

State: ORISSA

Agriculture Contingency Plan: District: BARGARH

1.0 District Agriculture profile				
1.1	Agro-Climatic/ Ecological Zone	West Central Table Land		
	Agro Ecological Sub Region (ICAR)	Eastern plateau (Chhotanagpur) (12.1)		
	Agro-Climatic Region (Planning Commission)	Eastern plateau & hills region (VII)		
	Agro Climatic Zone (NARP)*	Western Central table land zone (OR-9)		
	List all the districts failing under the NARP Zone	Bolangir, Sonepur, Boudh, Deogarh, Jharsuguda, Sambalpur, Bargarh		
	Geographical coordinates of district	Latitude	Longitude	Altitude
		21 ⁰ 19' 45.42"N	83 ⁰ 37' 13.11" E	189.3mt above MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Chiplima, Sambalpur-768028		
	Mention the KVK located in the district	KRISHI VIGYAN KENDRA , BARGARH at Gambharipali		
	Name & address of the nearest Agromet field unit (AMFU, IMD) for agro-advisories in the zone	RRTTS, Chiplima Bargarh Orissa - 768028		
1.2	Rainfall	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	1294.5	2 nd week of June	4 th week of September
	NE Monsoon (Oct-Dec):	171.9	2 nd week October	3 rd week of November
	Winter (Jan-March)	120.3		
	Summer (Apr-May)	153.1		
	Annual	1527		

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

1.3	Land use pattern of the district (latest statistics)	Geographical area	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)	584	122	50	20	15	29	20	32	2

1.4	Major Soils (Common names)	Area ('000 ha)	Percent (%) of total
	Lateritic soils	Data not available	Major dominating area- Attabira, Bijepur, Bheden, Bargarh blocks
	Mixed red & Yellow soils	-do-	Major dominating area- Part of Padampur and Gaisilet blocks
	Red & Black soils	-do-	Major dominating area- Jharbandha, Sohela, Paikamal, Gaisilet blocks
	Brown forest soils	-do-	Major dominating area- Ambanana, Bhatli blocks
	Others (specify): Net cultivated area	349	60%

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	330	142.4
	Area sown more than once	140	
	Gross cropped area	470	

1.6	Irrigation	Area ('000 ha)			
	Net irrigated area	149.4			
	Gross irrigated area	202			
	Rainfed area	209			
	Source of irrigation	Number	Area ('000 ha)	% area	
	Canals	36	76208	76.0	
	Tanks	N.A.	N.A.	-	
	Open wells	4253	6255	6.2	

Bore wells	324	4435	4.4
Lift irrigation	346	6710	6.7
Other sources	-	6538	6.5
Total irrigated area		100146	
Pumpsets	280		
Micro-irrigation			
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	Nil	-	-
Critical	Nil	-	-
Semi-critical	Nil	-	-
Safe	11	92	Good
Wastewater availability and use	1	8	Manageble
Ground water quality	District affected in part (5 %) 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%

Area under major field crops & horticulture etc. as per latest figure (2007)

Field crops-	Total area('000 ha)	Irrigated('000 ha)	Rainfed('000 ha)
Paddy	299.4	126.5	172.9
Groundnut	33.5	8.1	25.4
Maize	1.4	0.3	1.1
Sugarcane	1.1	1.1	-
Mung	44.3	3.7	40.6
Biri	18.5	1.5	17.0
Horticulture crops- Fruits	Total area('000 ha)		
Mango		1.7	
Guava		0.1	
Citrus		0.1	

Litchi	-
Sapota	0.2
Horticulture crops- Vegetables	Total area('000 ha)
Potato	0.4
Onion	2.0
Sweet Potato	1.6
Medicinal and Aromatic crops	Total area('000 ha)
N.A.	N.A.
Plantation crops	Total area('000 ha)
Coconut	1.1
Banana	0.6
Papaya	-
Others	1.9
Fodder crops	Total area('000 ha)
N.A.	N.A.
Total fodder crop area	2
Grazing land	
Sericulture etc.	Nil

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

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)			409.7
	Improved cattle			62.9
	Crossbred cattle			-
	Non descriptive and descript Buffaloes total			38.4
	Goat			177.0
	Sheep			57.9
	Others (Camel, Pig, Yak etc.)			(Pigs) 8261
	Commercial dairy farms (Number)			

1.9	Poultry	No. of farms		Total No. of birds ('000)			
	Commercial			248.2			
	Backyard			233.8			
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine	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	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		1148		1		1540	
	B. Culture						
			Water Spread Area (ha)		Yield (t/ha)	Production ('000 tons)	
	i) Brackish water		-		-	-	
	ii) Fresh water		1602		2.5	4.012	
	Others		-		-	-	

