Agriculture Contingency Plan for Koraput District, Odisha

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Gujrat hills, Dandakaranya and Eastern Ghats hot moist sub-humid eco-sub-region.			
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau and Hill region (VII)			
	Agro Climatic Zone (NARP)	Eastern Ghat High Land Zone (OR-6)			
	List all the districts falling under the NARP Zone	Koraput and Nabarangpur			
	Geographic coordinates of district Headquarters	Latitude	Longitude	Altitude	
		$18^0$48’43.70” N	$82^0$42’43.16”E	969 m (MSL)	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Semiliguda, At P.O Sunabeda, Dist – Koraput, PIN-763002			
	Mention the KVK located in the district with address	KVK, Koraput, Semiliguda, P.O- Sunabeda, Dist – Koraput, PIN-763002			
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Regional Centre of IISWC (RC), ,At P.O-Sunabeda, Dist – Koraput, PIN-763002			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	1232.3	62.4	June 2nd week	September 2nd week
	NE Monsoon(Oct-Dec):	165.2	9.3	October 1st week	December 1st week
	Winter (Jan- Feb)	14.3	1.3	-	-
	Summer (Mar-May)	155.4	10.9	-	-
	Annual	1567.2	83.9	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivated 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)	881	304	188	54	45	44	17	210	49	19

Source-Orissa Agriculture Statistics 2018-19

1. 4	Major Soils (common names like red sandy loam deep soils (etc.,)*	Area (‘000 ha)
	Red soils	437.9
	Alluvial soils	200.0
	Mixed Red and Yellow soils	140.0
	Red and black soils	60.0
	Total	837.9

1.5	Agricultural land use	Area (‘000 ha)	Cropping intensity %
	Net sown area	272.0	147.18 %
	Area sown more than once	99.7	
	Gross cropped area	400.34	

1.6	Irrigation	Area (‘000 ha)		
	Net irrigated area	90.19		
	Gross irrigated area	153.08		
	Rainfed area	181.81		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals		69.319	45.5
	Tanks and ponds	2682		
	Open wells		1.39	0.9
	Bore wells	1		
	Lift irrigation schemes		22.685	14.68
	Micro-irrigation		5.575	3.64
	Other sources (perennial)		48.724	31.8
	Total Irrigated Area(Gross)		153.08	
	Pump sets	896		
	No. of Tractors	185		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tahsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	Ground water quality			

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

(Source:CWC,CGWB district irrigation and agricultural office records)

1.7 Area under major field crops & horticulture

1.7	**Major field crops Cultivated**	**Area ('000 ha)**							
		Kharif			**Rabi**				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Paddy	64.05	47.81	111.86	20.8	68.28	89.08	20.8	221.74
	Finger millet	4.14	60.84	64.98	0.18	0	0.18	0	65.16
	Maize	6.18	20.31	26.49	2.53	0	2.53	0	29.02
	Niger	0	22.9	22.9	0	0	0	0	22.9
	Arhar	0	5.1	5.1	0	0	0	0	5.1
	Sugarcane	0	0	0	9.98	0	0	0	9.98

	Horticulture crops - Fruits	Area ('000 ha)
		Total
	Mango	6.7
	Guava	1.0
	Banana	0.8
	Citrus	0.7
	Sapota	0.1
	Horticulture crops - Vegetables	Total(28.46)
	Brinjal	4.0
	Okra	2.0
	Tomato	1.7
	Cabbage	0.8
	Cauliflower	0.8
	Sweet potato	3.16
	Medicinal and Aromatic crops	Total
	Turmeric	3.13
	Ginger	3.37
	Coriander	0.5
	Garlic	0.43
	Plantation crops	Total
	Cashew nut	6.05
	Coconut	0.2
	Eg., industrial pulpwood crops etc.	
	Fodder crops	Total
	Total fodder crop area	-
	Grazing land	-
	Sericulture etc	-

1.8	Livestock	Male (‘000)	Female (‘000)	Total (‘000)			
	Non descriptive Cattle (local low yielding)			179.585			
	Improved cattle						
	Crossbred cattle			9.459			
	Non descriptive Buffaloes (local low yielding)						
	Descript Buffaloes						
	Total Buffaloes	40.609	40.581	81.190			
	Goat			163.3			
	Sheep			129.67			
	Others (Camel, Pig, Yak etc.)			39.588			
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds (‘000)				
	Commercial						
	Backyard						
	Total	62.4	11442.02				
1.10	Fisheries						
	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)	Non-mechanized (Shore Seines, Stake & trap nets)	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds and Tanks	No. of Reservoirs	No. of village tanks			
		2682	3	-			
	B. Culture						
		Water Spread Area (ha)	Yield (t/ha)	Production (‘000 tons)			
	i) Brackish water	-	-	-			
	ii) Fresh water	10000	1.5	15000			
	Others	-	-	-			

1.11 Production and Productivity of major crops

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 MTS)	Productivity (kg/ha)	Production ('000 MTS)	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	453.25	282.08	453.25	6682	54,89	3411	317.40	2416	-
	Finger millet	58.48	900	0.16	916	-	-	58.64	900	-
	Niger	14.8	386	1.3	358	-	-	16.1	384	-
	Maize	72.2	2726	7.01	2769	-	-	79.21	2729	-
	Arhar	3.1	608	-	-	-	-	3.1	608	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	14.7	2210	14.7	2210	-
	Guava	-	-	-	-	-	-	6.6	6890	-
	Banana	-	-	-	-	-	-	10.7	14010	-
	Citrus	-	-	-	-	-	-	65.9	8970	-
	Sapota	-	-	-	-	5.8	4790	5.8	4790	-

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Finger millet	Niger	Maize	Arhar
	Kharif- Rainfed	June 2nd week to July 2nd Week	June 2nd week to July 2nd week	July 3rd week to September 1st week	June 2nd week to July 1st week	June 2nd week to July 2nd week
	Kharif-Irrigated	June 2nd week to July 2nd Week	June 2nd week to July 2nd week	August 1st week to September 1st week	June 2nd week to July 1st week	June 1st week to July 1st week
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	December 1st week to January 1st week	December 1st week to January 1st week	-	-	-

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 (specify)		√		
	Others (specify)				
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 2	Enclosed: Yes		
		Soil map as Annexure 3	Enclosed: Yes		

