State: ORISSA
Agriculture Contingency Plan District: BOLANGIR

1.0 District Agriculture profile					
1.1	**Agro-Climatic/ Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Gujarat Hills, Dandakaranya & eastern ghats hot moist sub humid eco sub-region (12.1)			
	Agro-Climatic Region (Planning Commission)	Eastern Plateau and hills region (VII)			
	Agro Climatic Zone (NARP)*	West central Table land zone (OR-9)			
	List all the districts failing under the NARP Zone	Debagarh, Bolangir, Sonepur , Bargarh, parts of sambalpur and Jharsuguda			
	Geographical coordinates of district	Latitude	Longitude	Altitude	
		$20^0$42’08.15 N	$83^0$28’49.43” E	207 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Chiplima, sambalpur- 768 026			
	Mention the KVK located in the district	KRISHI VIGYAN KENDRA , Larkipalli farm, Bolangir-767 002			
	Name & address of the nearest Agromet field unit (AMFU, IMD) for agro-advisories in the zone	RRTTS, Chiplima,sambalpur			
1.2	**Rainfall**	**Average (mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep):	1134.3	49	2nd week of June	2nd week of September
	NE Monsoon (Oct-Dec):	77.9	5	1st week of October	1st week of December
	Winter (Jan-February)	36.4	3		
	Summer (March-May)	41.2	3		
	Annual	1289.8	60		

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

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)	679	346	154	53	46	18	4	23	22	13

Source: Orissa Agriculture statistics 2008-2009

1.4	Major Soils (Common names)	Area ('000 ha)	Percent (%) of total
	Mixed red and yellow	196.38	30
	Red and black	189.33	29
	Black	101.56	15
	Laterite and lateritic	54.59	9

Source: Soil Conservation Office, Bolangir

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	324	146
	Area sown more than once	148	
	Gross cropped area	472	

Source: Orissa Agriculture statistics 2008-2009

1.6	**Irrigation**	**Area (‘000 ha)**	**Percent (%)**	
	Net cultivated area	346	52.66(of geographical area)	
	Net irrigated area	53.92	15.58(of net cultivated area)	
	Gross irrigated area	84.04	12.79(of geographical area)	
	Rainfed area	270	84.39(of net cultivated area)	
	Source of irrigation	**Number**	**Area (‘000 ha)**	**% area**
	Canals	NA	23.31	27.7
	Tanks	NA	NA	NA
	Open wells	NA	16.79	20
	Bore wells	49	NA	NA
	Lift irrigation	NA	24.47	32.2
	Other sources	NA	42.98	52
	Total irrigated area	NA	84.04	NA
	Pumpsets	457	NA	NA
	No. of tractors	68	NA	NA
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited	NIL	NA	NA
	Critical	NIL	NA	NA
	Semi-critical	NA	NA	NA
	Safe	NA	NA	NA
	Wastewater availability and use	NA	NA	NA

	Ground water quality	NA	NA	NA

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%
Data source SREP, 2008-09 Bolangir

1.7 Area under major field crops & horticulture etc. as per latest figure (2008)

1.7	S.No.	Major field crops cultivated	Area ('000 ha)							
			Kharif			*Rabi*			Summer	
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		Grand total
	1	Rice	41.82	168.91	210.73	4.12	-	-	4.12	218.97
	2	Mung	0.67	35.51	36.18	0.67	16.87	17.54	-	53.72
	3	Biri	0.46	19.35	19.81	0.15	3.94	4.09	-	23.90
	4	Cotton	-	21.84	21.84	-	-	-	-	21.84
	5	Sesamum	-	-	15.54	1.82	-	1.82	-	17.36
	6	Groundnut	-	8.48	8.48	0.50	1.88	2.38	-	10.86
	7	Sunflower	-	0.02	0.02	2.47	-	2.47	-	2.49
	S.No.	**Horticulture crops - Fruits**	**Area ('000 ha)**							
			Total							
	1	Mango	7.36							
	2	Banana	1.47							
	3	Guava	0.26							
	4	Citrus	0.67							

	5	Pineapple	0.01
		Horticulture crops - Vegetables	**Total**
	1	Onion	4.79
	2	Potato	0.07
	3	Chilli	3.40
	4	Sweet Potato	3.72
		Floriculture	**Total**
	1	Mariegold	35.00
	2	Rose	15.00
	3	Gladioli	25.00
	4	Tuberose	13.00
		Medicinal and Aromatic crops	**Total**
	1	Garlic	0.20
	2	Turmeric	0.02
	3	Ginger	0.05
	4	Coriander	0.31
		Plantation crops	**Total**
	1	Cashewnut	0.03

	2	Coconut	0.90
		Fodder crops	**Total**
	1	Crop 1	-
		Total fodder crop area	
		Grazing land	
		Sericulture etc	
		Others (specify)	

