

State: ORISSA

Agriculture Contingency Plan: MALKANGIRI DISTRICT

1.0 District Agriculture profile				
1.1	Agro-Climatic/ Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Eastern (Chhotanagpur) Plateau and Eastern Ghats, hot subhumid ecoregion (12.1)		
	Agro-Climatic Region (Planning Commission)	Eastern Plateau & Hills region (VII)		
	Agro Climatic Zone (NARP)*	South eastern ghat zone, Eastern ghat high land zone (OR-7, OR-6)		
	List all the districts failing under the NARP Zone	Malkangiri and parts of Koraput.		
	Geographical coordinates of district	Latitude	Longitude	Altitude
		18°21'48.11"N	81°53'43.00"	204m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Similiguda, Koraput, RRTTSS, Kalimela		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Mungalguda, Malkangiri, Distt. Jeypora-764048		
	Name & address of the nearest Agromet field unit (AMFU, IMD) for agro-advisories in the zone	CSWCRTI, Research Centre P.B.No.12,. Sunabeda Koraput - 763 002, (Orissa)		
1.2	Rainfall	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June-September):	1312.2	2 nd week of June	4 th week of September
	NE Monsoon (October-December):	23.7	2 nd week October	3 rd week of November
	Winter (Jan-February)	-		
	Summer (March-May)	13.2		
	Annual	1349.2		

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)	579	335	23	21	4	1	38	6	15

1.4	Major Soils (Common names)	Area ('000 ha)	Percent (%) of total
	Red Soils	483	83.4
	Black Soils	96	16.6

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	136	163
	Area sown more than once	85	
	Net irrigated area	57.8	
	Gross cropped area	221	

Source: Orissa Agriculture Statistics 2008-2009 (DoA & FP, Orissa, Bhubaneswar)

1.6	Irrigation	Area ('000 ha)
	Net cultivated area	136
	Net irrigated area	57.8
	Gross cultivated area	142

Gross irrigated area	93.8		
Rainfed area	78.2		
Source of irrigation	Number	Area (*000 ha)	% of total irrigated area
Canals (medium and minor)		78.1	83.3
Tanks	-	5.0	5.4
Open wells	-	0.3	0.3
Bore wells	-	2.2	2.4
Lift irrigation schemes	-	4.8	5.1
Micro-irrigation (Drip and sprinkler)		1.6	1.7
Other sources (please specify) WHS		1.8	1.9
Total Irrigated Area		93.8	
Pump sets	206		
No. of Tractors	29		
Groundwater availability and use	No. of blocks	% area	Quality of water
Over exploited	-		
Critical	-		
Semi-critical	-	-	
Safe	7	100	
Wastewater availability and use	-	-	
Ground water quality	-	-	-

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

Source: Irrigation Programme (kharif 2008-09) for Malkangiri district, DRDA, Malkangiri

Area under major field crops & horticulture etc. as per latest figure (2008)

1.7	Major field crops cultivated	Area ('000 ha)							Grand total
		<i>Kharif</i>			<i>Rabi</i>			Summer	
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Paddy	42.0	50.9	92.9	0.9	-	0.9	-	187.6	
Maize	2.1	6.7	8.7	0.0	-	0.0	-	17.5	
Greengram	0.6	4.7	5.3	2.0	-	2.0	-	14.6	
Groundnut	0.0	1.7	1.7	18.2	-	18.2	-	39.8	
Sesamum	5.5	22.5	28.0	-	-	-	-	56	
Others (Specify)	-	-	-	-	-	-	-	-	
Horticulture crops- Fruits	Total area('000 ha)								
Mango	7.2								
Citrus	0.7								
Banana	0.5								
Guava	0.5								
Papaya	0.05								
Others (Specify)	0.02								
Horticulture crops- Vegetables	Total area('000 ha)								

Chilli	1.6
Onion	0.2
Turmeric	0.3
Ginger	0.3
Garlic	0.1
Others (Specify)	-
Medicinal and Aromatic crops	-
Plantation crops	-
Fodder crops	-
Total fodder crop area	21
Grazing land	-
Sericulture etc.	-
Others (specify)	-

Source: Orissa Agriculture Statistics 2008-2009 (DoA & FP, Orissa, Bhubaneswar)

1.8	Livestock (Source: 17th Livestock Census, 2003)	Male ('000)	Female ('000)	Total ('000)
	Non-descriptive cattle (local cows)			429
	Improved cattle			
	Crossbred cattle			5.7
	Non – descriptive Buffaloes			47
	Descriptive buffalo			
	Total buffalo			47
	Commercial dairy farms			N.A.
	Goat			145
	Sheep			28.5
	Others (Camel, Pig, Yak etc.)			60.2
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial		-	
	Backyard		487.2	
	Duck		24.4	
1.10	A. Capture			
	Marine	No. of fishermen	Boats	Nets
		Marine fisheries not available		
	Inland	No. farmer owned ponds	No. of reservoir	No. of village tanks
		5260	3	887
	B. Culture			
	Inland Fisheries	Area (ha)	Yield (MT/ha)	Production (in MT)
	Brackish water	-	-	-
	Fresh water	39737.2	0.1	3529.6
	Others			

