

DISTRICT AGRICULTURE CONTINGENCY PLAN OF DEOGARH DISTRICT



KRISHI VIGYAN KENDRA, DEOGARH



**ORISSA UNIVERSITY OF AGRICULTURE AND
TECHNOLOGY**

State: ODISHA

Agriculture Contingency Plan for District: Deogarh

1.0 District Agriculture profile					
1.1 Agro-Climatic/Ecological Zone					
1.1	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 (0-1)			
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Deogarh and Sundergarh			
	Geographic coordinates of district headquarters				
	Geographic coordinates of district headquarters Deogarh town	Latitude 21° 31' 53" N	Longitude 84° 43' 2" E	Altitude 750 m MSL	
	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	2 nd week of June	2 nd week of September
	NE Monsoon(Oct-Dec):	95.9	6.3	2 nd week of October	3 rd week of December
	Winter (Jan- March)	41.1	2.8	2 nd week of January	4 th week of February
	Summer (Apr-May)	83.8	6.4	3 rd week of March	2 nd week of May
	Annual	1582.5	75.8	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical area	Net Area Sown	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	62	156	51	5	6	1	6	5	2
Source: Orissa Agriculture Statistics 2013-14, Directorate of agriculture & Food Production Orissa, Bhubaneswar, pp : 9											

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 soils	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 Deogarh 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	62	175
	Area sown more than once	46.53	
	Gross cropped area	108.53	

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/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe	3	90 % of the district	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)

1.7	Major field crops cultivated	Area ('000 ha)							Summer	Grand total
		<i>Kharif</i>			<i>Rabi</i>					
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
	Rice	-	34.50	34.50	0.015	-	0.015	-	34.515	
	Sesamum	-	7.124	7.124	5.185	-	5.185	-	12.309	
	Blackgram	-	6.34	6.34	0.815	-	0.815	-	7.155	
	Greengram	-	6.87	6.87	6.5	-	6.5	-	13.37	
	Groundnut	-	1.43	1.43	0.425	-	0.425	-	1.855	
	Horticulture crops - Fruits	Total Area ('000 ha)								
	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									
	Onion	0.58								
	Chilli	1.69								
	Sweet potato	0.67								
	Potato	0.31								
	Vegetables	7.07								
	Water melon	0.35								
	Horticulture crops - Flowers									
	Marigold	35.0								
	Rose	25.0								
	Gladioli	30.0								
	Tuberose	9.0								
	Medicinal and Aromatic crops									
	Garlic	0.19								

	Turmeric	0.19
	Ginger	0.16
	Coriander	0.29
	Plantation crops	
	Coconut	0.18
	Cashew	1.29
	Eg., industrial pulpwood crops etc.	
	Fodder crops	
	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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000mt)	Productivity (kg/ha)	Production ('000 t)	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)										
	Rice	85.91	1925	-	-	0.97	2650	86.87	1931	
	Sesamum	3.80	427	3.19	408	-	-	6.99	418	
	Greengram	2.13	325	1.59	377	-	-	3.72	351	
	Blackgram	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	

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Sesamum	Greengram	Blackgram	Groundnut
	Kharif- Rainfed	3 rd week of June – 1 st week of July	3 rd week of June	3 rd week of June	3 rd week of June	3 rd week of June – 1 st week of July
	Kharif-Irrigated	June – July	-	-	-	-
	Rabi- Rainfed	-	4 th week of Sept – 3 rd week of Oct	4 th week of Sept- 3 rd week of Oct	4 th week of Sept – 3 rd 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

