

State: ORISSA

Agriculture Contingency Plan for District: JHARSUGUDA

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone :			
	Agro Ecological Sub Region (ICAR)	Eastern Plateau (chhotanagpur) And Eastern Ghats, Hot subhumid eco-region (12.1)		
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau and hills region (VII)		
	Agro Climatic Zone (NARP)	Western Central Table Land Zone (OR-9)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Jharsuguda, Sambalpur, Sonepur, Bargarh & Bolangir		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21 ⁰ 51'36. 87"N	84 ⁰ 00' 55.86"E	255m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research and Technology Transfer Station, Chiplima, Sambalpur		
	Mention the KVK located in the district with address	Krishi Vignan Kendra, Jharsuguda At/P.O : O.S.A.P, 2 nd Batalian, Jharsuguda-768204		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	AMFU,IMD located at RRTTS, Chiplima, Sambalpur		

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-September):	1198.2	53.8	2 nd week of June	2 nd week of September
	NE Monsoon(October-December):	67.0	4.5	2 nd week of October	2 nd week of November

	Winter (January-February)	54.6	4.1		
	Summer (March-May)	43.0	3.8		
	Annual	1362.8	66.2		

Source- Odisha Agriculture Statistics 2008-09

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	208.0	78.0	20.0	39.0	20.0	15.0	6.0	17.0	21.0	3.0

Source- Odisha Agriculture Statistics 2008-09.

1.4	Major Soils (common names like red sandy loam deep soils (etc.))*	Area ('000 ha)	Percent (%) of total
	Red & Yellow Soils	125.5	60.3
	Red & Black Soils	73.4	35.3
	Laterite Soils	9.1	4.4

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	78.0	144.5 %
	Area sown more than once	34.7	
	Gross cropped area	112.7	

* Source- Odisha Agriculture Statistics 2008-09.

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	101.1		
	Gross irrigated area	143.3		
	Rainfed area	278.8		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		5.1	37.1
	Tank	-		

Open wells	6088		
Bore wells	143	4.1	30.0
Lift irrigation schemes	85		
Micro-irrigation			
Other sources	45	5.1	32.9
Total Irrigated Area		13.97	
Pump sets	220		
No. of Tractors	35		
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			
Critical	1	70 %	Good & neutral (PH)
Semi- critical	-	-	-
Safe	4	100%	Good & neutral (PH)
Wastewater availability and use			
Ground water quality			

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

1.7 Area under major field crops & horticulture (as per latest figures) (Year 2009-10)

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Paddy	0.3	46.1	46.5	0.3	-	0.3	-	46.7	
Sesamum	1.3	5.3	6.6	1.0	1.5	2.6	-	9.3	
Greengram	1.9	2.6	4.5	1.5	1.4	3.0	-	7.5	
Blackgram	0.7	3.8	4.5	0.3	1.0	1.2	-	5.8	

	Horsegram	-	1.9	1.9	0.04	1.2	1.2	-	3.1
	Groundnut	0.4	1.1	1.6	0.8	-	0.8	-	2.4
	Mustard	-	-	-	1.3	2.2	3.5	-	0.4

* Source- Department of Agriculture, Jharsuguda (Proceeding, Strategic meeting)

Horticulture crops - Fruits	Area ('000 ha)	
		Total
Mango		1.0
Banana		0.2
Citrus		0.2
Guava		0.1
Papaya		0.004
Horticulture crops - Vegetables		Total
Brinjal		0.4
Tomato		0.4
Cole crops		0.2
Potato		0.2
Sweet Potato		0.1
Grazing land		20

* Source- SREP, Jharsuguda

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)	10.1	57.8	67.9		
	Improved cattle	0.1	0.2	0.3		
	Crossbred cattle	3.5	5.1	8.6		
	Non descriptive Buffaloes (local low yielding)	7.7	2.3	10.1		
	Descript Buffaloes	0.4	0.6	1.1		
	Goat	18.0	27.9	45.9		
	Sheep	3.3	4.1	7.4		
	Others (Camel, Pig, Yak etc.)	1.9	3.7	5.7		
	Commercial dairy farms (Number)					
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial	27	5.3			
	Backyard	5543	53.3			
1.10	Fisheries (Data source: Chief Planning Officer)					
	A. Capture					
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs	No. of village tanks	
		500		1	1240	
	B. Culture					
				Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)					
ii) Fresh water (Data Source: Fisheries Department)			1640	2.9	4756	