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Suggested Contingency measures					
Early season drought (delayed onset)	**Major Farming situation**		**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 4th week).	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/ Ginger/Turmeric-Fallow	* Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) * Ginger - Suprava, Suruchi * Turmeric- Roma, Surama *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* Closer row and plant spacing, * In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and convertion of unbunded uplands to bunded uplands. *Apply soil tested based fertiiser dose along with well decomposed organic matter for early seedling vigour.*Apply soil tested based fertiiser dose along with well decomposed organic matter for early seedling vigour. * Inter-cultivation and gap filling to maintain plant population per unit area of the crop *Mulching in ginger and turmeric and bed method of Planting	* Ensure availabilityof varieties from Seed Corporation, Agril Dept, OUAT,NRRI *Supply of Seeds through ATMA and NFSM Monitoring By Agril. Department and KVK
			Finger millet-Fallow	* varieties (Arjun, Bhairabi,Cillika) * Intercropping of arhar with Ragi(2:5)	same as above	-do-
		Irrigated	Rice-Vegetable	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* Apply soil tested based fertiiser dose along with well decomposed organic matter for early seedling vigour. *Community Nursery raising for transplanting	

			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown	*Same as above	-do-
	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) * Ginger - Suprava, Suruchi,suravi * Turmeric- Roma, Surama *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* Closer row and plant spacing, * In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and convertion of unbunded uplands to bunded uplands. *Apply soil test based fertiiser dose along with well decomposed organic matter for early seedling vigour. * Inter-cultivation and gap filling to maintain plant population per unit area of the crop	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	*Same as above	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* Apply soil tested based fertiiser dose along with well decomposed organic matter for early seedling vigour. *Community Nursery raising for transplanting	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	same as above	-do-

	Farming situation:III (<300 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* Closer row and plant spacing, * In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and convertion of unbunded uplands to bunded uplands. *Apply soil test based fertiiser dose along with well decomposed organic matter for early seedling vigour. * Inter-cultivation and gap filling to maintain plant population per unit area of the crop	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	*Same as above	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* Apply soil tested based fertiiser dose along with well decomposed organic matter for early seedling vigour. *Community Nursery raising for transplanting	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	same as above	-do-

Condition	Suggested Contingency measures					
Early season drought (delayed onset)	**Major Farming situation**		**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July 2nd Week)	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/ Ginger/Turmeric-Fallow	* Develop community nursery of short duration paddy * Crop diversification with low water requirement crops like Ragi (Var. Arjun, Suvra, Bhairabi, Dibyasinha, Godavari), blackgram (Prasad, Ujala, PU-31, IPU 02-43, Mahuri), cowpea (SEB-2, Pusa Barsati, Utkal Manik), ricebean (RBL-6,RBL-35, BRB-1) ,Ground nut(Devi) *Grow drought tolerant short duration off season vegetables.	* When the population is less than 50% plough the land and go for non paddy crops. *When the population is more than 50% go for gap Filling In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	* Ensure availabilityof varieties fromSeed Corporation,Agril Dept, OUAT,NRRI *Supply of Seeds through ATMA and NFSM Monitoring By Agril. Department and KVK
			Finger millet-Fallow	* varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	* Other measures like landshaping,contour cultivation, field/ contour bunding can be adopted. * Withheld Nitrogen application till rainfall is received.	-do-
		Irrigated	Rice-Vegetable	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerantshort duration off season vegetables.	*When the population is more than 50% go for gap Filling. * In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya,Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown.	* When the population is more than 50% go for gap Filling.	-do-

	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* When the population is less than 50% plough the land and go for non paddy crops. *When the population is more than 50% go for gap Filling In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	* Other measures like landshaping,contour cultivation, field/ contour bunding can be adopted. * Withheld Nitrogen application till rainfall is received.	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-

	Farming situation:III (<300 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* When the population is less than 50% plough the land and go for non paddy crops. *When the population is more than 50% go for gap Filling In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	* Other measures like landshaping,contour cultivation, field/ contour bunding can be adopted. * Withheld Nitrogen application till rainfall is received	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-

Condition	Suggested Contingency measures					
Early season drought (delayed onset)	**Major Farming situation**		**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (July 4th Week)	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables-Fallow	* Transplanting can be done using previously sown nursery. • In the event of late arrival of southwest monsoon the crops like cowpea, black gram, Groundnut,Arhar, can be grown up to last week of July. • Raise seedling for drougt tolerant vegetables(Potato,Tomato,Cauliflower, Cabbage,Onion,carrot,leafy vegetables)	* plant protection measures should be taken to avoid any germination failure. *In-situ rain water conservation. *The field should be free of weeds for utilization of water and nutrients by the late sown crops. *Use post emergence herbicide whenever possible.	* Ensure availabilityof varieties fromSeed Corporation,Agril Dept, OUAT,NRRI *Supply of Seeds through ATMA and NFSM Monitoring By Agril. Department and KVK
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	Apply more FYM to improve water holding capacity of soil	-do-

		Irrigated	Rice-Vegetable	* Medium late rice varieties like , Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* plant protection measures should be taken to avoid any germination failure. *In-situ rain water conservation. *The field should be free of weeds for utilization of water and nutrients by the late sown crops. *Use post emergence herbicide whenever possible. *Sprouted seeds can be sown in the lines by seed drill. *Repair field bunds to check seepage loss. * Apply more quantity of FYM to improve water holding capacity of soil	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya,Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown.	* Direct seeding of sprouted seeds or fresh seedlings of early varieties may be raised for transplanting. * If the rice population is more than 50% carry outweeding and adjust the plant population by Khelua (removing and redistributing the hills) and clonala reliable water source to save time for further delay.Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm propagation .* Raise community nursery of rice for transplanting at a reliable water source to save time for furtherdelay. Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cmand cover it with a mixture of FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in low land.Use aseed rate of100kg/a to maintain 40-60 plants/m2.Use FYM/green lef manure.	-do-

	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta * Intercropping of arhar with rice (2:5) *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* When the population is less than 50% plough the land and go for non paddy crops. *When the population is more than 50% go for gap Filling In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	* Other measures like land shaping,contour cultivation, field/ contour bunding can be adopted. * Withheld Nitrogen application till rainfall is received.	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* In-situ rain water conservation	-do-

