State: ODISHA

Agriculture Contingency Plan for District: CUTTACK

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	**Sub humid to humid eastern and south eastern upland**		
	Agro-Climatic Zone (Planning Commission)	**East coast plain hill region**		
	Agro Climatic Zone (NARP)	**East and south Eastern Coastal Plain Zone (OR -4)**		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	**Kendrapada,Khurda,Jagatsinghpur,parts of Cuttack,Puri,Nayagarh and parts of Ganjam**		
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**
		20^{o} 03' to 20^{o} 40'	**84^{o} 58' to 86^{o} 20'**	**23.5mtr**
	Name and address of the concerned RRTTS	**RRTTS, Bhubaneswar**		
	Mention the KVK located in the district with address	**KVK, Santhapur, At/Po-Uchapada, Via-Kotashai, Cuttack , Pin- 754 002**		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	**CRRI,Cuttack-753006**		

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1389.42	49.0	June 2nd week	Sept. last week
	NE Monsoon(Oct-Dec):	207.68	8.0	Oct. last week	Dec. 2nd week
	Winter (Jan- Feb.)	36.08	2.9	Jan 3rd week	March last week
	Summer (March-May)	91.34	6.1	April 1st week	May last week
	Annual	1724.52	66.0		

***Source – SREP,ATMA Cuttack 2008-09**

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)	393	157	79	10	11	10	11	10	31	1

*** Source -Orissa Agril. Statistic 2008-09**

1. 4	Major Soils (common names like red sandy loam deep soils (etc.,)*	Area ('000 ha)	Percent (%) of total
	1. Alluvial Red Laterite	98.82	52.56
	2.Laterite Alluvial	35.60	18.94
	3. Alluvial Laterite	23.88	12.70
	4.Red Laterite Alluvial	20.50	10.90
	5. Alluvial	09.20	04.89

*** mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets *Source - SREP ATMA Cuttack 2008-09**

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	157	197
	Area sown more than once	164	
	Gross cropped area	309	

***Source- Orissa Agricultural statistic 2008-09**

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	97.43		
	Gross irrigated area	149.6		
	Rainfed area	59.57		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		81.578	72.05
	Tanks		-	-
	Open wells		2.602	2.30
	Bore wells		-	
	Lift irrigation schemes		19.142	16.91
	Micro-irrigation		-	
	Other sources (Water harvesting structure)		9.900	8.74
	Total Irrigated Area		113.222	
	Pump sets		*Source – SREP ATMA & line Dept.	
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)

	Over exploited	**Nil**	**Nil**	
	Critical	**3**		
	Semi- critical	**3**		
	Safe	**8**		
	Wastewater availability and use	**Nil**		
	Ground water quality			
***over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%**				

***Source- Orissa Agricultural statistic 2008-09 & SREP ATMA Cuttack 2008-09**

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

1.7	**S.No.**	**Major field crops cultivated**	**Area ('000 ha)**							
			Kharif			***Rabi***			**Summer**	
			Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		**Grand total**
	1	**Paddy**	**88.34**	**40.06**	**128.4**	**4.66**	**-**	**4.66**		**133.06**
	2	**Black gram**	**-**	**1.35**	**1.35**	**1.98**	**44.3**	**46.28**		**47.63**
	3	**Greengram**	**-**	**0.31**	**0.31**	**11.34**	**28.25**	**39.59**		**39.90**
	4	**Groundnut**	**-**	**0.70**	**0.70**	**-**	**8.30**	**8.30**		**9.00**
	5	**Sugarcane**	**-**	**-**	**-**	**2.63**	**-**	**2.63**		**2.63**
	Others	**Jute**	**-**	**1.76**	**1.76**	**-**	**-**	**-**		**1.76**

***Source – Orissa Agril. Statisstic2008-09**

	S.No.	**Horticulture**	**Area ('000 ha)**

		crops - Fruits	**Total**	**Irrigated**	**Rainfed**
	1	**Mango**	**3.08**		**3.08**
	2	**Cashewnut**	**1.87**		**1.87**
	3	**Banana**	**0.60**		**0.60**
	4	**Citrus**	**0.47**		**0.47**
	5	**Guava**	**0.18**		**0.18**
		Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	1	**Chilli**	**3.89**		
	2	**Potato**	**1.05**		
	3	**Onion**	**0.92**		
	4	**Sweet Potato**	**0.65**	**-**	**-**
	5	**Other vegetable**	**21.46**		
		Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
	1	**Amlla**			
	2	**Aloevera**			
		Plantation crops	**Total**	**Irrigated**	**Rainfed**

	1	**Coconut**	**4.91**		
	2	**Cashew**	**187**	**-**	
	Others (Specify)	**Eg., industrial pulpwood crops etc.**			
	1	**Fodder crops**	**Total**	**Irrigated**	**Rainfed**
	2	**Total fodder crop area**			
	3	**Grazing land**	**10375**		
	4	**Sericulture etc**			
	5	**Others (specify)**			

***Source- SREP ATMA Cuttack 2008-09**

1.8	**Livestock**		**Total ('000)**
	Non descriptive Cattle (local low yielding)		**505.18**
	Improved cattle		**103.58**
	Crossbred cattle		**-**
	Non descriptive Buffaloes (local low yielding)		**44.91**
	Descript Buffaloes		**-**
	Goat		**278.11**
	Sheep		**88.34**
	Others (Camel, Pig, Yak etc.)		**2.62**
	Commercial dairy farms (Number)		
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**
	Commercial		**988.33**

	Backyard						
1.10	**Fisheries (Data source: Chief Planning Officer)** ***Source- SREP ATMA , Cuttack 2008-09 & Dept. of AH**						
	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**	
	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)			**2615.19**	**2.72**	**3.117MT**	
	Others						

***Source : SREP ATMA , Cuttack 2008-09 & Dept. of fishery**

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08; specify years)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
Crop 1	Paddy	198.41	1490	9.83	2147			208.24	1818.5	
Crop 2	Blackgram	0.5	430	26.73	525			27.31	477.5	
Crop 3	Greengram	-	-	19.2	485			15.85	1625.5	
Crop 4	Groundnut	1.03	1465	14.82	1786			19.20	485	
Crop 5	Sugarcane	-	-	174.2	55655			174.2	55655	
Others	Jute	16.3	1667	-	-			16.3	1667	
Major Horticultural crops (Crops to be identified based on total acreage)										
Crop 1	Potato			12.44	11798			12.44	11798	
Crop 2	Onion			6.64	7217			6.64	7217	
Crop 3	Sweet potato	3.52	8000	1.81	8619			5.33	8200	
Crop 4	Chilli	1.35	804	1.97	883			3.32	849	
Crop 5	Garlic			2.61	3145			2.61	3145	
Others										

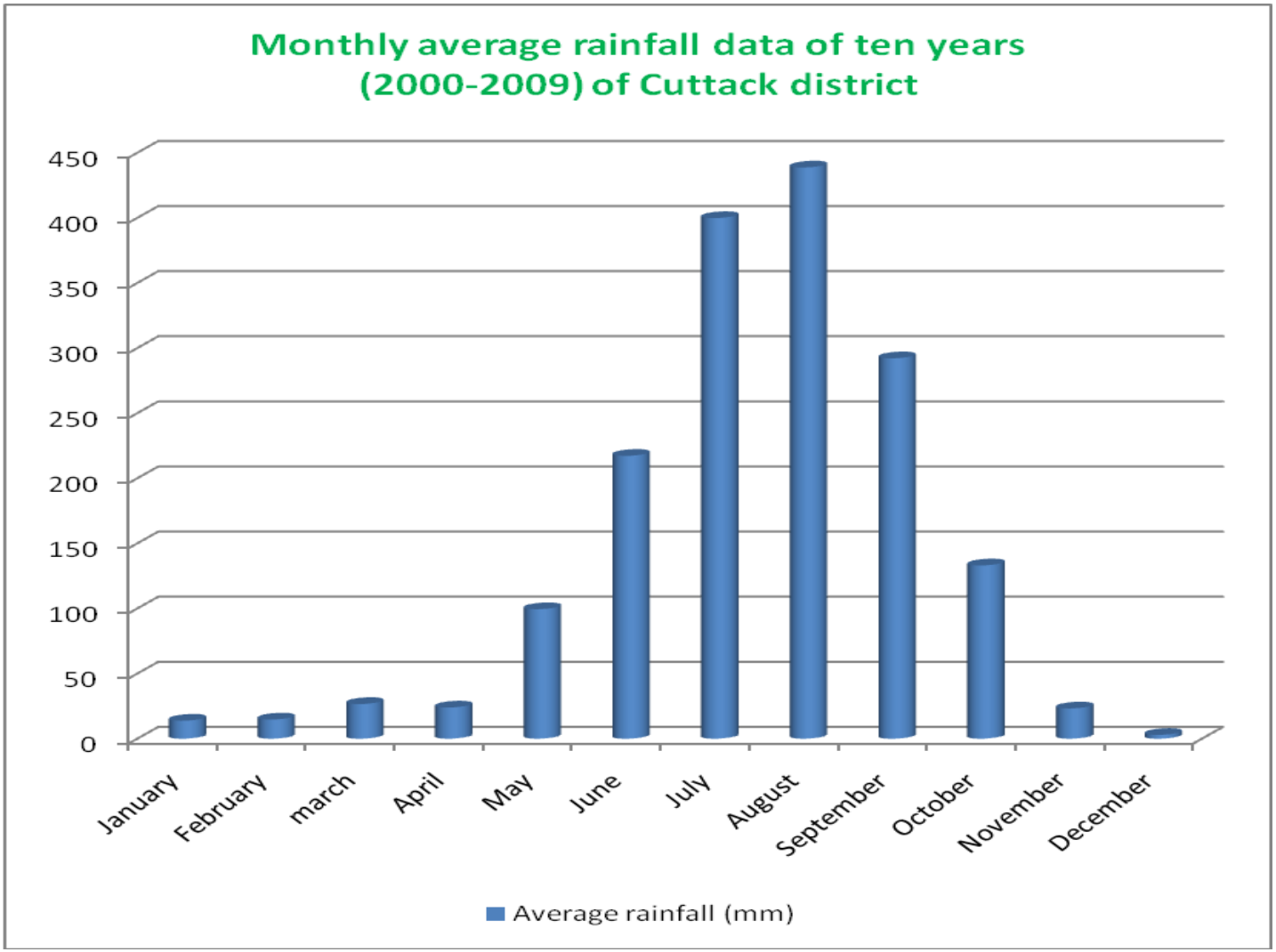
***Source : Orissa Agril. Statistic 2008-09**

