State: ORISSA

Agriculture Contingency Plan for District: SAMBALPUR

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Gujrat hills, Dandakaranya and Eastern Ghats hot moist sub-humid eco-sub-region.(12.1)		
	Agro-Climatic Zone (Planning Commission)	Eastern plateau and Hill Region (VII)		
	Agro Climatic Zone (NARP)	West central Table land zone (OR-9)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Bargarh, Debagarh, Jharsuguda, Sonapur and Sambalpur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21^0 27'55.77" N	85^0 58'30.31" E	167 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research & technology Transfer Station (RRTTS), Chiplima, Sambalpur-768025, Odisha		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Sambalpur , At/po-Chiplima,Pin-768025		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Regional Research & technology Transfer Station (RRTTS), Chiplima, Sambalpur, Odisha		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep):	1317.6	56	3rd week of June	4th Week of September
	NE Monsoon(Oct-Dec):	71.8	6	1st week of Oct	4th Week of Nov
	Winter (Jan- March)	57.5	3	1st week of Jan	4th Week of Feb

	Summer (Apr-May)	48.8	3	1st week of April	1st Week of May
	Annual	1495.7	68	-	-

1.3	**Land use pattern of the district** (latest statistics)	Geographical Area	Cultivated area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	666	194	363	38	13	19	4	18	30	17

*Source- Odisha, Agricultural statistics , 2008-09

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)**	**Area ('000 ha)**	**Percent (%) of total**
	Mixed red and black soil		
	Red sandy soil		
	Mixed red and yellow		
	Lateritic soil		

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	164	175.1
	Area sown more than once	118	
	Gross cropped area	282	
*Source- Odisha, Agricultural statistics , 2008-09			

1.6	**Irrigation**	**Area ('000 ha)**		
	Net irrigated area	61.38		
	Gross irrigated area	100.97		
	Rainfed area	103		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals (Major/Minor)		19.1	54.0
	Tanks			
	Open wells	9871	5.3	15.1
	Bore wells		0.3	1.0
	Lift irrigation schemes	238	3.8	11.0
	Micro-irrigation(Drip/sprinkler)	41/264	0.8	2.5
	Other sources (please specify)		5.7	16.1
	Total Irrigated Area		35.3	
	Pump sets	1036		
	No. of Tractors	97		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe	All blocks		
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source-Ground water board Sambalpur district

1.7 Area under major field crops & horticulture (as per latest figures) (2008-09)

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Paddy	55.7	75.4	131.1	20.2	-	20.2	-	151.3
	Greengram	0.06	14.2	14.3	1.7	-	7.9	-	22.3
	Blackgram	0.04	-	14.7	-	-	5.3	-	19.9
	Kulthi	-	-	-	6.7	-	6.7	-	6.7
	Redgram	-	2.9	2.2	-	-	-	-	2.2
	Maize	0.07	1.2	1.2	0.2	-	0.2	-	1.4
	Fieldpea	-	-	-	0.9	-	0.9	-	0.9
	Cowpea	-	-	-	0.7	-	0.7	-	0.7
	Groundnut	-	-	0.9	0.6	-	0.6	-	1.5
	Sesame	-	19.6	19.6	0.9	5.0	5.9	-	25.6
	Mustard	-	-	-	2.1	4.1	6.2	-	6.2
	Castor	-	-	0.1	-	-	0.3	-	0.4
	Sun flower	-	-	-	0.2	-	0.2	-	0.2
	Mesta	-	-	1.01	-	-	-	-	1.0
	Sweet potato	-	-	1.2	-	-	0.6	-	1.8
	Potato	-	-	-	-	-	0.3	-	0.3

	Onion	-	-	-	-	-	1.9	-	1.9
	Chilli	-	-	1.8	-	-	2.4	-	4.2
	Corriender	-	-	-	-	-	1.1	-	1.0
	Ginger	-	-	0.7	-	-	-	-	0.7
	Garlic	-	-	-	-	-	0.3	-	0.4
	Turmeric	-	-	0.2	-	-	-	-	0.2
	Sugarcane	-	-	-	-	-	-	-	0.04

Source-Orissa Agriculture Statistics 2008-09

	Horticulture crops – Fruits	**Area ('000 ha)**
		Total
	Mango	GF
	Guava	0.4
	Citrus	0.9
	Sapota	0.04
	Litchi	0.9
	Banana	0.6
	Pine apple	0.01
	Coconut	0.3
	Cashewnut	1.7
	Fodder crops	**Total**

	Green fodder	0.4
	Grazing land	137
	Sericulture etc	-
	Dry fodder	135

Source- CDVO, Office, Sambalpur

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			380
	Crossbred cattle			24.7
	Non descriptive Buffaloes (local low yielding)			27.2
	Descript Buffaloes			1.2
	Goat			184.1
	Sheep			20.9
	Pig			20.8
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial		443	
	Backyard			

1.10 **Fisheries** (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	

	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		No	**area**	**No**	**Area, ha**	**No**	**Area, ha**
		1259	678.80 ha	3	35699	3266	3682.51
	B. Culture						
				Water Spread Area (ha)		**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)						
	ii) **Fresh water** (Data Source: Fisheries Department)						
	Others						

Source- CDVO, Office, MPEDA/ Fisheries Department, Sambalpur

1.11 Production and Productivity of major crops (Year-2008)

1.11	Name of crop	**Kharif**		**Kharif**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Paddy	389.8	2973	113.4	5615	-	-	503.2	3325	-
	Maize	1.5	1207	0.3	1665	-	-	1.8	1269	-
	Jawar	0.05	788	-	-	--	-	0.05	788	-
	Bajra	0.06	505	-	-	-		0.06	505	-
	Small millets	0.02	467	-	-	-	-	0.02	467	-

	Mung	4.9	345	3.2	397	-	-	8.1	364	-
	Black gram	5.3	357	1.9	352	-	-	7.1	356	-
	Arhar	2.2	987	-	-	-	-	2.2	987	-
	Fieldpea	0.7	782	-	-	-	-	0.7	782	-
	Cowpea		-	0.6	782	-	-	0.6	782	-
	Sesame	9.9	508	2.7	457	-	-	12.7	496	-
	Ground nut	1.3	1455	0.9	1495	-	-	2.3	1471	-
	Others pulse	1.8	451	0.5	475	-	-	2.3	456	-