LOCATION MAP OF DEOGARH DISTRICT WITHIN ODISHA STATE

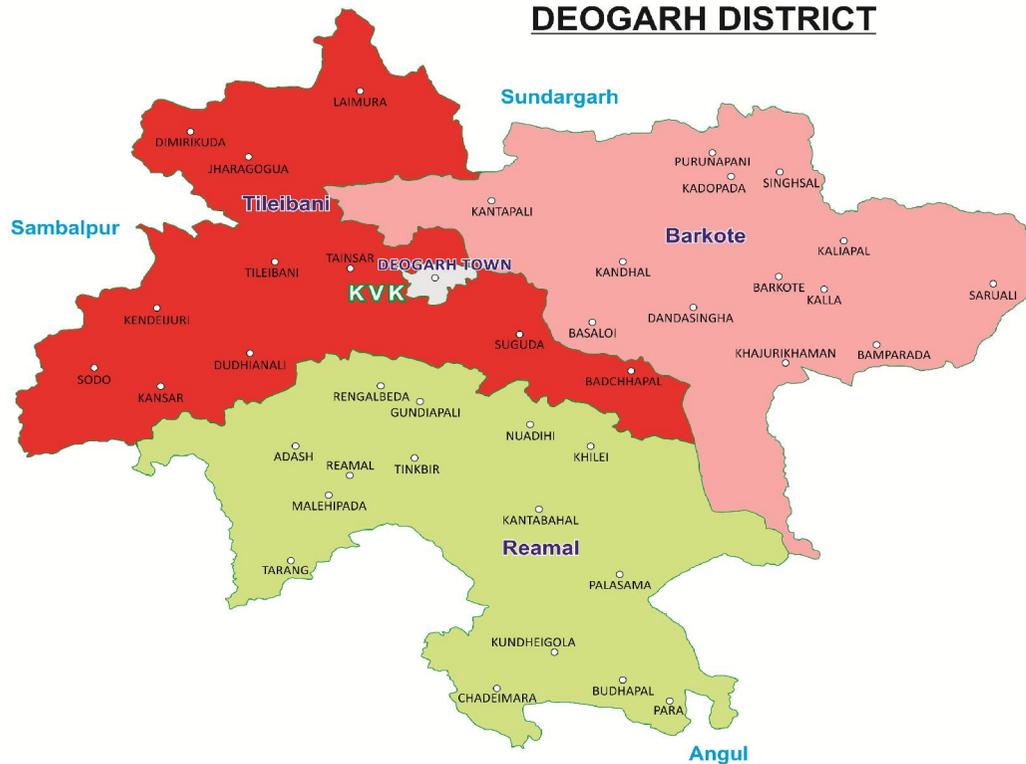


District : DEOGARH