1.11 Production and Productivity of major crops (Av. Of last Five Years)

1.11	Production and Productivity of major crops	Kharif		Rabi		Summer		Total	
	Major field crop	Production ('000 t)	Productivity (kg/ha)						
	Paddy	3420.5	1823	711.7	2722			4132.3	1933
	Maize	1.4	1270	0.4	1475			1.8	1317
	Groundnut	28.2	1025	9.4	1590			37.7	1125
	Blackgram	5.9	345	0.6	486			6.5	355
	Greengram	11.4	310	313	427			14.6	330

	Major Paddy	3420.5	1822	711.7	2722			4132.3	1933
Major Horticultural crops									
	Potato	-	-	2.0	8650	-	-	2.0	8650
	Sweet Potato			3.4	7836	-	-	3.4	7236
	Chili	0.8	845	1.2	913			2.1	884
	Coriander			-	364			-	364
	Onion			19.1	8563			19.1	8563

1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Groundnut	Vegetable	Sugarcane	Oilseeds
	Kharif-Rainfed	June – July	July-Aug	July-Aug	July-Aug	July-Aug
	Kharif-Irrigated	June – July	June – Aug	July-Aug	July-Aug	July-Aug
	Rabi-Rainfed	November-December	December – January	November - February	November-December	December – January
	Rabi-Irrigated	November – December	December – January	November- February	November-December	December – January

1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought		✓(July 1 st wk, Late Sept)	
	Flood		-	✓
	Cyclone		-	✓
	Hail storm		-	
	Heat wave	✓ (May)	-	

	Cold wave		✓(Dec-Jan)	
	Frost		-	√
	Sea water intrusion			√
	Pests and diseases (specify)	√		
		Stem borer in paddy, Pod borer in Arhar, Collar rot in Groundnut, Fruit & shoot borer , leaf curl virus in vegetables, Red rot in Sugarcane, Leaf folder and case worm in paddy, Sheath blight in paddy, Powdery mildew in greengram Termite, Mango hopper, Fruit flies, Ant	Swarming caterpillar in Aug/sept., BPH in Paddy, hispa in paddy, Tungro virus in paddy BLB in Paddy, Panicle mite in paddy Root knot nematode in vegetables	--

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

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency Measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Low rainfall shallow Lateritic soil Uplands	Rice-fallow	Varietal substitution with drought tolerant/Short duration varieties of sole crops Paddy : Heera,JHU,Kalinga III, Sneha	Conservation of moisture	Supply of seeds through OSSC , through NFSM,ATMA Apiculture, Mushroom production and vermin composting through ATMA,NHM and KVKs
		Groundnut	Intercropping like rice + Arhar(5:2), rice + blackgram (1:4)), rice + groundnut(4:1) Groundnut: Smruti, JL-24,Devi	Application of FYM to increase water holding capacity of soil	
		Redgram	Redgram: ICPL-87-119, Pragati, Jagruti	Apply full P, K and 25% N of recommended dose along with well decomposed organic matter,	
		Green gram	Greengram: Sujata, PDM 54, Durga	Weed control and interculture of the sole crops	
		Ragi	Ragi: Subhadra,Chilka, Bhairabi	Apply life saving irrigation as needed	
		Maize	Maize: Pragati, Navjot		
	Scarce rainfall laterite, lateritic, mixed red & yellow rainfed Medium land	Rice-fallow	Growing of Medium duration rice variety: (120-135days),Lalat, MTU1001, Naveen, Chandan , MTU1010, Konark, Surendra	Use of bulky organic manures Checking seepage and drainage loss of water Transplanting with 3-4 seedlings/hill with closer spacing	Breeder seed from OSSC, Seed drills from RKVY
		Maize- hybrid	Short duration maize Navjot	Apply full P, K and 25% N of recommended dose along with well decomposed organic matter	
		Groundnut	Smruti, JL-24,Devi	In-situ rain water conservation, Harvesting of excess runoff for recycling and groundwater recharge.	
	Mixed red & Black rainfed	Vegetable-fallow		* Ridge and furrow methods of sowing.	Seeds from RKVY, OSSC, OUAT

