State: ODISHA
Agriculture Contingency Plan for District: Kendrapara

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 (5)		
	Agro-Climatic Zone (Planning Commission)	Eastern plateau and hills region		
	Agro Climatic Zone (NARP)	East and South Eastern Coastal Plain Zone		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Puri, Kendrapara, Jagatsinghpur, Khurda, Nayagarh, Parts of Cuttack, Parts of Ganjam		
	Geographic coordinates of district headquarters			
	Geographic coordinates of district headquarters Deogarh town	**Latitude**	**Longitude**	**Altitude**
		20^0 21'N-$20^0$47'N	$86^0$15'E- $87^0$08'E	**13 m MSL**
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	JRS, Kendrapara		
	Mention the KVK located in the district with address	At- Jajanga, P.O- Kapaleswar, Dist.-Kendrapara, PIN: 754211, Odisha		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	**K.V.K, Campus**		

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):	1361.7	60.3	2nd week of June	4TH week of September
	NE Monsoon(Oct-Dec):	95.9	6.3		
	Winter (Jan- March)	61.7	4.3	-	-
	Summer (Apr-May)	63.2	4.9	-	-
	Annual	1582.5	75.8	-	-

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Net sown 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)	264	144	25	49	8	6	5	5	8	14

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	1. Alluvial	142	74.65
	2. Saline	32.35	17.00
	3. Black	15.85	8.35
	Other (specify):	-	-

* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets (data source: Soil Resource Maps of NBSS & LUP)

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	144	186
	Area sown more than once	124	
	Gross cropped area	268	
	Net irrigated area	67.04	

1.6	**Irrigation**	Area ('000 ha)		
	Rainfed area	76.96		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	3	46.150	68.84
	Tanks	1654	1.120	1.67
	Open wells	3614	1.800	2.68

	Bore wells	3438	3.245	4.84
	Lift irrigation schemes	1378	10.371	15.47
	Other sources (please specify)		4.350	6.49
	Total Irrigated Area		67.04	45.6%
	Pump sets	4313	-	-
	No. of Tractors	492	-	-
	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		
	Critical	Nil		
	Semi- critical	Nil		
	Safe	9	100%	
	Wastewater availability and use			
	Ground water quality	Ground water is affected with Nitrate>45mg/l and Iron>1.0 mg/l		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2005-09 e.g., 2008-09)

1.7	S.No.	Major field crops cultivated	Area ('000 ha)							
			Kharif			Rabi				
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	1	Paddy	-	138	138	135.3	-	135.3	5.02	278.32
	2	Greengram	-			34.86		34.86		34.86
	3	Blackgram	-			37.93		37.93		37.93
	4	Groundnut	-			10.66		10.66		10.66
	5	Jute	-	3.31	3.31	-	-	-	-	3.31
	Others (specify)	Sunflower				0.30		0.30		0.30

	S.No.	Horticulture crops - Fruits	Area ('000 ha)		
			Total	Irrigated	Rainfed
	1	Mango	1.137	1.137	-
	2	Banana	0.254	0.254	-
	3	Guava	0.069	0.069	-
	4	Papaya	0.014	0.014	-
	5	Sapota	0.08	0.08	-
	Others (specify)				
		Horticulture crops - Vegetables	Total	Irrigated	Rainfed
	1	Brinjal	6.108	6.108	-
	2	Tomato	4.354	4.354	-
	3	Chilli	3.67	3.67	-
	4	Cabbage	1.7	1.7	-
	5	Cauliflower	1.64	1.64	-
	6	Okra	1.93	1.93	-
	7	Potato	1.2	1.2	-
	8	Sweetpotato	0.23	0.23	-
	4				
	5				
	Others (specify)				

	S.No.	Horticulture crops - Fruits	Area ('000 ha)		
			Total	Irrigated	Rainfed
		Plantation crops	Total	Irrigated	Rainfed
	1	Coconut	2.084	2.084	-
	2	Arecanut	0.22	0.22	-
	Others (Specify)	Eg., industrial pulpwood crops etc.			
		Fodder crops	Total	Irrigated	Rainfed
	1	Vertiver	4.53	4.53	
	2				
	3				
	4				
	5				
	Others (Specify)				
		Total fodder crop area			
		Grazing land	8		8
		Sericulture etc			
		Others (specify)			

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	25000	125000	150000
	Improved cattle	10085	50000	60085
	Crossbred cattle	24568	52860	77428
	Non descriptive Buffaloes (local low yielding)	3760	8004	11,764
	Descript Buffaloes	2080	6228	8308
	Goat	15480	6520	22000
	Sheep	8220	8797	17017
	Others (Camel, Pig, Yak etc.)			2134(Pig)
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	208	45.8	
	Backyard		94.8	

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)	
		1858-	**265-**	**1998**	**203**	**1134**	**-**
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		1540		**-**		**928**	
	B. Culture						
				Water Spread Area (ha)		**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)			1492.50-		1.43-	2138.5-
	ii) **Fresh water** (Data Source: Fisheries Department)			1576.50		3.43	5418.5
	Others			-		-	-

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	Rice	191.09	2067	190.10	2097	9.78	2906	200.87	2356.6	
Crop 2	Greengram			14.54	417			14.54	417	
Crop 3	Blackgram			37.93	507			37.93	507	
Crop 4	Groundnut			24.42	2291			24.42	2291	
Crop 5	jute	34.48	1875					34.48	1875	
Others										

Major Horticultural crops (Crops to be identified based on total acreage)										
Crop 1	Brinjal			88566	145			88566	145	
Crop 2	Tomato			57821	132			57821	132	
Crop 3	Chili			3106	8.4			3106	8.4	
Crop 4	Cabbage			47056	276			47056	276	
Crop 5	Cauliflower			23373	141			23373	141	
Others	Okra			16850	87			16850	87	