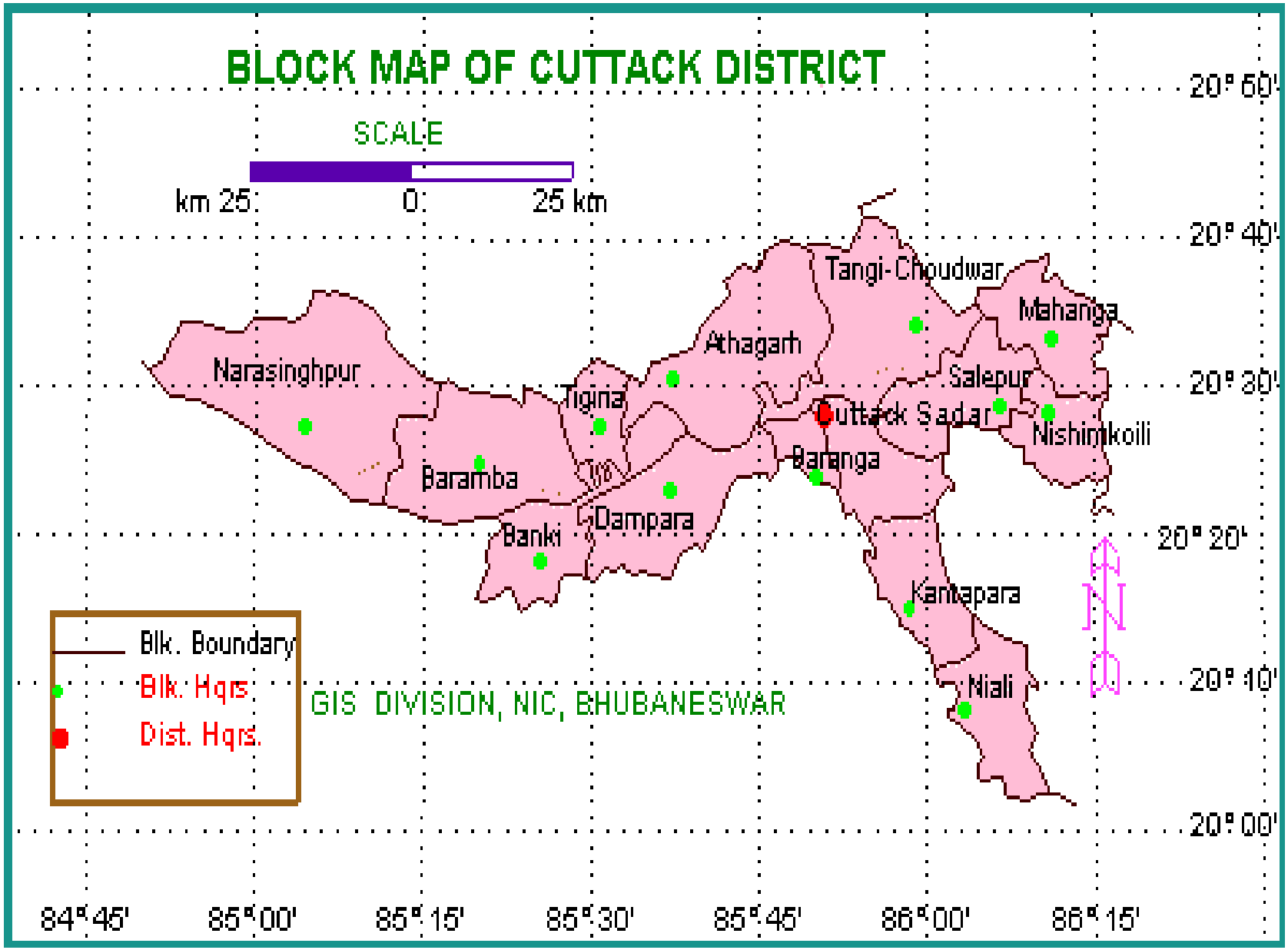
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Crop 1: Paddy	2: Blackgram	3:Greengram	4: Groundnut	5:Sugarcane
	Kharif- Rainfed	May June	June-July	-	June-July	-
	Kharif-Irrigated	June – July	June-July	-	June-July	-
	Rabi- Rainfed	-	Dec – Dec	Nov – Dec	Nov – Dec	-
	Rabi-Irrigated	Dec – Jan	Jan – Jan	Nov – Nov	Nov – Nov	Dec -Feb

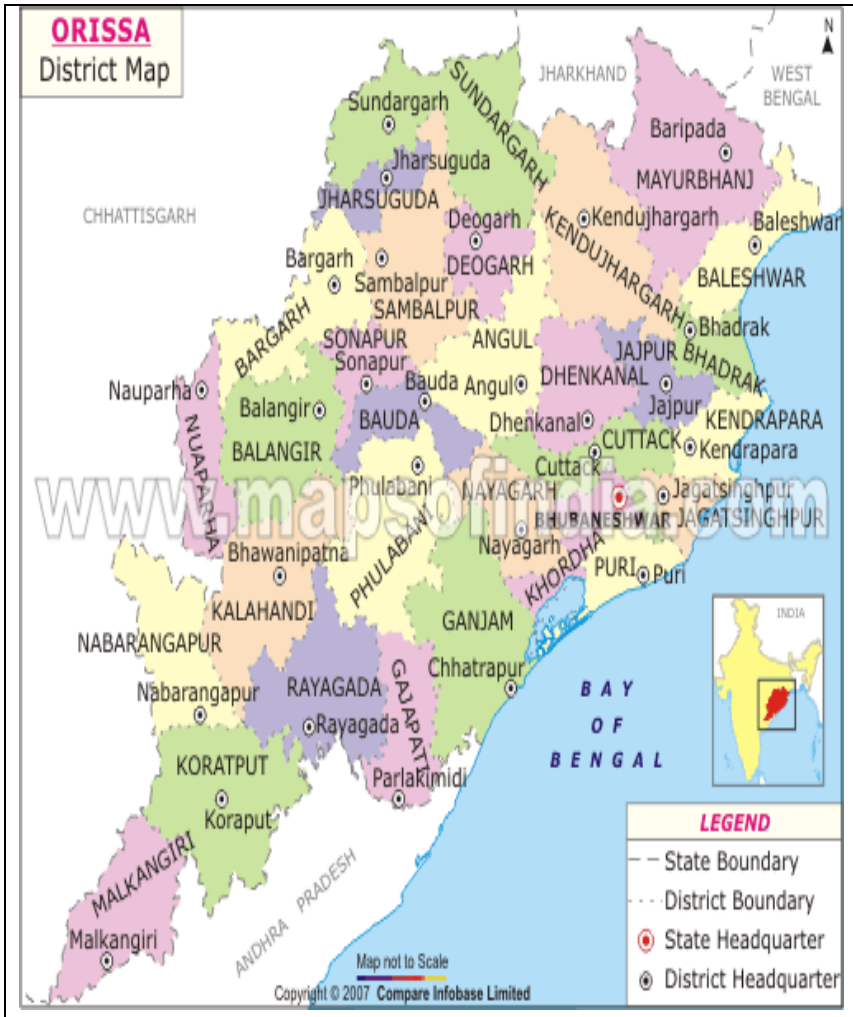
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		√	
	Flood		√	
	Cyclone		√	
	Hail storm		√	
	Heat wave	√		
	Cold wave			√
	Frost			√
	Sea water intrusion			
	Pests and disease outbreak (specify) Tobacco leaf eating cater pillar in greengram, sheath blight & blast in paddy	√	√	
	Sheath blight in paddy		√	
	Blast in paddy	√		
	Others (specify)			

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

Figure 1 - Average Monthly Rainfall of Cuttack District




BLOCK MAP OF CUTTACK DISTRICT
SCALE
km 25
0
25 km
Tangi-Choudwar
Mahanga
Athagarh
Narasinghpur
Salepur
Tigiria
Cuttack Sadar
Nischintkoili
Baramba
Baranga
Dampara
Banki
Kantapara
Niali
Blk. Boundary
Blk. Hqrs.
Dist. Hqrs.
GIS DIVISION, NIC, BHUBANESWAR
N
20° 50'
20° 40'
20° 30'
20° 20'
20° 10'
20° 00'
84° 45'
85° 00'
85° 15'
85° 30'
85° 45'
86° 00'
86° 15'


ORISSA
District Map
JHARKHAND
WEST BENGAL
CHHATTISGARH
Sundargarh
Jharsuguda
Deogarh
Bargarh
Sambalpur
Baripada
MAYURBHANJ
Kendujhargarh
Baleshwar
BALESHWAR
Bhadrak
SAMBALPUR
SONAPUR
Sonapur
ANGUL
Angul
DHENKANAL
JAJPUR
Jajpur
KENDRAPARA
Kendrapara
Nauparha
Balangir
BAUDA
Dhenkanal
CUTTACK
Cuttack
BALANGIR
Phulabani
NAYAGARH
Jagatsinghpur
BHUBANESWAR
JAGATSINGHPUR
Bhawanipatna
Nayagarh
PURI
Puri
KALAHANDI
GANJAM
NABARANGAPUR
Chhatrapur
Nabarangapur
RAYAGADA
Rayagada
KORATPUT
Parlakimidi
Koraput
MALKANGIRI
Malkangiri
ANDHRA PRADESH
BAY OF BENGAL
INDIA
LEGEND
State Boundary
District Boundary
State Headquarter
District Headquarter
Map not to Scale
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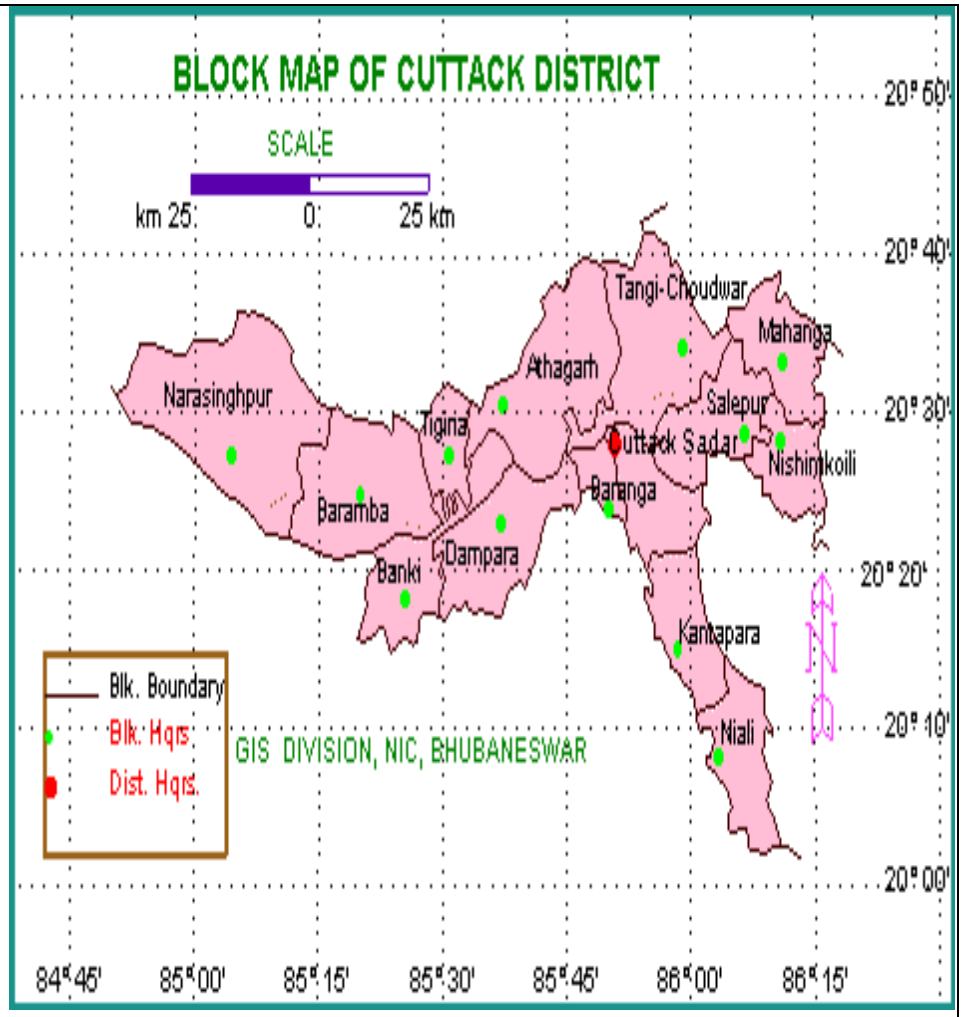
BLOCK MAP OF CUTTACK DISTRICT
SCALE
km 25 0 25 km
Tangi-Choudwar
Mahanga
Athagarh
Narasinghpur
Salepur
Tigiria
Cuttack Sadar
Nischintkoili
Baramba
Baranga
Banki
Dampara
Kantapara
Niali
Blk. Boundary
Blk. Hqrs.
Dist. Hqrs.
GIS DIVISION, NIC, BHUBANESWAR
20° 50'
20° 40'
20° 30'
20° 20'
20° 10'
20° 00'
84° 45'
85° 00'
85° 15'
85° 30'
85° 45'
86° 00'
86° 15'

