Vegetables Autumn rice(Direct seeded)-Vegetable</p> <p>Fruits-Vegetables</p>	Harvesting of vegetables at physiological maturity, Weeding, Thinning of population.	Avoid application of remaining split dose of fertilizer, Spray of antitranspitint.	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measrues	Remarks on Implementation

At flowering/ fruiting stage	1. Medium and Low Land (High rainfall, loamy sandy loam soil, acidic soil)	Kharif vegetables-winter Rice Winter Rice-rapeseed Winter Rice-summer Rice Kharif vegetables- Rabi Vegetables	Harvesting of vegetables at physiological maturity, Weeding, Thinning of population. Prepare land for rabi crop	Avoid application of remaining split dose of fertilizer, Spray of antitranspitint.	
	2. Upland(High rainfall, loamy, sandy loam soil, acidic soil)	Autumn rice(Direct seeded)- Vegetable			
	3. Hill slope(High rainfall, sandy loam soil, slightly eroded acidic soil)	Fruits-Vegetables			

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Rabi Crop planning ^d	Remarks on Implementation ^e
Terminal drought (Early withdrawal of monsoon)	1. Medium and Low Land (High rainfall, loamy sandy loam soil, acidic soil)	Kharif vegetables-winter Rice Winter Rice-rapeseed Winter Rice-summer Rice	Harvesting of vegetables at physiological maturity, Weeding, Thinning of population. Prepare land for rabi crop	Avoid application of remaining split dose of fertilizer, Spray of antitranspitint.	
	2. Upland(High rainfall, loamy, sandy loam soil, acidic soil)	Kharif vegetables- Rabi vegetables Autumn rice(Direct seeded)- Vegetable			
	3. Hill slope(High				

	rainfall, sandy loam soil, slightly eroded acidic soil)	Fruits-Vegetables			
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2.1.2 Drought - Irrigated situation--

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agonomic 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			Not Applicable		
Non release of water in canals under delayed onset of monsoon in catchment			Not Applicable		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon			Not Applicable		
Insufficient groundwater recharge due to low rainfall			Not Applicable		

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Field Crops				
Winter Rice	Short term water logging may not harm to the crop. In very low land growing submergence tolerance variety may be grown	Crop may not suffers till as long as the flag leaf and panicle is out of water	Early harvesting, spaying growth regulator for enhancing early maturing of the panicle.	Provision for drying for harvested panicle
Rapeseed	Drainage of excess water	Drainage of excess water	Immediate harvest	Provision for drying for harvested silliqua
Blackgram	Provide drainage facility	Drainage of excess water	Drainage of excess water and immediate harvest	Provision for drying for harvested pods
Greengram	Provide drainage facility	Drainage of excess water	Drainage of excess water and immediate harvest	Provision for drying for harvested pods
Potato	Provide drainage facility Light hoeing after drainage	Provide drainage facility Light hoeing after drainage	Immediate harvesting	Storing the dried potato in cool dark place
Pea	Provide drainage facility Light hoeing after drainage	Provide drainage facility Light hoeing after drainage	Immediate harvesting	-
Sesame	Provide drainage facility, Light hoeing after drainage	Proper drainage facility, Light hoeing after drainage	Immediate harvesting	Drying of pods
Lentil	Provide drainage facility, Light hoeing after drainage	Provide drainage facility, Light hoeing after drainage	Immediate harvesting	Drying of pods

Sugarcane	Drain out excess water			
Banana	Drain out excess water within 24 hours, immediate light hoeing after drainage of water			
Heavy rainfall with high speed winds in a short span²	Not applicable			
Horticulture				
Outbreak of pests and diseases due to unseasonal rains				
Rice	Proper chemical and biological plant protection measures	Proper chemical and biological plant protection measures	Proper chemical and biological plant protection measures	-
Black gram				
Green gram				
Rape seed				
Kharif vegetable				