Source-Odisha Agriculture Statistics 2008-09

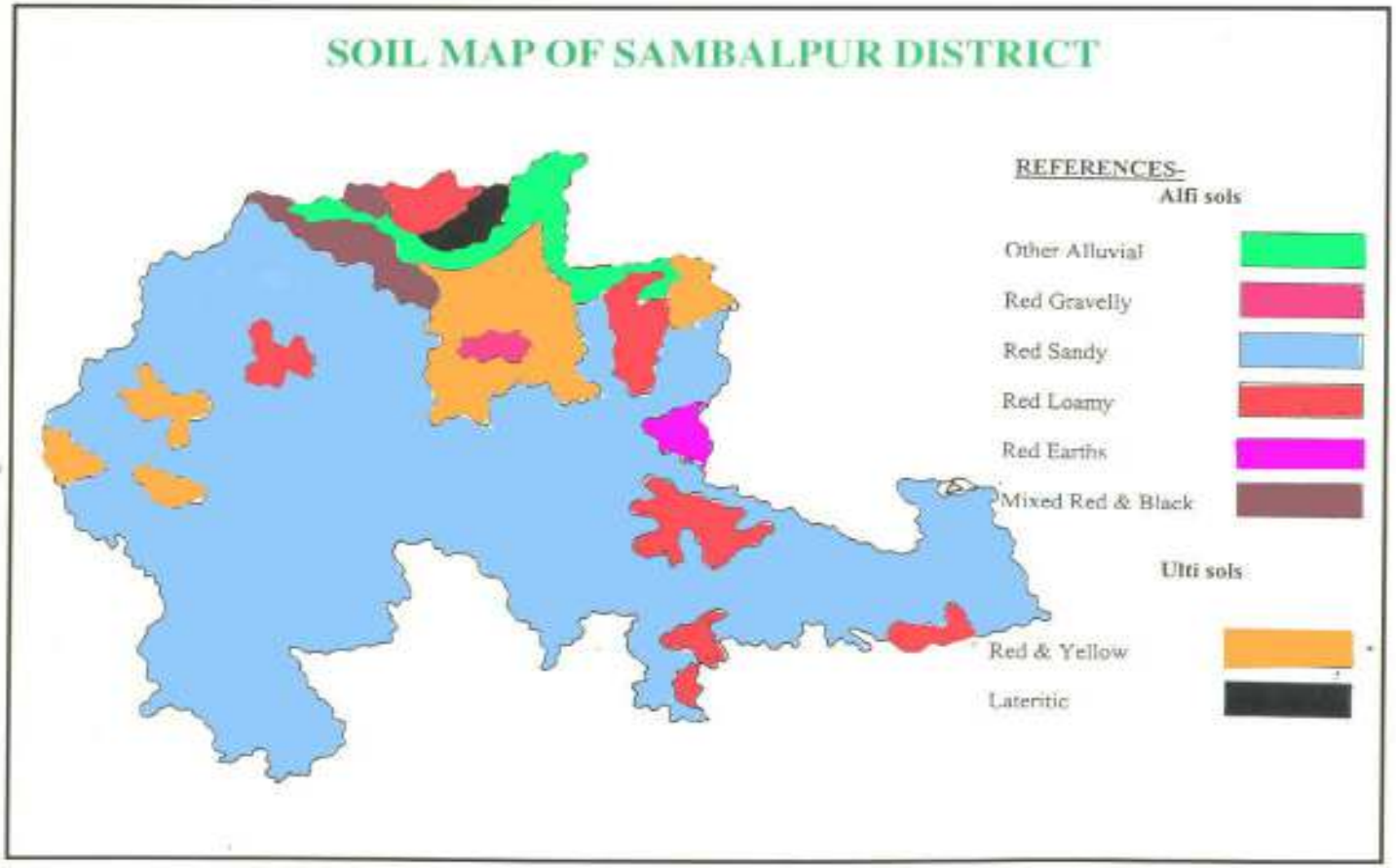
1.12	**Sowing window for 5 major field crops**	Paddy	Mustard	Black gram	Green gram	Sesame
	Kharif- Rainfed	June 2nd week-July 2nd week	-	June 2nd week-July 2nd week	June 2nd week-July 2nd week	June 2nd week-July 2nd week
	Kharif-Irrigated	July 2nd week – August 2nd week	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	December 2nd week-January 2nd week	October 2nd week-November 3rd week	January 2nd week-February 1st week	January 2nd week-February 1st week	January 2nd week- February 1st week

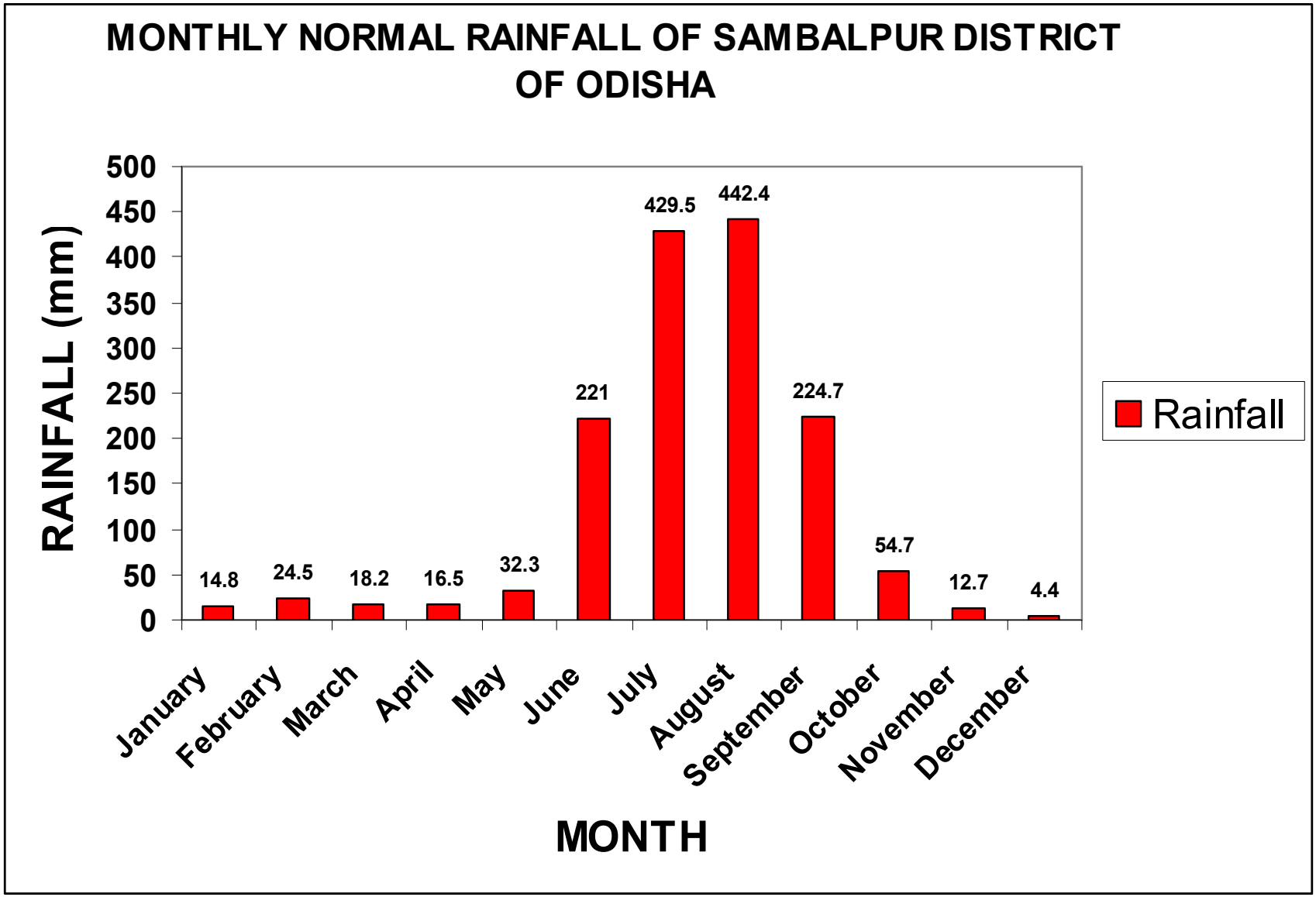
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought	✓	-	
	Flood	-	✓	
	Cyclone	-	-	✓
	Hail storm	-	✓	
	Heat wave	✓	-	
	Cold wave	-	-	✓
	Frost	-	-	✓
	Sea water intrusion	-	-	✓
	Pests and disease outbreak (specify)	Pest and disease out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