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 [a]	Normal Crop / Cropping system [b]	Change in crop / cropping system [c] including variety	Agronomic measures [d]	Remarks on Implementation
Delay by 2 weeks (July 1st week)	1) Farming situation: Red laterite rain fed	Paddy - fallow	➢ Paddy(Hira, Jaldidhan, Anjali, Vandana, Sneha	• Summer ploughing, inter tillage, conservation furow, in-situ rain water harvest / conservation • Strengthening of field bunds in paddy , weeding and hoeing within 20 days to provide dust mulch	NFSM, CLDP IWMP, RKVY,
		Maize - Fallow	➢ Maize (Kiran,Pratap, VL-16)	• Rain water harvesting and recycling • Life saving irrigation when needed	NFSM, CLDP IWMP, RKVY, ISOPOM
	2) Farming situation: High rainfall light laterite	Maize - Fallow	➢ Maize (Kiran,VL-16, Pratap)	➢ Summer ploughing, inter tillage, conservation furrow for in-situ rain water conservation ➢ Strengthening field bunds ➢ Apply lime @ 5.0qtl + 5.0 ton FYM per ha ➢ Sowing across the slope, ridge and furrow planting	NFSM, CLDP IWMP, RKVY, ISOPOM

		Groundnut - Fallow	**Groundnut (Devi, smruti)**	➢ **Broad bed and furrow planting in groundnut** ➢ **Hoeing within 20days to provide soil mulch and weeding** ➢ **Life saving irrigation as needed** ➢ **Application of Oxiflurofen @ 200gm/ha as PE spray or post emergence spray of Quizalofop Ethyle @ 0.05kg ai/ha to groundnut for weed control**	**NFSM, CLDP IWMP, RKVY, ISOPOM OCTMP**
		Brinjal – Fallow	➢ **Brinjal(Green star)**	➢ **Hoeing weeding and ridging** ➢ **Organic mulch to brinjal**	**NFSM, CLDP IWMP, NHM, RKVY, ISOPOM OCTMP**
	3. Rainfed alluvium	**Paddy - Blackgram**	➢ **Paddy (Pooja ,Ranidhan, Gayatri for low land and Naveen, MTU 1001 for medium land) Blackgram (PU 30,PU 35)** ➢	➢ **Strengthening field bunds , in-situ moisture conservation** ➢ **Raising bund height in paddy** ➢ **Blocking drainage holes** ➢ **Community nursery raising and transplanting 3-4 seedlings per hill** ➢	**NFSM, CLDP IWMP, NHM, RKVY, ISOPOM OCTMP**
		Jute - Blackgram	➢ **Jute (Naveen, Basudev, JRO 524 ,Baladev) - Blackgram (PU 30,PU 35)**	➢ **weed control, thinning and 2% urea solution spray to jute** ➢ **Basal K & Bo application**	**ISOPOM NFSM, RKVY,**

	4. Medium rainfall river valley alluvium	**Paddy – Groundnut**	➢ **Paddy (Lalata, Naveen, Swarna, Pratikhya) – Groundnut (Devi,Smruti,TMV-2)**	➢ **Strengthening field bunds , in-situ moisture conservation** ➢ **Raising bund height in paddy** ➢ **Higher seed rate to direct seeded paddy** ➢ **Community nursery raising and transplanting 3-4 seedling per hill** ➢ **Blocking drainage hole**	**NFSM, CLDP IWMP, RKVY, ISOPOM OCTMP**
		Jute – Groundnut	➢ **Jute (Naveen, Basudev) - Groundnut (Devi,Smruti,TMV-2)**	➢ **weed control, thining and 2% urea solution spray to jute** ➢ **Basal K & Bo application**	**NFSM, CLDP IWMP, RKVY, ISOPOM OCTMP**
	5. low laying flood prone	**Local paddy**	➢ **Paddy (Pooja, Varsadhan, Swarna Sub-1, Pratikhya) -**	➢ **Strengthening field bunds, plugging drainage holes** ➢ **Transplanting 3-4 seedlings per hill** ➢	**NFSM, CLDP IWMP, NHM, RKVY, ISOPOM**
		Blackgram	**Blackgram(PU-30, PU-35)**	➢ **Life saving irrigation at critical stages** **Pulse seed treatment with bio-fertiliser**	**RKVY, NFSM,**
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/ cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation**

Delay by 4 weeks (up to July 3rd week)	**1) Farming situation: Red laterite rainfed**	**Paddy**	➢ **Paddy (KalingaIII, Hira, Jaldidhan**	• **Summer ploughing, inter tillage, conservation furow, in-situ rain water harvest / conservation** • **Strengthening of field bunds in paddy**	**CLDP, IWMP, ISOPOM NFSM, RKVY**
		Maize	➢ **Maize(Kiran, VL 16, Pratap)**	• **Weeding and hoeing within 20 days to provide dust mulch** • **Rain water harvesting and recycling** • **Life saving irrigation when needed**	**CLDP, IWMP, ISOPOM NFSM, RKVY OCTMP**
	2) Farming situation: High rainfall light laterite	**Maize**	➢ **Maize (Kiran,VL 16,Pratap)**	➢ **Summer ploughing, inter tillage, conservation furrow for in-situ rain water conservation** ➢ **Strengthening field bunds** ➢ **Apply lime @ 5.0qtl + 5.0ton FYM per ha** ➢ **Sowing across the slope, ridge and furrow planting** ➢ **Hoeing ,weeding and ridging**	**CLDP, IWMP, ISOPOM NFSM, RKVY OCTMP**
		Groundnut	**Groundnut (Devi, Smruti)**	➢ **Broad bed and furrow planting in groundnut** ➢ **Hoeing within 20days to provide soil mulch and weeding** ➢ **Application of Oxiflurofen @ 200gm/ha as PE spray**	**CLDP, IWMP, ISOPOM NFSM, RKVY OCTMP**

				or post emergence spray of Quizalofop Ethyle @ 0.05kg ai/ha to groundnut for weed control	
		Brinjal	➢ **Brinjal(Greenstar) + Maize (Kiran, VL16) / Arhar (UPAS-120 /ICPL 87) (4:2)**	➢ **Organic mulch to brinjal** ➢ **Provide life saving irrigation when needed**	**NHM CLDP, IWMP, ISOPOM NFSM, RKVY OCTMP**
	3. Rainfed Alluvium	**Paddy**	➢ **Paddy (Pooja, Ranidhan, Swarna, Sarala, Padmini)**	➢ **Strengthening of field bunds , in-situ moisture conservation , raising bund heights in paddy** ➢ **Blocking drainage holes** ➢ **Community nursery raising and transplanting 3-4 seedling per hill**	**CLDP, IWMP, ISOPOM NFSM, RKVY**
		Jute	➢ **Jute (Naveen ,Baladev,Basudev)**	➢ **Weed control, thinning and 2% urea solution spray to jute** ➢ **Basal application of K and Bo** ➢ **Provide life saving irrigation**	**CLDP, IWMP, ISOPOM NFSM, RKVY NHM OCTMP**
		Paddy - Blackgram	➢ **Paddy (Pooja, Ranidhan, Swarna, Sarala, Padmini)** ➢ **Blackgram(PU-30,PU-19)**	➢ **Strengthening of field bunds , in-situ moisture conservation , raising bund heights in paddy** ➢ **Blocking drainage holes**	**CLDP, IWMP, ISOPOM NFSM, RKVY**

				➢ **Community nursery raising and transplanting 3-4 seedling per hill**	**NHM OCTMP**
	4. Medium rainfall river valley alluvium	**Paddy – Groundnut**	➢ **Paddy (Jogesh,Sidhhant, Lalata, Surendra, Konark, Khandagiri) – Groundnut (Devi,Smruti,TMV-2)**	➢ **Strengthening field bunds , in-situ moisture conservation , raising bund height in paddy** ➢ **Blocking drainage holes** ➢ **Higher seed rate to direct seeded paddy** ➢ **Community nursery raising and transplanting 3-4 seedling per hill**	**CLDP, IWMP, ISOPOM NFSM, RKVY**
		Jute – Groundnut	➢ **Jute (Naveen, Basudev) - Groundnut (Devi,Smruti)**	➢ **Weed control , thining and 2% urea solution spray to jute** ➢ **Provide life saving irrigation**	**CLDP, IWMP, ISOPOM NFSM, RKVY**

	5. low laying flood prone	**Local paddy - Blackgram**	➢ **Paddy (Pooja, Tulasi, Upahar, Varsadhan, Swarna Sub-1) – Blackgram-(PU-30, PU-19)**	➢ **Strengthening field bunds, plugging drainage holes, raising bund height** ➢ **Transplant 3-4 seedling per hill** ➢ **Life saving irrigation at critical stage s** ➢ **Raising community nursery and transplanting** ➢ **Pulse seed treatment with bio fertiliser**	**CLDP, IWMP, ISOPOM NFSM, RKVY NHM**
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (August 1nd week)	**1) Farming situation: Red laterite rainfed**	**Paddy** **Maize**	➢ **Sesamum (Uma , ,Prachi, Nirmala)** ➢ **Cowpea(Utakala Manika, Pusa Barsati)** ➢ **Ricebean(RBL -6, KRB-1)** ➢ **Radish -Pusa Chetki** ➢ **Arhar (UPAS-120,ICPL-87) + Cowpea (2:2) / Sesamum(2:4)/ Radish(2:2)**	• **Summer ploughing, inter tillage, conservation furrow, in-situ rain water conservation** • **Strengthening of field bunds, weeding and hoeing within 20 days to provide dust mulch** • **Well decomposed FYM in seed rows. Ridge & forrow planting** • **Spraying 2%KCl + 0.1 PPM Boron to pulse crop,** • **Foliar application of 2% urea at pre flowering and flowering stage** • **Rainwater harvesting and recycling as life saving irrigation**	**IWMP, CLDP ISOPOM NHM NFSM RKVY**

