

AGRICULTURE CONTINGENCY PLAN

DISTRICT: BALASORE

STATE: ODISHA

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Sub Region (ICAR)	Gangetic Delta Hot Moist Sub-Humid Eco-Sub region (18.5)	
	Agro-Climatic Zone (Planning Commission)	East Coast Plains & Hills Region (XI)	
	Agro Climatic Zone (NARP)	North Eastern Coastal Plain Zone of Odisha (OR-3)	
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Jajpur, Bhadrak, Balasore	
	Geographic coordinates of district headquarters	Latitude	Longitude
		21 ⁰ 03 to 21 ⁰ 59 ⁰ N	86 ⁰ 16 ⁰ to 87 ⁰ 29 ⁰ E
		Altitude	
		28.3m	
	Name and address of the concerned ZRS/ZARS/ RARS/ RRS/ RRTTS	RRTTS, Ranital Balasore	
	Mention the KVK located in the district with address	KVK, Balasore, At/po- Devog, Via- Singla, Dist- Balasore, 756023	
	Name and address of the nearest Agro-met Field Unit (AMFU, IMD) for agro-advisories in the Zone	RRTTS, Ranital	

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):	957	50	2 nd Week of June	Last Week of September
	NE Monsoon(Oct-Dec):	303	10		
	Winter (Jan- March)	105	05		
	Summer (Apr-May)	185	09		
	Annual	1550	74		

Source: Odisha Agriculture Statistics, 2017-18

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	381	234	33	33	16	9	25	10	34	5

Source: Odisha Agriculture Statistics, 2017-18

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))	Area ('000 ha)	Percent (%) of geographical area of the zone.
	1 saline	75.48	19.81%
	2 alluvial	i) Rainfed	25.75%
		ii) canal irrigated	5.94%
		iii) flood prone	23.77%
	3. Red laterite	i) rainfed	12.87%
		ii) canal irrigated	10.89%

Source: SREP, Balasore

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

1.5	Agricultural land use	Area (�000 ha)	Cropping intensity %
	Net sown area	191	156%
	Area sown more than once	108	
	Gross cropped area	299	
Source: Odisha Agriculture Statistics, 2017-18			

1.6	Irrigation	Area (�000 ha)		
	Net irrigated area	244.01		
	Gross irrigated area	319.558		
	Rainfed area	146.3		
	Sources of Irrigation	Number	Area (�000 ha)	Percentage of total irrigated area
	Canals	3	20.8	8.5
	Tanks	35,624	5.665	2.3
	Open wells	-	-	-
	Bore wells	-	-	-
	Lift irrigation schemes	28161	72851	43
	Micro-irrigation	75	0.133	0.1
	Shallow tube well	2239	4.478	1.8
	Medium irrigation project	2	3.865	1.6
	MIP	32	6.03	2.5
	Other		98.192	40.2
	Total Irrigated Area		244.01	
	Pump sets	321		
Source: DDA, Balasore.				

	Groundwater availability and use* (Data source: State/Central Ground Water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			202 ha. Saline
	Critical	-		5 ha. Iron toxicity

	Semi- critical	5		
	Safe	7		
	Wastewater availability and use	1		
	Ground water quality			-
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: DDA, Balasore,

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2013-14)

1.7	Sl. No.	Major field crops cultivated	Area ('000 ha)							Summer	Grand total
			Kharif			Rabi					
			Irrigated	Rain-fed	Total	Irrigated	Rainfed	Total			
	1	PADDY	105.21		211.46	26.49	-	26.49			
	2	MAIZE	0.03			0.13	-	0.13			
	3	JUTE	0.30								
	4	MUNG				7.44					
	5	BIRI				3.58					
	6	Ground nut				9.76					
	7	MUSTARD				2.57					

Source: DDA, Balasore

	S.No.	Horticulture crops – Fruits	Area ('000 ha)		
			Total	Irrigated	Rainfed
	1	Mango	4.65	-	4.65
	2	Citrus	0.85	-	0.85
	3	Papaya	0.36	-	0.36

	5	Pineapple	0.07	-	0.07
	4	Guava	0.33	-	0.33
	5	Sapota	0.07	-	0.07
		Horticulture crops - Vegetables	Total	Irrigated	Rainfed
	1	Brinjal	10.225	0.445	9.78
	2	Tomato	8.912	8.4	0.512
	3	Chilli	3.97	3.27	0.70
	4	Potato	0.110	0.110	-
	5	Onion	1.01	1.01	-
		Medicinal and Aromatic crops	Total	Irrigated	Rainfed
	1	Aonla	0.02	-	0.02
	2	Bacha	0.002	-	0.002
	3	Brahmi	0.005	-	0.005
	Others (specify)	-	-	-	-
		Plantation crops	Total	Irrigated	Rainfed
	1	Banana	1.84	-	0.71
	2	Coconut	1.49	-	1.13
	3	Cashew nut	1.40	-	0.56
	Others (Specify)	-	-	-	-
Source: DDH, Balasore					

	Fodder crops	Total	Irrigated	Rainfed
	Perennial: Hybrid Napier (CO1), Para grass, guinea grass, combo grass Annual: Maize (Kharif), oat, barley, berseem, Lucerne (Rabi)	0.04		0.04
	Total fodder crop area	0.04	-	0.04
	Grazing land	13.8	-	13.8
	Sericulture etc	0.02	-	0.02
	Others (specify)	-	-	-

Source: District veterinary Office, Balasore

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non-descriptive Cattle (local low yielding)	443.776	409.772	853.548
	Improved cattle	11.054	24.467	35.521
	Crossbred cattle	-	-	-
	Non-descriptive Buffaloes (local low yielding)	2.203	2.043	4.246
	Descript Buffaloes	-	-	-
	Goat	116.94	217.16	334.1
	Sheep	2.59	5.259	7.849
	Others (Camel, Pig, Yak etc.)	7.177	10.766	17.943
	Commercial dairy farms (Number)	69		
1.9	Poultry	No. of farms	Total No. of birds ('000)	
	Commercial	758	656.396	
	Backyard	76	353.444	

Source: District. Veterinary Office, Balasore

1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage Facilities (Ice plants etc.)
Mechanized			Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)		
			85000	1561	652	1561	

	Inland (Data Source: Fisheries Department)	No. Farmer owned ponds	No. of Reservoirs	No. of village tanks
		110150	34	1925
B. Culture				
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	Brackish water (Data Source: MPEDA/ Fisheries Department)	1648.87	1.40	2.6316
	Fresh water (Data Source: Fisheries Department)	3942.00	2.875	11.336
Source: District Fisheries Office, Balasore				

1.11 Production and Productivity of major crops (Average of last 5 years)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (±00 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
Crop 1	Paddy	415.01	1963	109.73	3220	-	-	524.74	2137	-
Crop 2	Maize	0.37	1156	0.10	1205	-	-	0.47	1166	-
Crop 3	Green Gram	0.04	515	3.20	425	-	-	3.24	426	-
Crop 4	Black Gram	0.12	527	3.36	505	-	-	3.48	506	-
Others	Ground nut					-	-			-
Major Horticultural crops (Crops to be identified based on total acreage)										
		Kharif		Rabi		Summer		Total		Crop residue as fodder (±00 tons)
		Production ('000 t)	Productivity (tonne/ha)	Production ('000 t)	Productivity (tonne/ha)	Production ('000 t)	Productivity (tonne/ha)	Production ('000 t)	Productivity (tonne/ha)	
Crop 1	Brinjal	293.4	30.0	14.017	31.5	-	-	307.417	30.06	
Crop 2	Tomato	10.24	20.0	252.0	30.0	-	-	262.240	29.42	
Crop 3	Chilli (dry)	1.45	0.853	2.12	0.934	-	-	3.57	0.899	

