State: ORISSA
Agriculture Contingency Plan for District : NABARANGPUR

1.0 District Agriculture profile				
1.1	**Agro-Climatic/ Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern plateau (chhotanagpur) And Eastern Ghats, Hot Subhumid Eco-Region (12.1)		
	Agro-Climatic Region (Planning Commission)	Eastern Plateau & Hills Region (VII)		
	Agro Climatic Zone (NARP)*	Eastern Ghat High Land Zone (OR-6)		
	List all the districts falling under the NARP Zone	Nabarangpur, Koraput,		
	Geographical coordinates of district	Latitude	Longitude	Altitude
		19^0 9' - 20^0 5' N	81^0 52' - 82^0 53' E	572 m (average)
	Name and Address of the Concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RRTTS, Semiliguda, Koraput 764036		
	Mention the KVK located in the District	KRISHI VIGYAN KENDRA , NABARANGPUR , UMERKOTE 764073		
	Name & Address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the zone	CSWCRTI, At/PO - Sunabeda, Dist. - Koraput PIN - 763002		
1.2	**Rainfall ****	**Average (mm)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-Sep):	1241.5	2nd week of June	4th week of September
	NE Monsoon (Oct-Dec):	191.9	2nd week October	3rd week of November
	Winter (Jan-March)	35.9	2nd week January	1st week of February
	Summer (Apr-May)	100.2	3rd week May	4th week of May
	Annual	1569.5	-	-

* If a district falls in two NARP zones, mention the zone in which more than 50% area falls

** Source – Orissa Agricultural Statistics , 2008-09

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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)	529.00	194	246	44	8	15	13	9	5	8

1.4	Major Soils (Common names)	Area ('000 ha)	Percent (%) of total
	1. Sandy loam	139.08	74.85
	2. others	22.244	11.97
	3. Red soil	22.143	11.91
	4. Black	2.35	1.26
1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	181.00	157
	Area sown more than once	103.84	
	Net irrigated area	22.37	
	Gross cropped area	284.84	

1.6	**Irrigation**	**Area (‘000 ha)**	**Percent (%)**	
	Net cultivated area	181.00	-	
	Net irrigated area	26.62	14.65 (of net cultivated area)	
	Gross irrigated area	47.52	15.57 (of gross cultivated area)	
	Rainfed area	159.326	87.00 (of net cultivated area)	
	Source of irrigation	**Number**	**Area (‘000 ha)**	**% area**
	Lift Irrigation	-	12.24	54.71
	Canals	-	6.5	29.05
	Bore Wells	-	2.3	10.28
	Open Wells	-	0.8	3.58
	Tanks	-	0.53	2.38
	Other Sources	-	-	-
	Total Irrigated Area	-	30.752	-
	Pumpsets	-		
	No. Of Tractors	55		
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited	NIL		N.A.
	Critical	NIL		N.A.
	Semi-critical	3	50	N.A.
	Safe	7	100	N.A.
	Wastewater availability and use	1	-	N.A.
	Ground water quality	-	-	N.A.

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

1.7 Area under major field crops & horticulture etc. as per latest figure (2007-08)

1.7	Field crops-	Total area('000 ha)	Irrigated('000 ha)	Rainfed('000 ha)
	Paddy	158.93	1.76	157.17
	Maize	46.53	3.64	42.89
	Black Gram	9.49	-	9.49
	Ragi	5.50	0.03	5.47
	Arhar	4.36	-	4.36
	Sugarcane	4.30	-	-
	Cowpea	3.13	0.32	2.81
	Linseed	2.69	-	2.69
	Groundnut	1.70	0.81	0.89
	Niger	1.27	-	1.27

	Horticulture crops- Fruits	Total area('000 ha)
	Mango	6.19
	Cashew	1.00
	Guava	0.95
	Banana	0.57
	Citrus	0.47
	Coconut	0.24
	Papaya	0.04
	Litchi	0.02
	Pineapple	0.01
	Others	1.86
	Horticulture crops- Vegetables	**Total area('000 ha)**
	Chilli	1.85
	Onion	0.77

	Sweet Potato	0.16
	Ginger	0.13
	Potato	0.10
	Turmeric	0.10
	Garlic	0.08
	Others	13.54
	Medicinal and Aromatic crops	**Total area('000 ha)**
	N.A.	N.A.
	Plantation crops	**Total area('000 ha)**
	Fodder crops	**Total area('000 ha)**
	N.A.	N.A.
	Total fodder crop area	**25 Ac.**
	Grazing land	**9168 ha.**
	Sericulture (Tussar)	**40 ha.**