	Farming situation:III (<300 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta *Tomato - (Arka Rakshak, Arka Samrat, Utkal Kumari, Utkal Raja) * Brinjal -Blue Star * Grow drought tolerant short duration off season vegetables	* When the population is less than 50% plough the land and go for non paddy crops. *When the population is more than 50% go for gap Filling In-situ rain water conservation * Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. *Withheld Nitrogen application till rainfall is received	-do-
			Finger millet-Fallow	Medium duration Finger millet varieties (Arjun, Bhairabi) * Intercropping of arhar with Ragi(2:5)	* Other measures like landshaping,contour cultivation, field/ contour bunding can be adopted. * Withheld Nitrogen application till rainfall is received	-do-
		Irrigated	Rice-Vegetables	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	* Direct seeding of Sprouted seeds or fresh seedlings of early varieties may be raised for transplanting. * If the rice population is more than 50% carry out weeding and adjust the plant population by Khelua (removing and redistributing the hills) and clonal propagation. * Raise community nursery of rice transplanting at a reliable water source to save time for further delay. * Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm and cover it with a mixture of FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in lowland. Use a seed rate of 100 kg per ha to maintain 40 - 60 plants/m2 FYM/green leaf manure.	-do-

			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	-do-	-do-
Condition	**Suggested Contingency measures**					
Early season drought (delayed onset)	**Major Farming situation**		**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (August 2nd weeek)	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Crop diversification with low water requirement crops like Ragi (Var. Arjun, Suvra, Bhairabi, Dibyasinha, Godavari), blackgram (Prasad, Ujala, PU-31, IPU 02-43, Mahuri), cowpea (SEB-2, Pusa Barsati, Utkal Manik), ricebean (RBL-6,RBL-35, BRB-1) ,Ground nut(Devi) *Grow drought tolerant short duration off season vegetables.	* Provide life saving irrigation * Remove the pest and disease infected plants from the field. *Weed control should be done by chemical Weedicide *Fresh seedlings of early varieties may be raised for transplanting.	* Ensure availabilityof varieties fromSeed Corporation,Agril Dept, OUAT,NRRI *Supply of Seeds through ATMA and NFSM Monitoring By Agril. Department and KVK
			Finger millet-Fallow	Short duration Finger millet varieties(Arjun) * Intercropping of arhar with Ragi(2:5)	* Apply more FYM to improve water holding capacity of soil	-do-

		Irrigated	Rice-Vegetables	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta	* Direct seeding of Sprouted seeds or fresh seedlings of early varieties may be raised for transplanting. * If the rice population is more than 50% carry out weeding and adjust the plant population by Khelua (removing and redistributing the hills) and clonal propagation. * Raise community nursery of rice transplanting at a reliable water source to save time for further delay. * Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm and cover it with a mixture of FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in lowland. Use a seed rate of 100 kg per ha to maintain 40 - 60 plants/m2 FYM/green leaf manure.	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	-do-	-do-
	Farming situation: II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	Crop diversification with low water requirement crops like Ragi (Var. Arjun, Suvra, Bhairabi, Dibyasinha, Godavari), blackgram (Prasad, Ujala, PU-31, IPU 02-43, Mahuri), cowpea (SEB-2, Pusa Barsati, Utkal Manik), ricebean (RBL-6,RBL-35, BRB-1) ,Ground nut(Devi) *Grow drought tolerant short duration off season vegetables.	* Provide life saving irrigation * Remove the pest and disease infected plants from the field. *Weed control should be done by chemical Weedicide *Fresh seedlings of early varieties may be raised for transplanting.	-do-

			Finger millet-Fallow	Short duration Finger millet varieties(Arjun) * Intercropping of arhar with Ragi(2:5)	* Apply more FYM to improve water holding capacity of soil	-do-
		Irrigated	Rice-Vegetables	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta	* Direct seeding of Sprouted seeds or fresh seedlings of early varieties may be raised for transplanting. * If the rice population is more than 50% carry out weeding and adjust the plant population by Khelua (removing and redistributing the hills) and clonal propagation. * Raise community nursery of rice transplanting at a reliable water source to save time for further delay. * Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm and cover it with a mixture of FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in lowland. Use a seed rate of 100 kg per ha to maintain 40 - 60 plants/m2 FYM/green leaf manure.	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	-do-	-do-
	Farming situation:III (<300 m above MSL)	Rainfed	Rice/Vegetables - Fallow	Crop diversification with low water requirement crops like Ragi (Var. Arjun, Suvra, Bhairabi, Dibyasinha, Godavari), blackgram (Prasad, Ujala, PU-31, IPU 02-43, Mahuri), cowpea (SEB-2, Pusa Barsati, Utkal Manik), ricebean (RBL-6,RBL-35, BRB-1) ,Ground nut(Devi) *Grow drought tolerant short duration off season vegetables.	* Provide life saving irrigation * Remove the pest and disease infected plants from the field. *Weed control should be done by chemical Weedicide *Fresh seedlings of early varieties may be raised for transplanting.	-do-

			Finger millet-Fallow	Short duration Finger millet varieties(Arjun) * Intercropping of arhar with Ragi(2:5)	* Apply more FYM to improve water holding capacity of soil	-do-
		Irrigated	Rice-Vegetables	Grow short duration rice varieties like Sahabhagi, Mandakini, Naveen , Vandana, Khandagiri,Jogesh,Sidhanta	* Direct seeding of Sprouted seeds or fresh seedlings of early varieties may be raised for transplanting. * If the rice population is more than 50% carry out weeding and adjust the plant population by Khelua (removing and redistributing the hills) and clonal propagation. * Raise community nursery of rice transplanting at a reliable water source to save time for further delay. * Sow the seeds at 5-6 cm depth by punji method (6 - 8 seeds at one point) at a spacing of 20 cm x 10 cm and cover it with a mixture of FYM: SSP (10:1) to avoid seedling mortality due to moisture stress in lowland. Use a seed rate of 100 kg per ha to maintain 40 - 60 plants/m2 FYM/green leaf manure.	-do-
			Rice-Rice	* Medium late rice varieties like Swarna, Pratikshya, Gajapati,DRR-42,DRR-44, CR Dhan 307,CR Dhan-300,303,304,305,310 shoud be grown. *Grow drought tolerant short duration off season vegetables.	-do-	-do-