* Source- SREP, Jharsuguda

1.11 Production and Productivity of major crops (Average of last 5 years: 2003-04, 2004-05, 2005-06, 2006-07, & 2007-08)

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 to be identified based on total acreage)										
	Paddy	97.0	3062	46.8	1958	6.628	3035	145.4	2440	-
	Sesamum	0.5	294	-	-	-	-	0.5	294	-
	Horsegram	-	-	0.1	316	-	-	0.1	316	-
	Mustard	-	-	0.1	318	-	-	0.1	318	-
	Greengram	-	-	0.006	372	0.1	412	0.1	408	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	3.0	3062	-	-	-	-	3.0	3062	-
	Chili	0.6	850	-	-	-	-	0.6	850	-
	Brinjal	-	-	5.6	12700	-	-	5.6	12700	-
	Tomato	-	-	4.6	12225	-	-	4.6	12225	-
	Ginger	2.1	15200	-	-	-	-	2.1	15200	-

* Source- SREP, Jharsuguda

1.12	Sowing window for 5 different crops (start and end of sowing period)	Paddy	Sesamum	Horsegram	Mustard	Greengram
	Kharif – Rainfed	1 st week of June –4 th week of July	1 st week of July-4 th week of August	1 st week of June –4 th week of July	-	1 st week of June –4 th week of July
	Kharif – Irrigated	1 st week of June –4 th week of July	1 st week of July-4 th week of August	1 st week of June –4 th week of July	-	1 st week of June –4 th week of July
	Rabi – Rainfed	-	-	1 st week of November-4 th week of December	-	1 st week of December – 4 th week of January
	Rabi – Irrigated	1 st week of January – 4 th week of February	-	1 st week of November-4 th week of December	1 st week of November-4 th week of December	1 st week of December – 4 th week of January

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	✓		
	Flood			✓
	Cyclone		✓	
	Hail storm			✓
	Heat wave	✓		
	Cold wave	✓		
	Frost			✓
	Sea water intrusion			✓
	Pests and disease outbreak		✓	

1.14	Include Digital maps of the district for		
		Location map of district within State as Annexure I	Enclosed: No
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: No

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 June 4 th week	Plain rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> • In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to bunded uplands • Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • Interculture and thinning to maintain plant population per unit area of the crop 	<ul style="list-style-type: none"> • Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM • Apiculture, Mushroom production and vermi composting through ATMA, NHM and KVKs • Pisciculture and farming system in farm ponds through NREGS
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
		Chilli	Utkal ava		
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
	Rainfed medium lands	Sole crops: Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • Apply full P, K and 20% N of recommended dose along with well decomposed 	<ul style="list-style-type: none"> • Seed drill under RKVY. • Supply of seeds

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)				organic matter for early seedling vigor, • In-situ rain water conservation.	through ATMA, OSSC and NFSM
	Rainfed low lands :	Sole crops: Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Masuri	• Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation.	

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks July 3 rd week	Plain rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> If the mortality rate is less than 50% gap filling should be done .in case of more than 50% mortality resow the crop with short duration high yielding ,low water requiring crops like Greengram, Blackgram, Horsegram etc . Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation in Vegetable and Groundnut crop 	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
Chilli	Utkal ava				

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • If rice population is less than 50% re sow the sprouted seeds in line through pre-germinated seed drill or fresh seedlings. • Select short to medium duration varieties (90-120 d) • Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice through transplanter saving of 50% seed requirement or through SRI method (@5kg seeds/ha). • Do not top dress nitrogen in nursery • Apply life saving irrigation to maintain nursery seedlings. 	Pre-germinated seed drill under RKVY. High yielding rice varieties under NFSM. Paddy transplanter, marker and cono weeder under RKVY

Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Rainfed low lands	Sole crops: Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Masuri	<ul style="list-style-type: none"> If rice population is more than 50% carryout weeding and maintain the plant population by <i>Khelua</i> operation (removing and distributing the hills) Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice. Do not top dress nitrogen in nursery 	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks August 1 st week	Plateau, Rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> Top dressing of 25 % urea and potash after receipt of the rain for upland rice. Spraying of 2% KCl + 0.1 ppm Boron to black gram Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai / ha in 500lt of water to control weeds in groundnut. Complete hoeing and weeding of non-paddy crops to provide dust mulch. Remove the pest and disease infected plants from the main field. 	<ul style="list-style-type: none"> Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		

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)		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
		Chilli	Utkal ava		
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplanting of 45 days old seedlings at closer spacing. 	
		Sole crops under rainfed low lands : Rice	Swarna, Pratikshya, Ranidhan, Sidhanta and Musuri	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application of receipt of rainfall. • Transplant seedlings up to 45 days old. • Follow need based plant protection measures against stem borer and blast. • Follow close planting of 4-5 	Tractor, power tiller, rotavator under RKVY

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)				seedlings per hill. • Apply full P, k and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary	
		Fallow –Greengram /Blackgram/ Horsegram	Greengram variety Dhauli, Kamadev, Sujata Blackgram variety - Pant U-19 &30, Ujala, Sarala Horse gram-Urmi		

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 8 weeks August 3 rd week	Plateau Rainfed Uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> • Provide life saving irrigation • Remove the pest and disease infected plants from the field. • Need based plat protection measures to be taken • Harvesting of vegetables 	<ul style="list-style-type: none"> • Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala, Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		

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)		Chilli	Utkal ava		
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Transplant seedlings with closure spacing up to 45 days old. • Apply full P, K and 25% N of recommended dose along with well decomposed organic manures. • Provide life saving irrigation. 	
		Sole crops under rainfed low lands : Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Musuri	<ul style="list-style-type: none"> • Top dressed N fertilizer after receipt rainfall. • Transplant seedlings up to 45 days old. • Follow plant protection measures against steam borer and blast in nursery. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedling per hill. • Apply full P, k and 50 % N at the time of transplanting. • Apply life saving irrigation. 	Tractor, power tiller, rotator under RKVY

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)			Crop management		
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Plateau rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> • Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50%. • Cultivate vegetables like cow pea and tomato. • Complete hoeing weeding and earthing up at 20 DAS for moisture conservation for groundnut and vegetable crops 	<ul style="list-style-type: none"> • Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
		Chilli	Utkal ava		
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
	Rainfed medium lands	Sole crops : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> •If rice population is less than 50% resow the crop. •Select early maturing varieties (90d). •Sprouted seeds may be direct seeded in lines or fresh seedlings may be raised for 	<ul style="list-style-type: none"> • Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
				transplanting •If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.	NFSM and OSSC.
	Rainfed low lands	Sole crops: Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Musuri	•If rice population is less than 50% gap filling may be dawn. •Fresh seedlings may be transplanted •If rice population is more than 50 % carryout weeding and adjust the plant population by khelua	

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 measures	Remarks on Implementation
At vegetative stage	Plateau rainfed uplands	Sole crops under rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	• Organic mulching with previous crop residues • Follow ridge and furrow method of planting for Groundnut and vegetable crops.	• Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		

