

# **AGRICULTURE CONTINGENCY PLAN**

**DISTRICT : KENDRAPARA**

**STATE : ODISHA**



**KRISHI VIGYAN KENDRA, KENDRAPARA**

**ODISHA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**BHUBANESWAR - 751003**

## State: Odisha

### State: ODISHA

#### Agriculture Contingency Plan for District: KENDRAPARA

1.0 District Agriculture profile			
<b>1.</b>	<b>Agro-Climatic/Ecological Zone</b>		
<b>1</b>	Agro Ecological Sub Region (ICAR)	Eastern Coastal Plain, Hot Sub-humid To Semi-Arid Eco-Region (18.4)	
	Agro-Climatic Zone (Planning Commission)	East Coast Plains And Hills Region (XI)	
	Agro Climatic Zone (NARP)	East And South Eastern Coastal Plain Zone (OR-4)	
	List all the districts falling under the NARP Zone* (*>50% are falling in the zone)	Puri, Kendrapara, Jagatsinghpur, Khurda, Nayagarh, Part of Cuttack, Part of Ganjam	
	Geographic coordinates of district headquarters Deogarh town	<b>Latitude</b>	<b>Longitude</b>
		38°57'03.80"N	95°15'55.74"E
	Name and address of the concerned ZRS/ZARS/RARS/RRS/RRTTS	RRTTS, Coastal Zone, Bhubaneswar	
	Mention the KVK located in the district with address	At-Jajanga, P.O-Kapaleswar, Dist.-Kendrapara, PIN:754250, Odisha	
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	K. V. K Campus, Jajanga, P.O-Kapaleswar, Dist.-Kendrapara, Odisha PIN:754250	

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):	1558.8	47.3	2 <sup>nd</sup> week of June	4 <sup>th</sup> week of September
	NEMonsoon (Oct-Dec):	206.8	8.5		
	Winter (Jan-March)	0.0	0	-	-
	Summer (Apr-May)	119.3	9.8	-	-
	Annual	1885.8	65.6	-	-

SOURCE: DISTRICT STATISTICAL HANDBOOK, 2018

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable land	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. trees and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000ha)	264	152	25	49	8	6	5	5	15	14

1.4	<b>Major Soils (common names like reds, sandy loam, deep soils (etc.))*</b>	<b>Area ('000ha)</b>	<b>Percent (%) of total</b>
	1. Alluvial soils	142	74.65
	2. Saline soils	32.35	17.00
	3. Black soils	15.85	8.35

(Data source: Soil Resource Maps of NBSS & LUP)

1.5	<b>Agricultural land use</b>	<b>Area ('000ha)</b>	<b>Cropping intensity %</b>
	Netsown area	137	178
	Area sown more than once	107	
	Gross cropped area	244.0	
	Net irrigated area	67.04	

Source: Odisha Agriculture statistics 2018-19

1.6	<b>Irrigation</b>	Area ('000ha)		
	Rainfed area	76.96		
	<b>Sources of Irrigation</b>	Number	Area ('000ha)	Percentage of total irrigated area
	Canals	3	46.150	68.84
	Tanks	1654	1.120	1.67
	Open wells	3614	1.800	2.68
	Borewells	3438	3.245	4.84
	Lift irrigation schemes	1378	10.371	15.47
	Other sources (please specify)		4.350	6.49

TotalIrrigatedArea		78.34	45.6%
Pump sets	4313	-	-
No.ofTractors	492	-	-
Groundwateravailabilityanduse*(Dataprovider:State/CentralGroundwaterDepartment/ Board)	No.ofblocks/Tehsils	(%) area	Qualityofwater(specifytheproblemsuchashighlevelsofarsenic, fluoride, saline,etc.)
Over exploited	Nil		
Critical	Nil		
Semi-critical	Nil		
Safe	9	100%	
Wastewateravailabilityanduse			
Groundwater quality	Ground waterisaffected withNitrate>45mg/landIron>1.0mg/l		
*over-exploited:groundwaterutilization>100%;critical:90-100%;semi-critical:70-90%;safe:<70%			

**1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2018-19Source: Odisha Agriculture statistics 2018-19 )**

1.7	Majorfieldcropscultivated	Area('000ha)							
		Kharif			Rabi			Summer	Grandtotal
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Paddy	-	124.7	124.7	123.7	-	123.7	1.01	249.41	
Greengram	-			38.53		38.53		38.53	
Blackgram	-			35.48		35.48		35.48	
Groundnut	-			6.23		6.23		6.23	
Jute	-	0.80	0.80	-	-	-	-	0.80	
Sunflower				0.19		0.19		0.19	
Mustard	-	-	-	1.78	-	1.78		1.78	

<b>Horticulturecrops-Fruits</b>		<b>TotalArea('000ha)</b>	
	Mango		1.072
	Banana		0.456
	Guava		0.094
	Papaya		0.179
	Sapota		0.009
<b>Horticulturecrops-Vegetables</b>			
	Brinjal		1.586
	Tomato		0.97
	Chilli		3.00
	Cabbage		0.509
	Cauliflower		0.732
	Okra		1.94
	Potato		0.26
	Sweetpotato		0.23
<b>Plantationcrops</b>			
	Coconut		3.802
	Arecanut		0.065
	Eg.,industrialpulpwoodcropsetc.		
<b>Foddercrops</b>			
	Vertiver		4.53
	Totalfoddercroparea		
	Grazingland		8
	Sericultureetc		
	Others(specify)		

<b>1.8</b>	<b>Livestock</b>	<b>Male('000)</b>	<b>Female('000)</b>	<b>Total('000)</b>
	NondescriptiveCattle(localloyielding)	25000	125000	150000
	Improvedcattle	10085	50000	60085

