

State: ODISHA

Agriculture Contingency Plan for District: NAYAGARH

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 (12.2)		
	Agro-Climatic Zone (Planning Commission)	East coast plain and hill region (XI)		
	Agro Climatic Zone (NARP)	East & south Eastern coastal plain zone (OR-4)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Nayagarh, Kendrapada, Khurda, Jagatsinghpur, parts of Cuttack, Puri, Gajapati, and parts of Ganjam		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		19 ⁰ 54' to 20 ⁰ 32'N	84 ⁰ 29' to 85 ⁰ 27' E	90m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, OUAT, Bhubaneswar-751003, Odisha		
	Mention the KVK located in the district with address	KVK Nayagarh , OUAT, At-Panipoila, PO-Balugaon Dist-Nayagrh Pin: 752070, Odisha		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Agromet Advisory Service OUAT, Bhubaaneswar – 751003, Odisha		

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):	1007.0	54.4	3 rd week of July	4 th week of September
	NE Monsoon(Oct-Dec):	178.3	8.5	1 st week of October	1 st week of November
	Winter (Jan- Feb)	40.3	2.8	-	-
	Summer (March-May)	138.7	9.3	-	-
	Annual	1354.3	75.0	-	-

Source: Orissa Agriculture Statistics, 2008-2009 (Page 1)

1.3	Land use pattern of the district (latest statistics)	Geographical Area	Cultivated area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area in ('000 ha)	389	134	208		4	5	6	6	7	1

Source: Orissa Agriculture Statistics, 2008-2009 (Page 8&9)

1.4	Major Soils (common names like red sandy loam deep soils (etc.))*	Area ('000 ha)	Percent (%) of total
	Mixed red & black	Data not available	
	Red		
	Alluvial		
	Laterite		

* 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	127	176
	Area sown more than once	96	
	Gross cropped area	223	

Source: Orissa Agriculture Statistics, 2008-2009 (Page 16)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	39.70		
	Gross irrigated area	55.83		
	Rainfed area	78.17		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		32.09	59.08
	Tanks			
	Open wells			
	Bore wells			
	Lift irrigation schemes		10.12	18.63
	Micro-irrigation			
	Other sources (please specify)		13.62	25.07
	Total Irrigated Area		55.83	
	Source: Orissa Agriculture Statistics, 2008-2009 (Page 20)			
	Pump sets			
	No. of Tractors			
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)	
Over exploited				
Critical				
Semi- critical				
Safe	8	90%	Good and neutral pH	
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			
* Source: Orissa Agriculture Statistics, 2008-2009 (Page 28, 22,20)				

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)							
		<i>Kharif</i>			<i>Rabi</i>				
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
Paddy	36.90	57.64	94.54	0.07	-			94.61	
Greengram	--	0.73	0.73	0.78	47.77	48.55		49.28	
Blackgram	-	7.83	7.83	0.36	9.25	9.61		17.44	
Sesame	-	4.87	4.87	-	1.08	1.08		5.95	
Sugarcane	-	-	-	5.42	-	5.42		5.42	

Source: Orissa Agriculture Statistics, 2008-2009

Horticulture crops - Fruits	Area ('000 ha)	
	Total	
Mango	3.05	
Citrus	0.32	
Banana	0.94	
Papaya	0.02	
Guava	0.23	
Source: Orissa Horticultural Statistics, 2008-09		

	Total
Brinjal	3.28
Tomato	2.13
Cauliflower	1.18
Cabbage	1.13
Lady's finger	2.93
Source:Orissa Horticultural Statistics, 2008-09	
Medicinal and Aromatic crops	Total
Anola	0.01
Plantation crops	Total
Coconut	4.85
Cashew	21.0
Source:Orissa Horticultural Statistics, 2008-09	
Eg., industrial pulpwood crops etc.	
Fodder crops	Total
Sorghum	0.04
Bajra + Clusterbean	0.03

	Other fodder crop	0.04
	Total fodder crop area	0.10
	Grazing land	
	Sericulture etc	
	Others (specify)	

Source: Annual Report, 2009-10, Department of Animal Resources, Orissa

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)			282.14
	Improved cattle			
	Crossbred cattle			
	Non descriptive Buffaloes (local low yielding)			46.35
	Descript Buffaloes			
	Goat			98.12
	Sheep			36.28
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			
	Source: livestock census status 2003			
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial		102.71	
	Backyard			
	Source: Nayagarh District Potential Linked Credit Plan,2010-11			
1.10	Fisheries (Data source: Chief Planning Officer)			
	A. Capture			
	i) Marine (Data Source:	No. of fishermen	Boats	Nets
				Storage

Fisheries Department)		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	facilities (Ice plants etc.)
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	2111		88		2046	
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)			5728.77		1.14	6.566
Others						

Source: Nayagarh District Potential Linked Credit Plan, 2010-11

1.11 Production and Productivity of major crops (2008-09; specify years)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	198.63	2101	-	-	0.22	3108	198.87	2102	
	Greengram	0.23	320	17.53	361	-	-	17.76	360	
	Blackgram	3.11	397	3.99	415	-	-	7.10	407	
	Sesamum	1.70	350	0.31	285	-	-	2.01	338	

	Sugarcane							348.37	64275	
Source: Orissa Agriculture Statistics, 2008-2009										
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango							8.24	3180	
	Citrus							2.78	9039	
	Banana							12.49	14560	
	Papaya							0.44	22100	
	Guava							1.64	7302	
	Brinjal							48.24	14700	
	Tomato							28.37	13300	
	Cauliflower							16.91	14303	
	Cabbage							32.12	28499	
	Okra							25.51	8709	
Source: Orissa Horticultural Statistics, 2008-09										

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Greengram	Blackgram	Sesamum	Sugarcane
	Kharif- Rainfed	June – July	June – July	June-July	June-July	
	Kharif-Irrigated	June to July				
	Rabi- Rainfed	-	Oct-Nov	Oct-Nov		
	Rabi-Irrigated	January				January-Feb

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	✓		
	Flood	✓		
	Cyclone		✓	
	Hail storm		✓	
	Heat wave		✓	
	Cold wave		✓	
	Frost		✓	
	Sea water intrusion			✓
	Pests and disease outbreak (specify)		✓	
Others (specify)				

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures			
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation	
Delay by 2 weeks July 1 st week	Rainfed lateritic Medium rainfall (upland)	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	<ul style="list-style-type: none"> • Closer row and plant spacing, 	<ul style="list-style-type: none"> • Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC 	
		Upland Rice(Parijat, Culture, Daanra	Heera, ZHU, Pathara, Bandana	15cm x 10 cm	<ul style="list-style-type: none"> • Resowing of short duration of paddy incase of failure of earlier sown paddy. • Strengthening of field bunds in paddy • Life saving irrigation 	
		Blackgram (T 9)	Pant U-19 &30, Ujala,	20cm X8cm	Weeding and hoeing within 20 days to provide dust mulch	
		Greengram K 851,	Durga, Kamdev, PDM-11, PDM 54	20cm X8cm	Weeding and hoeing within 20 days to provide dust mulch	
		Sesamum (Bhodei rasi)	Nirmala and Prachi	20cmX8cm		
		Brinjal (Kakeri, Gabanala local)	Blue star, Utkal Anushree, UtkalTarini	45cmX30cm		
		Ladies finger	Utkal Gourav, Arka Anamika, Barsa,Uphar	45cmX15cm		
					<ul style="list-style-type: none"> • Intercrop upland rice with blackgram/greengram/groundnut. • Sowing of crop should be done 	