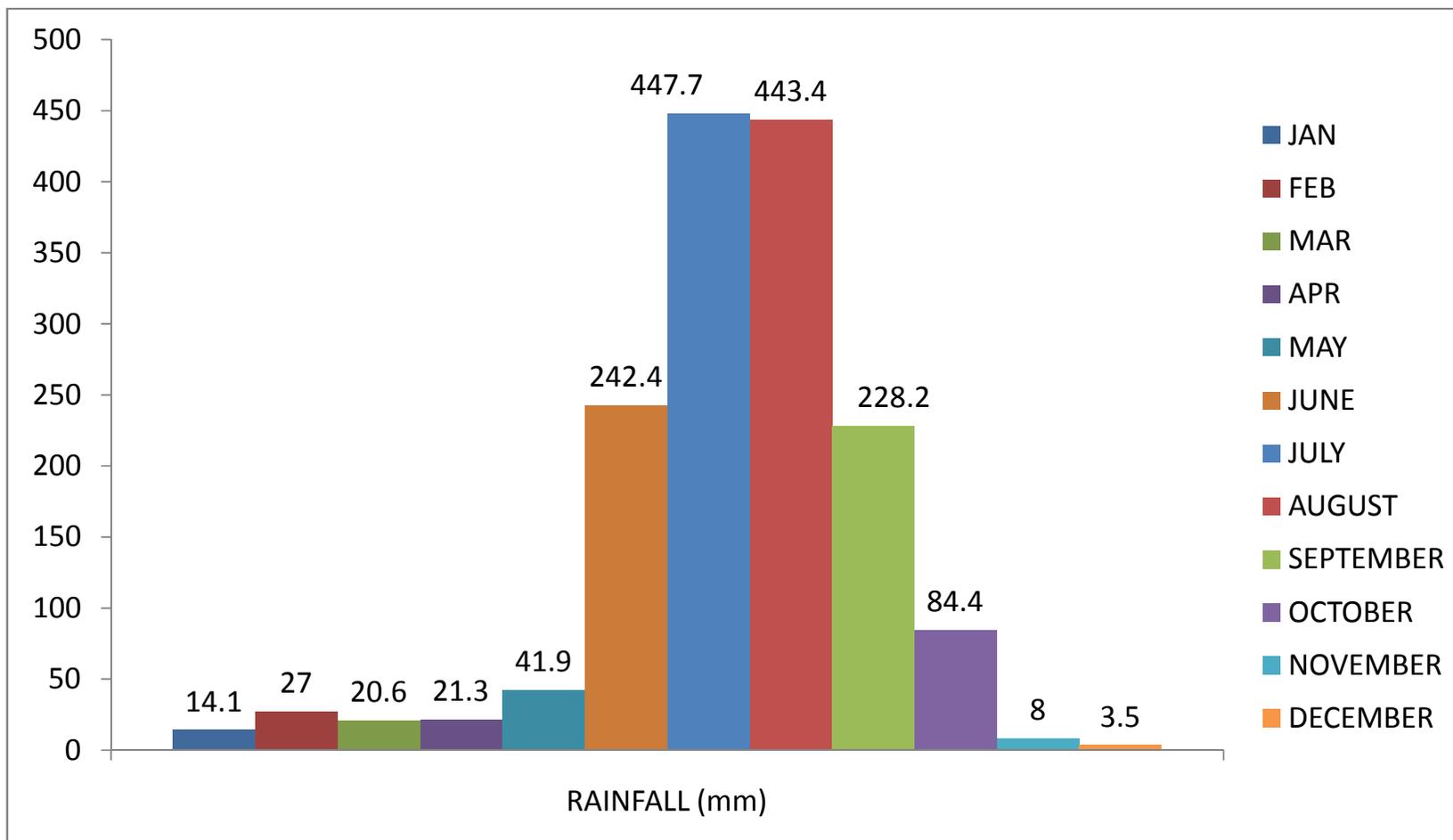
BLOCKS



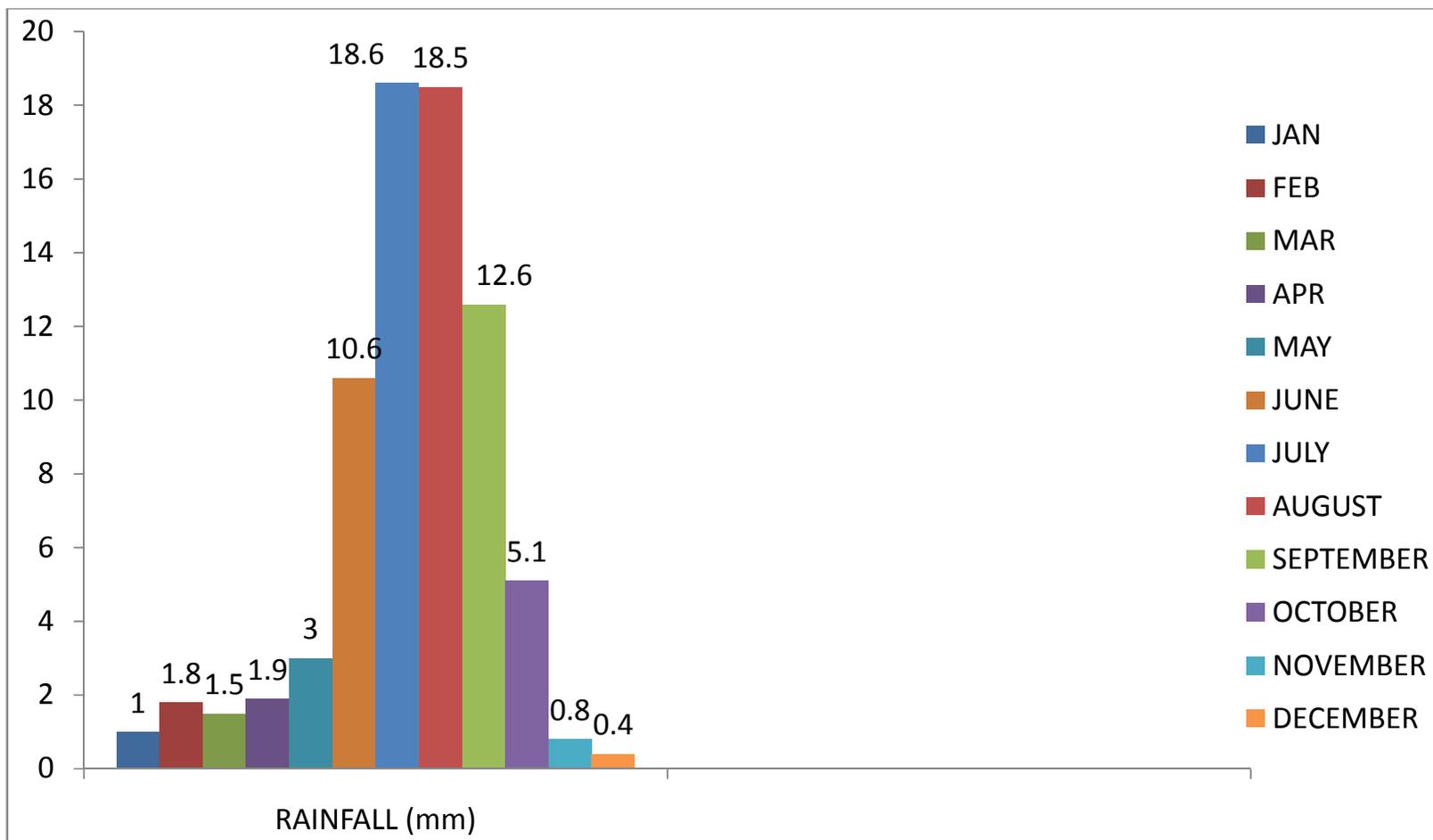