	Crossbredcattle	24568	52860	77428			
	NondescriptiveBuffaloes(localowyielding)	3760	8004	11,764			
	DescriptBuffaloes	2080	6228	8308			
	Goat	15480	6520	22000			
	Sheep	8220	8797	17017			
	Others(Camel,Pig, Yaketc.)			2134(Pig)			
	Commercialdairyfarms(Number)						
<b>1.9</b>	<b>Poultry</b>	<b>No.offarms</b>	<b>TotalNo.ofbirds('000)</b>				
	Commercial	208	45.8				
	Backyard		94.8				
<b>1.1</b>	<b>Fisheries(DataSource:ChiefPlanningOfficer)</b>						
<b>0</b>	<b>A.Capture</b>						
	<b>i)Marine(DataSource:FisheriesDepartment)</b>	<b>No.offishermen</b>	<b>Boats</b>		<b>Nets</b>	<b>Storagefacilities(Iceplantsetc.)</b>	
			<b>Mechanized</b>	<b>Non-mechanized</b>			<b>Mechanized(Trawlnets, Gillnets)</b>
		<b>1858</b>	<b>265</b>	<b>1998</b>	<b>203</b>	<b>1134</b>	<b>-</b>
	<b>ii)Inland(DataSource:FisheriesDepartment)</b>	<b>No.Farmerowned ponds</b>		<b>No.ofReservoirs</b>		<b>No.ofvillagetanks</b>	
		<b>1540</b>		<b>-</b>		<b>928</b>	
	<b>B.Culture</b>						
		<b>WaterSpreadArea(ha)</b>		<b>Yield(t/ha)</b>	<b>Production('000tons)</b>		
	<b>i)Brackishwater(DataSource:MPEDA/FisheriesDepartment)</b>	1492.50-		1.43-	2138.5-		
	<b>ii)Freshwater(DataSource:FisheriesDepartment)</b>	1576.50		3.43	5418.5		
	<b>Others</b>	-		-	-		

**1.11 Production and Productivity of major crops (2018-19 specify years)**

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (-'000 tons)
		Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)	Production ('000t)	Productivity (kg/ha)	
<b>Major Field crops (Crop to be identified based on total acreage)</b>										
	Rice	272.14	2188	166.27	2189	2.04	2011	200.87	2356.6	
	Greengram			19.07	495			19.07	495	
	Blackgram			17.92	505			17.92	505	
	Groundnut			12.36	1984			12.36	1984	
	jute	9.84	2208					9.84	2208	
<b>Major Horticultural crops (Crop to be identified based on total acreage)</b>										
	Brinjal			28.086	17710			28.086	17710	
	Tomato			13.652	13972			13.652	13972	
	Chili			7.652	12372			7.652	12372	
	Cabbage			14.276	28020			14.276	28020	
	Cauliflower			11.945	15094			11.945	15094	
	Okra			22.816	11740			22.816	11740	

Source: Odisha Agriculture statistics 2018-19

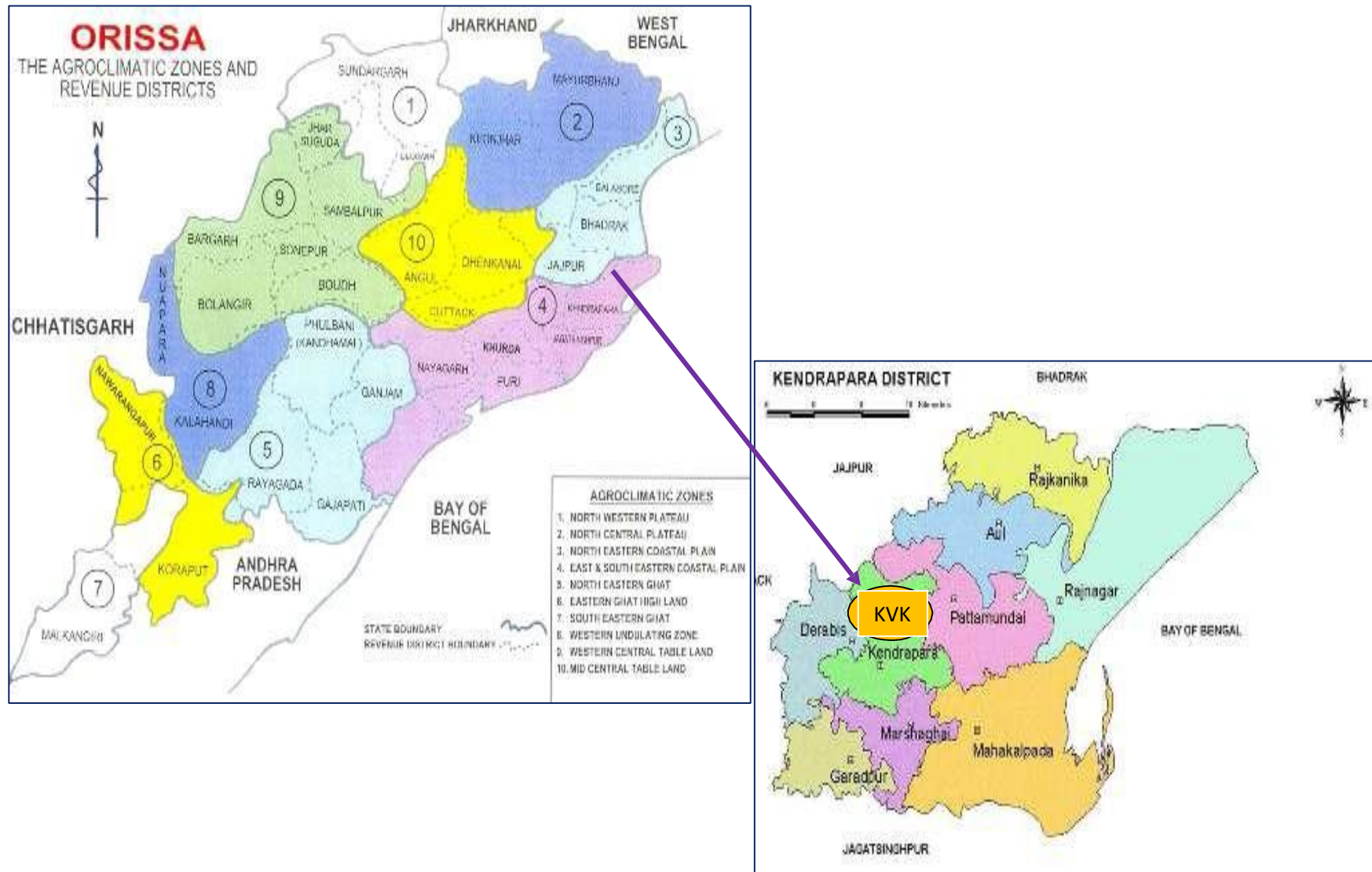
1.12	Sowing window for 5 major field crops	Rice	Greengram	Blackgram	Groundnut	Jute
	Kharif-Rainfed	June-July	-	-	-	April-May
	Kharif-Irrigated	-	-	-	-	-
	Rabi-Rainfed	-	-	-	-	-
	Rabi-Irrigated	Dec-Jan	Nov-Dec	Nov-Dec	Nov-Dec	-