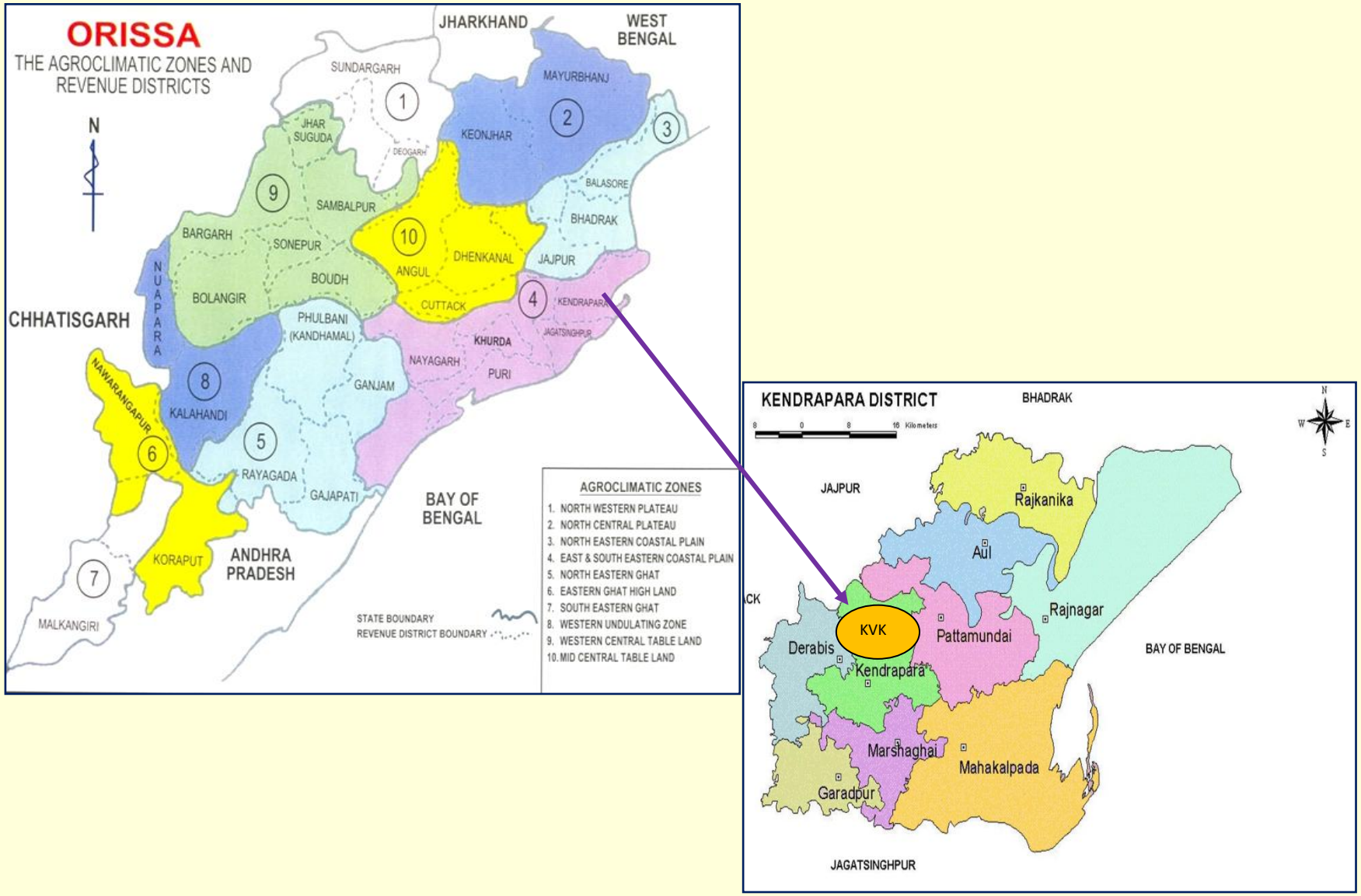
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Crop 1: Rice	2: Green gram	3: Black gram	4: Groundnut	5: jute
	Kharif- Rainfed	June – July	-	-	-	April - May
	Kharif-Irrigated	-	-	--	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	Dec- Jan	Nov-Dec	Nov-Dec	Nov-Dec	-

	What is the major contingency the district is prone to (Tick mark)	**Regular**			**Sporadic (specify month of occurrence in brackets)**			None
		Severe	Moderate	Mild	Severe	Moderate	Mild	
	Drought		√			June-Aug (long dry spell)		
	Flood	√			(Aug. to Sept.)			
	Cyclone		√			(October)		
	Hail storm							
	Heat wave			√			(May)	
	Cold wave							
	Frost							
	Sea water inundation		√					
	Pest and diseases (specify)	Leaf folder in paddy	BLB in paddy	False smut of paddy	Black headed caterpillar in			

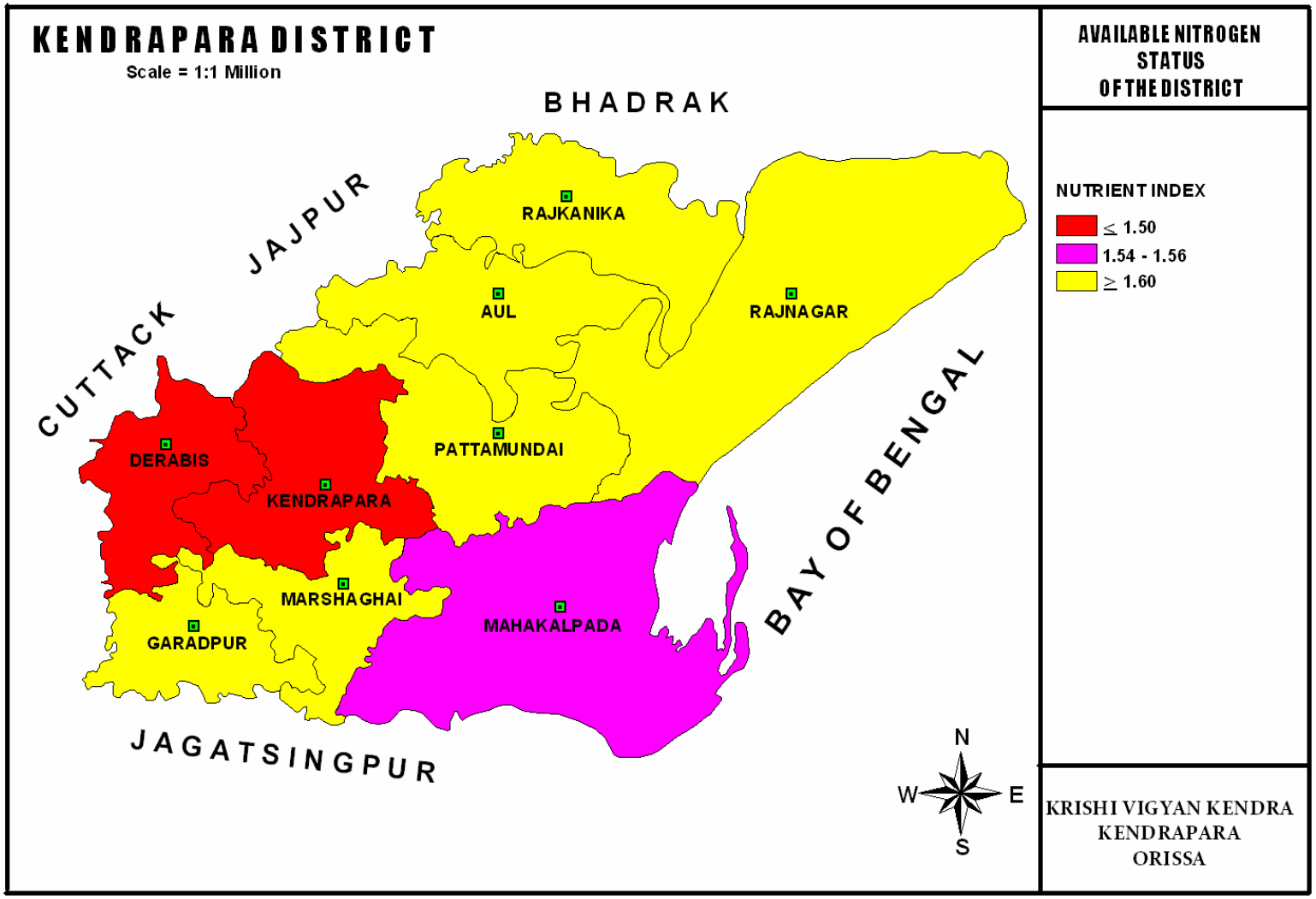
		Tikka disease in groundnut YMV in greengram & blackgram Pod borer in greengram & blackgram		Gundhi bug in paddy	greengram & blackgram (January) BPH in paddy (October)			

