State: ODISHA

Agriculture Contingency Plan for District: DEOGARH

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Eastern Ghats, hot moist sub humid eco-sub region (12.1)			
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau and hill Region (VII)			
	Agro Climatic Zone (NARP)	North Western plateau zone (0R-1)			
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Deogarh and Sundergarh			
	Geographic coordinates of district headquarters Deogarh town	Latitude	Longitude	Altitude	
		21° 31' 53" N	84° 43' 2" E	750 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research & Technology Transfer Station (RRTTS), Chiplima, Sambalpur-768025, Odisha			
	Mention the KVK located in the district with address	At / Po Purnagarh, Dist : Deogarh-768119, Odisha			
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Regional Research & Technology Transfer Station (RRTTS), Chiplima, Sambalpur, Odisha (140 km away from district headquarters)			
1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep):	1361.7	60.3	2nd week of June	2nd week of September
	NE Monsoon(Oct-Dec):	95.9	6.3	2nd week of October	3rd week of December
	Winter (Jan- Feb)	41.1	2.8	2nd week of January	4th week of February
	Summer (March-May)	83.8	6.4	3rd week of March	2nd week of May
	Annual	1582.5	75.8	-	-

1.3	**Land use pattern of the district** (Orissa State Agriculture Statistics, 2008)	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)	294	57	156	51	5	6	1	6	10	2
Source: Orissa Agriculture Statistics 2008-09, Directorate of agriculture & Food Production Orissa, Bhubaneswar, pp : 8											

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Red soil	85.72	46.02
	Sandy soils	16.13	8.66
	Sandy loamy soils	58.62	31.47
	Black soil	1.44	2.0
	Other soils (red and yellow, brown forest soil, alluvial soils)	24.34	12.67
Source: Strategic research and Extension Plan (SREP) of Deogath, district, 2008. pp 18-19			

* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets (data source: Soil Resource Maps of NBSS & LUP)

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	57	189
	Area sown more than once	51	
	Gross cropped area	108	

1.6	**Irrigation**	**Area ('000 ha)**		
	Net irrigated area	18.52		
	Gross irrigated area	28.21		
	Rainfed area	38.48		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals (medium and minor)	24 (1 med., 23 minor)	13.80	48.92
	Tanks	968	0.85	3.03
	Open wells	4292	5.11	18.11
	Bore wells	493	0.61	2.15
	Lift irrigation schemes	72	3.55	12.58
	Micro-irrigation (Drip and sprinkler)	233	0.35	1.25
	Other sources (please specify) WHS	89	3.93	13.94
	Total Irrigated Area		28.21	
	Pump sets	1775		
	No. of Tractors	226		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	**No. of blocks**	**(%) area**	**Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)**
	Over exploited			
	Critical			
	Semi- critical			
	Safe	3	90	Good and neutral pH
	Wastewater availability and use			
	Ground water quality	District affected in part (10%) with problems such as fluoride > 1.5 mg/l, 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) (Specify year 2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Paddy	16.64	27.99	44.63	-	-	-	0.36	44.99
	Sesamum	-	8.90	8.90	7.82	-	7.82	-	16.72
	Black gram	-	6.72	6.72	2.01	-	2.01	-	8.73
	Green gram	-	6.56	6.56	4.21	-	4.21		10.77
	Groundnut	-	1.51	1.51	0.51	-	0.51	-	2.02
	Horticulture crops - Fruits	**Area ('000 ha)**							
		Total							
	Mango	2.41							
	Litchi	0.61							
	Sweet orange	0.42							
	Banana	0.24							
	Guava	0.10							
	Papaya	0.03							
	Sapota	0.03							
	Horticulture crops - Vegetables								
		Total							
	Onion	0.58							
	Chilli	1.69							
	Sweet potato	0.67							
	Potato	0.31							
	Vegetables	7.07							
	Horticulture crops - Flowers	**Total**							
	Marigold	35.0							
	Rose	25.0							
	Gladioli	30.0							

	Tuberose	9.0
	Medicinal and Aromatic crops	**Total**
	Garlic	0.19
	Turmeric	0.19
	Ginger	0.16
	Coriander	0.29
	Water melon	0.35
	Plantation crops	**Total**
	Coconut	0.18
	Cashew	1.29
	Eg., industrial pulpwood crops etc.	
	Fodder crops	**Total**
	Total fodder crop area	
	Grazing land	
	Sericulture etc	0.34
	Others (specify)	

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			178.510
	Improved cattle			-
	Crossbred cattle			-
	Non descriptive Buffaloes (local low yielding)			11.764
	Descript Buffaloes			-
	Goat			100.729
	Sheep			5.373
	Others (Camel, Pig, Yak etc.)			(Pigs)5.477, 1.134 (Ducks)
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial		-	
	Backyard		161.848	

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**	
		148		**2**		**548**	
	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)			17706.16	1.20	1008	
	Others			-	-	-	