	2) Farming situation: High rainfall light laterite	**Maize** **Groundnut** **Brinjal**	➢ **Sesamum (Uma ,Prachi, Nirmala)** ➢ **Cowpea(Utakala Manika, Pusa Barsati)** ➢ **Ricebean(RBL - 6,KRB-1)** ➢ **Radish -Pusa Chetki** ➢ **Arhar (Upas 120,ICPL-87) + Cowpea (2:2) / Sesamum(2:4)/ Radish(2:2)**	• **Summer ploughing, inter tillage, conservation furow, in-situ rain water harvest / conservation** • **Strengthening of field bunds, weeding and hoeing within 20 days to provide dust mulch** • **Well decomposed FYM in seed rows. Ridge & forrow planting** • **Rainwater harvesting and recycling as life saving irrigation** • **Spraying 2%KCl + 0.1PPM Boron to pulse crop,** • **Foliar application of 2% urea at preflowering and flowering stage**	**IWMP, CLDP ISOPOM NHM NFSM RKVY** **OCTMP**
	3. Rainfed alluvium	**Paddy** **Jute** **Paddy - Blackgram**	➢ **Paddy (Jogesh , Khandagiri, Naveen, Surendra, Pooja) - Blackgram (PU-30,PU-19)** ➢ **Jute (Naveen ,Basudev, Baladev) - Greengram(PDM-54,OBGG-52,TARM-2) /**	➢ **Strengthening field bunds , raising bund height in paddy and blocking drainage holes** ➢ **Community nursery raising and transplanting** ➢ **closer spacing and 4-5 seedlings per hill** ➢ **Sowing pregerminated seeds & weed control** ➢ **Spraying 2% urea solution to jute** ➢ **Rain water harvest & life saving irrigation when needed**	**IWMP, CLDP ISOPOM NHM NFSM RKVY OCTMP**
	4. Medium	**Paddy –**	➢ **Paddy (Jogesh,**	➢ **Strengthening field bunds ,**	

	rainfall river valley alluvium	**Groundnut Jute – Groundnut**	**Sidhhant, Khandagiri, Naveen) – Groundnut (Devi,Smruti,TMV-2)** ➢ **Jute (Naveen, Basudev) - Groundnut (Devi, Smruti, TMV-2)**	**raising bund height in paddy and blocking drainage holes** ➢ **Community nursery raising and transplanting** ➢ **closer spacing and 4-5 seedlings per hill** ➢ **Sowing pregerminated seeds & weed control** ➢ **Spraying 2% urea solution to jute** ➢ **Rain water harvest & life saving irrigation when needed**	**IWMP, CLDP ISOPOM NHM NFSM RKVY OCTMP**
	5. low laying flood prone	**Local paddy – Blackgram**	➢ **Paddy (Pooja, Tulasi, Indrabati, Upahar, Varsadhan, Swarna Sub-1) – Blackgram-(PU-30, PU-35)**	➢ **Strengthening field bunds, plugging drain-age holes** ➢ **Life saving irrigation at critical stages** ➢ **Raising community nursery and transpla-nting 3-4 seedling /hill** ➢ **Closer spacing to clonal tillers and aged seedlings** ➢ **Apply 50% N as basal** ➢ **Pulse seed treatment with bio-fertiliser**	**IWMP, CLDP ISOPOM NHM NFSM RKVY**
Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop /cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implement ation[e]**
Delay by	**1) Farming situation:**	**Paddy**	➢ **Niger (Deomali)** ➢ **Blackgram (T-9,PU-30)**	• **Summer ploughing, inter tillage, in-situ rain water harvest and**	**IWMP,**

8 weeks (August 3r^{d} week)	**Red laterite rainfed**	**Maize**	➢ **Cowpea (Utakala Manika, Pusa Barsati)** ➢ **Sesamum (Uma , Prachi)** ➢ **Horsegram (Urmi)** ➢ **Arhar (Upas 120,ICPL-87) + Cowpea (2:2) / Sesamum(2:4)/ Blackgram/ Horsegram(2:3)**	**conservation** • **Strengthening of field bunds, weeding and hoeing within 20 days to provide dust mulch** • **Rainwater harvesting and recycling as life saving irrigation when needed** • **Apply full P & K along with 20% N** • **Well decomposed FYM in seed rows.** • **Spraying 2%KCl + 0.1PPM Boron to pulse crop,** • **Foliar application of 2% urea at preflowering and flowering stage**	**CLDP ISOPOM NHM NFSM RKVY**
	2) Farming situation: High rainfall light laterite	**Maize** **Groundnut** **Brinjal**	➢ **Niger (Deomali)** ➢ **Blackgram (T9, PU-30)** ➢ **Cowpea(Utakala Manika, Pusa Barsati)** ➢ **Sesamum (Uma ,Nirmala, Prachi)** ➢ **Horsegram (Urmi)** ➢ **Arhar (Upas 120,ICPL-87) + Cowpea (2:2) / Sesamum(2:4)/ Blackgram/ Horsegram(2:3)**	• **Summer ploughing, inter tillage, in-situ rain water harvest and conservation** • **Strengthening of field bunds, weeding and hoeing within 20 days to provide dust mulch** • **Well decomposed FYM in seed rows.** • **Spraying 2%KCl + 0.1PPM Boron to pulse crop,** • **Foliar application of 2% urea at preflowering and flowering stage** • **Rainwater harvesting and recycling as life saving irrigation when needed**	**IWMP, CLDP ISOPOM NHM NFSM RKVY**
	3. Rainfed alluvium	**Paddy** **Jute** **Paddy - Blackgram**	➢ **Paddy (Jogesh , Khandagiri, Lalata, Surendra, Konarka) - Blackgram (PU-30,T-9)** ➢ **Jute (Naveen ,Basudev, Baladev)**	➢ **Strengthening field bunds , raising bund height in paddy and blocking drainage holes** ➢ **Community nursery raising and transplanting** ➢ **Closer spacing and 4-5 seedlings per hill**	**IWMP, CLDP ISOPOM NHM NFSM**

			➢ Sesamum (Uma,Nirmala, Prachi) - Greengram(PDM-54,OBGG-52)	➢ Sowing pregerminated seeds & weed control ➢ Spraying 2% urea solution to jute ➢ Rain water harvest & life saving irrigation when needed	RKVY
	4. Medium Rainfall river valley alluvium	Paddy – Groundnut	➢ Paddy (Jogesh, Sidhhant, Khandagiri) – Groundnut (Devi,Smruti,TMV-2)	➢ Strengthening field bunds ,raising field bund in paddy ➢ Higher seed rate to direct sown paddy and weed control Community nursery raising and transplanting, 4-5 seedling per hill	IWMP, CLDP ISOPOM NHM NFSM RKVY
		Jute – Groundnut	➢ Jute (Naveen, Basudev) - Groundnut (Devi, Smruti, TMV-2) ➢ Sesamum (Uma, Nirmala, Prachi) - Groundnut (Devi,Smruti,TMV-2)	➢ Application of 50% N as basal ➢ 2% urea solution spray to jute ➢ Bio fertiliser to pulse and oilseeds along with drainage ➢ Rainwater harvesting and life saving irrigation when needed	IWMP, CLDP ISOPOM NHM NFSM RKVY
	5. Low laying flood prone	Local paddy - Blackgram	➢ Paddy (Pooja, Tulasi, Upahar, Varsadhan, Swarna Sub-1) - Blackgram-(PU-30, T-9)	➢ Strengthening field bunds raising field bund in paddy ➢ Higher seed rate to direct Sown paddy plugging drainage holes ➢ Life saving irrigation at critical stages ➢ Raising community nursery and transplanting 4-5 seedling /hill ➢ Closer spacing to clonal tiller apply 50% N as basal ➢ Pulse seed treatment with bio fertiliser	IWMP, CLDP ISOPOM NHM NFSM RKVY

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

Normal onset (Month and week)	Month and week for specifying condition of early season drought due to delayed onset of monsoon			
	Delay in onset of monsoon by			
	2 wks	4 wks	6 wks	8 wks
June 1st wk	June 3rd wk	July 1st wk	July 3rd wk	Aug 1st wk
June 2nd wk	June 4th wk	July 2nd wk	July 4th wk	Aug 2nd wk
June 3rd wk	July 1st wk	July 3rd wk	Aug 1st wk	Aug 3rd wk
June 4th wk	July 2nd wk	July 4th wk	Aug 2nd wk	Aug 4th wk
July 1st wk	July 3rd wk	Aug 1st wk	Aug 3rd wk	Sep 1st wk
July 2nd wk	July 4th wk	Aug 2nd wk	Aug 4th wk	Sep 2nd wk

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation[a]	Normal Crop/cropping system[b]	Crop management[c]	Soil nutrient & moisture conservation measues[d]	Remarks on Implementation[e]
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination /crop stand	1) Farming situation: Red Laterite Rainfed	Paddy Maize	➢ FYM:SSP @10:1 placed at seeding point to avoid seedling mortality ➢ Resowing if more than 50% population damaged other wise gap filling. ➢ Preferring paddy varieties like Hira,Kalinga-III, Jaldidhan ➢ Summer ploughing ,	➢ Application of FYM and lime @ 5.0qtl/ha ➢ Sowing across the slope ➢ Water harvesting and recycling for life saving irrigation ➢ Bed -furrow and strip - furrow system of planting	IWMP RKVY NHM NFSM OCTMP

etc.			**weeding** ➢ **Seed treatment with $CaCl_2$ for drought tolerance** ➢ **Hoeing and weeding after 20 DAS for in-situ moisture conservation**	➢ **Inter tillage and hoeing for dust mulching** ➢ **Strengthening field bunds** ➢ **Blocking seepage holes & gully plugging in paddy**	
	2) High rainfall lilght laterite	**Maize** **Groundnut**	➢ **Summer ploughing** ➢ **Application of FYM and lime @5.0qtl/ha** ➢ **Seed treatment with $CaCl_2$ for seed drought tolerance** ➢ **Weed control** ➢ **Resowing if more than 50% population damaged other wise gap filling** ➢ **FYM : SSP @ 10:1placed at seeding point to avoid seedling mortality** ➢ **Sowing in furrows across the slope** ➢ **Hoeing and weeding after 20 DAS for in-situ moisture conservation**	➢ **Water harvesting and recycling** ➢ **Inter tillage and hoeing for dust mulching** ➢ **Bed furrows system of planting** ➢ **Weeding , hoeing, ridging in maize**	**IWMP** **RKVY** **NHM** **NFSM** **OCTMP**
	3) Rain fed alluvium	**Paddy** **Jute** **Paddy – Blackgram/ Greengram**	➢ **Prefer varieties like Lalata, Konarka, Surendra** ➢ **Sow sprouted seeds** ➢ **Community nursery raising and transplanting** ➢ **Application of 2% urea solution to jute** ➢ **Providing life saving**	➢ **Strengthening of field bunds** ➢ **In-situ water harvesting and recycling** ➢ **Blocking seepage hole** ➢ **Gully plugging**	**IWMP** **RKVY** **NHM** **NFSM**

			irrigation ➢ Resowing if more than 50% population damaged ➢ FYM : SSP @ 10:1placed at seeding point to avoid seedling mortality sowing in furrows across the slope ➢ Gap filling by Khelua and by clonal propagation ➢ Weed control to check transpiration loss		
	4) Medium rainfall river valley alluvium	Paddy – Groundnut Jute -	➢ Prefer varieties like Jogesh, Sidhhant, Khandagiri ➢ Community nursery raising and transplanting ➢ Sow sprouted seeds ➢ Application of 2% urea solution to jute ➢ Providing life saving irrigation ➢ Resowing if more than 50% population damaged ➢ FYM : SSP @ 10:1placed at seeding point to avoid seedling mortality sowing in furrows across the slope ➢ Gap filling by Khelua and by clonal propagation ➢ Weed control to check the transpiration loss	➢ Strengthening of field bunds ➢ Insitu water harvesting and recycling ➢ Blocking seepage hole ➢ Gully plugging	IWMP RKVY NHM NFSM OCTMP
	4) Medium rainfall	Paddy – Groundnut	➢ Prefer variety like Jaldidhan, Jogesh,	➢ Strengthening of field bunds	IWMP RKVY

	rivervelly	**Jute**	**Sidhhant, Khandagiri, Vandana, Anjali, Annada) – Groundnut (Devi,Smruti,TMV-2)** ➢ **Jute (Naveen, Basudev) - Groundnut (Devi, Smruti, TMV-2) Community nursery raising and transplanting** ➢ **Providing life saving irrigation** ➢ **Resowing if more than 50% population damaged** ➢ **Gap filling by Khelua and clonal propagation** ➢ **Sow sprouted seeds**	➢ **In-situ water harvesting and recycling** ➢ **Blocking seepage holes** ➢ **Gully plugging**	**NHM NFSM OCTMP**
	5)Low laying flood prone	**Paddy – Blackgram**	➢ **Prefer varieties like Pratikhya, Ranidhan, Swarna sub-1** ➢ **Community nursery raising and transplanting** ➢ **Providing life saving irrigation** ➢ **Resowing if more than 50% population damaged** ➢ **Gap filling by Khelua and clonal propagation** ➢ **Sow sprouted seeds**	➢ **Strengthening of field bunds** ➢ **In-situ water harvesting and recycling** ➢ **Blocking seepage holes** ➢ **Gully plugging**	**IWMP RKVY NHM NFSM OCTMP**

