State: ORISSA
Agriculture Contingency Plan District: BHADRAK

1.0 District Agriculture profile				
1.1	**Agro-Climatic/ Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern Ghats, hot moist sub humid eco sub region; Gangetic delta, hot moist sub humid eco sub region; Utkal plain and East Godavari delta, hot dry sub humid eco sub region (18.4)		
	Agro-Climatic Region/Zone (Planning Commission)	East coast plains and hills region (XI)		
	Agro Climatic Zone (NARP)*	North Eastern Costal Plain (OR-3)		
	List all the districts failing under the NARP Zone	Bhadrak , Balasore, Parts of Jajpur,Anandpur,Ghasipura, and Hatadihi block of Keonjhar		
	Geographical coordinates of district	Latitude	Longitude	Altitude
		21° 3' 10" N	86° 31' 12" E	18 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Ranital, At/Po/Via- Ranital, Dist-Bhadrak, Odisha, Pin-756111		
	Mention the KVK located in the district	Krishi Vigyan Kendra, Bhadrak, At/Po/Via- Ranital, Dist-Bhadrak, Odisha, Pin-756111		
	Name & Address of nearest Agromet field unit	Agromet Advisory Service, Ranital, Bhadrak		
1.2	**Rainfall**	**Average (mm)**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep)	1020.0	2nd Week of June	Last Week of September
	NE Monsoon (Oct-Dec)	187.5		
	Winter (Jan-March)	77.5		
	Summer (Apr-May)	142.6		
	Annual	1427.6		

1.3	Land use pattern of the district (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (000ha)	250	10	33	11	11	3	1	3	3

Source: Orissa Agricultural Statistics (2008-09)

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Alluvial Soils	148.4	56.9
	Latertic Soils	1.0	0.3
	Sandy Soils	19.5	7.4
	Acid Soils	71.3	27.3
	Others (specify): Salt affected soils	20.2	7.7

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	173	138
	Area sown more than once	65	
	Gross cropped area	238	

Source : *District Strategy Committee Meeting Report, Kharif 2010

** Orissa Agricultural Statistics, 2008-09

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	111.8		
	Gross irrigated area	150.1		
	Rainfed area	61.5		
	Source of irrigation	**Number**	**Area ('000 ha)**	**% area**
	Canals		1.3	3.6
	Tanks	-	-	-
	Open wells	-	-	-
	Bore wells	5160	10.6	29.5

	Lift irrigation	575	12.2	33.8
	Micro-irrigation			
	Other sources		11.9	33.0
	Total Irrigated area		36.0	
	Pumpsets			
	No. of Tractors			
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited			
	Critical			
	Semi-critical			
	Safe	07	N.A.	Good for irrigation and drinking water prupose. In some parts of Basudevpur , Chandballi, Tihidi & Dhamnagar block the ground water is saline.
	Wastewater availability and use			

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%
Source: Orissa Agricultural Statistics, 2008-09

Area under major field crops & horticulture etc. (2008-09)

1.7	Field crops-	Total area (in 000 ha)	Irrigated (in ha)		Rainfed(in ha)	
			Kharif	Rabi	Kharif	Rabi
	Paddy	179.4	-	14.6	164.7	-
	Greengram	7.0	-	1.8	-	5.1
	Blackgram	9.6	-	1.5	-	8.0
	Mustard	1.2	-	1.2	-	-
	Sunflower	0.1	-	0.1	-	-
	Groundnut	1.7	-	1.1	-	0.6
	Horticulture crops- Fruits					
	Mango	4500	-	770	3730	-
	Guava	880	-	200	680	-
	Banana	340	-	340	0	-

	Citrus	820	-	165	655	-
	Papaya	54	-	52	2	-
	Horticulture crops- Vegetables					
	Okra	2651	-	2360	291	-
	Pumpkin	221	-	175	46	-
	Pointed gourd	109	-	105	4	-
	Colocasia	235	-	198	37	-
	Potato	354		354	0	-
	Medicinal and Aromatic crops	N.A.				
	Plantation crops	N.A.				
	Fodder crops	N.A.				
	Total fodder crop area	N.A.				
	Grazing land	N.A.				

*If break-up data (irrigated, rainfed) is not available, give total area

Source: Orissa Agricultural Statistics, 2008-09

1.8	**Livestock**	**Male (‘000)**	**Female (‘000)**	**Total (‘000)**
	Cattle			564.9
	Buffaloes			9.3
	Commercial dairy farms			
	Goat			155.7
	Sheep			2.3
	Others (Pig)			8.3
1.9	**Poultry***	**No. of farms**	**Total No. of birds (‘000)**	
	Commercial	NA	368.8	
	Backyard	NA		
1.10	**Inland Fisheries****	**Water Spread Area (ha)**	**Yield (t/ha)**	**Production (tones)**
	Brackish water	6424.4	0.43	2775.8
	Fresh water	3739.9	1.8	6472.9
	Others Capture(Rivers, Canal, Reels & Swamps)	10371.0	0.024	254.1
	Marine Capture(Continual shelf area)	336200.0	0.034	11720.6

Source: * Report of Dept. of Animal Resource Development, Bhadrak, 2009.

** Report of Dept. of Fisheries. 2010

1.11	Production and Productivity of major crops	Kharif		Rabi		Summer		Total	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
	Paddy	479.9	2913			34.12	2330	514.1	2866
	Greengram	-	-	4.4	628	-	-	4.4	628
	Blackgram	-	-	5.7	579	-	-	5.7	579
	Mustard	-	-	0.8	702	-	-	0.8	702
	Sunflower	-	-	0.2	1072	-	-	0.2	1072
	Jute	6.2	1772	-	-	-	-	6.2	1772
	Sugarcane	-	-	47.6	75625	-	-	47.6	75625
	Ground nut	-	-	3.6	2125	-	-	3.6	2125
	Mango	-	-	-	-	-	-	127.8	3393
	Guava	-	-	-	-	-	-	3.3	4271
	Citrus	-	-	-	-	-	-	4.6	6189
	Banana	-	-	-	-	-	-	7.0	20714
	Papaya	-	-	-	-	-	-	0.6	11125
	Okra	1.7	6214	21.8	9114	-	-	23.6	7664
	Pumpkin	0.3	7717	1.8	10833	-	-	2.1	9275
	Potato	-	-	5.3	14714	-	-	5.3	14714
	Colocasia	0.3	10571	2.9	15286	-	-	3.3	12929