1.11 Production and Productivity of major crops (2008)

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000mt)	Productivity (kg/ha)	Production ('000 mt)	Productivity (kg/ha)	Production ('000mt)	Productivity (kg/ha)	Production ('000 mt)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	85.91	1925	-	-	0.97	2650	86.87	1931	
	Sesamum	3.80	427	3.19	408	-	-	6.99	418	
	Green gram	2.13	325	1.59	377	-	-	3.72	351	
	Black gram	2.36	351	0.87	432	-	-	3.23	392	
	Groundnut	2.24	1482	0.78	1535	-	-	3.02	1509	

Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango							3.715	2234	
	Litchi							2.033	3800	
	Sweet orange							34.09	8970	
	Onion							4.770	9173	
	Vegetables							633.02	1181	
	Marigold							1180	8000	

Source : Horticulturist, Deogarh

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Rice	Sesame	Green gram	Black gram	Groundnut
	Kharif- Rainfed	3rd week of June – 1st week of July	3rd week of June	3rd week of June	3rd week of June	3rd week of June – 1st week of July
	Kharif-Irrigated	June – July	-	-	-	-
	Rabi- Rainfed	-	4th week of Sept – 3rd week of Oct	4th week of Sept- 3rd week of Oct	4th week of Sept – 3rd week of Oct	-
	Rabi-Irrigated	Dec- Jan	Nov	Oct- Nov	Oct-Nov	Oct-Nov

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood		✓	
	Cyclone (Kalbaisakhi)			✓
	Hail storm			✓
	Heat wave		✓	

	Cold wave			✓
	Frost			✓
	Sea water intrusion			✓
	Pests and disease outbreak (specify)			✓
	Others (specify) Rice swarming caterpillar		✓	

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

LOCATION MAP OF DEOGARH DISTRICT WITHIN ODISHA STATE

SOIL REACTION MAP OF DEOGARH DISTRICT

(SOIL REACTION)

NUTRIENT INDEX

ACIDIC

NEUTRAL

ALKALINE

LEGEND

BLOCK BOUNDRY

DISTRICT BOUNDRY

SOIL FERTILITY MAP OF DEOGARH DISTRICT (AVAILABLE – N)

LEGEND

BLOCK BOUNDRY

DISTRICT BOUNDRY

NUTRIENT INDEX

LOW MEDIUM HIGH

SOIL FERTILITY MAP OF DEOGARH DISTRICT (AVAILABLE – P)