		Pumpkin	Baidyabati, Guamal	at closer spacing. * Strengthen the field and contour bunds for in-situ moisture conservation. * Use of mulch in vegetables * Planting with 3-4 seedlings/hill with closer spacing * Addition of Sufficient FYM to increase WHC. Seed priming in case of pulses and vegetables before sowing	Supply of seeds from RRTTS, OUAT Supply of seeds from ISOPOM
		Brinjal	Utkal Anushree, Blue star,		
		Okra	Parbani Kranti, Utkal Gaurav		
		Paddy	Growing of Medium duration rice varieties: Lalat,(120-135days), MTU1001, MTU1010, Konark,Surendra		
		Blackgram	Ujala, Prasad, PU 30, PU19		
	Low rainfall shallow Sandy loam soil	Groundnut- Vegetable	Smruti, JL-24, Devi, TMV-2, TAG-24	* Addition of Sufficient FYM to increase water holding capacity *Weed control , inerculture and ridging in vegetables, maize and groundnut *Organic mulching in vegetables	Seed drill under RRVY, Supply of seeds from OSSC, NSC Supply of seeds through NFSM
		Maize	Intercropping of maize with Cowpea (Utkal Manik) in 2 : 2 ratio or Maize+Arhar in 2:2 ratio		
		Vegetable: Brinjal	Utkal Anushree,		
		Chilli	Utkal Tarini Utkal ava, Utkal ragini		
		Tomato	Utkal Raja, Utkal Kumari		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency Measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 4 weeks (July 2 nd week)	Low rainfall Shallow Lateritic soil	Upland rice-fallow based	Low water requiring crops like blackgram, groundnut, greengram, cowpea, pigeonpea etc. Double cropping in upland can be done through maize-horsegram/sesamum rotation.	1) Delayed raising of nursery 2) Conservation of moisture 3) Intercropping(2:1 & 4:1 ratio) 4) Splitting nutrient application 5) Thinning to retain one seedling at	Supply of seeds through OSSC , through NFSM

		Groundnut	The legume based intercropping system like groundnut + pigeonpea, groundnut + blackgram, groundnut + greengram, groundnut + cowpea in the ratio of 4:1 was proved as successful. Some of the suitable varieties of non rice crop in upland are: Groundnut TMV-2, Smruti, AK-12-24. Pigeonpea : UPAS-120, KPL 151, T21, KPH-8. Blackgram : TU-94-2, PU30, Sarada. Greengram : K-851, Dhauli. Horsegram : Urmi, Madhu. Sesame: Kanak, Konika, Gujarat-1.	30 cm 6) Soaking of seeds in water overnight before sowing	
		Niger- local	Niger No-71, deomali		
	Scarce rainfall laterite, lateritic, mixed red & yellow soils rainfed	Medium land paddy	Direct sowing is not recommend after 10 th July but transplanting can be done from previously sown nursery. Medium land rice: Lalat, Swarna, Masoori.	Maintain more plant population for direct seeded rice. Nursery can be raised for transplanting after 21 days Emphasis should be given In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge.	
	.Mixed red & Black soils rainfed	Vegetable-fallow	Growing of short duration vegetable like cucumber, bittergourd, country bean, okra, Cowpea in bunds of upland paddy	Sowing in pits with little weeding, Mulching Dry sowing 8-10 days before rains with 15% higher seed rate Broadcasting with 1 st shower of rain	Seeds from NHM Supply of seeds from OSSC, OUAT Seeds may be procured from NFSM
		Niger- local	Niger- Deomali		
		Blackgram- local	Blackgram –TU-94-2, Ujala, Prasad		
	Low rainfall shallow Sandy loam soils	Maize- Vegetable Vegetable: Brinjal local Chilli local, Tomato BT-10	Maize hybrids of shorter duration, Intercropping of maize with Cowpea (Utkal Manik) in 1:2 ratio or Maize+Arhar in 2:1 ratio to manage water shortage Brinjal- Utkal Anoooshree, Chilli- Utkal ava, Tomato- Utkal Raja	Wider spacing at 60x45 cm, Split application of fertilizer reduced to two times Transplanting older seedlings with wider spacing than recommendation, Thinning, Mulching with paddy straw	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency Measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (July 4 th week)	Low rainfall shallow Lateritic soil	Upland rice-fallow	In the event of late arrival of southwest monsoon the pulses like Cowpea, Blackgram, Greengram can be grown upto last week of July but Pigeonpea, Groundnut, Maize are not recommended to be sown after 20 th July.	Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late onset of monsoon. In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. The recommended dose of nitrogen application should be reduced by 40 % in rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal.	Supply of seeds through OSSC , through NFSM
		Vegetable	Short duration improved varieties of vegetables like Tomato, Okra, Cucumber, Amaranthus, country bean etc	The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of kharif crops at closure plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures is recommended. Sowing of seeds in ridges, pits with proper seed treatment to avoid mortality	