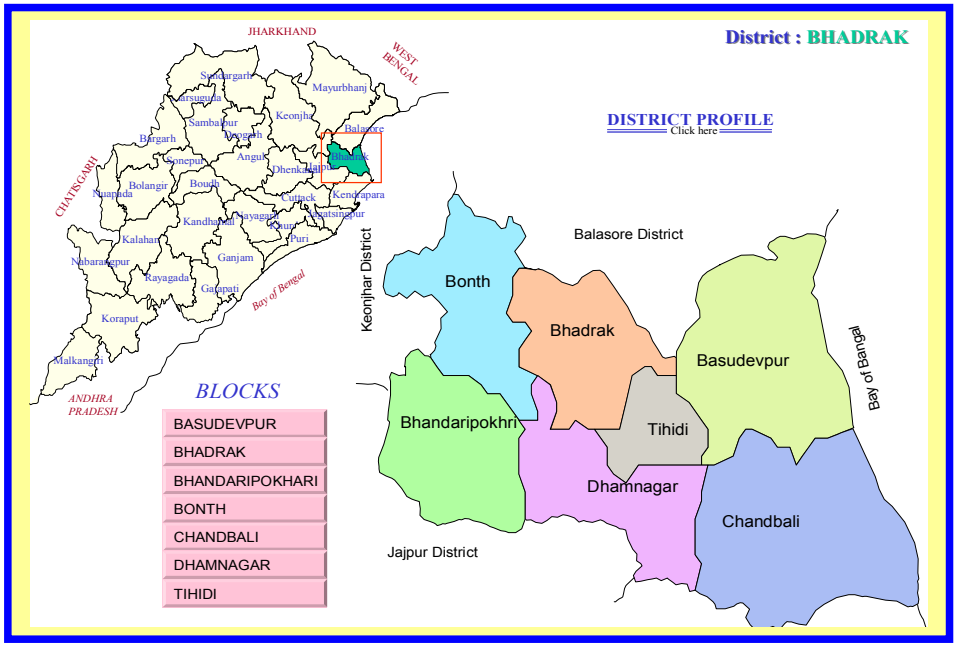
Source: Orissa Agricultural Statistics, 2006-07, 2007-08 & 2008 -09

1.12	Sowing window for 5 major crops	Paddy	Greengram	Blackgram	Mustard	Sunflower
	Kharif-Rainfed	Last week of May-2nd week of June	-	-	-	-
	Kharif-Irrigated	Paddy-1st week of June-Last week of July	-	-	-	-
	Rabi-Rainfed	-	1st week of September-Last week of October	-1st week of September-Last week of October	Last week of October-Last week of November	
	Rabi-Irrigated	-	1st week of February-Last week of March	1st week of February-Last week of March	1st week of November-1st week of December	1st week of February-Last week of March

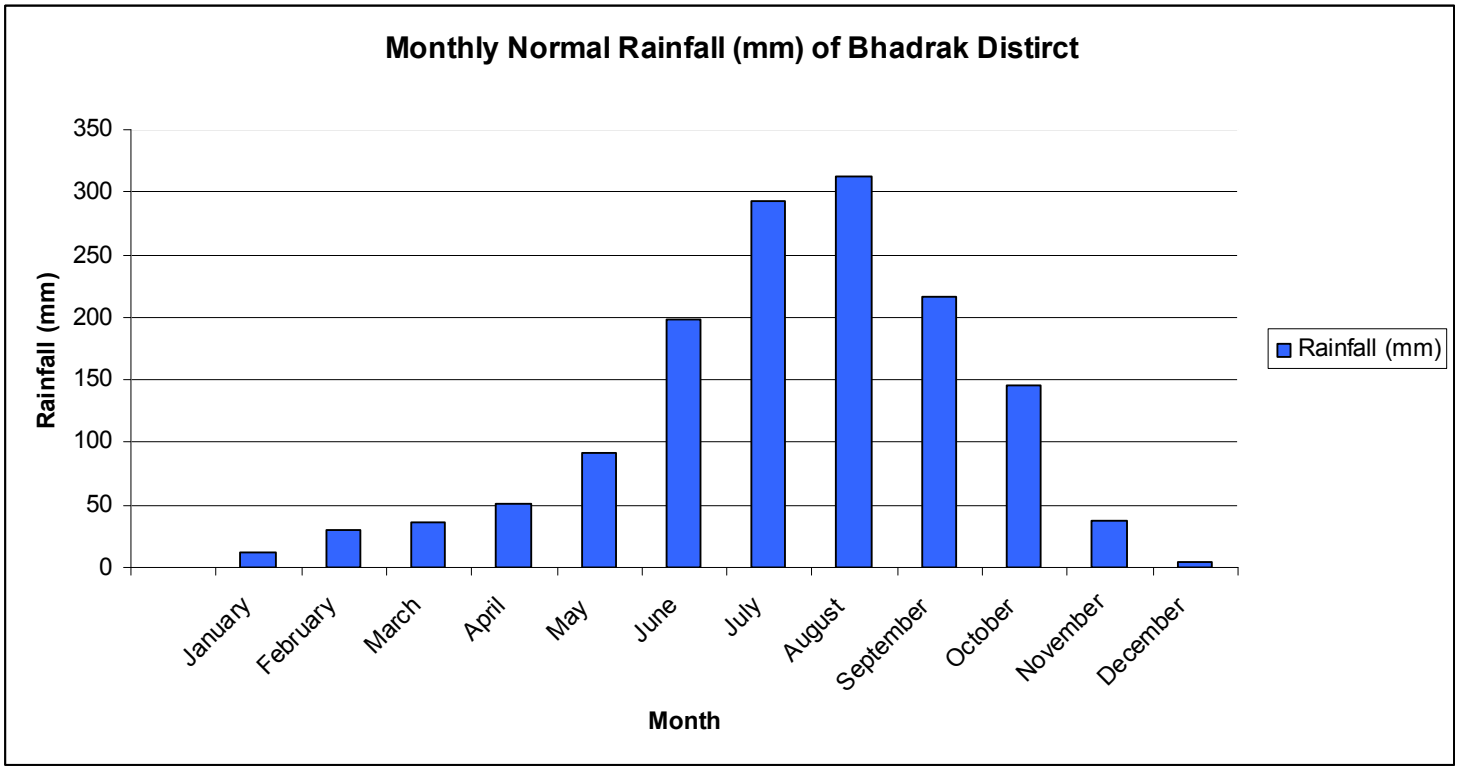
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		✓	
	Flood	✓		
	Cyclone	✓		
	Hail storm		✓	
	Heat wave	✓		
	Cold wave		✓	
	Frost			✓
	Sea water inundation		✓	
	Pests and diseases (specify)		✓	
	Paddy	Sheath Blight, Blast, Stem Borer		
	Green gram		Yellow vein mosaic	
	Black gram		Yellow vein mosaic	
	Mustard	Aphid		
	Sunflower		Head rot, Necrosis, Charcoal rot	