LEGEND

BLOCK BOUNDRY

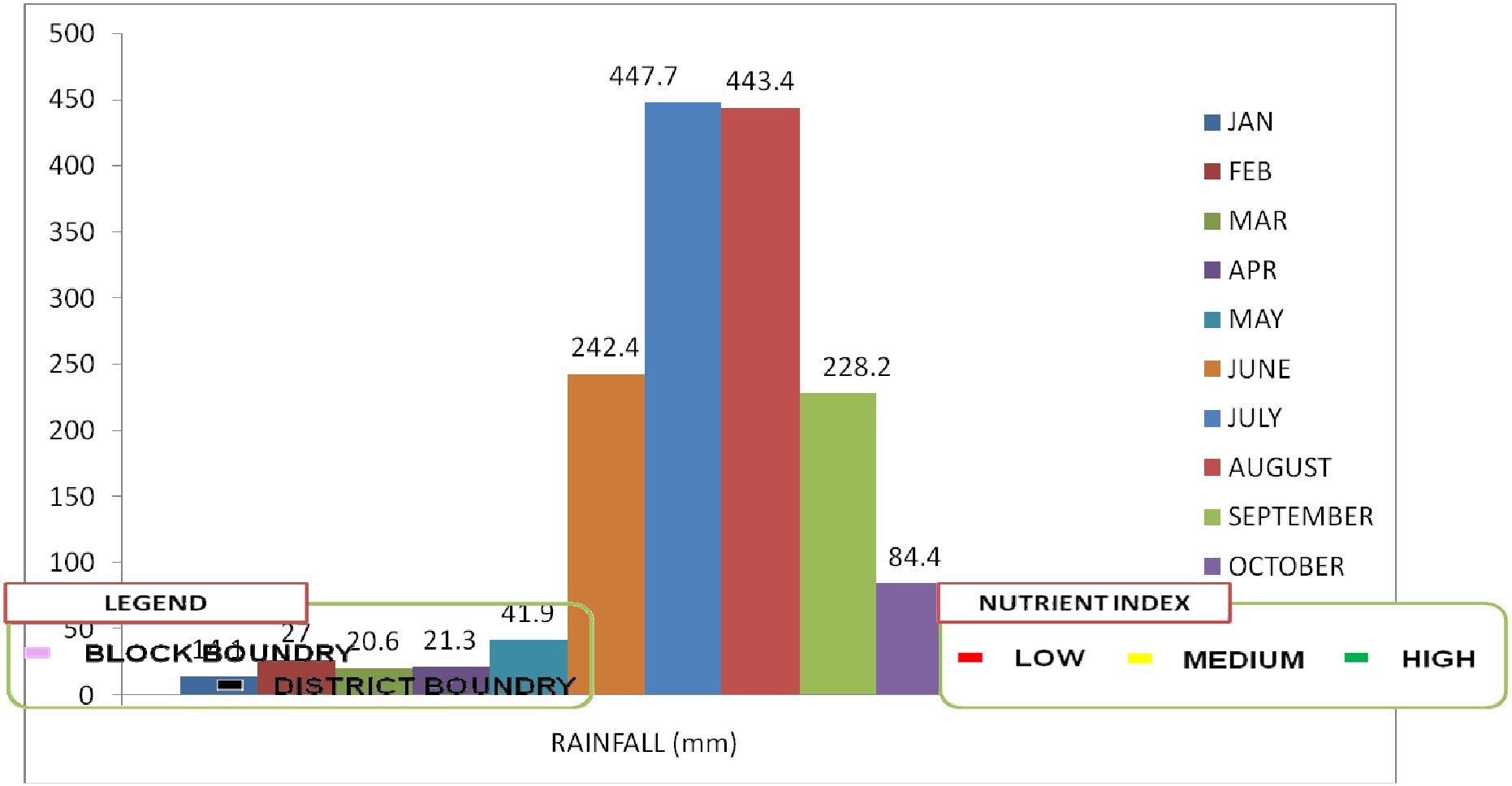
DISTRICT BOUNDRY

NUTRIENT INDEX

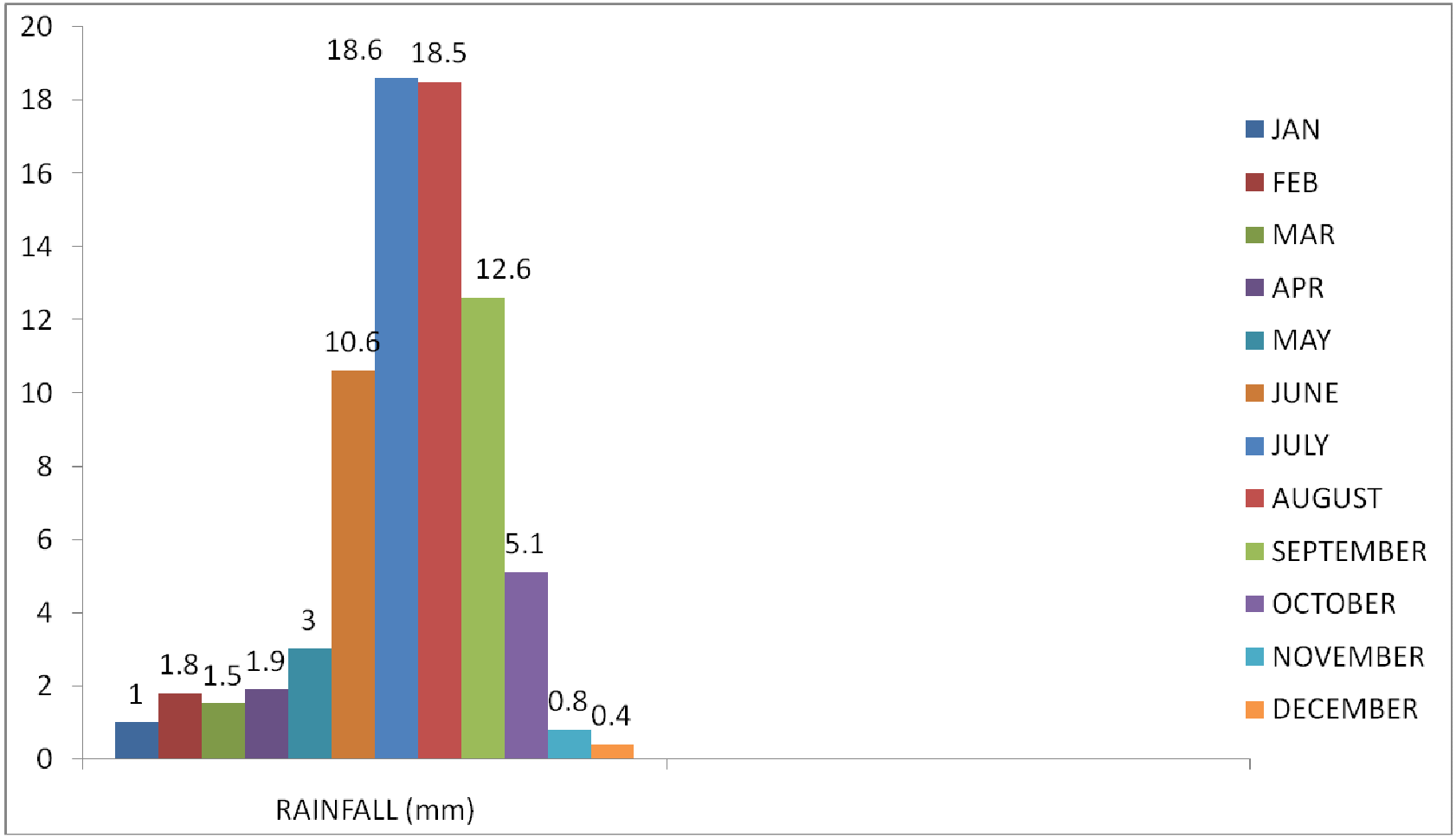
LOW MEDIUM HIGH

SOIL FERTILITY MAP OF DEOGARH DISTRICT (AVAILABLE – K)