DEOGARH DISTRICT



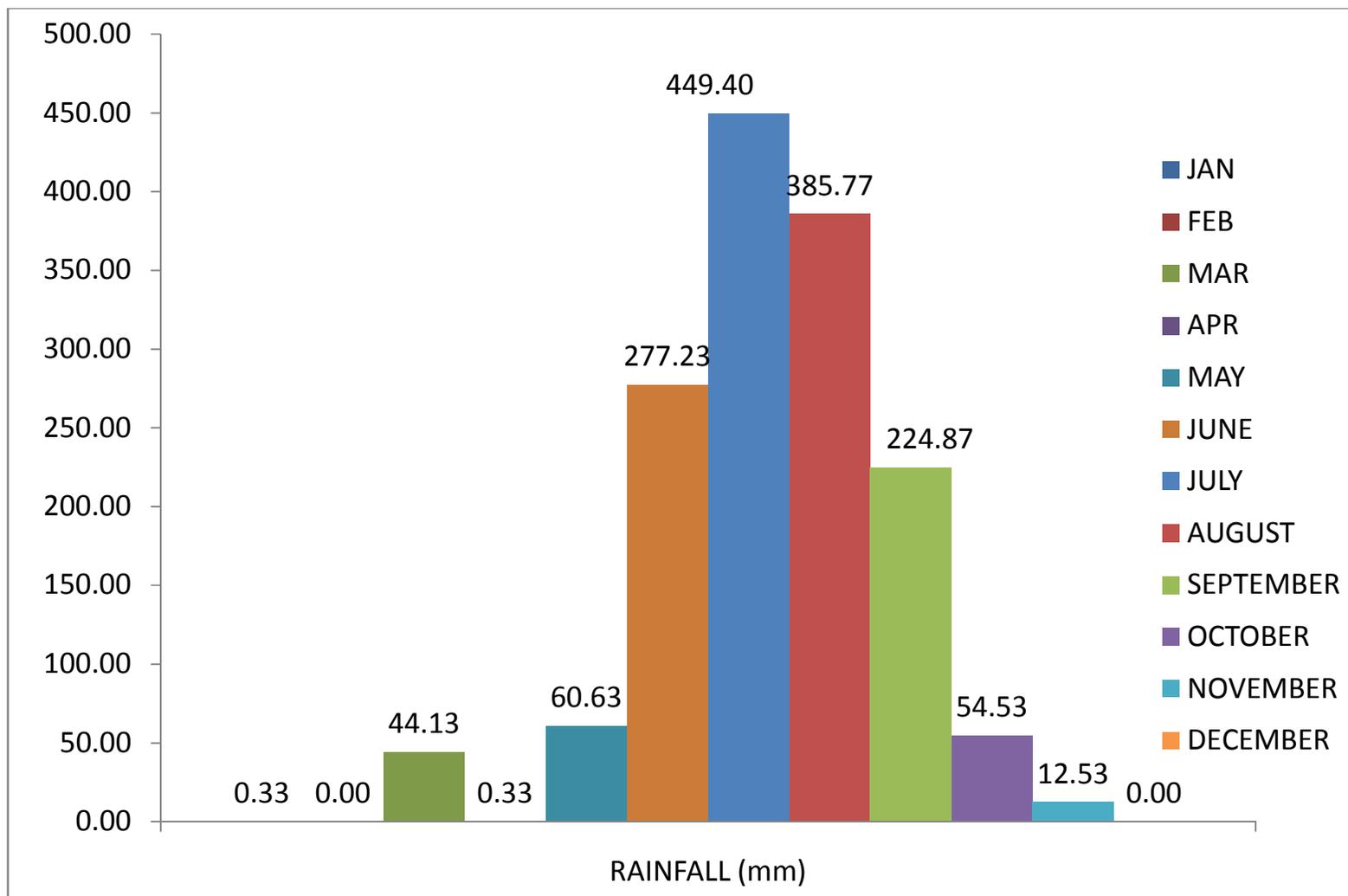
MONTHLY NORMAL RAINFALL OF DEOGARH DISTRICT OF ODISHA

