State: ODISHA

Agriculture Contingency Plan for District: DHENKANAL

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Sub-humid to humid Eastern and South Eastern Upland (5)			
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau and hill Region (VII)			
	Agro Climatic Zone (NARP)	Mid central table land (OR-10)			
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Angul, Dhenkanal and parts of Cuttack and Jajpur			
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**	
		20^0 39'22.18" N	85^0 36'15.35" E	249 m from MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS Mahisapat, PO: Mahisapat Dist Dhenkanal -*759001*			
	Mention the KVK located in the district with address	KVK(RRTTS Campus), At/PO: Mahisapat Dist Dhenkanal-*759001*			
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	RRTTS Mahisapat, PO: Mahisapat Dist Dhenkanal-*759001*			
1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep):	1109	53.5	June 2nd week	Sept 4th week
	NE Monsoon(Oct-Dec):	143	6.9	-	-
	Winter (Jan- March)	66	4.2	-	-

	Summer (Apr-May)	111	7.1	-	-
	Annual	1429	71.7	-	-

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)	445	186	174	42	8	4	6	5	31	20

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)**	**Area ('000 ha)**
	Red sandy loam medium textured soils	152.0
	Light textured laterite soils	159.0
	Alluviun sandy loam soils	67.0
	Clay and heavy clay soils	55.0
	Black soils	12.0

1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	155	170
	Area sown more than once	108	
	Gross cropped area	263	

1.6	**Irrigation**	**Area ('000 ha)**		
	Net irrigated area	51.7		
	Gross irrigated area	74.7		
	Rainfed area	134.2		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals		57.3	76.6
	Tanks	26	0.1	0.13
	Open wells	13390	1.2	1.6
	Bore wells	292	0.38	0.5
	Lift irrigation schemes	299	13.8	18.4
	Micro-irrigation		-	-
	Other sources (please specify)	River lift, pond, etc	2.1	2.8
	Total Irrigated Area		74.8	100.0
	Pump sets	1630		
	No. of Tractors	180		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	-
	Critical	-	-	-
	Semi- critical	-	-	-
	Safe	8 blocks	95 % of the district	Good and neutral pH
	Wastewater availability and use	-	-	-
	Ground water quality	District affected in part (5 %) with problems such as iron > 1.0 mg/l and nitrate > 45 mg/l. There is need of rain water harvesting to artificially recharge the ground water for safe domestic use		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**

	Paddy	36.3	73.9	110.2	1.8	-	1.8	-	112.0
	Horsegram	-	-	-	-	7.6	7.6	-	7.63
	Greengram	0.9	5.8	6.7	0.4	15.1	15.5	-	22.2
	Blackgram	0.4	10.6	10.9	0.4	14.5	14.9	-	25.8
	Groundnut	-	3.6	3.6	0.2	8.2	8.4	-	12.0
	Mustard	-	-	-	0.2	2.3	2.5	-	2.48

	Horticulture crops – Fruits	**Area ('000 ha)**
		Total
	Mango	8.4
	Citrus	0.9
	Cashew nut	1.7
	Coconut	1.1
	Banana	0.5
	Horticulture crops - Vegetables	**Total**

	Potato	0.2
	Onion	0.8
	Sweet potato	3.4
	Vegetables	25.4
	Medicinal and Aromatic crops	**Total**
	Garlic	0.7
	Turmeric	0.4
	Ginger	0.3
	Coriander	0.8
	Plantation crops	**Total**
	Eucalyptus	2.0
	Teak	0.5
	Eg., industrial pulpwood crops etc.	
	Fodder crops	**Total**
	Total fodder crop area	-
	Grazing land	8.0
	Others (specify)	

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**

	Non descriptive Cattle (local low yielding)	243.4	157.4	400.8
	Improved cattle	21.5	49.2	70.7
	Crossbred cattle	6.2	18.6	24.8
	Non descriptive Buffaloes (local low yielding)	34.1	22.7	56.8
	Descript Buffaloes	1.9	4.4	6.3
	Goat	1.0	1.1	2.1
	Sheep	24.0	29.3	53.3
	Others (Camel, Pig, Yak etc.)	0.3	0.8	1.1
	Commercial dairy farms (Number)			1.1
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	62	111.2	
	Backyard	-	268.8	

1.10 **Fisheries** (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	-	-	-	-	-	-

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	837	26	1423

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-	-	-
ii) **Fresh water** (Data Source: Fisheries Department)	5584	1. 65	9. 214
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 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	271.32	2461	5.31	2894	-	-	276.64	2469	-
	Blackgram	4.94	452	6.01	405	-	-	10.95	425	-
	Greengram	2.80	417	4.95	319	-	-	7.75	349	-
	Groundnut	5.41	1486	13.91	1666	-	-	19.32	1611	-
	Sesamum	7.31	435	0.86	348	-	-	8.17	424	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	104.4	12500	
	Citrus					-	-	5.3	5920	
	Cashew nut	-	-	-	-	-	-	3.4	2000	
	Banana					-	-	17.9	35700	