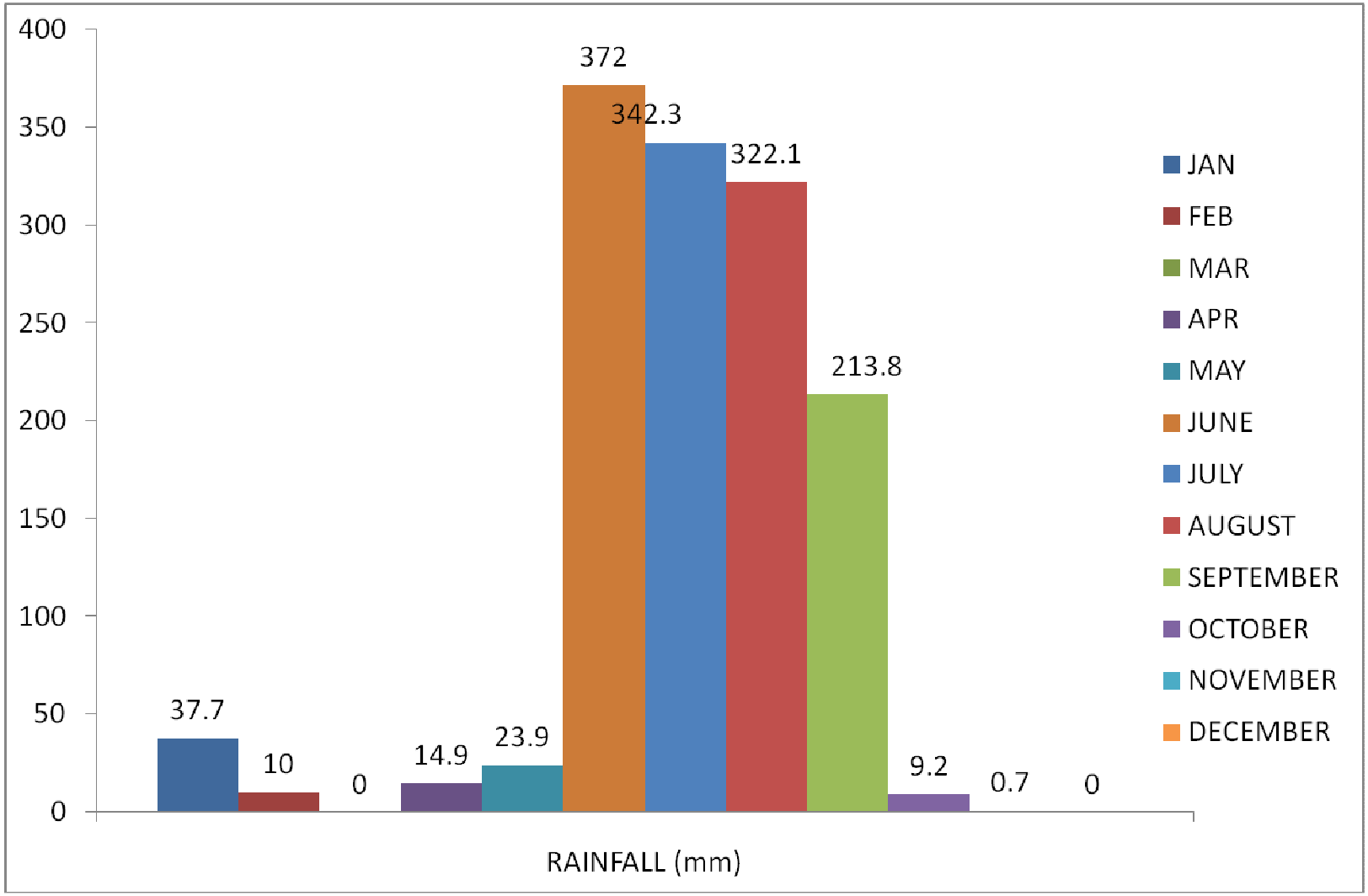
MONTHLY NORMAL RAINFALL OF DEOGARH DISTRICT OF ODISHA



NORMAL RAINY DAYS OF THE DISTRICT DEOGARH OF ODISHA



MONTHLY RAINFALL FOR 2008 OF DEOGARH DISTRICT OF ODISHA



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **July 1ST WEEK**	**Low rainfall lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• Closer row and plant spacing,	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
		Sesamum (Uma)	Nirmala and Prachi	20cm X8cm	
		Green gram (K 851,Chaita Muga)	Sujata, Durga, PDM-11& 54	20cm X8cm	
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala	20cm X8cm	
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24	20cm X10cm	
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna	15cmX10cm	
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)	45cmX30cm	
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini	45cmX30cm	
		Cow pea (SEB 2)	Utkal Manika	30cmX10cm	
		Lady's finger (Anamika)	Utkal Gourav	45cmX15cm	
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava	45cmX30cm	
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2		
			Arhar + Sesamum (2:4)		
			Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika)		
			Yam : (Orissa Elite, Pusa Hemlata)	75cmX75cm	