1.14	Include Digital maps of the district for	Location map of district with in States as Annexure 1	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

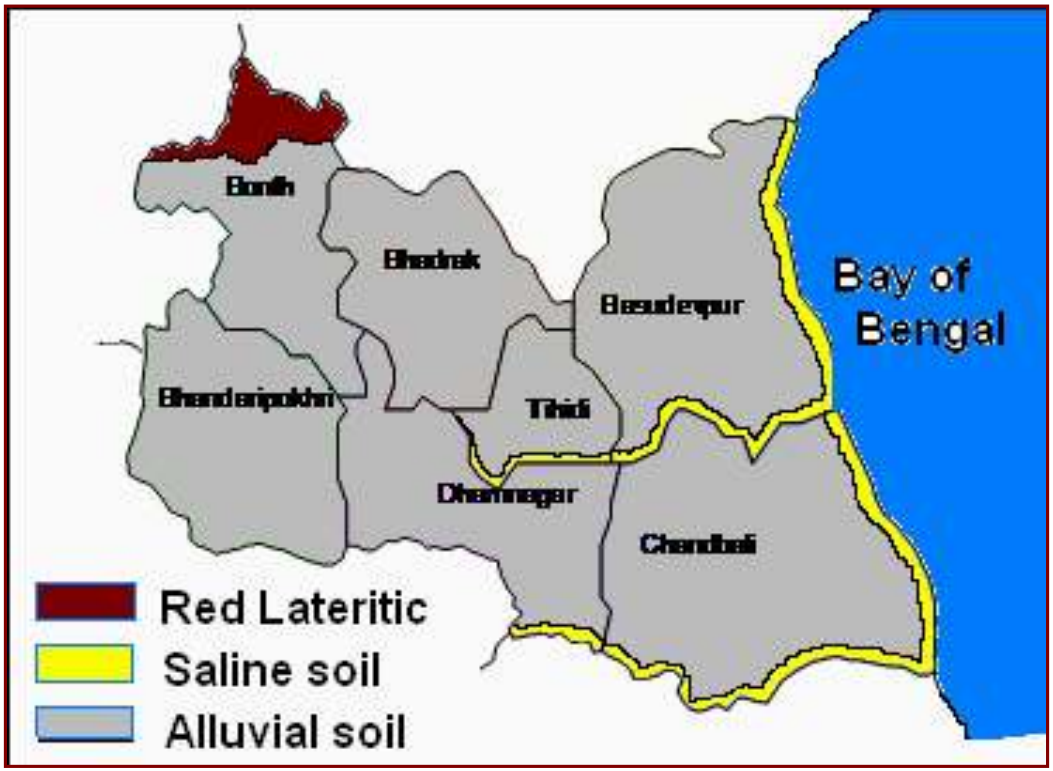
LOCATION MAP OF BHADRAK DISTRICT



MEAN ANNUAL RAINFALL OF BHADRAK DISTRICT



SOIL MAP OF BHADRAK DISTRICT



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition				**Suggested Contingency Measures**		
Early season drought (delayed onset)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June) 24th June	Alluvial Canal Irrigated	Upland	Rice-fallow based	Take a sole crop of rice in delayed sowing condition	Strengthening the field bunds. Weed management using herbicide.	
		Medium land	Rice fallow/ Rice-Toria	Direct sowing can be done with higher seed rate in one fourth of the area to facilitate use of clonal tillers if required. Growing of Medium duration rice variety: Lalat, Pratiskhya, Surendra, Naveen, Srabani (120-135 days)	• Use of bulky organic manures is recommended • Maintain more plant population for direct seeded rice. • Optimum plant population with recommended practices.	Ensure availability of varieties from Seed Corporation, Agril Dept.
		Low land	Rice fallow/ Rice-Oilseeds/pulses	▪ Direct sowing can be done ▪ Community nursery can be raised. ▪ Suitable variety for growing of lowland rice: Savitri, Gayatri, Padmini, Moti, Pooja, Varshadhan. (140-145 days duration). ▪ Pond based farming system may be developed.	• Use of bulky organic manures is recommended • Maintain more plant population for direct seeded rice.	Include various components of farming system like Mushroom, Poultry, Dairy,Apiary etc.
	Low lying and flood	Upland				
		Medium land				

	prone area	Lowland	Rice fallow	Direct sowing can be done. Suitable variety for growing of lowland rice: Savitri, Gayatri, Padmini, Moti, Pooja, Varshadhan, Tulasi, Jagabandhu, Ranidhan, Upahar (140-145 days duration)	• Use of bulky organic manures is recommended • Maintain more plant population for direct seeded rice.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
	Saline soil group	Upland				
		Medium land	Rice fallow	Direct sowing can be done. Growing of Medium duration rice variety: Lalat, Swarna, Pratiskhya(120-135 days)	• Use of bulky organic manures is recommended • Maintain more plant population for direct seeded rice.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
		Lowland	Rice fallow	Direct sowing can be done. Suitable variety for growing of lowland salt tolerant rice: Lunishree, SR-26 B, Pateni, Luna sampada, Luna suvarna	-do-	