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Paddy	Blackgram	Greengram	Sesamum	Groundnut
	Kharif- Rainfed	1st week of June- 4th week of June	1st week of June- 4th week of June	1st week of June- 4th week of June	1st week of June- 4th week of June	1st week of June- 4th week of June
	Kharif-Irrigated	1st week of July- 4th week of July	-	-	-	-

	Rabi- Rainfed	-	1st week of September- 4th week of October	1st week of September- 4th week of October	1st week of September- 4th week of October	1st week of September- 4th week of October
	Rabi-Irrigated	1st week of December- 4th week of January	1st week of October- 4th week of November	1st week of October- 4th week of November	1st week of October- 4th week of October	1st week of November- 4th week of December

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 (manual)

Strategies for weather related contingencies

Drought

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 wk)	Low rainfall medium textured red sandy loam soils Rainfed uplands	Sole crops ➢ Sesamum ➢ Greengram ➢ Blackgram ➢ Groundnut ➢ Rice ➢ Kharif vegetables • Brinjal • Cowpea • Chilli	No change	• Closer row and plant spacing • In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to bunded uplands • Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • Conservation furrow, • Inter-cultivation and thinning to maintain plant population per unit area of the crop	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
	Rainfed medium lands	Sole crops	Rice: Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation.	-do-
	Rainfed medium low lands	Sole crops : Rice	No Change Prefer varieties like Swarna, Pratikshya,Rani dhan and Mahsuri	-do-	–do-
	Medium rainfall light textured laterite soils Rainfed uplands	Sole crops ➢ Sesamum ➢ Green gram	No change	• Closer row and plant spacing, • In-situ rain water conservation, summer ploughing, interculture, tillage practices,	-do-

		➢ Black gram ➢ Groundnut ➢ Rice ➢ Kharif vegetables Brinjal Cowpea Chilli		weed control and unbunded uplands converted to bunded uplands • Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • Conservation furrow, • Inter-cultivation and thinning to maintain plant population per unit area of the crop	
	Rainfed medium lands	Sole crops : Rice	No change	• Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation.	-do-
	Rainfed low lands	Sole crops rainfed low lands : Rice	No Change Prefer varieties like Swarna, Pratikshya,Rani dhan and Mahsuri	-do-	-do-

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 4 weeks (Jul 2nd wk)	Low rainfall medium textured red sandy loam soils	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• When the mortality of seedlings is less than 50% gap filling should be done and if more than 50% mortality, resow the crop with short duration high yielding low water requiring crops like green gram, black gram, horsegram (Urmi), Niger (Deomali) cow pea, sesame and castor after receiving the rainfall.	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
	Rainfed uplands				
		Sesamum	Uma, Nirmala and Prachi		

		Greengram	Sujata, Durga, PDM-11& 54	• Cultivate vegetables like okra, brinjal • Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation in vegetable and groundnut crop	
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120 Hira, JHU, Pathara, Bandana		
		Rice Kharif vegetables • Brinjal	Blue star, Utkal Anushree		
		• Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• If rice population is less than 50% resow the sprouted seeds in line through pre-germinated seed drill or fresh seedlings. • Select short to medium duration varieties (90-120 days) • Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice through transplanter saving of 50% seed requirement or through SRI method (@5kg seeds/ha). • Do not top dress nitrogen in nursery • Apply life saving irrigation to	Pre-germinated seed drill under RKVY. High yielding rice varieties under NFSM. Paddy transplanter, marker and cono weeder under RKVY

				maintain nursery seedlings.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Rani dhan and Mahsuri	• If rice population is more than 50% carryout weeding and maintain the plant population by *Khelua* operation (removing and distributing the hills) • Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice. • Do not top dress nitrogen in nursery	
	Medium rainfall light textured laterite soils Rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• When the mortality of seedlings is less than 50% gap filling should be done and if more than 50% mortality, resow the crop with short duration high yielding low water requiring crops like green gram, black gram, horsegram (Urmi), Niger (Deomali) cowpea, sesame and castor after receiving the rainfall. • Cultivate vegetables like okra, brinjal. • Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation in vegetable and groundnut crop	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120 Hira, JHU, Pathara, Bandana		

		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
	Rainfed medium lands	Sole crops : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• If rice population is less than 50% resow the sprouted seeds in line through pre-germinated seed drill or fresh seedlings. • Select short to medium duration varieties (90-120d) • Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice through transplanter saving of 50% seed requirement or through SRI method (@5kg seeds/ha). • Do not top dress nitrogen in nursery • Apply life saving irrigation to maintain nursery seedlings.	Pre-germinated seed drill under RKVY. High yielding rice varieties under NFSM. Paddy transplanter, marker and cono weeder under RKVY
		Sole crops under rainfed medium low lands: Rice	Swarna, Pratikshya,Rani dhan and Mahsuri	• -do-	

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 (Jul 4th wk)	Low rainfall medium textured red sandy loam soils Rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops	• Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai /	