	Scarce rainfall laterite, lateritic, mixed red & yellow soils rainfed		Shifting from traditional crops/varieties to short duration low water requiring crops in upland, by substituting rice totally. Rice varieties like Lalat, Masuri are suitable.	-do-	
	Mixed red & Black rained	Vegetable-fallow	Growing of short duration vegetable like cucumber, bitter gourd, country bean, okra, Cowpea in bunds of upland paddy	Sowing in pits with little weeding, Mulching	Seeds from NHM Supply of seeds from OSSC, OUAT
		Niger- local	Niger- Deomali	Dry sowing 8-10 days before rains with 15% higher seed rate	Seeds may be procured from NFSM
		Blackgram- local	Black gram –TU-94-2	Broadcasting with 1 st shower of rain	
	Low rainfall shallow Sandy loam soils	Sunflower- local, Cowpea-local, Niger- local	Sunflower- Jwalamukhi Cowpea- Utkal Manik Niger- Deomali	Wider spacing at 60x45 cm, Split application of fertilizer reduced to two times	
		Vegetable - fallow	Other vegetables of short duration	Transplanting older seedlings with wider spacing than recommendation, Thinning, Mulching with paddy straw Ridge & furrow method of sowing & staking	

Condition	Suggested Contingency Measures				
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks (August 2 nd week)	Low rainfall Shallow Lateritic soils Upland	Rice-fallow based	<p>Shifting from traditional crops/varieties to short duration low water requiring crops like Cowpea, Blackgram, Greengram by substituting rice totally.</p> <p>If the main crop is failed cultivation or re-sowing with fodder is the best option. Fodders can be harvested at any stage keeping in view sowing of the next <i>rabi</i> season crop</p>	<p>The recommended dose of nitrogen application should be reduced by 40 % in rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal.</p> <p>Furrow sowing of crops at closure plant-to-plant distance with wider inter-row spacing is recommended.</p>	Supply of seeds through OSSC , through NFSM
	Scarce rainfall laterite, lateritic, mixed red & yellow soils rainfed	Medium land rice-fallow based	<p>Shifting from traditional crops/varieties to short duration rice. Rice varieties like Lalat (120 days), Vandana (100-110 days) are useful in this situation.</p> <p>If the main crop is failed re-sowing with pre-rabi crops like horse gram, sesamum will give good return. Winter maize can be grown for the purpose of green cob.</p>	<p>In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge.</p> <p>Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late onset of monsoon.</p> <p>The recommended dose of nitrogen application should be reduced by 40 % in rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal.</p> <p>The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of kharif crops at closure plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures is recommended.</p>	Supply of seeds through OSSC , through NFSM

	Mixed red & Black rainfed soils	Vegetable-fallow	Growing of short duration vegetable like cucumber, bittergourd, country bean, okra, Cowpea in bunds of upland paddy	Sowing in pits with little weeding, Mulching	Seeds from NHM Supply of seeds from OSSC, OUAT
		Niger- local	Niger- Deomali	Dry sowing 8-10 days before rains with 15% higher seed rate	Seeds may be procured from NFSM
		Blackgram- local	Blackgram –TU-94-2	Broadcasting with 1 st shower of rain	
	Low rainfall shallow Sandy loam soil	Vegetable-fallow	Growing short duration vegetable like cucumber, okra, Cowpea in bunded upland, Country bean in field bund	Ridge and furrow methods of sowing and staking. The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of kharif crops at closure plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures is recommended	

Condition	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.	Shallow lateritic soils Upland	Rice- fallow	In upland, rice will be damaged very quickly, result poor crop stand. The land may re - sowed with low water requiring non-rice crops rather than allowing sub-optimal poor rice plant stand to persist.	Ridge and furrow methods of sowing may be adopted as in-situ soil moisture practices.	
		Maize	Maize should be resown as germinated seeds fail to sustain	Mulching should be practiced in between crop rows using locally available mulch material.	
		Arhar- UPAS-120	The field should be free of weeds for utilization of water and nutrients by the late sown crops A shorter duration variety like UPAS-120, ICPL-87 may be resown	Light irrigation during evening hours	

Laterite, mixed red & yellow rainfed Medium land	Rice –Fallow	Direct seeded rice should be re-sown because ‘sprouting drought’ will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended for transplanted rice. If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. Seeds treatment with Thiram or Captan @ 2-2.5 g/kg seed and other recommended plant protection measures.	Strengthen the field and contour bunds for in-situ moisture conservation. About 11-37 % run-off is generated even by the delayed monsoon and should be stored in the farm ponds or tanks. These will recharge ground water during normal or excessive rainfall year.
Mixed red & Black soils	Maize- Vegetable	Resowing of maize , Short duration high yielding vegetables like Tomato, Brinjal, Chilli, Kharif Onion(bhima red), Crucifer vegetables	Thinning, conservation furrow Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material
Shallow sandy loam soils	Pulses -Vegetable	The land may be re-sowed with low water requiring non-rice crops rather than allowing sub-optimal plant population. For anticipating prolonged dry spells the practices of inter-row cropping help in risk sharing. This can be achieved by including a companion crop like Greengram, Cowpea than the main crops.	Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material.