				<p>at the time of next shower following drought.</p> <ul style="list-style-type: none"> • Seed soaking with calcium chloride solution (0.25%) for 2 hrs. before sowing to improve drought resistance in plants. 	
	Rainfed lateritic Medium rainfall (Medium land)	Rice (Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark	<ul style="list-style-type: none"> • Apply full P, K and 20% N of recommended dose (80:40:40 kg/ha N P₂O₅ K₂O) along with well decomposed organic matter for early seedling vigor. Strengthening of field bunds in paddy. • Direct seeding of sprouted paddy seed, if seedlings are not available or raised earlier. • Resowing of short duration paddy incase of failure of earlier sown paddy. • Sowing of crop should be done at the time of next shower following draught • Seed soaking with calcium chloride solution (0.25%) for 2 hrs. before sowing to improve drought resistance in plants. 	Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC
	Rainfed lateritic Medium rainfall (low land)	Paddy (Swarna)	Pratikshya, Pooja, Upahar	<ul style="list-style-type: none"> • Apply full P, K and 20% N of recommended dose (80:40:40 kg N P₂O₅ K₂O) along with well decomposed organic matter for early seedling vigour. • Direct seeding of sprouted paddy 	Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC

				<p>seed, if seedlings are not available or raised earlier.</p> <ul style="list-style-type: none"> • Resowing of short duration paddy incase of failure of earlier sown paddy. • Sowing of crop should be done at the time of next shower following drought • Seed socking with calcium chloride solution (0.25%) for 2 hrs. before sowing improve drought resistance in plants. 	
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Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 4 weeks July 3 rd week	Rainfed lateritic Medium rainfall (upland)	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e		<ul style="list-style-type: none"> • Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT & NSC
		Rice(Parijat, Culture, Daanra	Heera, ZHU, Pathara, Bandana	<ul style="list-style-type: none"> • Resowing of short duration of paddy incase of failure or more than 50% seedling mortality of earlier sown paddy. • Gap filling should be done when the mortality of the seedling is less than 50%. • Strengthening of field bunds in paddy. 	
		Blackgram (T 9)	Pant U-19 & 30, Ujala,		
		Greengram K 851	Durga, Kamdev, PDM-11,		

			PDM 54		
		Sesamum (Bhodei rasi)	Uma, Nirmala and Prachi		
		Brinjal (Kakeri, Gabanala local)	Blue star, Utkal Anushree, UtkalTarini	<ul style="list-style-type: none"> Complete hoeing, weeding followed by ridging to the base of the crop at 20 DAS for in-situ moisture conservation. 	
		Ladis finger	Utkal Gourav, Arka Anamika, Barsa,Uphar		
				<ul style="list-style-type: none"> Strengthening of field bunds in paddy. Intercrop upland rice with blackgram/greengram/groundnut. Sowing of crop should be done at the time of next shower of following draught. Seed socking with calcium chloride solution (0.25%) for 2 hrs. before sowing improve drought resistance in plants. Intercropping of arhar + groundnut (2 : 5) <p>Arhar + Sesamum (2:4) Maize + Cow pea (2:2)</p>	
	Rainfed lateritic Medium rainfall (Medium land)	Rice (Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark	<ul style="list-style-type: none"> If rice population is less than 50% resow the sprouted seeds in line through pre-germinated seed drill., Raise community nursery of both short duration rice varieties like Khandagiri, Bandana, Manaswini, (90-120days)at reliable water source. Do not top dress nitrogen in nursery Basal application of full P, K and 20% N of recommended dose (80:40:40 kg N P₂O₅ K₂O) along with well decomposed 	Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC

				<p>organic matter for early seedling vigor.</p> <ul style="list-style-type: none"> • Direct seeding of sprouted paddy seed, if seedlings are not available or raised earlier. • Sowing of crop should be done at the time of next shower of following draught • Seed socking with calcium chloride solution (0.25%) for 2 hrs. before sowing improve drought resistance in plants. 	
	Rainfed lateritic Medium rainfall (Low land)	Paddy (Swarna)	Pratikshya, Pooja, Upahar	<ul style="list-style-type: none"> • Basal application of full P, K and 20% N of recommended dose (80:40:40 kg N P₂O₅ K₂O) along with well decomposed organic matter for early seedling vigor. • Direct seeding of sprouted paddy seed, if seedlings are not available or raised earlier. • Resowing of short duration of paddy incase of failure or more than 50% mortality of seedling of earlier sown paddy. • Sowing of crop should be done at the time of next shower of following draught • Seed socking with calcium chloride solution (0.25%) for 2 hrs. before sowing improve drought resistance in plants. 	Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 6 weeks August 1 st week	Rainfed lateritic Medium rainfall (upland)	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e		• Supply of seeds through ATMA, OSSC NFSM, CRRRI, OUAT& NSC
		Rice (Parijat, Culture, Daanra	Heera, ZHU, Pathara, Bandana	<ul style="list-style-type: none"> Resowing of short duration paddy incase of failure or more than 50% seedling mortality of earlier sown paddy. Gap filling should be done when the mortality of the seedling is less than 50%. Strengthening of field bunds in paddy. 	
		Blackgram (T 9)	Pant U-19 &30, Ujala,	Provide dust mulch by hoeing and weeding Foliar application of 2% urea at pre-flowering and flowering stage	
		Greengram K 851	Durga, Kamdev, PDM-11, PDM 54	Provide dust mulch by hoeing and weeding Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai / ha in 500lt of water Foliar application of 2% urea at pre-flowering and flowering stage	
		Groundnut (AK 12-24)	Devi, TMV-2,TAG-24	<ul style="list-style-type: none"> Complete hoeing, weeding followed by ridging to the base of the crop at 20 DAS for in-situ moisture conservation. 	
		Maize	Pragati, HQPM		
		Sesamum (Bhodei rasi)	Uma, Nirmala and Prachi		
		Brinjal (Kakeri, Gabanala local)	Blue star, Utkal Anushree, UtkalTarini	<ul style="list-style-type: none"> Complete hoeing, weeding followed by ridging to the base of the crop at 20 DAS for in-situ moisture conservation. 	
		Ladis finger	Utkal Gourav, Arka Anamika,		

			Barsa, Uphar	<ul style="list-style-type: none"> • Strengthening of field bunds. • Remove the pest and disease infected plants from the main field. • In situ rain water conservation • Harvesting of rain water. • Provide life saving irrigation. • In drought prone areas perform summer plan. • Intercropping of arhar + groundnut (2 : 5) <p>Arhar + Sesamum (2:4) Maize + Cow pea (2:2)</p>	
	Rainfed lateritic Medium rainfall (Medium land)	Rice (Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark	<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 close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary • Raise community nursery of both short duration rice varieties like Khandagiri, Bandana, Manaswini, (90-120days) at reliable water source. 	Supply of seeds through ATMA, OSSC NFSM, CRR, OUAT& NSC
	Rainfed lateritic Medium rainfall (Low land)	Paddy (Swarna)	Pratikshya, Pooja, Uphar	<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 close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary 	Supply of seeds through ATMA, OSSC NFSM, CRR, OUAT& NSC