Condition				**Suggested Contingency Measures**		
Early season drought (delayed onset)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July) **10th July**	Alluvial Canal Irrigated	Upland	Upland rice fallow based	▪ Develop community nursery of short duration paddy ▪ Low water requiring crops like maize (Shakti-1, Novjyot.), black gram (T-9, PU30, Sarala), green gram (K-851, Dhauli) , cowpea (Swarna, (C,152),	▪ Other measures like land shaping, contour cultivation, field/ contour bunding can be adopted. ▪ Withheld Nitrogen application till rainfall is received.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT

				Utkal Manika) , Sesame: Kanaka, Kalika, Uma, Usha etc		
		Medium land	Rice fallow based, Rice-Toria	Direct sowing is not recommend after 10th July but transplanting can be done from previously sown nursery or sowing of sprouted seeds using drum seeder. **Medium land rice**: Lalat, Swarna, Pratiskya, Ranidhan.	▪ Maintain more plant population for direct seed rice. ▪ Nursery can be raised and that will be ready for transplanting after 21 days seedling. ▪ Withheld Nitrogen application till rain fall is received. ▪ Emphasis should be given in-situ rain water conservation, harvesting of excess runoff recycling and ground water recharge. ▪ Strengthen filed bunds.	
		Lowland	Rice- fallow, Rice-Toria/ Pulse	▪ Direct sowing is not recommended only transplanting can be done from previously sown nursery. ▪ Sowing of sprouted seeds using drum seeder. ▪ **Low land rice**: Savitri, Gayatri, Padmini, Moti,Mahalaxmi, RGL 2537	Same as above	
	Low lying and flood prone area	Upland				
		Medium land	Rice fallow based	▪ Direct sowing is not recommend after 10th July but transplanting can be done from previously sown nursery upto 45days old seedlings with 3-4seedlings per hill. ▪ **Medium land rice**: Lalat, Swarna, Mahasuri, Pratiskya, Swarn sub 1	▪ Maintain more plant population for direct seed rice. ▪ Nursery can be raised and that will be ready for transplanting after 21 days seedling. ▪ Withheld Nitrogen application till rain fall is received. ▪ Emphasis should be given in-situ rain water conservation, harvesting of excess runoff recycling and ground water recharge.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI

		Low land	Rice- fallow, Rice-Toria, Rice-Sesamum	▪ Direct sowing is not recommended only transplanting can be done from previously sown nursery. ▪ Sowing of sprouted seeds using drum seeder. ▪ **Low land rice**: Savitri, Gayatri, Padmini, Moti,Mahalaxmi, Mahanadi, Pooja, Varshadhan, Tulasi, Jagabandhu , Upahar	-do-	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
	Saline soil group	Upland				
		Medium land	Rice fallow based	▪ Direct sowing is not recommend after 10th July but transplanting can be done from previously sown nursery. ▪ **Medium land rice**: Lalat, Konark, Surendra, Pratiskya , Ranidhan	▪	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
		Lowland	Rice- fallow, Pond based farming system	Direct sowing is not recommended only transplanting can be done from previously sown nursery. **Low land rice**: Lunishree, SR-26 B, Pateni., Luna Suvarna, Luna Sampad	Same as above	

Condition				Suggested Contingency Measures		
Early season drought (delayed onset)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (July 4th Week)	Alluvial Canal Irrigated	Up land	Rice- fallow Fallow - vegetable	• Transplanting can be done using previously sown nursery. • In the event of late arrival of southwest monsoon the crops like cowpea, black gram, green gram, Sesamum can be grown up to last week of July. • Raise seedling for early cauliflower.	▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended dose of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended. ▪ Use post emergence herbicide whenever possible.	
		Medium land	Rice-fallow	• Transplanting can be done using previously sown nursery. • Direct sowing using pregerminated seed • Rice varieties Lalat, Konark, Ranidhan, Surendra	▪ Raising the bund height, Seepage loss control, plugging of drainage loss to increase the water storage ▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ For Pest affected crop practice need based plant protection measures. ▪ Control rice stem borer and leaf folder attack.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI

					▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended. ▪ Mechanical weeding using cono weeder and in situ incorporation.	
		Low land	Rice- fallow	Rice varieties like 'Swarna' Pratikshya, Tapaswini, Ranidhan, Pooja	Same as above	Adopt community nursery
	Low lying and flood prone area	Upland				
		Medium land				
		Low land	Rice- fallow	Rice varieties like 'Swarna' Pratikshya, Tapaswini, Swarna sub 1, Upahar	▪ In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. ▪ Seedling treatment and proper plant protection measures should be taken to avoid any germination failure. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
	Saline soil group	Upland				
		Medium land	Rice-fallow	Transplanting can be done using previously sown nursery of var. Lunishree, Luna sampad,	▪ Green manuring, use of paper mill sludge. ▪ Application of ZnSo4 along with FYM ▪ Raising the bund height, Seepage	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT,

				Luna suvarna and Pateni	loss control, plugging of drainage loss to increase the water storage ▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and K should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended ▪ Planting more no. of plants per hill with closer spacing.	CRRI
		Low land	Rice- fallow	Rice varieties like Lunishree, SR 26 B, Pateni. Luna sampad, Luna suvarna	▪ Raising the bund height, Seepage loss control, plugging of drainage loss to increase the water storage ▪ Seedling treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and K should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Use of bulky organic manures is recommended	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI

Condition				Suggested Contingency Measures		
Early season drought (delayed onset)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (August 2nd Week)	Alluvial Canal Irrigated Upland		Rice - fallow	▪ Horsegram (Urmi), Sesamum (Kanak, Kalika, Uma, Usha), Blackgram (T-9, Sarala, PU 19, 30, Greengram (K851)and Cowpea (Utkalmanika)can be taken ▪ Nursery raising of vegetables early cauliflower	Irrigation at critical stage, Weed management, Interculture, Organic mulching, Crop residue as mulching.	
		Medium land	Rice-fallow	▪ Shifting from traditional crops/ varieties to short duration Rice varieties like Navin, (120) days Rice varieties like Lalat (120) days, Konark (120days) are useful in this situation. ▪ Transplant older seedlings with closer spacing ▪ Direct sowing of sprouted seeds.	▪ Raising the bund height, Seepage loss control, plugging of drainage loss to increase the water storage ▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
		Low land	Rice -fallow	• Transplant older seedlings with closer spacing	Same as above	