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

** Central Silk Board (BSMTC) , Nabarangpur

1.8	**Livestock**	**Number ('000)**
	Non-descriptive cattle(local cows)	4,32,500
	Improved cattle	6,490
	Crossbred cattle	15,588
	Non – descriptive Buffaloes	78,956
	Descriptive buffalo	2,420
	Commercial dairy farms	N.A.
	Goat	85,964
	Sheep	79,882
	Others (Camel, ***Pig*** **,** Yak etc.)	29,202

1.9	**Poultry**			
	Commercial	25.771		
	Backyard	610.818		
1.10	**A. Capture**			
	Marine	No. of fishermen	Boats Nets	Storage facility
	Marine fisheries not available			
	Inland	No. farmer owned ponds	No. of reservoir	No. of village tanks
		4283	**29**	**900**
	B. Culture			
	Inland Fisheries	**Area (ha)**	**Yield (MT/ha)**	**Production (in MT)**
	Brackish water	-	-	-
	Fresh water	4811.35	0.73	4617.00

1.11 Production and Productivity of major crops

1.11	**Production and Productivity of major crops**	**Kharif**		**Rabi**		**Summer**		**Total**	
	Major field crop	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	288.418	1835	-	-	3.657	2086	292.07	1838
	Maize	227.23	5298	20.59	5657	-	-	247.82	5326
	Ragi	4.91	898	0.04	1296	-	-	4.95	900
	Black Gram	3.21	338	-	-	-	-	3.21	338
	Arhar	2.77	635	-	-	-	-	2.77	635
	Cowpea	1.99	709	0.20	622	-	-	2.19	700
	Groundnut	1.29	1450	1.24	1530	-	-	2.53	1488

	Niger	0.44	346	-	-	-	-	0.44	346
	Linseed	2.20	445	-	-	-	-	1.20	445
	Sugarcane	281.85	65547	-	-	-	-	281.85	65547
Major Horticultural crops									
	Potato	-	-	1.56	9931	-	-	1.56	9931
	Onion	-	-	9.52	12364	-	-	9.52	12364
	Chilli	0.64	810	0.94	887	-	-	1.58	854
	Garlic	-	-	0.27	3375	-	-	0.27	3375
	Ginger	0.21	2100	-	-	-	-	0.21	2100
	Sweet Potato	0.75	8334	0.60	8571	-	-	1.35	8437.7
	Misc.vegetable	85.20	11152	73.58	12471	-	-	158.78	11727

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	**Paddy**	**Maize**	**Blackgram**	**Ragi**	**Arhar**
	Kharif-Rainfed	May-June	June – July	August	June – July	June – July
	Kharif-Irrigated	June - July	June - July	August-Sept		June – July
	Rabi-Rainfed	November	October-November	-		-
	Rabi-Irrigated	November - January	November - February	-	December	-

1.13	**What is the major contingency the district is prone to? (Tick mark)**	**Regular**	**Occassional**	**None**
	Drought	✓	-	-
	Flood	-		✓
	Cyclone			✓

	Hail storm	-	✓	-
	Heat wave		✓	-
	Cold wave		-	-
	Frost		-	✓
	Sea water intrusion	-	-	✓
	Pests and diseases (specify)	Fruit & shoot borer , leaf curl virus in vegetables Red rot in Sugarcane, Maize stem borer Aphid and Pod borer in Arhar Termite in Mango , Downy mildew in Blackgram	Swarming caterpillar in Aug/sept., BPH in Paddy (August) BLB in Paddy (August) Shoot tip drying in cashew nut Root knot nematode	-

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: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency Measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 4th week)*	Low rainfall Shallow red soil	a) Upland rice-fallow	Paddy : MTU-1001/1010, Lalat Intercropping like rice + pigeonpea, rice + blackgram, Composite maize variety Navjot, Shakti, QPM	1) Resowing for nursery/ Delayed raising of nursery 2) Conservation of moisture by not ploughing 3) Intercropping(2:1 &	Supply of seeds through OSSC , through NFSM

		b) Maize c) Arhar- UAS-1	maize Short duration hybrid maize Hishell, Proagro, Bio-9681 Arhar- ICPL-87119, BRG-1	4:1 ratio) 4) Sowing of maize seeds when soil is warm 5) Reduced fertilizer application, conservation furrows	
	Scarce rainfall Alluvial rainfed	a) Medium land rice-Fallow b) Maize- hybrid c)Groundnut and Arhar TMV-2, JL-24, Smruti	Direct sowing can be done. Growing of Medium duration rice variety**:** Lalat, Swarna, Masoori. (120-135 days) Short duration maize hybrids like Pioneer, Bio-9681, Groundnut based cropping system, Arhar- BRG-1	Use of bulky organic manures is recommended Maintain more plant population for direct seeded rice. Nursery can be raised for transplanting after 21 days. In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. Wider spacing 90x30 cm for arhar	Breeder seed from OSSC, Seed drills from RKVY
	Shallow Black soil and rainfed	a)Vegetable-Fallow	Growing of short duration vegetable like cucumber, okra, Cowpea in bunds of upland paddy	Ridge and furrow methods of sowing. at closer plant-to-plant distance with wider inter-row spacing. Strengthen the field and contour bunds for in-situ moisture conservation. Use of mulch with locally available materials.	Seeds fron RKVY, OSSC, OUAT Supply of seeds from RRTTS, OUAT