Source: Fisheries Department, annual progress report08-09 Malkangiri

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	
		Production ('000 t)	Productivity (kg/ha)	Production ('000m t)	Productivity (kg/ha)	Production\ ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Major field crop								
	Paddy	165.4	1780	-	-	2.3	2480	167.7	1787
	Maize	14.2	1625	0.6	1995	-	-	14.8	1637
	Greengram	0.9	310	2.2	492	-	-	3.0	420
	Groundnut	2.6	1576	42.6	2336	-	-	45.2	2272
	Sesamum	13.1	470	-	-	-	-	13.1	470
Major Horticultural crops									
	Onion	-	-	1.3	8400	-	-	1.3	8400
	Chilli	0.6	814	0.8	892	-	-	1.4	859
	Ginger	0.5	1880	-	-	--	-	0.5	1880
	Garlic	-	-	0.3	3000	-	-	0.3	3000
	Turmeric	0.5	2120	-	-	-	-	0.5	2120

Source: Orissa Agriculture Statistics 2008-2009 (DoA & FP, Orissa, Bhubaneswar)

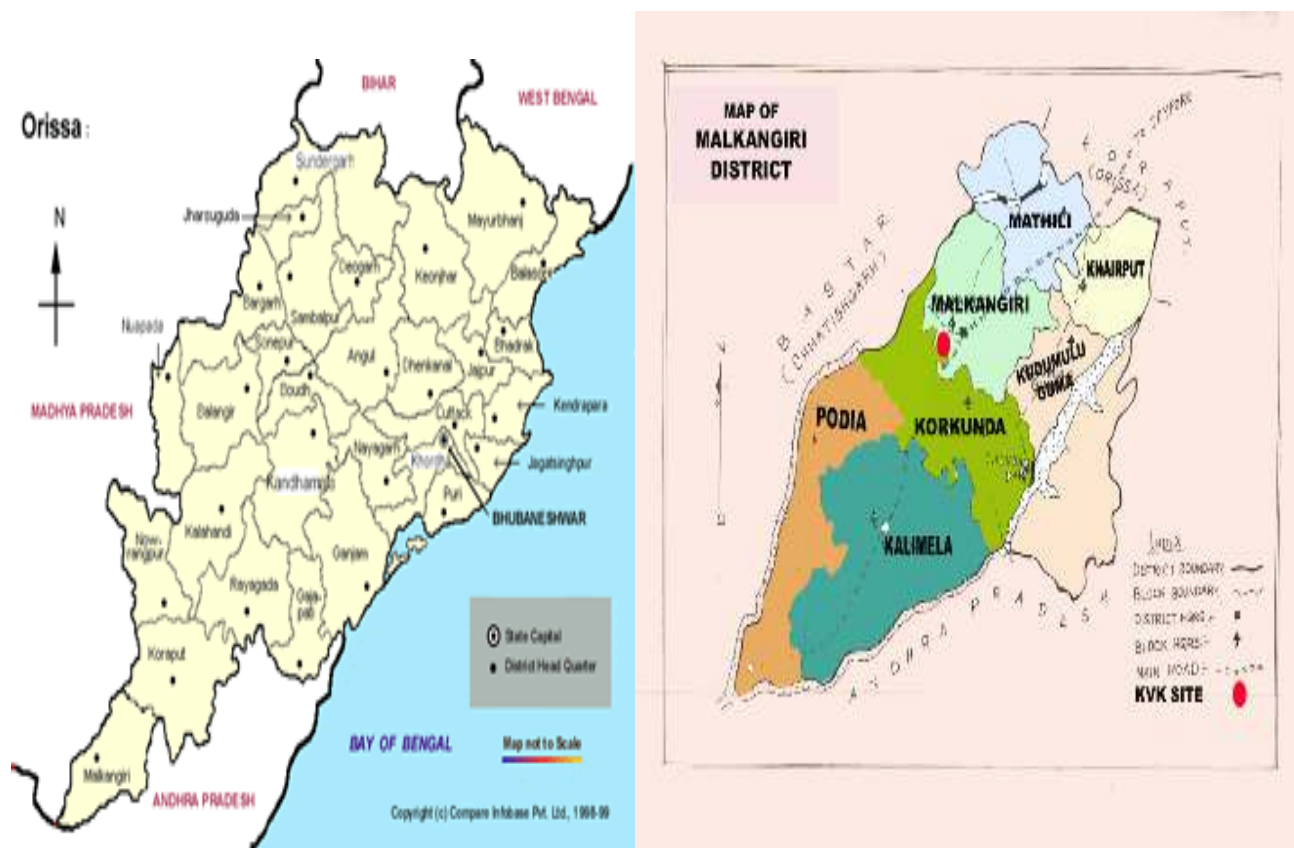
1.12	Sowing window for 5 major crops (start and end of sowing period)	Paddy	Groundnut	Maize	Sesamum	Greengram
	Kharif-Rainfed	June 1 st week – July 2 nd week	June 1 st week – July 2 nd week	June 1 st week – July 2 nd week	June 1 st week – July 2 nd week	July 4 th week
	Kharif-Irrigated	June 1 st week – July 2 nd week	June 1 st week – July 2 nd week	June 1 st week – July 2 nd week	-	Aug 1 st week
	Rabi-Rainfed	-	September 2 nd week-	October 2 nd week-	September 2 nd week-	November 2 nd week

			October 1st week	November 1 st week	October 1st week	
	Rabi-Irrigated	December 2 nd week – January 1 st week	Dec 2 nd week – January 1 st week	November 4 th week- January 1 st week	-	January 2 nd week – February 1 st week