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

LOCATION MAP OF SAMBALPUR DISTRICT WITHIN ODISHA STATE

SOIL MAP OF SAMBALPUR DISTRICT




MONTHLY NORMAL RAINFALL OF SAMBALPUR DISTRICT OF ODISHA
RAINFALL (mm)
500
450
400
350
300
250
200
150
100
50
0
14.8
24.5
18.2
16.5
32.3
221
429.5
442.4
224.7
54.7
12.7
4.4
January
February
March
April
May
June
July
August
September
October
November
December
MONTH
Rainfall

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 4th wk**)***	Undulating plain land with mixed red and black soils	Paddy	Sowing may be continued to last week of June Select short duration var. (paddy-Heera, Kalinga-III)	• In-situ rain water conservation measures like contour farming, ,bunding, summer ploughing, intercultural, tillage practices may be followed • Weed control and unbunded uplands converted to bunded uplands. • Apply FYM in furrows before sowing.	OSSC ISOPOM NFSM Watershed mission
		Arhar	S-5. UPAS 120		
		Greengram	Sujata,Dhauli		
		Blackgram	PDM-11,PDM-54 T-9		
		Groundnut	Smruti,TAG-24 ICGS-44,JL-24,Kadiri-3		
		Sesame	Kanak .Kalika, Uma,Binayak		
		Vegetables Brinjal	Utkal.Madhuri, Blue star, U. Anushree, U. Tarini		
		Cow pea	Utkal Manika		
		Lady's finger	Utkal Gaurab		

		Paddy	Konark, Lalat, Manaswini, Naveen, MTU 1001 and Surendra	• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter and PMS (1t/ha) for early seedling vigor, • In-situ rain water conservation. • Take weed control measures in nursery & main field. • Life saving irrigation when needed.	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM.
	Rainfed plain land with red soils	Paddy	Paddy-Heera, Kalinga-III	• Perform off season ploughing to conserve moisture. • Adopt 10 % of land for rain water harvesting. • Adopt inter cropping/mixed cropping system in recurrent drought prone areas. • In paddy field bund should be strengthen to store rain water.	OSSC NFSM
		Green gram	Green gram,var-Sujata,Dhauli,PDM-11,PDM-54		
		Sesame	Kanak, Kalika,Uma,Binayak		
		Sole crops: Paddy	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation. • In paddy field bund should be strengthen to store rain water.	Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM
	Rainfed with mixed red and yellow black soils.	Paddy	Improved varieties of crop may be adopted. paddy-Heera, Kalinga-III	• Provide vegetative barriers (Vetiver filter strips) in un bunded up land to check soil loss and conserve rain water. • Water harvesting structures may be adopted in 10% of the field. • Life saving irrigation to crops.	OSSC NFSM
		Greengram	Sujata, Dhauli, PDM-11,PDM-54,		
		Black gram	Pant U-19 & PU 30,Ujala,Sarala		
		Sesame	Kanak., Kalika,Uma,Binayak		
		Sole crops Paddy	Lalat, Manaswini, Naveen, Bejeta, MTU 1010, Konark, Jogesh and Surendra	• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor,	Seed drill under RKVY. Supply of seeds through ATMA,

				• In-situ rain water conservation.	OSSC and NFSM
	Rain fed Plateu with laterite ,mixed red and yellow soil	Paddy	JHU, Heera, Sneha	• Raise bund height in paddy field to conserve rain water. • Sowing should be continued to last week of June. • Adopt 10% of land for rain water harvesting for storing rain water. • Apply FYM@ 5t/ha for improving soil water holding capacity. Life saving irrigation to crops.	OSSC NFSM
		Green gram	Sujata,Dhauli,PDM-11,PDM-54		
		Black gram	Pant U-19 &30,Ujala,Sarala		
		Ground nut	Smruti, Devi, TMV-2,TAG-24		
		Sole crops: Paddy	Lalat, Manaswini, Naveen, MTU 1010, Konark, Jogesh and Surendra	• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation.	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
	Undulating sub-mountainous tract with mixed red and yellow soil	Paddy	JHU, Heera, Sneha	• In –situ soil and water conservation measures like contour farming, cover cropping, bunding, trenching, ridge and furrow method of planting may be adopted. • Apply FYM@ 5t/ha for improving soil water holding capacity. • Apply all fertilizer basal. • Raise bund height in paddy field to conserve rain water. • Life saving irrigation to crops.	Orissa watershed mission OSSC NFSM
		Greengram	Sujata, Dhauli, PDM-11, PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Ground nut	Smruti, Devi, TMV-2,TAG-24		
		Sole crops: Paddy	Lalat, Manaswini, Naveen, MTU 1010, Konark, and Surendra	• Apply full P, K and 25% N of recommended dose along with well decomposed organic matter for early seedling vigor, • In-situ rain water conservation. Increase bund height in paddy field to conserve rain water.	• Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
delay by 4 weeks (July2nd wk**)***	Undulating plain land with mixed red and black soil	Paddy	JHU, Heera, Sneha	• In-situ rain water conservation measures like contour farming bunding, summer ploughing, interculture, tillage practices may be follwed • weed control and unbunded uplands converted to bunded uplands. • Water harvesting and recycling should be done. • Life saving irrigation to crops.	NFSM OSSC
		Green gram	Sujata, Dhauli, PDM-11,PDM-54		
		Black gram	Pant U-19 &30,Ujala,Sarala		
		Sesame	Kanak.Kalika,Uma,Binayak		
		Paddy	Grow Medium duration Paddy variety: (120d) Konark, Lalat, Manaswini, Naveen, Vijeta, MTU 1010 and Surendra	• Major imphasis should be given on in-situ rain water conservation,harvesting excess run-off for its recycling to make for life saving irrigation. • Transplant 3-4 seedlings/ hill. • Field bund to be raised to conserve rain water.	NFSM OSSC
	Rainfed plain land with red soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara	• Perform off season ploughing to conserve moisture. • Adopt 10 % of land for rain water harvesting. • Adopt inter cropping/mixed cropping system in recurrent drought prone areas for pulse and oilseed. • Life saving irrigation should be given.	OSSC NFSM
		Green gram	Sujata, Durga, PDM-11& 5 PDM-4		
		Black gram	Pant U-19 &30,Ujala,Sarala		
		Sesame	Kanak.Kalika,Uma,Binayak		