Condition	Major Farming situation	Normal 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)		Greengram	Sujata, Durga, PDM-11 & 54		
		Blackgram	Pant U-19 & 30, Ujala, Sarala		
		Groundnut	Smruti, Devi, TMV-2, TAG-24		
		Kharif vegetables Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
		Chilli	Utkal ava		
		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra		
Sole crops under rainfed low lands : Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Musuri	<ul style="list-style-type: none"> • Seedling of 45 days old can be transplanted or gap filled. • Do not practice beushaning • Weed out the field • Follow plant protection measures • Provide protective irrigation through harvested rain water • Withhold N application • Apply Potassic fertilizer • Strengthen field bunds. 			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)	Plateau rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	<ul style="list-style-type: none"> • Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought. • Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. • Remove and destroy pest and disease affected plants • Provide irrigation at critical stages at flowering and grain filling stage. • Crops like Cow pea, Greengram, Blackgram, maize and vegetables may be harvested. • Under situation of complete failure of Kharif crop, dismantle it and sow pre-rabi crops minor pulses like horse gram (var. Urmi), Niger (Deomali) • Need based plant protection measures to be taken. 	<ul style="list-style-type: none"> • Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24		
		Kharif vegetables	Utkal Kumari, Utkal Raja (determinate type)		
		Tomato	Blue star, Utkal Anushree, Utkal Tarini		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
		Chilli	Utkal ava		
	Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)			
	Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • Advised to spray Tricyclazole (Beam/Team) 0.06 - 0.1% at 10-12 days interval to control blast and brown spot diseases in rice during this period. • To control stem borer and Gandhi bug, spray methyl 		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)				demeton/dimethioate	
		Sole crops under rainfed low lands : Rice	Swarna, Pratikshya,Rani dhan, Sidhanta and Musuri	<ul style="list-style-type: none"> • Provide life saving irrigation. • For late transplanted rice 2 spraying at 10 days interval with Vardamycin 0.3% to control sheath blight. • Provide life saving irrigation and plugging of drainage holes. 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Plateau Rainfed Uplands	Sole crops under rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops i.e.	Utilization of residual moisture for early sowing of pre-rabi crops like Cowpea (SEB – 2, Utkal Manik), Horsegram (Urmi), Greengram (Durga), Blackgram (Ujala), Niger (Deomali,ONS-15) Tomato Utkal Raja, Utkal Kumari, Utkal Urbasi. Cabbage (Pride of India, Golden Acre, Konark, Sujata, Vijay, Cauliflower (Snow ball, Improved Japanese, Himani), Okra (Utkal Gourab, Arka Anamika), and leafy vegetables to be sown to conserve soil moisture. And provide life saving irrigation as and when necessary	<ul style="list-style-type: none"> • Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
		Rice	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11 & 54		
		Blackgram	Pant U-19 & 30, Ujala, Sarala		
		Groundnut	Smruti, Devi, TMV-2, TAG-24		
		Kharif vegetables	Utkal Kumari, Utkal Raja (determinate type)		
		Tomato	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal	Blue star, Utkal Anushree, Utkal Tarini		
Chilli	Utkal ava				

		Intercrop under rainfed upland	Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	Provide life saving irrigation, from harvested rain water at reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Musuri	Provide life saving irrigation, and monitoring of pest surveillance, <i>paira</i> cropping of Blackgram and Greengram	

2.1.2. Drought - Irrigated situation: Not experienced

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 Paddy	Drainage of excess water, management of Blast(0.2% Edifenphos), leaf blight(0.01% Streptocycline) & Stem borer(0.2% Trizaphos)	Drainage of excess water, management of Blast(0.2% Edifenphos), leaf blight(0.01% Streptocycline) & stem borer(0.2% Trizaphos)	Drainage excess water, Protection against pest like , Green leaf hopper & BPH (Imidacloprid 0.025%)& diseases like Blast, preventing crop from lodging, harvesting in physiological maturity stage.	Covering of harvested bundles by tarpaulin, Shifting of produce to godown or safer place, protecting from stray cattle

Greengram	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease (powderymildew with 0.2% sulphur) management.	Drainage, Protection against pest (pod borer with 0.2% triazophos)	Drainage, Shifting of produce to godown or safer place, protecting from stored grain pest & diseases
Groundnut	Excess water drainage, Termite & Tikka disease management , need based intercultural operation	Drainage of excess water, Pest & disease management(Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals)	Drainage of excess water, Pest & disease management(Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals)	-do-
Sesame	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease management.	Drainage, Protection against pest & diseases.	-do-
Black gram	-do-	-do-	-do-	-do-
Horticulture				
Tomato	Drainage of Excess water, gap filling, disease & pest management	Drainage of excess water, Pest & disease management, staking of plant	Drainage, Protection against pest & diseases, harvesting	Drainage, Shifting of produce to safer place, grading & packing
Brinjal	Excess water drainage, disease & pest management	-do-	-do-	-do-
Ginger	Excess water drainage, disease & pest management, earthing-up, making channel, weeding, re-mulching	Drainage of excess water, rhizome rot disease management(0.2% ridomyl-MZ), weeding, re-mulching	Drainage of water immediately, pesticides drenching & spraying for rot management	-do-
Mango	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease management,	Drainage, Protection against pest & diseases, harvesting of fruits	-do-
Banana	-do-	Drainage of excess water, Pest & disease management, cutting of trashes	Drainage, Protection against pest & diseases, preventing crop lodging	Drainage, Shifting of produce to godown or safer place
Heavy rainfall with high speed winds in a short span				
Paddy	Drainage of excess water, management of Blast(0.2% Edifenphos), leaf	Drainage of excess water, management of Blast(0.2% Edifenphos), leaf	Drainage of excess water, Protection against pests like, Green leaf hopper & BPH	Drainage, Shifting of produce to godown or safer place, protecting from stored grain pest & diseases