Condition			Suggested Contingency Measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At vegetative stage	Shallow lateritic soils Upland	Rice-fallow based	Crops should be suitably thinned out.		
		Groundnut	In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rainwater by increasing bund height	Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material.	
		Arhar	Top dressing of fertilizers may be postponed till rainfall/ foliar application of nutrients 1% KNO ₃ spray shall be done for rice	Application of weedicide on broad leaf weeds to minimize competition for water	
	Laterite, lateritic, mixed red & yellow soils rainfed	Medium land rice-fallow based	In-situ rain water conservation, harvesting of excess Run off for re-use and ground water recharge. Conserve rainwater by increasing bund height	Small and marginal farmers may be employed under NREGA for creating Rain water conservation and storage structures to enhance productivity of their limited land.	
		Groundnut	Application of fertilizer through foliar spray		
Mixed red & Black soils	Pulses- Vegetable	Application of light irrigation to avoid soil cracking Postponement of top dressing	Economically viable, mulching should be practiced in between crop rows using locally available mulch material.		
Shallow sandy loam soils	Vegetable-fallow	Light irrigation Thinning & pruning of vegetables Life saving irrigation from harvested rainwater, wherever feasible, adopts micro-irrigation to save water.	Irrigating the crop in the root zone Sub-soil moisture conservation through minimum tillage Irrigate on ridge and irrigate every alternate furrow on rotation		

Condition			Suggested Contingency Measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At reproductive stage	Shallow lateritic soils Upland	Rice-fallow based	Crops should be suitably thinned out Life saving irrigation if possible. Irrigate on ridge and irrigate every alternate furrow on rotation.	If fertilizers are to be applied, foliar application is recommended. Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material	
	Laterite, lateritic, mixed red & yellow rainfed soils Medium land	Rice-fallow based Arhar	Life saving irrigation from harvested rainwater. Reduction of conveyance losses while irrigating the light textured soils. Spread a polythene sheet in the field channel before irrigating the field and then roll it back for irrigating the other field.	If fertilizers are to be applied, foliar application is recommended. 1% KNO ₃ spray	
	Mixed red & Black soils	Pulses- Vegetable	-do-	-do-	
	Shallow sandy loam soils	Vegetable-fallow	Light & frequent (if possible) irrigation to prevent flower drop Plucking vegetables for marketing	Spraying of anti-transpirants to check evapo-transpiration Mulching with crop trashes	

Condition			Suggested Contingency Measures		
Terminal drought	Major Farming situation	Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Shallow lateritic soils Upland	Rice-fallow	Life saving irrigation from harvested rainwater, wherever feasible, adopt micro-irrigation to save crop.	Cowpea, Sunflower, Field bean, Horsegram, Blackgram, Linseed for month of October	Farm ponds from NREGS, RKVY Seeds from NHM, OSSC
		Arhar	May be harvested for vegetable purpose Harvesting at physiological maturity		

	Laterite, lateritic, mixed red & yellow rainfed soils Medium land	Rice-fallow	Reduction of conveyance losses while irrigating the light textured soils. Spread a polythene sheet in the field channel before irrigating the field and then roll it back for irrigating the other field. Harvesting of rice at physiological maturity will realize 80-85% of normal yield.	Raise Brinjal seedlings for Rabi, being a hardy plant it may withstand moisture stress condition Cowpea, Sunflower, Field bean, Horsegram, Blackgram, Linseed for month of October	Farm ponds through IWSM programme Supply of intercultural implements through RKVY
		Maize-Arhar	Harvesting of plants for fodder purpose if cob formation hampered	Crucifer vegetables & other high yielding Solanaceous vegetables	
	Mixed red & Black soils	Pulses- vegetable	Harvest at physiological maturity	Cowpea, Carrot, Sunflower, , Horsegram, Blackgram, Linseed for month of October	-do-
	Shallow sandy loam soils	Vegetable-fallow	Harvest at physiological maturity	Plan for short duration high yielding oilseed especially Mustard/Toria & pulse crops Vegetables like potato, carrot. Radish, & other crucifers.	-do-

2.1.2 Drought- Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency Measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Upland Tubewell Irrigated canal laterite soils	Rice-fallow based Groundnut (Smruti, TAG-24)	Vegetable, Oilseed, pulses	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation Planting in deep furrows/Pit method of planting	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,
	Medium land Canal irrigated laterite, lateritic, mixed red & yellow soil	Rice-fallow based Pulses	Pulses, Vegetable (Chilli, Tomato, Brinjal, Okra, Cauliflower)	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation Mulching, Irrigation in root zone	-do-
	Tube well/ pond irrigated Shallow sandy loam soil	Vegetable	High yielding varieties with short duration	Delayed raising of nursery for delayed planting Limited & life saving irrigation Alternate furrow irrigation Drip irrigation	-do-