		b)Niger- local c) Blackgram- local	Niger- Deomali Blackgram –TU-94-2	Broadcasting at first shower of rainfall, thinning Closer spacing, broadcasting, conservation furrows	
	Low rainfall shallow Sandy loam soil	Maize- Vegetable Maize : pinnacle, CP, Hishell Vegetable: Brinjal local Chilli local, Tomato BT-10	Maize hybrids of shorter duration, Intercropping of maize with Cowpea(Utkal Manik) in 1:2 ratio or Maize+Arhar in 2:1 ratio to manage water Shortage Brinjal- Utkal Anushree, Chilli- Utkal Ava,Tomato-Utkal Raja	Wider spacing at 60x45 cm, split application of fertilizer reduced to two times Transplanting older seedlings with wider spacing than recommendation, Thinning, Mulching with paddy straw	Seed drill under RKVY, Supply of seeds from OSSC Supply of seeds through NFSM

Condition			**Suggested Contingency Measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July 2nd week)*	Low rainfall Shallow Red soil	a) Upland rice-Fallow based	Low water requiring crops like blackgram, groundnut, greengram, cowpea, pigeonpea etc. Double cropping in upland can be done through maize-horsegram/sesamum rotation. The legume based intercropping system like groundnut + pigeonpea, groundnut + blackgram, groundnut + greengram, groundnut + cowpea in the ratio of 4:1 was proved as successful.	1) Delayed raising of nursery 2) Conservation of moisture 3) Intercropping(2:1 and 4:1 ratio) 4) Splitting nutrient application 5) soaking of seeds in	Supply of seeds through OSSC , through NFSM

		b) Maize C) Niger- local	Some of the suitable varieties of non rice crop in upland are: Maize (Hybrids) : Ganga-5, Daccan-103, KH 510, KH 101; Maize (Composites): Shakti-1, Novjyot. Groundnut: TMV-2, Smruti, AK-12-24. Pigeonpea : UPAS-120, KPL 151, T21, KPH-8. Blackgram : TU-94-2, PU30, Sarada. Greengram : K-851, Dhauli. Horsegram : Urmi, Madhu. Sesame : Kanak, Konika, Gujarat-1. Niger No-71, deomali	water overnight before sowing	
	Scarce rainfall Alluvial rainfed	Medium land paddy	Direct sowing is not recommend after 10th July but transplanting can be done from previously sown nursery. Medium land rice: Lalat, Swarna, Masoori.	Maintain more plant population for direct seeded rice. Nursery can be raised for transplanting after 21 days Emphasis should be given In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge.	Supply of seeds through OSSC , through NFSM

	Shallow Black soil and rainfed	a)Vegetable-fallow b)Niger- local c) Blackgram- local	Growing of short duration vegetable like cucumber,bittergourd,country bean, okra, Cowpea in bunds of upland paddy Niger- Deomali Blackgram –TU-94-2	Sowing in pits with little weeding, Mulching Dry sowing 8-10 days before rains with 15% higher seed rate Broadcasting with 1st shower of rain	Seeds from NHM Supply of seeds from OSSC, OUAT Seeds may be procured from NFSM
	Low rainfall shallow Sandy Loam soil	Maize- Vegetable Maize : Pinnacle, CP, Hishell Vegetable: Brinjal local Chilli local, Tomato BT-10	Maize hybrids of shorter duration, Intercropping of maize with Cowpea(Utkal Manik) in 1:2 ratio or Maize+Arhar in 2:1 ratio to manage water Shortage Brinjal- Utkal Anooshree, Chilli- Utkal ava, Tomato- Utkal Raja	Wider spacing at 60x45 cm, split application of fertilizer reduced to two times Transplanting older seedlings with wider spacing than recommendation, Thinning, Mulching with paddy straw	Supply of seeds through OSSC , through NFSM

Condition			**Suggested Contingency Measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**

Delay by 6 weeks (July 4th week)*	Low rainfall Shallow Red soil	a) Upland Rice-Fallow	In the event of late arrival of South West Monsoon the pulses like cowpea, blackgram, greengram can be grown upto last week of July but pigeonpea, groundnut, maize are not recommended to be sown after 20th July.	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. 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 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. Sowing of seeds in ridges, pits with proper seed treatment to avoid mortality	Supply of seeds through OSSC , through NFSM