2.3 Floods:

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Summer and autumn Rice	-	-	Spray of hormones to hasten ripening and immediate harvesting	Immediate harvest and provision for drying the harvest
Winter Rice	Drain out excess water, Submergence tolerant variety, Staggered transplanted variety(Prafulla)	Interculture operation immediately after recession of water. If damage is high go for next planting with short duration variety(Eg Luit)	Spray of hormones to enhance maturity and harvesting at physiological maturity	Immediate harvest and provision for drying the harvest
Blackgram	Provide drainage of the land and if damaged completely go for re sowing	Provide drainage of the land,light hoeing	Spray of hormones to enhance maturity and harvesting at physiological	Immediate harvest and provision for drying the harvest

			maturity	
Rapeseed	Re sowing	-	-	-
Summer vegetables	Proper drainage of the land and if damaged completely go for resowing	Proper drainage of the land, light hoeing	Harvesting immediately	Harvest immediately
Continuous submergence for more than 2 days²				
Summer and autumn Rice	-	-	Spray of hormones to hasten ripening and immediate harvesting	Immediate harvest and provision for drying the harvest
Winter Rice	Drain out excess water, Submergence tolerant variety, Staggered transplanted variety (Prafulla)	Interculture operation immediately after recession of water. If damage is high go for next planting with short duration variety (Eg Luit)	Spray of hormones to enhance maturity and harvesting at physiological maturity	Immediate harvest and provision for drying the harvest
Blackgram	Provide drainage and if damaged completely go for re sowing	Proper drainage of the land, light hoeing	Spray of hormones to enhance maturity and harvesting at physiological maturity	Immediate harvest and provision for drying the harvest
(Rapeseed)	Resowing	-	-	-
(Summer vegetables)	Proper drainage and if damaged completely go for resowing	Provide drainage, light hoeing	Harvesting immediately	Harvest immediately
Sea water intrusion³	Not applicable			

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

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave ^p	Not applicable			
Cold wave ^q	Not applicable			
Frost	Not applicable			

Hailstorm			
Boro rice	Selection of lodging resistant varieties	Potash application at 25 and 45 DAT	
Cyclone	Not applicable		

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
Drought			
Feed and fodder availability	<ul style="list-style-type: none"> a. Storage of feed ingredient namely Maize, wheat bran, rice polish, moc etc. b. Storage of Rice straw silage making. c. Cultivation of perennial grass, fodder trees etc. 	<ul style="list-style-type: none"> a. Stall feeding (restricted) b. Utilization of agricultural by-product, house hold wastage, kitchen wastage, hotel wastage(pig) 	<ul style="list-style-type: none"> a. Rainfed fodder cultivation of both seasonal and perennial type b. Utilization of fodder tree leaves
Drinking water	<ul style="list-style-type: none"> d. Provision created for shallow tube well, Ring well. e. Community water tank 	<ul style="list-style-type: none"> a. Utilization of shallow Tubewell, Ring well b. Community water tank c. Minimum use of water 	Community tank
Health and disease management	<ul style="list-style-type: none"> a. Vaccination against viral and bacterial disease b. Anti stress management 	<ul style="list-style-type: none"> a. Heat stress management as and when required. b. Showering facilities c. Wallowing (Bufaloo) d. Restricted movement. 	<ul style="list-style-type: none"> a. Health tonic, Vitamin b. Management for any disease management break

Floods			
Feed and fodder availability	a.Storage of feed ingredient (wheat bran, Rice polish) b.Straw, processed fodder above the water level of last major flood	a.Community shelter b.Restricted stall feeding Fodder tree leaves	a.Cultivation of seasonal and perennial fodder crop b.Utilization of fodder tree leaves
Drinking water	a.Overhead storage water tank	Utilization of chemical treated (Chlorinated) water Boiled water	Community tank
Health and disease management	a.Vaccination against FMD, HS, BQ b.De-worming	a.Community rescue centre b.Quarantine/ Isolation facility c.Vaccination/ Treatment	a.Post flood disease management (Vaccination/Treatment/ Isolation) b.Quarantine/ Isolation of any suspected animal
Cyclone			
Feed and fodder availability	a. Storage of feed ingredient (wheat bran, Rice polish) b. Storage of fodder crop in the form of silage etc		
Drinking water	a. Ground water facility creation		
Health and disease management	a.Vaccination against FMD, HS, BQ b.De-worming	a.Community rescue centre b.Quarantine/ Isolation facility c.Vaccination/ Treatment	a.Post flood disease management (Vaccination/Treatment/ Isolation) b.Quarantine/ Isolation of any suspected animal
Heat wave and cold wave			
Shelter/environment management	Provision for community shelter	a.Community shelter facility b.Covering sheds/ animals during cold wave c.Roof reflector for sun light during heat wave..	
Health and disease management	Vaccination against common disease	a.Anti stress medicated b.Restricted movement c.Stall feeding and watering	