			Arrararoot (White)		
				• In-situ rain water conservation - unbunded uplands converted to bunded uplands	
	Sole crops under **<u>Rainfed medium lands</u>**	Rice (Butia local and Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	• Apply full P, K and 20% N of recommended dose (60:30:30 kg N P_2O_5 K_20) along with well decomposed organic matter for early seedling vigor.	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
	Sole crops under **Rainfed low lands**	Rice (Swarna)	Pratikshya,Rani dhan, Sidhanta and Mahsuri		
	Low rainfall lateritic soils	Cropping system 1:			
	Irrigated Medium land	Rice(Lalat) – onion (Nasik Red)	Rice variety: Medium duration (120days), Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra Onion variety: N-53, Bhima Red.	15cmX10cm	
	Irrigated low land	Rice(Swarna) – onion (Nasik Red)	Medium late (140-145 days) Pratikshya,Rani dhan, Sidhanta and Mahsuri Onion variety: N-53, Bhima Red.	20cmX10cm 15cmX10cm	
		Cropping system 2:			
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha	
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July,	

				spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Traditional pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisci culture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	Feed and disease management (Fishery Dept.)

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**
	Low rainfall lateritic soils : Unbunded rainfed uplands	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops i.e		
		Sesamum (Uma)	Nirmala and Prachi	• 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, sesamum and castor after receiving the rainfall. • Cultivate vegetables like okra, brinjal, tomato. • 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 such as rotary peg weeder, wheel finger weeder and power weeder under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Green gram (K 851,Chaita Muga)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
	Sole crops under rainfed medium lands	Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh 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-	Pre-germinated seed drill under RKVY. High yielding rice varieties under NFSM. Paddy transplanter, marker and cono weeder under RKVY

				120days) • 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.	
	Sole crops under rainfed medium low lands	Rice	Swarna, Pratikshya,Rani dhan, Sidhanta 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	
		Cropping system 1:			
		Rice-onion	Rice variety: Medium duration (120days) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark,		

			Jogesh and Surendra		
			Medium late (140-145 days) Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri		
			Onion variety : Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
		Cropping system 2:			
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha	
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally	Composite pisciculture in farm	10,000 fry/ha or 5,000	

		available species with inappropriate stocking density	ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

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**	L**ow rainfall lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• 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	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Sesamum (Uma)	Nirmala and Prachi		
		Green gram (K 851,Chaita Muga)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5)		

			Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1)Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)	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.	
	Sole crops under rainfed medium lands	Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh 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,Rani dhan, Sidhanta 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. • 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 %	Tractor, power tiller, rotavator under RKVY

			N at the time of transplanting. • Apply life saving irrigation as and when necessary	
	Cropping system 1:			
	Rice-onion	Rice variety: Medium duration (120days) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
		Medium late (140-145 d) Swarna, Pratikshya, Rani dhan, Sidhanta and Mahsuri		
Farming situation:		Onion variety: Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Cropping system 2:			
Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha	
Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		

		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

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 August 3rd week	**Low rainfall lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	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		
		Green gram (K 851,Chaita Muga)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
	Sole crops under rainfed medium lands	Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and 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	Rice	Swarna, Pratikshya,Rani dhan, Sidhanta	• Close the drainage hole	Tractor, power tiller,

	under Rainfed medium low lands		and Mahsuri	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 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.	rotavator under RKVY
		Rice-onion	Rice variety: Medium duration (120d) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
	2) Farming situation:		Medium late (140-145 d) Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri		
			Onion variety: Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing	

				120cmX120cm, NPK 30:30:100 kg/ha	
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

Condition			**Suggested Contingency measures**		
Early season droughtt **(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 lateritic soils : Unbunded rainfed uplands**	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50%. • Cultivate vegetables like cow pea and tomato. • Complete hoeing weeding and 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, diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Sesamum (Uma)	Nirmala and Prachi		
		Green gram (K 851)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh 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	• Supply of seed drills and intercultural implements through RKVY. • Good quality seeds through NFSM and OSSC.

				(Khelua), plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary.	
		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 done. • Fresh seedlings may be transplanted • If rice population is more than 50 % carryout weeding and adjust the plant population by redistribution of hills (Khelua)	
		Rice-onion	Rice variety: Medium duration (120days) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
	2) Farming situation:		Medium late (140-145 days) Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri		
			Onion variety : Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing	

				120cmX120cm, NPK 30:30:100 kg/ha	
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to	

				control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
At vegetative stage	**Low rainfall lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	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		
		Green gram (K 851)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120,		

			TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	• 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	Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri	• Seedling of 45 days old can be transplanted or gap filled. • Do not practice beushaning • Weed out the field • Follow plant protection measures • Provide protective irrigation through harvested rain water • Withhold N application • Apply Potassic fertilizer • Strengthen field bunds.	
		Rice-onion	Rice variety: Medium duration (120days) Lalat,		

			Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
			Medium late (140-145 days) Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri		
			Onion variety : Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Rainfed medium lands	Rice - fallow	Rice – greengram /blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha	
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		