		Maize hybrids	Short duration improved varities of vegetables like Tomato, Okra, Cucumber, Amaranthes, Country Bean etc		
	Scarce rainfall Alluvial rainfed	Medium land paddy	Shifting from traditional crops/varieties to short duration low water requiring crops in upland, by substituting rice totally. Rice varieties like Lalat, Masuri are suitable.	In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. 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. The recommended dose of nitrogen application should be reduced 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	Supply of seeds through OSSC , through NFSM

				sowing of kharif crops at closer plant-to-plant distance with wider inter-row spacing. Use of bulky organic manures is recommended.	
	Shallow Black Soil and rainfed	a)Vegetable-Fallow b)Niger- local c) Blackgram- local	Growing of short duration vegetable like cucumber,bittergourd,country bean, okra, Cowpea in bunds of upland paddy Niger- Deomali Blackgram –TU-94-2	Sowing in pits with little weeding, Mulching Dry sowing 8-10 days before rains with 15% higher seed rate Broadcasting with 1st shower of rain	Seeds from NHM Supply of seeds from OSSC, OUAT Seeds may be procured from NFSM
	Low rainfall shallow Sandy Loam Soil	Sunflower, Cowpea, Niger Sunflower- local, Cowpea-local, Niger- local Vegetable - Fallow	Sunflower- Jwalamukhi Cowpea- Utkal Manik Niger- Deomali Other vegetables of short duration	Wider spacing at 60x45 cm, split application of fertilizer reduced to two times Transplanting older seedlings with wider spacing than recommendation, Thinning, Mulching with paddy straw Ridge and furrow method of sowing and staking	Supply of seeds through OSSC , through NFSM

Condition			Suggested Contingency Measures		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (August 2nd week)*	Low rainfall Shallow Red soil	Upland rice-Fallow based	Shifting from traditional crops/varieties to short duration low water requiring crops like cowpea, blackgram, greengram 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 *rabi* season crop	The recommended dose of nitrogen application should be reduced 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.	Supply of seeds through OSSC , through NFSM
	Scarce rainfall Alluvial rainfed	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.	In-situ rain water conservation, harvesting of excess runoff for recycling and ground water recharge. 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. The recommended dose of nitrogen application should be reduced by 40 % in	Supply of seeds through OSSC , through NFSM

				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.	
	Shallow Black soil and rainfed	a)Vegetable-Fallow b)Niger- local c) Blackgram- local	Growing of short duration vegetable like cucumber,bittergourd,country bean, okra, Cowpea in bunds of upland paddy Niger- Deomali Blackgram –TU-94-2	Sowing in pits with little weeding, Mulching Dry sowing 8-10 days before rains with 15% higher seed rate Broadcasting with 1st shower of rain	Seeds from NHM Supply of seeds from OSSC, OUAT Seeds may be procured from NFSM

	Low rainfall shallow Sandy loam soil	Vegetable-Fallow	Growing short duration vegetable like cucumber, okra, Cowpea in bunded upland	Ridge and furrow methods of sowing and staking. 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	

Condition					
Early season drought (normal onset)	**Major Farming situation**	**Crop/Cropping system**	**Crop management**	**Soil Nutrient and Moisture Conservation Measure**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.	Shallow Red Soil	Upland rice- Fallow Upland Maize Arhar- UAS-1	In upland, rice will be damaged very quickly, result poor crop stand. The land may re-sowed with low water requiring non-rice crops rather than allowing sub-optimal poor rice plant stand to persist. Maize should be resown as germinated seeds fail to sustain The field should be free	Ridge and furrow methods of sowing may be adopted as in-situ soil moisture practices. Mulching should be practiced in between crop rows using locally available mulch material. Light irrigation during evening hours	Supply of seeds through OSSC , through NFSM

			of weeds for utilization of water and nutrients by the late sown crops A shorter duration variety like UPAS-120, ICPL-87 may be resown		
	Alluvial Rainfed	Medium land rice – Fallow Medium land maize	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. Seeds treatment with Thiram or Captan @ 2-2.5 g/kg seed and other recommended plant protection measures. Resowing of maize with short duration varieties	Strengthen the field and contour bunds for in-situ moisture conservation. 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.	Supply of seeds through OSSC , through NFSM

	Shallow Black Soil	Maize- Vegetable	Resowing of maize , Short duration high yielding vegetables like Tomato, Brinjal, Chilli, Kharif Onion (Nasik Dark Red), Cruciferous vegetables	Thinning, conservation furrow Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material	Supply of seeds through OSSC , through NFSM
	Shallow Sandy Loam	Vegetable - fallow	The land may re-sowed 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. This can be achieved by including a companion crop like greengram, cowpea than the main crops.	Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material.	Supply of seeds through OSSC , through NFSM

Condition			**Suggested Contingency Measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measure**	**Remarks on Implementation**