1.14	Include Digital maps of the district for	Location map of district within state	Enclosed: yes
		District map with farming situation	Enclosed: yes
		Soil fertility map	Enclosed: Yes
		Soil textural class classification	Enclosed: Yes
		Mean annual rainfall(mm)	Enclosed: Yes

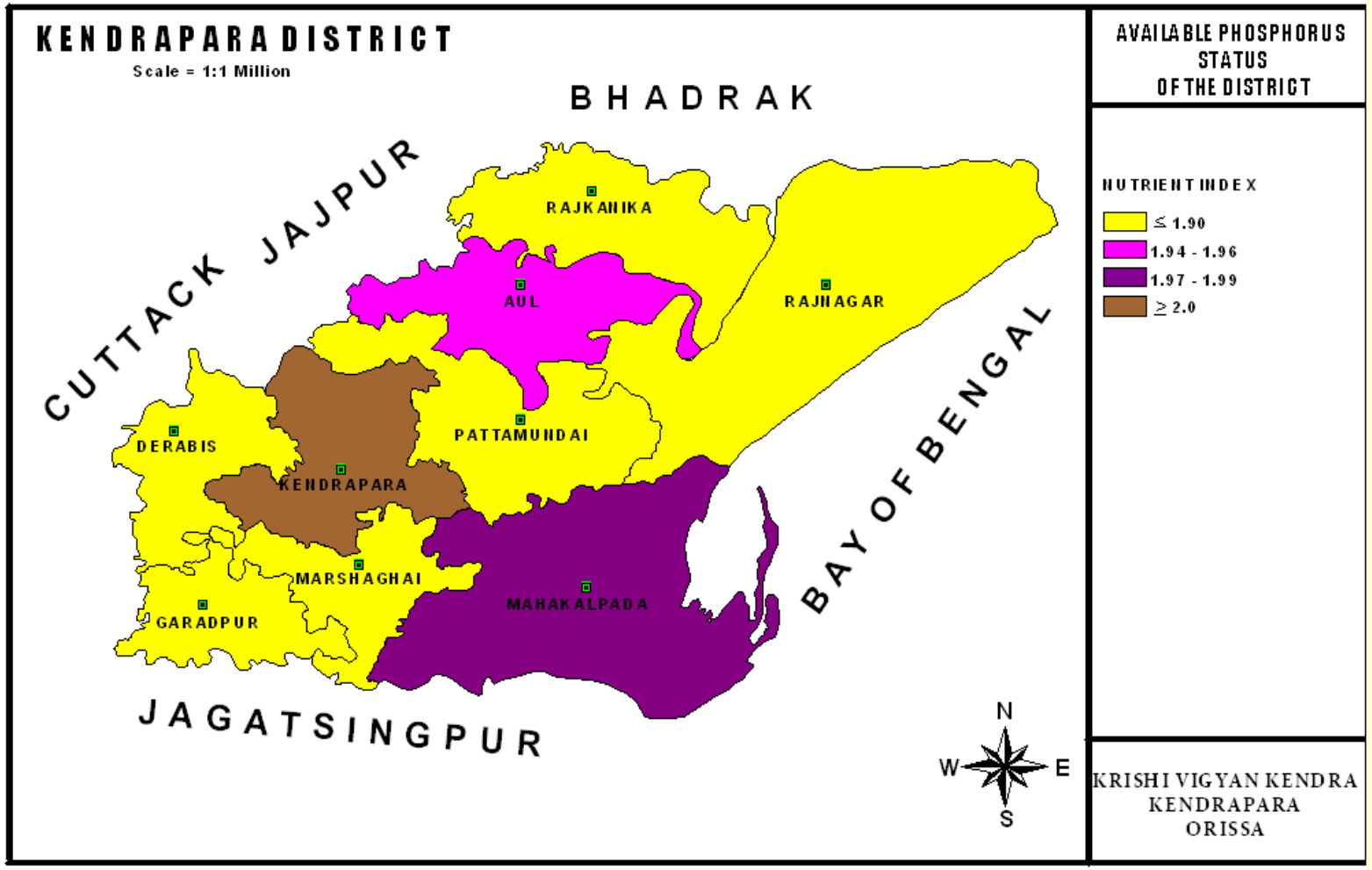
Location map of Kendrapara district within Odisha State