Condition			Suggested Contingency Measures		
Lack of inflows due to insufficient/delayed onset of monsoon	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Upland tubewell Irrigated canal laterite soils	Rice-fallow based	<p>Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.</p> <p>Use of early duration variety like 'MTU-1010' (115 days) is well suited in rabi. Khandagiri (95 to 100 days)</p>	<p>Irrigate the kharif rice with groundwater during dry spells only, if dry spell comes before release of canal water. Reduction of conveyance losses while irrigating the light textured soils. Spread a polythene sheet in the field channel before irrigating the field and then roll it back for irrigating the other field.</p> <p>Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.</p> <p>Irrigate the rabi rice at critical stages only with groundwater.</p>	
	Medium land Canal irrigated laterite, lateritic, mixed red & yellow rainfed soil	Rice-fallow based Groundnut	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum	Same as above for kharif rice	
	Tube well/ pond irrigated Shallow sandy loam soil	Vegetable -fallow	High yielding varieties with short duration	<p>Delayed raising of nursery for delayed planting</p> <p>Limited & life saving irrigation</p> <p>Alternate furrow irrigation</p> <p>Drip irrigation</p>	

Condition			Suggested Contingency Measures		
Insufficient ground water recharge due to low rainfall	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Upland Tubewell Irrigated canal laterite soil	Rice-fallow based	Rice area during rabi should be reduced. Instead low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower and Sesamum are preferred options.	Irrigate the kharif crops during dry spell with harvested rain water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. About 11-37 % run-off is generated even by the delayed monsoon and should be stored in the farm ponds or tanks. These will recharge ground water during normal or excessive rainfall year. Rainwater stored in self sealing or lined ponds can be used for irrigation if there is long break in the rainfall or for pre-sowing of the <i>rabi</i> crops to ensure proper germination.	
	Medium land Canal irrigated laterite, lateritic, mixed red & yellow rainfed soil	Rice-fallow based Pulses, Vegetable	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower, Sesamum	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation	
	Tube well/ pond irrigated Shallow sandy loam soil	Vegetable -fallow	Low water requiring oilseeds and pulses like Groundnut, Greengram, Blackgram, Sunflower, Sesamum	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation	

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

Condition	Suggested contingency measures			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvests
Continuous high rainfall in a short span leading to water logging				
Groundnut	Provide drainage	Provide drainage	Drain water for drying Harvest at physiological maturity stage	Shifting to a safer place Dry in shade in a well ventilated space
Paddy	No substantial problem as uplands donot maintain water logging condition for long time	Provide drainage If possible	Drain water for drying Harvest at physiological maturity stage	Shifting to a safer place Dry in shade in a well ventilated space
Arhar	Provide drainage	Provide drainage	Drain water for drying Harvest for vegetable purpose	Safe storage against pest & diseases
Cowpea	Provide drainage	Provide drainage	Drain water for drying Harvest for vegetable purpose	Shifting to a safer place Dry in shade in a well ventilated space Safe storage against pest & diseases
Sugarcane	Provide drainage Maintain ridge & furrow method	Provide drainage Maintain ridge & furrow method	Harvest at physiological maturity stage	Extraction of jaggery
Horticulture				
Fruits (Mango, Citrus etc)	Provide drainage Earthing up of plant base/root zone	Provide drainage Earthing up of plant base/root zone	Provide drainage Earthing up of plant base/root zone In case of established tree, no problem	Dry the fruits, Keep at safer place, may be sold at green stage
Banana, Papaya	Raising seedlings in sunken bed method	Provide drainage Earthing up of plant base/root zone	Harvested at green stage or table purpose, No problem for marketing as it has buyers' preference	Store for ripening in closed godowns for marketing
Cucurbit vegetables	Seedling in raised nursery beds, drainage,	Vines should be staked along elevated frames	Ensure drainage Harvesting at tender stages	Ensure drainage Harvesting at tender stages
Solanaceous/ cruciferous vegetables	Seedling in raised nursery beds, drainage,	Provide drainage Application of hormones to induce more flowering	Provide drainage	Ensure drainage Harvesting at tender stages
Heavy rainfall with high speed winds in a short span				
Paddy	Drainage if waterlogging persists Small seedlings withstand the problem	Drainage if waterlogging persists Small seedlings withstand the problem	Lodged panicles may be harvested at physiological maturity stage	Ensure drainage Harvesting at tender stages
Sugarcane	Drainage if waterlogging persists Small seedlings withstand the	Bundling of canes And drainage	Lodged canes may be harvested for extraction of juice	Lodged canes may be harvested for extraction of juice & jaggery