				• Direct sowing of sprouted seeds.		
	Low lying and flood prone area	Upland				
		Medium land	Rice-fallow	▪ Transplant older seedlings with closer spacing Direct sowing of sprouted seeds.	▪ Raising the bund height, Seepage loss control, plugging of drainage loss to increase the water storage ▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon. ▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
		Lowland	Rice -fallow	Transplant older seedlings with closer spacing. Direct sowing of sprouted seeds.	Same as above	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI
	Saline soil group	Upland				
		Medium land	Rice-fallow	▪ Shifting from traditional crops/ varieties to short duration Rice varieties like Navin, (120) days Rice varieties like Lalat (120) days, Konark (120days) are useful in this situation.	▪ Raising the bund height, Seapage loss control, plugging of drainage loss to increase the water storage ▪ Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late the onset of monsoon.	Ensure availability of varieties from Seed Corporation, Agril Dept, OUAT, CRRI

				▪ Transplant older seedlings with closer spacing and more no.s of seedlings per hill.	▪ The recommended dose of nitrogen application should be reduced by 40 % in rain fed situation and should be applied as basal and full recommended of P and k should be placed as basal. ▪ The field should be free of weeds for utilization of water and nutrients by the late sown crops. Furrow sowing of plant to plant distance with wider inter-row spacing. Use of bulky organic manures is recommended.	
		Low land	Rice -fallow	▪ Transplant older seedlings with closer spacing and more no of seedlings per hill.	Same as above	

Condition				**Suggested Contingency Measures**		
Early season drought (Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Crop Management**	**Soil Management**	**Remarks on Implementation**
	Alluvial Canal Irrigated	Medium land	Rice- fallow	• In direct sown rice if the plant population is less than 50%, re sow the crop after getting rain. • Rice variety Lalat,Swarna,Pratikshya,Surendra • If the plant population is more than 50%, gap filling will be made. Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided	• Strengthen the field bunds, • Provide life saving irrigation	

				till sufficient rains have been received. Raising community nurseries of rice is recommended. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan @ 2-2.5 g/kg seed and other recommended plant protection measures.		
		Low land	Rice-fallow	• Same as above	• Strengthen the field and contour bunds for in-situ moisture conservation. • Utilize already harvested rain water as live saving or protective irrigation.	
	Low lying and flood prone area	Upland				
		Medium land	Rice- fallow	• Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended for transplanted rice. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan @ 2-2.5 g/kg seed and other recommended plant protection measures.	• Strengthen the field and contour bunds for in-situ moisture conservation. • Run-off generated should be stored in the farm ponds or tanks.	

		Low land	Rice-fallow	Same as above	• Strengthen the field and contour bunds for in-situ moisture conservation. • Utilize already harvested rain water as live saving or protective irrigation.	
	Saline soil group	Upland				
		Medium land	Rice- fallow	• Rice variety Lalat, Swarna,Pratikshya • Direct seeded rice should be re-sown because 'sprouting drought' will damage substantial rice area. But re-sowing of direct seeded rice should be avoided till sufficient rains have been received. Raising community nurseries of rice is recommended for transplanted rice. • If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check. • Seed treatment with Thiram or Captan @ 2-2.5 g/kg seed and other recommended plant protection measures.	• Strengthen the field and contour bunds for in-situ moisture conservation. • Run-off generated should be stored in the farm ponds or tanks.	
		Low land	Rice-fallow	Same as above	❖ Strengthen the field and contour bunds for in-situ moisture conservation. ❖ Utilize already harvested rain water as live saving or protective irrigation.	

Condition				Suggested Contingency Measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Crop Management**	**Soil Management**	**Remarks on Implementation**
At vegetative stage	Alluvial Canal Irrigated	Up land	Rice-fallow	▪ If mortality is >50% go for re-sowing. ▪ If plant population is >50% go for gap filling. Closer spacing, 50% N should be applied at basal ▪ Top dressing should be avoided in nursery ▪ Rice variety; Khandagiri,Vandana,Parijat	▪ Whenever, economically viable mulching should be practiced in between crop rows using locally available mulch material ▪ In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rain water by increasing bund height	
		Medium land	Rice- fallow	▪ Keep the field weed free ▪ If plant population is >50% go for gap filling. ❖ Closer planting using 3-4 seedlings/hill ❖ 50% N should be applied as basal ▪ Top dressing should be avoided in nursery ▪ Rice variety Lalat, Swarna, Pratikshya	▪ In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rain water by increasing bund height	Small and marginal farmers may be employed under NREGA for creating rain water conservation and storage structures to enhance productivity of their limited land.
		Low land	Rice-fallow	Same as above	Same as above	
	Low lying and flood prone area	Up land	Rice-fallow	▪ Crop should be suitably thinned out. ▪ In-situ rain water conservation, harvesting of excess runoff for re-use and ground water	Mulching should be practiced in between crop rows using locally available mulch material	

				recharge. Conserve rain water by increasing bund height ▪ Rice variety Khandagiri,Parijat,Vandana		
		Medium land	Rice- fallow	Same as above	▪ In-situ rain water conservation, harvesting of excess runoff for re-use and groundwater recharge. Conserve rain water by increasing bund height	Small and marginal farmers may be employed under NREGA for creating rain water
		Low land	Rice-fallow	Same as above	Same as above	
	Saline soil group	Up land				
		Medium land	Rice fallow	Same as above	▪ In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rain water by increasing bund height	-do-
		Low land	Rice-fallow	Same as above	Same as above	
At reproductive stage	Alluvial Canal Irrigated	Up Land	Rice-fallow	▪ Life saving irrigation if possible. ▪ Provide irrigation at critical stage. ▪ Early short duration non-paddy crops / upland paddy be harvested at physiological maturity stage. ▪ Rice variety Khandagiri,Parijat,Pathara	▪ If fertilizers are to be applied, foliar application is recommended. ▪ Whenever, economically viable mulching should be practiced in between crop rows using locally available mulch material	
		Medium Land	Rice-fallow	▪ Life saving irrigation from harvested rainwater. Reduction of conveyance losses while irrigating the light textured soils. ▪ Rice variety Lalat, Swarna,Pratikshya	▪ If fertilizers are to be applied, foliar application is recommended. ▪ Strengthen field bund ▪ Need based plant protection a measure is to be taken.	
		Low Land	Rice-fallow	Same as above	▪ Small and marginal	