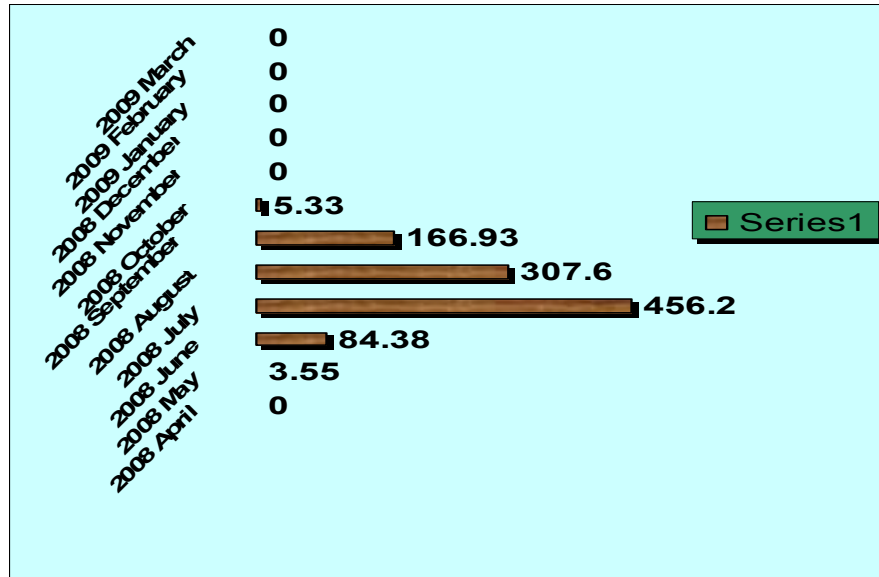
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	√		
	Flood		√	
	Cyclone			√
	Hail storm			√
	Heat wave		√	
	Cold wave			√
	Frost			√
	Sea water inundation			√
	Pests and diseases (specify) Fruit & shoot borer ,wilt blast, gall midge Paddy stem borer, Maize stem borer, pod borer, leaf folder Termite, Mango hopper, Fruit flies Swarming caterpillar in Aug/Sept., BPH in Paddy, BLB in Paddy ,Root knot nematode	√		

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: No
		Soil map as Annexure 3	Enclosed: No

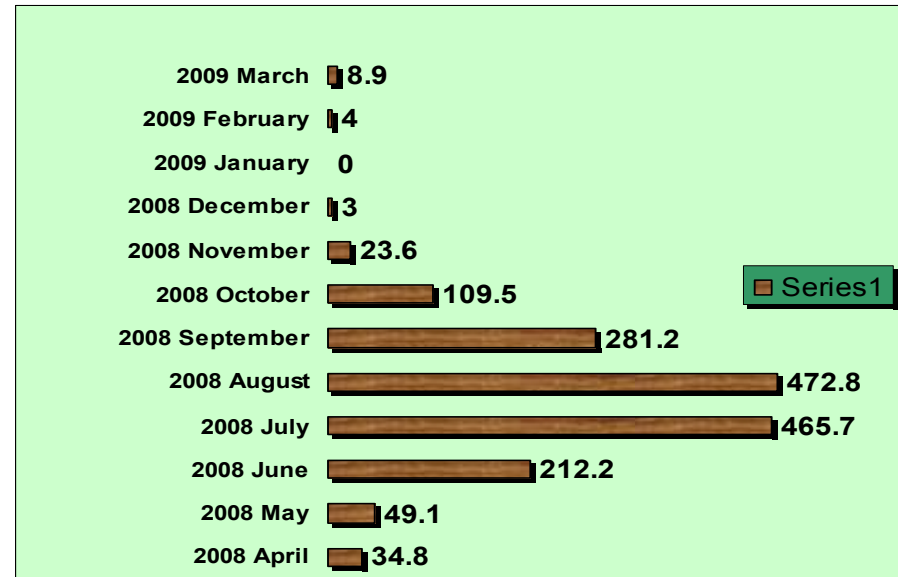
Annexure 1: Location Map of district



Annexure2: Monthly Annual Rainfall



Normal Rainfall data of 2008-09



Annexure 3: Soil map



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Suggested Contingency Measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 2 weeks (June 4 th week)	Medium rainfall red soils, undulated up lands	Rice	Prefer drought tolerant varieties of Paddy crop i.e. JHU, Pathara, Bandana, Sneha	<ul style="list-style-type: none"> • Closer row and plant spacing, • In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to bunded uplands • Apply full P, K and 20% N of recommended dose along with well decomposed organic matter for early seedling vigor, • Conservation furrow, Inter-cultivation and thinning to maintain plant population per unit area of the crop 	Supply of seeds through OSSC , through NFSM
		Ragi/ Maize	Ragi varieties : Bhairabi, Chillika Maize varieties : Kargil-633,Ganga11,Novjot, Nabin		
		Sesamum	Uma,Nirmala,Prachi		
		Ground nut	Smruti,Devi,JL-24		
	Medium rainfall, Red and laterite soils	Rice	Growing of Medium duration rice variety: MTU 1010, Konark, Jogesh, Lalat, Manaswini, Naveen, Bejeta Surendra, Lalat, Masoori	<ul style="list-style-type: none"> • Use of bulky organic manures with full P, K and 20% N of recommended dose for basal application. • Maintain more plant population for direct seeded rice. • In-situ rain water conservation, harvesting of runoff for recycling and 	
		Greengram	Prefer varieties Sujata, Durga, PDM-11& 54		