	problem			
Horticulture				
Banana, Papaya	Raising seedlings in sunken bed method	Provide drainage Earthing up of plant base/root zone	Harvested at green stage or table purpose, No problem for marketing as it has buyers' preference	Store for ripening in closed godowns for marketing
Cucurbit vegetables	Seedling in raised nursery beds, drainage,	Vines should be staked along elevated frames	Ensure drainage Harvesting at tender stages	Ensure drainage Harvesting at tender stages
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray tricyclazole against blast, Chloropyriphos against stem borer, Monocrotophos against Swarming caterpillar	Spray tricyclazole against blast, Chloropyriphos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Malathion spray against Gundhy bug	Sun drying / disinfection of gunny bags with malathion or heat treatment to manage stored grain pests
Groundnut	Phorate granules in the whorls & spray of Endosulfan against groundnut pod borer	Spraying of mancozeb @0.3% against <i>Cercospora</i> leaf spot	Spraying of Dimethoate against aphid	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Arhar	Removal of infested tips to manage leaf webber	Hand picking & destruction of blister beetles	Spray of Ekalux against pod borer	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Blackgram/Greengram	Application of Triazophos against YMV	Application of malathion against Flea beetle	Spray of Nuvan against pod borer	Disinfection of storage structure to manage stored grain pests
Horticulture				
Solanaceous vegetables	Spraying malathion against hadda beetle, hand collection of egg mass Soil drenching of COC & streptocycline against wilting	Application of Neem oil & tryozophos alternatively against brinjal fruit & shoot borer/ leaf curl virus,	Spraying of Profenophos against fruit borer Metalaxyl against Anthracnose	Segregation of infested fruits & destruction
Cucurbit vegetables	Spraying of Ekalux against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & streptocycline against wilting	Spraying Endosulfan against leaf eating caterpillars Metalaxyl against Powdery mildew, Carbendazim against leaf spot & blight	Poison baiting with Malathion & Jaggery against fruit fly	Destruction of overripe & infested fruits

2.3 Floods

Condition	Suggested contingency measures			
	Seedling/ nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Paddy	Drainage of the Nursery bed, If not possible go for resowing	Wet seeding of sprouted seeds (@75-80 kg/ha) of medium duration varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days). 50% N and 50% K ₂ O + full P may be applied as basal and rest 50% N + 50% K ₂ O as top dressing during the tillering stage. In partially damaged field gap filling may be done by redistributing the tillers. Management of pests & diseases	If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops. Supply of seeds and other agro-inputs of <i>rabi</i> crops at subsidized rate, provision of bank loan etc Wet seeding of short duration varieties (Heera (60 days), Kalinga –III (90 days)) or medium duration varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days) during forthcoming rabi season. Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to compensate the loss during kharif.	If flood comes during reproductive stage, , emphasis should be given on forthcoming rabi crops Supply of seeds and other agro-inputs of <i>rabi</i> crops at subsidized rate, provision of bank loan etc Wet seeding of short duration varieties (Heera (60 days), Kalinga –III (90 days)) or medium duration varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days) during forthcoming rabi season . Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of cucurbits after receding flood water
Cotton	Drainage, If damping off then resowing	Ensure drainage, Make ridge & furrows	Ensure drainage, Make ridge & furrows	Harvest the boll as soon as possible
Horticulture	NA			
Continuous submergence for more than 2 days	NA			
Horticulture				
Sea water inundation	NA			

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

Extreme event type	Suggested contingency measures			
	Seedling/ nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Paddy	Irrigate nursery bed, maintain sufficient moisture level	Irrigate the field and maintain water level	Keep water in the field, Harvest the crop at physiological maturity	Early harvest of crop to avoid grain shattering keeping the produce in shade
Groundnut	Maintain sufficient moisture level in field	Maintain sufficient moisture level in field, Plant protection measure as per need	Harvest the crop at physiological maturity	Keep the harvested crop in shed
Maize	Keep sufficient moisture in the field	-do-	Harvest the crop at physiological maturity and maintain moisture for tender cobs	-do-
Greengram/Blackgram	-do-	-do-	-do-	Keep the harvested produce in shed and well ventilated place
Horticulture				
(specify)Mango	Irrigate the orchard at 3 to 4 days interval	Irrigate the orchard at 8 to 10 days interval, Irrigation by ring	Irrigate the orchard by 15 days interval	Irrigate the orchard by 15 days interval, Mulching can be practiced to keep moisture in soil
Papaya	Irrigate the field at 3 days interval	Irrigate the field at 5 to 7 days interval	Irrigate the field at 8 to 10 days interval, Ensure less fruit drop due to lack of moisture	Irrigate the field at 15 days interval, harvest the matured fruits
Banana	Irrigate the plot by ring and basin method at 7 days interval	Practice drip method of irrigation	Irrigate the plot at 10 days interval by drip irrigation	-do-
Cold wave				
Paddy	Sowing of sprouted seeds in nursery mulching	Drainage field and maintain moisture level. Interculture and need based plant protection measures	Maintain low moisture level, need based plant protection	Keep the harvested produce for dry and keep in dry place
Groundnut	-do-	Maintain moisture level of field, inter-cultural operation, plant protection measures.	-do-	-do-
Maize	Sowing of sprouted seeds, mulching	Do not flood the field, inter-cultural operation and need based plant	Do not flood the field. Measures for hand pollination in need. Need based plant	-do-