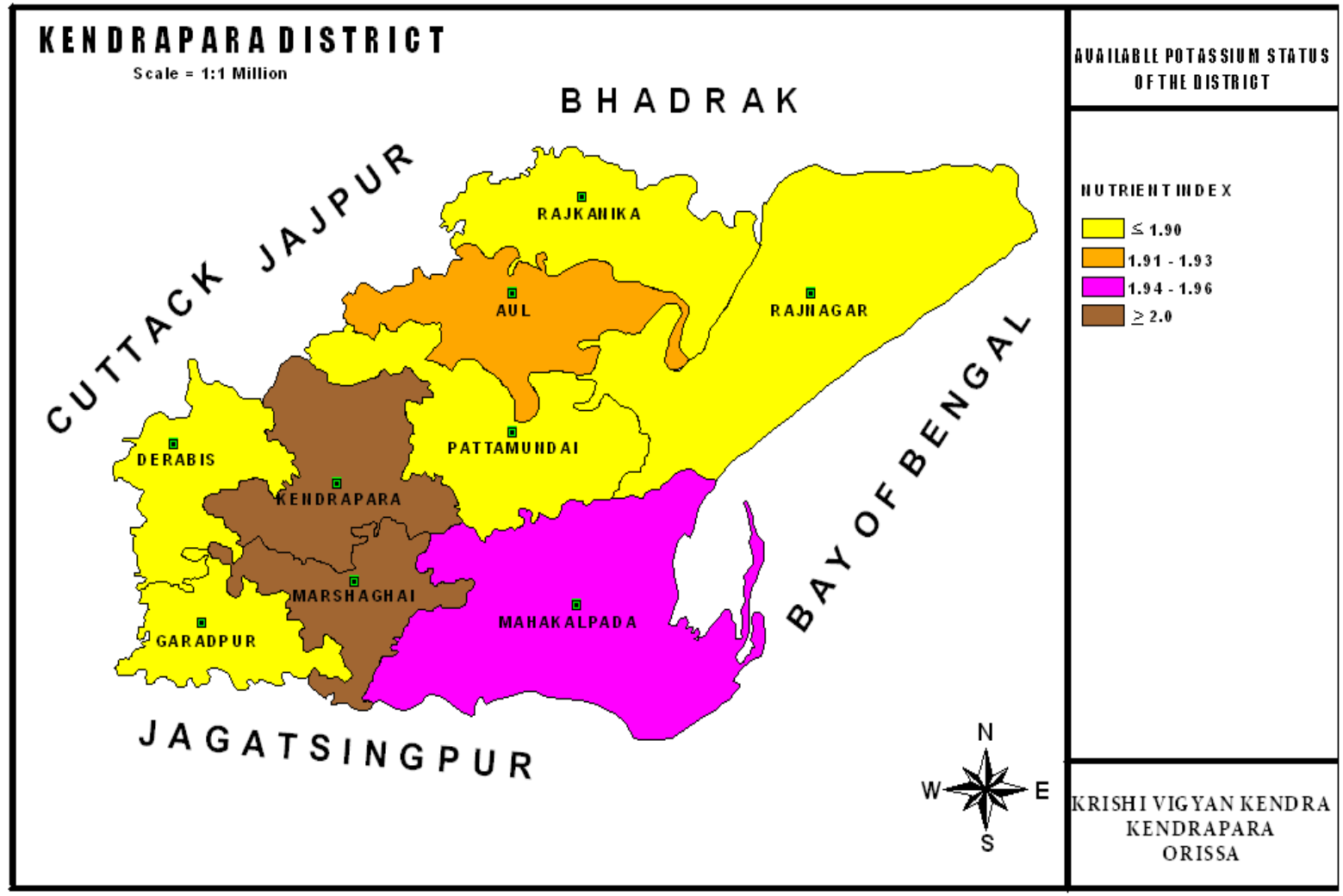
Soil fertility map of Kendrapara district-Nitrogen status



Soil fertility map of Kendrapara district-Phosphorus status

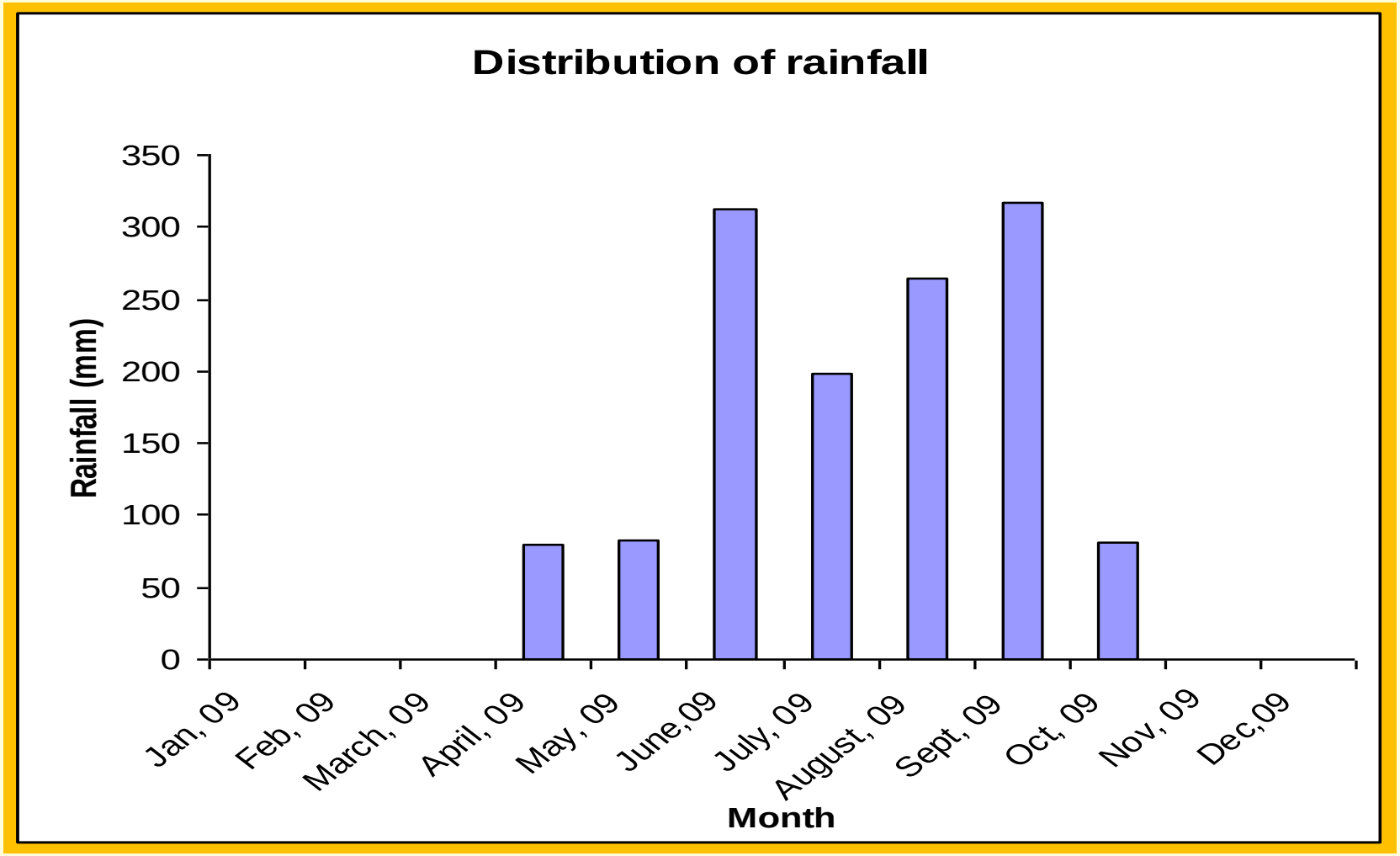


Soil fertility map of Kendrapara district-Potassium status



Soil textural class classification of Kendrapara district, Orissa

Name of the Block	Sandy loam	Clay loam	Loam	Saline	Total
Aul	1988	8210	6500	62	16760
Derabish	3300	8568	3100	0	14968
Kendrapara	4150	1642	5420	0	11212
Mahakalpada	4240	11200	2501	0	18241
Marshaghai	4085	9200	3616	12539	29440
Pattamundai	4600	2017	5500	0	12117
Rajkanika	5404	10500	2680	410	22693
Rajnagar	4230	1795	10809	3216	20050
Total	0	10446	1630	12424	24500
	31997	63578	41756	32350	169981