		Sesamum	Uma, Nirmala and Prachi	ha in 500lt of water to control weeds in groundnut. • Spraying of 2% KCl + 0.1 ppm Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Top dressing of 25 % urea and potash after receipt of the rain for upland rice. • Remove the pest and disease infected plants from the main field.	
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120 Hira, JHU, Pathara, Bandana		
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplanting of 45 days old seedlings at closer spacing.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Ranidhan and Mahsuri	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of rainfall.	Power tiller, rotavator under RKVY

				• Transplant seedlings up to 45 days old. • Follow need based plant protection measures against steam borer and blast. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. Apply life saving irrigation as and when necessary	
	Medium rainfall light textured laterite soils	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai / ha in 500lt of water to control weeds in groundnut. • Spraying of 2% KCl + 0.1 ppm Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Top dressing of 25 % urea and potash after receipt of the rain for upland rice.. • Remove the pest and disease infected plants from the main field.	
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU, Pathara, Bandana		

		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplanting of 45 days old seedlings at closer spacing.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya, Ranidhan and Masuri	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old. • Follow need based plant protection measures against steam borer and blast. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5seedling per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary	Power tiller, rotavator under 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**
Delay by 8 weeks (Aug 2nd week)	Low rainfall medium textured red sandy loam soils	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Provide life saving irrigation • Remove the pest and disease infected plants from the field. • Harvesting of vegetables	
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU, Pathara, Bandana		
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark, Surendra	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of	

				rainfall. • Provide life saving irrigation. • Weed incorporation through conoweeder.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri	• Transplant seedlings up to 45 days old. • Follow plant protection measures against stem borer and blast in nursery. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedling per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation.	Tractor, power tiller, rotavator under RKVY
	Medium rainfall light textured laterite soils	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Provide life saving irrigation • Remove the pest and disease infected plants from the field.	
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU,		

			Pathara, Bandana		
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark, Surendra	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Provide life saving irrigation. • Weed incorporation through conoweeder.	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Ranidhan and Mahsuri	• Transplant seedlings up to 45 days old. • Follow plant protection measures against stem borer and blast in nursery. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedling per hill. • Apply full P, K and 50 % N at the time of transplanting.	Power tiller, rotavator under RKVY

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	**Low rainfall medium textured red sandy loam soils**	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50%. • Cultivate vegetables like cow pea • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for groundnut and vegetable crops • Grow sweet potato var. Gouri, Shankar in ridges and allow the furrow to conserve rainwater, application of paper mill sludge (PMS) @ 5 q/ha, potash and boron and FYM during final land preparation for obtaining higher yield of sweet potato.	• Farm pond under NREGS, IWMP, and diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2, TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU, Pathara, Bandana		
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark,	• If rice population is less than 50% resow the crop. • Select early maturing varieties	• Supply of seed drills and intercultural

			Jogesh and Surendra	(90d). • Sprouted seeds may be direct seeded in lines or fresh seedlings may be raised for transplanting • If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.	implements through RKVY. • Good quality seeds through NFSM and OSSC.
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri	If rice population is less than 50% gap filling may be dawn. Fresh seedlings may be transplanted If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua)	
	Medium rainfall light textured laterite soils	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50%. • Cultivate vegetables like cow pea • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for groundnut and vegetable crops • Grow sweet potato var. Gouri, Shankar in ridges and allow the furrow to conserve rainwater, application of paper mill sludge (PMS) @ 5 q/ha, potash and boron and FYM during final land	• Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30, Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2, TAG-24 Intercropping of arhar + groundnut (2		

			: 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU, Pathara, Bandana	preparation for obtaining higher yield of sweet potato.	
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, MTU 1010, Konark and Surendra	• If rice population is less than 50% resow the crop. • Select early maturing varieties (90d). • Sprouted seeds may be direct seeded in lines or fresh seedlings may be raised for transplanting • If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.	• Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through NFSM and OSSC.
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Ranidhan and Mahsuri	1. If rice population is less than 50% gap filling may be dawn. 2. Fresh seedlings may be transplanted 3. If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua)	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Low rainfall medium textured red sandy loam soils	Sole crops under unbunded rainfed uplands	Varietal substitutions of drought tolerant varieties of the sole crops	• Inter-cultivation (Soil mulching) • Conservation furrow • Organic mulching with previous crop residues • Scooping • Compartmental bunding • Follow ridge and furrow method of planting for groundnut and vegetable crops. • Follow strip cropping in rolling topography for moisture conservation	
		Sesamum	Uma, Nirmala and Prachi		
		Greengram	Sujata, Durga, PDM-11& 54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Groundnut	Smruti,Devi, TMV-2,TAG-24 Intercropping of arhar + groundnut (2 : 6) Arhar var. ICPL 87, UPAS 120, Hira, JHU, Pathara, Bandana		
		Rice Kharif vegetables Brinjal	Blue star, Utkal Anushree		
		Cowpea	Utkal Manika		
		Chilli	Utkal ava		
		Sole crops under rainfed medium lands : Rice	• Weed out the field • Go for gap filling using seedling of same age. • Strengthen the field	• Provide life saving irrigation	