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/ cropping system[b]**	**Crop managemt[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At vegetative stage	**1) Farming situation: Red laterite rain fed**	**Paddy** **Maize**	➢ **Provide dust mulch using rotary peg weeder for hoeing** ➢ **Spray 2% urea and withhold topdressing till receipt of rain** ➢ **Intercropping of arhar with maize (2:2) and paddy(2:5)** ➢ **Spraying 2%KCl and 0.1% Boron to pulses**	➢ **Strengthening bunds with compartmental bunding** ➢ **Insitu water harvesting and recycling for life saving irrigation** ➢ **Plugging drainage lines** ➢ **Sowing across the slope with ridge and furrow method** ➢ **Summer ploughing and application of FYM 5t and lime 5qtl per ha**	**RKVY NFSM ISOPOM NREGS IWMP OCTMP**
	2) High rainfall light laterite	**Maize** **Groundnut** **Brinjal**	➢ **Provide dust mulch by hoeing with rotary- peg weeder** ➢ **Prune weeds and apply Quizalo-fopethyl 5% EC@ 0.05kg ai/ha at 20 DAS to control weeds in dicots** ➢ **Spray 1% urea to brinjal** ➢ **Top dress after receipt of rain** ➢ **Thin out 25% plants in groundnut and provide organic mulch**	➢ **Strengthening bunds with compartmental bunding** ➢ **In-situ water harvesting and recycling for life saving irrigation** ➢ **Sowing across the slope with bed- furrow /ridge -- furrow method** ➢ **Summer ploughing and application of FYM 5t and lime 5qtl Per ha**	**RKVY NFSM ISOPOM NREGS IWMP OCTMP**

			➢ Organic mulching to wide row crops. ➢ Intercropping arhar with maize (2:2) ,groundnut (2:6) ➢ bed furrow and ridge furrow system of planting ➢ Spraying anti transpirant (Kaoline) to brinjal ➢ Spray 2% KCL and 0.1 % Boron to pulses		
	3) Rain fed alluvium	Paddy Jute Paddy - Blackgram/ Greengram	➢ No beusuning if crop is more than 45 days old ➢ Weed out field without waiting for rain ➢ Gap filling with clonal tillers and topdressing after receipt of rain ➢ Transplant up to 35 days old seedlings for medium duration paddy ➢ Remove weeds in nursery with blast management and life saving irrigation ➢ Close transplanting with 4-5 seedlings per hill ➢ Spray 2% urea as foliar spray and apply potasic fertiliser	➢ Close the drainage lines ➢ Strengthening the field bund ➢ In-situ water harvesting and recycling for protective irrigation	RKVY NFSM ISOPOM NREGS IWMP OCTMP
	4) Medium rainfall river valley alluvium	Paddy – Groundnut Jute – Groundnut	➢ Weed out field without waiting for rain ➢ Gap filling with clonal tillers after receipt of rain ➢ Transplant up to 35 days old seedlings for medium duration	➢ Close the drainage lines ➢ Strengthening the field bund ➢ In-situ water harvesting and recycling for protective irrigation	RKVY NFSM ISOPOM NREGS IWMP OCTMP

			paddy ➢ Remove weeds in nursery , blast management and life saving irrigation ➢ Close transplanting with 4-5 seedlings per hill ➢ Spray 2% urea as foliar spray	➢ Close drainage hole and check seepage losses	
	5) low laying flood prone	Paddy – Blackgram/ Greengram	➢ No beusuning to 45 days old paddy crop ➢ Weed out field without waiting for rain ➢ Gap filling with clonal tillers after receipt of rain ➢ Community nursery raising ➢ Remove weeds in nursery , blast management and life saving irrigation ➢ Close transplanting with 4-5 seedlings per hill with up to 35 days old seedling of Swarna, Ranidhan, Swarna sub1 etc. ➢ Foliar spray with 2% urea	➢ Close the drainage lines ➢ Strengthening the field bunds ➢ In-situ water harvesting and recycling for protective irrigation	RKVY NFSM ISOPOM NREGS IWMP OCTMP

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At flowering/ fruiting stage	**1) Farming situation: Red laterite rain fed**	**Paddy**	➢ **Inter cropping arhar with paddy (2:5)& maize (2:2)** ➢ **Sprinkling of water to keep micro climate moist** ➢ **Spraying of 2% urea solution**	➢ **Strengthening of field bunds, blocking drainage and seepage holes,Compartmental bunding** ➢ **In-situ water harvesting and recycling**	**RKVY IWMP, NREGS, NFSM OCTMP**
		Maize	➢ **Application of life saving irrigation** ➢ **Maize may be harvested for cobs**	➢ **Sowing across the slope with ridge furrow method** ➢ **Application of FYM(5t) and lime(5qtl) per ha** ➢ **Provide dust mulching by hoeing with mechanical weeder**	**RKVY IWMP, NREGS, ISOPOM NFSM OCTMP**
	2) High rainfall light laterite	**Maize – Fallow Groundnut – Fallow Brinjal - Fallow**	➢ **Inter cropping arhar with maize (2:2)** ➢ **Sprinkling of water to keep micro climate moist** ➢ **Maize may be harvested for cobs** ➢ **Spraying of 1% urea solution to brinjal** ➢ **Spraying 2% KCL and 0.1% boron to pulses and vegetables** ➢ **Application of protective life saving irrigation**	➢ **Strengthening of field bunds, blocking drainage and seepage holes,Compartmental bunds** ➢ **In-situ water harvest and recycling** ➢ **Sowing across the slope with bed-furrow/ ridge -furrow methods** ➢ **Application of FYM (5t) and lime (5qtl) / ha**	**RKVY IWMP, NREGS, ISOPOM NFSM OCTMP**

			➢ Spraying anti transpirant (Kaoline) to brinjal ➢ Organic mulching to wide row crops	➢ Provide dust mulching by hoeing with mechanical weeder	
	3) Rain fed alluvium	Paddy Jute Paddy – Blackgram/ Greemgram	➢ Provide life saving irrigation ➢ Sprinkling of water to keep micro climate moist ➢ Spraying of 2% urea solutions after weeding the plot ➢ Top dressing with receipt of rain	➢ Strengthening of field bunds ➢ Blocking drainage and seepage hole ➢ In-situ water harvesting in small ditches to recycle as protective irrigation	RKVY IWMP, NREGS, ISOPOM NFSM
	4) Mid rainfall river valley alluvium	Paddy – Groundnut Jute – Groundnut	➢ Provide life saving irrigation ➢ Sprinkling of water to keep micro climate moist ➢ Spraying of 2% urea solutions after weeding the plot ➢ Top dressing with receipt of rain	➢ Strengthening of field bunds ➢ Blocking drainage and seepage holes ➢ Insitu water harvesting in small ditches to recycle as protective irrigation	RKVY IWMP, NREGS, ISOPOM NFSM
	5) Low laying flood prone	Paddy – Blackgram / Greengram	➢ Provide life saving irrigation ➢ Sprinkling of water to keep micro climate moist ➢ Spraying of 2% urea solutions after weeding the plot ➢ Apply potassic fertiliser even through spray solution ➢ Top dressing with receipt of rain	➢ Strengthening of field bunds ➢ Blocking drainage and seepage holes ➢ Compartmental bunds ➢ In-situ water harvesting in small ditches to recycle as protective irrigation	RKVY IWMP, NREGS, ISOPOM NFSM

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Rabi Crop planning[d]**	**Remarks on Implementation[e]**
	1) Farming situation: Redlaterite rainfed	**Paddy** **Maize**	➢ **Provide protective I life saving irrigation from the harvested rain water preferably in root zones** ➢ **Application of sufficient FYM at sowing to extend period of water availability** ➢ **Maize may be harvested as cobs** ➢ **Harvest paddy at physiological maturity stage** ➢ **Sowing the crop across the slope with ridge and furrow method** ➢ **Strengthening field bunds blocking drainage channel and seepage holes**	➢ **sow / dibble pre-rabi crops like sesamum (Uma, Nirmala,Prachi) , Niger (Deomali), Horsegram(Urmi) in case of complete crop failure**	**RKVY, IWMP, NREGS, ISOPOM NFSM OCTMP**

	2) High rainfall light laterite	**Maize** **Groundnut** **Brinjal**	➢ **Provide protective life saving irrigation from the harvested rain water preferably in root zones** ➢ **Application of sufficient FYM at sowing to extend period of water availability** ➢ **Maize may be harvested as cobs** ➢ **Sowing the crop across the slope with ridge and furrow method** ➢ **Strengthening field bunds, blocking drainage channes and seepage holes**	➢ **sow dibble prerabi crops like sesamum (Uma, Nirmala,Prachi) , Niger (Deomali), Horsegram(Urmi)incase of complete crop failure**	**RKVY, IWMP, NREGS, ISOPOM NFSM OCTMP**
	3) Rain fed alluvium	**Paddy** **Jute** **Paddy – Blackgram/ Greengram**	➢ **Provide protective life saving irrigation from the harvested rain water** ➢ **Application of sufficient FYM at sowing to extend period of water availability** ➢ **Harvest paddy at physiological maturity stage** ➢ **Application of potassium fertilizer** ➢ **Strengthening field bunds , cheak runoff and seepage loss and block drainage channels**	➢ **Sow prerabi crops like horsegram (Urmi), Sesamum(Uma, Nirmala,Prachi), Blackgram(T-9, PU-19,PU- 30), Greengram(PDM-54,Sujata)**	**RKVY, IWMP, NREGS, ISOPOM NFSM OCTMP**
	4) Medium rainfall river valley	**Paddy – Groundnut Jute -**	➢ **Provide protective life saving irrigation from the harvested rain water** ➢ **Application of sufficient**	➢ **Sow groundnut (Smruti, Devi, TMV-2) as pre rabi crop utilizing residual**	**RKVY, IWMP, NREGS, ISOPOM**

	alluvium	**Groundnut**	**FYM at sowing to extend periods of water availability** ➢ **Harvest paddy at physiological maturity stage** ➢ **Strengthening field bunds ,cheak runoff and seepage loss and block drainage channels**	**moisture** ➢ **In extreme case sow horsegram (Urmi), sesamum(Uma, Nirmala,Prachi), blackgram(T-9,PU-30,PU-19) Green gram (PDM-54, Sujata) as pre rabi crops**	**NFSM OCTMP**
	5) Low laying flood prone	**Paddy-Blackgram/ Greengram**	➢ **Provide protective life saving irrigation from the harvested rain water** ➢ **Application of sufficient FYM at sowing to extend period of water availability** ➢ **Harvest paddy at physiological maturity stage** ➢ **Strengthening field bunds , cheak runoff and seepage loss and block drainage channels**	➢ **Paira sowing of blackgram/field pea** ➢ **Sow pre-rabi crops like horsegram (Urmi), sesamum(Uma,Nirmala,Prachi), blackgram(T-9,PU-30,PU-19), Green gram (PDM-54, Sujata)**	**RKVY, IWMP, NREGS, ISOPOM NFSM OCTMP**