Condition			Suggested Contingency measures			
Early season drought (Normal onset)	**Major Farming situation**		**Normal Crop/cropping system**	**C**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/ Ginger/ Turmeric-Fallow	* In direct sown rice if the plant population is less than 50%, re sow the crop after getting rain. * stress tolerant Rice variety Sahabagi ,DRR-42,DRR-44 should be grown * If the plant population is more than 50%, gap filling will be made. Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan@ 2-2.5 g/kg seed and other recommended plant protectionmeasures.	In wide as well as close spaced line sown crops complete hoeing, weeding followed by ridging to the base of the crop rows at 20 days after sowing for in-situ moisture conservation. * .Practice mulching with organics to extend the period of moisture availability in vegetabe,Ginger and turmeric	Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tank fed areas under RKVY and NFSM. Tractor, power tiller, rotavator under RKVY
					Application of PMS @5q/ha and FYM @5 t/ha for higher yield	
			Finger millet-Fallow	*If the plant population is more than 50%, gap filling will be done. * If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. * Seed treatment with Thiram or Captan@ 2-2.5 g/kg seed and other recommended plant protectionmeasures.	1.Complete hoeing and weeding in Ragi crop fields	Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tank fed areas under RKVY and NFSM.
		Irrigated	Rice-Vegetables	* In direct sown rice if the plant population is less than 50%, re sow the crop after getting rain. * stress tolerant Rice variety Sahabagi ,DRR-42,DRR-44 should be grown * If the plant population is more than 50%, gap filling will be made. Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan@ 2-2.5 g/kg seed and other recommended plant protectionmeasures.	Close the drainage holes and check the seepage loss in direct sown medium land rice regularly	-do-
			Rice-Rice	-do-		-do-

	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	If more than 50% mortalityof crop, then go for resowing and if less than 50% mortality then go for gap filling. Low water requiring non- paddy crops like Finger millet (Suvra, Bhairabi, Dibyasinha, Godavari), cowpea (SEB-2, Pusa Barsati, Utkal Manik), ricebean (RBL-6, KRB-1) should be taken.	Complete hoeing and weeding in non paddy crop fields to provide dust mulch Practice mulching with organics to extend the period of moisture availability	-do-
			Finger millet-Fallow	* If more than 50% mortalityof crop, then go for resowing and if less than 50% mortality then go for gap filling	-do-	-do-
		Irrigated	Rice-Vegetables	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	Practice mulching with organics to extend the period of moisture availability	-do-
			Rice-Rice	Rice varieties like Swarna, Pratikshya, Rani dhan, and Mahsuri should be grown	Close the drainage holes and check the seepage loss in direct sown medium land rice regularly	-do-
	Farming situation:III (<300m above MSL)	Rainfed	Rice/Vegetables-Fallow	* In direct sown rice if the plant population is less than 50%, re sow the crop after getting rain. * stress tolerant Rice variety Sahabagi ,DRR-42,DRR-44 should be grown * If the plant population is more than 50%, gap filling will be made. Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan@ 2-2.5 g/kg seed and other recommended plant protectionmeasures.	Complete hoeing and weeding in non paddy crop fields to provide dust mulch Practice mulching with organics to extend the period of moisture availability	-do-
			Finger millet-Fallow	* If more than 50% mortalityof crop, then go for resowing and if less than 50% mortality then go for gap filling	-do-	-do-

		Irrigated	Rice-Vegetables	* In direct sown rice if the plant population is less than 50%, re sow the crop after getting rain. * stress tolerant Rice variety Sahabagi ,DRR-42,DRR-44 should be grown * If the plant population is more than 50%, gap filling will be made. Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan@ 2-2.5 g/kg seed and other recommended plant protectionmeasures.	Practice mulching with organics to extend theperiod of moisture availability	-do-
			Rice-Rice	-do-	Close the drainage holes and check the seepage loss in direct sown medium land rice regularly	-do-

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	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/Ginger/ Turmeric -Fallow	Give life saving irrigation at critical stage of crop growth	weeding in non paddy crop fields Follow strip cropping in rolling topography for moisture conservation	
			Finger millet-Fallow	-do-	Compartmental bunding and weeding in non paddy crop fields to provide dust mulch	
		Irrigated	Rice-Vegetables	-do-	Seedling of 45 days old can be 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	
			Rice-Rice	-do-	-do-	
	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	-do-	Weeding in non paddy crop fields to provide dust mulch	
			Finger millet-Fallow	-do-	Compartmental bunding and weeding in non paddy crop fields to provide dust mulch	

		Irrigated	Rice/Vegetables	-do-	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.	
			Rice-Rice	-do-	-do- Close the drainage holes and check the seepage loss in direct sown medium land rice regularly	
	Farming situation:III (<300m above	Rainfed	Rice/Vegetables-Fallow	-do-	Weeding in non paddy crop fields to provide dust mulch	
			Finger millet-Fallow	-do-	-do-	
		Irrigated	Rice-Vegetables	-do-	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 Close the drainage holes and check the seepage loss in direct sown medium land rice regularly	
			Rice-Rice	Give life saving irrigation at critical stage of crop growth	-do-	

Condition	Suggested Contingency measures					
Mid season drought (long dry spell)	**Major Farming situation**		**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/Ginger/Turmeric-Fallow	Harvest the crop at physiological maturity Remove and destroy pest and disease affected plants	Provide irrigation at critical stages at flowering and grain filling stage. Under situation of complete failure of Kharif crop, dismantle it and sow pre- rabi crops minor pulses like horse gram (var. Urmi), Niger (Utkal Niger-	
			Finger millet-Fallow	Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought		
		Irrigated	Rice-Vegetables	Harvest the crop at physiological maturity		
			Rice-Rice	-do-		
	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/Vegetables-Fallow	-do-		
			Finger millet-Fallow	Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought		
		Irrigated	Rice/Vegetables	-do-		
			Rice-Rice	-do-		
	Farming situation:III (<300m above MSL)	Rainfed	Rice/Vegetables-Fallow	-do-		
			Finger millet-Fallow	-do-		
		Irrigated	Rice/Vegetables	Harvest the crop at physiological maturity		
			Rice-Rice (Low Land)	-do-		

Condition	**Suggested Contingency measures**					
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**		**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
	Farming situation: I (600-900 m above MSL)	Rainfed	Rice/Vegetables/Ginger/ Turmeric- Fallow	Crop should be harvested at physiological Maturity	Provide protective irrigation through recycling of harvested rain water	
			Finger millet-Fallow	-do-	-do-	
			Little millet-Niger	-do-	-do-	
		Irrigated	Rice-Vegetables	-do-	Provide protective irrigation through recycling of harvested rain water	
			Rice-Rice	-do-	Utilization of residualmoisture for early sowing of pre-rabi crops	
	Farming situation:II (300-600 m above MSL)	Rainfed	Rice/vegetables-Fallow	-do-	-do-	
			Finger millet-Fallow	-do-	-do-	
		Irrigated	Rice/Vegetables	-do-	-do-	
			Rice-Rice	-do-	-do-	
	Farming situation:III (<300m above MSL)	Rainfed	Rice/vegetables-Fallow	-do-	-do-	
			Finger millet-Fallow	-do-	-do-	
		Irrigated	Rice/Vegetables	-do-	-do-	
			Rice-Rice	-do-	Provide protective irrigation through recycling of harvested rain water	