Distribution of rainfall
Rainfall (mm)
350
300
250
200
150
100
50
0
Jan, 09
Feb, 09
March, 09
April, 09
May, 09
June,09
July, 09
August, 09
Sept, 09
Oct, 09
Nov, 09
Dec,09
Month

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]**	**Crop / Cropping system[b]**	**Change in crop / cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks (June 4th week)	1) **Rainfed Alluvial**	Upland Rice/Pulse/ Groundnut	Use of draught tolerant varieties. The upland should be covered under early varieties of paddy like, Khandagiri, Heera, Kalinga-III, Vandana etc. Greengram –PDM-11, and PDM-54 Blackgram – PU 19, PU-30 Groundnut-Smruti, TMV-2, Devi	Resowing of short duration of paddy incase of failure of earlier sown paddy. Intercrop upland rice with blackgram /greengram/ groundnut. In case of medium and low land sprouted seed nursery raised should be done Sowing of crop should be done at the time of next shower of following draught In-situ moisture conservation should be followed. Seed socking with Calcium chloride solution (0.25%) for 20 hrs. before sowing improve drought resistance in plants.	Source seed -. CRRI, OUAT. The cost of the material may be met from RKVY.
	2. Coastal water logged	Jute - rice Rice	Select vars. like Pratikshya and Swarna sub-1 for med. land & Varshadhan, Durga for low land. For Jute JRC 212, KC-1, JRC-4444 may be grown.	Direct seeding of sprouted paddy seed, if seedlings are not available or raised earlier. Gap filling of paddy if the damage is partial Life saving irrigation for jute at critical stages.	
	3. Costal alluvial saline	Rice- Mustard rice-groundnut, jute-rice	Paddy Var. like Lunishree, CSR-10 and Sonamani should be grown in medium lands. Jute Var. like JRC-212, KC-1 and JRC-4444 may be grown. Toria/Mustard Var. like PT-303, TS-29 and Anuradha may be grown. Groundnut var. Smruti, JL-24 may be grown.	Resowing of short duration paddy incase of failure of earlier sown paddy crop. In case of medium and low land, sprouted seed nursery raised should be done. Two foliar spraying of Urea 2% at 10 days interval in between 45-60 days crop growth stage of jute. Seed socking with calcium chloride solution (0.25%) for 20 hrs. before sowing improves drought resistance in plants.	

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]**
By 4 weeks(July 2nd week)	1) Rainfed **Alluvial**	Rice- blackgram/ greengram/ groundnut	Varietal substitution of drought tolerant varieties. Select vars. like Khandagiri, Heera, Kalinga-III, Vandana etc for Upland Greengram-PDM-11, PDM-54 Blackgram-PU-19, PU-30 Groundnut-Smruti, Devi, JL-24	Addition of FYM to soil during land preparation. Resowing of short duration of paddy incase of failure of earlier sown paddy crop. Life saving irrigation to the crops at critical stages. Seed soaking with calcium chloride solution 0.25% for 20 hrs. before sowing improves drought resistance	Source of seed -. CRRI, OUAT. The cost of the material may be met from RKVY.
	2. Costal water logged	Jute-Rice Rice	Jute-Rice cropping system may be taken. Jute Var. JRC-212, KC-1, JRC-4444, Paddy Var. Swarna, Sub-1, CR-1014, Durga, Sarala	Jute to be sown in April. Paddy may be planted after jute by 15th August after receiving rainfall. Gap filling of paddy if the damage is partial	
	3. Costal alluvial saline	Rice/Mustard Rice - groundnut Jute – rice	Paddy Var. like CSR-10, Sonamani and Lunishree may be planted in medium low land. After rice Toria/mustard (TS-29, PT-303, Barun) may be grown. Jute Var. JRC-212, KC-1, JRC-4444 may be grown. Groundnut Var. Smruti, Devi, JL-24 may be grown	Resowing of short duration of paddy incase of failure of earlier sown paddy crop In case of medium and low land transplanting to be completed by 1st week of August.. Two foliar spraying urea 2% at 10 days interval in between 45-60 days crop growth stage of jute.	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Crop / Cropping system[b]**	**Change in crop / cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (July 4th week)	1) Rainfed **Alluvial**	Rice-blackgram/ Groundnut Greengram, Rice -Vegetable	Upland rice should be substituted by short duration vegetable, pulse and oilseed crops Blackgram, PU-19, PU-30 Greengram–PDM-11,PDM-54, Groundnut Var. Smruti, Devi, JL-24 Cowpea: Utkal Mani Brinjal: Blue star, Utkal Tarini Ladies finger: Utkal Gourav	Addition of recommended dose of FYM at final land preparation. Sowing of upland crops after getting first shower of rain following drought. In-situ moisture conservation through hoeing/intercultural operation, weeding. Seed soaking with calcium chloride solution 0.25%) for 20 hrs. before sowing improved drought resistance.	Source of seed - CRRI, OUAT. The cost of the material may be met from RKVY.
	2. Coastal water logged	Rice- blackgram/ greengram	Paddy Var. like Swarna sub-1, MTU-1010, Lalat and Konark for medium land and paddy crop to be planted by 15th August.	Close the drainage channel, checking seepage loss. With hold top dressing till receipt of rainfall. Adopt closer spacing while transplanting	

	3. Coastal alluvial saline	Rice- Mustard rice-groundnut, jute-rice	In case of medium and low land paddy varieties like Lunishree, CSR-10 and Sonamani may be planted by 15th August. Jute Varieties like JRC-212, KC-1, and JRC-4444 which are grown earlier may be harvested after which paddy will be transplanted. After harvest of paddy Toria/mustard (TS-29, PT-303, Barun) may be sown. Groundnut var. like Smruti, Devi and JL-24 may also be grown	Close the drainage hole, check seepage loss. With hole top dressing till receipt of rainfall. Adopt closer spacing while transplanting. Supplemental irrigation may be given for mustard at critical stages.	Source of seed - CRRI, OUAT. The cost of the material may be met from 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 Implementation[e]**
Delay by 8 weeks (Specify month August 2nd week)	1)Rainfed **Alluvial**	Rice- blackgram/greengram rice/vegetable	In uplands paddy should be substituted by short duration pulses(Greengram-PDM-11, PDM-54), Blackgram (PU-19 P-30) and vegetables like cowpea (Utkal Manik), Brinjal (blue star), Ladies finger (Utkal gourav) should be grown.	Addition of recommended dose of FYM at final land preparation. Sowing of upland crops after getting first shower of rain following drought. In-situ moisture conservation through hoeing /interculture, weeding. Seed soaking with calcium chloride solution 0.25%) for 20 hrs. before sowing improved drought resistance.	Source of seed - CRRI, OUAT. The cost of the material may be met from RKVY.
	2. Costal water logged	Jute-rice Rice	Rice varieties like Swarna sub-1, Lalat, Konark MTU-1010 should be planted by 15th August in medium land after jute	Close the drainage channel. Check seepage loss. Withhold top dressing till receipt of rainfall. Adopt close spacing while transplanting.	