Notes:

a. **Describe the major farming situation to provide information on growing environment (rainfall and soil information - colour, depth & texture) such as low rainfall shallow red sandy loam soils, high rainfall deep black soils, uplands, medium lands, eroded hill slops etc. tank fed black soils, shallow acid soils, sodic vertisols etc**

b. **Describe the normal crop or cropping system grown in that farming situation including catch crop, sequence, rotation & variety if known**

c. **Describe the alternative crop, variety and/or cropping pattern in view of the delay in monsoon and shortening of the growing period including delay in sowing of nurseries in case of paddy.**

- **In case of normal onset followed by early season droughts re-sowing may be recommended including variety seed rate etc.**
- **In case of early or mid season dry spells indicate crop management techniques to save standing crop.**
- **In case of terminal drought indicate giving life saving supplemental irrigation, if available or taking up harvest at physiological maturity with some realizable grain/fodder yield etc.**

d. Describe all agronomic practices which help in coping with late planting like increased or decreased spacing, changes in planting geometry, intercropping in case of sole crops, thinning, mulching, spray of anti-transpirants or other chemicals, supplemental irrigation, soil and moisture conservation practices like ridging, conservation furrows, dust mulch etc.

- **In case of early and mid season dry spells indicate moisture conservation techniques to save standing crop.**
- **In case of terminal drought indicate early rabi cropping with suitable crops/varieties with a possibility of giving pre-sowing/come up irrigation etc.**

e. Give details on the source of the breeder seed, in case an alternate crop or variety is suggested as part of the contingency. For agronomic measures, indicate any convergence possible with ongoing central or state schemes like National Rural Employment Guarantee Scheme (NREGS), Integrated Watershed Management Programme (IWMP), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM), National Horticulture Mission (NHM), Community Land Development Programme (CLDP) etc., to meet the cost of materials, labour or implements etc. to carry out any field based activity quickly.

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation[f]	Normal Crop/cropping system[g]	Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[j]
Delayed release of water in canals due to low rainfall	1) Farming situation: Rain fed alluv ium	Paddy Paddy – Moong Paddy / Jute – Groundnut	Paddy – groundnut / moong / sunflower Jute – Vegetable / Groundnut- moong Paddy – Sugarcane + moong – Ratoon ➢ Varieties for Moong- TARM-2,PDM-54, OBGG-52 Groundnut- Devi, Smruti,TMV-2 Sunflower – KBSH-1, MSH-1	➢ Raising community nursery ➢ Water harvesting and recycling ➢ Preferring shorter duration paddy (Lalata,Konarka,Surendra in place of Swarma,Pratikhya and Ranidhan and Kandagiri, Jogesh in place of Lalata and Surendra) ➢ Maintaining higher plant stand through closer spacing 3-4 seedling per hill in delayed transplanting of already raised nursery ➢ Planting pregerminated seeds ➢ Growing green gram intercropped with sugarcane ➢ 2% urea spray to jute ➢ Weeding to direct seeded paddy without beusuning ➢ Nitrogen top dressing after receipt of rain / irrigation	RKVY, IWMP, NREGS, ISOPOM OCTMP

Condition			Suggested Contingency measures		
	Major Farming situation[f]	Normal Crop/cropping system[g]	Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[j]
Limited release of water in canals due to low rainfall	1) Farming situation: Rain fed alluvium	Paddy Paddy – Moong Paddy / Jute – Groundnut	Paddy – Moong Paddy - G.nut Jute - G.nut /- Vegetable ➢ Varieties for Moong- TARM-2, PDM-54, OBGG-52 Groundnut - Devi, Smruti, TMV-2 Sunflower – KBSH-1, MSH-1	➢ Strengthening field bunds, water harvesting and recycling ➢ Application of irrigation at critical crop growth stages ➢ Preferring short duration paddy (var. Lalata, Konarka, Surendra, Khandagiri, Jogesh, Sidhhant) ➢ Opt for SRI method using cono weeder ➢ Direct seeding with pregerminated seeds ➢ Foliar nutrient application ➢ Bed - furrow system of planting in groundnut ➢ Skip row irrigation in vegetables , sprinkler irrigation to groundnut and moong	RKVY, IWMP, NREGS, ISOPOM OCTMP

Condition			Suggested Contingency measures		
	Major Farming situation[f]	Normal Crop/ cropping system[g]	Change in crop/cropping system[h]	Agronomic measure	Remarks on Implementation[j]
Non release of water in canals under delayed onset of monsoon in catchment	Farming situation: Rain fed alluvium	Paddy Paddy – Moong Paddy / Jute – Groundnut	Paddy – moong/ groundnut Jute- moong/ groundnut ➢ Varieties for Moong- TARM-2, PDM-54, OBGG-52 Groundnut- Devi, Smruti,TMV-2 Sunflower – KBSH-1, MSH-1	➢ Strengthening field bunds ➢ Water harvesting and recycling at critical stages for life saving ➢ Community nursery raising and transplanting 4-5 seedling /hill ➢ Growing shorter duration paddy (varieties, Lalata, Konarka, Surenda and Khandagiri, Jogesh, Sidhhant) ➢ Opt for SRI method using cono weeder ➢ Chemical weed control to direct seeded paddy ➢ Foliar nutrient application ➢ 2% urea spray to jute ➢ Nitrogen top dressing to paddy after receipt of rain	RKVY, IWMP, NREGS, ISOPOM OCTMP

Condition			Suggested Contingency measures		
	Major Farming situation[f]	Normal Crop/cropping system[g]	Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[j]
Insufficient groundwater recharge due to low rainfall	Farming situation: Rain fed Alluvium	Paddy Paddy – Moong Paddy / Jute – Groundnut	Paddy – moong Jute- moong / groundnut ➢ Varieties for Moong- TARM-2, PDM-54, OBGG-52 Groundnut- Devi, Smruti,TMV-2 Sunflower – KBSH-1, MSH-1	➢ Strengthening field bunds , water harvesting and recycling ➢ Transpl anting paddy(Khandagiri, Sidhhant, Jogesh) ➢ Opt for SRI method using cono weeder ➢ Foliar nutrient application(2% urea spray to jute) ➢ Sprinkler irrigation to jute ➢ Bed furrow system of planting groundnut ➢ Skip row irrigation ➢ Application of irrigation at critical growth stages	RKVY, IWMP, NREGS, ISOPOM

Notes:

[f] Describe such as uplands, medium and low lands and source of irrigation such as tank fed medium or deep black/loamy/red soils, tube well irrigated red soils, canal irrigated red soils, well irrigated black soils etc.,

[g] The normal crop or cropping systems grown in a given irrigated situation

[h] Suggested change in the crop, variety or cropping system in view of delay in release of irrigation water, less water availability etc.,

[I] All agronomic measures like improved methods of irrigation (skip row etc.), micro irrigation (drip/sprinkler/sub-surface), deficit irrigation, limited area irrigation, mulching etc, that improve water use efficiency and make best use of limited water including methods of ground water recharge and sharing.

[j] Comments on source of availability of seed of the alternate crop or variety, any constraints in marketing of alternative crop implications for livestock and dairy sectors and details of state or central schemes like National Rural Employment Guarantee Scheme (NREGS), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM), National Horticulture Mission (NHM) etc., which facilitate implementation of the agronomic measures suggested.

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[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Crop1 (Paddy)	**Provide drainage** **Gap filling for damaged seedling** **Varieties : Swarna sub-1, CR-1014, CR-1018**	**Intermitant drainage**	**Provide drainage** **Apply potassic fertiliser** **Harvest at physiological maturity**	**Drying** **Safe storage** **Early disposal**
Crop2(Blackgram)	**Provide drainage** **Higher seed rate**	**Provide drainage**	**Provide drainage**	**Drying** **Safe storage** **Early disposal**
Crop3(Greengram)	**Provide drainage** **Higher seed rate**	**Provide drainage**	**Provide drainage**	**Drying** **Safe storage** **Early disposal**
Crop4(Groundnut)	**Provide drainage**	**Provide drainage**	**Provide drainage**	**Drying** **Safe storage** **Early disposal**
Crop5(Sugarcane)	**It escapes**	**Provide drainage** **Earthing up**	**Provide drainage** **Earthing up**	**Safe storage and transportation**

Horticulture				
Crop1 (Mango)	**Drainage system should be developed**	**Drainage system should be developed**	**Drainage system should be developed**	**Keeping Fruit in a well ventilated dry place**
Crop2(Cashew)	**Drainage system should be developed**	**Drainage system should be developed**	**Drainage system should be developed**	**Keeping Fruit in a well ventilated dry place**
Crop3(Banana)	**Drainage system should be developed**	**Drainage system should be developed**	**Drainage system should be developed**	**Keeping Fruit in a well ventilated dry place**
Heavy rainfall with high speed winds in a short span[2]	***provide wind break and shelter belt** ***Phosphate application for route development** ***Potasium ,Boron, Silica and Zinc application**			
Crop1 (Paddy)	**Provide drainage** **Gap filling for damaged seedling** **Varieties : Swarna sub-1, CR-1014, CR-1018**	**Intermitant drainage**	**Provide drainage** **Apply potassic fertiliser** **Harvest at physiological maturity**	**Drying** **Safe storage** **Early disposal**
Crop2(Blackgram)	**Provide drainage** **Higher seed rate**	**Provide drainage**	**Provide drainage**	**Drying** **Safe storage** **Early disposal**
Crop3(Greengram)	**Provide drainage**	**Provide drainage**	**Provide drainage**	**Drying** **Safe storage** **Early disposal**
Crop4(Groundnut)	**Provide drainage**	**Provide drainage**	**Early harvest**	**Drying** **Safe storage** **Early disposal**
Crop5(Sugarcane)	**It escapes**	**Provide drainage**	**Provide drainage**	**Provide drainage**