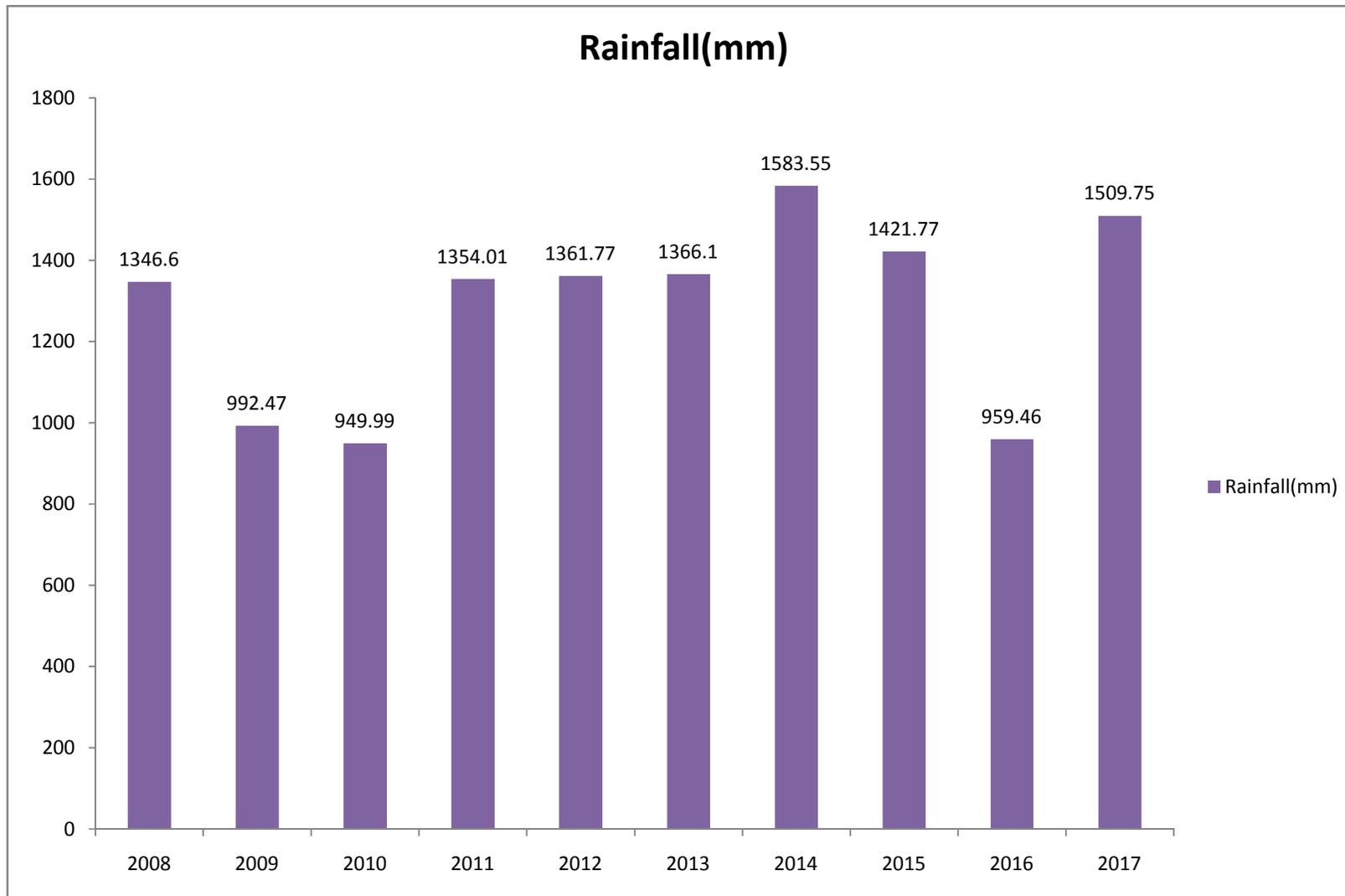


NORMAL RAINY DAYS OF THE DISTRICT DEOGARH OF ODISHA



MONTHLY RAINFALL FOR 2017 OF DEOGARH DISTRICT OF ODISHA





Rainfall Status of Last 10 Years of Deogarh District

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation ^a	Normal Crop / Cropping system ^b	Suggested Contingency measures		
			Change in crop / cropping system ^c including variety	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset) Delay by 2 weeks July 1ST WEEK	1) Farming situation: Low rainfall lateritic soils Sole crops under unbunded rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	• Closer row and plant spacing	<ul style="list-style-type: none"> • Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
		Sesamum (Uma)	Nirmala and Prachi	20cm X 8cm	
		Greengram (K 851)	Sujata, Durga, PDM-11& 54	20cm X 8cm	
		Blackgram (T9)	Pant U-19 &30,Ujala,Sarala	20cm X 8cm	
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24	20cm X 10cm	
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura	15cm X 10cm	
		Tomato (Utkal Deepti)	Utkal Kumari, Utkal Raja (determinate type)	45cm X 30cm	
		Brinjal (Blue star)	Utkal Anushree, Utkal Tarini	45cm X 30cm	
		Cow pea (SEB 2)	Utkal Manika	30cm X 10cm	
		Lady's finger (Anamika)	Utkal Gourav	45cm X 15cm	
		Chilli (Barsati lanka)	Kuchinda local, Utkal ava	45cm X 30cm	
			Intercropping of Pigeonpea + groundnut (2 : 5)		
			Pigeonpea var. ICPL 87, UPAS 120, TUR N-2		
			Pigeonpea + Sesamum (2:4)		
	Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Cowpea (Utkal Manika)				

Condition	Major Farming situation ^a	Normal Crop / Cropping system ^b	Suggested Contingency measures		
			Change in crop / cropping system ^c including variety	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)			Yam : (Orissa Elite, Pusa Hemlata), Arrowroot (White)	75cm X 75cm	
				<ul style="list-style-type: none"> In-situ rain water conservation – unbunded uplands converted to banded uplands 	
	Sole crops under Rainfed medium lands	Rice (Butia local and Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor 	<ul style="list-style-type: none"> 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(Nashik Red)	Rice variety: Medium duration (120d) Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	15cm X 10cm	
	Irrigated low land	Rice(Swarna) – onion (Nasik Red)	Medium late (140-145 d) Pratikshya, Rani dhan, Sidhanta and Mahsuri	20cm X 10cm	
			Onion variety : N-53, Bhima Red.	15cm X 10cm	
		Cropping system 2:			
	Rainfed medium lands	Rice - fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhali, Kamdev, Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, 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	
Rainfed rolling topography	Plantation crops (fruits local varieties)	Improved Varieties			
	Litchi	Seedless early, Mumbai early	Planting time Jun-July,		

Condition	Major Farming situation ^a	Normal Crop / Cropping system ^b	Suggested Contingency measures		
			Change in crop / cropping system ^c including variety	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)				spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Citrus	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langera	Planting time July, spacing 10mX10m, 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 pisciculture in farm ponds Indian major carps (Rohu, Mirgal, Catla plus exocotic 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 ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
	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	<ul style="list-style-type: none"> 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 Greengram, Blackgram, horsegram (Urmi), Niger (Deomali) cow pea, sesame 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 under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Greengram (K 851)	Sujata, Durga, PDM-11& 54		
		Blackgram (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 Pigeonpea + groundnut (2 : 5) Pigeonpea var. ICPL 87, UPAS 120, TUR N-2 Pigeonpea + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Yam : (Orissa Elite, Pusa Hemlata) Arrowroot (White)			
	Sole crops under rainfed medium lands	Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> If rice population is less than 50% resow the sprouted seeds in line through pre-germinated seed drill or fresh seedlings. Select short to medium duration varieties (90-120d) 	Pre-germinated seed drill under RKVY. High yielding rice varieties under NFSM. Paddy transplanter, marker and cono