		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

Condition			**Suggested Contingency measures**		
Mid season drought (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 lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops	• Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome droughtt.	
		Sesamum (Uma)	Nirmala and Prachi		

		Green gram (K 851)	Sujata, Durga, PDM-11& 54	• Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. • Remove and destroy pest and disease affected plants • Provide irrigation at critical stages at flowering and grain filling stage. • Crops like cow pea, green gram, black gram, maize and vegetables may be harvested at physiological maturity. • 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.	
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	• 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	Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri	• For late transplanted rice 2 spraying at 10 days interval with Validamycin 0.3% to control sheath blight. • Provide life saving irrigation.
		Cropping system 1:		
		Rice-onion	Rice variety: Medium duration (120d) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	
			Medium late (140-145 d) Swarna, Pratikshya,Rani dhan, Sidhanta and Musuri	
			Onion variety : Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up
		Cropping system 2:		
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties	
		Litchi	Seedless early, Mumbai early	Planting time Jun-July,

				spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved	Planting time Jun-July, spacing 5mX5m, pit size 50cmX50cmX50cm, pit manuring : 250g N + 125g P + 125g K	
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

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**
At vegetative stage	L**ow rainfall lateritic soils** : **Unbunded rainfed uplands**	**Sole crops**	Varietal substitutions of drought tolerant varieties of the sole crops i.e	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	
		Sesamum (Uma)	Nirmala and Prachi		
		Green gram (K 851)	Sujata, Durga, PDM-11& 54		
		Black gram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapurna		
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)		
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini		
		Cow pea (SEB 2)	Utkal Manika		
		Lady's finger (Anamika)	Utkal Gourav		
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava		
			Intercropping of arhar + groundnut (2 : 5) Arhar var. ICPL 87, UPAS 120, TUR N-2 Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cow pea (Utkal Manika) Yam : (Orissa Elite, Pusa Hemlata) Arrararoot (White)		
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	Provide life saving irrigation, from harvested rain water at reproductive stage and conserve soil moisture harvest the crop at physiological maturity stage	

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**
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Rani dhan, Sidhanta and Musuri	Provide life saving irrigation, and monitoring of pest surveillance, *paira* cropping of blackgram and greengram	
		Cropping system 1:			
		Rice-onion	Rice variety: Medium duration (120d) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
	2) Farming situation:		Medium late (140-145 d) Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri		
			Onion variety : Nasik Red, N-53, Bhima Red.	10 kg seeds/ha, sowing time Nov-Dec, NPK 60:60;50 kg/ha as basal. 60 kg N and 60 kg K_2O top dressed at 21 DAS followed by weeding hoeing and earthing up	
		Cropping system 2:			
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhauli, Kamdev, Durga) Black gram: (Sarala, Prasad, Ujala) Water melon: (Sugarbaby, Sugar pack, Black magic)	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm 2kg seeds/ha, sowing time Jan, spacing 120cmX120cm, NPK 30:30:100 kg/ha	

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**
	Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved varieties		
		Litchi	Seedless early, Mumbai early	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N + 16g P + 60g K	
		Citrus	Cino mandarine		
		Mango	Amrapali, Malika	Planting time July, spacing 5mX5m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	
		Custard apple	Local improved		
		Pisciculture in farm ponds with locally available species with inappropriate stocking density	Composite pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus execotic carps (Silver/ grasscarp)	10,000 fry/ha or 5,000 fingerlings feeding 10% of the body weight i.e 2kg/day (twice during morning and evening) mix with multivitamin @ 2 tea spoon / kg feed. Cow dung 2.5q /ha should be applied in 10-15 days interval for 5-6 times depending on the growth of the planktons. Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease	

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**
				syndrome (UDS) and Epizootic ulcerative syndrome (EUS)	

2.1.2 Drought - Irrigated situation: Not experienced

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	**Low rainfall lateritic soils** : **Unbunded rainfed uplands**	Cropping system 1: rice-onion	Rice-onion	Manaswini, Pratikshya, Navin, Hybrid: (Ajaya, Rajlaxmi) Onion: Nasik Red, N-53, Bhima Super, Agrifound Light Red	Assured irrigation through shallow tanks
		Cropping system 2:rice-fallow	Rice-Sunflower	Manaswini, Pratikshya, Navin, Hybrid: (Ajaya, Rajlaxmi Sunflower (KBSH-1) 5kg seeds/ha, spacing 60cmX30 cm, Gypsum 250kg/ha, 60:80:60 kg $N:P_2O_5:K_2O$:/ha	Assured irrigation through deep bore wells

2.2 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**
Sesamum, Green gram, Black gram, Groundnut	Provide drainage	Provide drainage	Drain out excess water, harvest at	Shift the produce to half covered threshing

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
			physiological maturity	floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Horticulture				
Tomato, Brinjal, Cow pea, Lady's finger and chillies	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Outbreak of pests and diseases due to unseasonal rains				
Rice – Swarming caterpillar	Spray the crop with chloropyriphos or tria-zophos @ 2 ml /litre of water or dusting with Quinalphos 1.5 % dust i.e., 25 kg/ha and prevent migration from one field to another`			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Mango and Litchi	Sprinkling water	Drip / sprinkler irrigation with soil mulching	Drip / sprinkler irrigation with soil mulching	Drip / sprinkler irrigation with soil mulching