		Paddy	Konark, Lalat, Naveen and Surendra	• Raise community nursery for Paddy varieties at reliable water source to save further delay of transplanted Paddy. • Transplant 3-4 seedlings/ hill. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation.	NFSM OSSC
	Rainfed table land with mixed red and yellow black soil.	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara	• Perform off season ploughing to conserve moisture. • Adopt 10 % of land for rain water harvesting. • Adopt inter cropping/mixed cropping system in recurrent drought prone areas with pulses and oil seed cops. • Transplant 3-4 seedlings/ hill. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation when needed.	Intercultural farm implements under RKVY Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Sesame	Kanak.Kalika,Uma,Binayak		
		Paddy	Konark, Lalat, Naveen,MTU-1001 and Surendra	• If Paddy population is less than 50% resow the sprouted seeds in line through pre-germinated seed or fresh seedlings may be planted. • Raise community nursery for Paddy varieties at reliable water source to save further delay of transplanted Paddy. • Transplant 3-4 seedlings/ hill. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation to maintain nursery seedlings	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).

	Rain fed Plateau with laterite ,mixed red and yellow soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara,Bandana	• Perform off season ploughing to conserve moisture. • Weed contol in paddy. • Adopt 10 % of land for rain water harvesting. • Adopt inter cropping/mixed cropping system in recurrent drought prone areas. • Addition of Sufficient FYM@ 5t/ha to increase water holding capacity. • Weed control, intercultural and ridging in vegetables, maize and groundnut. • Organic mulching in vegetables.	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		
		Sesame	Kanak.Kalika,Uma,Binayak		
		Sole crops: Paddy	Konark, Lalat, Naveen and Surendra	• Raise community nursery for Paddy varieties at reliable water source to save further delay of transplanted Paddy. • Transplant 3-4 seedlings/ hill. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation to maintain nursery seedlings. • Check seepage loss of water.	• Intercultural farm implements under RKVY. • Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).ICDP
	Undulating sub-mountainous tract with mixed red and yellow soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Shneha,Bandana	• In –situ soil and water conservation measures like contour farming,cover cropping, bunding, trenching, ridge and furrow method of planting may be adopted. • Weed contol in paddy, pulses and oil seeds. • Apply FYM@ 5t/ha for	OSSC NSM
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Sarala		

		Sesame	Kanak, Kalika,Uma,Binayak	improving soil water holding capacity. • Apply life saving irrigation when needed.	
		Paddy	Lalat, Manaswini, Naveen, MTU 1001, Konark and Surendra	• Raise community nursery for Paddy varieties short duration at reliable water source to save further delay of transplanted Paddy. • Transplant 3-4 seedlings/ hill. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation to maintain nursery seedlings.	Orissa watershed mission OSSC NFSM

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (August 1st week)	Undulating plain land with mixed red and black soil	Paddy	Paddy crop should be substituted by low water requiring and short duration crops like pulses, oil seeds and vegetables.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Spraying of 2% KCl + 0.1 % Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops.	Intercultural farm implements under RKVY. Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Saral		
		Sesame	Uma, Nirmala and Prachi.		

		Vegetables Cow pea	 Utkal Manika	• Mulching of vegetables.	
		Lady's finger	Utkal Gaurav		
		Sole crop : Paddy	Lalat ,Konark ,Surendra , MTU1001	• Transplant 3-4 seedlings/ hill at closer spacing. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation to maintain nursery seedlings. • Check seepage loss of water in medium land.	OSSC NFSM
	Rainfed plain land with red soil	Paddy	Paddy crop should be substituted by low water requiring and short duration crops like pulses, oil seeds and vegetables.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Spraying of 2% KCl + 0.1 % Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Weed control in paddy, pulses and oil seeds. • Apply life saving irrigation. • Mulching in vegetables.	ISOPOM OSSC NFSM
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 &30,Ujala,Saral		
		Sesame	Uma, Nirmala and Prachi.		
		Kharif vegetables Cow pea	Utkal Manika		
		Lady's finger	Utkal Gaurav		
		Sole crops: Paddy	Lalat ,Konark, Surendra, MTU1001	• Close the drainage hole and check the seepage loss in direct sown medium land rice regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplant 3-4 seedlings/ hill at	ISOPOM OSSC NFSM

				closer spacing. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation.	
	Rainfed with mixed red and yellow black soil.	Paddy	Paddy crop should be substituted by Low water requiring and short duration crops like pulses, oil seeds and vegetables.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Spraying of 2% KCl + 0.1 % Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Mulching in vegetables.	ISOPOM OSSC NFSM
		Green gram	Sujata, Durga, PDM-11& PDM-54		
		Black gram	Pant U-19 &30,Ujala,Saral		
		Sesame	Uma, Nirmala and Prachi.		
		Kharif vegetables Cow pea	Utkal Manika		
		Lady's finger	Utkal Gaurav		
		Sole crop -Paddy	Lalat, Konark, Surendra, MTU1001.	• Close the drainage hole and check the seepage loss in medium land regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplant 3-4 seedlings/ hill at closer spacing. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation.	ISOPOM OSSC NFSM
	Rain fed Plateau with laterite ,mixed red and yellow soils	Paddy	Paddy crop should be substituted by low water requiring and short duration crops like pulses, oil seeds and vegetables.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Complete hoeing and weeding of non-paddy crops to provide dust	OSSC ISOPOM

		Green gram	Sujata, Durga, PDM-11& PDM-54	mulch. • Spraying of 2% KCl + 0.1 % Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Mulching in vegetables.	
		Black gram	Pant U-19 & Pant U- 30		
		Sesame	Uma, Nirmala and Prachi.		
		Kharif vegetables Cow pea	Utkal Manika		
		Lady's finger	Utkal Gaurav		
		Sole crop Paddy	Lalat, Konark, Surendra, MTU1001.	• Close the drainage hole and check the seepage loss in medium land regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplant 3-4 seedlings/ hill at closer spacing. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation.	ISOPOM OSSC NFSM
	Undulating sub-mountainous tract with mixed red and yellow soil	Paddy	Paddy crop should be substituted by low water requiring and short duration crops like pulses, oil seeds and vegetables.	• Plough across slope. • In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Complete hoeing and weeding of non-paddy crops to provide dust mulch. • Spraying of 2% KCl + 0.1 % Boron to black gram. • Foliar application of 2% urea at pre-flowering and flowering stage of green gram. • Spray 1% urea in vegetable crops. • Complete hoeing, weeding followed	OSSC ISOPOM
		Green gram	Sujata, Durga, PDM-11and PDM- 54		
		Black gram	Pant U-19 &30,Ujala,Saral		
		Sesame	Uma, Nirmala and Prachi.		
		Kharif vegetables Cow pea	Utkal Manika		