	blight(0.01% Streptocycline) & Stem borer(0.2% Trizaphos)	blight(0.01% Streptocycline) & stem borer(0.2% Trizaphos)	(Imidacloprid 0.025%) & diseases like, Blast, preventing crop from lodging, harvesting in physiological maturity stage.	
Greengram	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease (powderymildew with 0.2% sulphur) management.	Drainage, Protection against pest(pod borer with 0.2% triazaphos)	-do-
Groundnut	Excess water drainage, disease & pest management, weeding, earthing-up	Drainage of excess water, Pest & disease management(Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals)	Drainage of excess water, Pest & disease management(Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals)	Drainage, Shifting of produce to godown or safer place, protecting from grain pest & diseases
Sesame	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease management,	Drainage, Protection against pest & diseases, preventing crop lodging, harvesting	-do-
Blackgram	-do-	-do-	Drainage, Protection against pest & diseases, harvesting	-do-
Horticulture				
Tomato	Drainage of Excess water, gap filling, disease & pest management	Drainage of excess water, Pest & disease management, staking of plant	Drainage, Protection against pest & diseases, harvesting	Drainage, Shifting of produce to safer place, grading & packing
Brinjal	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease management,	Drainage, Protection against pest & diseases, preventing crop lodging, harvesting fruit	Drainage, Shifting of produce to godown or safer place, grading ,packing,& marketing
Ginger	Excess water drainage, disease & pest management, earthing-up, making channel, weeding, re-mulching	Drainage of excess water, rhizome rot disease management(0.2% Ridomyl-MZ), weeding, re-mulching	Drainage of water immediately, pesticides drenching & spraying for rot management	-do-

Mango	Excess water drainage, disease & pest management	Drainage of excess water, Pest & disease management,	Drainage, Protection against pest & diseases, harvesting of fruits	-do-
Banana	-do-	Drainage of excess water, Pest & disease management, cutting of trashes	-do-	Drainage, Shifting of produce to godown or safer place
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Management of Blast(0.2% Edifenphos), leaf blight(0.01% Streptocycline) & stem borer(0.2% Trizaphos)	Management of Blast(0.2% Edifenphos), leaf blight(0.01% Streptocycline) & stem borer(0.2% Trizaphos)	Management of Green leaf hopper & BPH using Imidacloprid 0.025%	Shifting of produce to godown or safer place, protecting from stored grain pest & diseases
Greengram	Curative disease & pest management, weeding	Powdery mildew with 0.2% sulphur management.	Protection against pod borer with 0.2% triazophos	-do-
Groundnut	Pesticide application, weeding, intercultural operation	Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals	Manage leaf miner in Groundnut by spraying Monocrotophos or Triazophos 40 EC @ 1 litre/ha at fortnightly intervals	-do-
Sesame	Disease & pest management	Pest & disease management	Protection against pest & diseases	-do-
Blackgram	-do-	-do-		-do-
Horticulture				
Tomato				Shifting of produce to safer place, grading & packing
Brinjal				-do-
Ginger		Rhizome rot disease management (0.2% Ridomyl-MZ)		Shifting of produce to godown or safer place, cleaning, seed treating & drying
Mango		Pest & disease management,	Protection against pest & diseases, harvesting of fruits	-do-

Banana	Disease & pest management	Pest & disease management, cutting of trashes	Protection against pest & diseases, preventing crop lodging	Shifting of produce to godown or safer place
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2.3 Floods: Not Applicable