2.1.2 Drought - Irrigated situation

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Canal irrigated Medium land	Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower and field pea are preferred options	Irrigate the kharif rice with groundwater during dry spells only, if dry spell comes before release of canal water. Reduction of conveyance losses while irrigating the light textured soils. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. Irrigate the rabi rice at critical stages only with ground water.	
		Vegetables	Grow short duration vegetables	Irrigate critical stages only with ground water	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Rice-Pulse/Oilseed	Grow short duration rice followed by usual pulse/oilseed	-do-	
	Canal irrigated Low land	Rice	Low water requiring Oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower, Sesamum	-do-	
		Rice-Pulse/Oilseed	-do-	-do-	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Canal irrigated Medium land	Rice	Grow short duration Rice followed by usual pulse/oilseed	Irrigate at critical stages only with ground water	
		Vegetables	Grow short duration vegetables	Plastic mulching, Skip row irrigation, ridge and furrow method of planting	
		Rice-Pulse/Oilseed	Grow short duration rice followed by usual pulse/oilseed	Irrigate at critical stages only with ground water	
	Canal irrigated Low land	Rice	-do-	-do-	
		Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower, Sesamum are preferred options.	Irrigate the kharif rice with groundwater during dry spells only, if dry spell comes before release of canal water. Reduction of conveyance losses while irrigating the light textured soils. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. Irrigate the rabi rice at critical stages only with groundwater.	
Non release of water in canals under delayed onset of monsoon in catchment	Canal irrigated Medium land	Rice	Low water requiring non paddy crops	Rain water harvesting and Recycling	
		Vegetables	-do-	-do-	
		Rice-Pulse/Oilseed	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram,	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. 80-85% of normal yield.	
	Canal irrigated Low land	Rice	Go for low water requiring non paddy crops	Rain water harvesting and Recycling	

		Rice-Pulse/Oilseed	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower, Sesamum	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tank fed Medium land	Rice	Low water requiring oilseeds and pulses should be taken	Weeding, life saving irrigation	
		Vegetables	-do-	-do-	
		Rice-Pulse/Oilseed	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	
	Tank fed Low land	Rice	Low water requiring oilseeds and pulses should be taken	Weeding, life saving irrigation	
		Rice-Pulse/Oilseed	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	

Condition	Suggested Contingency measures				
	Major Farming situation	**Normal Crop/cropping System**	**Change in crop/cropping System**	**Agronomic measure**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Tank fed Medium land	NA			
	Tank fed Low land	NA			

2.2 Unusual rains (untimely, unseasonal etc) **(for both rain fed and irrigated situations)**

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Paddy	Well drainage	Well drainage	Well drainage	Drying
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Drainage System should be developed	Drainage System should be developed	Drainage System should be developed	Keep fruits in a well ventilated drier place
Guava				
Banana				
Citrus				
Sapota				
Heavy rainfall with high speed winds in a short span				
Paddy	Well drainage	Well drainage	Well drainage	Drying
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Drainage System should be Developed	Drainage System should be developed	Drainage System should be developed	Keep fruits in a well ventilated drier place
Guava				
Banana				
Citrus				

Sapota				
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Use of need based pesticides	Use of need based pesticides	Use of need based pesticides	Proper cleaning, drying and storage
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Use of need based pesticides	Use of need based pesticides	Use of need based pesticides	Proper Cleaning and storage
Guava				
Banana				
Citrus				
Sapota				

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation[1]	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Paddy	Well drainage	Well drainage	Water spraying	Drainage
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Drainage System should be developed	Drainage System should be developed	Drainage System should be developed	Keep fruits in a well ventilated drier place
Guava				
Banana				
Citrus				
Sapota				
Continuous submergence for more than 2 days				
Paddy	Well drainage	Well drainage	Water spraying	Drainage
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Drainage System should be developed	Drainage System should be developed	Drainage System should be developed	Keep fruits in a well ventilated drier place
Guava				
Banana				
Citrus				
Sapota				
Sea water intrusion	Not Applicable			
Horticulture	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	Frequent Irrigation	Frequent Irrigation	Frequent Irrigation	NA
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Watering through Rose can	Pitcher Irrigation	Pitcher irrigation with water Spraying	Harvest mature fruits and keep them in well ventilated place
Guava				
Banana				
Citrus				
Sapota				
Cold wave				
Paddy	NA	NA	NA	NA
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Fumigation	Fumigation	Fumigation	Fumigation
Guava				
Banana				
Citrus				
Sapota				
Frost	NA			
Horticulture	NA			
Hailstorm				
Paddy	-	-	-	Immediate harvest and drying
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	-	-	-	Immediate harvest and drying
Guava				
Banana				
Citrus				
Sapota				

Cyclone				
Paddy	-	-	-	Immediate harvest and drying
Finger millet				
Niger				
Maize				
Arhar				
Horticulture				
Mango	Shift the planting material to safer shed Place	Staking in case of smaller plants	Staking in case of smaller plants	Immediately harvest the mature fruits
Guava				
Banana				
Citrus				
Sapota				

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	Livestock insurance	Water sources of Temples, Churches, Gurudwaras, Jain temples and Masjids are generally ideal sources during drought.	Availing insurance
Feed and fodder availability	Encourage perennial fodder production on river beds and tank bed on community basis. Village gochar (grazing) lands should be developed for fodder production. On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. In the costal part of Orissa Sun hemp (Crotolaria) can be sown. It is essential to establish fodder bank near forest areas. Provision is also necessary to store surplus crop residues in fodder banks, which can be made available during draught. Excess fodder in flush season can be preserved as hay / silage. Explore the possibilities of availability of unconventional / alternative feed resources during draught.	Utilizing fodder from perennial trees and fodder bank reserves. Transporting excess fodder from adjoining districts. Utilizing the existing crops which fail to grow adequately due to failure of monsoon for feeding of animals. Use of unconventional livestock feed such as sugar cane top, sugar cane bagasse, and banana plant Crop residues such as cassia tora water hyacinth and other like tree pods and seeds etc. Improving poor quality roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them.	Supplementary feeding of remaining livestock and the replacement stock
	Organizing training programme of persons connected with A.H. on feeding and management of animals during draught		
Drinking water	Preserving water in community tanks and ponds etc for drinking purpose by excavation and sanitization of these resources. In addition, wells (bore wells or dug wells) may be constructed ahead of possible event of draught		