		Lady's finger	Utkal Gaurav	by ridging to the base of crop at 20 DAS for in-situ moisture conservation. • Remove the pest and disease infected plants from the main field.	
		Sole crop Paddy	Lalat, Konark, Surendra, MTU1001.	• Close the drainage hole and check the seepage loss in medium land regularly. • Withhold N fertilizer (top dressing) application up to receipt of rainfall. • Transplant 3-4 seedlings/ hill at closer spacing. • Field bund height to be raised to conserve rain water. • Apply life saving irrigation to maintain nursery seedlings.	ISOPOM OSSC NFSM

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (August 3rd wk)*	Undulating plain land with mixed red and black soil	Paddy-fallow based	Shifting from traditional crops/varieties to short duration low water requiring non-paddy crops like Cowpea, Blackgram, Greengram by substituting Paddy totally. Green gram- Sujata, Durga, PDM-11,PDM- 54	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Sowing of crops at close plant-to-plant distance with wider inter-row spacing is recommended. • Irrigate at critical stages. • Harvest at physiological maturity stage.	ISOPOM OSSC NFSM

			Black gram - PU 30, Ujala, Sarala Cow pea – Utkal Manik	• Weeding and intercultural operation to be done to conserve moisture.	
			Shifting from traditional crops/varieties to medium duration Paddy. Paddy varieties like Lalat, MTU-1001, Konark, Surendra are useful in this situation	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Seed treatment and proper plant protection measures should be taken to avoid any germination failure. • Raising bund height to conserve rain water. • Checking seepage and drainage loss of water in medium land. • Planting 3-4 seedlings/hill with closer spacing. • . Fields should be free from weeds for utilization of water and nutrients by the crops. • Use of bulky organic manures to improve soil water holding capacity. • Harvest at physiological maturity stage. • Irrigate at critical stage.	ISOPOM OSSC NFSM
	Rainfed plain land with red soil	Paddy-fallow based	Shifting from traditional crops/varieties to short duration low water requiring non-paddy crops like Cowpea, Blackgram, and Greengram by substituting Paddy totally. Greengram- Sujata, Durga, PDM-11,PDM- 54 Blackgram - PU -30, Ujala, Sarala	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Sowing of crops at close plant-to-plant distance with wider inter-row spacing is recommended. • Irrigate at critical stages. • Harvest at physiological maturity stage. • Weeding and intercultural operation to be done to conserve moisture.	ISOPOM OSSC NFSM

			Cow pea – Utkal Manik		
			Shifting from traditional crops/varieties to medium duration Paddy. Paddy varieties like Lalat, MTU-1001, Konark, Surendra are useful in this situation	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Seed treatment and proper plant protection measures should be taken to avoid any germination failure. • Raising bund height to conserve rain water. • Checking seepage and drainage loss of water in medium land. • Planting 3-4 seedlings/hill with closer spacing. • Fields should be free from weeds for utilization of water and nutrients by the crops. • Use of bulky organic manures to improve soil water holding capacity. • Harvest at physiological maturity stage. • Irrigate at critical stage.	ISOPOM OSSC NFSM
	Rainfed table land with mixed red and yellow black soil.	Paddy-fallow based	Shifting from traditional crops/varieties to short duration low water requiring non-paddy crops like Cowpea, Blackgram, and Greengram by substituting Paddy totally.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Sowing of crops at close plant-to-plant distance with wider inter-row spacing is recommended. • Irrigate at critical stages. • Harvest at physiological maturity stage. • Weeding and intercultural operation to be done to conserve moisture.	ISOPOM OSSC NFSM
			Green gram- Sujata, Durga, PDM-11,PDM- 54		
			Black gram - PU 30, Ujala, Sarala		
			Cow pea – Utkal Manik		
			Shifting from traditional	• In-situ rainwater conservation and	ISOPOM

			crops/varieties to medium duration Paddy. Paddy varieties like Lalat, MTU-1001, Konark, Surendra are useful in this situation	recycling of excess runoff for life saving irrigation. • Seed treatment and proper plant protection measures should be taken to avoid any germination failure. • Raising bund height to conserve rain water. • Checking seepage and drainage loss of water in medium land. • Planting 3-4 seedlings/hill with closer spacing. • Fields should be free from weeds for utilization of water and nutrients by the crops. • Use of bulky organic manures to improve soil water holding capacity. • Harvest at physiological maturity stage. • Irrigate at critical stage.	OSSC NFSM
	Rainfed Plateu with laterite ,mixed red and yellow soil	Paddy-fallow based	Shifting from traditional crops/varieties to short duration low water requiring non-paddy crops like Cowpea, Blackgram, Greengram by substituting Paddy totally. Green gram- Sujata, Durga, PDM-11,PDM- 54 Black gram - PU 30, Ujala, Sarala Cow pea – Utkal Manik	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Sowing of crops at close plant-to-plant distance with wider inter-row spacing is recommended. • Irrigate at critical stages. • Harvest at physiological maturity stage. • Weeding and intercultural operation to be done to conserve moisture.	ISOPOM OSSC NFSM
			Shifting from traditional crops/varieties to medium duration Paddy.	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Seed treatment and proper plant	ISOPOM OSSC NFSM

			Paddy varieties like Lalat, MTU-1001, Konark, Surendra are useful in this situation	protection measures should be taken to avoid any germination failure. • Raising bund height to conserve rain water. • Checking seepage and drainage loss of water in medium land. • Planting 3-4 seedlings/hill with closer spacing. • . Fields should be free from weeds for utilization of water and nutrients by the crops. • Use of bulky organic manures to improve soil water holding capacity. • Harvest at physiological maturity stage. • Irrigate at critical stage.	
	Un dulating sub-mountaineous tract with mixed red and yellow soil	Paddy-fallow based	Shifting from traditional crops/varieties to short duration low water requiring non-paddy crops like cowpea, blackgram, greengram by substituting Paddy totally. Green gram- Sujata, Durga, PDM-11,PDM- 54 Black gram - PU 30, Ujala, Sarala Cow pea – Utkal Manik	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Sowing of crops at close plant-to-plant distance with wider inter-row spacing is recommended. • Irrigate at critical stages. • Harvest at physiological maturity stage. • Weeding and intercultural operation to be done to conserve moisture.	ISOPOM OSSC NFSM
		Paddy-fallow based	Shifting from traditional crops/varieties to medium duration Paddy. Paddy varieties like Lalat, MTU-	• In-situ rainwater conservation and recycling of excess runoff for life saving irrigation. • Seed treatment and proper plant protection measures should be	