Crop 4	potato	-	-	1.26	11.279	-	-	1.26	11.279	
Crop 5	Onion			8.22	8.139			8.22	8.139	

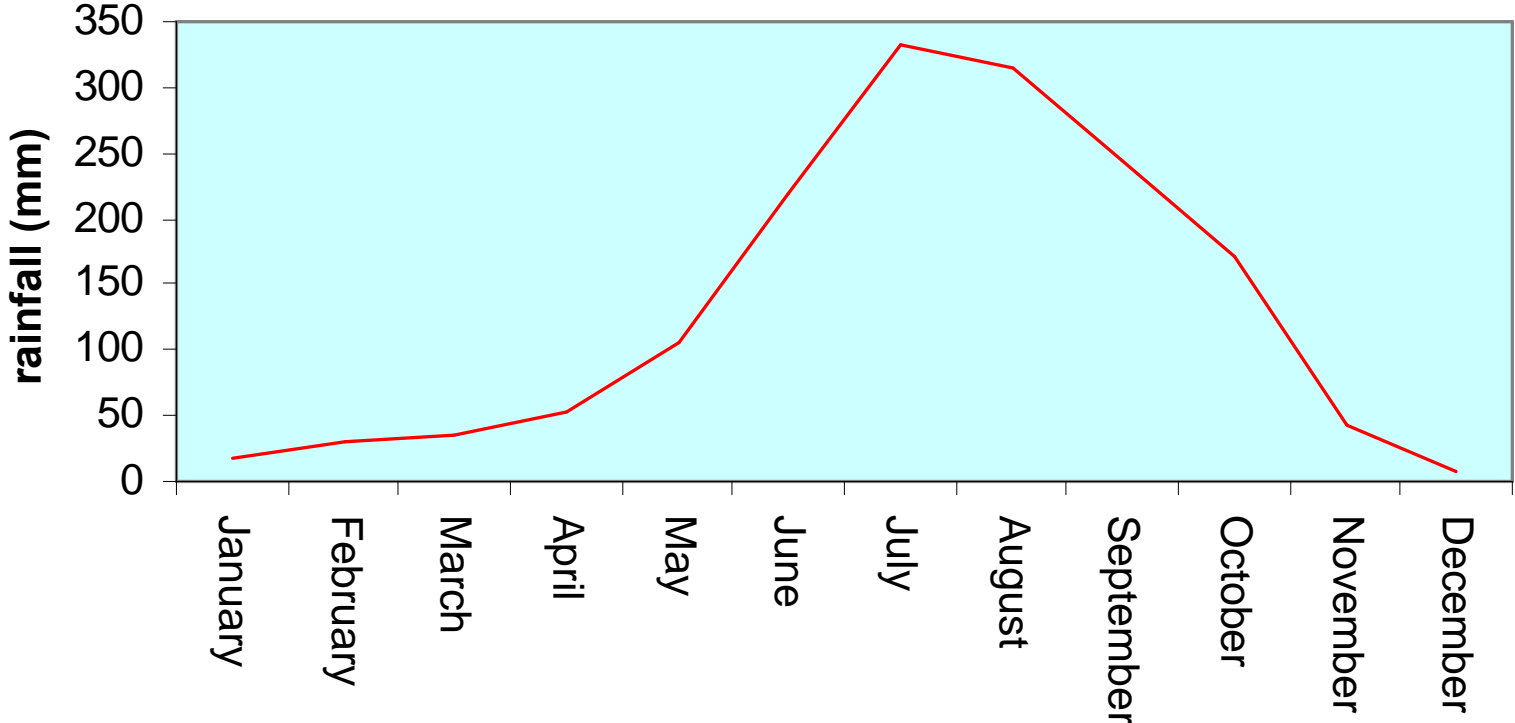
Source: Odisha Agric. Stat. 2017-18

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Greengram and black gram	Ground nut	Mustard	Brinjal
	Kharif- Rainfed	2 nd week of June				1 st week of June
	Kharif-Irrigated	4 th week of June	-			2 nd week of June
	Rabi- Rainfed	-	1 st week of January	2 nd week of January	4 th week of October	2 nd week of December
	Rabi-Irrigated	2 nd week of January	3 rd week of January	4 th week of January	3 rd week of November	1 st week of November-

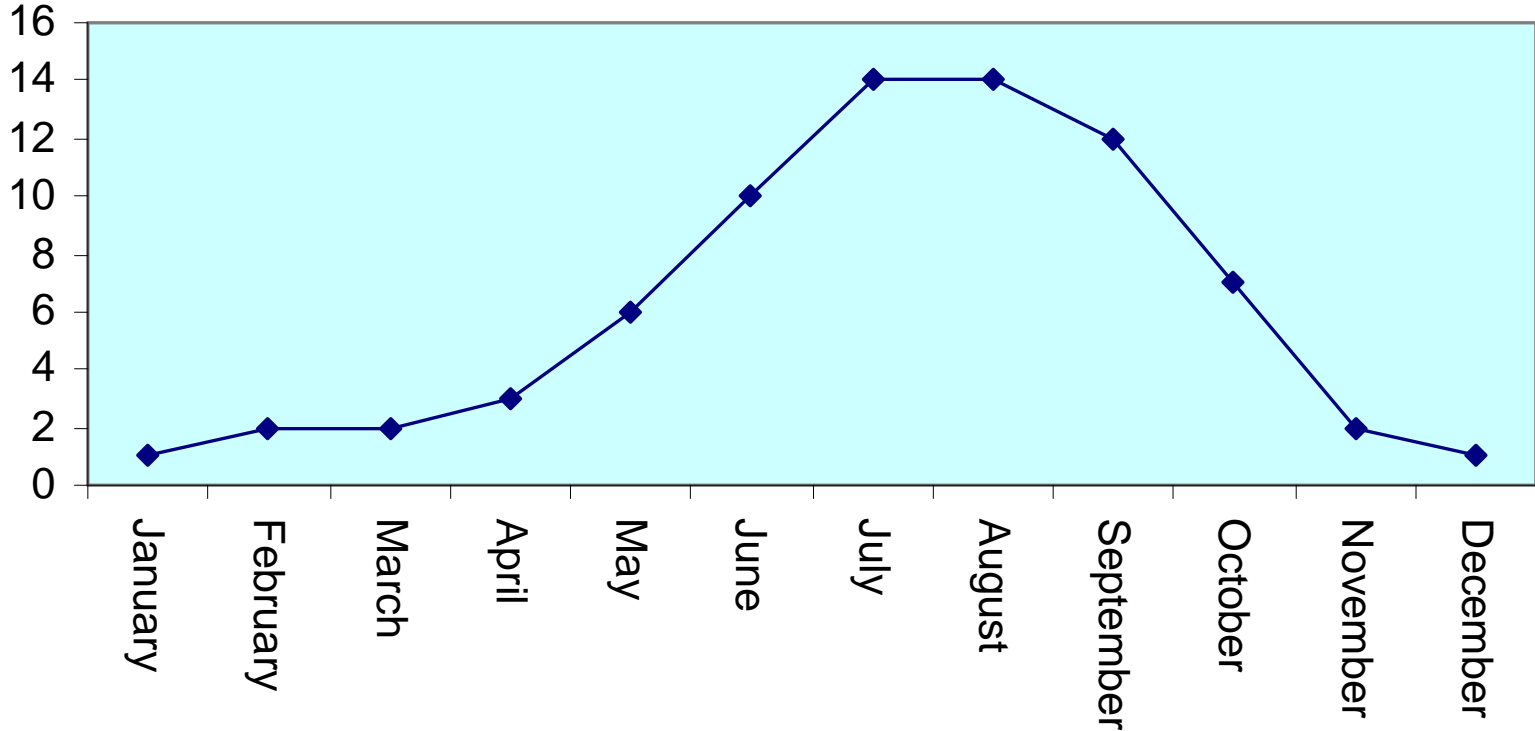
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		☒	
	Flood	☒		
	Cyclone	☒		
	Hail storm		☒	
	Heat wave		☒	
	Cold wave			☒
	Frost			☒
	Sea water intrusion	☒		
	Pests and disease outbreak (specify)	☒		
	Others (specify)	-	-	