Health and disease management	Veterinary preparedness with vaccine and medicines.	Conducting animal health camps and treating the affected animals Supplementation of mineral and vitamin mixtures	Culling of unproductive livestock Proper disposal of dead animals

Floods			
Feed and fodder availability	Training to the farmers about care of their animas when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local language for care of livestock in disaster. Keeping track of weather forecast and prior information through radio and TV Etc. Prior construction of animal shelters in disaster prone areas. Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. Variation of livestock before onset of rainy season. Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate,	Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. Procured feeds and fodders should be fed to all animals on the order of priority of animals. Straws and stoves that got soaked during floods need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying chopping and sprinkling concentrate mixture can improve intake and utility. Drinking water be made available to the animals in any kind of clean container available with the farmer.	Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.

	Acriflvin, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, Treacle, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint), Trocar and canola (for bloat), Pocket Knife (for cutting, strangulating ropes etc.) Temporary camps may be started to herd or flocks animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. If no trees or sheds are available shelter the animals under a tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof.		
Drinking water			Provision of clean drinking water.
Health and disease management		There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners	Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. Improving shed hygiene especially in the farmers household through cleaning and disinfection

Cyclone			
Feed and fodder availability			Provision of supplementary feeding (concentrate / Roughage) with vitamin &
Drinking water			Provision of clean drinking water.
Health and disease management		There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners	Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. Improving shed hygiene especially in the farmers household through cleaning and disinfection
Heat wave and cold wave			
Shelter/environment management	Green cover (trees plantation, land scaping)	Proper sheltering / housing white painting outside the roof and black painting inside the roof. Washing / wallowing / sprinkling/ splashing / showering Provision of cool drinking water (in earthen pitches) Cooling devices: fans, wet curtains or panels, air cooler if possible. Feeding Green fodder/ silage/ hay Provision for night feeding Grazing only if green pastures/ grass lands available Graze early in the morning and late in the afternoon	

Health and disease management		Protection of dry / milch cows/ buffaloes/ breeding bulls and teasers against thermal stress Heat detection with young teasers Close observation of all open cows Study of cervical mucous Heat detection and AI during cooler parts of the day. Insemination at optimal time with good quality semen.	

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	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	-
Drinking water	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		-
Floods				
Shortage of feed ingredients	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control	-
Drinking water	Protect the water sources from submergence	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	-
Health and disease management	Procurement of vaccines and medicines. Feeding antibiotics Procurement of litter materials	Continue feeding antibiotics Prevent entrance of flood water to the shed Replace wet litter Proper disposal of dead birds if any	Disinfection of the farm premises. Feeding antibiotics And deworming. Replace wet litter Disinfection of sheds. Proper disposal of dead birds if any	-
Cyclone				
Shortage of feed ingredients	Procurement of feed	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control	-

Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	-
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for available of sanitized water	-do-	-
Heat wave and cold wave				
Shelter/environment management	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	-
Health and disease management	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	-

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	Restricted release of water from reservoir. Supplementary water harvest structures like pond and tanks has to be developed. Renovation and maintenance of existing water harvest structures.	-	-
(ii) Changes in water quality	Prepare to release water into the habitat.	Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	Monitoring the water quality and health of aquatic organisms.
(iii) Any other	-	-	-
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/ inflow	Building deep ditches in culture ponds for shelter of the fish to overcome high temperature	Recharge the ponds with bore well water or water from other sources. Partial harvesting of the stock to reduce stocking density. Artificial shelter by putting aquatic floating weeds in 1/3rd area.	-
(ii) Impact of salt load build up in ponds/ change in water quality	Application of organic manure in culture system	Recharge the ponds with bore well water or water from other sources	Application of organic manure in culture system
2. Floods			
A. Capture Marine Inland	-		-
(i)Average compensation paid due to loss of human life	Construction of humane shelter. Storage of sand filled bags for emergency use. Repair and maintenance of bunds. Preparedness for relief Insurance coverage provision for life and Property		Relief operation will continue. Care of health of affected people Settlement of insurance. Financial support to other people.

(ii) No. of boats / nets damaged	The boats have to be secured safely to river/ reservoir banks. Non operation of fixed bag nets in streams and rivers. Insurance coverage for nets and boats.		Maintenance of the boats and nets. Assessment and settlement of insurance.
(iii) No. of houses damaged	Insurance coverage for houses.		Settlement of insurance.
(iv) Loss of stock	-		Assessment of stock (fish population) and replenishment if stock is depleted. Habitat restoration for the stock remaining.
(v) Changes in water quality	-		Application of lime in tanks. Application of fertilizer.
(v) Health and diseases	-		Observation of the health status of fish and accordingly control measure should be taken. Control on transport of brooders and seeds
B. Aquaculture			
(i) Inundation with flood water	Strengthening and increase in dyke height. This should be constructed with inlet and out let facility.	Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	Repairing and strengthening of dyke if required.
(ii) Water contamination and changes in water quality	Application of lime.	-	Application of lime and geolite. Application of Alum. Application of KmnO4
(iii) Health and diseases	Application of lime	-	Application of lime and KmnO4.. Assessment of the health status of fish and accordingly control measure should be taken. Control on transport of brooders and seeds.

(iv) Loss of stock and inputs (feed, chemicals ets)	Strengthening and increase in dyke height. Before flood the stock should be harvested and sold in flood prone areas. Transport of feed and chemicals to safer place. Purchase of feeds and chemicals on weekly or fortnightly basis. Insurance coverage for stock.	Net enclosure should be provided over the dyke to prevent the escape of fish from pond. Water should be diverted from the main stream. Sand bags cam be used for protection of dykes. Storing of feed and chemicals to safer place.	Stock assessment and restocking with advanced fingerlings or yearling if required. Repairing of dykes. Assessment of quality of feed and fertilizer. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, huts etc.)	Construction of flood shelter for pumps, aerators etc.	-	Repairing of pumps, aerators if required. Repairing of damaged hut.
3. Cyclone/ Tsunami			
A. Capture Marine			
(i)Average compensation paid due to loss of fishermen lives	Repeated broadcast and telecast of warning. Sea venture should be avoided	Provision of relief. Evacuation of people to safer areas.	Assessment and settlement of insurance.
(ii) No. of boats / nets damaged	Insurance coverage for lives of fishermen. The boats has to be secured safely to river/ reservoir banks. Insurance coverage for nets and boats.	Checking of the safety of the boats / nets. An inventory logbook with name of crewmembers should be maintained.	Maintenance of the boats and nets. Assessment and settlement of insurance.
(iii) No. of houses damaged Inland	Insurance coverage for houses.	-	Settlement of insurance.