			bunds and close the holes		
		Sole crops under rainfed medium low lands : Rice	• 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.	
	Medium rainfall light textured laterite soils	Sole crops under unbunded rainfed uplands ➢ Sesamum ➢ Greengram ➢ Blackgram ➢ Groundnut ➢ Rice ➢ Kharif vegetables • Brinjal • Cowpea • Chilli	• Inter-cultivation (Soil mulching) • Conservation furrow • Organic mulching with previous crop residues • Scooping • Compartamental bunding • Follow ridge and furrow method of planting for groundnut and vegetable crops	• Follow strip cropping in rolling topography for moisture conservation	
		Sole crops under rainfed medium lands : Rice	• Weed out the field • Go for gap filling using seedling of same age.	• Strengthen the field bunds and close the holes • Provide life saving irrigation	
		Sole crops under rainfed medium low lands : Rice	• Seedling of 45 days old can be transplanted or gap filled. • Do not practice beushaning • Weed out the field • Follow plant protection measures	1. Provide protective irrigation through harvested rain water 2. Withhold N application 3. Apply Potassic fertilizer 4. Strengthen field bunds.	

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[e]**
At flowering/ fruiting stage	**Low rainfall medium textured red sandy loam soils**	Sole crops under unbunded rainfed uplands ➢ Sesamum ➢ Green gram ➢ Black gram ➢ Groundnut ➢ Rice ➢ Kharif Vegetables • Brinjal • Cowpea • Chilli	• Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought. • Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. • Remove and destroy pest and disease affected plants • Crops like cow pea, green gram, black gram, maize and vegetables may be harvested. • Under situation of complete failure of Kharif crop, dismantle it and sow pre-rabi crops minor pulses like horse gram (var. Urmi), Niger (Deomali) • Need based plant protection measures to be taken.	• Provide irrigation at critical stages at flowering and grain filling stage.	
		Sole crops under rainfed medium lands : Rice	• Spray Tricyclazone (Beam/Team) 0.06-0.1% at 10-12 days interval to control blast and brown spot diseases in rice during this period. • To control stem borer and Gandhi bug, spray methyl demeton/dimethioate	• Provide life saving irrigation.	
		Sole crops under rainfed medium low lands : Rice	For late transplanted rice 2 sprayings at 10 days interval with Validamycin 0.3% to control sheath blight.	Provide life saving irrigation and plugging of drainage holes.	
	Medium rainfall light	Sole crops under	• Spray 2% KCl + 0.1 ppm	• Provide	

	textured laterite soils	unbunded rainfed uplands ➢ Sesamum ➢ Green gram ➢ Black gram ➢ Groundnut ➢ Rice ➢ Kharif Vegetables • Brinjal • Cowpea • Chilli	boron to non paddy crops to overcome drought. • Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. • Remove and destroy pest and disease affected plants • Crops like cow pea, green gram, black gram, maize and vegetables may be harvested. • Under situation of complete failure of Kharif crop, dismantle it and sow pre-rabi crops minor pulses like horse gram (var. Urmi), Niger (Deomali)	irrigation at critical stages at flowering and grain filling stage.	
		Sole crops under rainfed medium lands : Rice	• Advised to spray Tricyclazone (Beam/Team) 0.06-0.1% at 10-12 days interval to control blast and brown spot diseases in rice during this period. • To control stem borer and Gandhi bug, spray methyl demeton/dimethioate	• Provide life saving irrigation.	
		Sole crops under rainfed medium low lands : Rice	For late transplanted rice 2 sprayings at 10 days interval with Validamycin 0.3% to control sheath blight.	Provide life saving irrigation and plugging of drainage holes.	

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Low rainfall medium textured red sandy loam soils	Sole crops under unbunded rainfed uplands		Utilization of residual moisture for early sowing of pre-rabi crops like Cow pea (SEB – 2, Utkal Manik),	-

		➢ Sesamum ➢ Green gram ➢ Black gram ➢ Groundnut ➢ Rice ➢ Kharif vegetables • Brinjal • Cowpea • Chilli		horse gram (Urmi), green gram (Durga), black gram (Ujala), Niger (Deomali,ONS-15) tomato Utkal Raja, Utkal Kumari, Utkal Urbasi. Cabbage (Pride of India, Golden Acre, Konark, Sujata, Vijay, Cauliflower (Snow ball, Improved Japanese, Himani), Okra (Utkal Gourab, Arka Anamika), and leafy vegetables to be sown to conserve soil moisture. And provide life saving irrigation as and when necessary	
		Sole crops under rainfed medium lands : Rice		Provide life saving irrigation, from harvested rain water at reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage	-
		Sole crops under rainfed medium low lands : Rice		Provide life saving irrigation, and monitoring of pest surveillance, *paira* cropping of Blackgram and Greengram	-
	Medium rainfall light textured laterite soils	Sole crops under unbunded rainfed uplands ➢ Sesamum ➢ Green gram ➢ Black gram ➢ Groundnut ➢ Rice ➢ Kharif vegetables • Brinjal • Cowpea • Chilli		Utilization of residual moisture for early sowing of pre-rabi crops like Cow pea (SEB – 2, Utkal Manik), horse gram (Urmi), green gram (Durga), black gram (Ujala), Niger (Deomali,ONS-15) tomato Utkal Raja, Utkal Kumari, Utkal Urbasi. Cabbage (Pride of India, Golden Acre, Konark, Sujata, Vijay, Cauliflower (Snow ball, Improved Japanese, Himani), Okra (Utkal Gourab, Arka Anamika), and leafy vegetables to be sown to conserve soil moisture. And provide life saving irrigation as and when necessary	-
		Sole crops under rainfed medium lands : Rice		Provide life saving irrigation, from harvested rain water at	-

				reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage	
		Sole crops under rainfed medium low lands : Rice		Provide life saving irrigation, and monitoring of pest surveillance, *paira* cropping of blackgram and greengram	-

Drought - Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**[i]	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Low rainfall medium textured red sandy loam soils	Rice-Pulse/Oilseed	Grow short duration Rice followed by usual pulse/oilseed	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.	NFSM
	Medium rainfall light textured laterite soils	Rice-Pulse/Oilseed	Grow short duration Rice followed by usual pulse/oilseed	-do-	NFSM

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Low rainfall medium textured red sandy loam soils	Rice-Pulse/Oilseed	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are	Reduction of conveyance losses while irrigating the light textured soils. Increase the bond height	-

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			preferred options.		
	Medium rainfall light textured laterite soils	Rice-Pulse/Oilseed	-do-	-do-	-

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Low rainfall medium textured red sandy loam soils	Rice-Pulse/Oilseed	Low water requiring short duration varieties of oilseeds and pulses are preferred options.	Irrigate the kharif rice with groundwater source.	-
	Medium rainfall light textured laterite soils	Rice-Pulse/Oilseed	-do-	-do-	-

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	Low rainfall medium textured red sandy loam soils	Rice-Pulse/Oilseed	Low water requiring short duration varieties of oilseeds and pulses are preferred options.	Irrigate the kharif rice with groundwater source.	-
	Medium rainfall light textured laterite soils	Rice-Pulse/Oilseed	-do-	-do-	-

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Low rainfall medium textured red sandy loam soils	Rice-Pulse/Oilseed	Go for second crop with low water requiring short duration varieties of oilseeds and pulses are preferred options.	Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield	-
	Medium rainfall light textured laterite soils	Rice-Pulse/Oilseed	-do-	-do-	-

Unusual rains (untimely, unseasonal etc) (for both rainfed 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
Groundnut				
Blackgram				
Greengram				
Sesamum				
Horticulture				
Mango	Drainage system should be developed	Drainage system should be developed	Drainage system should be developed	Keeping fruits in a well ventilated drier place
Cashewnut	-do-	-do-	-do-	-do-
Banana	-do-	-do-	-do-	-do-
Citrus	-do-	-do-	-do-	-do-

Coconut	-do-	-do-	-do-	-do-
Heavy rainfall with high speed winds in a short span				
Paddy	Well drainage	Well drainage	Well drainage	Drying
Groundnut				
Blackgram				
Greengram				
Sesamum				
Horticulture				
Mango	Drainage system should be developed	Drainage system should be developed	Drainage system should be developed	Keeping fruits in a well ventilated drier place
Cashewnut	-do-	-do-	-do-	-do-
Banana	-do-	-do-	-do-	-do-
Citrus	-do-	-do-	-do-	-do-
Coconut	-do-	-do-	-do-	-do-
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Insect swarming caterpillar -applies spark@1g/lit of water Disease sheath blight- applies sheathmar @1g/lit of water& adopts need based pesticides.	BPH- apply thiomethoxam @1g/4 lit of water& adopt need based pesticides	Adopt need based pesticides	Drying
Groundnut	Adopt need based pesticides	Tikka disease- apply saaf sanchar @ 1 g/lit of water & adopt need based pesticides	-do-	-do-
Blackgram	-do-	-do-	-do-	-do-
Greengram	-do-	-do-	-do-	-do-

Sesamum	Bud necrosis- apply imidacloprid @ 1 ml/4 lit of water & adopt need based pesticides	-do-	-do-	-do-
Horticulture				
Mango	Adopt need based pesticides	Adopt need based pesticides	Adopt need based pesticides	Drying
Cashewnut	-do-	-do-	-do-	-do-
Banana	-do-	-do-	-do-	-do-
Citrus	-do-	-do-	-do-	-do-
Coconut	-do-	-do-	-do-	-do-

Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Well drainage	Well drainage	Well drainage	Well drainage
Groundnut				
Blackgram				
Greengram				
Sesamum				
Horticulture				
Mango	Drainage system should be developed	Drainage system should be developed	Drainage system should be developed	Keeping fruits in a well ventilated drier place
Cashewnut				
Banana				