			1001, Konark, Surendra are useful in this situation	taken to avoid any germination failure. • Raising bund height to conserve rain water. • Checking seepage and drainage loss of water in medium land. • Planting 3-4 seedlings/hill with closer spacing. • Fields should be free from weeds for utilization of water and nutrients by the crops. • Use of bulky organic manures to improve soil water holding capacity. • Harvest at physiological maturity stage. • Irrigate at critical stage	

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor	Undulating plain land with mixed red and black soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Shneha,Bandana	• Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50% mortality. • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for	ISOPOM OSSC NFSM
		Greengram	Sujata, Durga, PDM-11& 54		

germination /crop stand etc.		Black gram	Pant U-19 & Pant U-30,Ujala,Sarala	vegetable crops. • Hoeing and weeding in pulse and paddy. • Irrigate at critical stage. • Irrigate form harvested rain water.	
	Rainfed plain land with red soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Shneha,Bandana	-do-	ISOPOM OSSC NFSM
		Green gram	Sujata, Durga, PDM-11& 54		
		Black gram	Pant U-19 & Pant U-30,Ujala,Sarala		
	Rainfed with mixed red and yellow black soil.	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Sneha,Bandana	-do-	ISOPOM OSSC NFSM
		Green gram	Sujata, Durga, PDM-11& 54		
		Black gram	Pant U-19 & Pant U-30,Ujala,Sarala		
	Rainfed Plateau with laterite ,mixed red and yellow soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Sneha,Bandana	Thinning and gap filling of the existing crop if mortality is less than 50%. • Resow the crop if the mortality is more than 50% mortality. • Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for vegetable crops • Hoeing and weeding in pulse and paddy. • Irrigate at critical stage. • Irrigate form harvested rain water.	ISOPOM OSSC NFSM
		Greengram	Sujata, Durga, PDM-11& PDM-54		
		Blackgram	Pant U-19 & Pant U-30,Ujala,Sarala		
	Undulating sub-mountaineous tract with mixed red and yellow soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Sneha,Bandana	-do-	ISOPOM OSSC NFSM

		Greengram	Sujata, Durga, PDM-11& PDM- 54		
		Blackgram	Pant U-19 & Pant U-30,Ujala,Sarala		

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Undulating plain land with mixed red and black soil	Paddy	Varietal substitutions of drought tolerant varieties of paddy i.e. Heera, JHU, Pathara, Bandana	• Major imphasis should be given on in-situ rain water conservation. • Harvesting excess run off for its recycling to make provision for life saving irrigation. • Provide life saving irrigation. • Hoeing and weeding in crop.	OSSC ISOPOM NFSM
		Green gram	Sujata, Durga, PDM-11& PDM-54		
		Black gram	Pant U-19 & Pant U-30,Ujala,Sarala		
	Rainfed plain land with red soil	Paddy Green gram	In rain fed up land paddy variety like Heera,Kalinga-III may be taken.	• Complete hoeing weeding and earthling up at 20 DAS for moisture conservation for groundnut and vegetable crops. • Irrigate at critical stage. • Irrigate form harvested rain water. • Rain water harvesting and recycling.	OSSC ISOPOM NFSM
		Black gram	K 851, Sujata		
		Sesame	T-9,PU-19 & PU-30		
		Ground nut	Uma, Nirmala,Prachi JL-24, Smruti		
	Rainfed table land with mixed red and yellow black soil.	Paddy	Paddy variety like Heera,Kalinga-III,JHU, Pathara may be taken.	• Proper land leveling is pre-requisite for efficient water management in Paddy. • Irrigate at critical stage. • Irrigate form harvested rain water. • Complete hoeing weeding for moisture conservation.	OSSC ISOPOM NFSM
		Green gram	K 851, Sujata,PDM-11& PDM-54		
		Black gram	T-9,PU-19 & PU-30,Ujala,Sarala		
		Ground nut	JL-24,Smruti,Devi		

	Rain fed Plateau with laterite ,mixed red and yellow soil	-do-	-do-	-do-	-do-
	Un dulating sub-mountaineous tract with mixed red and yellow soils	-do-	-do-	-do-	-do-

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Flowering and fruiting stage	Undulating plain land with mixed red and black soil	Paddy	Paddy variety like Heera,Kalinga-III,JHU, Pathara may be taken.	• Foliar application of 2% urea at pre-flowering and flowering stage to pulses. • Remove and destroy pest and disease affected plants • Provide irrigation at critical stages at flowering and grain filling stage. • Need based plant protection measures to be taken. • Harvest at physiological maturity stage.	OSSC NFSM
		Green gram	K 851, Sujata,PDM-11& PDM-54		
		Black gram	T-9,PU-19 &PU-30,Ujala,Sarala		
		Ground nut	JL-24,Smruti,Devi		
	Rainfed plain land with red soil	-do-	-do-	-do-	
	Rainfed with mixed red and yellow black soil.	-do-	-do-	-do-	
	Rain fed Plateu with laterite ,mixed red and yellow soil	-do-	-do-	-do-	
	Un dulating sub-mountaineous tract with mixed red and yellow soil	-do-	-do-	-do-	

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Canal irrigated table land ,Mixed red and yellow soils	Paddy-Paddy	• Paddy area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame are preferred options. • Irrigate from harvested rain water of ground water.	Irrigate the kharif Paddy 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.	Irrigation dept. Pani panchayat
	Plain land irrigated, laterite and lateritic soils	Paddy-Vegetables	Growing of short duration vegetable like Cowpea, Bean or Root vegetables like radish during rabi seasons.	-do-	Irrigation dept. Pani panchayat
		Paddy- Pulses	Low water requiring pulses like Greengram, Blackgram in rabi.	-do-	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	Canal irrigated table land ,Mixed red and yellow soil	Paddy-Paddy	• Paddy area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame are preferred options. • Use of mid duration variety like 'Lalat' (120 days) is well suited in khaif.	• At the lower portion of the field 10% of the field size farm ponds may be constructed in order to store the water which will be recycled at the critical period. • Irrigate the kharif Paddy with groundwater during dry spells and critical stages only. • Reduction of conveyance losses while irrigating the light textured soils. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	Irrigation dept. Pani panchayat
	Plain land irrigated, laterite and lateritic soil	Paddy-oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame	• Irrigate the crops through ground water. • Bond height in paddy field to be raised to conserve rain water.	
		Paddy-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during kharif seasons.	• Irrigate the crops through ground water. • Bond height in paddy field to be raised to conserve rain water.	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under	Canal irrigated table land ,Mixed red and yellow soil	Paddy-Paddy	• Paddy area during rabi should be reduced.	• Irrigate the kharif crops during dry spell with harvested rain	Irrigation dept. Pani panchayat