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

Monthwise normal rainfall of Balasore district



Monthwise normal rainy days of Balasore district



District Map of Balasore, Orissa

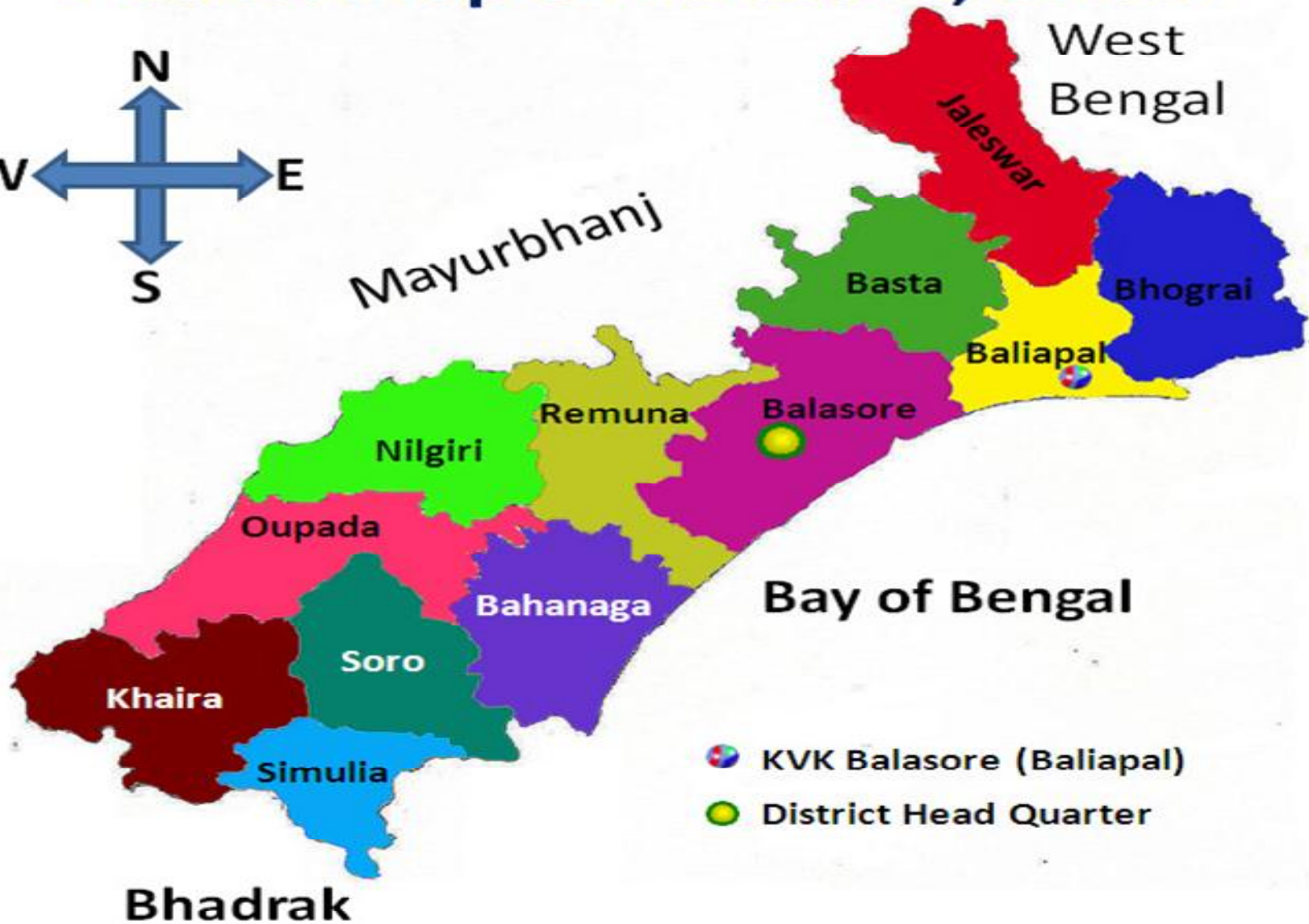
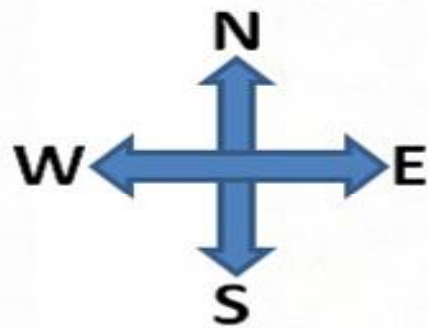
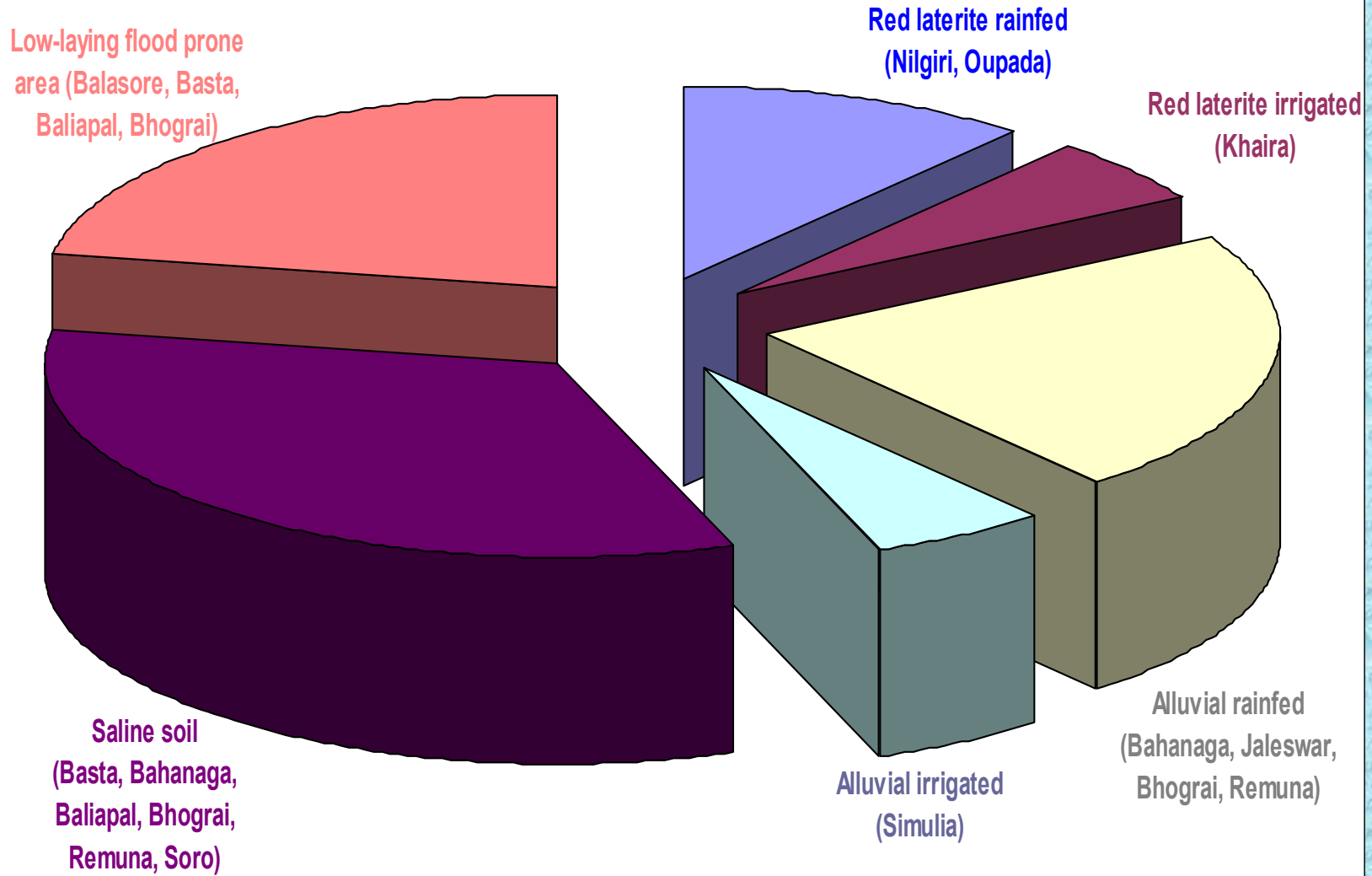
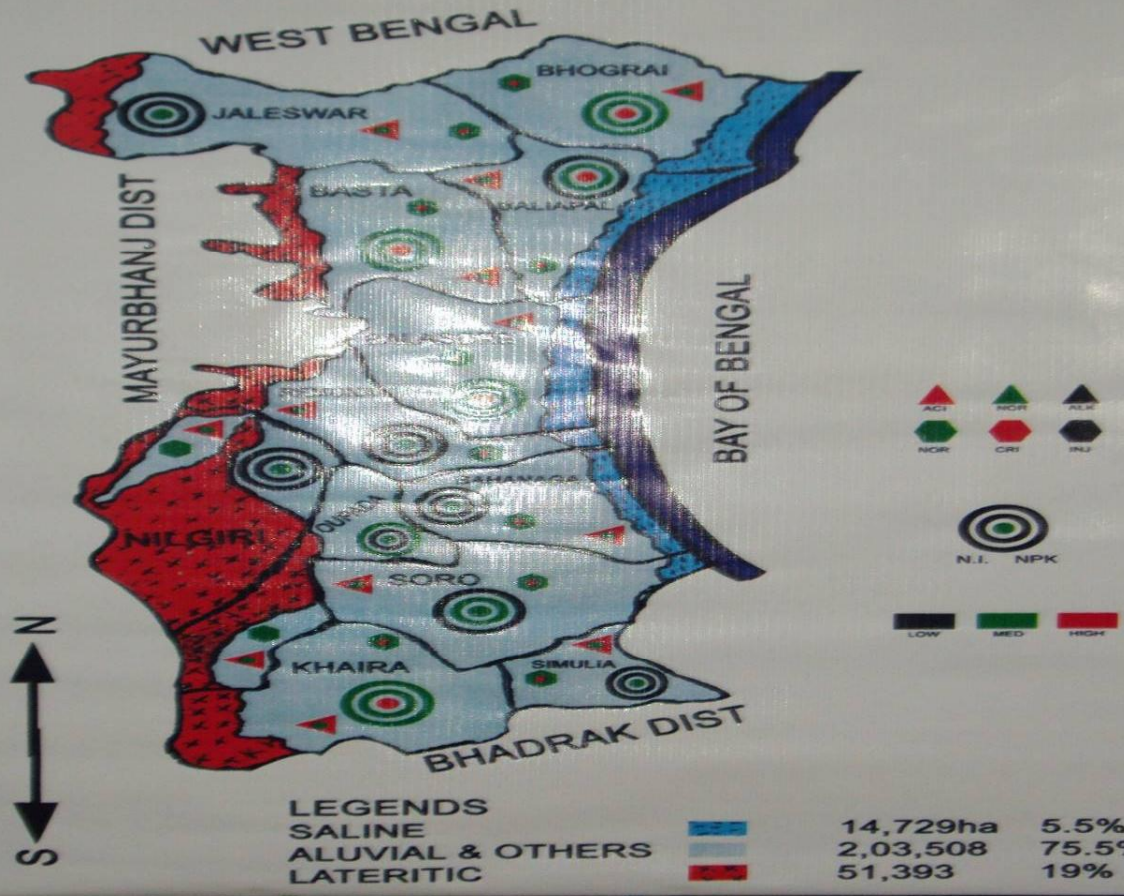