At vegetative stage	Shallow Red Soil	Upland rice-Fallow based Maize Arhar	Crops should be suitably thinned out. In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rainwater by increasing bund height Top dressing of fertilizers may be postponed till rainfall/ foliar application of nutrients	Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material. Application of weedicide on broad leaf weeds to minimize competition for water	Supply of seeds through OSSC , through NFSM
	Alluvial Rainfed	Medium land rice-Fallow based Maize	In-situ rain water conservation, harvesting of excess runoff for re-use and ground water recharge. Conserve rainwater by increasing bund height Application of fertilizer through foliar spray	Small and marginal farmers may be employed under NREGA for creating rain water conservation and storage structures to enhance productivity of their limited land.	Supply of seeds through OSSC , through NFSM
	Shallow Black Soil	Maize- Vegetable	Application of light irrigation to avoid soil cracking Postponement of top dressing	Economically viable, mulching should be practiced in between crop rows using locally available mulch material.	Supply of seeds through OSSC , through NFSM
	Shallow Sandy Loam	Vegetable-Fallow	Light irrigation Thinning and pruning of vegetables Life saving irrigation from harvested rainwater, wherever feasible, adopt micro-irrigation to save	Irrigating the crop in the root zone Sub-soil moisture conservation through minimum tillage Irrigate on ridge and irrigate every alternate	

			water.	furrow on rotation	

Condition			**Suggested Contingency Measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Crop/Cropping system**	**Crop Management**	**Soil nutrient & moisture conservation measure**	**Remarks on Implementation**
At reproductive stage	1. Shallow Red Soil	Upland rice-fallow based	Crops should be suitably thinned out Life saving irrigation if possible. Irrigate on ridge and irrigate every alternate furrow on rotation.	If fertilizers are to be applied, foliar application is recommended. Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material	Supply of seeds through OSSC , through NFSM,OUAT
	Alluvial Rainfed	Medium Land Rice-Fallow based Maize-Arhar	Life saving irrigation from harvested rainwater. 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.	If fertilizers are to be applied, foliar application is recommended.	Supply of seeds through OSSC , through NFSM,OUAT

	Shallow Black Soil	Maize- Vegetable	-do-	If fertilizers are to be applied, foliar application is recommended	Supply of seeds through OSSC , through NFSM,OUAT
	Shallow Sandy Loam	Vegetable-Fallow	Light and frequent (if possible) irrigation to prevent flower drop Plucking vegetables for marketing	Spraying of anti-transpirants to check transpiration Mulching with crop trashes	Supply of seeds through OSSC , through NFSM,OUAT

Condition			**Suggested Contingency Measures**		
Terminal drought	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Shallow Red Soil	Upland Rice-Fallow based Arhar	Life saving irrigation from harvested rainwater, wherever feasible, adopt micro-irrigation to save crop. May be harvested for vegetable purpose Harvesting at physiological maturity	Cowpea, Sunflower, Field Bean, Horsegram, Blackgram, Linseed for month of October	Farm ponds from NREGS, RKVY Seeds from NHM, OSSC
	Alluvial Rainfed	Medium Land Rice-Fallow based	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.	Raise Brinjal seedlings for Rabi, being a hardy plant it may withstand moisture stress condition Cowpea, Sunflower, Field bean, Horsegram,	Farm ponds through IWSM programme Supply of intercultural implements through RKVY

		Maize-Arhar	Harvesting of rice at physiological maturity will realize 80-85% of normal yield. Harvesting of plants for fodder purpose if cob formation hampered	Blackgram, Linseed for month of October Crucifers and other high yielding Solanaceous vegetables	
	Shallow Black Soil	Maize- Vegetable	Harvesting of plants for fodder purpose if cob formation hampered Vegetables approaching maturity may be harvested for marketing	Cowpea,Carrot, Sunflower, , Horsegram, Blackgram, Linseed for month of October	Farm ponds through IWSM programme Seeds from NHM Supply of intercultural implements through RKVY
	Shallow Sandy Loam	Vegetable-Fallow	Harvesting of plants for fodder purpose if cob formation hampered Vegetables approaching maturity may be harvested for marketing	Plan for short duration high yielding oilseed especially Mustard/Toria and pulse crops Vegetables like potato, carrot. Radish, and other crucifers.	Farm ponds through IWSM programme Supply of intercultural implements through RKVY Seeds from NHM

2.1.2 Drought- Irrigated situation

Condition			**Suggested Contingency Measures**		
Delayed/ limited release of water in canals due to low rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland Tubewell/ Canal Irrigated Red Soil	Upland Rice- Fallow based Hybrid Maize	Vegetable, Maize, Oilseed, Pulses	Limited & life saving irrigation Alternate furrow irrigation Drip irrigation	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,