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
				<ul style="list-style-type: none"> • 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. 	weeder under RKVY
	Sole crops under rainfed medium low lands	Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Mahsuri	<ul style="list-style-type: none"> • If rice population is more than 50% carryout weeding and maintain the plant population by <i>Khelua</i> operation (removing and distributing the hills) • Raise community nursery of both short duration rice varieties at reliable water source to save further delay of transplanted rice. • Do not top dress nitrogen in nursery 	
		Cropping system 1:			
		Rice-onion	Rice variety: Medium duration (120 days) Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Jogesh and Surendra		
			Medium late (140-145 days)		

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)			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 ₂ O 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 : (Dhauri, Kamdev, Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, 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	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langera	Planting time July, spacing 10mX10m, 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	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
				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 excecotic 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 ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Delay by 6 weeks August 1 st week	Low rainfall lateritic soils: Unbunded rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	<ul style="list-style-type: none"> • 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 Blackgram. • Foliar application of 2% urea at pre-flowering and flowering stage of Greengram. • 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. 	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed Corporation (OSSC).
		Sesamum (Uma)	Nirmala and Prachi		
		Greengram (K 851)	Sujata, Durga, PDM-11& 54		
		Blackgram (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 Pigeonpea + groundnut (2 : 5) Pigeonpea var. ICPL 87, UPAS 120, TUR N-2 Pigeonpea + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Yam : (Orissa Elite, Pusa Hemlata) Arrowroot (White)			

	Sole crops under rainfed medium lands:	Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplanting of 45 days old seedlings at closer spacing. 	
	Sole crops under rainfed medium low lands:	Rice	Swarna, Pratikshya, Rani dhan, Sidhanta and Mahsuri	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old. • Follow need based plant protection measures against stem borer and blast. • 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 as and when necessary 	Tractor, power tiller, rotavator under RKVY

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)		Cropping system 1:			
		Rice-onion	Rice variety: Medium duration (120days) Lalat, Manaswini, Naveen, Bejeta, 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 60:60:50kg/ha as basal. 60 kg N and 60 kg K ₂ O 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 : (Dhali, Kamdev, Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, 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 crop (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	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
				size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langera	Planting time July, spacing 10mX10m, 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 excecotic 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	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Early season drought (Normal onset)					
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	<ul style="list-style-type: none"> • Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50%. • Cultivate vegetables like cow pea and tomato. • Complete hoeing weeding and earthing up at 20 DAS for moisture conservation for groundnut and vegetable crops • 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. 	<ul style="list-style-type: none"> • Farm pond under NREGS, IWMP, diesel pump sets and KB pumps in tankfed areas under RKVY and NFSM. • Small nursery development under NHM.
		Sesamum (Uma)	Nirmala and Prachi		
		Greengram (K 851)	Sujata, Durga, PDM-11& 54		
		Blackgram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		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 Pigeonpea + groundnut (2 : 5) Pigeonpea var. ICPL 87, UPAS 120, TUR N-2 Pigeonpea + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Yam : (Orissa Elite, Pusa Hemlata) Arrowroot (White)			
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> •If rice population is less than 50% resow the crop. •Select early maturing 	<ul style="list-style-type: none"> • Supply of seed drills and intercultural

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Early season drought (Normal onset)				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.	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)	
		Rice-onion	Rice variety: Medium duration (120days) Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra		

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Early season drought (Normal onset)	2) Farming situation:		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 ₂ O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Rainfed medium lands	Rice - Fallow	Rice - greengram/blackgram/ water melon Greengram variety : (Dhali, Kamdev, Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, 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 20cmX120cm, 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	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langer	Planting time July, spacing 10mX10m, pit size 1mX1mX1m, pit manuring : 80g N + 100g P + 60g K	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Early season drought (Normal onset)		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 excecotic 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 ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
At vegetative stage	Low rainfall lateritic soils: unbanded rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops		
		Sesamum (Uma)	Nirmala and Prachi	<ul style="list-style-type: none"> • 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 	
		Greengram (K 851)	Sujata, Durga, PDM-11& 54		
		Blackgram (T9)	Pant U-19 &30,Ujala,Sarala		
		Groundnut (AK12-24)	Smruti,Devi, TMV-2,TAG-24		
		Rice (Ekchhupi, malati)	Hira, JHU, Pathara, Bandana, Khandagiri, Arnapura		
		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 Pigeonpea + groundnut (2 : 5) Pigeonpea var. ICPL 87, UPAS 120, TUR N-2 Pigeonpea + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Yam : (Orissa Elite, Pusa Hemlata) Arrowroot (White)				
	Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark,	Weed out the field Go for gap filling using		

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)			Jogesh and Surendra	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 (120d) Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra		
			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	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
				60:60:50 kg/ha as basal. 60 kg N and 60 kg K ₂ O top dressed at 21 DAS followed by weeding hoeing and earthing up	
	Rainfed medium lands	Rice-fallow	Rice-greengram/blackgram/ water melon Greengram variety : (Dhali, Kamdev, Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, 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	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langera	Planting time July, spacing 10mX10m, pit	