		Maize	Prefer varieties Kargil-633,Ganga11, Novjot, Nabin. Intercropping of Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Arhar var. ICPL 87, UPAS 120, TUR N-2.	ground water recharge by elevating the field bunds • Ridge and furrow methods of sowing at closer plant-to-plant distance with wider inter-row spacing.	
High rainfall, Red soils	Rice-Greengram		Growing of short duration paddy varieties like JHU, Pathara, Bandana, Sneha and Hira.	<ul style="list-style-type: none"> • Broadcasting at first shower of rainfall. • Apply full P, K and 20% N of recommended dose along with well decomposed organic matter and lime application for early seedling vigor, • Strengthen the field and contour bunds for in-situ moisture conservation. • Ridge and furrow methods of sowing at closer plant-to-plant distance and inter-row spacing. 	Seeds from RKVY, OSSC, OUAT Supply of seeds from RRTTS, OUAT
			Greengram varieties: Sujata, Durga, PDM-11& 54. Cucumber, Okra, Cowpea in bunds of upland paddy to conserve soil moisture		
		Groundnut-Fallow	Prefer Groundnut varieties Smruti, JL 24,Devi		
		Greengram-Fallow	Prefer Greengram varieties PDM-11, Durga		
Low rainfall, low elevation, red and black laterite soils	Rice	Parijata, JHU, Pathara, Bandana, Khandagiri	<ul style="list-style-type: none"> • FYM application • Maintain more plant population for direct seeded rice. • In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to banded uplands • Ridge and furrow methods of sowing 	Seed drill under RKVY, Supply of seeds from OSSC Supply of seeds through NFSM	
	Maize	Intercropping of maize with Cowpea (Utkal Manik) in 1:2 to manage water shortage.			
	Sesamum	Uma, Nirmala, Prachi			

		Vegetables (Brinjal)	Brinjal Varieties: Blue star, Utkal, Anushree, Utkal Tarini	at closer plant-to-plant distance and inter-row spacing.	
		Chilli /	Chillies: Pusa jwala, Utkal ava		
		Tomato /	Tomato Varieties: Utkal Kumari, Utkal Raja (determinate type)		
		Cowpea)	Cowpea: Utkal Manika		

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 4 weeks (July 2 nd week)	Medium rainfall, red soils undulated uplands	Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e. JHU, Pathara, Bandana, Sneha	<ul style="list-style-type: none"> Apply life saving irrigation to maintain nursery When the mortality of seedlings is less than 50% gap filling should be done and if more than 50% mortality, resow the crop with short duration paddy variety after receiving the rainfall. In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed control and unbunded uplands converted to banded uplands Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation in groundnut crop Follow ridge and furrow method of planting for groundnut and vegetable crops 	Supply of seeds through OSSC, through NFSM
		Ragi/Maize	Ragi: Bhairabi, Chillika Maize: Kargil-633, Ganga 11, Novjot, Nabin		
		Sesamum	Uma, Nirmala, Prachi		
		Ground nut	Smruti, Devi, JL-24		

	Medium rain fall, red and laterite soil	Rice	Growing of Medium duration rice varieties: MTU 1010, Konark, Jogesh, Lalat, Manaswini, Naveen, Bejeta, Surendra, Lalat, Masoori	<ul style="list-style-type: none"> Nursery can be raised for transplanting after Use of bulky organic manures with full P,K and 20% N of recommended dose for basal application. Maintain more plant population for direct seeded rice. When the mortality of seedlings is less than 50%, gap filling should be done and if more than 50% mortality, resow the crop with short duration paddy variety after receiving the rainfall. In-situ rain water conservation by elevating the bund. Complete hoeing, weeding followed by ridging to the base at 20 DAS for in-situ moisture conservation 			
		Greengram	Sujata, Durga, PDM-11& 54				
		Maize	Kargil-633,Ganga11,Novjot, Nabin Intercropping of Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Arhar var. ICPL 87, UPAS 120, TUR N-2				
	High rainfall, Red soil	Rice - Greengram	Growing of short duration Paddy varieties like JHU, Pathara, Bandana and Sneha. Greengram var. Sujata, Durga, PDM-11& PDM- 54. Grow cover crops like Cucumber, Sweet Potato, Cowpea in the bunds to conserve moisture.			<ul style="list-style-type: none"> If rice population is more than 50% do khelua operation. Raise community nursery of short duration rice varieties at reliable water sources to save delay in transplanting. Do not top dress nitrogen in nursery Complete hoeing, weeding followed by ridging to the base of the root crop at 20 DAS for in-situ moisture conservation 	Seeds from NHM Supply of seeds from OSSC, OUAT Linkage with NFSM for seed supply
		Groundnut-Fallow	Prefer G.nut varieties Smruti, JL 24,Devi				
		Greengram-Fallow	Prefer Greengram varieties PDM-11, Durga				
			Follow strip cropping in rolling topography for moisture conservation				

Condition	Suggested Contingency Measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 6 weeks (July 4 th week)	Medium rainfall, red soils, undulated uplands	Rice	Varietal substitutions of drought tolerant varieties of the sole crops i.e. Parijata, JHU, Pathara, Bandana, Khandagiri, Non paddy crop such as , arhar, green gram, cow pea should be grown	<ul style="list-style-type: none"> • In rainfed situation apply full P, K and reduce Nitrogen application by 40% of the recommended dose as basal along with well decomposed organic manure for early seedling vigour • Close the drainage hole and check seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Crop field should be kept weed free 	Supply of seeds through ATMA and NFSM
		Ragi / Maize	Growing of Ragi var.like - Bhairabi, Chillika Maize:Kargil633,Gangal1, Novjot, Nabin	<ul style="list-style-type: none"> • Seed treatment and proper plant protection measures should be taken to avoid germination failure. • Remove the pest and disease infected plants from the main field. 	-do-
		Sesamum - fallow	Growing of var.like-Uma, Nirmala, Prachi	-do-	-do-
	Medium rain fall, red and laterite soils	Rice	Growing of Medium duration rice varieties: MTU-1010,Konark, Jogesh, Lalat, Manaswini, Naveen, Bejeta, Surendra, Masoori	<ul style="list-style-type: none"> • Nitrogen application should be reduced by 40 % in basal. Full recommended dose of P and K should be applied. Close the drainage hole and check seepage loss in direct sown rice. 	