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	• Urea enriched paddy straw should be preserved in air tight underground pits (straw 100 kg + urea 4kg + water 25 lt) • Livestock insurance • On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. • Explore the possibilities of availability of unconventional / alternative feed resources during drought. • Upgradation of desi cow through artificial insemination and upgradation of local good breeds (Ganjam, Black Bengal through cross breeding with improved breeds) • Regular deworming with vaccination of cows and need based treatments against ailments	• Conducting animal health camps and treating the affected animals • Regular de-worming and vaccination for goats against PPR, FMD with intensive care and treatment for ailments. • Low cost housing with stake arrangement • Preventive measures against early kid mortality by external/ artificial feeding arrangement. • Medicines like glucon D, saline's and multi vits can be supplied to avoid dehydration of animals. • Mobile vehicle with ice box and anti stress drugs should be kept ready.	• Availing insurance • Culling of unproductive livestock • Marketing link should be reviewed • Vaccination should be undertaken • Health camps should be carried out for revival of good growth.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Feed and fodder availability	• It is essential to establish fodder bank near forest areas. • Provision is also necessary to store surplus crop residues in fodder banks, which can be made available during drought. • Excess fodder in flush season can be preserved as hay / silage. • Encourage perennial fodder production on river beds and tank bed on community basis. • Village gauchar (grazing) lands should be developed for fodder production.	• 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 other like tree pods and seeds etc. Improving poor quality roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them.	• Supplementary feeding of remaining livestock and the replacement stock. • Addition of calcium, mineral mixture and multi-vitamin supplement @ 40 g/cow/day with home prepared feed (rice and wheat bran: groundnut oilcake at 9:1 ratio mixed with kitchen waste) + 40 kg green fodder/cow/day • Stall feeding with home prepared feed (mixture of maize + Mahua cake + rice/wheat bran @ 6:1:3 ratio in kitchen waste) + mineral and multi-vitamin supplement (25 g/goat/day). Sufficient browsing for at least four hours per day
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 drought.	• Pure drinking water and vaccines to be given.
Health and disease management	• Organizing training programme of persons connected with A.H. on feeding and management of animals during drought. • Veterinary preparedness with vaccine and medicines.	• Supplementation of mineral and vitamin mixtures • Campaign and mass vaccination	• Proper disposal of dead animals (carcass)

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Floods			
Feed and fodder availability	• Procurement feeds and fodders for feeding the animals. • Water purifying drugs should be applied to avoid contamination of water	• Straw and Stover that got soaked during flood need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying, chopping and sprinkling concentrate mixture can improve intake and utility. • 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. • Tents should be arranged to protect the animals • Driving of the animals from lower ridge to the bunds	• Construction of sheds • Post flood deworming and vaccination.
Drinking water		Pure drinking water and vaccines to be given	• Sanitization of water resources. • Pure drinking water and vaccines to be given
Health and disease management	• Training to the farmers about care of their animals when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local language for care of livestock in disaster. • Keeping track of weather forecast and prior information through radio and TV etc. • Prior construction of animal shelters	• Supplementation of mineral and vitamin mixtures • Campaign for mass vaccination	• Proper disposal of dead animals(carcass)

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	in disaster prone areas. • Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, upland etc. • Variation of livestock before onset of rainy season • 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. • Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Dettol, Savlon, Tannic acid powder (for poisons) and		

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, 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.)		
Cyclone			
Feed and fodder availability	• Procured feeds and fodders to be used for feeding the animals.	• Procured feeds and fodders should be fed to all animals on the order of priority of animals. • 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 supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	• Provision of clean drinking water.	• Drinking water to be made available to the animals in clean container	• Provision of clean drinking water.
Health and disease management	• Training to the farmers about care of their animals when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local	• There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. • The team should be well equipped with contingent items like bandages,	• 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.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	language for care of livestock in disaster. • Keeping track of weather forecast and prior information through radio and TV etc. • Prior construction of animal shelters in disaster prone areas. • Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. • Variation of livestock before onset of rainy season • 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. • Keep the emergency service kit (first Aid Requisites) ready always	tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. • Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. • Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners.	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

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, 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.)		
Heat wave and cold wave			
Shelter/environment management	• Green cover (trees plantation, land scaping)	• Proper sheltering / housing white painting outside the roof and black painting inside the roof. • Washing / wallowing / sprinkling/ splashing / showering	

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
		• Provision of cool drinking water (in earthen pitchers) • Cooling devices : fans, wet curtains or panels, air cooler if possible	
Health and disease management		• Feeding Green fodder/ silage/ hay • Provision for night feeding • Grazing only if green pastures/ grass lands available • Graze early in the morning and late in the afternoon	• Protection of dry / milch cows/ buffaloes/ breeding bulls and teasers against thermal stress • Heat detection with young teasers • Close observation of all open cows • Study of cervical mucous • Heat detection and AI during cooler parts of the day. • Insemination at optimal time with good quality semen.