Data source - Data source (Orissa Agriculture stastics 2008-09

*If break-up data (irrigated, rainfed) is not available, give total area

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	296.2	190.3	486.5
	Improved cattle			
	Crossbred cattle	18.0	23.0	41.0
	Non descriptive Buffaloes (local low yielding)	60.8	57.4	118.3
	Descript Buffaloes	0.9	0.6	1.5
	Goat	104.4	194.7	299.1
	Sheep			
	Pig	1.1	1.5	2.6
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial		251.3	
	Backyard		233.8	
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**		**No. of Reservoirs**		**No. of village tanks**	
		840		104		4874	
	B. Culture						
				Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**	
	i) **Brackish water** (Data Source: Fisheries Department)						
	ii) **Fresh water** (Data Source: Fisheries Department)			3936.8 (ha)	5	6.1	

1.11 Production and Productivity of major crops

1.11	**Production and Productivity of major crops**	**Kharif**		**Rabi**		**Summer**		**Total**	
	Major field crop	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
1	Paddy	459.7	2149	-	-	12.4	2985	472.2	5134
2	Mung	12.3	340	7.9	452	-	-	20.2	792
3	Biri	5.0	255	1.8	445	-	-	6.8	700
4	Groundnut	14.3	1695	4.0	1675	-	-	18.3	3370
5	Sesamum	7.5	485	0.6	348	-	-	8.1	833
6	Sunflower	0.01	710	2.8	1136	-	-	2.8	1846

7	Cotton	43.5	339	-	-	-	-	43.5	339
Major Horticultural crops									
1	Potato	-	-	0.5	7520	-	-	0.5	7520
2	Onion	-	-	43.1	9000	-	-	43.1	9000
3	Vegetables	102.1	11028	244.2	14257	-	-	346.3	25285
4	Sweet potato	22.2	8158	11.2	11333	-	-	33.5	19491

Source: Orissa Agriculture statistic, Govt of Orissa, 2008-2009

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	**Paddy**	**Blackgram**	**Green gram**	**Sesamum**
	Kharif-Rainfed	June 1st week – July 2nd week	June 1st week- July 1st week	June 1st week- July 1st week	June 1st week- July 2nd week
	Kharif-Irrigated	June 1st week –August 1st week	-	-	-
	Rabi-Rainfed	-	October 2nd week-Dec 3rd week	October 2nd week-December 3rd week	September 3rd week
	Rabi-Irrigated	December 2nd wk – January 1st wk	-	-	-

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) Rice swarming cater pillar	-	✓	-

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

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season droughtt (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 **July 1ST WEEK**	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira	• Closer row and plantspacing Summer ploughing, interculture tillage practices, • Insitu rain water conservation • Conservation furrow, • Intercultivation and thining to maintain plant population per unit area of the crop • Weed control	Supply of seeds through OSSC & NFSM
		Black gram	Sarala & Ujjala		
		greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	variety (Naveen, MTU 1010, Surendra, Lalata, Konark	1-In-situ rain water conservation 2-25% N and apply full P, K of recommended doses as basal. 3- Raising the bund height in paddy field to conserve rain water 4- Checking the seepage and drainage water loss. 5-Planting 3 -4 seedlings per hill with closer spacing in paddy field.	Supply of seeds through OSSC & NFSM
	Low rainfall shallow lateritic	Rice	Var : Swarna, Pratikshya	1-In-situ rain water conservation 2-25% N and apply full P, K of	Supply of seeds through OSSC &

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
	soils (Low land)			recommended doses 3- raising the bund height in paddy field to conserve rain water 4- Checking the seepage and drainage water loss 5-planting 3 -4 seedlings per hill with closer spacing in paddy field	NFSM
	Low rainfall, red lateritic and black soil	Sole crops Rice	Short duration drought tolerent varieties. Heera, JHU,Pathara	1) FYM application 2) Maintain more plant population for direct seeded rice/high seed rate. 3) In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control 4) Ridge and furrow methods of sowing at closer plant-to-plant distance and inter-row spacing. 5-Use of mulch with locally available mulch materials.	Seeds from RKVY, OSSC, NFSM, NSC
		Sesamum	Prachi,nirmala,uma		
		Cotton	Sri Tulasi, Bunny		
		(Vegetable) Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arhar(2:5), rice + blackgram(1:4),		

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks **July 2nd week**	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira	1- Closer row and plant spacing 2-Summer ploughing, interculture tillage practices, 3-Insitu rain water conservation , 4-Conservation furrow, 5-intercultivation and thining to maintain plant population per unit area of the crop 6-,weed control 7-FYM application increase water holding capacity, 8-Line sowing 9-Seed priming	Supply of seeds through OSSC , through NFSM
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	variety (Naveen, MTU 1010, Surendra, Lalata, Konark)	• In-situ rain water conservation • 25% N and apply full P, K of recommended doses • raising the bund height in paddy field to conserve rain water • Checking the seapage • Planting 3-4 seedlings per hill with closer spacing in paddy field. • Select medium duration varieties • Apply life saving irrigation to nursery	Supply of seeds through OSSC & NFSM
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Swarna, Pratikshya	•In-situ rain water conservation •25% N and apply full P, K of recommended doses • raising the bund height in paddy field to conserve rain water •Checking the seepage and drainage water loss. •Transplanting 3 -4 seedlings per hill with closer spacing.	Supply of seeds through OSSC & NFSM