Citrus				
Coconut				
Continuous submergence for more than 2 days[2]	Well drainage	Well drainage	Well drainage	Well drainage
Paddy				
Groundnut				
Blackgram				
Greengram				
Sesamum				
Horticulture				
Mango	Drainage system should be developed	Drainage system should be developed	Drainage system should be developed	Keeping fruits in a well ventilated drier place
Cashewnut				
Banana				
Citrus				
Coconut				
Sea water intrusion	NA			

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
Groundnut				
Blackgram				
Greengram				
Sesamum				
Horticulture				
Mango	Watering through Rose cane	Pitcher irrigation	Pitcher irrigation with water Spraying	Harvest mature fruits and keep them in well ventilated place
Cashewnut				
Banana				
Citrus				
Coconut				
Cold wave[q]	Not Applicable			
Horticulture				
Frost	Not Applicable			
Horticulture				
Hailstorm	Not Applicable			
Horticulture				
Cyclone				
Paddy				Immediate harvest and drying
Groundnut				
Blackgram				

Greengram				
Sesamum				
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
Cashewnut				
Banana				
Citrus				
Coconut				

Contingent strategies for Livestock, Poultry & Fisheries

Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought	Livestock insurance		• Availing insurance
Feed and fodder availability	• Encourage perennial fodder production on river beds and tank bed on community basis. • Village gauchar (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	• 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, banana plant Crop residues such as cassiatora water hyacinth and	• Supplementary feeding of remaining livestock and the replacement stock.

	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. • Organizing training programme of persons connected with A.H. on feeding and management of animals during draught.	other like tree pods and seeds etc. Improving poor quality roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them.	
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.	Water sources of Temples, Churches, Gurdwaras, Jain temples and Maszids are generally ideal sources during draught.	• Culling of unproductive livestock
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	• Proper disposal of dead animals
Floods			
Feed and fodder availability	• Keeping track of weather forecast and prior information through radio and TV Etc.	• Procured feeds and fodders should be fed to all animals on the order of priority of animals. • Straws and stover 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 choffing and sprinkling concentrate mixture can improve intake and utility.	• Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	• Drinking water be made available to the animals in any kind of clean container available with the farmer.	• 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.	• Provision of clean drinking water.
Health and disease	• Temporary relief camps on spots can be set	• There should be one veterinarian with	• Prompt and appropriate attention to

management	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	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.	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	• 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 indisaster.	• Procured feeds and fodders should be fed to all animals on the order of priorityof animals. • Straws and stover 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 choffing and sprinkling concentrate mixture can improve intake and utility.	• Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water		• 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. • Drinking water be made available to the animals in any kind of clean container available with the farmer	• Provision of clean drinking water.
Health and disease management	• Prior construction of animal shelters in disaster prone areas. • Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet),	• 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	• 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.)

	Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, 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.	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.	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	1. Green cover (trees plantation, land scaping) 2. Cooling devices: fans, wet curtains or panels, air cooler if possible.	1. Proper sheltering / housing white painting outside the roof and black painting inside the roof. 2. Washing / wallowing / sprinkling/ splashing / showering 3. Provision of cool drinking water (in earthen pitches)	1. Feeding Green fodder/ silage/ hay 2. Provision for night feeding 3. Grazing only if green pastures/ grass lands available 4. Graze early in the morning and late in the afternoon

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 antistress agent. Feeding antibiotics Procurement of litter materials	Continue feeding of antistress 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 roads	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 sources will sanitized with bleaching powder or any water	

		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 cyclone affected 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	Water sources will sanitized with bleaching powder or any water sanitizer	
Heat wave and cold wave				
Shelter/environment management	Pruning of big trees in the farm. Putting curtains on open	Attempt will be made for cooling of poultry shed by adapting different	Provision should be made to ensure proper ventilation to the house	

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

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	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.	-	-
(ii) Changes in water quality	1. Prepare to release water into the habitat.	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms.
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/ inflow	1. Building deep ditches in culture ponds for shelter of the fish to over come high temperature	1. Recharge the ponds with bore well water or water from other sources. 2. Partial harvesting of the stock to reduce stocking density. 3. Artificial shelter by putting aquatic floating weeds in 1/3rd area.	-
(ii) Impact of 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

2) Floods			
A. Capture			
Marine	-	-	-
Inland			
(ii) No. of boats / nets damaged	1. The boats has to be secured safely to river/ reservoir banks. 2. Non operation of fixed bag nets in streams and rivers. 3. Insurance coverage for nets and boats.	1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained. 3. Number of crew and load should be much below the marked tonnage.	1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.
(iii) No. of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
(iv) Loss of stock	-	-	1. Assessment of stock (fish population) and replenishment if stock is depleted. 2. Habitat restoration for the stock remaining.
(v) Changes in water quality	-	-	1. Application of lime in tanks. 2. Application of fertilizer.
(v) Health and diseases	-	-	1. Observation of the health status of fish and accordingly control measure should be taken. 2. Control on transport of brooders and seeds
B. Aquaculture			
(i) Inundation with flood water	1.Strengthening and increase in dyke height.	1. Net enclosure should be provided over the dyke to prevent the escape of	1. Repairing and strengthening of