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Paddy	Mulching, irrigating frequently, spraying pesticide to prevent from damping off	Increase Irrigation frequency, intercultural operation	Provide deficit irrigation, quick harvesting to prevent moisture loss	Shifting of produce to shade and safe place
Greengram	Frequent irrigation	-do-	-do-	-do-
Groundnut	-do-	-do-	-do-	-do-
Horticulture				
Mango	Growing in poly house, Pesticide application, watering twice daily	Disease & pest control, pitcher irrigation, continuous irrigation by drip method	Protective irrigation, disease & pest management, quick harvesting	store in cool dry place, grading, packing ,quick disposal for marketing
Guava	Growing in poly house, Pesticide application, watering twice daily	-do-	-do-	-do-
Cold wave				
Paddy	mulching, irrigating frequently	intercultural operation,	Quick harvesting to prevent loss due to frost	Shifting of produce to shade and safe place and in close store room
Groundnut	Continuous irrigation, weeding	-do-	-do-	-do-
Greengram	-do-	-do-	-do-	-do-
Blackgram	-do-	-do-	-do-	-do-

Horticulture				
Tomato	Raising of seedling in Poly house, resowing if damaged	Disease and pest control, care for chilling injury or replanting	Quick harvesting	Grading, quick disposal for marketing
Potato	-do-	Disease and pest control	Harvesting, disease management	Store in cold storage or quick disposal for marketing
Chilli	-do-	Disease and pest control, care for chilling injury or replanting	-do-	-do-
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	<ol style="list-style-type: none"> 1. Encourage perennial fodder production on river beds and tank bed on community basis. 2. Village Gauchar land should be developed 3. Excess fodder in flush season can be preserved as hay / silage 	<ol style="list-style-type: none"> 1. Utilizing fodder from perennial trees and fodder bank reserves 2. Utilizing fodder from perennial trees and fodder bank reserves 3. Utilizing the existing crops which fail to grow adequately due to failure of monsoon for feeding of animals. 	Supplementary feeding of remaining livestock and the replacement stock.
Drinking water	Preserving water in community tanks and ponds etc for drinking purpose by excavation and	Water sources of social institutions generally ideal sources during draught.	Water supply from town area or nearby areas where water is

	sanitization of these. In addition, wells (bore wells or dug wells) may be constructing ahead of possible event of draught.		available
Health and disease management	Veterinary preparedness with vaccine and medicines	1. Conducting animal health camps and treating the affected animals 2. Supplementation of mineral and vitamin mixtures	1. Culling of unproductive livestock 2. Proper disposal of dead animals
Floods			
Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Temporary shelter, green cover	Temporary shelter, don't leave for grazing, sufficient water	Application of multivitamins and nutrients
Health and disease management	Stocking of medicines	Open LI centres, give sufficient water and required medicines.	Application of multivitamins and nutrients

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Feed resources	Ensure procurement of feed ingredients sufficient ahead	Feed supplementation will be made to the farms	Attempt will be made for available of feed ingredient or compound feed to the farmers	
Water Resources	Check water source for ensuring sufficient portable water during draught	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well	
Health and disease management	Procurement of vaccines and medicines and anti-stress agent. Feeding antibiotics Procurement of litter materials	Continue feeding of anti-stress agent		
Flood				
Feed resources	-	-	-	
Water Resources	-	-	-	
Health and disease management	-	-	-	
Cyclone				
Feed resources	-	-	-	
Water resources	-	-	-	
Health and disease management	-	-	-	

Shelter and environment management	-	-	-	
Heat Waves				
Feed resources	Procurement of high protein and low energy diet. Procurement of medicine, anti stress agent and vitamin C and E.	Feeding during cooler hour of the day. Supplementation of vitamin E and C, antistress agent with water	Feeding will be continued with high protein and low energy till heat waves ends and then feeding will be done with normal diet. Antistress agents will be continued in drinking water for some days	
Water resources	Provision should be made for continuous available of water	Sufficient cool drinking water with sodium bicarbonate or electrolytes.	Availability of cold water will be made for some days	
Health and disease management	Procurement of anti stress drugs	Supplementation of anti stress drug	Vaccination of birds against RD	
Shelter and environment management	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories Providing shed to poultry houses. Providing proper ventilation.	Attempt will be made for cooling of poultry shed by adapting different cooling methods Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan	Provision should be made to ensure proper ventilation to the house	
Cold Waves				
Feed resources	Procurement of high energy diet	Feed high energy diet.	Disease control or taking care if affected	
Water resources	Proper water supply will be ensured			
Health and disease management	Procurement of anti stress drugs and vaccine	Feeding of anti stress drugs in drinking water Vaccination with	Vaccination against IBD and RD	