	Whatisthemajorcontingencythedistrictisprone to(Tickmark)	Regular	Occasional	None
1.1 3	Drought	ç	June-Aug(longdryspell)	
	Flood	ç	(Aug.toSept.)	
	Cyclone	ç	(October)	
	Hailstorm			ç
	Heatwave	ç	(May)	
	Coldwave			ç
	Frost			ç
	Seawaterinundation	ç		
	Pestanddiseases (specify)	Leaffolderinpaddy TikkadiseaseingroundnutYMVingreengram&blackgram Podboreringreengram&blackgramBLBinpaddy FalsesmutofpaddyGundhibuginpaddy	Blackheadedcaterpillaringreengram&blackgram(January)BPHinpaddy(October)	

1.14	IncludeDigitalmaps ofthedistrictfordistrict	Locationmapofdistrictwithinstat	Enclosed:yes
		Districtmapwithfarmingsituation	Enclosed:yes
		Soilfertilitymap	Enclosed:Yes
		Soiltexturalclassclassification	Enclosed:Yes
		Meanannualrainfall(mm)	Enclosed:Yes



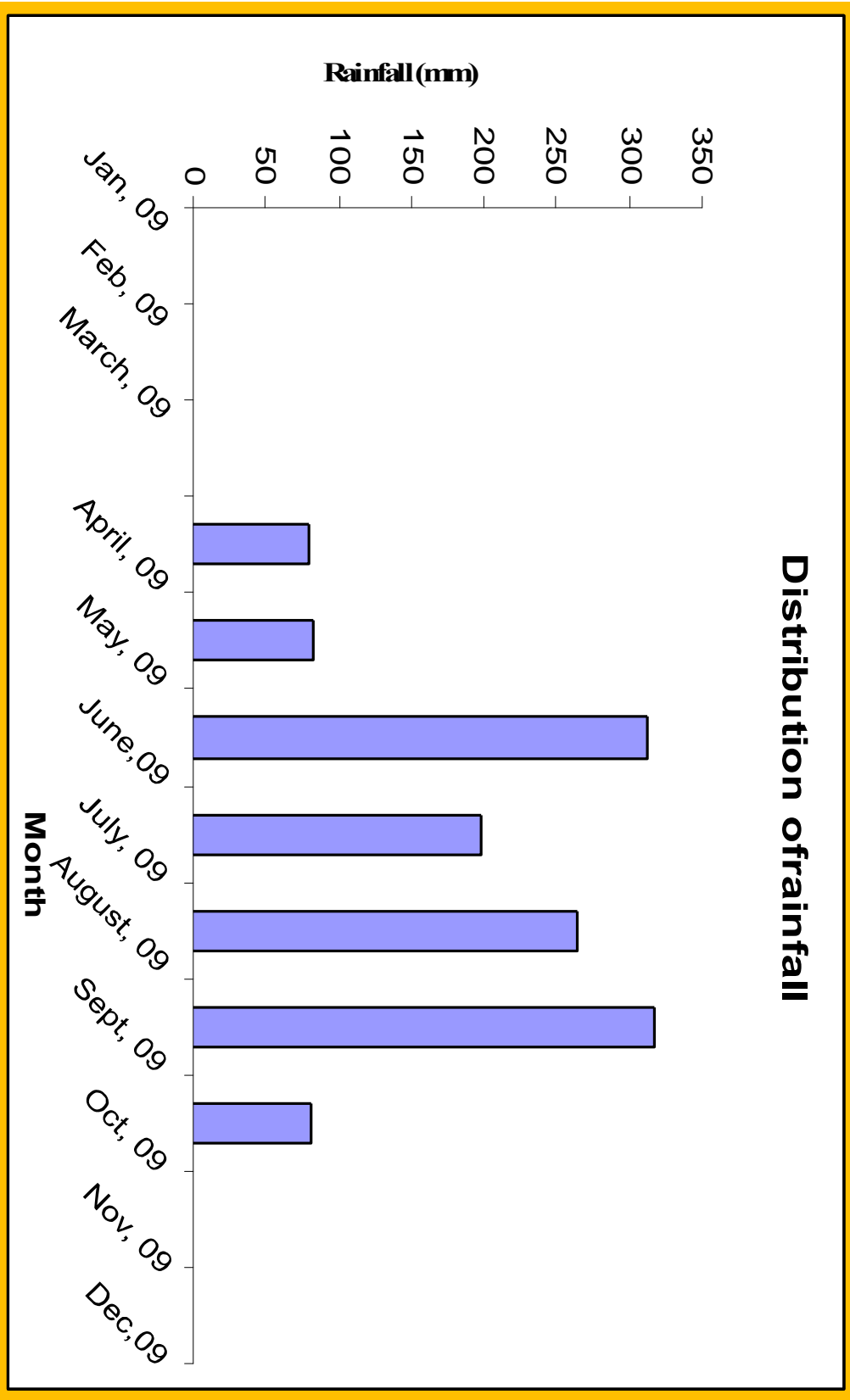
## Location map of Kendrapara district within Odisha State



**SoiltexturalclassclassificationofKendraparadistrict,Orissa**

NameoftheBlock	Sandyloam	Clayloam	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



## 2.1 Strategies for weather related contingencies

### 2.2 Drought

#### 2.2.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming Situation	Crop/ Cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (June 4 <sup>th</sup> week)	Rainfed Alluvial	Upland Rice/Pulse/ Groundnut	Growing of drought tolerant rice variety: Bina 11, Shahbhagidhan, Swarna shreya DRR 42 (120-135 days) , DRR 44	Resowing of short duration of paddy in case of failure of earlier sown paddy. Intercrop upland rice with black gram/green gram/groundnut. In case of medium and lowland 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 soaking with Calcium chloride solution (0.25%) for 20 hrs. before sowing improved drought resistance in plants.	Source seed - NRRI, OUAT. The cost of the material may be met from RKVY.