					farmers may be employed under NREGA for creating rain water ▪ Conservation and storage structures for future drought.	
		Low land	Rice-vegetable-fallow	Same as above	Same as above	
	Low lying and flood prone area	Up land				
		Medium land				
		Low land	Rice-fallow	Life saving irrigation from harvested rainwater. Reduction of conveyance losses while irrigating the light textured soils. Rice variety Savitri,Gayatri,Padmini,Pooja	Small and marginal farmers may be employed under NREGA for creating rain water Conservation and storage structures for future drought.	
		Low land	Rice-vegetable-fallow.	Same as above	Same as above	
	Saline soil group	Up land				
		Medium land	Rice-fallow	▪ Rice variety Lalat,Swarna,Pratikshya ▪ Life saving irrigation from harvested rainwater. ▪ Reduction of conveyance losses whole irrigating the light textured soils.	If fertilizers are to be applied, foliar application is recommended.	
		Low land	Rice-fallow	Rice variety Lunishree,Pateni,Luna suvarna,Luna sampada Same as above	▪ Small and marginal farmers may be employed under NREGA for creating rain water ▪ Conservation and storage structures for future drought.	
		Low land	Rice-vegetable-fallow.	Same as above, Sow pyra crop	Same as above	
Terminal drought	Alluvial Canal Irrigated	Medium land	Rice fallow	▪ Rice variety Lalat, Swarna,Pratikshya,Surendra ▪ Life saving irrigation from	Same as above	

				harvested rainwater, wherever feasible,adopt micro-irrigation to save water. ▪ Reduction of conveyance losses while irrigating the light textured soils. ▪ Harvesting of rice at physiological maturity. ▪ If main crop is damaged / partially success it may be dismantled & go for land preparation for pre-rabi crops (Toria, Blackgram, Green gram, seasamum, Sunflower)		
		Low land	Rice-fallow	Same as above Sow pyra crop	Same as above	
		Low land	Rice vegetable / oilseeds/ pulses/ maize	Same as above for Kharif.	Same as above	
		Low land	Rice-rice	Same as above for Kharif	Same as above	
		Medium land	Vegetable – fallow	Life saving irrigation from harvested rainwater, wherever feasible, adopts micro-irrigation to save water. Irrigate on ridge and irrigate every alternate furrow on rotation.	Whenever, economically viable. Mulching should be practiced in between crop rows using locally available mulch material	
	Low lying and flood prone area	Up land				
		Medium land	Rice fallow based	▪ Life saving irrigation from harvested rainwater, wherever feasible, adopts micro-irrigation to save water. Reduction of conveyance losses while irrigating the light textured soils. ▪ Harvesting of rice at physiological maturity will realize 80-85% of normal	▪ Small and marginal farmers may be employed under NREGA for creating rain water ▪ Conservation and storage structures for future drought.	

				yield.		
		Low land	Rice-fallow	Same as above. Sow pyra crop	Same as above	
		Low land	Rice vegetable / oilseeds/ pulses/ maize	Same as above for Kharif.	Same as above	
		Low land	Rice-Rice	Same as above for Kharif	Same as above	
		Medium land	Vegetable – fallow	Life saving irrigation from harvested rainwater, wherever feasible, adopt micro-irrigation to save water. Irrigate on ridge and irrigate every alternate furrow on rotation.	Whenever, economically viable mulching should be practiced in between crop rows using locally available mulch material	
	Saline soil group	Up land				
		Medium land	Rice fallow based	▪ Life saving irrigation from harvested rainwater, wherever feasible, adopts micro-irrigation to save water. Reduction of conveyance losses while irrigating the light textured soils ▪ Harvesting of rice at physiological.	Small and marginal farmers may be employed under NREGA for creating rain water Conservation and storage structures for future drought.	
		Low land	Rice-fallow	Same as above. Sow pyra crops.	Same as above	
		Low land	Rice vegetable / oilseeds/ pulses/ maize	Same as above for Kharif.	Same as above	
		Low land	Rice-Rice	Same as above for Kharif	Same as above	
		Medium land	Vegetable – fallow	Life saving irrigation from harvested rainwater, wherever feasible, adopts micro-irrigation to save water. Irrigate on ridge and irrigate every alternate furrow on rotation.	Whenever, economically viable mulching should be practiced in between crop rows using locally available mulch material	

2.1.2 Irrigated situation

Condition				Suggested Contingency Measures		
Delayed/ limited release of water in canals due to low rainfall	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Alluvial Canal Irrigated	Up/Medium/ Low land	Rice-rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options. Use of mid duration variety like 'Lalat, Naveen (120 days) is well suited in rabi following SRI method.	Reduction of conveyance losses while irrigating the light textured soils. Harvesting of kharif rice at physiological maturity. Irrigated the rabi rice at critical stages only with ground water.	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF, MPLAD funds, etc.
			Rice-oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Same as above for kharif rice. Provide irrigation at critical stages. Provide organic mulching. Weed management	
			Rice-oilseeds/pulses	-do-	-do-	
			Rice vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi season.	-do-	
	Low lying and flood prone area	Up land				
		Medium land				
		Low land	Rice -Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred	Reduction of conveyance losses while irrigating the light textured soils. Harvesting of kharif rice at physiological maturity Irrigated the rabi rice at	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF,

				options. Use of mid duration variety like'Lalat'(120 days) is well suited in rabi.	critical stages only with ground water.	MPLAD funds, etc.
			Rice- Oilseeds / Pulses	Low water requiring oilseed and pulses like groundnut, greengram, blackgram, sunflower, sesamum	Same as above for kharif rice. Provide organic mulching. Weed management	
			Rice-oilseeds/pulses	-do-	-do-	
			Lowland rice vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi season.	-do-	
	Saline soil group	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options. Use of mid duration variety like 'Lalat' (120 days) is well suited in rabi.	Reduction of conveyance losses while irrigating the light textured soils. Harvesting of kharif rice at physiological maturity. Irrigated the rabi rice at critical stages only with ground water.	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF, MPLAD funds, etc.
			Rice-oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Same as above for Kharif rice. Provide organic mulching. Weed management	
			Rice-oilseeds/pulses	-do-	-do-	
			Rice vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi season.	-do-	