		Earthing up **Wrapping and propping**	**Earthing up** **Wrapping and propping**	**Safe storage and transportation** **Wrapping and propping**
Horticulture				
Crop1 (Mango)	**Drainage of excess water**	**Drainage of excess water**	**Drainage of excess water**	**Keeping Fruit in a well ventilated dry place**
Crop2(Cashew)	**Drainage of excess water**	**Drainage of excess water**	**Drainage of excess water**	**Keeping Fruit in a well ventilated dry place**
Crop3(Banana)	**Drainage of excess water**	**Drainage of excess water**	**Drainage of excess water**	**Keeping Fruit in a well ventilated dry place**
Outbreak of pests and diseases due to unseasonal rains				
Crop1 (Paddy)	**Swarming caterpillar spray cartap hydrochloride @ 1gm/ltr of water. Disease – sheath blight spray hexaconazol @1ml/ltr of water and adopt need based pesticide**	**BPH- Apply thiomethoxam @ 1gm/4ltr of water and adopt need based pesticide**	**Adopt need based pesticide**	**Drying** **Safe storage** **Early disposal**
Crop2(Blackgram)	**Tobacco leaf eating caterpillar- spraying of chloropyriphos @ 2ml/ltr of water at evening**	**Adopt need based pesticide**	**Adopt need based pesticide**	**Drying** **Safe storage** **Early disposal**
Crop3(Greengram)	**Tobacco leaf eating**	**Adopt need based**	**Adopt need based**	**Drying**

	caterpillar- spraying of chloropyriphos @ 2ml/ltr of water at evening	**pesticide**	**pesticide**	**Safe storage** **Early disposal**
Crop4(Groundnut)	**Adopt need based insecticide**	**Tikka disease – apply Saf @ 1gm/ltr of water and adopt need based pesticide**	**Adopt need based pesticide**	**Drying** **Safe storage** **Early disposal**
Crop5(Sugarcane)	**IPM**	**Adopt need based pesticide**	**Adopt need based pesticide**	**Safe storage and transportation** **Early disposal**
Horticulture				
Crop1 (Mango)	**Adopt need based pesticide**	**Adopt need based pesticide**	**Adopt need based pesticide**	**Safe storage** **Early disposal**
Crop2(Cashewnut)	**Adopt need based pesticide**	**Adopt need based pesticide**	**Adopt need based pesticide**	**Drying** **Safe storage** **Early disposal**
Crop3(Banana)	**Adopt need based pesticide**	**Adopt need based pesticide**	**Adopt need based pesticide**	**Safe storage** **Early disposal**

[k] Such as drainage in black soils, indicate taking up need based inter-culture operations, outbreak of pests/diseases along with their management etc.

[l] Such as drainage in black soils, application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruiting and indicate possibility of pest/disease outbreak with need based prophylactic / curative management etc.

[m] Such as drainage in black soils, measures for preventing seed germination etc and Indicate possibility of harvesting at physiological maturity immediately and shifting produce to safer place and protection against pest/disease damage in storage etc.

[n] Such as shifting of produce to safer place for drying and maintaining the quality of grain/fodder and protection against pest/disease damage in storage etc

2.3 Floods

Condition	Suggested contingency measure[o]			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Crop1 (paddy)	• **Provide drainage** • **Spray clean water to clear up the leaves** • **If seedling damaged go for reseeding by dapog method** • **Community nursery raising** • **Select varieties like Swarna Sub-1 & Sarasa**	• **Provide drainage** • **If damage is more than 50% retransplant or put pregerminated sprouted seeds on puddle soil with higher seed rate and closer spacing** • **Use short duration variety like Lalata , Khandagiri , Konark ,Surendra ,Jogesh Sidhhant .** • **Transplant 40 – 60 days old seedling after flood water recedes with close spacing and 4-5 seedlings per hill** • **Drainage excess water** • **Transplant clonal tillers .do not go for beusaning** • **Apply moderate dose of fertiliser @40:20:20NPK / ha** • **Weeding out and gap filling by clonal tillers** • **Weed out rice field** • **Apply N&K to boost the growth** • **Redistribution of seedling** • **Ridge and forrow planting to horticulture crops**	• **Provide drainage** • **Rinsing the top leaves and floral parts** • **If revibal not possible go for sowing blackgram /greengram** • **Harvest at physiological maturity** • **Paira cropping blackgram**	• **Provide drainage** • **Preventing premature germination by hormonal spray** • **Plan for rabi crop – blackgram, greengram or groundnut** • **Safe storage** • **Threshing by power thresher and drying of the produce**

Crop2- Jute (water logging/ partial irrigated)	• **It escapes**	• **Spray application of N & K fertiliser (2%)** • **Early draining out of flood water**	• **Provide drainage** • **Early harvest at physiological maturity stage** • **planning for rabi groundnut & Blackgram**	• **Provide drainage** • **Safe stacking after drying**

Crop3- Sugarcane	• **It escapes**	• **Provide drainage**
		• **Spraying of 2% urea**
		• **Higher K application**
		• **Application of Carbendazim to previous redrot infected field**
		• **Weed out the infected / diseased shoots to prevent lodging**
			• **Quick drain out of flood water by deep drains**
			• **Early harvest**
			• **Gap filling for ratoon**
			• **Basal fertiliser to be followed by earthing up**
				• **Provide drainage**
				  • **Safe harvest washing & crushing**
				  • **Deep drains for ratoon crop**

Continuous submergence for more than 2 days[2]				
Crop1 (specify)paddy	• **Provide drainage** • **Spray clean water to clear up the leaves** • **If seedlings damaged reseeding** • **Community nursery raising**	• **Provide drainage** • **If damage is more than 50% retrans plant or put pregerminated sprouted seeds on puddle soil with higher seed rate and closer spacing** • **Use short duration variety like Lalata , Khandagiri, Konarka , Surendra , Jogesh Sidhhant etc.** • **Transplant 40 – 60 days old seedling after flood water residues** • **Apply moderate dose of fertiliser**	• **Early drainage** • **Rinsing the top leaves and floral parts** • **If revibal is not possible go for paira cropping blackgram/sowing greengram**	• **Provide drainage** • **Preventing premature germination by hormonal spray** • **Plan for rabi crop – blackgram, greengram or groundnut** • **Drying of the produce**

		@40:20:20NPK / ha • **Weed ing and gap filling by clonal tillers** • **Apply N&K to boost the growth**		
Crop2- Jute	• **It escapes**	• **Spray application of N & K fertiliser (2%)** • **Early draining out of flood water**	• **Provide drainage** • **Early harvest at physiological maturity stage** • **planning for rabi groundnut & Blackgram**	• **Provide drainage** • **Safe stacking after drying**
Crop3- Sugarcane	• **It escapes**	• **Provide drainage** • **Spraying of 2% urea** • **Higher K application** • **Application of Carbendazim to previous red rot infected field** • **Weed out the infected / diseased shoots to prevent lodging**	• **Quick drain out of flood water by deep drains** • **Early harvest** • **Gap filling for ratoon** • **Basal fertiliser to be followed by earthing up**	• **Provide drainage** • **Safe harvest washing & crushing** • **Deep drains for ratoon crop**

Notes:

[1] Water logging due to heavy rainfall, poor drainage in vertisols, flash floods in streams and rivers due to high rainfall, breach of embankments

[2] If the water remains in the field due to continuous rains, poor infiltration and push back effect

[3] Entry of sea water into cultivated fields in coastal districts due to tidal wave during cyclones or tsunami; intrusion of seawater into groundwater in coastal districts

[o] Crop/field management depends on nature of material (sand or silt) deposited during floods. In sand deposited crop fields/ fallows indicate ameliorative measures such as early removal of sand for facilitating *rabi* crop or next kharif. In silt deposited indo-

gangetic plains, indicate early *rabi* crop plan in current cropped areas and current fallow lands. Indicate drainage of stagnating water and strengthening of field bunds etc. In diara land areas indicate crop plans for receding situations. Usually rice cropped areas are flood prone causing loss of nurseries, delayed transplanting or damage to the already transplanted fields etc. Indicate community nursery raising, scheduling bushenings, re-transplanting in damaged fields and transplanting new areas or direct seeding including seed availability so that the season is not lost. Indicate steps for preventing pre-mature germination of submerged crop at maturity or harvested produce.

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

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave[p]				
Crop1(Paddy)	Shading of nursery Sprinkling irrigation	Sprinkling water Soil mulching	Sprinkling water Frequent irrigation	NA
Crop2 (Blackgram)	Sprinkling water	Sprinkling water Soil mulching	Sprinkling water Frequent irrigation	NA
Crop3 (Greengram)	Sprinkling water	Sprinkling water Soil mulching	Sprinkling water Frequent irrigation	NA
Crop4(Groundnut)	Frequent irrigation	Frequent irrigation	Frequent irrigation	NA
Crop 5 (Sugarcane)	Frequent irrigation	Frequent irrigation	Frequent irrigation	NA
Horticulture	Frequent irrigation	Frequent irrigation	Frequent irrigation	NA
Crop1 (Mango)	Watering through rose cane	Pitcher Irrigation	Pitcher Irrigation with water spraying	Harsest mature fruits and keep them in well ventilated place
Crop2 (Cashewnut)	Watering through rose cane	Pitcher Irrigation	Pitcher Irrigation with water spraying	Harsest mature fruits and keep them in well ventilated place
Crop3(Banana)	Watering through rose cane	Pitcher Irrigation	Pitcher Irrigation with water spraying	Harsest mature fruits and keep them in well ventilated place

Cold wave[q]	**NA**	**NA**	**NA**	**NA**
Frost	**NA**	**NA**	**NA**	**NA**
Hailstorm	**NA**	**NA**	**NA**	**NA**
Cyclone				
Crop1(Paddy)	**Drainage** **Reseeding**	**Cleaning**	**Cleaning**	**Immediate harvest and drying**
Crop2 (Blackgram)	**Escapes**	**Drainage**	**Drainage**	**Immediate harvest and drying**
Crop3 (Green gram)	**Escapes**	**Drainage**	**Drainage**	**Immediate harvest and drying**
Crop4 (Groundnut)	**Escapes**	**Drainage**	**Drainage**	**Immediate harvest and drying**
Crop 5 (Sugarcane)	**Draiage** **Wrapping & propping**	**Drainage** **Wrapping & propping**	**Drainage** **Wrapping & propping**	**Immediate harvest and drying**
Horticulture				
Crop1 (specify)	**Shift the planting material to safer shed place**	**Stacking in case of smaller plants**	**Stacking in case of smaller plants**	**Immediate harvest of mature fruits**
Crop2	**Shift the planting material to safer shed place**	**Stacking in case of smaller plants**	**Stacking in case of smaller plants**	**Immediate harvest of mature fruits**
Crop3	**Shift the planting material to safer shed place**	**Stacking**	**Stacking**	**Immediate harvest of mature fruits**

[p] **In regions where the normal maximum temperature is more than 40^0C, if the day temperature exceeds 3^0Cabove normal for 5 days it is defined as heat wave. Similarly, in regions where the normal temperature is less than 40^0C, if the day temperature remains 5^0C above normal for 5 days, it is defined as heat wave.**

[q] **In regions where normal minimum temperature remains 10^0C or above, if the minimum temperature remains 5^0C lower than normal continuously for 3 days or more it is considered as cold wave. Similarly in regions with normal minimum temperature is less than 10^0C, if the minimum temperature remains 3^0C lower than normal it is considered as cold wave**

[r] **Indicate appropriate crop/soil management measures depending upon the crop and its stage for alleviating the specified stress. Contingent strategies for Livestock, Poultry & Fisheries**