Fig. 3 Agro-ecological Situations of Balasore District



SOIL FERTILITY MAP OF BALASORE DIST.



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Onset of monsoon delay by 2 weeks (4 th week of June)	Laterite	Upland rice-fallow	Short duration, drought tolerant varieties suggested to grow as sole crop. Rice: (90-95 days duration): Sahabhagi, CR Dhan 101, CR Dhan 100, Mandakini, Jogesh, Khandagiri	<ul style="list-style-type: none"> • Proper field bunding, • Life saving irrigation, • Application of well decomposed organic matter for early seedling vigor, • Inter-cultivation and thinning to maintain plant population per unit area of the crop • Weed control by herbicide application 	<ul style="list-style-type: none"> • Seed drill under RKVY • Supply of seeds through ATMA, OSSC, ICAR-NRRI, OUAT and NFSM
	Alluvial	Medium land rice-fallow	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: Bina 11, Lalat, Surendra, Naveen, Tapaswini, CR Dhan 303, DRR 42 (120-135 days)	<ul style="list-style-type: none"> • Use of bulky organic manures • Direct seeding with the help of seed drill • Optimum plant population maintenance • Weed control by herbicide application 	
		Lowland land rice-fallow	Variety for growing of Lowland rice: Swarna Sub1, CR Dhan 407, CR Dhan 404, Reeta, Nua Chinikamini, Hasanta, Pooja, Tanmayee, Pratikshya (140-145 days duration)	<ul style="list-style-type: none"> • Use of bulky organic manures • Transplanting of rice after receipt of rainfall • Maintenance optimum plant population • Weed control by herbicide application 	
	Coastal alluvial saline	Low land rice-fallow/vegetables	Lowland rice: Lunishree, Luna Sampad, Luna Suvarna, Luna Barial Vegetables: Sugar beet, sweet potato	<ul style="list-style-type: none"> • Use of bulky organic manures • Ridges and furrow methods of sowing in vegetables • Strengthening of field bunds 	