		d.Covering animals	

^s based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/ linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Early storage of feed ingredients	Restricted feeding, reducing the stock	Reducing the stock and restricted feeding	
Drinking water	Storage water tank	Restricted use of water	Restricted use of water	
Health and disease management	Strategic vaccination of the bird for all possible diseases	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	
Floods				
Shortage of feed ingredients	Storage of feed ingredients	Reducing the stock	Reducing the stock and restricted feeding	
Drinking water	Over head water reservoir	Use boiled water	Use boiled water	
Health and disease management	Strategic vaccination of the bird for all possible diseases	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	
Cyclone				
Shortage of feed ingredients	Storage of feed ingredients	Reducing the stock	Reducing the stock and restricted	

			feeding	
Drinking water	Ground water facility creation	Use boiled water	Use boiled water	
Health and disease management	Strategic vaccination of the bird for all possible diseases, anti stress medicine	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management , anti stress medicine	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	
Heat wave and cold wave				
Shelter/environment management	Arrangement of coverage of the poultry sheds	Proper coverage of the poultry sheds	-	
Health and disease management	Strategic vaccination and preventive application of anti microbial drug, anti stress medicine	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management , anti stress medicine		

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			

B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<p>a. Reduce the stocking density of fishes by harvesting the marketable sized fishes</p> <p>b. At one side of the pond, depth should be made more by digging so that during drought fishes can take shelter in this deeper portion of the pond.</p> <p>c. If possible, provision should be made for pumping water into the pond from other sources or ground water.</p> <p>d. If the water body is very small, air breathing fishes like magur culture should be encouraged rather than IMC</p> <p>e. If possible provision for mechanical aerator should be made.</p>	<p>a. Application of feed and FYM should be restricted.</p> <p>b. Aeration should be done either manually or mechanically at least two times in a day (Morning and evening)</p> <p>c. Netting over pond surface can be made in these areas where attack of predatory birds is dominant.</p> <p>d. Frequent netting activities should be restricted.</p> <p>e. Lime should be applied at proper dose.</p> <p>f. $KMnO_4$ can also be applied @ 2-4 ppm.</p>	<p>a. After drought one partial harvesting should be done to check the fish health. If any symptom of disease seen, measures should be taken immediately.</p> <p>b. Lime should be applied at proper dose.</p> <p>c. Restock the pond with fingerlings if available.</p> <p>d. If the water quality and fish health is good enough then start feeding.</p>
(ii) Impact of salt load build up in ponds / change in water quality	<p>a. Growth of <i>Azolla pinnata</i> should be encouraged to check eutrophication and excessive evaporation.</p> <p>b. Lime should be applied according to PH of water</p>	<p>a. Don't make any disturbances in the pond from outside like netting, application of feed, FYM etc.</p> <p>b. Activities like bathing, washing domestic animals should be stopped.</p>	<p>a. After drought check water quality and fish health.</p> <p>b. When fish health and water quality becomes normal start feeding and fertilizing activities.</p>
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No. of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			

(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	<p>a. Broken dykes of pond should be repaired.</p> <p>b. Height of the pond dyke should be increased above the flood level.</p> <p>c. Bamboo screen or nylonnets should be made ready for sudden rise in flood level.</p> <p>d. Inlets and outlets of the ponds should be checked for working condition.</p> <p>e. Marketable sized fishes should be harvested.</p>	<p>a. Bamboo screen or nylonnets should be placed round the pond dyke.</p> <p>b. Stop application of feed, fertilizer and lime.</p> <p>c. If flood level starts decreasing apply KMnO_4 @ 2-4 ppm.</p>	<p>a. Lime should be applied at proper dose.</p> <p>b. Repeated netting should be done to check fish health and entry of any unwanted and predatory fishes.</p> <p>c. Apply KMnO_4 @ 2-4 ppm</p>
(ii) Water contamination and changes in water quality	<p>a. Reduce the stocking density of fishes by harvesting the marketable sized fishes</p> <p>b. Stop application of feed, fertilizer and manure.</p> <p>c. Lime should be applied at proper dose.</p>	<p>a. Stop feeding</p> <p>b. Stop application of manure.</p>	<p>a. Examine water quality and then go for liming, manuring and feeding.</p>
(iii) Health and diseases	<p>a. Lime should be applied at proper dose.</p> <p>b. Apply KMnO_4 @ 2-4 ppm frequently.</p>	<p>a. Stop feeding, manuring and netting activities.</p>	<p>a. Check fish health by netting</p> <p>b. Lime should be applied at proper dose.</p> <p>c. Apply CIFAX.</p>
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
3. Cyclone / Tsunami	Not applicable		
4. Heat wave and cold wave	Not applicable		