	Coastal waterlogged	Jute-rice Rice	No Change	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.	
	Coastal alluvial saline	Rice-Mustard Rice-groundnut, Jute-Rice	Rice-sunflower Growing of salinity tolerant variety Luna suvarna, Luna Sankhi, Luna Bariala	Resowing of short duration paddy in case of failure of earlier sown paddy crop. In case of medium and lowland, sprouted seed nursery raised should be done. Two foliar spraying of Urea 2% or NPK (18:18:18) 2% at 10 days interval in between 45-60 days crop growth stage of jute. Seed soaking with calcium chloride solution (0.25%) for 20 hrs. before sowing improves drought resistance in plants.	
Delay by 4 weeks (July 2 <sup>nd</sup> week)	Rainfed Alluvial	Rice-blackgram/green gram	Varietal substitution of drought tolerant varieties. Rice-Select vars. like Khandagiri, Heera, Kalinga-III, Vandana, Swarna Shreya, DRR 42, DRR-44 etc for Upland	Addition of FYM to soil during land preparation. Resowing of short duration of paddy in case of failure of earlier sown	Source of seed-. NRRI, OUAT.

		am/groundnut	Greengram-PDM-11,PDM-54,IPM 2-14, IPM-2-3 Blackgram-IPU 2-43,PU-31 Groundnut-Devi,JL-24, Dharani	wnpaddy crop.  Lifesaving irrigation to the crops at critical stages.  Seed soaking with calcium chloride solution 0.25% for 20 hrs. before sowing improves drought resistance	
	Coastal 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 1009 sub 1, CR-1014, Durga, Sarala	Jute to be sown in April. Paddy may be planted after jute by 15 <sup>th</sup> August after receiving rain fall. Gap filling of paddy if the damage is partial	
	Costal alluvial saline	Rice/Mustard Rice	Paddy Var. like CSR-10, Sonamani and Lunishree may be planted in medium lowland. After rice Toria/mustard (TS-29, PT-303, Barun, Sushree) may be grown. Jute Var. JRC-212, KC-1, JRC-4444 may be grown. Groundnut Var. Smruti, Devi, JL-24, Dharani may be grown	Resowing of short duration of paddy in case of failure of earlier sown paddy crop  In case of medium and lowland transplanting to be completed by 1 <sup>st</sup> week of August.  Two foliar spraying urea 2% or NPK (18:18:18) 2% at 10 days interval in between 45-60 days crop growth stage of jute.	

		u t J u t e ó r i c e			
<b>Delay by 6 weeks (July 4<sup>th</sup> week)</b>	Rainfed Alluvial	Rice-blackgram/ Groundnut Greengram, Rice-vegetable	Upland rice should be substituted by short duration vegetable, pulse and oil seed crops Blackgram, IPU-2-43, PU-31, Greengram PDM-11, PDM-54, IPM 2-3, IPM 2-14  Groundnut Var. Smruti, Devi, JL-24, Dharani Cowpea: Utkal Manik, Kashi Kanchan Brinjal: Blue star, Utkal Tarini, Swarna shyamali, Utkal keshari  Ladies finger: Utkal Gourav, Kashi Lalima, Kashi Chaman, Arka Anamika	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- NRRI, OUAT. The cost of the material may be met from RKVY.
	Coastal	Rice-	Paddy Var. like Swarnasub-1, MTU-	Close the	

	Water logged	blackgram/green gram	1010, Lalat and Konark for medium land and paddy crop to be planted by 15 <sup>th</sup> August.	drainage channel, checking seepage loss. Withhold top dressing till receipt of rain fall. Adopt closer spacing while transplanting	
	Coastal saline	Rice-Mustard e-groundnut, jute, e-ric	In case of medium and low land paddy varieties like Lunishree, CS R-10 and Sonama may be planted by 15 <sup>th</sup> 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, Dharani and JL-24 may also be grown	Close the drainage hole, check seepage loss. Withhold top dressing till receipt of rain fall.  Adopt closer spacing while transplanting. Supplemental irrigation may be given for mustard at critical stages.	Source of seed - NRRI, OUAT. The cost of the material may be met from RKVY.
<b>Delay by 8 weeks August 2<sup>nd</sup> week</b>	<b>Rain fed Alluvial</b>	Rice-blackgram/green gram/vegetable	In uplands paddy should be substituted by short duration pulses (Green gram-PDM-11, PDM-54), Black gram (PU-19P-31) 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	Source of seed - CRRI, OUAT. The cost of the material may be met from RKVY.



				ghhoeing/interculture,weeding . Seedsoakingwithcalciumchloridesolution0.25% )for 20hrs.before sowingimproveddroughresistance.	
Costal waterlogged	Jute-rice Rice	RicevarietieslikeSwarnasub-1,Lalat,KonarkMTU-1010shouldbeplantedby15 <sup>th</sup> August inmediumlandafterjute		Close the drainagechannel.  Check seepage loss. Withhold top dressing till receipt of rainfall.  Adopt close spacing while transplanting.	
Costal alluvial saline	Jute-Mustard Rice-groundnut Jute-rice	Jutecropshouldbeharvestedafterwhichland shouldbepuddledfortransplantingpaddy.  IncaseofmediumandlowlandsplantvarietieslikeCSR-10,LunishreeandSonamaniPlantingshouldbecompletedby15 <sup>t</sup> hAugust.  Afterharvestofpaddytoria/mustard(PT-303, TS-29,Barunmaybegrown.Groundnutvar. likeSmruti, Dharani, DeviandJL-24may alsobegrown.		Closethedrainagehole. Checktheseepage loss. Withhold topdressingtillreceiptofrainfall .  Adoptcloserspacingwhiletransplanting.  Needbasedplantprotectionmeasures shouldbetakenup.	

				Supplemental irrigation may be given to mustard at critical stages.	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
Early season drought (Normal onset)	Major Farming situation	rop/cropping system	<b>Crop management</b>	<b>Soil management</b>	<b>Remarks on implementation</b>
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Rainfed Alluvial	Rice-pulse, Rice-groundnut	In upland 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. Short duration paddy varieties like Sneha, Heera, Kalinga-3, Vandana, Jogesh, Sidhant, Swarna Shreya, DRR 42, DRR 44 may be grown. After rice short duration black gram (PU-19, PU-31) or green gram (PDM-11, PDM-54, IPM 2-14, IPM 2-3) and groundnut Smruti, Dharani and Devi may be grown. Remove the weeds and follow plant protection against blast.	Complete hoeing and weeding followed by ridge to the base of the crop rows at 20 days after sowing for in-situ moisture conservation.	Cost of the material may be met from the following schemes like RKVY, NFSM, etc
	Costal waterlo	Jute-rice	Raise community nursery of rice for transplanting at reliable water source at same time and avoid further delay. Apply	Addition of recommended dose of FYM during land preparation.	