	2. The should be constructed with inlet and out let facility.	fish from pond.	dyke if required.
(ii) Water contamination and changes in water quality	1. Application of lime.	-	1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO4
(iii) Health and diseases	1. Application of lime	-	1. Application of lime and KMnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals ets)	1. Strengthening and increase in dyke height. 2. Before flood the stock should be harvested and sold in flood prone areas. 3. Transport of feed and chemicals to safer place. 4. Purchase of feeds and chemicals on weekly or fortnightly basis. 5. Insurance coverage for stock.	1. Net enclosure should be provided over the dyke to prevent the escapeof fish from pond. 2. Water should be diverted from the main stream. 3. Sand bags can be used for protection of dykes. 4. Storing of feed and chemicals to safer place.	1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes. 3. Assessment of quality of feed and fertilizer. 4. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, huts etc.)	1. Construction of flood shelter for pumps, aerators etc.	-	1. Repairing of pumps, aerators if required. 2. Repairing of damaged hut.

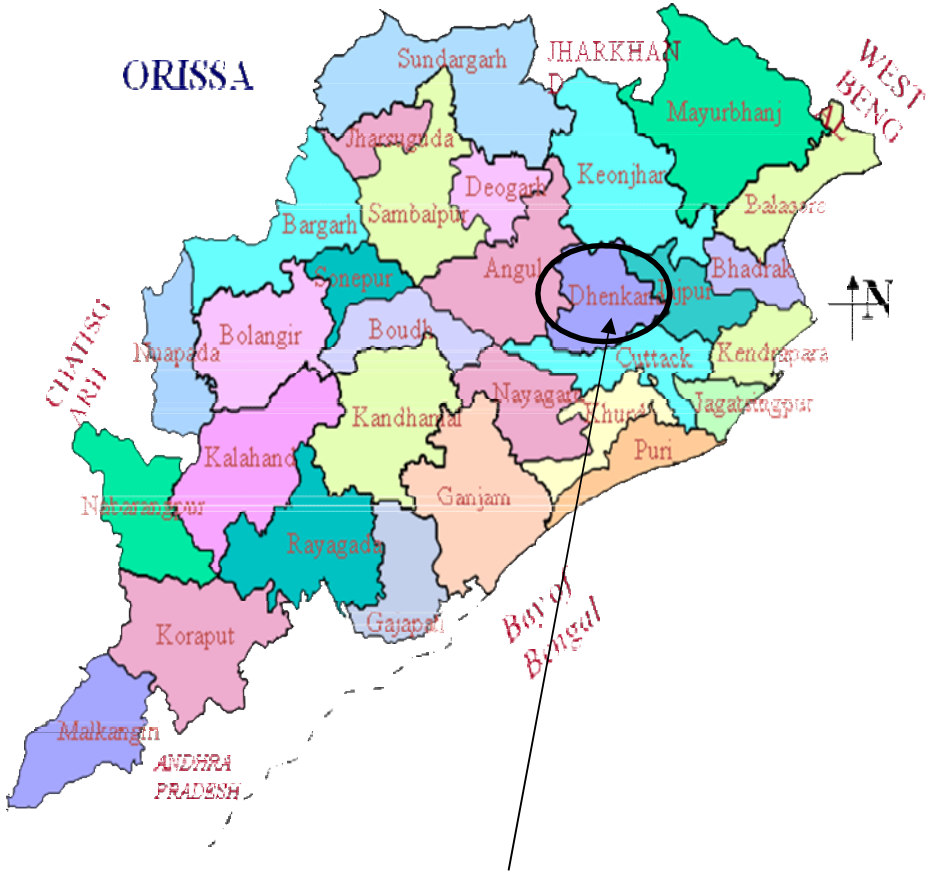
3. Cyclone/ Tsunami			
A. Capture			
Marine			
(i)Average compensation	1. Repeated broadcast and telecast of warning.	1. Provision of relief.	1. Assessment and settlement of

paid due to loss of fishermen lives	2. Sea venture should be avoided 3. Insurance coverage for lives of fishermen.	2. Evacuation of people to safer areas.	insurance.
(ii)Av. No. of boats / nets damaged	1. The boats has to be secured safely to river/ reservoir banks. 2. Insurance coverage for nets and boats.	1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained.	1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.
(iii)Av. No. of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
Inland			
B. Aquaculture			
(i) Over flow/ flooding of ponds	1. Strengthening and increase in dyke height. 2. They should be constructed with inlet and out let facility.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	1. Repairing and strengthening of dyke if required.
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases	-	-	1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals ets)	1. Strengthening and increase in dyke height. 2. Transport of feed and chemicals to safer place.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Storing of feed and chemicals to	1. Stock assessment and restocking with advanced fingerlings or yearling if required.