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Breed (OUAT synthetic, Banaraja, Gramapriya/ Kalinga Brown, Giriraja) Ensure procurement of feed ingredients sufficient ahead	Feed supplementation will be made to the farms. Free range system (Self feeding in the back yard) depending on local household waste	Attempt will be made for available of feed ingredient or compound feed to the farmers. Regular vaccination starting from day old chick. Immediately isolating the	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
			birds affected by infectious diseases from the flock.	
Drinking water	Check water source for ensuring sufficient portable water during drought	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well	
Health and disease management	Procurement of vaccines and medicines and anti-stress agent. Feeding antibiotics Procurement of litter materials	Continue feeding of anti-stress agent		
Floods				
Shortage of feed ingredients	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting 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/ contamination	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of vaccines and medicines. Feeding antibiotics Procurement of litter materials	Continue feeding antibiotics Prevent entrance of flood water to the shed Replace wet litter Proper disposal of dead birds if any	Disinfection of the farm premises. Feeding antibiotics and deworming. Replace wet litter Disinfection of sheds. Proper disposal of dead birds if any	
Cyclone				
Shortage of feed ingredients	Procurement of feed	Supply the compound feed to the poultry farm under cyclone affected area	Supply will continued till the situation is under control	
Drinking water	-	Attempt will be made to	Water sources will	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
		provide sanitized drinking water	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				
Shelter/environment management	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories Providing shed to poultry houses. Providing proper ventilation.	Attempt will be made for cooling of poultry shed by adapting different cooling methods Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan	Provision should be made to ensure proper ventilation to the house	
Health and disease management	Procurement of Antistress drugs	Supplementation of antistress drug	Vaccination of birds against RD	
Cold wave				
Shelter/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.	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
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	Procurement of Antistress drugs and vaccine

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. 4. Species : (Indian Major Carps (IMC), i.e., Rohu, Mrigal and Catla + Exotic carps (Silver carp and Grass carp @ 5000 fingerlings/ha	Application of rice bran + Groundnut oil cake + vitamins or 80 kg, urea + 40 kg SSP/ha/year: Raw cow dung @ 5 t/ha + micronutrient to enhance the production of phyto plankton and zoo plankton.	Using Cifax @ 1 lit/ha or lime and turmeric powder (10:1) ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epizootic ulcerative syndrome (EUS)
(ii) Changes in water quality	1. Prepare to release water into the habitat. 2. Leveling of farm bonds , testing of water	1. Mixing of water from the water harvest structure like ponds and tanks	1. Monitoring the water quality and health of aquatic organisms.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	body 3. Development high stocking density	into the fish habitat.	
(iii) Any other			
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 overcome 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.	(i) Increase the water depth using other sources like ground water nearby surface water sources
(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. Phytoplankton management – application of cimazine @ 0.2 ppm in case of over population 3. pH regulation through liming @ 60-75 kg/ha m at 15 days interval 4. Turbidity control through application of Gypsum @ 200-250 kg/ ha m of water. 5. In case of plankton crash algal inoculation is recommended followed by fertilization @ 30 kg (15 kg urea + 15 kg ssp)/ ha m of water
(iii) Any other	-	-	-
2) Floods			
A. Capture			

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Marine			
Inland			
(i) 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. 4. As a safety measure, harvesting up to 25% of maximum sustainable yield.	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.
(ii) No. of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
(iii) Loss of stock	-	-	1. Assessment of stock (fish population) and replenishment if stock is depleted. 2. Habitat restoration for the stock remaining.
(iv) 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. 2. This 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) Water contamination and changes in water quality	1. Application of lime.	-	1. Application of lime and geolite. 2. Application of Alum. 3. Application of $KMnO_4$
(iii) Health and diseases	1. Application of lime	-	1. Application of lime and $KMnO_4$. 2. Assessment of the health status of

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
			fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals etc)	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 escape of 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 paid due to loss of fishermen lives	1. Repeated broadcast and telecast of warning. 2. Sea venture should be avoided 3. Insurance coverage for lives of fishermen.	1. Provision of relief. 2. Evacuation of people to safer areas.	1. Assessment and settlement of insurance.
(ii) Avg. no. of boats / nets/damaged	1. The boats has to be secured safely to river/ reservoir banks.	1. Checking of the safety of the boats / nets.	1. Maintenance of the boats and nets. 2. Assessment and settlement of

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	2. Insurance coverage for nets and boats.	2. An inventory logbook with name of crewmembers should be maintained.	insurance.
(iii) Avg. no. of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds	1. Strengthening and increase in dyke height. 2. This 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 $KmnO_4$. 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 etc)	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 in	1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
	3. Insurance coverage for stock.	safer place.	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.
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine	-		-
Inland	-	1. During heat waves night fishing should be done. 2. Preservation by cold chain should be increased during heat waves.	-
B. Aquaculture			
(i) Changes in pond environment (water quality)	1. During heat waves adequate water depth should be maintained. 2.Deep trenches may be created 3. Artificial substrate to be created for shelter of prawns	1. During heat 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 heat 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@1l/ha to control EUS disease in fish.