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Droughtt	• Livestock insurance • On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. • Explore the possibilities of availability of unconventional / alternative feed resources during draught. • Up-gradation of desi cow through artificial insemination and up-gradation of local good breeds, Black Bengal through cross	• Conducting animal health camps and treating the affected animals • Regular de-worming with vaccination of cows with need based treatments against ailments. • Regular de-worming and vaccination for goats against PPR, FMD with intensive care and treatment for ailments. • Low cost housing with stake arrangement • Preventive measures against early kid mortality by regular deworming	• Availing insurance • Culling of unproductive livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
	breeding with improved breeds(Sirohi &Beetal)		
Feed and fodder availability	• It is essential to establish fodder bank near forest areas. • Provision is also necessary to store surplus crop residues in fodder banks, which can be made available during draught. • Excess fodder in flush season can be preserved as hay / silage. • Encourage perennial fodder production on river beds and tank bed on community basis. • Village gauchar (grazing) lands should be developed for fodder production.	• Utilizing fodder from perennial trees and fodder bank reserves. • Transporting excess fodder from adjoining districts. • Utilizing the existing crops which fail to grow adequately due to failure of monsoon for feeding of animals. • Use of unconventional livestock feed such as sugar cane top, sugar cane bagasse, banana plant Crop residues such as cassiatora water hyacinth and other like tree pods and seeds etc. Improving poor quality roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them.	• Supplementary feeding of remaining livestock and the replacement stock. • Addition of calcium, mineral mixture and multi-vitamin supplement @ 40 g/cow/day with home prepared feed (rice and wheat bran: groundnut oilcake at 9:1 ratio mixed with kitchen waste) + 40 kg green fodder/cow/day • Stall feeding with home prepared feed (mixture of maize + Mahua cake + rice/wheat bran @ 6:1:3 ratio in kitchen waste) + mineral and multi-vitamin supplement (25 g/goat/day). Sufficient browsing for at least four hours per day
Drinking water	• 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.	• Pure drinking water and vaccines to be given
Health and	• Organizing training programme of persons connected with A.H. on	• Supplementation of mineral and vitamin mixtures	• Proper disposal of dead animals

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
disease management	feeding and management of animals during draught. • Veterinary preparedness with vaccine and medicines.	• Campaign and mass vaccination	
Floods			
Feed and fodder availability	• Procured feeds and fodders to be used for feeding all animals.	• Straw and stover that got soaked during flood need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying, chopping and sprinkling concentrate mixture can improve intake and utility. • Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply.	
Drinking water		Pure drinking water and vaccines to be given	• Sanitization of water resources. • Pure drinking water and vaccines to be given

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Health and disease management	• Training to the farmers about care of their animals 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, upland etc. • Variation of livestock before onset of rainy season • Temporary camps may be started to herd or flocks animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. • If no trees or sheds are available shelter the animals under a tent /	• Supplementation of mineral and vitamin mixtures • Campaign and mass vaccination	• Proper disposal of dead animals

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
	tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof. • Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for torniquet), Surgical scissors – Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers – two or three, Disinfectants – potassium permanganate, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint), Trocar and canola (for bloat), Pocket Knife (for cutting, strangulating ropes etc.)		

Cyclone			
Feed and fodder availability	• Procured feeds and fodders to be used for feeding all animals.	• Procured feeds and fodders should be fed to all animals on the order of priority of animals. • Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply.	• Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	• Provision of clean drinking water.	• 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 animals 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	• 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	• Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. • Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. • Improving shed hygiene especially in the farmers household through cleaning and disinfection

	embankments, low hillocks, upland etc. • Variation of livestock before onset of rainy season • Temporary camps may be started to herd or flocks animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. • If no trees or sheds are available shelter the animals under a tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof. • Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for 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	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.	

	hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters (for restraint), Trocar and canola (for bloat), Pocket Knife (for cutting, strangulating ropes etc.)		
Heat wave and cold wave			
Shelter/environment management		• 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.

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
Droughtt				
Shortage of feed ingredients	Breed (OUAT synthetic, Vanaraja, Gramapriya/ Kalinga Brown, Giriraja) Ensure procurement of feed ingredients sufficient ahead	Feed supplementation will be made to the farms. Free range system (Self feeding in the back yard) depending on local household waste	Attempt will be made for available of feed ingredient or compound feed to the farmers. Regular vaccination starting from day old chick. Immediately isolating the birds affected by infectious diseases from the flock. Protecting birds from dog, wild cat, jackel, fox etc.	
Drinking water	Check water source for ensuring sufficient portable water during draught	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well	
Health and disease management	Procurement of vaccines and medicines and anti stress agent.	Continue feeding of anti stress agent		

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
	Feeding antibiotics Procurement of litter materials			
Floods				
Shortage of feed ingredients	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting roads	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control	
Drinking water	Protect the water sources from submergence/ contamination	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of vaccines and medicines. Feeding antibiotics Procurement of litter	Continue feeding antibiotics Prevent entrance of flood water to the shed	Disinfection of the farm premises. Feeding antibiotics And deworming.	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
	materials	Replace wet litter Proper disposal of dead birds if any	Replace wet litter Disinfection of sheds. Proper disposal of dead birds if any	
Cyclone				
Shortage of feed ingredients	Procurement of feed	Supply the compound feed to the poultry farm under cyclone affected area	Supply will continued till the situation is under control	
Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for available of sanitized water	Water sources will sanitized with bleaching powder or any water sanitizer	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
Heat wave				
Shelter/environment management	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	
Health and disease management	Procurement of Anti stress drugs	Supplementation of anti stress drug	Vaccination of birds against RD	
Cold wave				
Shelter/environment management	Procurement of curtains to cover open sides of the shed.	Close the open sides of the shed by curtain in such a way that ventilation	Remove the curtains. Discontinue heating.	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
	Heating arrangement kept ready	should not be hampered. Provide heat if necessary depending on the temperature and age of the birds		
Health and disease management	Procurement of Anti stress drugs and vaccine	Feeding of anti stress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD	Procurement of Anti stress drugs and vaccine

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
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. 4. Species : (Indian Major Carps (IMC), i.e., Rohu, Mrigal and Catla + Exotic carps (Silver carp and Grass carp @ 5000 fingerlings/ha	Application of rice bran + Groundnut oil cake + vitamins or 80 kg, urea + 40 kg SSP/ha/year: Raw cow dung @ 5 t/ha + micronutrient to enhance the production of phyto plankton and zoo plankton.	Using Cifax @ 1 lit/ha or lime and turmeric powder ! 10:1 ratio applied @ 200 kg/ha during the month of November and January to control Ulcerative disease syndrome (UDS) and Epicortical ulcerative syndrome (EUS)
(ii) Changes in water quality	1. Prepare to release water into the habitat. 2. Leveling of farm bonds , testing of water body 3. Development high stocking density	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms.
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	1. Building deep ditches in culture ponds for shelter of the fish to	1. Recharge the ponds with bore well water or water from other sources.	-

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
	overcome high temperature	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	1. Application of organic manure in culture system	1. Recharge the ponds with bore well water or water from other sources	1. Application of organic manure in culture system
(iii) Any other	-	-	-
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged	1. The boats has to be secured safely to river/ reservoir banks. 2. Non operation of fixed bag nets in streams and rivers. 3. Insurance coverage for nets and boats.	1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained. 3. Number of crew and load should be much below the	1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
		marked tonnage.	
(ii) No.of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
(iii) Loss of stock	-	-	1. Assessment of stock (fish population) and replenishment if stock is depleted. 2. Habitat restoration for the stock remaining.
(iv) Changes in water quality	-	-	1. Application of lime in tanks. 2. Application of fertilizer.
(v) Health and diseases	-	-	1. Observation of the health status of fish and accordingly control measure should be taken. 2. Control on transport of brooders and seeds
B. Aquaculture			
(i) Inundation with flood water	1.Strengthening and increase in dyke height. 2. This should be constructed with inlet and out let facility.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	1. Repairing and strengthening of dyke if required.
(ii) Water contamination and	1. Application of lime.	-	1. Application of lime and geolite. 2. Application of Alum.

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
changes in water quality			3. Application of KmnO4
(iii) Health and diseases	1. Application of lime	-	1. Application of lime and $KMnO_4$. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals etc)	1. Strengthening and increase in dyke height. 2. Before flood the stock should be harvested and sold in flood prone areas. 3. Transport of feed and chemicals to safer place. 4. Purchase of feeds and chemicals on weekly or fortnightly basis. 5. Insurance coverage for stock.	1.Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Water should be diverted from the main stream. 3. Sand bags can be used for protection of dykes. 4. Storing of feed and chemicals to safer place.	1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes. 3. Assessment of quality of feed and fertilizer. 4. Assessment and settlement of insurance.
(v) Infrastructure damage (pumps, aerators, huts etc)	1. Construction of flood shelter for	-	1. Repairing of pumps, aerators if required.

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
	pumps, aerators etc.		2. Repairing of damaged hut.
(vi) Any other	-	-	-
3. Cyclone / Tsunami			
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives	1. Repeated broadcast and telecast of warning. 2. Sea venture should be avoided 3. Insurance coverage for lives of fishermen.	1. Provision of relief. 2. Evacuation of people to safer areas.	1. Assessment and settlement of insurance.
(ii) Avg. no. of boats / nets/damaged	1. The boats has to be secured safely to river/ reservoir banks. 2. Insurance coverage for nets and boats.	1. Checking of the safety of the boats / nets. 2. An inventory logbook with name of crewmembers should be maintained.	1. Maintenance of the boats and nets. 2. Assessment and settlement of insurance.
(iii) Avg. no. of houses damaged	1. Insurance coverage for houses.	-	1. Settlement of insurance.
Inland			

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
B. Aquaculture			
(i) Overflow / flooding of ponds	1.Strengthening and increase in dyke height. 2. This should be constructed with inlet and out let facility.	1. Net enclosure should be provided over the dyke to prevent the escape of fish from pond.	1. Repairing and strengthening of dyke if required.
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases	-	-	1. Application of lime and $KmnO_4$. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
(iv) Loss of stock and inputs (feed, chemicals etc)	1. Strengthening and increase in dyke height. 2. Transport of feed and chemicals to safer place. 3. Insurance coverage for stock.	1.Net enclosure should be provided over the dyke to prevent the escape of fish from pond. 2. Storing of feed and chemicals in safer place.	1. Stock assessment and restocking with advanced fingerlings or yearling if required. 2. Repairing of dykes. 3. Assessment of quality of feed and chemicals. 4. Assessment and settlement of insurance.

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	-	-	1. Repairing of pumps, aerators if required. 2. Repairing of damaged hut.
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine	-		-
Inland	-	1.During hot waves night fishing should be done. 2. Preservation by cold chain should be increased during hot waves.	-
B. Aquaculture			
(i) Changes in pond environment (water quality)	1. During heat waves adequate water depth should be maintained.	1. During heat waves mixing of water with fresh water should be done. 2. The culture system should be provided with aeration to avoid oxygen depletion due to high temperature during heat waves. 3. Partial harvesting can be done	-

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
		to avoid loss of crop.	
(ii) Health and Disease management	1. Application of lime and turmeric.	1. Feeding should be stopped. 2. If cold waves persists EUS outbreak takes place	1. Application of CIFAX to control EUS disease in fish.
(iii) Any other	-	-	-

[a] based on forewarning wherever available

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