	gged	Rice-pulse	<p>lifesavingirrigationtomaintainnurseryseedlings ingoodhealthandtakeplantprotectionmeasures. Sproutedseedsmaybedirectseededorfreshseedlingsofmedium durationgroupmaybeplantedafterreceivingrainwater.</p> <p>ForJutecroplifesavingirrigationmaybegivenwhenneeded.Afte rharvestofriceshortdurationblackgramandgreengrammaybegr own.</p> <p>Applylifesavingirrigationtomaintainnurseryseedlingingoodh ealthandtakeplantprotectionmeasures.</p>	<p>Closethedrainagechanneltoche ckofthelossofwater.</p> <p>Maintainproperwaterlevelinnu rseryfield</p>	
	Costalalluvial saline	Jute-rice Rice-Mustard	<p>Forjutecroplifesavingirrigationmaybegivenwhenneeded. Wee dingalsotobedonetoconservemoisture.</p> <p>Forrice,whenthereismorethan50% mortalityre- sowthecropuptoJulyafterreceiptofsufficientrainwater.If morta lityislessthan50%thecropsmaybegapfield.Formediumandlow landifricepopulationislessthan50%re- sowthecrop.Selectmediumdurationvarieties(125days)sprou te dseedsmaybedirectseededorfreshseedlingsofearlyvarietiesma yberaisedfortransplanting.</p> <p>Ifricepopulationismorethan50%carryoutweeding,closethedra inageholesfor checkinglossofwater,providelifesavingirrigationwhenneeded.</p>	UseFYM/greenleafsmanure	
<b>Condition</b>			<b>SuggestedContingencymeasures</b>		
<b>Midseason drought(longd</b>	<b>Major Farmi</b>	<b>Crop/c roppin</b>	<b>Cropmanagement</b>	<b>Soilmanagement</b>	<b>Remarkson Implementation</b>

r spell	ng situa tion	g system			
At vegetative stage August-September	Rain fed Alluvial	Rice-pulse, rice-groundnut	Skip <i>beushaning</i> , 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 rainwater harvesting technique to be followed to minimize the excess runoff. Use water bodies for life saving irrigation to minimize crop losses.	In-situ moisture conservation.  Practice mulching with organic mulches/plastic mulches to extend the period of moisture availability	Cost of the material may be met from ongoing scheme like RKVY, NFSM etc
	Coastal logged	Rice-pulse	Uprooting weed from the main field the field without waiting for rainfall provides irrigation through recycling of harvested rainwater. Go for gap filling using seedling of same age or clonal tiller to have uniform distribution of plant. Apply potassic fertilizer wherever soil moisture allows or wet up to the receipt of rainfall. Aged seedlings of 45 days old can be planted in case of medium duration rice. Closed drainage channel and reduce runoff losses. Take plant protection measures against blast and other diseases.	Strengthen field bunds and close drainage hole	
	Coastal alluvial saline	Rice-mustard	Weeding to be done to conserve moisture. If mortality is less than 50% the crops may be gap filled. 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% carry out weeding, close the drainage holes for checking loss of water, provide life saving irrigation when needed. After harvest of rice mustard varieties like Varun may be grown.	Strengthen field bunds and close drainage hole	

Condition			Suggested Contingency measures		
<b>Midseason drought (long dry spell)</b>	<b>Major Farming situation</b>	<b>Crop/cropping system</b>	<b>Crop management</b>	<b>Soil management</b>	<b>Remarks on Implementation</b>
<b>At reproductive stage September -October</b>	Rain fed Alluvial	Rice-pulse/ rice-groundnut	Close the drainage holes and check theseepage loss in the medium land riceregularly. Thecropsshouldbeirrigatedwithconservedwaterat criticalstages. Pre-rabiandrabicrop (Pulseand oilseeds crop) maybesownwithresidualmoisture. Ricemaybeharvestatphysiologicalmaturitystage. Appropriateplantprotectionmeasure maybetakenuptominimizethecroploses.	Use of biofertilizer and organic manure	Costofthe materialmaybe meetfromongoingschemelike RKVY, NFSM etc.
	Coastal water logged	Rice-pulse	Provide protectiveirrigation throughrecyclingofharvestedrainwater. Closedrainagechannel sandreducerrunofflosses. Takeplantprotectionmeasuresagainst blast. Ricecrop tobeharvestedatphysiologicalmaturitystage.	- Use of biofertilizer and organic manure	
	Coastal alluvial saline	Rice-mustard	Closedrainageholesandchecktheseepage loss ofwater. Thecropsshouldbeirrigatedwithconservedrainwater. Weedingtobedonetooconservemoisture. Providelifesavingirrigationwhenneeded. Ricecropmaybeharvestedatphysiologicalmaturitystage afterwhichToria/Mustardcropmay begrown.	- Use of biofertilizer and organic manure	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Terminal drought</b>	<b>Major Farming situation</b>	<b>Crop/cropping system</b>	<b>Crop management</b>	<b>Rabi Crop planning</b>	<b>Remarks on Implementation</b>

October- November	Rainfed <b>Alluvial</b>	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, black gram can be taken. Utilize water of ponds and reservoirs for growing cowpea, okra and chilli.	Source of seed from NRRI, OUAT the cost of the material may met from RKVY, NFSM etc.
	Coastal water logged	Rice-pulse	Insect/pests and diseases appear more frequently under drought situation for which requires constant vigilance and timely control measures. Harvest the rice at physiological maturity stage and sow rabi crop with residual moisture.	With residual moisture condition rabi crops like green gram, black gram 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 show rabi crops with residual moisture	With residual moisture condition rabi crops like green gram, black gram can be taken up. Utilize the water of pond and reserves for growing cowpea, okra and chilli.	

### 2.2.2 Drought-Irrigated situation

Condition	Suggested Contingency measures				
	Major farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/limited release of	Coastal	Rice	Groundnut, Black gram, Green	Irrigation for sowing or transplanting of the crops and saving of the	Source of seed from NRRI, OUAT the cost of the

waterincanalsdue tolowrainfall	riga ted allu vial		gram,potato	Iready sown/transplantedcropsisuppermost considerationofthecontingencymeasures.	materialmaymetfromRKVY,NFSMetc.
	Coa stali rriga ted allu vial	Ground nut	Blackgram,greeng ram	Irrigation at critical crop growthstageslikefloweringandpodformati ontobepreferred	
<b>Condition</b>			<b>SuggestedContingencymeasures</b>		
	<b>Maj orF arm ing situ atio n</b>	<b>Norma lCrop/ croppi ng system</b>	<b>Changeincrop/cr opping system</b>	<b>Agronomicmeasures</b>	<b>Remarkson Implementation</b>
Nonreleaseof waterincanalsund erdelayedonsetof monsoonincatch ment	Coa stali rriga ted allu vial	Rice Ground nut	Blackgram,greeng ram Blackgram,greeng ram	Residual soil moisture utilizationisthemainremedyunder thissituation  Irrigationatcriticalcropgrowthstageslikefl oweringandpodformationtobepreferred	SourceofseedfromNRRI, OUAT thecostofthematerialmaymet fromRKVY,NFSMetc.
<b>Condition</b>			<b>SuggestedContingencymeasures</b>		
	<b>Maj orF arm</b>	<b>Crop/ croppi ngsyst</b>	<b>Changein crop/croppingsys tem</b>	<b>Agronomicmeasures</b>	<b>Remarkson Implementation</b>