B. Aquaculture			
(i) Over flow/ flooding of ponds	Strengthening and increase in dyke height. They should be constructed with inlet and out let facility.	Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	Repairing and strengthening of dyke if required.
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases	-		Application of lime and KmnO4. Assessment of the health status of fish and accordingly measure should be taken. Control on transport of brooders and seeds.

(iv) Loss of stock and inputs (feed, chemicals ets)	Strengthening and increase in dyke height. Transport of feed and chemicals to safer place. Insurance coverage for stock.	Net enclosure should be provided over the dyke to prevent the escape of fish from pond. Storing of feed and chemicals to safer place.	Stock assessment and restocking with advanced fingerlings or yearling if required. Repairing of dykes. Assessment of quality of feed and cemicals. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, shelters/ huts etc.)	-	-	Repairing of pumps, aerators if required. Repairing of damaged hut.
(vi) Any other	-	-	-

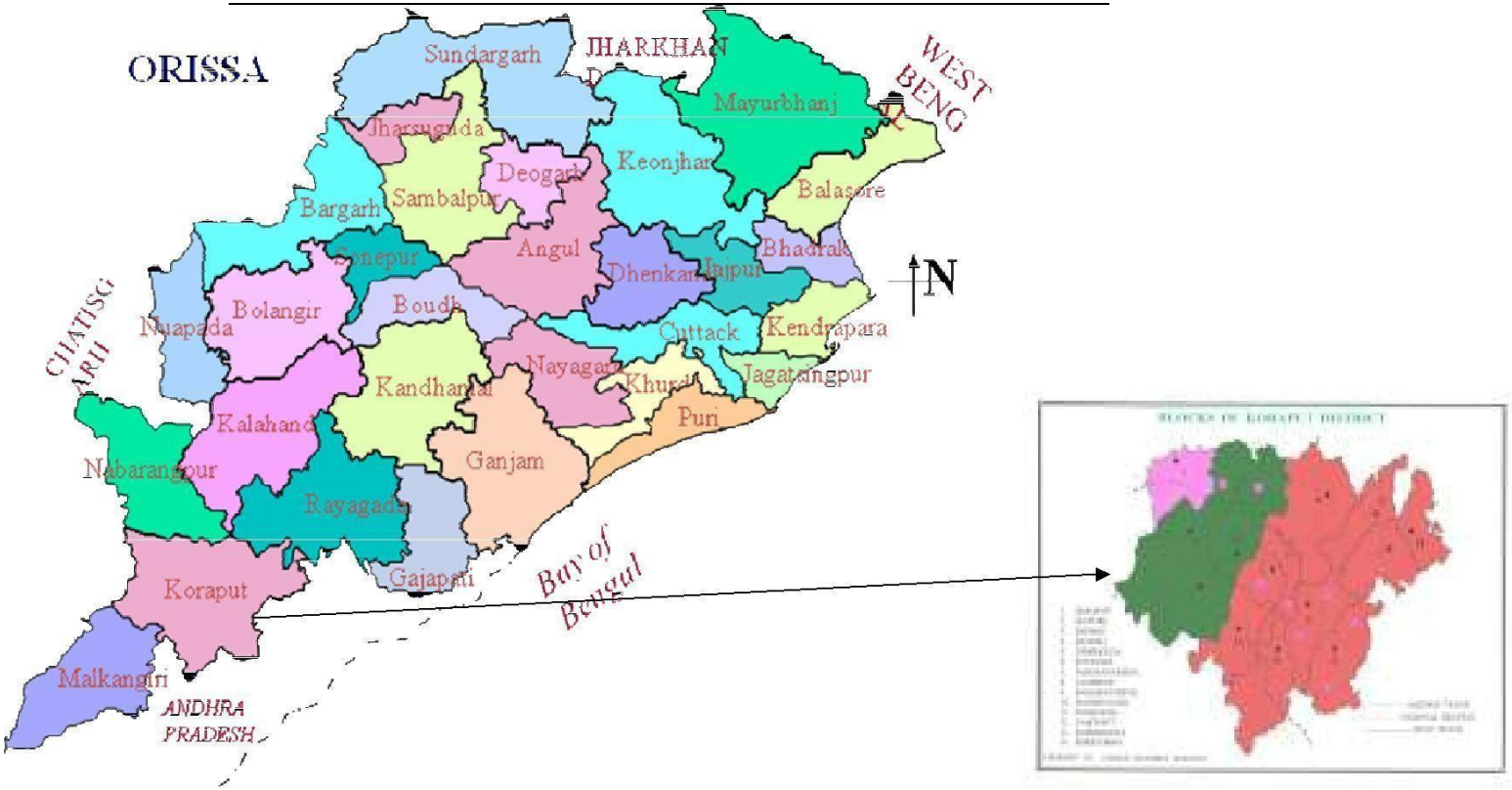
1. Heat Wave and Cold Wave

A. Capture Marine Inland	-	During hot waves night fishing should be done. During hot waves preservation by cold chain should be increased.	
	-	During hot waves night fishing should be done. Preservation by cold chain should be increased during hot waves.	-
B. Aquaculture			