	3. Costal alluvial saline	Jute-Mustard Rice-groundnut Jute-rice	Jute crop should be harvested after which land should be puddled for transplanting paddy. In case of medium and low lands plant varieties like CSR-10, Lunishree and Sonamani Planting should be completed by 15th August. After harvest of paddy toria/ mustard (PT-303, TS-29, Barun may be grown. Groundnut var. like Smruti, Devi and JL-24 may also be grown.	Close the drainage hole. Check the seepage loss. Withhold topdressing till receipt of rainfall. Adopt closer spacing while transplanting. Need based plant protection measures should be taken up. Supplemental irrigation may be given to mustard at critical stages.	

***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)** **Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.**	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management[c]**	**Soil management[d]**	**Remarks on Implementation[e]**
	1)Rainfed **Alluvial**	Rice-pulse, Rice-groundnut	In upland when there is more than 50% mortality resown the crop up to July after receipt of sufficient rain water. If mortality is less than 50% the crops may be gap field. Short duration paddy varieties like Sneha, Heeera, Kalinga-3, Vandana, Jogesh, Sidhant may be grown. After rice short duration blackgram (PU-19. PU-30 or greengram PDM-11, PDM-54 and groundnut Smruti and Devi may be grown. Remove the weeds and follow plant protection against blast.	Complete hoeing and weeding followed by ridging to the base of the crop rows at 20 after sowing for in-situ moisture conservation.	Cost of the material may be meet from ungoing scheme like RKVY, NFSM, etc
	2. Costal water logged	Jute - rice Rice-pulse	Raise community nursery of rice for transplanting at reliable water source to same time and avoid further delay. Apply life saving irrigation to maintain nursery seedlings in good health and take plant protection measures. Sprouted seeds may be direct seeded or fresh seedlings of medium duration group may be planted after receiving rainwater. For Jute crop life saving irrigation may be given when needed. After harvest of rice short duration blackgram and greengram may be grown. Apply life saving irrigation to maintain nursery seedling in good health and take plant protection measures.	Addition of recommended dose of FYM during land preparation. Close the drainage channel to check of the loss of water. Maintain proper water level in nursery field	
	3. Costal alluvial saline	Jute-rice Rice-Mustard	For jute crop life saving irrigation may be given when needed. Weeding also to be done to conserve moisture. For rice, when there is more than 50% mortality re-sow the crop up to July after receipt of sufficient rain water. If mortality is less than 50% the crops may be gap field. For medium and low land if rice population is less than 50% re-sow the crop. Select medium duration varieties(125 days) sprouted seeds may be direct	Use FYM /green leafs manure	

			seeded or fresh seedlings of early varieties may be raised for transplanting. If rice population is more than 50% carryout weeding, close the drainage wholes for checking loss of water, provide life saving irrigation when needed.		

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management[c]**	**Soil management[d]**	**Remarks on Implementation[e]**
At vegetative stage August-September	1)Rainfed **Alluvial**	Rice-pulse, rice-groundnut	Skip *beushaning*, if rice is more than 45 days old and water is not available. Uprooting weed from the main field without waiting for rainfall. Strengthen the field bunds and close the whole to check seepage loss of water. Fertiliser application could be delayed till receipt of rainfall. In-situ moisture conservation and rain water harvesting technique to be followed to minimize the excess runoff. Use water bodies for life saving irrigation to minimize crop loses.	In-situ moisture conservation. Practice mulching with organic mulches to extend the period of moisture availability	Cost of the material may be meet from ongoing scheme like RKVY, NFSM etc
	2. Costal water logged	Rice-pulse	Uprooting weed from the main field the field without waiting for rainfall provides irrigation through recycling of harvested rain water. Go for gap filling using seedling of same age or clonal tillers to have uniform distribution of plant. Apply potassic fertilizer where ever soil moisture allows or wet up to the receipt of rain falls. Aged seedlings of 45 days old can be planted in case of medium duration rice. Close drainage channel and reduce run off losses. Take plant protection measures against blast and other diseases.	Strengthen field bunds and close drainage hole	
	3. Costal alluvial saline	Rice-mustard	Weeding to be done to conserve moisture. If mortality is less than 50% the crops may be gap field. For medium and low land if rice population is less than 50% gap filling may be done. Select medium duration varieties (125 days). If rice population is more than 50% carryout weeding, close the drainage holes for checking loss of water, provide life saving	Strengthen field bunds and close drainage hole	

			irrigation when needed. After harvest of rice mustard varieties like Varun may be grown.		
Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management[c]**	**Soil management[d]**	**Remarks on Implementation[e]**
At reproductive stage September-October	1)Rainfed **Alluvial**	Rice-pulse/ rice-groundnut	Close the drainage holes and check the seepage loss in the medium land rice regularly. The crops should be irrigated with conserved water at critical stages. Pre-rabi and rabi crop (Pulse and oilseeds crop) may be sown with residual moisture. Rice may be harvest at physiological maturity stage. Appropriate plant protection measure may be taken up to minimize the crop loses.		Cost of the material may be meet from ongoing scheme like RKVY, NFSM etc.
	2. Costal water logged	Rice-pulse	Provide protective irrigation through recycling of harvested rain water. Close drainage channels and reduce run off losses. Take plant protection measures against blast. Rice crop to be harvested at physiological maturity stage.		
	3. Costal alluvial saline	Rrice-mustard	Close drainage holes and check the seepage loss of water. The crops should be irrigated with conserved rain water. Weeding to be done to conserve moisture. Provide life saving irrigation when needed. Rice crop may be harvested at physiological maturity stage after which Toria/Mustard crop may be grown.		

Condition			**Suggested Contingency measures**		
Terminal drought	**Major Farming situation[a]**	**Crop/cropping system[b]**	**Crop management[c]**	**Rabi Crop planning[d]**	**Remarks on Implementation[e]**
October-November	1)Rainfed **Alluvial**	Rice-pulse/ groundnut	Insect/pests and diseases appear more frequently under drought situation for which requires constant vigilance and timely control measures. Sowing of rabi crops as per availability of residual moisture	With residual moisture condition rabi crops like green gram, blackgram can be taken. Utilize water of ponds and reservers for growing cowpea, okra and chilli.	Source of seed from CRRI, OUAT the cost of the material may met from RKVY, NFSM etc.
	2. Costal water	Rice-pulse	Insect/pests and diseases appear more frequently under drought situation for which requires	With residual moisture condition rabi crops like green gram,	

	logged		constant vigilance and timely control measures. Harvest the rice at physiological maturity stage and sow rabi crop with residual moisture.	blackgram can be taken.	
	3. Coastal alluvial saline	Rice-mustard	Insect/pests and diseases appear more frequently under drought situation for which requires constant vigilance and timely control measures. Harvest rice at physiological maturity stage and shown rabi crops with residual moisture	With residual moisture condition rabi crops like green gram, blackgram can be taken up. Utilize the water of pond and reserves for growing cowpea, okra and chilli.	