	<b>ing situation</b>	<b>em</b>			
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Coastal irrigated alluvial	Groundnut	Short duration groundnut varieties Blackgram/Greengram -	Paddy straw mulching close spacing intercropping with green gram Green gram mosaic resistant varieties to be grown.	
		Potato	Groundnut	Short duration groundnut varieties. AK-12-24, smruti, Dharani etc.	
		Vegetable	Blackgram/Green gram	Green gram mosaic resistant varieties to be grown.	
<b>Condition</b>			<b>Suggested Contingency measures</b>		
	<b>Major Farming situation</b>	<b>Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
Insufficient groundwater recharge due to low rainfall	Coastal 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	Green gram mosaic resistant varieties to be grown	

### 2.3 Un-timely (unseasonal) rains



Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Postharvest
Continuous high rainfall in short span leading to water logging				
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 15 days before harvesting period.	Well designed storage bins are required to protect the grain against storage pest
Green gram	Surface drainage		Surface drainage	
Black gram	Surface drainage		Surface drainage	
Groundnut	Surface drainage		Surface drainage	
Jute	Drainage		Surface drainage	
<b>Horticulture</b>				
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 @ 2g in 10 liters of water	
Tomato	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 @ 2g in 10 liters of water	
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 @ 2g in 10 liters of water	
Cabbage	Drainage	Immediate drainage of water	Drainage of water, drenching of crop base with streptocycline @ 2g in 10 liters of water	
Cauliflower	Drainage and soil drench	Immediate drainage of water	Drainage of water, drenching of crop base	

	ching with suitable plant protection chemical		ewith streptocycline @2gmin10liters of water	
<b>Heavy rainfall with high speed winds in a short span</b>				
Rice	Drainage at tillering stage for 8-10 days	Efforts for early drainage of water from the field will save the crop damage	Completely drain the water from the field 15 days before harvesting period	Well designed storage Bin is required to protect the grain against storage pest
Green gram	Surface drainage	Drainage	Surface drainage	
Black gram	Surface drainage	Surface drainage	Surface drainage	
Groundnut	Surface drainage	Surface drainage	Surface drainage	
Jute	Drainage	Drainage	Drainage	
<b>Horticulture</b>				
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 @2gmin10liters of water	
Tomato	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 @2gmin10liters of water	
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 @2gmin10liters of water	
Cabbage	Drainage	Immediate drainage of water	Drainage of water, drenching of soil base with streptocycline @2gmin10liters of water	
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice	For control of swarming caterpillar, spray the crop with emamectin	For control of gundhi bugs spray the crop with cartap hydrochloride @ 2ml/lit. of water. For	For control of false smut diseases spray the crop with carbenidazim+Mancozeb. For control of cut worms spray the	Well designed storage Bin is required to protect the grain against storage pest

	benzoate @0.4/lit. of water. For brown spot, Blasts pray the crop with triclazole @2gm/lit. of water.	BPH spray the crop with imidacloprid @50ml/acre. for control of BLB spray the crop with 0.1% plantomycin along with 0.2% copper oxychloride.	crop with cypermethrin @1 ml/lit of water.	
Greengram	Aphid, Spray the crop	. YMV, spray the crop with rogor @2ml/lit or thiomethoxam @ 5g/15 lt of water	Powdery mildew spray the crop with Sulphur (0.2%) or Kerathane (0.1%)	
Blackgram	-Do-	-Do-	-Do-	
Groundnut	Aphid, leaf miner, spray the crop with emamectin benzoate 0.4g/lit of Water.	Aphid, leaf minor, spray the crop with Emamectin benzoate @ 0.4g/lit of Water	Spray 0.25% of Dithane M-45 for reducing the incidence of Tikkal eaf spot disease.	
Jute	Semilooper, caterpillar, spray the crop with emamectin benzoate	Wilting, spray the basal portion of the plant with carbendazim @0.15%	Wilting, spray the basal portion of the plant with carbendazim @0.15%	
<b>Horticulture</b>				
Brinjal	Stem & fruit borer, spray the crop with cartaphydrochloride @2gm/lit of water	Wilting, spray the base of the plant with streptomycin @0.015% + copper oxychloride @0.2% in 1 lit. of water.	Stem & fruit borer, spray the crop with emamectin benzoate @0.4g/lit of water	
Tomato	Aphid, jassid & white fly, spray the crop with rogor @2ml/lit. of water.	Fruit borer, spray the crop with carbaryl @2kg/ha. Wilting, spray the base of the plant with streptomycin @0.015% + copper oxychloride @0.2% in 1 lit. of water.	Wilting, spray the base of the plant with streptomycin @0.015% + copper oxychloride @0.2% in 1 lit. of water..	
Chilli	Thrips, spray the crop with Abamectin @400 ml/acre	Bacterial wilt, spray streptomycin @0.015% + copper oxychloride @0.2% in 1 lit. of water.	Bacterial wilt, spray streptomycin @0.015% + copper oxychloride @0.2% in 1 lit. of water.	

			fwater.	
Cabbage	DBM,spraythecropwithem amectin benzoate @ 0.4g/litofwater	Bacterialwilt,spraythecropstreptocycli ne@ 0.015%+copper oxychloride@0.2%in1lit.ofwater.	Forheadborer,Spraythecropwithcype rmethrin@ 1 ml/litofwater	
Cauliflower	-Do-	-Do-	-Do-	