				<ul style="list-style-type: none"> Raise community nursery of both short duration rice varieties like Khandagiri, Bandana, Manaswini, (90-120days)at reliable water source 	
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Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 8 weeks August 3rd week	Rainfed lateritic Medium rainfall (upland)	Sole crops	Varietal substitutions of drought tolerant varieties of the sole crops i.e	<ul style="list-style-type: none"> Strengthening of field bunds, weeding and hoeing within 20 days to provide dust mulch Rainwater harvesting and recycling as life saving irrigation when needed Provide life saving irrigation Remove the pest and disease infected plants from the field.	<ul style="list-style-type: none"> Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC
		Rice (Parijat, Culture, Daanra)	Heera, ZHU, Pathara, Bandana		
		Blackgram (T 9)	Pant U-19 &30, Ujala,		
		Greengram K 851	Durga, Kamdev, PDM-11, PDM 54		
		Sesamum (Bhodei rasi)	Uma, Nirmala and Prachi		
		Brinjal (Kakeri, Gabanala local)	Blue star, Utkal Anushree, UtkalTarini		
		Ladies finger	Utkal Gourav, Arka Anamika, Barsa,Uphar		
	Rainfed lateritic Medium	Rice (Lalat)	Manaswini, Naveen, Vijeta, MTU 1010, Konark	<ul style="list-style-type: none"> Close the drainage hole Withhold N fertilizer application till receipt of rainfall. 	Supply of seeds through ATMA, OSSC NFSM,

	rainfall (Medium land)			<ul style="list-style-type: none"> • Transplant seedlings up to 45 days old • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary. 	CRRI, OUAT& NSC
	Rainfed lateritic Medium rainfall (Low land)	Paddy (Swarna)	Pratikshya, Pooja, Upahar	<ul style="list-style-type: none"> • Close the drainage hole • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary. 	Supply of seeds through ATMA, OSSC NFSM, CRRI, OUAT& NSC

***Matrix for specifying condition of early season drought due to delayed onset of monsoon (2, 4, 6 & 8 weeks) compared to normal onset (2.1.1)**

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)	Rainfed lateritic Medium rainfall (upland)	Paddy	<ul style="list-style-type: none"> ✓ In drought prone areas, adopt summer ploughing seed treatment with CaCl₂ for drought tolerance ✓ Resown if more than 50% population damaged other wise go for gap filling. ✓ Preferring paddy varieties like Hira, Kalinga-III, Pathara 	<ul style="list-style-type: none"> ✓ Application of FYM @ 5.0qtl/ha ✓ Sowing across the slope ✓ Water harvesting and recycling for life saving irrigation ✓ Strengthening field bunds ✓ Blocking seepage holes & gully plugging in paddy 	
		Greengram	➤ Resow the crop if the mortality is more than 50%.		
		Blackgram	➤ Resow the crop if the mortality is more than 50%.		
	Rainfed lateritic Medium rainfall (Medium land)	Rice-Greengram / Blackgram	<ul style="list-style-type: none"> ➤ Resowing if more than 50% population damaged ➤ In drought prone areas apply FYM : SSP @ 10:1 placed at seeding point to avoid seedling mortality ➤ Community nursery raising and transplanting 	<ul style="list-style-type: none"> ➤ Strengthening of field bunds ➤ In-situ water harvesting and recycling ➤ Blocking seepage hole 	

			➤ Providing life saving irrigation		
	Rainfed lateritic Medium rainfall (low land)	Rice- Greengram / Blackgram	<ul style="list-style-type: none"> ➤ Resowing if more than 50% population damaged ➤ In drought pron areas apply FYM : SSP @ 10:1 placed at seeding point to avoid seedling mortality ➤ Community nursery raising and transplanting ➤ Providing life saving irrigation. 	<ul style="list-style-type: none"> ➤ Strengthening of field bunds ➤ In-situ water harvesting and recycling ➤ Blocking seepage hole 	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Rainfed lateritic Medium rainfall (upland)	Paddy	<ul style="list-style-type: none"> ➤ Spray 2% urea and withhold topdressing of N till receipt of rain 	<ul style="list-style-type: none"> ➤ Insitu water harvesting and recycling for life saving irrigation ➤ Strengthening bunds with compartmental bunding ➤ Plugging drainage lines ➤ Sowing across the slope with ridge and furrow method ➤ Summer ploughing and application of FYM 5t and lime 2.5qtl per ha 	
	Rainfed lateritic Medium rainfall (Medium land)	Rice- Greengram / Blackgram	<ul style="list-style-type: none"> ➤ Resowing if more than 50% population damaged ➤ In drought pron areas apply FYM : SSP @ 10:1 placed at seeding point to avoid seedling mortality ➤ Community nursery raising and transplanting ➤ Providing life saving irrigation 	<ul style="list-style-type: none"> ➤ Provide life saving irrigation ➤ Strengthening of field bunds ➤ In-situ water harvesting and recycling ➤ Blocking seepage hole 	

	Rainfed lateritic Medium rainfall (low land)	Rice- Greengram / Blackgram	<ul style="list-style-type: none"> ➤ Resowing if more than 50% population damaged ➤ In drought pron areas apply FYM : SSP @ 10:1 placed at seeding point to avoid seedling mortality ➤ Community nursery raising and transplanting ➤ Providing life saving irrigation. 	<ul style="list-style-type: none"> ➤ Provide life saving irrigation ➤ Strengthening of field bunds ➤ In-situ water harvesting and recycling ➤ Blocking seepage hole 	
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Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At flowering/ fruiting stage	Rainfed lateritic Medium rainfall (upland)	Paddy	<ul style="list-style-type: none"> ➤ Sprinkling of water to keep micro climate moist ➤ Spraying of 2% urea solution ➤ Application of life saving irrigation 	<ul style="list-style-type: none"> ➤ Insitu water harvesting and recycling for life saving irrigation ➤ Strengthening bunds with compartmental bunding ➤ Plugging drainage lines ➤ Sowing across the slope with ridge and furrow method ➤ Summer ploughing and application of FYM 5t and lime 2.5qtl per ha ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-Rabi crops 	
		Maize	<ul style="list-style-type: none"> ➤ Application of protective life saving irrigation ➤ Maize may be harvested for cobs ➤ Maize may be harvested for fodder purpose to avoid their failure as grain crops. 	<ul style="list-style-type: none"> ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-Rabi crops 	