Condition				Suggested Contingency Measures		
Non release of water in canals under delayed onset of monsoon in catchments	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Alluvial Canal Irrigated	Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Reduction of conveyance losses while irrigating the crops. Harvesting of kharif rice at physiological maturity. Use organic mulch, keep the land weed free.	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF, MPLAD funds etc.
			Rice- oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	-do-	
			Rice vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi seasons	-do-	
	Low lying and flood prone area	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Life saving irrigation for kharif rice with groundwater. Use organic mulch, keep the land weed free. Reduction of conveyance losses while irrigating the crops.	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF, MPLAD funds etc.
			Rice- Oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Irrigated the kharif crops during dry spell with ground water. Use organic mulch, keep the land weed free. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal	

					yield.	
			Rice- Vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi seasons	Irrigated the kharif crops during dry spell with ground water Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield	
	Saline soil group	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Irrigate the kharif rice with groundwater. Reduction of conveyance losses while irrigating the crops. Harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	Desalting, repairing, renovation and construction of new conveyance system under different schemes like NREGA, BRGF, MPLAD funds etc.
			Rice- Oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Irrigated the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetable like radish during rabi seasons	-do-	

Condition				Suggested Contingency Measures		
Lack of inflows into tanks due to insufficient/ delayed onset of monsoon	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Alluvial Canal Irrigated	Low land	Rice-Rice	Rice area during rabi should be reduced. Instead low water requiring oilseeds and pulses like groundnut, greengram, blackgram, sunflower, sesamum are preferred.	Provide life saving irrigation for kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity. Use organic mulch, keep the land weed free.	
			Rice- Oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, greengram, sunflower, sesamum.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons.	-do-	
	Low lying and flood prone area	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead low water requiring oilseeds and pulses like ground nut, green gram, black gram,, sunflower, sesamum are preferred.	-do-	
			Rice- Oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, greengram, sunflower,	Irrigate the kharif crops during dry spell with ground water.	

				sesamum.	Harvesting of kharif rice at physiological maturity.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity.	
	Saline soil group	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead low water requiring oilseeds and pulses like ground nut , green gram, black gra, sunflower, sesamum are preferred.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity.	
			Rice- Oilseeds/pulses	Low water requiring oilseeds and pulses like ground nut , green gram, sunflower, sesamum.	Irrigate the kharif crops during dry spell with ground water. harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish, Sugarbeet, during rabi seasons.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	

Condition				Suggested Contingency Measures		
Insufficient ground water recharge due to low rainfall	**Agro-Ecological Situations**	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Alluvial Canal Irrigated	Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like Groundnut, Greengram, Black gram, Sunflower, Sesamum are preferred options.	▪ Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. ▪ Run-off generated should be stored in the farm ponds or tanks. These will recharge ground water. ▪ Rainwater stored in self sealing or lined ponds can be used for irrigation if there is long break in the rainfall or for Pre-sowing of the rabi crops to ensure proper generation.	
			Rice- Oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Harvesting of kharif rice at physiological maturity Use organic mulch, keep the land weed free.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons.	-do-	
	Low lying and flood prone area	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Harvesting of kharif rice at physiological maturity. Run off generated even by the delayed monsoon and should be stored in the farm ponds or tanks. Rainwater stored in self	

					sealing or lined ponds can be used for irrigation if there is long break in the rainfall or for Pre-sowing of the rabi crops to ensure proper generation.	
			Rice- Oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Harvesting of kharif rice at physiological maturity.	
			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons.	Irrigated the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	
	Saline soil group	Up land				
		Medium land				
		Low land	Rice-Rice	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Rice area during rabi should be reduced. Instead, low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum are preferred options.	Harvesting of kharif rice at physiological maturity Run-off generated should be stored in the farm ponds or tanks. . Rainwater stored in self sealing or lined ponds can be used for irrigation for Pre-sowing of the rabi crops to ensure proper germination.
			Rice- Oilseeds/pulses	Low water requiring oilseed and pulses like groundnut, green gram, black gram, sunflower, sesamum	Irrigated the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity. Use organic mulch, keep the land weed free.	

			Rice- vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons.	-do-	

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

Condition	**Suggested contingency measures**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice	Provide drainage	Provide drainage	Provide drainage, harvest at physiological maturity.	Provide drainage, move the produce to dry and safe place
Pulses, Oilseeds	Provide drainage, Ridge and furrow	Provide drainage, Ridge and furrow	-do-	-do-
Vegetables	-do-	-do-	Provide drainage, harvest for table purpose.	-do-
Horticulture				
Fruits	Provide drainage, Provide staking	Provide drainage, provide staking	Provide drainage, Provide staking, harvest at physiological maturity.	Provide drainage, provide staking move the produce to dry and safe place
Heavy rainfall with high speed winds in a short span				
Fruits	Provide drainage, Provide staking	-do-	-do-	Provide drainage, provide staking move the produce to dry and safe place
Outbreak of pests and diseases due to unseasonal rains				
Rice	Mgt for case worm, BPH, Blast, Leaf	Mgt. of BPH(Imidacloprid 100ml/ac),	Mgt. of Gundhi bug(Malathion	

	folder, Swarming catter pillar		1lt/ac)	
Greengram, Blackgram	Mgt for aphid(Imidacloprid100ml/ac)	Jassids, Hoppers,YMV	Pod borer(Endosulphan1lt/ha)	
Toria	Mgt for leaf webber(Ekalux 1lt/ha)	Leaf webber, White rust	Capsule borer(Ekalux 1lt/ha)	