		Sugarcane		Planting in deep furrows/Pit method of planting	
	Medium land Canal Irrigated Alluvial Soil	Medium land rice-fallow based Maize	Maize, vegetable(Chilli, Tomato, Brinjal, Okra, Cauliflower)	Limited and life saving irrigation Alternate furrow irrigation Drip irrigation Mulching, Irrigation in root zone	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,
	Tube Well/ Pond Irrigated Shallow Sandy Loam Soil	Vegetable	High yielding varieties with short duration	Delayed raising of nursery for delayed planting Limited and life saving irrigation Alternate furrow irrigation Drip irrigation	Seeds through OSSC, NFSM, NHM Intercultural implements through NHM, ATMA,

Condition			**Suggested Contingency Measures**		
Lack of inflows due to insufficient/ delayed onset of monsoon	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland tubewell/ canal Irrigated Red soil	Upland rice-fallow based	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 during dry spells only, if dry spell comes before release of canal water. Reduction of conveyance losses while irrigating the light	Supply of seeds through OSSC , through NFSM,OUAT

			Use of early duration variety like 'MTU-1010' (115 days) is well suited in rabi.	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.Irrigate the rabi rice at critical stages only with groundwater.	
	Medium Land Canal Irrigated Alluvial Soil	Medium Land Rice-Fallow based Maize	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum	Same as above for kharif rice	
	Tube well/ Pond Irrigated Shallow Sandy Loam Soil	Vegetable -Fallow	High yielding varieties with short duration	Delayed raising of nursery for delayed planting Limited and life saving irrigation Alternate furrow irrigation drip irrigation	
Condition			**Suggested Contingency Measures**		
Insufficient ground water recharge due to law rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Upland Tubewell/ Canal Irrigated Red Soil	Upland Rice-Fallow based	Rice area during rabi should be reduced. Instead low water requiring	Irrigate the kharif crops during dry spell with harvested rain water.	Supply of seeds through OSSC , through NFSM,OUAT

			oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesame are preferred options.	Harvesting of kharif rice at physiological maturity will realize 80-85% of normal yield. 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. 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 germination.	
	Medium Land Canal Irrigated Alluvial Soil	Medium Land Rice-Fallow based Maize	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum	Limited and life saving irrigation Alternate furrow irrigation Drip irrigation	Supply of seeds through OSSC , through NFSM,OUAT
	Tube well/ pond irrigated Shallow sandy loam soil	Vegetable -Fallow	Low water requiring oilseeds and pulses like groundnut, green gram, black gram, sunflower, sesamum	Limited and life saving irrigation Alternate furrow irrigation Drip irrigation	Supply of seeds through OSSC , through NFSM,OUAT

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 harvests**
Maize + Arhar	Provide drainage	Provide drainage	Drain water for drying Harvest at physiological maturity stage	Shifting to a safer place Dry in shade in a well ventilated space
Paddy	No substantial problem as uplands donot maintain water logging condition for long time	Provide drainage If possible	Drain water for drying Harvest at physiological maturity stage	Shifting to a safer place Dry in shade in a well ventilated space
Arhar	Provide drainage	Provide drainage	Drain water for drying Harvest for vegetable purpose	Safe storage against pest & diseases
Cowpea	Provide drainage	Provide drainage	Drain water for drying Harvest for vegetable purpose	Shifting to a safer place Dry in shade in a well ventilated space Safe storage against pest & diseases
Sugarcane	Provide drainage Maintain ridge and furrow method	Provide drainage Maintain ridge and furrow method	Harvest at physiological maturity stage	Extraction of jaggery
Horticulture				
Fruits(Mango, Citrus etc)	Provide drainage Earthing up of plant base/root zone	Provide drainage Earthing up of plant base/root zone	Provide drainage Earthing up of plant base/root zone In case of established tree, no problem	Dry the fruits, Keep at safer place, may be sold at green stage
Banana, Papaya	Raising seedlings in sunken bed method	Provide drainage Earthing up of plant base/root zone	Harvested at green stage or table purpose, No problem for marketing as it has buyers' preference	Store for ripening in closed godowns for marketing
Cucurbits	Seedling in raised nursery beds, drainage,	Vines should be staked along elevated frames	Ensure drainage Harvesting at tender stages	Ensure drainage Harvesting at tender stages
Solanaceous/ cruciferous	Seedling in raised nursery	Provide drainage	Provide drainage	*Ensure drainage*