	Flood prone area	Lowland rice-vegetable Fallow-vegetable	<ul style="list-style-type: none"> • Lowland rice: Swarna Sub-1, CR 1009 Sub-1, CR Dhan 801, CR Dhan 802, Ranidhan, Barsha, Kanchan, Gayatree, Pooja, Sarala, Varshadhan for semi-deep low lands. are suggested for flash flood situations. • Vegetable: Cucurbits, cole crops, solanaceous, greens, root crops. 	<ul style="list-style-type: none"> • If damage is more than 50% re-transplant rice crop of medium duration group. • Community nursery raising • Dapog/mat nursery for quick raising of seedling for replanting • In partially damaged fields, allow the rice plants to stand upright. Do not go for beushaning as it may further reduce the plant population. • Weeding, make gap filling and top dress N and K to boost the growth if situation permits. 	<ul style="list-style-type: none"> • Seed drill under RKVY • Supply of seeds through ATMA, OSSC and NFSM
Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (Specify month) 2nd week of July	laterite	Upland rice-fallow based	<ul style="list-style-type: none"> ▪ Develop community nursery of short duration paddy ▪ Low water requiring crops like Maize (Hybrids): Ganga-5, VNR 4246, Ajay, NMH-777, DKC 9081, Deccan-103, KH 510, KH 101; Maize (Composites): Shakti-1, Navjote. 	<p>Land shaping, contour cultivation, field/ contour bonding can be adopted.</p> <p>Ridge and furrow methods of sowing may be adopted as in-situ soil moisture practices.</p> <p>Withheld Nitrogen application till rainfall is received.</p>	Intercultural farm implements under RKVY & BGREI Seeds through NFSM, ISOPOM, NHM and state seed corporation (OSSC).
	Alluvial	Medium land rice-fallow based	Medium land rice: Lalat, Swarna, Bina-11, Naveen, Tapaswini, CR Dhan 300, DRR 42	<p>Nursery can be raised and that will be ready for transplanting after 21 days seedling.</p> <p>In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge.</p>	
	Coastal alluvial saline	Low land rice-fallow/	Lowland rice: Lunishree, Luna Sampad, Luna Sankhi, Luna Suvarna. (140-145 days duration), Vegetables: Sugar beet, sweet potato	-Do-	

	Flood prone area	Lowland rice-vegetable Fallow-vegetable	<ul style="list-style-type: none"> • Lowland rice: Swarna Sub-1, CR 1009 Sub-1, CR Dhan 801, CR Dhan 802, Ranidhan, Barsha, Kanchan, Gayatree, Pooja, Sarala, Varshadhan for semi-deep low lands. are suggested for flash flood situations. • Vegetable: Cucurbits, cole crops, solanaceous, greens, root crops. 	-Do-	
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Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (Specify month) 4 th weeks of July	Lateritic	Upland rice-fallow	Community nursery of short duration rice should be developed Non-rice crops like maize, sesame, cowpea, black gram, green gram can be grown up to last week of July	<ul style="list-style-type: none"> • Seed treatment with Zinc sulphate & manganese sulphate (1g/1ltr water, 1kg seed treated in 350ml solution for 3hour followed by drying back) should be done for Seed hardening • Proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late onset of monsoon. • Reduce Nitrogen application by 40 % in rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal. • Furrow sowing of kharif crops at closure plant-to-plant distance with wider inter-row spacing. • Use of bulky organic manures is recommended. 	<ul style="list-style-type: none"> • Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM

	Alluvial soil	Medium land rice-fallow Vegetable-fallow	Shifting from traditional crops/varieties to short duration low water requiring crops in upland, by substituting rice totally. Rice varieties like Lalat, Naveen, Mandakini Jogesh are suitable. Growing short duration vegetable like cucumber, okra, Cowpea	<ul style="list-style-type: none"> Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late onset of monsoon. Reduce Nitrogen application by 40 % in rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal. Weed management by herbicide application Furrow sowing of <i>kharif</i> crops at closure plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures 	<ul style="list-style-type: none"> Seed drill under RKVY, BGREI Supply of seeds through ATMA, OSSC and NFSM
	Coastal alluvial saline	Low land rice-fallow	lowland rice: Lunishree, Gayatri, Luna Sampad, Luna Subarna, Luna Barial, Luna Sankhi, Rajashree (140-145 days duration), Vegetables: sugarbeet, sweet potato	-Do-	
	Flood prone area	Lowland rice-vegetable Fallow-vegetable	<ul style="list-style-type: none"> Lowland rice: Swarna Sub-1, CR 1009 Sub 1, Ramachandi, Durga,Uphar, Sarala, Varshadhan for semi-deep low lands are suggested for flash flood situations Vegetables: Cucurbits, cole crops, solanaceous, greens, root crops. 	-Do-	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 8 weeks (Specify month) 2 nd week of August	Lateritic	Upland rice-fallow based	Shifting from traditional crops/varieties to short duration low water requiring crops like cowpea, black gram, green gram by substituting rice totally. If the main crop is failed cultivation or re-sowing with fodder is the best option. Fodders can be harvested at any stage keeping in view sowing of the next <i>rabi</i> season crop	<ul style="list-style-type: none"> Reduce Nitrogen application by 40 % in Rainfed situation and should be applied, as basal and full-recommended dose of P and K should be placed as basal. Furrow sowing of crops at closure plant-to-plant distance with wider inter-row spacing is recommended. 	Tractor, power tiller, rotavator under RKVY
	Alluvial soil	Medium land rice-fallow based	Shifting from traditional crops/varieties to short duration rice. Rice varieties like Lalat (120 days), Vandana (100-110 days) are useful in this situation. If the main crop is failed Re-sowing with pre-rabi crops like horse gram, Sesamum will give good return. Winter maize can be grown for the purpose of green cob.	<ul style="list-style-type: none"> Seed treatment and proper plant protection measures should be taken to avoid any germination failure because sowing has already got delayed because of late onset of monsoon. Reduce Nitrogen application by 40 % in rainfed 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 kharif crops at closure plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures is recommended. 	
	Coastal alluvial saline	Low land rice-fallow	Lowland rice: Luni Sampad, Luna Suvarna (140-145 days duration) , Vegetables: sugar beet, sweet potato	-Do-	<ul style="list-style-type: none"> Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM

	Flood prone area	Lowland rice-vegetable Fallow-vegetable	<ul style="list-style-type: none"> • Lowland rice: Swarna Sub-1, CR 1009 Sub 1, Ramachandi, Durga,Uphar, Sarala, Varshadhan for semi-deep low lands. are suggested for flash flood situations. • Vegetables: Cucurbits, cole crops, solanaceous, greens, root crops. 	-Do-	
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Condition		Suggested Contingency measures			
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Lateritic	Upland rice-fallow based	<p>Re-sowing with low water requiring non-rice crops rather than allowing sub-optimal poor rice plant stand to persist.</p> <p>Weed management by herbicide application</p>	<p>Ridge and furrow methods of sowing may be adopted as in-situ soil moisture practices.</p> <p>Mulching should be practiced in between crop rows using locally available mulch material.</p>	<ul style="list-style-type: none"> • Supply of seed drills and intercultural implements through RKVY • Good quality seeds through NFSM and OSSC.
	Alluvial soil	Medium land rice-fallow based	<p>Direct seeded rice should be practiced during re-sowing of rice, but re-sowing should be avoided till sufficient rains have been received.</p> <p>Raising community nurseries of rice is recommended for transplanted rice.</p> <p>If sufficient good quality seed is not available, locally available seeds from adjoining areas should be used after proper germination check.</p>	<p>Strengthen the field and contour bunds for in-situ moisture conservation.</p> <p>Farm ponds or tanks for storage of run-off water.</p>	<ul style="list-style-type: none"> • Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
	Coastal alluvial saline	Low land rice-fallow	-Do-	<p>Strengthen the field and contour bunds for in-situ moisture conservation.</p> <p>Utilize already harvested rainwater as live saving or protective irrigation.</p>	<ul style="list-style-type: none"> • Seed drill under RKVY. Supply of seeds through ATMA, OSSC and NFSM