Condition			Suggested Contingency measures		
Mid season droughtt (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation^a	Normal Crop/cropping system^b	Crop management^c	Soil nutrient & moisture conservation measues^d	Remarks on Implementation^e
				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 ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
	At flowering/fruiting stage	low rainfall lateritic soils: Unbunded rainfed uplands	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops	<ul style="list-style-type: none"> • Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought. • Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds is helpful. • Remove and destroy pest and disease affected plants • Provide irrigation at critical stages at flowering and grain filling stage. • Crops like cow pea, Greengram, Blackgram, maize and vegetables may be harvested at physiological maturity. • Under situation of complete failure of Kharif crop, dismantle it and sow pre-rabi crops minor
		Sesamum (Uma)	Nirmala and Prachi		
		Greengram (K 851)	Sujata, Durga, PDM-11& 54		
		Blackgram (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			

Condition			Suggested Contingency measures		
Mid season drought(long dry spell)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
			Pigeonpea + groundnut (2 : 5) Pigeonpea var. ICPL 87, UPAS 120, TUR N-2 Pigeonpea + Sesamum (2:4) Maize + Cow pea (2:2) Maize var. Navjot (HQPM-1) Yam : (Orissa Elite, Pusa Hemlata) Arrawroot (White)		pulses like horse gram (var. Urmi), Niger (Deomali) • Need based plant protection measures to be taken.
		Sole crops under rainfed medium lands : Rice	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	<ul style="list-style-type: none"> Advised to spray 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 For late transplanted rice 2 spraying at 10 days interval with Validamycin 0.3% to control sheath blight. Provide life saving irrigation. 	
		Sole crops under rainfed medium low lands : Rice	Swarna, Pratikshya,Rani dhan, Sidhanta and Mahsuri	<ul style="list-style-type: none"> For late transplanted rice 2 spraying at 10 days interval with Validamycin 0.3% to control sheath 	

Condition			Suggested Contingency measures		
Mid season drought(long dry spell)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
				blight. <ul style="list-style-type: none"> • Provide life saving irrigation 	
		Cropping System 1:			
		Rice-onion	Rice variety: Medium duration (120d) Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra		
			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 ₂ O 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 : (Dhauri, Kamdev,	25 kg seeds/ha, full NPK 20:40:40 kg/ha and PMS 500 kg/ha as full basal, line sowing 30X10cm	

Condition			Suggested Contingency measures		
Mid season drought(long dry spell)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
			Durga) Blackgram: (Sarala, Prasad, Ujala) Water melon: (Augusta, Sugar pack, Black magic)	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	Nagpur Santra	Planting time Jun-July, spacing 7mX7m, pit size 1mX1mX1m, pit manuring : 60g N+16g P +60g K	
		Mango	Amrapali, Malika and Langera	Planting time July, spacing 10mX10m, 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	Composite pisciculture in farm Ponds Indian major carps (Rohu, Mirgal, Catla plus	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	

Condition			Suggested Contingency measures		
Mid season drought(long dry spell)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measues ^d	Remarks on Implementation ^e
		stocking density	execotic carps (Silver/ grasscarp)	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)	

2.1.2 Drought - Irrigated situation : Not experienced

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
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 ₂ O ₅ :K ₂ O:/ha	Assured irrigation through deep bore wells

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

Condition	Suggested contingency measure			
	Vegetative stage ^k	Flowering stage ^l	Crop maturity stage ^m	Post harvest ⁿ
Continuous high rainfall in a short span leading to water logging				
Sesamum, Greengram, Blackgram, Groundnut	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
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 triazophos @ 2 ml /litre of water or dusting with Quinalphos 1.5 % dust i.e., 25 kg/ha and prevent			

Condition	Suggested contingency measure			
	Vegetative stage ^k	Flowering stage ^l	Crop maturity stage ^m	Post harvest ⁿ
Continuous high rainfall in a short span leading to water logging	migration from one field to another ^o			

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

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

2.4 Contingent strategies for Livestock, Poultry & Fisheries

2.4.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought	<ul style="list-style-type: none"> 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 draught. Up gradation of desi cow through artificial insemination and upgradation of local good breeds (Ganjam, Black 	<ul style="list-style-type: none"> Conducting animal health camps and treating the affected animals Regular de-worming for 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 vitamins can be supplied to avoid dehydration of animals. 	<ul style="list-style-type: none"> 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 ^s	During the event	After the event
	<p>Bengal through cross breeding with improved breeds)</p> <ul style="list-style-type: none"> • Regular deworming with vaccination of cows and need based treatments against ailments 	<ul style="list-style-type: none"> • Mobile vehicle with ice box and anti stress drugs should be kept ready. 	
Feed and fodder availability	<ul style="list-style-type: none"> • It is essential to establish fodder bank near forest areas. • Provision is also necessary to store surplus crop residues in fodder banks, which can be made available during draught. • Excess fodder in flush season can be preserved as hay / silage. • Encourage perennial fodder production on river beds and tank bed on community basis. • Village gauchar (grazing) lands should be developed for fodder production. 	<ul style="list-style-type: none"> • 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 cassiadora 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Water sources of Temples, Churches, Gurdwaras, Jain temples and Maszids are generally ideal sources during draught. 	<ul style="list-style-type: none"> • Pure drinking water and vaccines to be given
Health and disease management	<ul style="list-style-type: none"> • Organizing training programme of persons connected with A.H. on feeding and management of animals during draught. 	<ul style="list-style-type: none"> • Supplementation of mineral and vitamin mixtures • Campaign and mass vaccination 	<ul style="list-style-type: none"> • Proper disposal of dead animals