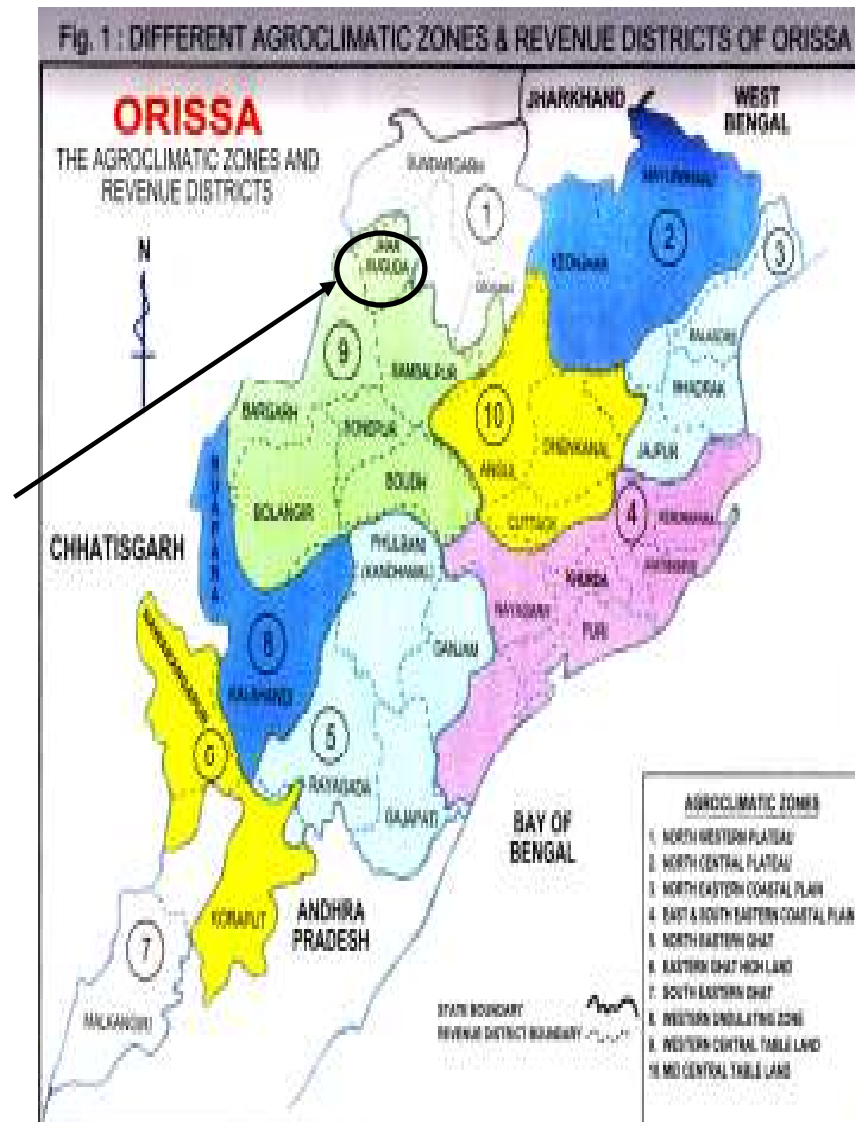
		fowl pox		
Shelter and environment management	Procurement of curtains to cover open sides of the shed. Heating arrangement kept ready	Close the open sides of the shed by curtain in such a way that ventilation should not be hampered. Provide heat if necessary depending on the temperature and age of the birds	Remove the curtains. Discontinue heating.	