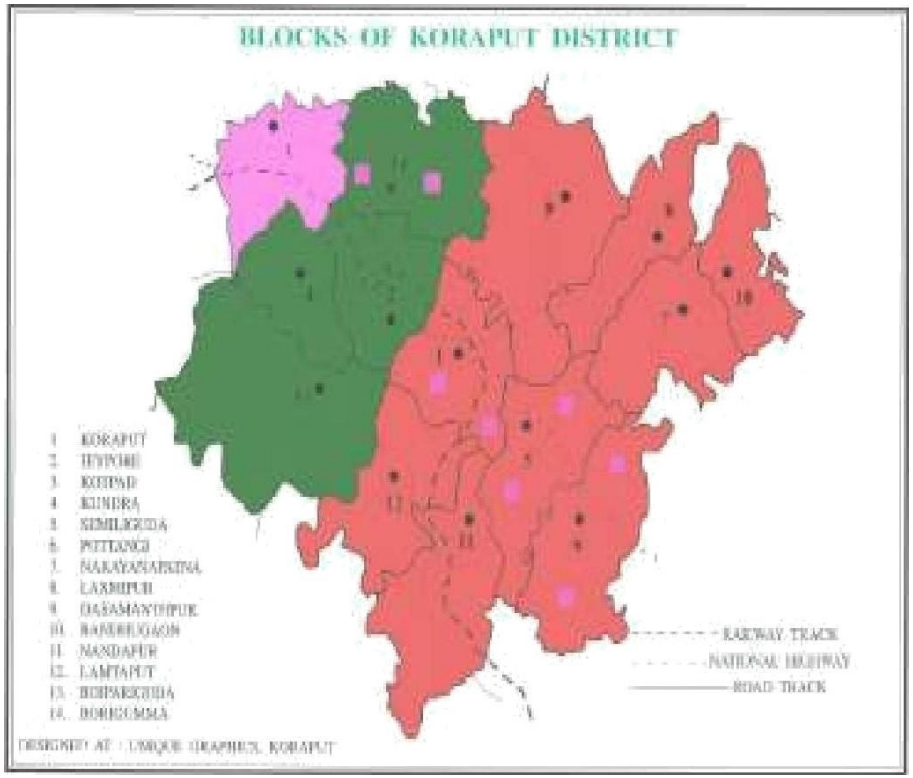
(i) Change in pond environment	During hot waves adequate water depth should be maintained.	During hot waves mixing of water with fresh water should be done. The culture system should be provided with aeration to avoid oxygen depletion due to high temperature during hot waves. Partial harvesting can be done to avoid loss of crop.	-
(ii) Health and disease management	Application of lime and turmeric.	Feeding should be stopped. If cold waves persists EUS outbreak takes place	Application of CIFAX to control EUS disease in fish.
(iii) Any other	-	-	-

Annexure-1

LOCATION MAP OF KORAPUT DISTRICT OF ORISSA



MAP OF KORAPUT DISTRICT



Fwndng 6ituiation —I (600•900 rrc} - Itoraput, Patten i, Nandapw, 8emiliguda, Laxcrgjxax, Nmay q>aswa, Bandhagaon, Da•ma•cpts

Farming Situation-II (300-600rtt)•Jeypore,Boipariguda,Borigumma,Kundra

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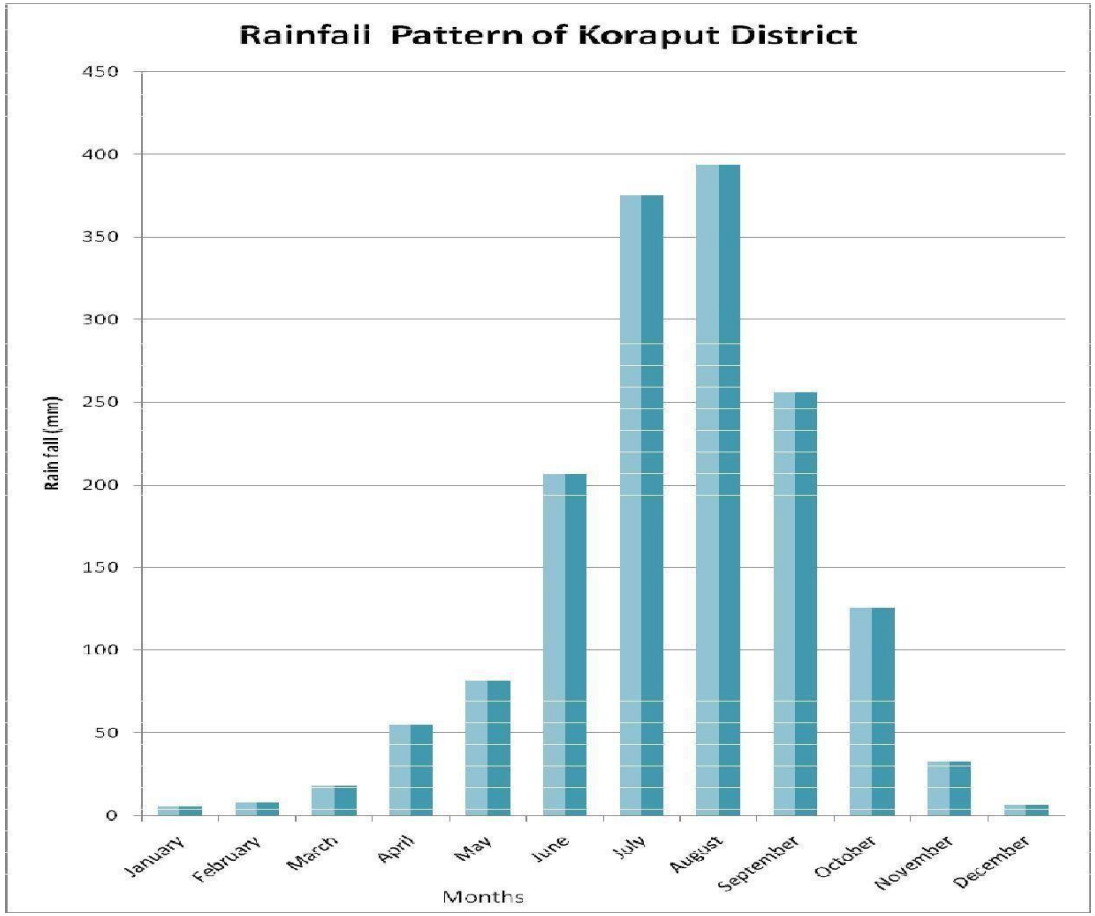
Annexure-2

MEAN ANNUAL RAINFALL (mm) KORAPUT DISTRICT

Sl. No.	Months	Rainfall(mm)	No. of Rainy Days
1	January	5.7	0.4
2	February	8.6	0.9
3	March	18.3	1.5
4	April	55.2	3.9
5	May	81.9	5.5
6	June	206.8	10.6
7	July	375.6	18.6
8	August	393.6	19.3
9	September	256.3	13.9
10	October	126.1	6.7
11	November	32.6	2.1
12	December	6.5	62.4
	TOTAL	1567.2	83.9

AVERAGE RAINFALL PATTERN OF KORAPUT



Annexure-3

SOIL MAP OF KORAPUT DISTRICT