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	low rainfall, red lateritic and black soil	Sole crops Rice	Short duration drought tolerent varieties. Heera, JHU,Pathara	1) FYM application 2) Maintain more plant population for direct seeded rice/high seed rate. 3) In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control 4) Ridge and furrow methods of sowing at closer plant-to-plant distance and inter-row spacing. 5-Use of mulch with locally available mulch materials in vegetables.	Seeds from NHM Supply of seeds from OSSC Seeds may be procured from NFSM
		Sesamum	Prachi,nirmala,uma		
		Cotton	Sri Tulasi, Bunny		
		(Vegetable) Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arhar(2:6), rice + blackgram(1:4),		

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 1st week)**	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira,pathara,JHU	• Top dressing of 25 % urea and potash after receipt of the rain for upland rice. • Spray urea in vegetable crops • Spraying 2% KCl to black gram • Application of recommended dose of FYM during land preparation.	Supply of seeds through OSSC & NFSM
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		

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**
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	Variety (Naveen, MTU 1010, Surendra, Lalata, Konark)	1-In-situ rain water conservation 2-25% N and apply full P, K of recommended doses 3- raising the bund height in paddy field to conserve rain water 4- Checking the seepage and drainage water loss. 5-planting 3 -4 seedlings per hill with closer spacing in paddy field. 6-Apply life saving irrigation	Supply of seeds through OSSC & NFSM
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Swarna, Pratikshya	1-In-situ rain water conservation 2-25% N and apply full P, K of recommended doses 3- raising the bund height in paddy field to conserve rain water 4- Checking the seepage and drainage water loss. 5-planting 3 -4 seedlings per hill with closer spacing in paddy field 6-Apply life saving irrigation 7-Transplanting of seedling at closer spacing 8-Community nursery	Supply of seeds through OSSC & NFSM
	low rainfall, red lateritic and black	Rice	Heera,Pathara,JHU	1) Complete hoeing and weeding of non-paddy crops to provide dust mulch.	Seeds fron RKVY,

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**
	soil	Sesamum	Prachi,nirmala,uma	2) Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai / ha in 500lt of water to control weeds in groundnut. 3) Spraying of 2% KCl + 0.1% Boron to black gram. 4) Foliar application of 2% urea at pre-flowering and flowering stage of green gram. 5) Spray 1% urea in vegetable crops. 6) FYM application to increase water holding capacity. 7) Remove the pest and disease infected plants from the main field	OSSC, NFSM, NSC
		Cotton	Sri Tulasi, Bunny		
		(Vegetable) Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arhar(2:5), rice + blackgram(1:4)		

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks August 3rd week	Low rainfall shallow lateritic soils (Upland)	Rice	Heera JHU, Pathara	1) Withhold N fertilizer application till receipt of rainfall. 2) Follow plant protection measures against stem borer and blast in nursery. 3)Provide life saving irrigation	Supply of seeds through OSSC & NFSM
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Monika		
	Low rainfall	Rice	Variety (Naveen, MTU	1-In-situ rain water conservation	Supply of seeds

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	shallow lateritic soils (Medium land)		1010, Surendra, Lalata)	2-25% N and apply full P, K of recommended doses 3- raising the bund height in paddy field to conserve rain water 4- Checking the seepage and drainage water loss. 5-planting 3 -4 seedlings per hill with closer spacing in paddy field. 6-Apply life saving irrigation	through OSSC & NFSM
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Bandana swarna	1-In-situ rain water conservation 2-25% N and apply full P, K of recommended doses 3- raising the bund height in paddy field to conserve rain water 4- Checking the seapage 5-planting 3 -4 seedlings per hill with closer spacing in paddy field. 6-Apply life saving irrigation	Supply of seeds through OSSC & NFSM
	Low rainfall, red lateritic and black soil	Rice	Heera,JHU,Pathara,parijata	1) Provide life saving irrigation 2) Remove the pest and disease infected plants from the field. 3) Mulching of vegetables	Seeds from NHM Supply of seeds from OSSC, Seeds may be procured from NFSM
		Sesamum	Prachi,nirmala,uma Sri Tulasi, Bunny		
		Cotton	Utkal anushree,utkal tarini		
		(Vegetable) Brinjal	Pusajwala,utkal ava		
		Chilli	Utkal manika		

Condition			Suggested Contingency measures		
Early season droughtt (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Cow pea	inter crop rice + arha(2:5)r, rice + blackgram(1:4),		