#### 2.4 FLOODS

Condition	Suggestedcontingencymeasure			
	Seedling/nurserystage	Vegetativestage	Reproductivestage	Atharvest
Transientwater logging/partialinundation				
Rice	Maintainingnursery ofoveragedrice seedlingsof45daysto 60daysduration	GrowingwaterloggingresistantvarietieslikeDurga,Sarala, Varshadhan, Swarna sub1, CR 1009 sub1andHanseswari	Removalofstandfromthefieldincaseofstandde positionandplanningforalternatecropslikeswe etpotatounderzerotillage	Sprayingplantgrowthhormone sthatpreventprematuregermina tionofriceseeds
Greengram	drainage	Drainage	drainage	Do-
Blackgram	drainage	Drainage	drainage	Do-
<b>Horticulture</b>				
Brinjal	Drainageofwaterfro mthefield	Drainthewaterasearlyaspos sibleasfloweringstageiscriti caltowaterlogging	Drainageofwater,drenchingofcropbase withstreptocycline @2gmin10litersof water	-
Tomato	Immediatedraina geofwateris neededasitishighl ysusceptibleto	Immediatedrainageofwater		

	terlogging		Do-	*
Chilli	Do-	Do-	Do-	-
<b>Continuoussubmergenceformorethan2days</b>	Drainage	Do-	Do-	-
Rice	Drainageandsoildrenchingwithsuitableplantprotectionchemical	Immediatedrainageofwater	Drainageofwater,drenchingofcropbasewithstreptocycline@2gmin10litersofwaterplanforrabicropsowing	Sprayingplantgrowthhormonesthatpreventprematuregerminationofriceseeds
Greengram	Drainage	Drainage	Drainage	Do-
Blackgram	Drainage	Drainage	Drainage	Do-
<b>Horticulture</b>				
Brinjal	Drainageofwaterfromthefield	Drainthewaterasearlyaspossiblesasfloweringstageiscriticaltowaterlogging	Drainageofwater,drenchingofcropbasewithstreptocycline@2gmin10litersofwater	26
Tomato	Immediatedrainageof	Immediatedrainageof	Drainageofwater,drenchingofcrop	
	waterisneededasitishighlysusceptibletowaterlogging	Water	basewithstreptocycline@2gmin10litersofwater	
Chilli	Do-	Do-	Do-	
<b>Seawaterintrusion</b>				
Rice	Growingsalttoleran	-		

	tricevarietieslikeLunishree,CSR-10		-	-
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**2.5 Extreme events: Heatwave/Coldwave/Frost/Hailstorm/Cyclone**

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling/nursery stage	Vegetative stage	Reproductive stage	At harvest
Cyclone	Not applicable			
Hailstorm	Not applicable			
Heatwave	Not applicable			
Coldwave	Not applicable			
Frost	Not applicable			
Seawater intrusion	Not applicable			
Pests and disease outbreak	Already covered in above table			

## 2.6 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	<p>Encourage perennial fodder production on field bunds and wastelands.</p> <p>Village pasture (grazing) lands should be developed for fodder production.</p> <p>On boundaries of agricultural fields trees or shrubs like Sesbania, Subabul, Neem etc should be planted.</p> <p>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.</p> <p>Excess fodder in flush season can be preserved as hay/silage.</p> <p>Explore the possibilities of availability of unconventional/alternative feed resources during draught.</p> <p>Organizing training programme of persons connected with A.H. on feeding and management of animals during draught.</p>	<p>Utilizing fodder from perennial trees and fodder bank reserves.</p> <p>Transporting excess fodder from adjoining districts.</p> <p>Utilizing the existing crops which fail to grow adequately due to failure of monsoon for feeding of animals.</p> <p>Use of unconventional livestock feeds such as sugarcane top, sugarcane bagasse, banana plant crop residues such as cassia or raw water hyacinth and other legume tree pods and seed etc. Improving poor quality roughages by ammonium treatment, urea treatment.</p> <p>Utilization of the fodder stored in silos.</p>	<p>Supplementary feeding of remaining livestock and the replacement stock. Availability of insurance for live-stock.</p>
Drinking water	<p>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.</p>	<p>Using persevered water in the tanks for drinking. Wherever ground water resources are available priority should be given for drinking purpose.</p>	<p>Clean drinking water</p>

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
<b>Floods</b>			
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 in the order of priority of animals. Straws and stovers that got soaked during floods need not be thrown away outright. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying, chaffing 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 panchayat 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 temples are the ideal sources for drinking of the animals during drought.	Provision of clean drinking water. Vaccination of the cattle should be made.
Health and disease	Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool,	The team should be well equipped with contingent items like bandages,	Prompt and appropriate attention



management	<p>Bandages,Surgicalgauze,oldcottonsheets,Rubbertubing(f or tourniquet),Surgicalscissorsó</p> <p>Curvedandmadeofstainlesssteel,Forceps,Splints orSplitbamboos(forfractures),Clinicalthermometersó twoorthree,Disinfectantsó</p> <p>potassiumpermanganate,Dettol,Savlon,Tannicacidpowde r(forpoisons)andJelly(forburns)Antibiotic eyedrops,Epsom salts,coppersulphate, Treacle, oilofturpentine(for bloat),Obstetricropes,chainsand hooks,Tinctureofiodine,tinctureofBenzoinCo.(forwounds ),Cottonrope,halts(forrestraint),Trocarandcanola(forbl oat),PocketKnife(forcutting, strangulatingropesetc.)Train ingtothefarmersfortakingcareoftheanimalsduringflood.</p>	<p>tourniquetropes, controlling rope, splints, slings, poles and ropes to lift animals.</p> <p>Drugsincludingpainkillers,antiseptics,antibiotic s,anti-venomandanti- shockdrugsetc.shouldbeadequatelyavailablewit hthem.</p> <p>Keeptheanimalslooseinpaddock(shelteredorun sheltered)ratherkeepingthemetethered.Campaig nandmassvaccination.</p>	<p>ion toinjuries byprovidingnecessar ymedicines to the livestock owners.</p> <p>Vaccination campaignagainstcommone ndemicdiseases of the areas (likeH.S.B.Q,Anthraxetc.) mustbetakenupurgently.Ne cessarystepsshouldbetaken forthecontrolofnon- specificdigestiveandrespira toryinfectionsinconsultatio noflocalveterinarypersonal s.</p> <p>Improvingshedhygieneespec iallyinthefarmershouseholdt hroughcleaninganddisinfecti on.Properdisposalofdeadani mals.</p>
<b>Cyclone</b>			
Feedandfodderavailability	Storageoffeed	Useoflocallyavailablefeed,storingofconcentrat es,encouragingthemtostoredryfeeds,communit yfeedgodownforstoringgovt.suppliedfeeds.	Useoflocallyavailablefeed. Provision ofsupplementaryfeeding(co