		Groundnut	<ul style="list-style-type: none"> ➤ Application of protective life saving irrigation ➤ Organic mulching ➤ Groundnut may be harvested for fodder purpose to avoid their failure as grain crops. ➤ Foliar application of 2% urea at pre-flowering and flowering stage is helpful. ➤ Spray 2% KCL+ 0.1 % Boron to non paddy crops to overcome drought. 	<ul style="list-style-type: none"> ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-Rabi crops 	
		Greengram	<ul style="list-style-type: none"> ➤ Greengram may be harvested for fodder purpose to avoid their failure as grain crops. ➤ Foliar application of 2% urea at pre-flowering and flowering stage is helpful. ➤ Spray 2% KCL+ 0.1 % Boron to overcome drought. 	<ul style="list-style-type: none"> ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-Rabi crops 	
		Blackgram	<ul style="list-style-type: none"> ➤ Blackgram may be harvested for fodder purpose to avoid their failure as grain crops. ➤ Foliar application of 2% urea at pre-flowering and flowering stage is helpful. ➤ Spray 2% KCL+ 0.1 % Boron to overcome drought. 	<ul style="list-style-type: none"> ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-Rabi crops 	
	Rainfed lateritic Medium rainfall (Medium land)	Rice- Greengram / Blackgram	<ul style="list-style-type: none"> ➤ Resowing if more than 50% population damaged ➤ In drought pron areas apply FYM : SSP @ 10:1 placed at seeding point to avoid seedling mortality ➤ Community nursery raising and transplanting 	<ul style="list-style-type: none"> ➤ Strengthening of field bunds ➤ In-situ water harvesting and recycling ➤ Blocking seepage hole 	

			➤ Providing life saving irrigation		
	Rainfed lateritic Medium rainfall (low land)	Rice-Greengram / Blackgram	Same as above farming situation	Same as above farming situation	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
Terminal drought early with drawal of monsoon	Rainfed lateritic Medium rainfall (upland)	Paddy	<ul style="list-style-type: none"> ➤ In drought pron areas apply sufficient FYM at sowing to increase water holding capacity ➤ Application of life saving protective irrigation ➤ Sprinkling of water to keep micro climate moist ➤ Spraying of 2% urea solution ➤ Harvest paddy at physiological maturity stage 	<ul style="list-style-type: none"> ➤ Strengthening field bunds blocking drainage channel and seepage holes ➤ In-situ water harvesting and recycling for life saving irrigation ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-rabi crops ➤ Sowing across the slope with ridge and furrow method ➤ Summer ploughing and application of FYM 5t and lime 2.5qtl per ha 	
		Greengram	<ul style="list-style-type: none"> ➤ Greengram may be harvested for fodder purpose to avoid their failure as grain crops. ➤ Foliar application of 2% urea at pre-flowering and flowering stage is helpful. ➤ Spray 2% KCL+ 0.1 % Boron to overcome drought. ➤ Harvest at physiological maturity stage 		

		Blackgram	<ul style="list-style-type: none"> ➤ Blackgram may be harvested for fodder purpose to avoid their failure as grain crops. ➤ Foliar application of 2% urea at pre-flowering and flowering stage is helpful. ➤ Spray 2% KCL+ 0.1 % Boron to overcome drought. ➤ Harvest at physiological maturity stage 		
	Rainfed lateritic Medium rainfall (Medium land)	Rice- Greengram / Blackgram	<ul style="list-style-type: none"> ➤ In drought pron areas apply sufficient FYM at sowing to increase water holding capacity. ➤ Application of life saving protective irrigation ➤ Sprinkling of water to keep micro climate moist ➤ Spraying of 2% urea solution ➤ Harvest paddy at physiological maturity stage 	<ul style="list-style-type: none"> ➤ Strengthening field bunds blocking drainage channel and seepage holes ➤ In-situ water harvesting and recycling for life saving irrigation ➤ Under situation of complete failure of kharif crop dismantle it. In such situation or where land is remaining fallow, sow (dibble) the pre-rabi crops ➤ Sowing across the slope with ridge and furrow method ➤ Summer ploughing and application of FYM 5t and lime 2.5qtl per ha 	
	Rainfed lateritic Medium rainfall (low land)	Rice-Greengram / Blackgram	Same as above farming situation	➤ Same as above farming situation	

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Canal irrigated lateritic Medium rainfall (Medium land and low land)	Paddy-pulse	Rice variety: Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark,. Pratikshya,	<ul style="list-style-type: none"> ➤ Do not practice beushning (blind cultivation) in rice, if the crop is more than 45 days old. ➤ Weed out the field without waiting for rainfall. ➤ Raise community nursery of rice for transplanting at a reliable water source. ➤ Seedlings up to 35 days old can be transplanted in case of medium duration rice varieties without much reduction in yield. ➤ Irrigation for sowing or transplanting of the crops and saving of the already sown/transplanted crops is prime consideration of the contingency measures. ➤ Rainwater harvesting and recycling of harvested rain water for life saving irrigation ➤ Provide irrigation at critical stages of the crops, using the water from ponds, dug wells, WHS etc. ➤ Plugging of holes in field bunds 	<p>Farmers are to be encouraged to have Dug wells, deep bore wells, through RKVY.</p> <p>Pump sets may be supplied at subsidized rate by agril. Dept.</p>
		Rice-Fallow		Same as above	Same as above
		Rice-Rice		Same as above	Same as above

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Canal irrigated lateritic Medium rainfall (Medium land and low land)	Paddy-pulse	Rice variety: Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark,. Pratikshya,	<ol style="list-style-type: none"> 1. Weed out the field without waiting for rainfall. 2. Raise community nursery of rice for transplanting at a reliable water source 3. Seedlings up to 35 days old can be transplanted in case of medium duration rice varieties without much reduction in yield. 4. Check canal water conveyance loss 5. Provide irrigation at critical stages of crop growth using water from ponds, WHs, dug wells & other available water bodies. 6. Rainwater harvesting and recycling of harvested rain water for life saving irrigation. 7. Plugging of holes in bunds 	Agril. Deptt. May encourage the farmers to have dug wells, bore wells, pump sets by providing very high subsidy.
		Rice-Fallow	Same as above	Same as above	Same as above
		Rice-Rice	Same as above	Same as above	Same as above

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Canal irrigated lateritic Medium rainfall (Medium land and low land)	Paddy-pulse	Rice variety: Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark,. Pratikshya,	<ol style="list-style-type: none"> 1. Do not practice beushning (blind cultivation) in rice, if the crop is more than 45 days old 2. Weed out the field without waiting for release of canal water. 3. Raise community nursery of rice for transplanting at a reliable water source 4. Seedlings up to 35 days old can be transplanted in case of medium duration rice varieties without much reduction in yield. 	

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
				5. Utilize other sources of water like ground water, WHS, ponds etc 6. Apply lifesaving irrigation at critical stages of crop growth	
		Rice-Fallow	Same as above	Same as above	Same as above
		Rice-Rice	Same as above	Same as above	Same as above

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Canal irrigated lateritic Medium rainfall (Medium land and low land)	Paddy-pulse	Rice variety: Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark,. Pratikshya, Swarna, Pooja	<ol style="list-style-type: none"> 1. Do not practice beushning (blind cultivation) in rice, if the crop is more than 45 days old. 2. Weed out the field without waiting for rainfall. 1. Raise community nursery of rice for transplanting at a reliable water source 2. Seedlings up to 35 days old can be transplanted in case of medium duration rice varieties without much reduction in yield. 5 Grow low duty crops 6 Utilize other sources of water like ground water, WHS, ponds etc 7 Check canal water conveyance loss 8 Recycling of harvested rain water 9 Harvest the crop at physiological maturity 	