	Flood prone area	Low land rice-vegetable Fallow-vegetables	The land may be re-sown with low water requiring non-rice crops rather than allowing sub-optimal plant population. For anticipating prolonged dry spells, the practices of inter-row cropping help in risk sharing. Companion crop like green gram, cowpea with the main crops.	Farm ponds or tanks for storage of run-off 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 <i>rabi</i> crops to ensure proper germination.	<ul style="list-style-type: none"> • Seed drill under RKVY. • Supply of seeds through ATMA, OSSC and NFSM
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Condition			Suggested Contingency measures		
Mid-season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Lateritic	Upland rice-fallow based	<ul style="list-style-type: none"> • Crops should be suitably thinned out • Weed management • Mulching • life saving irrigation 	<ul style="list-style-type: none"> • In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. • Conserve rainwater by increasing bund height 	<ul style="list-style-type: none"> • Seed drill under RKVY & BGREI • Supply of seeds through ATMA, OSSC and NFSM
	Alluvial soil	Medium land rice-fallow based	<ul style="list-style-type: none"> • Crops should be suitably thinned out • Weed management • Mulching • life saving irrigation 	<ul style="list-style-type: none"> • In-situ rain water conservation • Harvesting of excess runoff for re-use and ground water recharge. • Conserve rainwater 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.
	Coastal alluvial saline	Low land rice-fallow	-Do-	-Do-	
	Flood prone area	Lowland rice-vegetable Fallow-vegetable	-Do-	-Do-	

Condition	Major Farming situation	Suggested Contingency measures			
		Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid-season drought (long dry spell)					
At flowering/ fruiting stage	Lateritic	Upland rice-fallow based	<ul style="list-style-type: none"> • Crops should be suitably thinned out • Providing life saving irrigation • Irrigate every alternate furrow on rotation. 	<ul style="list-style-type: none"> • Foliar application of Boron(20%) @ 2.5g/ltr • Mulching should be practiced in between crop rows using locally available mulch material 	
	Alluvial soil	Medium land rice-fallow based	<ul style="list-style-type: none"> • Providing life saving irrigation from harvested rainwater. • Reduction of conveyance losses by spreading polythene sheet in the field channel before irrigating the field and then roll it back for irrigating the other field. 	<ul style="list-style-type: none"> • Foliar application of fertilizers • Mulching should be practiced in between crop rows using locally available mulch material 	
	Coastal alluvial saline	Low land rice-fallow/vegetable	-Do-	<ul style="list-style-type: none"> • Small and marginal farmers may be employed under NREGA for creating rain water conservation and storage structures for future drought. 	

	Flood prone area	Lowland rice- vegetable Fallow-vegetable	<ul style="list-style-type: none"> • Irrigate every alternate furrow on rotation. • Life saving irrigation from harvested rainwater • Adoption of micro-irrigation to save water. 	<ul style="list-style-type: none"> • Mulching in between crop rows 	
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Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Lateritic	Upland rice-fallow based	<ul style="list-style-type: none"> • Life saving irrigation from harvested rainwater • Adoption of micro-irrigation to save water. 	<ul style="list-style-type: none"> • Mulching in between crop rows 	Small and marginal farmers may be employed under NREGA for creating rain water conservation and storage structures to enhance productivity of their limited land
	Alluvial soil	Medium land rice-fallow based	<ul style="list-style-type: none"> • Life saving irrigation from harvested rainwater 		
	Coastal alluvial saline	Low land rice-fallow Low land rice-rice	<ul style="list-style-type: none"> • Adoption of micro-irrigation to save water. 		
	Flood prone area	Lowland rice-vegetable Fallow-vegetable	<ul style="list-style-type: none"> • Harvesting at physiological maturity will realize 80-85% of normal yield. • Mulching with locally available materials 		

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Lateritic	rice-rice system under up and medium land.	<ul style="list-style-type: none"> Reduction of rice area during rabi season Growing low water requiring oilseeds and pulses e.g. groundnut, green gram, black gram, sunflower, sesamum are preferred options. Use of mid duration variety like Lalat, Naveen, Bina 11 etc (120 days) is well suited in rabi. 	<ul style="list-style-type: none"> Life-saving irrigation with ground water during dry spells only, if dry spell comes before release of canal water. Reduction of conveyance losses while irrigating the light textured soils. Spread a polythene sheet in the field channel before irrigating the field and then roll it back for irrigating the other field. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. Rescheduling of irrigation roster is called upon to optimize use of depleted water 	Desilting and construct of new conveyance system under different schemes like NREGA, BRGF, MPLAD, etc.
	Alluvial soil	Medium & Lowland rice-oilseeds/pulses	Low water requiring crops like maize, Sesame are grown.	Same as above for kharif rice	
	Coastal alluvial saline	Lowland rice-vegetables	Growing of short duration legumes viz. cowpea, bean or root vegetables like radish during rabi seasons.	Same as above for kharif rice.	
	Flood prone area	Lowland rice-vegetables Fallow-vegetables	Growing of short duration legumes viz. cowpea, bean or root vegetables like radish during rabi seasons.		

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Lateritic	Lowland rice-rice	<ul style="list-style-type: none"> • Rice area during rabi should be reduced. • Use of mid duration variety like Lalat, Navven, Bina 110 (120 days) is well suited in rabi. • Growing of low water requiring oilseeds and pulses viz. arhar, maize, sunflower, sesamum 	<ul style="list-style-type: none"> • Irrigate the kharif rice in the critical stages with groundwater during dry spells only • Reduction of conveyance losses by using suitable irrigation method • Harvesting of kharif rice at physiological maturity • Irrigate the rabi rice at critical stages only with groundwater. • Re-scheduling of irrigation roster is called upon to optimize use of depleted water 	
	Coastal alluvial saline	Lowland rice-vegetables	<ul style="list-style-type: none"> • Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons. 	<ul style="list-style-type: none"> • Same as above for kharif rice. 	
	Flood prone area	Lowland rice-vegetables Fallow - vegetables	<ul style="list-style-type: none"> • Growing of short duration legumes like cowpea, bean or root vegetables like raddish during rabi seasons. 	<ul style="list-style-type: none"> • Same as above for kharif rice. 	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non-release of water in canals under delayed onset of monsoon in catchment	Lateritic	Lowland rice-rice	<ul style="list-style-type: none"> • Rice area during rabi should be reduced. • Growing low water requiring Oilseeds and Pulses like groundnut, green gram, black gram, sunflower and sesame 	<ul style="list-style-type: none"> • Irrigate the kharif crops during dry spell with ground water. • Irrigate the rabi rice at critical stages only with ground water . Reduction of conveyance losses while irrigating the crops. • Harvesting of kharif rice at physiological maturity 	
	Alluvial soil	Lowland rice-oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity	
	Coastal alluvial saline	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons.	Irrigate the kharif crops during dry spell with ground water. Harvesting of rice at physiological maturity	
	Flood prone area	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons, cole crops.	Irrigate the kharif crops during dry spell with ground water. Harvesting of rice at physiological maturity	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Lateritic	Lowland rice-rice	Rice area during rabi should be reduced. Instead low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame are preferred options.	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	
	Alluvial soil	Lowland rice-oilseeds/pulses	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.	
	Coastal alluvial saline	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons	Irrigate the kharif crops during dry spell with ground water. Harvesting of kharif rice at physiological maturity	
	Flood prone area	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons	Same as above	