		Greengram	Sujata, Durga, PDM-11& 54	<ul style="list-style-type: none"> • With hold N fertilizer (top dressing) application till receipt of rainfall. • Timely weeding 	
		Maize	Kargil-633,Ganga11,Novjot, Nabin Intercropping of Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Arhar var. ICPL 87, UPAS 120, TUR N-2.		
High rainfall, red soils	Rice-Greengram		Growing short duration paddy like, JHU, Pathara, Bandana, Sneha. Greengram var. Sujata, Durga, PDM-11& PDM-54 Grow cucumber, okra, Cowpea in bunds of upland paddy to conserve soil moisture.	<ul style="list-style-type: none"> • Close the drainage hole and check seepage loss in direct sown rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Transplant seedlings up to 45 days old. • Follow need based plant protection measures against stem borer and blast. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time of transplanting. • Apply life saving irrigation as and when necessary • Follow strip cropping in rolling topography for moisture conservation. 	Seeds from NHM Supply of seeds from OSSC, OUAT Linkage with NFSM for seed supply
		Groundnut-Fallow	Smruti, JL 24,Devi		
		Greengram - Fallow	PDM-11, Durga		
Low rain fall, red and black laterite soil	Rice	JHU, Pathara, Bandana, Sneha,	<ul style="list-style-type: none"> • Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Post emergence spray of Quizalofop 5%EC @ 0.05 kg ai / ha in 500lt of water to control weeds in groundnut. • Spraying of 2% KCl + • 0.1 ppm Boron to black gram. 		
	Maize	Intercropping of maize with Cowpea (Utkal Manika) in 1:2 proportion in view of			

			water shortage	<ul style="list-style-type: none"> • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Top dressing of 25 % urea and potash after receipt of rain for upland rice. • Follow ridge and furrow method of planting for groundnut crops. • 8) Follow strip cropping in rolling topography for moisture conservation 	
		Sesamum	Uma,Nirmala,Prachi		
		Vegetable: (Brinjal Chilli Tomato Cowpea)	Brinjal : Blue star, Utkal, Anushree, Utkal Tarini. Chillies: Pusajwala, Utkal ava Tomato:Utkal Kumari, Utkal Raja (determinate type) Cowpea:Utkal Manik		

Condition	Suggested Contingency Measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Medium rainfall, red soils with undulated up lands	Rice	Grow non paddy crops In the event of late arrival of southwest monsoon the pulses like cowpea blackgram, greengram can be grown	<ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown rice regularly. • Withhold N fertilizer application till receipt of rainfall. • Follow plant protection measures against stem borer and blast in nursery. • Use tractor, power tiller, rotavator for speedy land preparation. • Follow close planting of 4-5 seedlings per hill. • Apply full P, K and 50 % N at the time 	Supply of seeds through OSSC , NFSM.
		Ragi	Bhairabi, Chillika		
		Maize	Kargil-633,Ganga 11,Novjot, Nabin		
		Sesamum	Uma,Nirmala,Prachi		

		Groundnut	Smruti,Devi,JL-24 Intercropping(2:1 & 4:1 ratio) maize + cowpea(2:1)	of transplanting. <ul style="list-style-type: none"> Follow ridge and furrow method of planting for groundnut and vegetable crops 	
Medium rainfall, red and laterite soils	Rice	Growing of Medium duration rice variety: MTU 1010, Konark, Jogesh, Manaswini, Naveen, Bejeta, Surendra,lalat,masoori	<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 plant protection measures against stem borer and blast in nursery. Use tractor, power tiller, rotavator for speedy land preparation. Follow close planting of 4-5 seedlings per hill. Apply full P, K and 50 % N at the time of trans-planting. Apply life saving irrigation. 	Supply of seeds through OSSC , through NFSM	
	Greengram	Sujata, Durga, PDM-11 & 54			
	Maize	Kargil-633,Ganga 1,Novjot, Nabin			
		Intercropping of Arhar + Sesamum (2:4) Maize + Cow pea (2:2) Arhar var. ICPL 87, UPAS 120,TUR N-2			
High rainfall, red soils	Rice- Greengram	Growing of short duration paddy like, JHU, Pathara, Bandana, Sneha. Greengram varieties are Sujata, Durga, PDM-11 & 54 Cucumber, Okra, Cowpea in bunds of upland paddy to conserve soil moisture.	<ul style="list-style-type: none"> Close the drainage hole and check the seepage loss in direct sown rice regularly. Withhold N fertilizer application till receipt of rainfall. Follow plant protection measures against stem borer and blast in nursery. Use tractor, power tiller, rotavator for speedy land preparation Follow close planting of 4-5 seedling per hill. 	Seeds from NHM Supply of seeds from OSSC, OUAT Linkage with NFSM for seed supply	
	Groundnut- local	Prefer G.nut varieties Smruti, JL 24,Devi			