Condition			Suggested Contingency measures		
Early season droughtt **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**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.	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira	• Thinning and gap filling should be done • Resow the crop if the mortality is more than 50%, and if less than 50% then gap filling should be done • Vegetables like cowpea should be cultivated. • Weeding through herbicide application • Interculture tillage practices • Soil mulching	• Farm pond under NREGS, IWMP, and diesel pump sets in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	variety (Naveen, MTU 1010, Surendra, Lalata, Konark)	• Select medium duration varieties. • transplanting 3-4 seedlings per hill through closer spacing • Gap filling through clonal propagation should be done • Life saving irrigation	• Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through NFSM and OSSC.
	Low rainfall shallow lateritic soils (Low	Rice	Rice Var : Swarna, Pratikshya	•Select medium duration varieties. •Fresh seedlings should be	

Condition			**Suggested Contingency measures**		
Early season droughtt **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
	land)			transplanted. • Life saving irrigation	
	low rainfall, red lateritic and black soil	Rice	Heera, Pathara,JHU	1) Organic matter, FYM application as basal. 2) If rice population is less than 50% resow the crop. 3) Select early maturing varieties (60d). 4) Sprouted seeds may be direct seeded in lines 5) Weeding and mulching in vegetables.	
		Sesamum	Prachi,nirmala,uma		
		cotton	Sri Tulasi, Bunny		
		(Vegetable) Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arhar(2:5), rice + blackgram(1:4),		

Condition			**Suggested Contingency measures**		
Mid season droughtt (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At vegetative stage	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira	• Mulching by organic matter • Conservation furrow • Weeding by herbicide application • Strengthening filed bonds • Providing life saving irrigation.	
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		

Condition			Suggested Contingency measures		
Mid season droughtt (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	Rice variety (Naveen, MTU 1010, Surendra, Lalata, Konark)	• Select medium duration varieties. • Fresh seedlings should be transplanted. • Gap filling through clonal propagation • Life saving irrigation • Checking seepage loss and drainage water loss. • Transplanting 3-4 seedlings per hill	• Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through NFSM and OSSC.
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Swarna, Pratikshya	• Fresh seedlings should be transplanted. • Gap filling through clonal propagation • Life saving irrigation • Checking seepage loss • Transplanting 3-4 seedlings per hill with closer spacing. • Life saving irrigation	•
	low rainfall, red lateritic and black soil	Sole crops Rice	Short duration drought tolerent varieties. Heera,JHU.Pathara	1)Weed out the field 2)Follow plant protection measures 3)Provide protective irrigation through harvested rain water 4)Withhold N application till rainfall 5) Strengthen field bunds 6) Follow ridge and furrow method of planting for vegetable crops.	
		Sesamum	Prachi,nirmala,uma		
		cotton	Sri Tulasi, Bunny		

Condition			Suggested Contingency measures		
Mid season droughtt (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
		(Vegetable)		7)Follow strip cropping in rolling topography for moisture conservation	
		Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arha(2:5)r, rice + blackgram(1:4)		

Condition			Suggested Contingency measures		
Mid season droughtt (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At flowering/ fruiting stage	Low rainfall shallow lateritic soils (Upland)	Rice	Heera,Pathara,JHU	• Provide irrigation at critical stages at flowering and grain filling stage. • Destroy of pest and diseases affected plants • Weed control • Rain water conservation • Recycling of rain water • Harvesting at physiological maturity stage • Provide life saving irrigation.	
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Manika		
	Low rainfall shallow	Rice	Variety (Naveen, MTU 1010,	• Provide life saving irrigation.	

Condition			Suggested Contingency measures		
Mid season droughtt (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
	lateritic soils (Medium land)		Surendra, Lalata)	• Control stem borer and Gandhi bug.	
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Swarna, Pratikshya	• Provide life saving irrigation. • Checking field drainage	
	low rainfall, red lateritic and black soil	Rice	Heera, Pathara,JHU	1).Spray 2% KCl + 0.1% boron to non paddy crops to overcome drought. 2) Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. 3) Remove and destroy pest and disease affected plants 4) Provide irrigation at critical stages at flowering and grain filling stage. 5)Spraying of anti-transpirants to check evapo-transpiration Mulching with crop trashes 6)Need based plant protection measures to be taken 7) Harvest the crops at physiological maturity stage.	
		Sesamum	Prachi,nirmala,uma		
		Cotton	Sri Tulasi, Bunny		
		(Vegetable) Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava Utkal manika		
		Cow pea	inter crop rice + arhar(2:5), rice + blackgram(1:4),		

Condition			**Suggested Contingency measures**		
Terminal droughtt (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Low rainfall shallow lateritic soils (Upland)	Rice	Khandagiri, Hira	Cow pea, horse gram, green gram, black gram (tomato Raja, Utkal Kumari, Utkal Urbasi. Cabbage (P 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,Recycling of rain water, harvesting at physiological maturity stage of the crop.	Farm ponds from NREGS, RKVY Seeds from NHM, OSSC
		Black gram	Sarala & Ujjala		
		Greengram	Sujata		
		Sesamum,	Prachi, Nirmala		
		Cowpea	Utkala Manika		
	Low rainfall shallow lateritic soils (Medium land)	Rice	Variety (Naveen, MTU 1010, Surendra, Lalata)	Provide life saving irrigation, conserve soil moisture.	
	Low rainfall shallow lateritic soils (Low land)	Rice	Var : Swarna, Pratikshya	Provide life saving irrigation.	
	low rainfall, red lateritic and black soil	Sole crops Rice	Short duration drought tolerant varities Heera, Pathara,JHU	Weed control Irrigation at critical stage Provide lifesaving irrigation	Farm ponds through IWSM programme Seeds from NHM Supply of intercultural implements through RKVY
		Sesamum	Prachi,nirmala,uma		
		Cotton	Sri Tulasi, Bunny		
		vegetable			