vegetables	beds, drainage,	Application of hormones to induce more flowering		*Harvesting* at tender stages
Heavy rainfall with high speed winds in a short span[2]				
Paddy	Drainage if waterlogging persists Small seedlings withstand the problem	Drainage if waterlogging persisrs Small seedlings withstand the problem	Lodged panicles may be harvested at physiological maturity stage	*Ensure drainage* *Harvesting* at tender stages
Sugarcane	Drainage if waterlogging persists Small seedlings withstand the problem	Bundling of canes and drainage	Lodged canes may be harvested for extraction of juice	Lodged canes may be harvested for extraction of juice and jaggery
Horticulture				
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray Tricyclazole against blast, Chlorpyriphos against stem borer, Monocrotophos against Swarming caterpillar	Spray Tricyclazole against blast, Chlorpyriphos against stem borer, Monocrotophos against swarming caterpillar and leaf folder	Malathion spray against gundhy bug	Sun drying / disinfection of gunny bags with malathion or heat treatment to manage stored grain pests
Maize	Phorate granules in the whorls and spray of Endosulfan against maize stem borer	Spraying of Dimethoate against aphid	Wrapping of cobs against bird damage	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Arhar	Removal of infested tips to manage leaf webber	Hand picking and destruction of blister beetles	Spray of Ekalux against pod borer	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Blackgram/Greengram	Application of Triazophos against YMV	Application of Malathion against Flea	Spray of Nuvan against pod borer	Disinfection of storage structure to manage stored grain pests

		beetle		
Horticulture				
Solanaceous vegetables	Spraying malathion against hadda beetle, hand collection of egg mass Soil drenching of COC and streptocycline against wilting	Application of Neem oil &tryozophos alternatively against brinjal fruit & shoot borer/ leaf curl virus,	Spraying of Profenophos against fruit borer Metalaxyl against Anthracnose	Plucking of infested fruits and destruction
Cucurbits	Spraying of Ekalux against Red pumpkin beetle, Collection and destruction of eggs/grubs, Soil drenching of COC & streptocycline against wilting	Spraying Endosulfan against leaf eating caterpillars Metalaxyl against Powdery mildew, Carbendazim against leaf spot & blight	Poison baiting with Malathion and Jaggery against fruit fly	Destruction of overripe and infested fruits

2.3 Floods

Condition	**Suggested Contingency Measures**			
Transient Water Logging/ Partial Inundation[1]	**Seedling/ Nursery Stage**	**Vegetative Stage**	**Reproductive Stage**	**At Harvest**
Paddy	Drainage of the Nursery bed, If not possible go for resowing	Wet seeding of sprouted seeds (@75-80 kg/ha) of medium duration varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days). 50% N and 50% K2O + full P may be applied as basal and rest 50% N + 50% K2O as top dressing during the tillering stage. In partially damaged field gap filling may be done by redistributing the tillers.	If flood comes during reproductive stage, , emphasis should be given on forthcoming rabi crops. Supply of seeds and other agro-inputs of *rabi* crops at subsidized rate, provision of bank loan etc Wet seeding of short duration varieties (Heera (60 days), Kalinga –III (90 days)) or medium duration	If flood comes during reproductive stage, , emphasis should be given on forthcoming rabi crops Supply of seeds and other agro-inputs of *rabi* crops at subsidized rate, provision of bank loan etc Wet seeding of short duration varieties

		Management of pests and diseases	varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days) 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 kharif.	(Heera (60 days), Kalinga –III (90 days)) or medium duration varieties (Lalat (120 days), Parijat (100 days), Konark (125 days), Surendra (135 days) during forthcoming rabi season . Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growingof cucurbits after receding flood water
Maize	Drainage, If damping off then resowing	Ensure drainage, Make ridge and furrows	Ensure drainage, Make ridge and furrows	Harvest the cobs as soon as possible
Horticulture	**NOT A FEATURE OF FARMING SITUATION WHERE VEGETABLE IS GROWN**			
Continuous submergence for more than 2 days	**NOT A FEATURE OF THE DISTRICT**			
Sea water inundation	**NOT A FEATURE OF THE DISTRICT DUE TO DISTANCE FROM SEA MORE THAN 300 KM**			

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

EXPERINCED / ENCOUNTERED

Extreme event type	**Suggested Contingency Measures[r]**			
	Seedling/ Nursery Stage	**Vegetative Stage**	**Reproductive Stage**	**At Harvest**
Heat Wave[p]				
Horticulture				
Turmeric	Proper mulching	-	-	-

Ginger	Proper mulching	-	-	-
Cold wave[q]				
Frost	**Not applicable**			
Marigord , Rose, Crysanthem , Dahlia etc.	-	-	Afternoon irrigation	-
Hailstorm				
Mango	-	Pruning of damaged twig and branches	Damaged mature fruits can be value added	-
Sapota		Pruning of damaged twig and branches		
Litchi		Pruning of damaged twig and branches		
Cyclone	**Not applicable**			