		Greengram- local	Prefer Greengram varieties PDM-11, Durga	<ul style="list-style-type: none"> • Apply full P, K and 50 % N at the time of transplanting. • Follow strip cropping in rolling topography for moisture conservation 	
	Low rain fall, low elevation, red and black laterite soils	Rice	JHU, Pathara, Bandana, Sneha	<ul style="list-style-type: none"> • Follow ridge and furrow method of planting for groundnut crops. • Follow strip cropping in rolling topography for moisture conservation 	
		Maize	Intercropping of maize with Cowpea (Utkal Manik) in 1:2 to manage water Shortage		
		Sesamum	Uma,Nirmala,Prachi.		
		Vegetable: (Brinjal	Brinjal: Blue star, Utkal, Anushree, Utkal, Tarini		
		Chilli	Chillies: Pusa Jwala, Utkal ava		
		Tomato	Tomato:Utkal Kumari, Utkal Raja (determinate type)		
		Cowpea)	Cowpea:Utkal Manika		

Condition					
Early season drought (normal onset)	Major Farming situation	Normal 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.	Medium rainfall, red soils with undulated uplands	Rice Maize Ragi Sesamum Groundnut	<ul style="list-style-type: none"> • Resow the crop if the mortality is more than 50%. • Adjust the plant population by redistribution of hills (Khelua) in directed seeded rice. 	<ul style="list-style-type: none"> • Organic matter, FYM application. • Lime, potash, P application as basal prior to transplanting. • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation. 	Supply of seed drills and intercultural implements through RKVY.
	Medium rain fall, red and laterite soils	Rice Greengram Maize	-do-	<ul style="list-style-type: none"> • Strengthen the field and contour bunds for in-situ moisture conservation. • Organic matter, FYM application • Lime, potash, P, basal application prior to transplanting • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation in groundnut and vegetable crops. 	-do-
	High rainfall, red soils	Rice- Greengram Groundnut- Fallow Greengram- Fallow	-do-	<ul style="list-style-type: none"> • Strengthen the field and contour bunds for in-situ moisture conservation. • Organic matter, FYM application. • Lime, potash, P, basal application as prior to transplanting. • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for groundnut and vegetable crops. • Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material 	-do-

	Low rain fall, red and black laterite soils	Rice Maize Sesamum Vegetables: (Brinjal/ Chilli/ Tomato/ Cowpea)	<ul style="list-style-type: none"> • If rice population is less than 50% resow the crop. • If rice population is more than 50% carryout weeding and adjusts the plant population by redistribution of hills (Khelua). • Lime, potash, P, application as basal prior to transplanting 	<ul style="list-style-type: none"> • Organic matter, FYM appli-cation. • Select early maturing varieties of 90days duration. • Seedlings raised in polybags may be transplanted. • Plugging of drainage hole for checking seepage loss and to provide life saving irrigation as and when necessary. • Grow vegetables in ridges and allow the furrow to conserve rainwater. Apply paper mill sludge (PMS) @ 5 q/ha, potash, boron and FYM during final land preparation. 	
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Condition	Suggested Contingency Measures				
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At vegetative stage	Medium rain fall, red soil with undulated up lands	Rice Maize Ragi Sesamum Ground nut	Foliar application of nutrients 2% Urea or 2% DAP or 1% KNO ₃	<ul style="list-style-type: none"> • Weed out the field. • Strengthen the field bunds & close the holes • Provide life saving irrigation. • Inter-cultivation (Soil mulching). • Open conservation furrow(give distance/interval) • Organic mulching with previous crop residues. • Scooping • Compartmental bunding • Follow ridge and furrow method of planting • Follow strip cropping in rolling topography for moisture conservation. 	

	Medium rain fall, red and laterite soils	Rice Greengram Maize	Foliar application of nutrients 2% Urea or 2% DAP or 1% KNO ₃	<ul style="list-style-type: none"> • Weed out the field. • Strengthen the field bunds & close the holes • Provide life saving irrigation. • Inter-cultivation (Soil mulching). • Conservation furrow. • Organic mulching with previous crop residues. • Scooping. • Compartmental bunding. 	
	High rainfall, red soils	Rice-Greengram Groundnut-Fallow Greengram-Fallow	<ul style="list-style-type: none"> • Withhold N application • Apply Potassic fertilizer • Seedling of 45 days old can be transplanted or gap filled. • Do not practice beushaning 	<ul style="list-style-type: none"> • Weed out the field • Provide protective irrigation through harvested rain water • Strengthen field bunds. • Follow ridge and furrow method of planting for groundnut crops. 	Good quality seeds through NFSM and OSSC.
	Low rain fall, red and black laterite soils	Rice Maize Sesamum Vegetable (Brinjal / Chilli / Tomato /Cowpea)	-do-	<ul style="list-style-type: none"> • Weed out the field • Follow plant protection measures • Provide protective irrigation through harvested rain water • Strengthen field bunds. 	