2.5.3 Fisheries/ Aquaculture

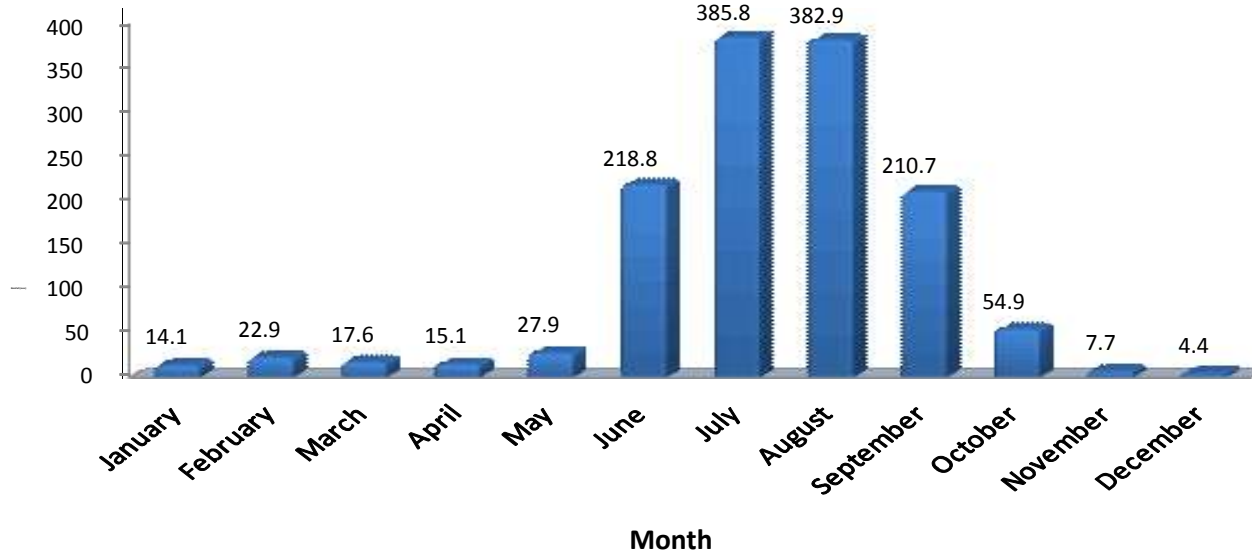
Drought	Suggested contingency measures		
	Before the event	During the event	After the event
Feed resources	Ensure procurement of feed ingredients sufficient ahead	Feed supplementation will be made to the farms	Attempt will be made for available of feed ingredient or compound feed to the farmers
Water Resources	Check water source for ensuring sufficient portable water during draught	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well
Health and disease management	Procurement of vaccines and medicines and anti stress agent. Feeding antibiotics Procurement of litter materials	Continue feeding of anti stress agent	
Flood	NA		
Cyclone	NA		
Heat Waves			
Feed resources	Procurement of high protein and low energy diet Procurement of medicine, anti stress agent and vitamin C and E.	Feeding during cooler hour of the day. Supplementation of vitamin E and C, anti stress agent with water	Feeding will be continued with high protein and low energy till heat waves ends and then feeding will be done with normal diet Anti stress agents will be continued in drinking water for some days
Water resources	Provision should be made for continuous available of water	Sufficient cool drinking water with sodium bicarbonate or electrolytes.	Availability of cold water will be made for some days
Health and disease management	Procurement of Anti stress drugs	Supplementation of anti stress drug	Vaccination of birds against RD
Shelter and environment management	Pruning of big trees in the farm. Putting curtains on open sides of the shed.	Attempt will be made for cooling of poultry shed by adapting different cooling methods	Provision should be made to ensure proper ventilation to the house

	Procurement of electrical accessories Providing shed to poultry houses. Providing proper ventilation.	Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan	
Cold Waves			
Feed resources	Procurement of high energy diet	Feed high energy diet.	
Water resources	Proper water supply will be ensured		
Health and disease management	Procurement of anti stress drugs and vaccine	Feeding of anti stress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD
Shelter and environment management	Procurement of curtains to cover open sides of the shed. Heating arrangement kept ready	Close the open sides of the shed by curtain in such a way that ventilation should not be hampered. Provide heat if necessary depending on the temperature and age of the birds	Remove the curtains. Discontinue heating.

ANNEXURE-1



Monthly Normal Rainfall (Average of last 5 years)



ANNEXURE-2

Normal Rainy Days (Average of last 5 years)