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]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed/ limited release of water in canals due to low rainfall	Costal irrigated alluvial	Rice	Groundnut, Blackgram, Green gram, potato	Irrigation for sowing or transplanting of the crops and saving of the already sown/transplanted crops is uppermost consideration of the contingency measures.	Source of seed from CRRI, OUAT the cost of the material may met from RKVY, NFSM etc.
	Costal irrigated alluvial	Groundnut	Blackgram, green gram	Irrigation at critical crop growth stages like flowering and pod formation to be preferred	Source of seed from CRRI, OUAT the cost of the material may met from RKVY, NFSM etc.

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**
Non release of water in canals under delayed onset of monsoon in catchment	Costal irrigated alluvial	Rice Groundnut	Blackgram, greengram Blackgram, greengram	Residual soil moisture utilization is the main remedy under this situation Irrigation at critical crop growth stages like flowering and pod formation to be preferred	Source of seed from CRRI, OUAT the cost of the material may met from RKVY, NFSM etc.

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Costal irrigated alluvial	Groundnut	Short duration groundnut varieties Blackgram/ Green gram-TARM-1	Paddy straw mulching close spacing intercropping with green gram Greengram mosaic resistant varieties to be grown.	
		Potato	Groundnut	Short duration groundnut varieties. AK-12-24, smruti etc.	
		Vegetable	Blackgram/ Green gram	Green gram mosaic resistant varieties to be grown.	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Costal irrigated alluvial	Potato	Groundnut	Short duration groundnut varieties	Promotion of subsidiary income and employment generating activities to be encouraged through gainful implementation of NREGA, RKVY, NFSM and other schemes
		Vegetable	Blackgram/ Green gram	Greengram mosaic resistant varieties to be grown	
Any other condition (specify)			NA		

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 Un- timely (unseasonal) rains

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 (specify) Rice	Drainage at tillering for 8-10 days	Efforts for early draining of water from the field will save the crop damages	Completely drain the water from the field 15days before harvesting period.	Well designed storage Bins are required to protect the grain against storage pest
Crop2 green gram	Surface drainage		Surface drainage	
Crop3 black gram	Surface drainage		Surface drainage	
Crop4 ground nut	Surface drainage		Surface drainage	
Crop5 jute	Damage		Surface drainage	
Horticulture				
Crop-1 Brinjal	Drainage of water from the field	Drain the water as early as possible as flowering stage is critical to water logging	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Crop-2Tomato	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of soil base with streptocycline @ 2gm in 10 liters of water	
Crop-3 Chilli	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 l liters of water	
Crop-4 Cabbage	Drainage	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	

Crop-5 Cauliflower	Drainage and soil drenching with suitable plant protection chemical	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 l liters of water	
Heavy rainfall with high speed winds in a short span[2]				
Crop1 Rice	Drainage at tillering stage for 8-10 days	Efforts for early drainage of water from the filled will save the crop damage	Completely drain the water from the field 15 days before harvesting period	Well designed storage Bins as required to protect the grain against storage pest
Crop2 green gram	Surface drainage	Drainage	Surface drainage	
Crop3 black gram	Surface drainage	Surface drainage	Surface drainage	
Crop4 ground nut	Surface drainage	Surface drainage	Surface drainage	
Crop5 jute	Drainage	Drainage	Drainage	
Horticulture				
Crop-1 Brinjal	Drainage of water from the field	Drain the water as early as possible as flowering stage is critical to water logging	Drainage of water, drenching of soil base with streptocycline @ 2gm in 10 liters of water	
Crop-2Tomato	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of soil base with streptocycline @ 2gm in 10 liters of water	
Crop-3 Chilli	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of soil base with streptocycline @ 2gm in 10 liters of water	
Crop-4 Cabbage	Drainage	Immediate drainage of water	Drainage of water, drenching of soil base with streptocycline	

			@ 2gm in 10 liters of water	
Outbreak of pests and diseases due to unseasonal rains				
Crop1 Rice	For control of swarming caterpillar , spray the crop with chloropyriphos @2ml/lit. of water. For brown spot, Blast spray the crop with tricyclazole @2gm/lit. of water.	For control of gundhi bug spray the crop with carbaryl@1kg/acre in 200 liters of water. For BPH spray the crop with imidiacloprid@50ml/acre. for control of BLB spray the crop with 0.1% plantomycin along with 0.2% copper oxychloride.	For control of false smut disease spray the crop with carbendazim+ Mancozeb. For control of cut worm spray the crop with cypermethrin@1ml/lit of water.	Well designed storage Bins as required to t protect the grain against storage pest
Crop2 Greengram	Aphid,Spray the crop with rogor@2ml/lit of water	. YMV,spray the crop with rogor@2ml/lit of water	Pwodery mildew spray the crop with Sulphur (0.2%) or Kerathane (0.1%)	
Crop3Blackgram	Aphid,Spray the crop with rogor@2ml/lit of water.	YMV,spray the crop with rogor@2ml/lit of water	Pwodery mildew spray the crop with Sulphur (0.2%) or Kerathane (0.1%)	
Crop 4 Groundnut	Aphid,leaf miner,spray the crop with monocrotophos@2ml/lit of Water.	Aphid,laf miner,spray the crop with monocrotophos@2ml/lit of Water	Spray 0.25% of Dithana M-45 for reducing the incidence of Tikka leaf spot disease.	
Crop 5 Jute	Semilooper , caterpillar,spray the crop with endosulfan @2ml/lit of water	Wilting, spray the basal portion of the plant with carbendazim@ 0.15%	Wilting, spray the basal portion of the plant with carbendazim@0.15%	
Horticulture				
Crop-1 Brinjal	Stem & fruit borer, spray the crop with cartap hydrochloride@2gm/lit of water	Wilting, spray the base of the plant with streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..	Stem & fruit borer , spray the crop with malathion@1ml/lit of water	
Crop-2Tomato	Aphid,jassid & white fly,spray the crop rogor@2ml/lit. of water.	Fruit borer, spray the crop with carbaryl@2kg/ha. Wilting, spray the base of the	Wilting, spray the base of the plant with streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..	