Condition			Suggested Contingency measures	
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	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Canal irrigated lateritic Medium rainfall (Medium land and low land)	Paddy-pulse	Rice variety: Lalat, Manaswini, Naveen, Vijeta, MTU 1010, Konark, Pratikshya,	<ul style="list-style-type: none"> Do not practice beushning (blind cultivation) in rice, if the crop is more than 45 days old. Weed out the field without waiting for rainfall. Raise community nursery of rice for transplanting at a reliable water source Seedlings up to 35 days old can be transplanted in case of medium duration rice varieties without much reduction in yield. Spray anti transpirants to non paddy crops Apply irrigation water in alternative furrows Irrigate at critical stages Utilize other sources of water like ground water, WHS, ponds etc for live saving irrigation Harvest the crop at physiological maturity 	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Paddy/ Blackgram/ Groundnut/ sesame	Surface drainage for early draining of water from the field to save the crop	Drain out water from the field	Drain out water from the field Harvest at physiological maturity and shift the produce to safer place	shifting of produce to safer place for drying and maintaining the quality of grain/fodder
Horticulture				
Tomato/ Brinjal/ cowpea/ Lady's finger / Chilli	Surface drainage for early draining of water from the field to save the crop	Drain out water from the field	Drain out water from the field Harvest at physiological maturity and shift the produce to safer place	shifting of produce to safer place for drying and maintaining the quality of grain/fodder
Heavy rainfall with high				

speed winds in a short span²				
Paddy, Blackgram	Surface drainage for early draining of water from the field to save the crop	Drain out water from the field	Drain out water from the field Harvest at physiological maturity and shift the produce to safer place	shifting of produce to safer place for drying and maintaining the quality of grain/fodder
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 migration from one field to another`			

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Paddy	<p>Drain out excess water immediately.</p> <p>Select rice varieties like Swarna, Swarna sub 1, Sarasafor shallow submergence lands.</p> <p>✓ Reduce nitrogen application & apply recommended dose of P & K as basal to</p>	<ul style="list-style-type: none"> ◆ Drain out excess water immediately. ◆ If damage is more than 50% re transplant rice crop of medium duration group. ◆ In partially damaged fields, allow the rice plants to stand upright. Do not go for beushaning as it may further reduce the plant population. ◆ Weed out the rice field, make gap filling and top dress N & K to boost the growth if situation permits ◆ Maintain a buffer nursery in the backyard/high land area to ensure adequate plant population in the field after flood damage 	<ul style="list-style-type: none"> ➤ Drain out excess water immediately. ➤ Harvest at physiological maturity ➤ Crop planning for rabi sowing utilizing residual moisture 	<p>Drain out excess water immediately.</p> <ul style="list-style-type: none"> ➤ Harvest at physiological maturity

	increase resistance..	flood	◆ Apply moderate dose of NPK at beushaning, if not applied earlier.		
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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				
Crop/Rice	Sprinkling water Frequent irrigation	Drip / sprinkler irrigation with soil mulching	Drip / sprinkler irrigation with soil mulching	Drip / sprinkler irrigation with soil mulching
Horticulture				
Coconut	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	Sprinkling with water, Irrigation should be done
Mango	Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	-Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	-Spraying with water -Irrigation(Pitcher/Drip) should be provided -Mulching must be done at the base of the plant, organic manure like vermin compost, NADEP compost must be applied in the field	-Sprinkling with water Irrigation should be done
Banana	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin compost, NADEP	Spraying with water, Irrigation should be provided, mulching must be done at the base of the plant, organic manure like vermin compost, NADEP	Sprinkling with water, Irrigation & mulching should be

	compost, NADEP compost must be applied in the field	compost must be applied in the field	must be applied in the field	done
CYCLONE				
Paddy	<ul style="list-style-type: none"> - Provide drainage - P & K application - Application of phospho gypsum - If damaged make fresh nursery - Broadcasting/ line sowing of sprouted seeds of relatively short duration varieties 	<ul style="list-style-type: none"> - Provide drainage - Apply 50% N and full P & K at basal 	<ul style="list-style-type: none"> - Provide drainage - If crop is damaged incorporate and go for rabi crops 	<ul style="list-style-type: none"> - Provide drainage - If crop is damaged incorporate and go for rabi crops
Horticulture				
Coconut	<ul style="list-style-type: none"> - Provide drainage -Uproot the damaged seedlings - Gap filling - Staking of the seedlings 	<ul style="list-style-type: none"> - Provide drainage 	<ul style="list-style-type: none"> - Provide drainage -Clean the damaged parts 	Clean the damaged parts
Mango	<ul style="list-style-type: none"> - Provide drainage - Mounding around the plants - Gap filling - Staking of the seedlings - Planting of wind breaks around the orchad 	<ul style="list-style-type: none"> - Provide drainage - Mounding around the plants - Manuring the plants with 75gm. N, 110gm. P and 55 gm. K per plant 	<ul style="list-style-type: none"> - Provide drainage -Clean the damaged parts -Mounding around the plants 	<ul style="list-style-type: none"> - Provide drainage -Clean the damaged parts -Mounding around the plants - harvesting should be done
Banana	<ul style="list-style-type: none"> - Provide drainage -Uproot the damaged seedlings - Gap filling - Staking of the seedlings 	<ul style="list-style-type: none"> - Provide drainage -Staking of the plant -Manuring with 60 gm urea, 120 gm potash along with Vermin compost 	<ul style="list-style-type: none"> - Provide drainage -Staking of the plant 	Harvesting must be done as early as possible
Frost				

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	<ul style="list-style-type: none"> • Livestock insurance • On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. • Sun hemp (Crotolaria) can be sown. • Explore the possibilities of availability of unconventional / alternative feed resources during draught. 		<ul style="list-style-type: none"> • Availing insurance • Culling of unproductive livestock
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 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. 	<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 	<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

	of possible event of draught.		
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. Veterinary preparedness with vaccine and medicines. 	<ul style="list-style-type: none"> Supplementation of mineral and vitamin mixtures Campaign and mass vaccination, treating the affected animals 	<ul style="list-style-type: none"> Proper disposal of dead animals
Floods		<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, 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 	<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 and respiratory infections in consultation of local veterinary personals. Improving shed hygiene especially in the farmers household through cleaning and disinfection Provision of clean drinking water. Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals
Feed and fodder availability		<ul style="list-style-type: none"> Procured feeds and fodders to be used for feeding all animals 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 	Short duration fodder crops may be grown to meet the demand

		<p>and sprinkling concentrate mixture can improve intake and utility.</p> <ul style="list-style-type: none"> • Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. 	
Drinking water		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 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, upland etc. <ul style="list-style-type: none"> • 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 	<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

	<p>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, 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.)</p>		
Cyclone			
Feed and fodder availability	<ul style="list-style-type: none"> • Procured feeds and fodders to be used for feeding all 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 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 	<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, 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. 	<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 and respiratory infections in consultation of local veterinary personals.

	<p>embankments, low hillocks, upland etc.</p> <ul style="list-style-type: none"> • Vaccination 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, 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.) 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> ▪ Improving shed hygiene especially in the farmers household through cleaning and disinfection
Heat wave and cold wave			
Shelter/environment management		<ul style="list-style-type: none"> • 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 	

		<ul style="list-style-type: none"> • 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.