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 measures	Remarks on Implementation
At reproductive stage	Medium rain fall, red soils with undulated uplands	Rice	<ul style="list-style-type: none"> • Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds Remove and destroy pest and disease affected plants • Spray Tricyclazole (Beam/Team) 0.06-0.1% at 10-12 days interval to control blast and brown spot diseases in Rice • Spray methyl demeton/ dimethioate to control stem borer and Gundhi bug 	<ul style="list-style-type: none"> • Provide irrigation at flowering and grain filling stage. • Gulli plugging and recycling of rain water • Provide life saving irrigation. • Incase of complete failure of Kharif crop, go for pre-rabi crops/ minor pulses like Horsegram (var. Urmi). 	
		Maize	<ul style="list-style-type: none"> • Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought 		
		Ragi			
		Sesamum			
		Ground nut			

	Medium rainfall, red and laterite soils	Rice Greengram Maize	<ul style="list-style-type: none"> • Take need based plant protection measures • Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought. 	<ul style="list-style-type: none"> • Provide irrigation at flowering and grain filling stage. • Gulli plugging and recycling of rain water • Provide life saving irrigation. • Incase of complete failure of Kharif crop, go for pre-rabi crops/ minor pulses like Horsegram (var. Urmi).Crops like Cow pea, Greengram, Blackgram, Maize may be harvested. • Crops like Cowpea, Greengram, Blackgram, Maize may be harvested 	
	High rainfall, red soils	Rice- Greengram	Spray 2% KCl + 0.1 ppm boron to non paddy crops Spray Tricyclazole (Beam/Team) 0.06-0.1% at 10-12 days interval to control blast and brown spot diseases in rice Spray methyl demeton/ dimethioate to control stem borer and Gundhi bug	-do-	
		Groundnut- Fallow			
		Greengram- Fallow			
	Low rainfall, red and black laterite soils	Rice Maize Sesamum Vegetable: (Brinjal / Chilli / Tomato / Cowpea)		-do-	

Condition	Suggested Contingency Measures				
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium rain fall, red soils with undulated uplands	Rice	Harvesting at physiological maturity	Utilization of residual moisture for early sowing of pre-rabi crops like Cowpea (SEB – 2, Utkal Manik), Horsegram (Urmi), Greengram (Durga), Blackgram (Ujala),	Construction of Farm ponds through NREGS, RKVY Linkage with NFSM, NHM, OSSC for seed supply
		Ragi			
		Maize			
Sesamum					
Ground nut					
	Medium rain fall, red and laterite soils	Rice	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, which may withstand moisture stress condition. Grow Cowpea, Field bean, Horsegram, Blackgram, Linseed in the month of October Grow crucifer vegetables & other high yielding Solanaceous vegetables	Farm ponds through IWSM programme
		Greengram	Harvesting at physiological maturity.		
		Maize	Harvesting of plants for fodder purpose if cob formation hampered.		
	High rainfall, red soils	Rice-Greengram	Harvesting at physiological maturity.	Grow Cowpea, Carrot, Sunflower, Horsegram, Blackgram, Linseed in the	Farm ponds through IWSM programme

		Groundnut		month of October	Seeds from NHM/NFSM
		Greengram			
	Low rain fall, red and black laterite soils	Rice	Harvesting at physiological maturity.	Plan for short duration high yielding oilseed crops especially Sesamum & pulse crops	Farm ponds through IWSSM programme
		Maize			
		Sesamum			
		Vegetable: (Brinjal/ Chilli / Tomato / Cowpea)	Vegetables approaching maturity may be harvested for marketing	Vegetables like Potato, Carrot. Radish, Cabbage, Cauliflower.	

2.1.2 Drought- Irrigated situation

Condition	Suggested Contingency Measures				
Delayed/ limited release of water in canals due to low rainfall	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Canal irrigated red soils in medium lands	Rice-Rice	Rice-Groundnut/Sesamum	Limited & life saving irrigation, alternate furrow irrigation, drip irrigation, mulching, Irrigation in root zone	Seeds through NFSM, NHM
			Rice: MTU 1010, Konark, Jogesh, Lalat, Manaswini, Naveen, Bejeta, Surendra, masoori		

			Groundnut: Smruti,JL- 24,Devi Sesamum :Amrit,Uma,GT-2		
Condition	Suggested Contingency Measures				
Lack of inflows into tanks due to insufficient/ delayed onset of monsoon	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	NA				

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
	Borewell Irrigated red soil	Vegetable-Vegetable Pointed gourd(local)	Short duration vegetables as detailed below: Brinjal :Utkal Anushree,Utkal Tarini	Alternate furrow irrigation, Limited & life saving irrigation, sprinkler/ Drip irrigation, use Mulching, Irrigation in root zone.	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,
			Okra BO-2, NP10		
			Chilli: Pusa jwala, Utkal ava		
			Tomato: Utkal Kumari, Utkal Raja		

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 harvest stage
Continuous high rainfall in a short span leading to water logging				
Paddy	Not a substantial problem as uplands don't maintain water logging condition for long time	Provide drainage If possible	Drain out excess water, harvest at physiological maturity	Shifting to a safer place Dry in shade in a well ventilated space
Groundnut	Provide drainage	Provide drainage	-do-	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Greengram	-do-	-do-	-do-	Shifting to a safer place Dry in shade in a well ventilated space Safe storage against pest & diseases
Maize	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	-do-
Sesamum	-do-	-do-	-do-	-do-
Horticulture				
Fruits (Mango, Citrus)	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	Raise 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,	Vines should be staked along	Ensure drainage	Ensure drainage

	drainage,	elevated frames	Harvesting at tender stages	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
Sesamum	Drainage if water logging persists	Provide drainage	Lodged pods may be harvested at physiological maturity stage	Shifting to a safer place Dry in shade in a well ventilated space
Horticulture	NA			
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray tricyclazole against blast, Chloropyrifos, Regent against stem borer, Monocrotophos against Swarming caterpillar	Spray tricyclazole against blast, Chloropyrifos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Malathion spray against Gundhi bug	Sun drying / disinfection of gunny bags with malathion or heat treatment to manage stored grain pests
Maize	Apply Phorate granules in the whorls & spray of Endosulfan against maize stem borer	Spray Dimethoate against aphid	Wrapping of cobs against bird damage	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Sesamum	Removal of infested tips to manage leaf webber	Spraying of systemic insecticide against borers	Spray of Ekalux against capsule 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 beetle, hand collection of egg	Application of Neem oil & Triazophos alternatively against	Spraying of Profenophos against fruit borer	Segregation of infested fruits & destruction