		Brinjal	Utkal anushree,utkal tarini		
		Chilli	Pusajwala,utkal ava		
		Cow pea	Utkal manika		

2.1.2 Drought- Irrigated situation

Condition	**Suggested Contingency Measures**				
Delayed/ limited release of water in canals due to low rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland Lift Irrigated Laterite soil	Vegetable-vegetable Tomato	Tomato – (Abinash)	• Alternate furrow irrigation • Drip irrigation • Interculture, tillage practices • Soil moisture conservation • Irrigation at critical stage	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,
		Pumkin	Pumkin (Arka chandan, Bidyabati)		
		Ivy gourd local	Ivy gourd local		
	Medium land Canal irrigated red laterite soil	Rice-rice	Rice:MTU 1010, Konark, JogeshLalat, Manaswini, Naveen,Surendra,lalat, Sesamum :Amrit,Uma Sunflower – Modern	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,

Condition	Suggested Contingency Measures				
Lack of inflows due to insufficient/ delayed onset of monsoon	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland Lift Irrigated Laterite soil	Vegetable-vegetable Tomato	Short duration vegetables Tomato – (Abinash)	Alternate furrow irrigation Drip irrigation Planting in deep furrow. Interculture, tillage practices Soil moisture conservation Irrigation at critical stage	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,
		Pumkin	Pumkin (Arka chandan, Bidyabati)		
		Ivy gourd local	Ivy gourd local		
	Medium land Canal irrigated red laterite soil	Rice-rice	Rice:MTU 1010, Konark, JogeshLalat, Manaswini, Naveen, Surendra,lalat, Rabi rice may be substituted with sunflower and sesamum. Sesamum :Amrit,Uma, Sunflower – Modern	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation Weed control to conserve moisture.	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,

Condition	Suggested Contingency Measures				
Insufficient ground water recharge due to law rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland Lift Irrigated Laterite soil	Vegetable-vegetable Tomato	Short duration vegetables Tomato – (Abinash)	• Alternate furrow irrigation • Interculture, tillage practices	Seeds through OSSC, NFSM, NHM

		Pumkin	Pumkin (Arka chandan, Bidyabati)	• Soil moisture conservation • Irrigation at critical stage	Intercultural implements through NHM, ATMA,
		Ivy gourd local	Ivy gourd local		
	Medium land Canal irrigated red soil	Rice-rice	Rice:MTU 1010, Konark, JogeshLalat, Manaswini, Naveen, Surendra,lalat, Rabi rice may be substituted with sunflower and sesamum. Sesamum :Amrit,Uma, Sunflower – Modern	• Limited & life saving irrigation • Alternate furrow irrigation • Irrigation in critical stages. • Weed control to conserve moisture	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,

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

Condition	**Suggested contingency measures**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvests**
Paddy	Drainage	Drainage	Drainage	Transport to a ventilated space & dry in shade
Arhar	Drainage	Drainage	Drainage	Storage against pest & diseases
Cowpea	Drainage	Drainage	Drain age	Transport to a ventilated space & storage against pest & diseases
Horticulture				
Fruits(Mango, Citrus etc)	Provide drainage	Provide drainage	Provide drainage	Early harvesting
Banana, Papaya	Drainage	Drainage	Drainage	
Cucurbit vegetables	Drainage,	Drainage	Drainage	Ensure drainage Harvesting at tender stages
Heavy rainfall with high speed winds in a short span[2]				

Paddy	Drainage	Drainage	Early harvesting	
Sugarcane	Drainage	Drainage	Drainage	Lodged canes may be harvested for extraction of juice & jiggery
Horticulture				
Banana	Drainage	Drainage	Drainage	
Papaya	Drainage	Drainage	Drainage	
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray tricyclazole against blast, ,	Spray tricyclazole against blast, Monocrotophos against stemborer	Malathion spray against Gundhy bug	Sun drying / disinfection of gunny bags with malathion
Arhar	Removal of infested tips to manage leaf webber	Hand picking & destruction of blister beetles	Spray of Ekalux against pod borer	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Blackgram/Greengram	Application of Triazophos against YMV	Application of malathion against Flea beetle	Spray of Nuvan against pod borer	Disinfection of storage structure to manage stored grain pests
Horticulture				
Cucurbit vegetables	Spraying of Ekalux against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & streptocycline against wilting	Spraying Endosulfan against leaf eating caterpillars Metalaxyl against Powdery mildew, Carbendazim against leaf spot & blight	Poison baiting with Malathion & Jaggery against fruit fly	Destruction of overripe & infested fruits