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Shortage of feed ingredients	Ensure procurement of feed ingredients sufficient ahead	Feed supplementation will be made to the farms. 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 draught	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well	

Health and disease management	Procurement of vaccines and medicines and anti stress agent. Feeding antibiotics Procurement of litter materials	Continue feeding of anti stress agent		
Floods				
Shortage of feed ingredients	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting 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 provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for available of sanitized water	Water sources will sanitized with bleaching powder or any water sanitizer	
Heat wave and cold wave				

<p>Shelter/environment management</p>	<p>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.</p> <p>Procurement of curtains to cover open sides of the shed. Heating arrangement kept ready</p>	<p>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 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</p>	<p>Provision should be made to ensure proper ventilation to the house Remove the curtains. Discontinue heating.</p>	
<p>Health and disease management</p>	<p>Procurement of Antistress drugs Procurement of Antistress drugs and vaccine</p>	<p>Supplementation of antistress drug Feeding of antistress drugs in drinking water Vaccination with fowl pox</p>	<p>Vaccination of birds against RD Vaccination against IBD and RD</p>	<p>Procurement of Antistress drugs and vaccine</p>

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	<ul style="list-style-type: none"> ▪ Partial harvesting of fish ▪ Partial shading of pond water ▪ Restricted release of water from reservoir. ▪ Supplementary water harvest structures like pond and tanks has to be developed. ▪ Renovation and maintenance of existing water harvest structures 	<ul style="list-style-type: none"> ➤ No fertilization ➤ Azolla can be put over pond water 	<ul style="list-style-type: none"> ▪ Increase the water level from outside ▪ Minor carps can be cultured ▪ Air breathing fishes can be cultured
(ii) Changes in water quality	<ul style="list-style-type: none"> ▪ Prepare to release water into the habitat 	<ul style="list-style-type: none"> ▪ .Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. 	1. Monitoring the water quality and health of aquatic organisms.
(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 i) input (feed, fertilizer and manure) minimization to improve water quality,	increase the water depth using other sources like ground water, nearby surface water sources etc

		(ii) short duration culture, (iii) prawn culture over fish culture (iv) phased harvesting may be adopted in case of over stocking	
2) Floods			
A. Capture			
Marine			
Inland			
(i) Average compensation paid due to loss of humane life	<ol style="list-style-type: none"> 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bundhs. 4. Preparedness for relief 5. Insurance coverage provision for life and property 	<ol style="list-style-type: none"> 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation. 	<ol style="list-style-type: none"> 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people.
(i) No. of boats / nets/damaged	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.
(ii) No. of houses damaged	<ol style="list-style-type: none"> 1. Insurance coverage for houses. 	-	<ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ▪ Harvest of fishes 	<ul style="list-style-type: none"> ▪ Pond encircled with nets ▪ Entering of outside water 	<ul style="list-style-type: none"> ▪ Removal of predatory and weed fish ▪ Liming and bleaching powder application ▪ Application of lime in tanks. ▪ Application of fertilizer.
(v) Health and diseases	<ul style="list-style-type: none"> ▪ Partial harvesting 	<ul style="list-style-type: none"> ▪ Aeration 	<ul style="list-style-type: none"> ▪ Fish to be bathed with KMNO4 solution ▪ Control on transport of brooders and seeds
B. Aquaculture			
(i) Inundation with flood water	<ul style="list-style-type: none"> ▪ Harvesting of fishes ▪ Strengthening and increase in dyke height. ▪ They should be constructed with inlet and out let facility. 	<ul style="list-style-type: none"> ▪ Pond encircled with nets ▪ Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 	<ul style="list-style-type: none"> ▪ Removal of predatory and weed fish ▪ Repairing and strengthening of dyke if required.
(ii) Water contamination and changes in water quality	<ul style="list-style-type: none"> ▪ Application of lime 	<ul style="list-style-type: none"> ▪ Entering of outside water 	<ul style="list-style-type: none"> ▪ Liming and bleaching powder application ▪ Application of lime and geolite. ▪ Application of Alum. ▪ Application of KMnO4
(iii) Health and diseases	<ul style="list-style-type: none"> ▪ Partial harvesting ▪ Application of lime 	<ul style="list-style-type: none"> ▪ Aeration 	<ul style="list-style-type: none"> ▪ Fish to be bathed with KMNO4 solution ▪ Application of lime and KmnO4. ▪ Assessment of the health status of fish and accordingly control measure should be taken. ▪ Control on transport of brooders and seeds.