		<p>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.</p> <p>Procured feeds and fodders should be fed to all animals in the order of priority of animals.</p>	<p>concentrate/Roughage) with vitamins &amp; minerals.</p>
		<p>Straws and stovers that got soaked during floods need not be thrown away outright. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying, chaffing and sprinkling concentrate mixture can improve intake and utility.</p>	
Drinking water	Large elevated community water tank in every Panchayat	<p>Chlorination of drinking water.</p> <p>Drinking water be made available to the animals in any kind of clean container available with the farmer.</p>	<p>Chlorination of drinking water.</p> <p>Provision of clean drinking water.</p>
Health and management	<p>Use of preventives like vaccination, de-worming of animals.</p> <p>Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for tourniquet), Surgical scissors ó Curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers ó two or three, Disinfectants ó potassium</p>	<p>Vaccination, first aid treatment.</p> <p>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 pain killers, anti-septics, antibiotics, anti-venom and anti-shock drug etc. should be adequately available with</p>	<p>Conducting health camps at regular intervals against diarrhoea.</p> <p>Prompt and appropriate attention to injuries by providing necessary medicines to the live stock owners.</p>

	permanganate, Acriflvin, Dettol, Savlon, Tannic acid powder (for poisons) and Jelly (for burns) Antibiotic eye drops, Epsom salts, copper sulphate, Treacle, oil of turpentine (for bloat), Obstetric ropes, chains and hooks, Tincture of iodine, tincture of Benzoin Co.(for wounds), Cotton rope, halters(for restraint), Trocar and canola (for bloat), Pocket Knife(for cutting, strangulating ropes etc.)	ththem. Keeptheanimalslooseinpaddock(she lteredorunsheltered)ratherkeepingth emtethered.	Vaccination campaignagainstcommone ndemicdiseases of the areas (likeH.S.B.Q,Anthraxetc.) mustbetakenupurgently.Ne cessarystepsshouldbetakenf orthecontrolofnon- specificdigestiveandrespira toryinfectionsinconsultatio noflocalveterinarypersonals .  Improvingshedhygieneespec iallyinthefarmershousehold through cleaning anddisinfection
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**Heatwaveandcoldwave**

Shelter/enviroment management	Communityshelterhome.  Propersheltering/housingwhitepaintingoutsidetherooftan dblackpaintinginsidetherooft.	Plantationaroundtheshed  Creating waterbodies within the shed.Provisionofcooldrinkingwater.	Washing /wallowing /sprinkling/splashing /howering
Health and management	Creating awareness regarding preventions of heat Stroke	Protectionofdry/milhcows/buffaloes/ breedingbullsandteasersagainstthermalstress. Grazingshouldbedoneearly inthemorningandintheafternoon.	Conductinghealthcamp

**2.3.1 Poultry**

	<b>Suggestedcontingencymeasures</b>
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	<b>Beforetheevent</b>	<b>Duringtheevent</b>	<b>Aftertheevent</b>
<b>Drought</b>			
Storageoffeeding ingredients	Ensureprocurementoffeedingredientssufficientahead	Feedsupplementationwillbemadetothefarms	Attemptwillbemadeforavailableoffeedingredientorcompoundfeedtothefarmers
Drinkingwater	Check water source for ensuring sufficient portablewater during draught	Attempt will be made to providesanitizeddrinkingwater	Availabilityofwaterwillbeensuredbydiggingofborewell
Healthanddisease management	Procurement ofvaccines andmedicinesandantistressagent.FeedingantibioticsProcurementoflittermaterials	Continuefeedingofantistressagent	-
<b>Floods</b>			
Storageoffeeding ingredients	Ensureprocurementoffeedingredients/compoundfeedsufficientaheadasfeedsupplytothefarmwillhamperduetosubmergenceoftheconnectingroads	Supply the compound feed to thepoultryfarmundersubmergedarea	Supply willcontinuedtillthesituationisundercontrol
Drinkingwater	Protect the water sourcessubmergence. from	Attempt will be made to providesanitizeddrinkingwater	Watersourceswillsanitizedwithbleachingpowderoranywatersanitizer
Healthanddisease management	Procurement ofvaccinesand medicines. FeedingantibioticsProcurementoflittermaterials	Continuefeedingantibiotics Prevententranceoffloodwatertotheshed Replacewetlitter Properdisposalofdeadbirdsifany	Disinfectionofthefarmpremises. FeedingantibioticsAnddeworming. Replacewetlitter Disinfectionofsheds. Properdisposalofdeadbirdsifany
<b>cyclone</b>			
Storageoffeeding ingredients	Procurementoffeed	Supplythecompoundfeed tothepoultryfarmundercycloneaffectedarea	Supply willcontinuedtillthesituationisundercontrol
Drinkingwater	Protect water resourcesubmergenceandcontamination from	Attempt will be made to providesanitizeddrinkingwater	Watersourceswillsanitizedwithbleachingpowderoranywatersanitizer

	.		
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for availability of sanitized water	Water sources will be sanitized with bleaching powder or any water sanitizer
<b>Heatwave</b>			
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 litters 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
<b>Coldwave</b>			
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 curtains 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

<sup>a</sup>Based on forewarning wherever available

### 2.3.2 Fisheries

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>Drought</b>			
Shallow water in ponds due to insufficient rains/inflows	<ol style="list-style-type: none"> <li>1. Restricted release of water from reservoir.</li> <li>2. Supplementary water harvest structures like pond and tank should be developed.</li> <li>3. Renovation and maintenance of existing water harvest structures.</li> </ol>	-	-
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.
<b>Floods</b>			
Inundation with flood water	<ol style="list-style-type: none"> <li>1. Strengthening and increase in dyke height.</li> <li>2. This should be constructed within inlet and outlet facility.</li> </ol>	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.	-	<ol style="list-style-type: none"> <li>1. Application of lime and geolite.</li> <li>2. Application of Alum.</li> <li>3. Application of KMnO<sub>4</sub></li> </ol>
Health and disease management	1. Application of lime	-	<ol style="list-style-type: none"> <li>1. Application of lime and KMnO<sub>4</sub>.</li> <li>2. Assessment of the health status of fish and accordingly control measures should be taken.</li> </ol>

			3. Control on transport of brooders and seeds.
<b>cyclone</b>			Stocking, Yearling culture
Overflow/flooding of ponds	1. Strengthening and increase in dyke height. 2. This should be constructed within inlet and outlet 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 <sub>4</sub> . 2. Assessment of the health status of fish and accordingly control measures should be taken. 3. Control on transport of brooders and seeds.
<b>Heat wave and cold wave</b>			
Management of pond environment	1. During hot waves adequate water depth should be maintained.	1. During hot waves mixing of water with fresh waters 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. Feedings should be stopped. 2. If cold waves persist EUS outbreak takes place	1. Application of CIFAX to control EUS disease in fish.