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
delayed onset of monsoon in catchment			• Instead low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame are to be grown depending on rainfall.	water. • Irrigate the khaif Paddy at critical stages only with ground water. Reduction of conveyance losses while irrigating the crops. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	
	plain land irrigated, laterite and lateritic soil	Paddy-oilseeds/pulses	• Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame.	• Irrigate the kharif crops during dry spell with harvested rain water. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	
		Paddy-Vegetables	• Growing of short duration vegetables like cowpea, bean or root vegetables like radish during rabi seasons.	• -do-	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of	Canal irrigated table land ,Mixed red and yellow soil	Paddy-Paddy	• Paddy area during rabi should be reduced. • Low water requiring oilseeds and pulses like groundnut,	• Irrigate the kharif crops during dry spell with harvested rain water. • Irrigate the crop at critical stages with ground water.	Irrigation dept. Pani panchayat

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
monsoon			green gram, black gram, sunflower, sesame are to be grown depending on rainfall during rabi season.	• Reduction of conveyance losses while irrigating the crops. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	
	Plain land irrigated, laterite and lateritic soil	Paddy-oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame	• Irrigate the kharif crops during dry spell with harvested rain water. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	
		Paddy-vegetables	Growing of short duration vegetable like cowpea, bean or root vegetables like radish during rabi seasons.	-do-	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Tubewell irrigated red soil/red and yellow soil	Paddy-Paddy	• Choose short duration varieties. • Paddy area during rabi should be reduced. Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame should be grow in rabi.	• Irrigate the kharif Paddy with harvested rain water during dry spells and critical stages only. • Reduction of conveyance losses while irrigating the light textured soils. • Harvesting of kharif Paddy at physiological maturity will realize 80-85% of normal yield.	Irrigation dept

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
			• Irrigate at critical stage.		
		Paddy- pulses	• Low water requiring pulses like green gram, black gram, sunflower, sesame in rabi. • Irrigate the crops from harvested rain water.	• Irrigate the crop at critical stage. • Weeding and intercultural operation should be done for moisture conservation.	Irrigation dept
		Paddy-vegetables	• Growing of short duration vegetables like cowpea, bean or root vegetables like raddish during rabi seasons.	• Irrigate the crop at critical stage. • Weeding and intercultural operation should be done for moisture conservation. • Use harvested rain water and irrigate at critical stage.	Irrigation dept

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Paddy	Provide drainage	Whenever possible the drainage of excess water from the field may be under taken	At physiological maturity stage harvest the crop. Drain out excess water	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
Sesame	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture

				absorption
Green gram	-do-	-do-	-do-	-do-
Black gram	-do-	-do-	-do-	-do-
Groundnut	-do-	-do-	-do-	-do-
Horticulture				
Mango	Provide drainage	Drain out the excess water from the field in order to avoid the standing water in the field	At physiological maturity occurs, harvest the fruits. Drain out excess water.	Shift the produce to safer place for drying and maintain the quality of fruit protect against the attack of pest disease .
Guava	-do-	-do-	-do-	-do-
Banana	-do-	-do-	-do-	-do-
Litchi	-do-	-do-	-do-	-do-
Cashewnut	-do-	-do-	-do-	-do-
Heavy rainfall with high speed winds in a short span				
Paddy	Drain out excess water.	Drain out excess water.	Drain out excess water. Harvest at physiological stage.	Shifting the produce from field to store in ventilated place. Shift the produce to safer place for drying and maintain the quality of grain and fodder and protect against the attack of pest disease.
Horticulture				
Mango	Drain out excess water.	Drain out the excess water from the field.	• At physiological maturity occurs, harvest the fruits Drain out excess water	.Shift the produce to safer place for drying and maintain the quality of fruit protect against the attack of pest disease.
Guava	-do-	-do-	-do-	-do-
Litchi	-do-	-do-	-do-	-do-
Banana	-do-	-do-	-do-	-do-
Cashewnut	-do-	-do-	-do-	-do-
Outbreak of pests and diseases due to unseasonal rains				
Paddy	1. Seedling root dip in chloropyriphos 20	For Gundibug:When pest population is more than 5	Malathion spray against Gundhi bug	Sun drying / disinfection of gunny bags with malathion or heat treatment to

	EC@1 ml/lit. 2. Apply granular insecticides carbofuran 3G@33 kg/ha at the stage of one month or one egg mass per sq.mt. 3. Application of spray formation like quinalphos 25 EC @2 lt/ha or monocrotophos 36 EC @1 Lt/ha twice a week interval. 4. For disease control seed treatment bavistin 2 gm/kg	bug/sq.mt apply dust formulation of methyl parathion 5% or chloropyriphos5%@25 kg/ha. At early milking stage apply monocrotophos 36EC @1.3 lit/ha or phosphamidon 85 EC@1.0li/hafor control of blast disease spraying of Tricyclazine @0.6 gm/lit.		manage stored grain pests
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	Application of malathion against Flea beetle	-do-	Disinfection of storage structure to manage stored grain pests
Horticulture				
Tomato	Gap filling, disease & pest management	Pest & disease management, staking of plant	Protection against pest & diseases, harvesting	Shifting of produce to safer place, grading & packing
Brinjal	Disease & pest management	Pest & disease management,	Protection against pest & diseases, preventing crop lodging, harvesting fruit	Shifting of produce to godown or safer place, grading ,packing,& marketing
Ginger	Disease & pest management, earthing-up, making channel, weeding, re-mulching	Rhizome rot disease management(0.2% ridomyl-MZ), weeding, re-mulching	Immediately, pesticides drenching & spraying for rot management	-do-
Mango	Disease & pest management	Pest & disease management,	Protection against pest & diseases, harvesting of fruits	Shifting of produce to godown or safer place,grading, packing & marketing
Banana	-do-	-do-	-do-	-do-

2.3 Floods

Condition	Suggested contingency measures			
Transient water logging/ partial inundation	**Seedling/ nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy	Drainage excess water from field.	Drainage excess water from field.	Drainage excess water from field.	Drainage excess water from field.
Horticulture				
Mango	-do-	-do-	-do-	Harvest the mature fruits with out delay
Continuous submergence for more than 2 days				
Paddy	Drainage excess water from field.	Drainage excess water from field.	Drainage excess water from field.	Drainage excess water from field.
Mango	-do-	-do-	-do-	Harvest the mature fruits without delay
Sea water inundation	**Not applicable**			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Paddy	Provide irrigation.	Provide sufficient irrigation water	Provide sufficient irrigation water	Harvest the crop as soon as possible in order to avoid excess heat wave
Vegetable	-do-	-do-	-do-	-do-
Horticulture				
mango	Grow nursery at shade net with	Provide micro irrigation at	Provide irrigation as per	Harvest the crop as soon as

	providing micro irrigation	the base of plant with mulching	the requirement of crop	possible in order to avoid excess heat wave
Banana	Providing micro irrigation	-do-	-do-	-do-
Litchi	-do-	-do-	-do-	-do-
Cold wave	Not experienced			
Hailstorm				
Paddy	Drain out the water from the field,clean the debris from the field	Drain out the water from the field,clean the debris from the field	Drain out the water from the field,clean the debris from the field	Harvest the crop with out delay
Horticulture				
Mango	Not encountered	Not encountered	Not encountered	
Banana	-do-	-do-	-do-	
Litchi	-do-	-do-	-do-	
Cyclone	Not experienced			