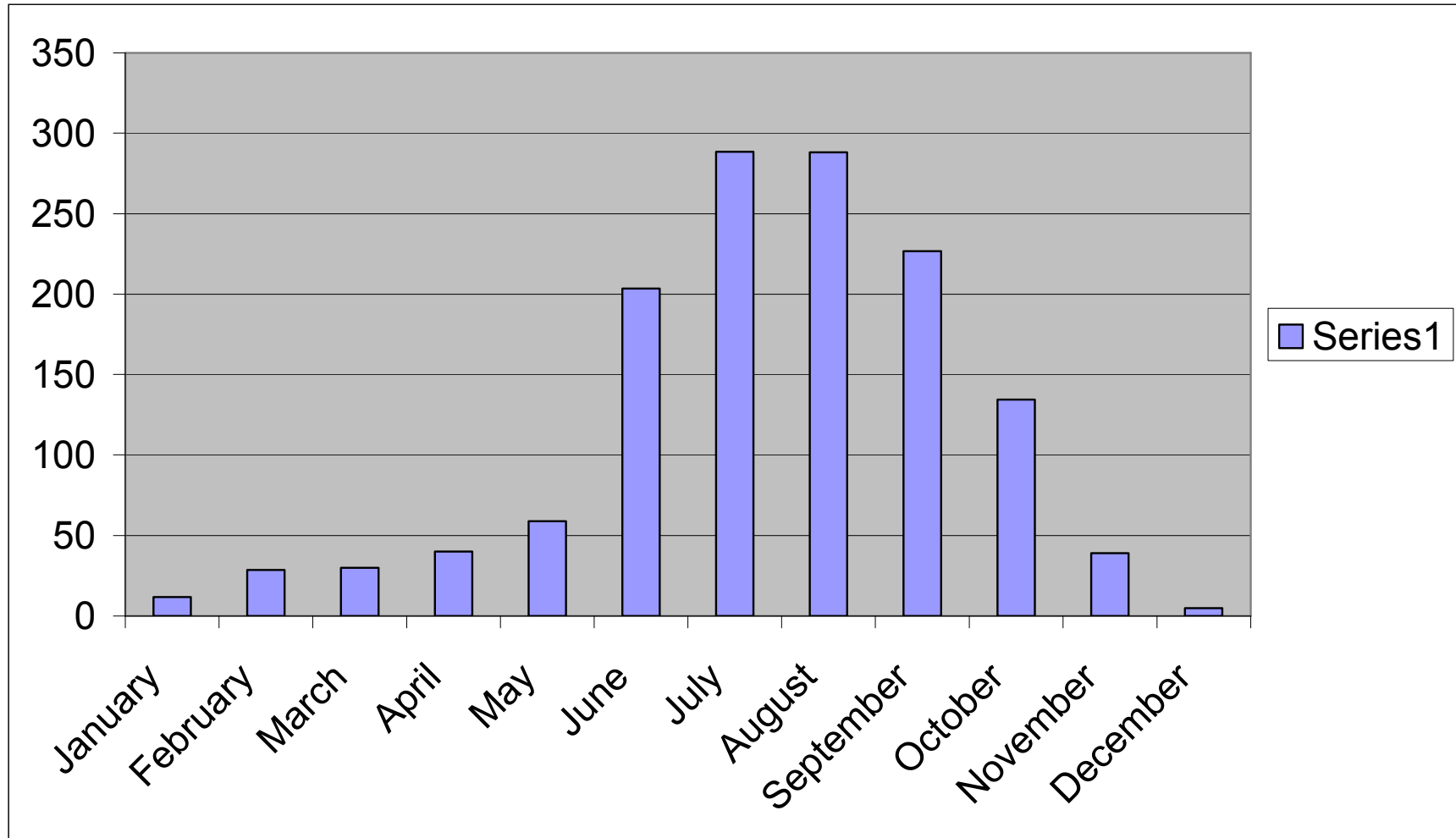
(iv) Loss of stock and inputs (feed, chemicals etc)	<ol style="list-style-type: none"> 1. Strengthening and increase in dyke height. 2. Before flood the stock should be harvested and sold in flood prone areas. 3. Transport of feed and chemicals to safer place. 4. Purchase of feeds and chemicals on weekly or fortnightly basis. 5. Insurance coverage for stock. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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)	<ol style="list-style-type: none"> 1. Construction of flood shelter for pumps, aerators etc. 	-	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Repeated broadcast and telecast of warning. 2. Sea venture should be avoided 3. Insurance coverage for lives of fishermen. 	<ol style="list-style-type: none"> 1. Provision of relief. 2. Evacuation of people to safer areas. 	<ol style="list-style-type: none"> 1. Assessment and settlement of insurance.
(ii) Avg. no. of boats / nets/damaged	<ol style="list-style-type: none"> 1. The boats has to be secured safely to river/ reservoir banks. 2. Insurance coverage for nets and boats. 	<ol style="list-style-type: none"> 1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained. 	<ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ▪ Increase pond dyke height & width ▪ Strengthening and increase in dyke height. ▪ The should be constructed with inlet and out let facility 	<p>Contact for good quality fingerlings</p> <p>Net enclosure should be provided over the dyke to prevent the escape of fish from pond</p>	<p>Culture with stunted fingerlings</p> <p>Repairing and strengthening of dyke if required.</p>
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			<p>CIFAX application</p> <p>Application of lime and $KmnO_4$.</p> <p>Assessment of the health status of fish and accordingly control measure should be taken.</p> <p>Control on transport of brooders and seeds.</p>
(iv) Loss of stock and inputs (feed, chemicals etc)	<ol style="list-style-type: none"> 1. Strengthening and increase in dyke height. 2. Transport of feed and chemicals to safer place. 3. Insurance coverage for stock. 	<ol style="list-style-type: none"> 1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Storing of feed and chemicals to safer place. 	<ol style="list-style-type: none"> 1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes. 3. Assessment of quality of feed and chemicals. 4. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	<ol style="list-style-type: none"> 1. Repairing of pumps, aerators if required. 2. Repairing of damaged hut.
4. Heat wave and cold wave			

A. Capture			
Marine	-	<ol style="list-style-type: none"> 1. During hot waves night fishing should be done. 2. During hot waves preservation by cold chain should be increased. 	-
Inland	-	<ol style="list-style-type: none"> 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)	<ol style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> ▪ Integrated farming system with horticulture based 	Short term culture practice
(ii) Health and Disease management	1. Application of lime and turmeric.	<ol style="list-style-type: none"> 1. Feeding should be stopped. 2. If cold waves persists EUS outbreak takes place 	1. Application of CIFAX to contro EUS disease in fish.

^a based on forewarning wherever available

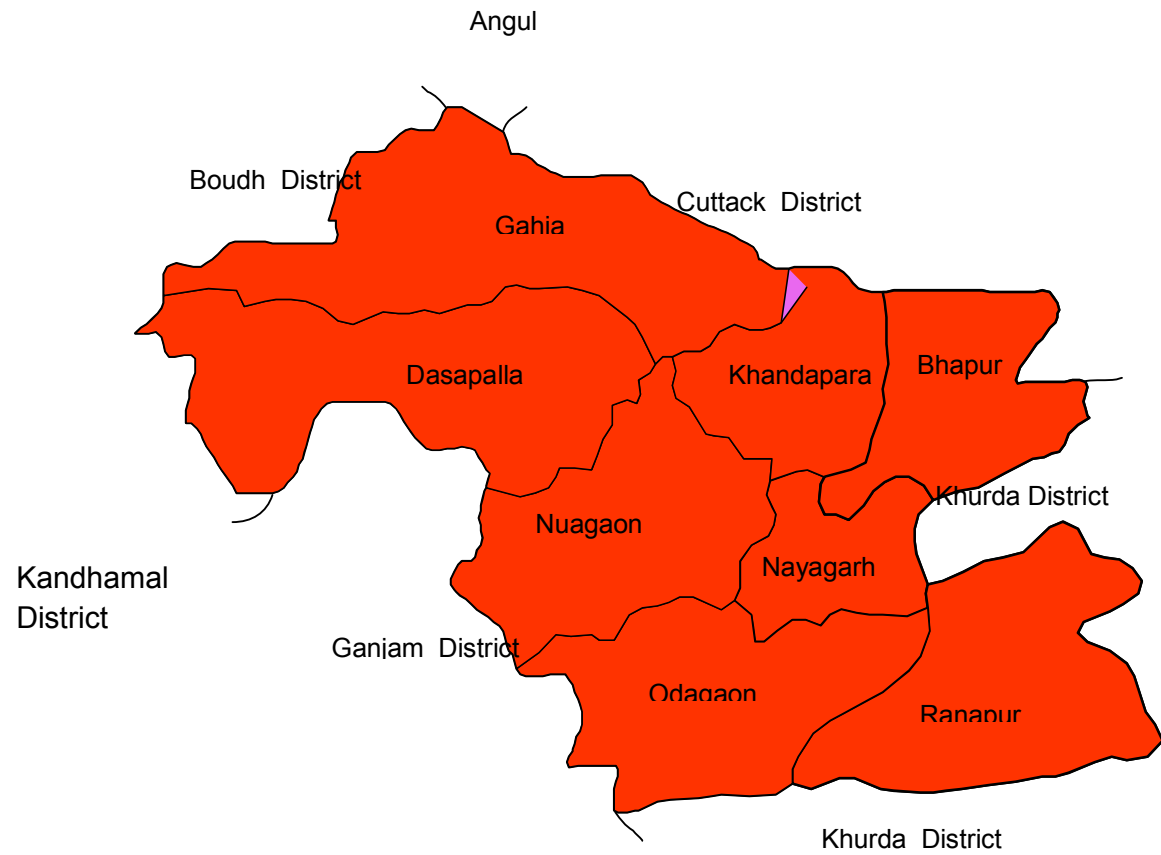
MONTHLY NORMAL RAINFALL OF NAYAGARH DISTRICT



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Nitrogen status of Nayagarh District