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Lateritic	Lowland rice-rice	Rice area during rabi should be reduced. Instead low water requiring crops like maize, arhar, groundnut, rapeseed and mustard, green gram, black gram, sunflower, sesame are preferred options.	<p>Irrigate the kharif crops during dry spell with harvested rain water.</p> <p>Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.</p> <p>About 11-37% run-off is generated even by the delayed monsoon and should be stored in the farm ponds or tanks. These will recharge ground water during normal or excessive rainfall year.</p> <p>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 <i>rabi</i> crops to ensure proper germination.</p>	
	Alluvial soil	Lowland rice-oilseeds/pulses	Low water requiring crops like maize, arhar, groundnut, rapeseed and mustard, green gram, black gram, sunflower, sesame	<p>Irrigate the kharif crops during dry spell with harvested rain water.</p> <p>Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield.</p>	
	Coastal alluvial saline	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons	Irrigate the kharif crops during dry spell with harvested rain water. Harvesting of kharif rice at physiological maturity.	
	Flood prone area	Lowland rice-vegetables	Growing of short duration legumes like cowpea, bean or root vegetables like radish during rabi seasons	Irrigate the kharif crops during dry spell with harvested rainwater. Harvesting of kharif rice at physiological maturity	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Rice	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Use pro-super bag for storage, Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption.
Groundnut	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Use of groundnut stripper for plucking, Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Brinjal	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Tomato	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Cow pea	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Lady's finger	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Use of Bhindi plucker for harvesting, Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption
Chilli	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shift the produce to half covered threshing floor and other safer places for post harvest operations and cover the crops to protect from moisture absorption

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Rice	Maintaining nursery of over aged rice seedlings of 45 days to 60 days duration	Growing waterlogging resistant varieties like Durga, Sarala, Varshadhan Swarna sub1, and Hanseswari	Removal of stand from the field in case of stand deposition and planning for alternate crops like sweet potato under zero tillage	Wet seeding of short duration rice, oilseeds, pulses, vegetables during forthcoming rabi season .
Maize	-	Drain out excess water, spray the crop with Emamectin benzoate@ 1g/3ltr water to check stem borer or FAW	Drain out excess water, spray the crop with Emamectin benzoate@ 1g/3ltr to check stem borer FAW	Wet seeding of short duration rice varieties, pulses, vegetables during forthcoming rabi season
Sugarcane	Drainage of excess water	Drain out excess water, spray the crop with Spinosad@ 1ml/3ltr to check stem borer and Flonicamide @1g per 3 lit water to check white fly.	Drain out excess water, spray the crop with Spinosad@ 1ml/3ltr to check stem borer and Flonicamide @1g per 3 lit water to check white fly..	Wet seeding of short duration rice varieties, pulses, vegetables during forthcoming rabi season.
Horticulture				
Banana	Immediate drainage of water is needed as it is highly susceptible to waterlogging	Immediate drainage of water		
Coconut	Basin repair to be done following flood	Spray Naphthalene acetic acid @ 20 ppm to reduce the flower and	Spray NAA@200 ppm to prevent fruit drop	Storage in protected place against the storage pests.

	withdrawal	fruit drop. Drain the water as early as possible as flowering stage is critical to waterlogging.		
Continuous submergence for more than 2 days				
Rice	Maintaining nursery of over aged rice seedlings of 45 days to 60 days duration.	Growing waterlogging resistant varieties like Durga, Sarala, Varshadhan and Hanseswari	Removal of stand from the field in case of stand deposition and planning for alternate crops like sweet potato under zero tillage.	Wet seeding of short duration rice varieties, pulses, vegetables during forthcoming rabi season.
Maize	Drain out excess water	Drain out excess water, spray the crop with Emamectin benzoate@ 1g/3ltr to check stem borer.	Drain out excess water, spray the crop with Emamectin benzoate@ 1g/3ltr to check stem borer.	Wet seeding of short duration rice varieties, pulses, vegetables during forthcoming rabi season.
Sugarcane	Drainage of excess water	Drain out excess water, spray the crop with Thiamethoxam 25% WG@ 1gm/3ltr water and Spinosad@ 1ml/3ltr to check stem borer and white fly.	Drain out excess water, spray the crop with Thiamethoxam 25% WG@ 1gm/3ltr to and white fly and Spinosad@ 1ml/3ltr to check stem borer	Wet seeding of short duration rice varieties, pulses, vegetables during forthcoming rabi season .
Horticulture				
Banana	Immediate drainage of water is needed as it is highly susceptible to waterlogging	Immediate drainage of water		
Coconut	Basin repair to be done	Spray Naphthalene acetic acid @ 20 ppm to	Spray NAA@200 ppm to prevent fruit drop	Storage in protected place against the storage pests.

	following flood withdrawal	reduce the flower and fruit drop. Drain the water as early as possible as flowering stage is critical to waterlogging.		
Sea water intrusion				
Rice	Growing salt tolerant rice varieties like Luna Sampad, Luna Sankhi, Luna Subarna, Luna Barial Transplanting of over aged seedlings			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	NA	NA	Life saving irrigation Foliar application of zinc Growing border crops	NA
Cold wave	NA	NA	NA	NA
Frost	NA	NA	NA	NA
Hailstorm	NA	NA	NA	NA
Cyclone	NA	NA	NA	<ul style="list-style-type: none"> • Withholding irrigation and pesticides application • Harvest at physiological maturity stage • Storing the farm produce in safe place • Staking in banana and papaya

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	<ul style="list-style-type: none"> • Livestock insurance • Encourage perennial fodder production on river beds and tank bed on community basis. • Village gauchar (grazing) lands should be developed for fodder production. • On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Neem etc should be planted. • In the costal part of Odisha Sun hemp (Crotolaria) can be sown. • It is essential to establish fodder bank near forest areas. Provision is also necessary to store surplus crop residues in fodder banks, which can be made available during draught. • Excess fodder in flush season can be preserved as hay / silage. • Explore the possibilities of availability of unconventional / alternative feed resources during draught. • Organizing training programme of persons connected with A.H. on feeding and management of animals during draught. 	<ul style="list-style-type: none"> • Utilizing fodder from perennial trees and fodder bank reserves. • Transporting excess fodder from adjoining districts. • Utilizing the existing crops which fail to grow adequately due to failure of monsoon for feeding of animals. • Use of unconventional livestock feed such as sugar cane top, sugar cane bagasse, banana plant Crop residues such as cassiatora water hyacinth and other like tree pods and seeds etc. Improving poor quality roughages by ammonia treatment, urea treatment, urea molasses mineral block etc and feeding them. 	<ul style="list-style-type: none"> • Supplementary feeding of remaining livestock and the replacement stock.
Drinking water	Preserving water in community tanks and ponds etc for drinking purpose by excavation and sanitization of these resources. In addition, wells (bore wells or dug wells) may be constructed ahead of possible event of draught.	<ul style="list-style-type: none"> • Water sources of Temples, Churches, Gurdwaras, Jain temples and Maszids are generally ideal sources during draught. 	
Health and disease management	Veterinary preparedness with vaccine and medicines.	<ul style="list-style-type: none"> • Conducting animal health camps and treating the affected animals • Supplementation of mineral and 	<ul style="list-style-type: none"> • Availing insurance • Culling of unproductive livestock • Proper disposal of dead animals

		vitamin mixture	
Floods			
Feed and fodder availability		<ul style="list-style-type: none"> • Procured feeds and fodders should be fed to all animals on the order of priority of animals. • Straws and stoves that got soaked during floods need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying chopping and sprinkling concentrate mixture can improve intake and utility. 	<ul style="list-style-type: none"> • Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water		<ul style="list-style-type: none"> • Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply. • Drinking water be made available to the animals in any kind of clean container available with the farmer. 	<ul style="list-style-type: none"> • Provision of clean drinking water.
Health and disease management	<ul style="list-style-type: none"> • Training to the farmers about care of their animas when catastrophe strives, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local language for care of livestock in disaster. • Keeping track of weather forecast and prior information through radio and TV Etc. • Prior construction of animal shelters in disaster prone areas. • Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. • Variation of livestock before onset of rainy season • Keep the emergency service kit (first Aid 	<ul style="list-style-type: none"> • There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. • The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. • Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. • Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating 	<ul style="list-style-type: none"> • Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. • Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. • Improving shed hygiene especially in the farmers household through cleaning and disinfection