		plant with streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..		
Crop-3 Chilli	Thrips,spray the crop with Abamectin @400ml/acre	Bacterial wilt, spray the crop streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..	Bacterial wilt, spray the crop streptocycline@ 0.015 %+ copper oxy chloride@0.2% in1lit. of water..	
Crop-4 Cabbage	DBM,spray the crop with endosulphin @2ml/lit of water	Bacterial wilt, spray the crop streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..	For head borer, Spray the crop with cypermethrin@1ml/lit of water	
Crop-5 Cauliflower	DBM,spray the crop with endosulphin @2ml/lit of water	Bacterial wilt, spray the crop streptocycline@ 0.015%+ copper oxy chloride@0.2% in1lit. of water..	For head borer, Spray the crop with cypermethrin@1ml/lit of water	

[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 Rice	Maintaining nursery of over aged rice seedlings of 45 days to 60 days duration	Growing water logging resistant varieties like Durga, Sarala, Varshadhan and Hanseswari	Removal of stand from the field in case of stand deposition and planning for alternate crops like sweet potato under zero tillage	Spraying plant growth hormones that prevent premature germination of rice seeds
Crop2 Greengram	drainage	drainage	drainage	Spraying plant growth hormones that prevent premature germination of rice seeds
Crop3 Blackgram	drainage	drainage	drainage	Spraying plant growth hormones that prevent premature germination of seeds
Horticulture				
Crop1 Brinjal	Drainage of water from the field	Drain the water as early as possible as flowering stage is critical to water logging	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Crop2 Tomato	Immediate drainage of water is needed as it is highly susceptible to waterlogging	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Crop3Chilli	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Continuous submergence for more than 2 days[2]	Drainage	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline@ 2gm in 10 liters of water	
Crop1 rice	Drainage and soil drenching with suitable plant protection chemical	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water plan for rabi crop sowing	Spraying plant growth hormones that prevent premature germination of rice seeds
Crop2 Greengram	Drainage	Drainage	Drainage	Spraying plant growth hormones that prevent premature germination of rice seeds

Crop3 Blackgram	Drainage	Drainage	Drainage	Spraying plant growth hormones that prevent premature germination of rice seeds
Horticulture				
Crop1 Brinjal	Drainage of water from the field	Drain the water as early as possible as flowering stage is critical to water logging	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Crop2 Tomato	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Crop3Chilli	Immediate drainage of water is needed as it is highly susceptible to water logging	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2gm in 10 liters of water	
Sea water intrusion[3]				
Crop1 Rice	Growing salt tolerant rice varieties like Lunishree, CSR-10			

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

[4.] 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.

2.3.1. Livestock

	Suggested contingency measures		
	Before the events	**During the event**	**After the event**
Drought			
Feed and fodder availability	Encourage perennial fodder production on field bunds and waste lands. Village pasture (grazing) lands should be developed for fodder production. On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. 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. Explore the possibilities of availability of unconventional / alternative feed resources during draught. Organizing training programme of persons connected with A.H. on feeding and management of animals during draught.	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. Utilization of the fodder stored in silos.	Supplementary feeding of remaining livestock and the replacement stock. Availing Insurance for live-stock.
Drinking water	Preserving water in community tanks and ponds etc	Using persevered water in the tanks for	Clean drinking water

	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.	drinking. Wherever ground water resources are available priority should be given for drinking purpose.	
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	Proper disposal of dead animals Availing insurance
Floods			
Feed and fodder availability	Storage of feed. Establish fodder bank near forest areas. Excess fodder in flush season can be preserved as hay/silage.	Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. Procured feeds and fodders should be fed to all animals on the order of priority of animals. Straws and stovers 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. Utilise fodder from perennial trees.	Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water	Large elevated community water tank in every panchyat and sanitation of these water resources.	Drinking water be made available to the animals in any kind of clean container available with the farmer. Water sources of	Provision of clean drinking water. Vaccination of the cattle should be made.

		temples are the ideal sources for drinking of the animals during drought.	
Health and disease management	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, 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.)Training to the farmers for taking care of the animals during flood.	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. Campaign and mass vaccination.	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. Proper disposal of dead animals.
Cyclone			
Feed and fodder availability	Storage of feed	Use of locally available feed, storing of concentrates, encouraging them to store dry feeds, community feed godown for storing govt. supplied feeds. Priorities animals as suckling animals,	Use of locally available feed. Provision of supplementary feeding (concentrate / Roughage) with vitamin &

		suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. Procured feeds and fodders should be fed to all animals on the order of priority of animals. Straws and stovers 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.	minerals.
Drinking water	Large elevated community water tank in every panchyat	Chlorination of drinking water. Drinking water be made available to the animals in any kind of clean container available with the farmer.	Chlorination of drinking water . Provision of clean drinking water.
Health and disease management	Use of preventives like vaccination, deforming of animals. 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	Vaccination, fast aid treatment. 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	Conducing health camp at regular interval against diarrhea. Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. Vaccination campaign against common endemic

	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.)	them tethered.	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
Heat wave and cold wave			
Shelter/environment management	Community shelter home . Proper sheltering / housing white painting outside the roof and black painting inside the roof.	Plantation around the shed Creating water bodies within the shed. Provision of cool drinking water.	Washing / wallowing / sprinkling/ splashing / showering
Health and disease management	Creating awareness regarding preventions of heat stroke	Protection of dry / milch cows/ buffaloes/ breeding bulls and teasers against thermal stress. Grazing should be done early in the morning and in the afternoon.	Conducting health camp

[s]Based on forewarning wherever available

2.3.2. Poultry

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Storage 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			
Storage 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			
Storage of feed ingredients	Procurement of feed	Supply the compound feed to the	Supply will continued till the situation

		poultry farm under cyclone affected area	is under control
Drinking water	Protect water resources from submergence and 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 medicine and vaccine	Vaccination of birds against different diseases Provision should be made for available of sanitized water	Water sources will sanitized with bleaching powder or any water sanitizer
Heat wave			
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 Antistress drugs	Supplementation of antistress drug	Vaccination of birds against RD
Cold wave			
Shelter/environment management	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.
Health and disease management	Procurement of Antistress drugs and vaccine	Feeding of antistress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD

[a]Based on forewarning wherever available

2.3.3. Fisheries

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
Drought			
Shallow water in ponds due to insufficient rains/inflows	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.	-	-
Impact of heat and salt load build up in ponds/change in water quality	1. Prepare to release water into the habitat.	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.
Floods			
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.
Water contamination and changes in BOD	1. Application of lime.	-	1. Application of lime and geolite. 2. Application of Alum. 3. Application of $KMnO_4$
Health and disease management	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.

cyclone			Stocking, Yearling culture
Over flow/ 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.
Change in fresh/ brackish water ratio			
Health and disease management	-	-	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.
Heat wave and cold wave			
Management of pond environment	1. During hot waves adequate water depth should be maintained.	1. During hot 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 hot waves. 3. Partial harvesting can be done to avoid loss.	-
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 CIFAXto contro EUS disease in fish.

[a]Based on forewarning wherever available