2.3 Floods

Condition	**Suggested contingency measures**			
Transient water logging/ partial inundation[1]	**Seedling/ nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Crop1 (Kharif Rice)		If rice is damaged due to flood during vegetative stage: Wet seeding of sprouted seeds @75-80 kg/ha) of medium duration varieties (Lalat (120 days), Surendra (135 days), where ice has fully been damaged but water will remain for longer period. 50% N and 50%K20 + full P may be applied as basal and rest 50% N+50% K20 as top dressing during the tillering stage. In partially damage field gap filling may be dome by redistributing the tillers. Control of pests and diseases.	If flood comes during reproductive stage. There is chance to damage rice, emphasis should be given on forthcoming rabi crops. Supply of seeds and other agro-inputs of rabi crops at subsidized rate, provision of back loan etc. Wet seeding of short duration varieties (Heera (60days), Kalinga-III (90 days) or medium duration varieties (Lalat (120days), parijat (100days) Surendra (135days) during forthcoming rabi season. Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to compensate the loss during	If flood comes during reproductive stage. There is chance to damage rice, emphasis should be given on forthcoming rabi crops. Supply of seeds and other agro-inputs of rabi crops at subsidized rate, provision of back loan etc. Wet seeding of short duration varieties (Heera (60days), Kalinga-III (90 days) or medium duration varieties (Lalat (120days), parijat (100days) Surendra (135days) during forthcoming rabi season. Utilization of residual soil moisture and use of recharged soil profile for growing pulses

			kharif.	Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to compensate the loss during kharif.
Continuous submergence for more than 2 days				
Rice	Drainage	Drainage	Drainage, Sow pyra crop	Drainage
Green gram, Black gram	-do-	-do-	Drainage	-do-
Toria, Sunflower	-do-	-do-	-do-	-do-
Horticulture				
Sea water inundation				

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

Extreme event type	**Suggested contingency measurer**			
	Seedling/ nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Green gram	Water spraying, Irrigation	Water spraying, Irrigation	Water spraying, Irrigation	Water spraying, Irrigation
Toria	-do-	-do-	-do-	-do-
Sunflower	-do-	-do-	-do-	-do-
Vegetables	-do-	-do-	-do-	-do-
Horticulture				
Cold wave				
Kharif rice				
Kharif Vegetables		To minimize the adverse affect of weather, farmers have to irrigate their rabi vegetables and maize crops frequently		
Horticulture				

Frost				
Horticulture				
Hailstorm				
Horticulture				
Cyclone				
Horticulture				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem Sowing of cereals (fodder varieties of Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Collection of groundnut haulms and groundnut cake for use as feed supplement during drought Motivating the sugarcane farmers to convert green sugarcane tops in to silage by the end of February Preserving the green maize fodder as silage Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-	Harvest and use biomass of dried up crops (Paddy, Green gram, Black gram, Groundnut, Maize, Horse gram, cow pea etc.,) material as fodder Use of locally available cheap feed resources like GN haulms as supplement for feeding of livestock during drought Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought	Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 on their own lands with input subsidy Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass, combo grass well before monsoon Flushing the stock to recoup Replenish the feed and fodder banks

	term fodder crops like sunhemp Formation of village Disaster Management Committee Capacity building and preparedness of the stakeholders and official staff for the drought/floods	Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder Continuous supplementation of minerals to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and diseases management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer

	regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	of any epidemic Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	
Floods			
	In case of early forewarning (EFW), harvest all the crops (Paddy, Green gram, Black gram, Groundnut, Maize, Horse gram, cow pea etc.) that can be useful as feed/fodder in future (store properly) Protect the dried Dongri grass, sorghum stover etc., from inundation of flood water Keeping sufficient of dry fodder to transport to the flood affected villages Don't allow the animals for grazing if severe floods are forewarned Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with	Transportation of animals to elevated areas Proper hygiene and sanitation of the animal shed In severe storms, un-tether or let loose the animals Use of unconventional and locally available cheap feed ingredients for feeding of livestock. Avoid soaked and mould infected feeds / fodders to livestock Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Encouraging farmers to cultivate short-term fodder crops like sunhemp. Deworming with broad spectrum dewormers Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder. Keep close surveillance on disease outbreak.

	regard to health & management measures Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations	Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	
Cyclone	Harvest all the possible wetted grain (Paddy, Green gram, Black gram, Groundnut, Maize, Horse gram, cow pea etc) and use as animal feed. Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone In case of EFW of severe cyclone, shift the animals to safer places.	Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers. Diarrhea out break may happen. Health camps should be organized In severe cases un-tether **or** let loose the animals Arrange transportation of highly productive animals to safer place Spraying of fly repellants in animal sheds	Repair of animal shed Deworm the animals through mass camps Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR Proper dispose of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Bleach / chlorinate (0.1%) drinking water or water resources Collect drowned crop material, dry it and store for future use Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.
Heat wave and cold wave			

Heat wave	i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinklers /fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

[$]based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds	
Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit	
Floods				
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc,	Use stored feed as supplement Don't allow for scavenging Culling of weak birds	Routine practices are followed Deworming and vaccination against RD	

Drinking water		Use water sanitizers or offer cool hygienic drinking water		
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD	
Cyclone				
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging Protect from thunder storms	Routine practices are followed	
Drinking water		Use water sanitizers or offer cool drinking water		
Health and disease management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds	Disposal of dead birds by burning / deep burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem	

		Assure supply of electricity Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	Supplementation of coccidiostats in feed Vaccination against Ranikhet Disease (0.5ml S/c)	
Heat wave and cold wave				
Shelter/environment management	***Heat wave:*** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed	
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed	
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed	

[a] based on forewarning wherever available

2.5.3 Fisheries

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shallow water in ponds due to insufficient rains/inflows.	Harvest of IMCs in case of polyculture with minor carps or Magur	Maintain the minor carp/magur culture	Raise the water level, if possible and restock the pond with stunted IMC yearlings
Impact of heat and salt load build up on ponds. change in water quality	Harvest IMCs in case of polyculture with fresh water prawns	Maintain the fresh water prawn culture	Raise the water level, if possible and restock the pond with stunted IMC yearlings
Floods			
Inundation with flood waters	Harvest out marketable fishes. Encircle stake nets (1.5m high) Put perforated feed bags inside the pond	Keep a vigil on the embankment & install stake nets.	By continuous netting, eradicate trash fishes, if any. Restock the fish pond, if required
Water contamination and changes in BOD			
Health and diseases management			Disinfect the pond with lime
Cyclone			
Overflow /flooding of ponds	As in case of floods	As in case of floods	As in case of floods
Changes in fresh/brackish water ratio			
Health and diseases management			
Heat wave and cold wave			
Management of pond environment management	For heat wave, raise the average water depth of the pond upto 6ft. level.	Exchange the pond water 5 to 10% daily with cool bore-well water.	Maintain the water level upto 5ft.
Health and diseases management			