	3. Insurance coverage for stock.	safer place.	2. Repairing of dykes. 3. Assessment of quality of feed and chemicals. 4. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, shelters/ huts etc.)	-	-	1. Repairing of pumps, aerators if required. 2. Repairing of damaged hut.
4. Heat Wave and Cold Wave			
A. Capture			
Marine	-		-
Inland	-	1. During hot waves night fishing should be done. 2. Preservation by cold chain should be increased during hot waves.	-
B. Aquaculture			
(i) Change in pond environment	1. During hot waves adequate water depth should be maintained.	1. During hot waves mixing of water with fresh water should be done. 2. The culture system should be provided with aeration to avoid oxygen depletion due to high temperature during hot waves. 3. Partial harvesting can be done to avoid loss of crop.	-
(ii) Health and disease management	1. Application of lime and turmeric.	1. Feeding should be stopped. 2. If cold waves persists EUS outbreak takes place	1. Application of CIFAX to control EUS disease in fish.

Annexure-1

LOCATION MAP OF DHENKANAL DISTRICT OF ORISSA



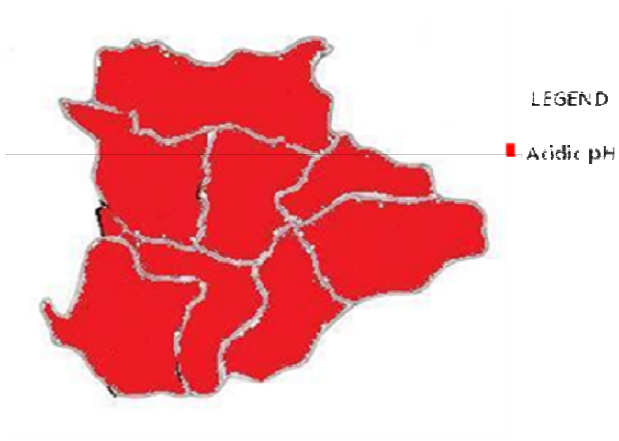
Map of Dhenkanal District

ANNEXURE-2

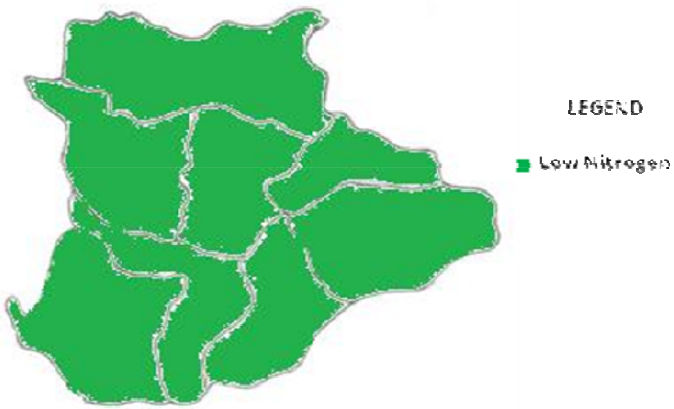
Mean Annual Rainfall (mm) Dhenkanal District

Sl. No.	Months	Rainfall(mm)	No. of Rainy Days
1	January	10.5	0.8
2	February	21.9	1.3
3	March	33.7	2.1
4	April	41.3	2.5
5	May	69.6	4.6
6	June	225.7	10.8
7	July	317.9	15.0
8	August	344.8	16.0
9	September	220.6	11.7
10	October	104.4	5.2
11	November	36.2	1.5
12	December	2.2	0.2
	TOTAL	1428.8	71.1

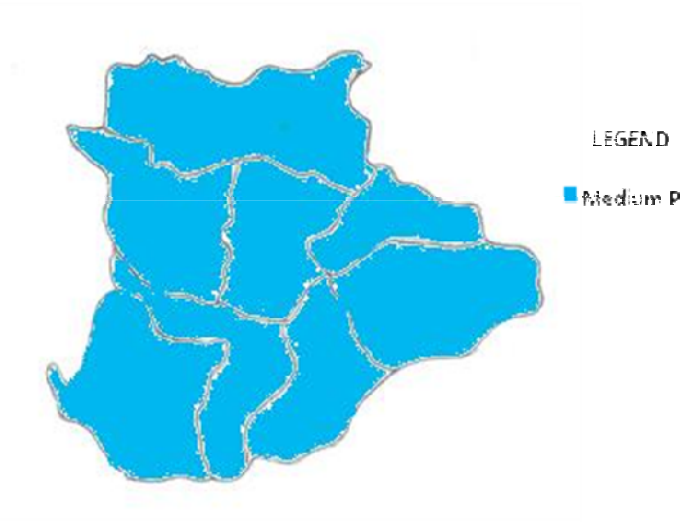
SOIL REACTION MAP OF DIFFERENT BLOCKS OF DHENKANAL DISTRICT



SOIL FERTILITY MAP OF DIFFERENT BLOCKS OF DHENKANAL DISTRICT (AVAILABLE N)



SOIL FERTILITY MAP OF DIFFERENT BLOCKS OF DHENKANAL DISTRICT (AVAILABLE P)



SOIL FERTILITY MAP OF DIFFERENT BLOCKS OF DHENKANAL DISTRICT (AVAILABLE K)