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 perennial fodder production on river beds and tank bed on community basis. --Village gauchar (grazing) lands should be developed for fodder production. --On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. --In the costal part of Orissa Sun hemp (Crotolaria) can be sown. --It is essential to establish fodder bank near forest areas. Provision is also necessary to store surplus crop residues		Supplementary feeding of remaining livestock and the replacement stock.

	in fodder banks, which can be made available during draught. --Excess fodder in flush season can be preserved as hay / silage. --Explore the possibilities of availability of unconventional / alternative feed resources during draught.		
Drinking water	--Preserving water in community tanks and ponds etc for drinking purpose by excavation and sanitization of these resources. In addition, wells (bore wells or dug wells) may be constructed ahead of possible event of draught.	--Water sources of Temples, Churches, Gurdwaras, Jain temples and Maszids are generally ideal sources during draught.	
Health and disease management	--Veterinary preparedness with vaccine and medicines.	--Conducting animal health camps and treating the affected animals --Supplementation of mineral and vitamin mixtures	--Availing insurance --Culling of unproductive livestock --Proper disposal of dead animals
Floods			
Feed and fodder availability		--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 choffing and sprinkling concentrate mixture can improve intake and utility.	--Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water		--Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. --Drinking water be made available to the animals in any kind of clean container available with the farmer.	--Provision of clean drinking water.
Health and disease management	--Training to the farmers about care of their animas when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or	--There should be one veterinarian with 3 to 4 village to work with the help of local volunteers.	--Prompt and appropriate attention to injuries by providing necessary

	booklets in simple local language for care of livestock in disaster. --Keeping track of weather forecast and prior information through radio and TV Etc. --Prior construction of animal shelters in disaster prone areas. --Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. --Variation of livestock before onset of rainy season --Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Acriflvin, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, Treacle, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint), Trocar and canola (for bloat), Pocket Knife (for cutting, strangulating ropes etc.) --Temporary camps may be started to herd or flocks animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. --If no trees or sheds are available shelter the animals under a tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof.	--The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. --Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. --Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners.	medicines to the livestock owners. --Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. --Improving shed hygiene especially in the farmers household through cleaning and disinfection
Cyclone			
Feed and fodder availability		--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.	--Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.

		Partial drying choffing and sprinkling concentrate mixture can improve intake and utility.	
Drinking water		--Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. --Drinking water be made available to the animals in any kind of clean container available with the farmer.	--[Provision of clean drinking water.
Health and disease management	--Training to the farmers about care of their animas when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local language for care of livestock in disaster. --Keeping track of weather forecast and prior information through radio and TV Etc. --Prior construction of animal shelters in disaster prone areas. --Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. --Variation of livestock before onset of rainy season --Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Acriflvin, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, Treacle, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint), Trocar and canola (for bloat), Pocket Knife (for cutting, strangulating ropes etc.)	--There should be one veterinarian with 3 to 4 village to work with the help of local volunteers --The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. --Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. --Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners.	--Prompt and appropriate attetion to injuries by providing necessary medicines to the livestock owners. --Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. --Improving shed hygiene especially in the farmers household through cleaning and disinfection

	--Temporary camps may be started to herd or flocks animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. --If no trees or sheds are available shelter the animals under a tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof.		
Heat wave and cold wave			
Shelter/environment management	Green cover (trees plantation, land scaping) Proper sheltering / housing white painting outside the roof and black painting inside the roof.	--Washing / wallowing / sprinkling/ splashing / showering --Provision of cool drinking water (inearthen pitches) --Cooling devices: fans, wet curtains or panels, air cooler if possible.	
Health and disease management		--Feeding Green fodder/ silage/ hay --Provision for night feeding --Grazing only if green pastures/ grass lands available --Graze early in the morning and late in the afternoon	--Protection of dry / milch cows/ buffaloes/ breeding bulls and teasers against thermal stress --Heat detection with young teasers --Close observation of all open cows --Study of cervical mucous --Heat detection and AI during cooler parts of the day. --Insemination at optimal time with good quality semen.

2.5.2 Poultry

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

		poultry farm under cyclone affected area	the situation is under control	
Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for available of sanitized water	-do-	
Heat wave and cold wave	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories	Water proof materials will be supplied to protect the poultry sheds Provision of generator should be made to ensure electric supply for brooding of chicks and preparation of feed.	Renovation and reconstruction of affected sheds Repair of damaged electric connection	
Shelter/environment management				
Health and disease management	Procurement of high protein and low energy diet Procurement of medicine, antistress agent and vitamin C and E.	Feeding during cooler hour of the day. Supplementation of vitamin E and C, antistress agent with water	Feeding will be continued with high protein and low energy till heat waves ends and then feeding will be done with normal diet Antistress agents will be continued in drinking water for some days	
	Provision should be made for continuous available of water	Sufficient cool drinking water with sodium bicarbonate or electrolytes.	Availability of cold water will be made for some days	
	Procurement of Antistress drugs	Supplementation of antistress drug	Vaccination of birds against RD	
	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories Providing shed to poultry houses. Providing proper ventilation.	Attempt will be made for cooling of poultry shed by adapting different cooling methods Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan	Provision should be made to ensure proper ventilation to the house	

	Procurement of high energy diet	Feed high energy diet.		
	Proper water supply will be ensured			
	Procurement of Antistress drugs and vaccine	Feeding of antistress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD	
	Procurement of curtains to cover open sides of the shed. Heating arrangement kept ready	Close the open sides of the shed by curtain in such a way that ventilation should not be hampered. Provide heat if necessary depending on the temperature and age of the birds	Remove the curtains. Discontinue heating.	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture	-		
Marine	-	-	-
Inland	-		
(i) Shallow water depth due to insufficient rains/ inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks has to be developed. 3. Renovation and maintenance of existing water harvest structures.	-	-
(ii) Changes 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.
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/ inflow	Building deep ditches in culture ponds for shelter of the fish to over come high temperature	1. Recharge the ponds with bore well water or water from other sources. 2. Partial harvesting of the stock to reduce stocking density. 3. Artificial shelter by putting aquatic floating weeds in 1/3rd area.	-
(ii) Impact of salt load build up in ponds/ change in water quality	Application of organic manure in culture system	Recharge the ponds with bore well water or water from other sources	Application of organic manure in culture system