2.3 Floods

Condition	Suggested contingency measureso			
Transient water logging/ partial inundation[1]	**Seedling/ nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Drainage	Drainage	Drainage	
Maize	Drainage	Drainage	Drainage	Harvest the cobs as soon as possible
Horticulture				
Crop1				
Continuous submergence for more than 2 days	**NOT A FEATURE OF THE DISTRICT**			
Crop1				
Horticulture				
Crop1				
Sea water intrusion	**NOT A FEATURE OF THE DISTRICT**			
Crop1				

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

Extreme event type	Suggested contingency measures			
	Seedling/ nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Rice, maize semamum	Irrigation as per needed.	Irrigation as per needed.	Irrigation as per needed.	
Horticulture				
Vegetables	Irrigation as per needed.	Irrigation as per needed.	Irrigation as per needed.	
Cold wave	**Not prevalent**			
Frost	**Not prevalent**			
Hailstorm	**Not prevalent**			
Cyclone	**Not prevalent**			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	As the district is frequently prone to drought the following practices may be implemented to prevent fodder shortage problem Sowing of cereals (fodder varieties of Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during rabi under dry land system for fodder production. Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February Preserving the green maize fodder as silage Encourage fodder production with Bajra /sorghum– stylo- Bajra/sorghum on rotation basis and also to cultivate short-term fodder crops like sunhemp Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods	Harvest and use biomass of dried up crops (Paddy, Green gram, Black gram, Maize, cow pea etc.,) material as fodder Use of locally available cheap feed resources like sun flower heads as supplement for feeding of livestock during drought Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder Continuous supplementation of minerals to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Anand/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass, combo grass well before monsoon Flushing the stock to recoup Replenish the feed and fodder banks

Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and diseases management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer

		Organize with community, daily lifting of dung from relief camps	
Floods			
	In case of early forewarning (EFW), harvest all the crops (Paddy, Green gram, Black gram, Maize, cow pea etc.) that can be useful as feed/fodder in future (store properly) Protect the dried Dongri grass, sorghum stover etc., from inundation of flood water Keeping sufficient of dry fodder to transport to the flood affected villages Don't allow the animals for grazing if severe floods are forewarned Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Identify the Clinical staff and trained paravets and indent for their services as per	Transportation of animals to elevated areas Proper hygiene and sanitation of the animal shed In severe storms, un-tether or let loose the animals Use of unconventional and locally available cheap feed ingredients for feeding of livestock. Avoid soaked and mould infected feeds / fodders to livestock Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Encouraging farmers to cultivate short-term fodder crops like sunhemp. Deworming with broad spectrum dewormers Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder. Keep close surveillance on disease outbreak.

	schedules Identify the volunteers who can serve in need of emergency Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations		
Cyclone	**NA**		
Heat wave	i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinklers /fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

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	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds	
Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit	
Floods				
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD	

Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD	
Cyclone	NA			
Heat wave and cold wave				
Shelter/environment management	***Heat wave:*** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed	
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed	

Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed	

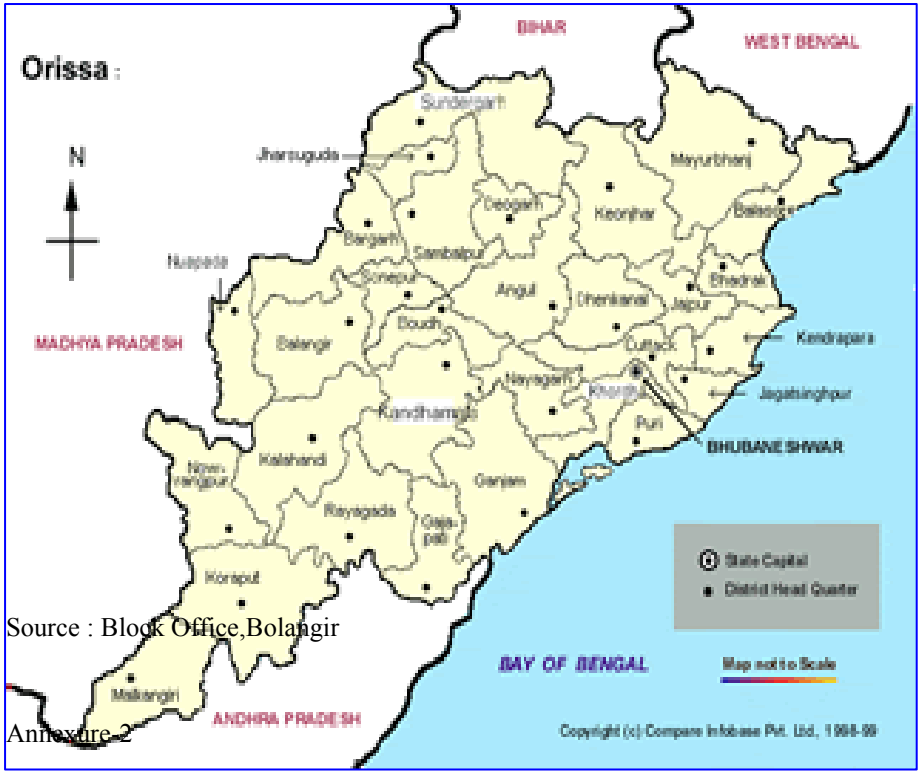
2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shallow water in ponds due to insufficient rains/inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks has to be developed. 3. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season
Impact of heat & salt load build up in ponds / change in water quality	1. Application of organic manure in culture system	1. Recharge the ponds with bore well water or water from other sources	1. Application of organic manure in culture system
Floods			
Innundation with flood waters	1 Storage of sand filled bags for emergency use. 2 Repair and maintenance of bundhs.	1. netting at gate 2. Evacuation of people to flood shelter areas. 3. Relief operation.	1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance.