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
	<ul style="list-style-type: none"> • Veterinary preparedness with vaccine and medicines. 		
Floods			
Feed and fodder availability	<ul style="list-style-type: none"> • Procured feeds and fodders to be used for feeding all animals. • Water purifying drugs should be applied to avoid contamination of water 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Construction of sheds • Post flood de-worming and vaccination
Drinking water		Pure drinking water and vaccines to be given	<ul style="list-style-type: none"> • Sanitization of water resources. • Pure drinking water and vaccines to be given
Health and disease management	<ul style="list-style-type: none"> • Training to the farmers about care of their animals when catastrophe strikes, 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 	<ul style="list-style-type: none"> • Supplementation of mineral and vitamin mixtures • Campaign and mass vaccination 	<ul style="list-style-type: none"> • Proper disposal of dead animals

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
	<p>and prior information through radio and TV Etc.</p> <ul style="list-style-type: none"> • 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, 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 tourniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Dettol, 		

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
	Savlon, Tannic acid powder (for poisons) and 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	<ul style="list-style-type: none"> • Procured feeds and fodders to be used for feeding the animals. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	<ul style="list-style-type: none"> • Provision of clean drinking water. 	<ul style="list-style-type: none"> • Drinking water be made available to the animals in any kind of clean container available with the farmer. 	<ul style="list-style-type: none"> • Provision of clean drinking water.
Health and disease management	<ul style="list-style-type: none"> • Training to the farmers about care of their animals when catastrophe strikes, 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 	<ul style="list-style-type: none"> • There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. • The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, 	<ul style="list-style-type: none"> • Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. • Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
	<p>and TV Etc.</p> <ul style="list-style-type: none"> • 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 containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for tourniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Acriflvin, 	<p>anti-venom and anti-shock drugs etc. should be adequately available with them.</p> <ul style="list-style-type: none"> • 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. 	<p>and respiratory infections in consultation of local veterinary personals.</p> <ul style="list-style-type: none"> • Improving shed hygiene especially in the farmers household through cleaning and disinfection

	Suggested contingency measures		
	Before the event^s	During the event	After the event
	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	<ul style="list-style-type: none"> Green cover (trees plantation, landscaping) 	<ul style="list-style-type: none"> Proper sheltering / housing white painting outside the roof and black painting inside the roof. Washing / wallowing / sprinkling/ splashing / showering Provision of cool drinking water (in earthen pitches) Cooling devices : fans, wet curtains or panels, air cooler if possible 	
Health and disease management		<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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.

2.4.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drought				
Shortage of feed ingredients	Breed (OUAT synthetic, Banaraja, Gramapriya/ Pallishree, 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 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	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
Drinking water	Protect the water sources from submergence/contamination	Attempt will be made to provide sanitized drinking water	Water sources will be 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 be continued till the situation is under control	
Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will be 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 availability of sanitized water	Water sources will be 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	Attempt will be made for cooling of poultry shed by adapting different cooling methods	Provision should be made to ensure proper ventilation to the house	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event ^a	During the event	After the event	
	accessories Providing shed to poultry houses. Providing proper ventilation.	Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan		
Health and disease management	Procurement of Anti-stress drugs	Supplementation of anti-stress 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.	
Health and disease management	Procurement of anti-stress drugs and vaccine	Feeding of anti-stress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD	Procurement of anti-stress drugs and vaccine

2.4.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	<ol style="list-style-type: none"> 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 	<p>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.</p>	<p>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)</p>
(ii) Changes in water quality	<ol style="list-style-type: none"> 1. Prepare to release water into the habitat. 2. Leveling of farm bonds , testing of water body 3. Development high stocking density 	<ol style="list-style-type: none"> 1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. 	<ol style="list-style-type: none"> 1. Monitoring the water quality and health of aquatic organisms.
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ol style="list-style-type: none"> 1. Building deep ditches in culture ponds for shelter of the fish to overcome high temperature 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Application of organic manure in culture system 	<ol style="list-style-type: none"> 1. Recharge the ponds with bore well water or water from other sources 	<ol style="list-style-type: none"> 1. Application of organic manure in culture system

	Suggested contingency measures		
	Before the event^a	During the event	After the event
(iii) Any other	-	-	-
2) Floods			
A. Capture			
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.	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	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.

	Suggested contingency measures		
	Before the event^a	During the event	After the event
	and out let facility.		
(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 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.
(vi) Any other	-	-	-
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	1. Provision of relief. 2. Evacuation of people to safer areas.	1. Assessment and settlement of insurance.

	Suggested contingency measures		
	Before the event^a	During the event	After the event
	3. Insurance coverage for lives of fishermen.		
(ii) Avg. 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) 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. 3. Insurance coverage for stock.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Storing of feed and chemicals in 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

	Suggested contingency measures		
	Before the event^a	During the event	After the event
			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 hot waves night fishing should be done. 2. Preservation by cold chain should be increased during hot waves.	-
B. Aquaculture			
(i) Changes in pond environment (water quality)	1. During heat waves adequate water depth should be maintained.	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 to control EUS disease in fish.
(iii) Any other	-	-	-