	<p>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 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.)</p> <ul style="list-style-type: none"> • Temporary camps may be started to herd or flockø animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. • If no trees or sheds are available shelter the animals under a tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof. 	<p>difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners.</p>	
Cyclone			
Feed and fodder availability		<ul style="list-style-type: none"> • Procured feeds and fodders should be fed to all animals on the order of priority of animals. • Straws and stoves that got soaked during floods need not be thrown away out right. They can be fed to animals as long as rotting or fungal growth has not set in. Partial drying chopping and sprinkling concentrate mixture can improve intake and utility. 	<ul style="list-style-type: none"> • Provision of supplementary feeding (concentrate / Roughage) with vitamin & minerals.
Drinking water		<ul style="list-style-type: none"> • Priorities animals as suckling animals, suckling animals along with their nursing mothers, producing and working 	<ul style="list-style-type: none"> • Provision of clean drinking water.

		<p>animals, sick and old animals, adult open and non-producing animals as the feed and water may be in short supply.</p> <ul style="list-style-type: none"> • Drinking water be made available to the animals in any kind of clean container available with the farmer. 	
Health and disease management	<ul style="list-style-type: none"> • Training to the farmers about care of their animals when catastrophe strikes, so that they are prepared for the situation. Preparation and distribution of leaflets or booklets in simple local language for care of livestock in disaster. • Keeping track of weather forecast and prior information through radio and TV Etc. • Prior construction of animal shelters in disaster prone areas. • Temporary relief camps on spots can be set up at short notice to provide shelter to animals on roads, railway line embankments, other earthen embankments, low hillocks, upland etc. • Variation of livestock before onset of rainy season • Keep the emergency service kit (first Aid Requisites) ready always containing Cotton wool, Bandages, Surgical gauze, old cotton sheets, Rubber tubing (for 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 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 	<ul style="list-style-type: none"> • There should be one veterinarian with 3 to 4 village to work with the help of local volunteers. • The team should be well equipped with contingent items like bandages, tourniquet ropes, controlling rope, splints, slings, poles and ropes to lift animals. Drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc. should be adequately available with them. • Keep the animals loose in paddock (sheltered or unsheltered) rather keeping them tethered. • Releasing animals from the unnatural and harmful position or situation, stopping bleeding, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, sedating difficult animals and even performing euthanasia on hopelessly injured and suffering animals with the consent of their owners. 	<ul style="list-style-type: none"> • Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. • Vaccination campaign against common endemic diseases of the areas (like H.S. B.Q, Anthrax etc.) must be taken up urgently. Necessary steps should be taken for the control of non-specific digestive and respiratory infections in consultation of local veterinary personals. • Improving shed hygiene especially in the farmers household through cleaning and disinfection

	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.)		
	<ul style="list-style-type: none"> • Temporary camps may be started to herd or flocksø animals of 25-50 animals in each group. Inside the camp the animals can be just left free within the paddock/ barricades created with wooden pole. • If no trees or sheds are available shelter the animals under some tent / tarpaulins held aloft by supporting poles or temporary sheds with coconut leaf roof. 		
Heat wave and cold wave			
Shelter/environment management	<ol style="list-style-type: none"> 1. Green cover (trees plantation, land scaping) 2. Proper sheltering / housing white painting outside the roof and black painting inside the roof. 	<ol style="list-style-type: none"> 1. Washing / wallowing / sprinkling/ splashing / showering 2. Provision of cool drinking water (inearthen pitches) 3. Cooling devices: fans, wet curtains or panels, air cooler if possible. 	
Health and disease management		<ul style="list-style-type: none"> • Feeding Green fodder/ silage/ hay • Provision for night feeding • Grazing only if green pastures/ grass lands available • Graze early in the morning and late in the afternoon 	<ul style="list-style-type: none"> • Protection of dry / milch cows/ buffaloes/ breeding bulls and teasers against thermal stress • Heat detection with young teasers • Close observation of all open cows • Study of cervical mucous • Heat detection and AI during cooler parts of the day. • Insemination at optimal time with good quality semen.

^s based on forewarning wherever available

2.5.2

Poultry

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

		Proper disposal of dead birds if any	Replace wet litter Disinfection of sheds. Proper disposal of dead birds if any	
Cyclone				
Shortage of feed ingredients	Procurement of feed	Supply the compound feed to the poultry farm under cyclone affected area	Supply will have continued till the situation is under control	
Drinking water	-	Attempt will be made to provide sanitized drinking water	Water sources will be sanitized with bleaching powder or any water sanitizer	
Health and disease management	Procurement of medicine and vaccine	Vaccination of birds against different diseases Provision should be made for availability of sanitized water	Water sources will be sanitized with bleaching powder or any water sanitizer	
Heat wave and cold wave	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories	Water proof materials will be supplied to protect the poultry sheds Provision of generator should be made to ensure electric supply for brooding of chicks and preparation of feed.	Renovation and reconstruction of affected sheds Repair of damaged electric connection	
Shelter/environment management				

Health and disease management	Procurement of high protein and low energy diet Procurement of medicine, anti-stress agent and vitamin C and E.	Feeding during cooler hour of the day. Supplementation of vitamin E and C, anti-stress agent with water	Feeding will be continued with high protein and low energy till heat waves ends and then feeding will be done with normal diet Anti-stress agents will be continued in drinking water for some days	
	Provision should be made for continuous available of water	Sufficient cool drinking water with sodium bicarbonate or electrolytes.	Availability of cold water will be made for some days	
	Procurement of Anti-stress drugs	Supplementation of anti-stress drug	Vaccination of birds against RD	
	Pruning of big trees in the farm. Putting curtains on open sides of the shed. Procurement of electrical accessories Providing shed to poultry houses. Providing proper ventilation.	Attempt will be made for cooling of poultry shed by adapting different cooling methods Thickness of litter should be reduced Ventilation to the house should be increased by providing ceiling fans and exhaust fan	Provision should be made to ensure proper ventilation to the house	
	Procurement of high energy diet	Feed high energy diet.		
	Proper water supply will be ensured			
	Procurement of Anti-stress drugs and vaccine	Feeding of anti-stress drugs in drinking water Vaccination with fowl pox	Vaccination against IBD and RD	
	Procurement of curtains to cover open sides of the shed. Heating arrangement kept ready	Close the open sides of the shed by curtain in such a way that ventilation should not be hampered. Provide heat if necessary depending on the temperature and age of the birds	Remove the curtains. Discontinue heating.	

^a based-on forewarning wherever available

2.5.3

Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/ inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks has to be developed. 3. Renovation and maintenance of existing water harvest structures.	-	-
(ii) Changes in water quality	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.
(iii) Any other	-	-	-
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/ inflow	1. Building deep ditches in culture ponds for shelter of the fish to overcome high temperature	1. Recharge the ponds with bore well water or water from other sources. 2. Partial harvesting of the stock to reduce stocking density. 3. Artificial shelter by putting aquatic floating weeds in 1/3 rd area.	-
(ii) Impact of salt load build up in ponds/ change in water quality	1. Application of organic manure in culture system	1. Recharge the ponds with bore well water or water from other sources	1. Application of organic manure in culture system
(iii) Any other	-	-	-

^a based-on forewarning wherever available