			4. Financial support to other people.
Water contamination & change in BOD	Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water	Check the water quality & take appropriate action	1. Application of lime 2. Application of Alum. 3. Application of KmnO4
Health and diseases management	Stock preventive medicines, vaccines	Administer medicines through random catch Disinfect water by lime , KMnO4	1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken.
Cyclone	**N O T P R E V A L E N T**		
Heat wave and cold wave	**N O T P R E V A L E N T**		

Annexure-1

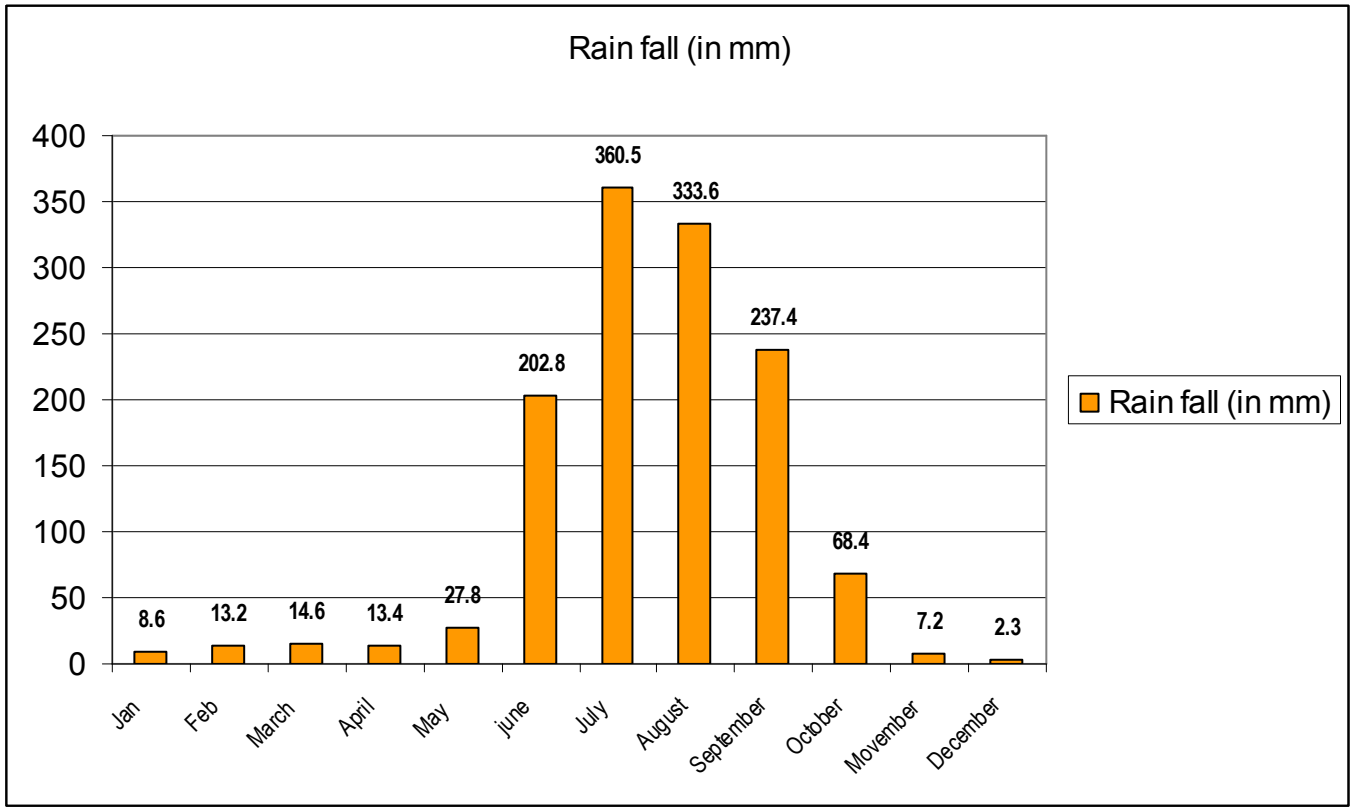