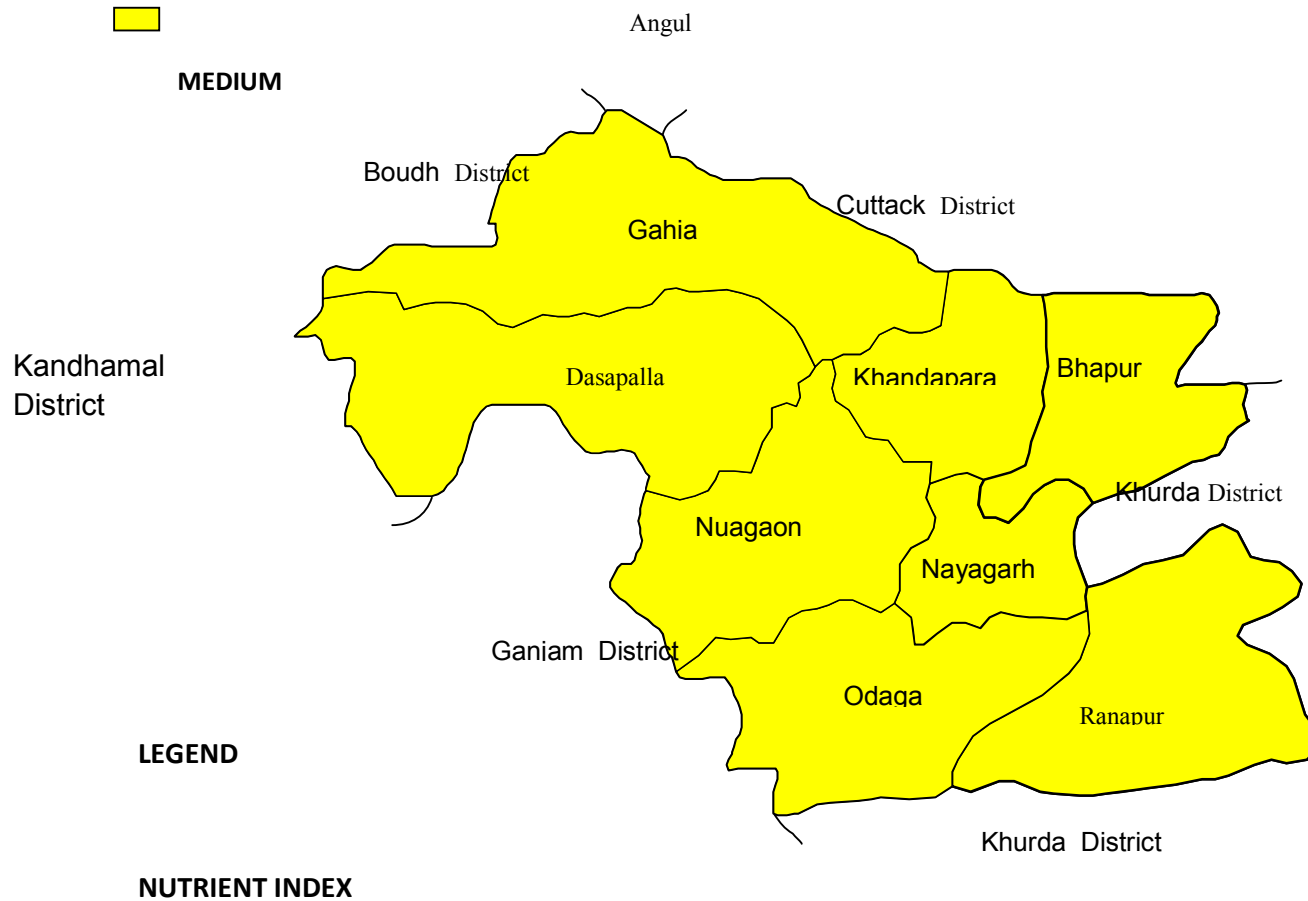


LEGEND

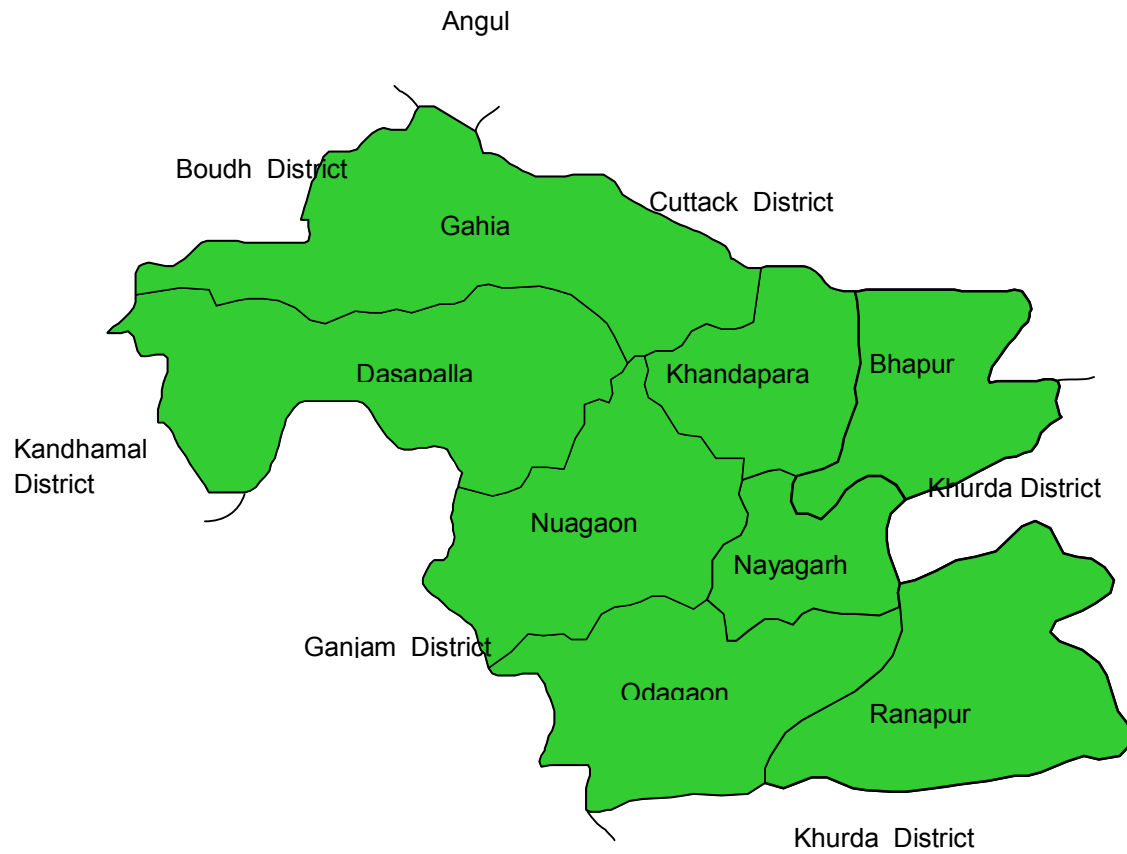
NUTRIENT INDEX

LOW

Phosphorus status of Nayagarh District



Potassium status of Nayagarh District



LEGEND

 HIGH

Nutrient Index