		protection	protection	
Greengram	-do-	-do-	Maintain the moisture level in field, need based plant protection measure	-do-
Horticulture				
Mango	Restricted irrigation, Drip irrigation	Drip irrigation at 8 days interval. Need based plant protection measures	Drip irrigation at 8-10 days interval. Need based plant protection measures	Restrict irrigation. Keep the produce in safer place to avoid cold injury.
Papaya	-do-	-do-	-do-	-do-
Banana	Restrict irrigation to avoid cold injury, Intercultural operation	Need based plant protection measures	Restricted irrigation, Need based plant protection measures	Restricted irrigation, Keep the produce in safer place
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			
Feed and fodder availability	<p>As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem</p> <p>Sowing of cereals (fodder varieties of Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Collection of groundnut haulms and groundnut cake for use as feed supplement during drought</p> <p>Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February</p> <p>Preserving the green maize fodder as silage</p>	<p>Harvest and use biomass of dried up crops (Paddy, Groundnut, Maize, Sugarcane, Black gram, Green gram, Ragi, cow pea etc.,) material as fodder</p> <p>Use of locally available cheap feed resources like GN haulms as supplement for feeding of livestock during drought</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy</p> <p>Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass, combo grass well before monsoon</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>

	<p>Encourage fodder production with Bajra – stylo- Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp</p> <p>Formation of village Disaster Management Committee</p> <p>Capacity building and preparedness of the stakeholders and official staff for the drought/floods</p>	<p>during drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources</p> <p>Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater.</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
Health and diseases management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

		relief camps	
Floods	NA		
Cyclone	NA		
Heat wave and cold wave			
Heat wave	<ul style="list-style-type: none"> i) Plantation around the shed ii) H₂O sprinklers / foggers in the shed iii) Application of white reflector paint on the roof iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress 	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers /fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H₂O during heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	<p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods	NA		
Cyclone	NA		
Heat wave and cold wave			
Shelter/environment management	Heat wave: Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed

2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shallow water in ponds due to insufficient rains/inflow	<ol style="list-style-type: none"> 1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks have to be developed. 3. Renovation and maintenance of existing water harvest structures 	<ol style="list-style-type: none"> 1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds. 	<ol style="list-style-type: none"> 1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season
Impact of heat & salt load build up in ponds / change in water quality	<ol style="list-style-type: none"> 1. Prepare to release water into the habitat 	<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
Floods			
Inundation with flood waters	<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.
Water contamination & change in BOD	Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water	Check the water quality & take appropriate action	<ol style="list-style-type: none"> 1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO4
Health and diseases management	Stock preventive medicines, vaccines	Prevent influx of diseased fish from outside source, Check through nets Administer medicines through random catch Disinfect water by lime , KMnO4	<ol style="list-style-type: none"> 1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
Cyclone			
Overflow/ Flooding of ponds	Increase in pond height, Provision of swiss gate	To allow excess water through swiss gate	Repair of ponds and dike
Change in fresh/brackish water ratio	NIL	NIL	NI
Health and diseases management	Profilatic measures to be taken	Excess water drain out, Provision of good aeration	Farm and water treatment with lime and medicine
Heat wave and cold wave			
Management of pond environment	Good water quality to be maintained, Water depth to be maintained	Recirculation of water and pruning	Water treatment with lime
Health and diseases management	Profilatic measures to be taken	Maintain good quality water in ponds	Treatment of pond water with lime and medicines

ANNEXURE-I



ORISSA STATE MAP



BARGARH DISTRICT MAP

ANNEXURE-II

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Mean annual rainfall (mm)	12.5	19.1	22.0	20.0	25.6	205.6	397.2	374.4	222.6	52.8	10.4	5.1	1367.3
No. of rainy days(No.)	0.8	1.5	1.6	1.6	1.8	8.9	16.0	14.9	10.1	3.1	0.6	0.4	61.3

ANNEXURE – III

SOIL MAP OF BARGARH DISTRICT