STATE MAP OF ORISSA



Source : Block Office,Bolangir

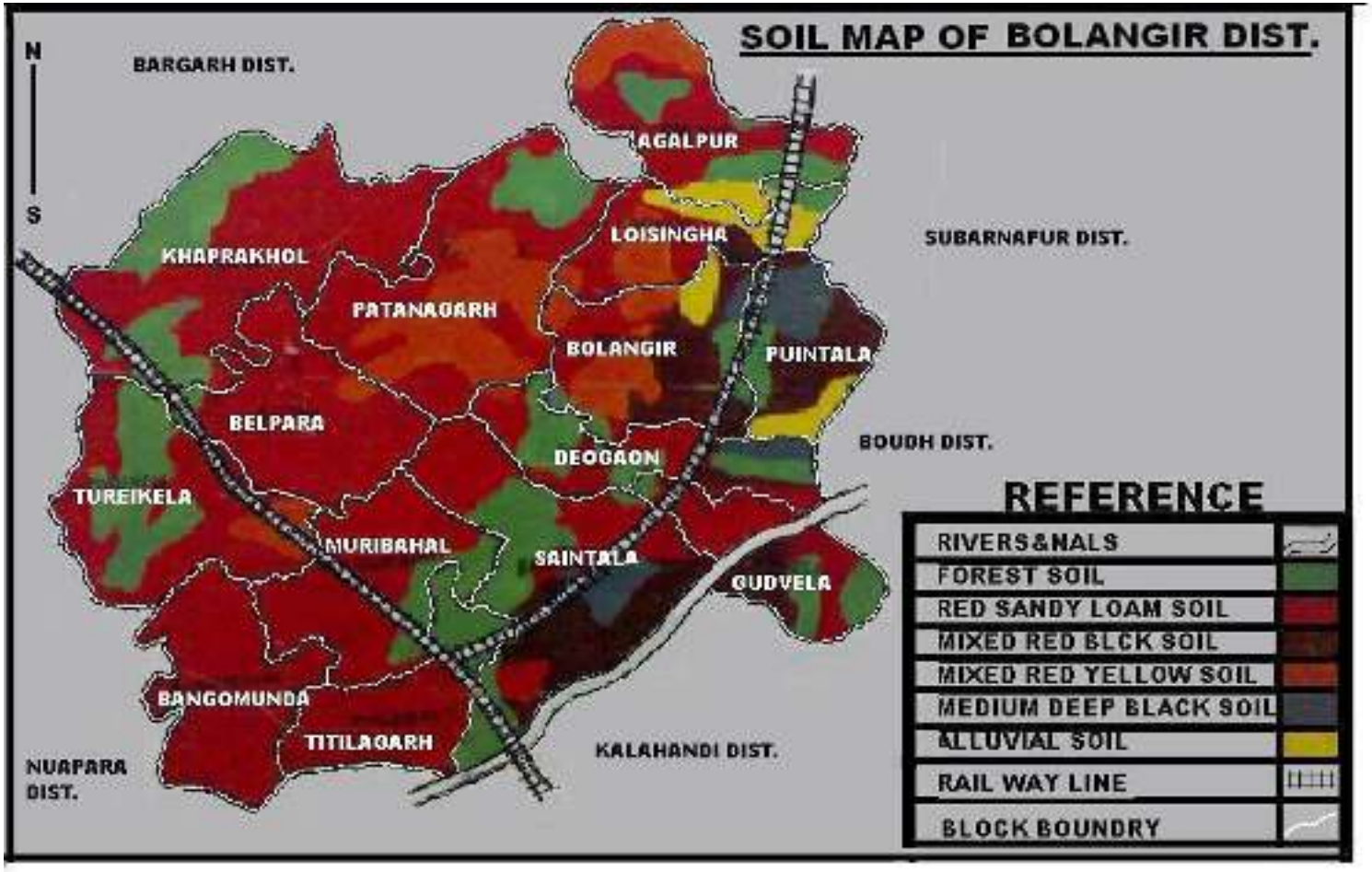
DISTRICT MAP OF BOLANGIR

Annexure-2



Source: Department of Agriculture, Bolangir

Annexure-3


SOIL MAP OF BOLANGIR DIST.
N
S
BARGARH DIST.
AGALPUR
LOISINGHA
SUBARNAPUR DIST.
KHAPRAKHOL
PATNAGARH
BOLANGIR
PUINTALA
BELPARA
DEOGAON
BOUDH DIST.
TUREIKELA
MURIBAHAL
SAINTALA
GUDVELA
BANGOMUNDA
TITILAGARH
KALAHANDI DIST.
NUAPARA DIST.
REFERENCE
RIVERS&NALS
FOREST SOIL
RED SANDY LOAM SOIL
MIXED RED BLCK SOIL
MIXED RED YELLOW SOIL
MEDIUM DEEP BLACK SOIL
ALLUVIAL SOIL
RAIL WAY LINE
BLOCK BOUNDRY