	mass Soil drenching of COC & streptomycin against wilting	brinjal fruit & shoot borer/ leaf curl virus,	Metalaxyl against Anthracnose	
Cucurbit vegetables	Spraying of Ekalux against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & streptomycin 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 re-sowing	Drainage of excess water. Apply 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. 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). Management of pests & diseases	Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops. 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.	Drainage of excess water. 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 Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of cucurbits after receding flood water

Maize	Drainage, If damping off then resowing	Ensure drainage, Make ridge & furrows	Ensure drainage, Make ridge & furrows	Harvest the cobs as soon as possible
Horticulture	NA			
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	Re-do the nursery. Always try to keep extra seedlings in the nursery to meet additional requirement	Gap filling with aged seedlings	Need based irrigation should be provided	Harvest at Physiological maturity
G.Nut	Early rabi sowing to avoid heat wave at seed setting	Pest control measures should be taken	During the harvest at extreme heat try to give one irrigation to moisture the field for easy harvest.	Early harvest avoiding heat wave for increasing oil content.
Horticulture				
Mango	Sapling should be kept in the shade net house. Planting of sapling should be avoided up to the onset of monsoon.	Regular irrigation of the orchard. If possible plant Bamboo/Eucalyptus plant at the boundary of the orchard to check the heat wave.	Regular irrigation of the orchard to avoid fruit and flower drop. If possible plant Bamboo/Eucalyptus plant at the boundary of the orchard to check the heat wave.	Regular irrigation of the orchard to avoid fruit drop. If possible plant Bamboo/Eucalyptus plant at the boundary of the orchard to check the heat wave.

Banana	-do-	-do-	-do-	-do-
Brinjal	Do not sow the seed in open condition. Nursery bed should be inside the shade net or at a shady place.	Irrigate the crop regularly. Spray the crop with acaricides as the infestation of mite and sucking pest population will increase.	Irrigate the crop regularly to avoid flower and fruit drop. Apply mulch to check water loss.	Irrigate the crop regularly to avoid fruit drop. Apply mulch to check water loss.
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

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	Livestock insurance, Encourage fodder cultivation in village grazing lands & near rivers, On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted, Excess fodder may be stored as hay/silage, Establish fodder bank near forest areas, Training & awareness camp among extension personnel for needful at time of exigencies.	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 biogases, and banana plant Crop residues such as 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.	Avail crop insurance, Supplementary feeding of remaining livestock and the replacement stock
Drinking water	Preserve water in community tanks, ponds etc with sanitization, Wells or dug wells may be constructed in advance, Training & awareness	Water sources from Temples, Mosques, and Churches may be used in case of shortfall of exiting potable water, Animals not to be exposed to outside rather they should be commonly fed.	Plan accordingly for next year

	camp among extension personnel		
Health and diseases management	Veterinary preparedness with vaccines & medicines, Training & awareness camp among extension personnel	Conducting animal health camps and treating the affected animals, Supplementation of mineral and vitamin mixtures	Culling of unproductive livestock, Proper disposal of dead animals
Floods			
Feed and fodder availability	Livestock insurance, Encourage fodder cultivation in village grazing lands & near rivers, On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted, Excess fodder should be stored as hay/silage, Establish fodder bank with dry straw & dry feed for at least 15 days, Training & awareness camp among extension personnel for needful at time of exigencies.	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. Procured feeds and fodders should be fed to all animals on the order of priority of animals. Straws and stoves that got soaked during floods need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying chuffing and sprinkling concentrate mixture can improve intake and utility.	Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	Preserve safe drinking water in community tanks which is not prone to seepage of rain or flood water, Arrange chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats & shelter places, Training & awareness camp among extension personnel	Drinking water is made available to the animals in any kind of clean container available with the farmer.	Provision of clean drinking water.
Health and diseases management	Prior construction of shelter places in elevated points, Vaccination of livestock 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, 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	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, drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. Keep the animals loose in paddock (sheltered or unsheltered) Releasing animals from the unnatural and harmful position or situation, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, Performing euthanasia on hopelessly injured and suffering animals with the consent of their owners	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.

	and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint) & the like.		Improving shed hygiene especially in the farmers household through cleaning and disinfection
Cyclone		NA	
Heat wave and cold wave		NA	

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Insurance of Poultry farms Ensure procurement of feed ingredients sufficient ahead Establish feed serve bank	Feed utilisation from feed bank Feed supplementation will be made to the farms	Availing insurance Attempt will be made for available of feed ingredient or compound feed to the farmers
Drinking water	Check water source for ensuring sufficient potable 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 diseases management	Procurement of vaccines and medicines and antistress agent. Feeding antibiotics Procurement of litter materials	Administration of vaccines Continue feeding of anti stress agent	Culling of affected birds
Floods			
Feed and fodder availability	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting roads	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control
Drinking water	Protect the water sources from submergence	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer
Health and diseases 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	NA
Heat wave and cold wave	NA

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 has 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	Prepare to release water into the habitat	Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	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 bunds. 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		NA	
Heat wave and cold wave		NA	