2.5 Contingent Strategies for Livestock, Poultry and Fishery

2.5.1 Livestock

	Suggested contingency measures		
	Before the Event[s]	**During the Event**	**After the Event**
Drought			
Feed and fodder availability	Livestock insurance, Encourage fodder cultivation in village grazing lands and near rivers**,** On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Bauhinia, Neem etc should be planted,Excess fodder may be stored as hay/silage,Establish fodder bank near forest areas, Training and awareness camp among extension personnels are needful at time of exigencies.	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, suar cane bagasse, banana plant crop residues, 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.	Avail crop insurance, Supplementary feeding of remaining livestock and the replacement stock

Drinking water	Preserve water in community tanks, ponds etc with sanitation ,Wells or dug wells may be constructed in advance, Training & awareness camp among extension personnels	Water sources from Temples, Mosques, Churches may be used in case of shortfall of exiting potable warer, Animals not to be exposed to outside rather they should be mass fed.	Plan accordingly for next year
Health and diseases management	Veterinary preparedness with vaccines and medicines**,** Training and awareness camp among extension personnels	Conducting animal health camps and treating the affected animals, Supplementation of mineral and vitamin mixtures	Culling of unproductive livestock, Proper disposal of dead animals
Floods			
Feed and fodder availability	Livestock insurance, Encourage fodder cultivation in village grazing lands and near rivers**,** On boundaries of agricultural field trees or shrubs like Sesbania, Subabul, Bauhinia , Neem etc should be planted,Excess fodder should be stored as hay/silage,Establish fodder bank with dry straw and dry feed for at least 15 days , Training and awareness camp among extension personnels for needful at time of exigencies.	Procured feeds and fodders should be fed to all animals on the order of priority of animals. Straws and stovers that got soaked during floods need not be thrown away out . 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.	Provision of supplementary feeding (concentrate / roughage) with vitamin & minerals.
Drinking water	Preserve safe drinking water in community tanks which is not prone to seepage of rain or flood water, Arrange chlorine tablets for sanitation of water and bleaching powder for disinfection of habitats & shelter places , Training & awareness camp among extension personnels	Drinking water be made available to the animals in any kind of clean container available with the farmer.	Provision of clean drinking water.
Health and diseases management	Prior construction of shelter places in elevated points, Vaccination of livestock Keep the emergency service kit (First Aid Requisites) ready always containing	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	Prompt and appropriate attention to injuries by providing necessary medicines to the livestock owners. Vaccination campaign against

	cotton wool, bandages, surgical gauge, old cotton sheets, rubber tubing (for torniquet), surgical scissors – curved and made of stainless steel, Forceps, Splints or Split bamboos (for fractures), Clinical thermometers,Potassium permanganate, Acriflavin, 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) & the like.	ropes, drugs including painkillers, antiseptics, antibiotics, anti-venom and anti-shock drugs etc.. Keep the animals loose in paddock (sheltered or unsheltered) Releasing animals from the unnatural and harmful position or situation, binding broken limbs, administering painkillers, anti-poison and anti-shock drugs, Performing euthanasia on hopelessly injured and suffering animals with the consent of their owners	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 personnels. Improving shed hygiene especially in the farmers household through cleaning and disinfection
Cyclone	**N O T P R E V A L E N T**		
Heat wave and cold wave			
Shelter/ environment management	Construction of either thatched room or spreading of insulating materials specially straw over RCC and asbestos roofs for heat wave(Loo) , care for sprinkler irrigation provision for berseem , lucerne , napier like grasses , and drip/pitcher irrigation to fodder trees.	Sufficient drinking water provision along with afternoon bathing of cattle and buffaloes , if possible.	Morning irrigation to grass/fodder fields.
Health and diseases management			

2.5.2 Poultry

	Suggested Contingency Measures		
	Before the Event[a]	**During the Event**	**After the Event**
Drought			
Feed and fodder availability	Insurance of Poultry farms Ensure procurement of feed ingredients	Feed utilization from feed bank Feed supplementation will be made to	Availing insurance Attempt will be made for available of

	sufficient ahead Establish feed serve bank	the farms	feed ingredient or compound feed to the farmers
Drinking water	Check water source for ensuring sufficient pottable water during drought	Attempt will be made to provide sanitized drinking water	Availability of water will be ensured by digging of bore well
Health and disease management	Procurement of vaccines and medicines and antistress agent. Feeding antibiotics Procurement of litter materials	Administration of vaccines Continue feeding of antistress agent	Culling of affected birds
Floods			
Feed and fodder availability	Ensure procurement of feed ingredients / compound feed sufficient ahead as feed supply to the farm will hamper due to submergence of the connecting roads	Supply the compound feed to the poultry farm under submerged area	Supply will continued till the situation is under control
Drinking water	Protect the water sources from submergence	Attempt will be made to provide sanitized drinking water	Water sources will sanitized with bleaching powder or any water sanitizer

Health and disease management	Procurement of vaccines and medicines. Feeding antibiotics Procurement of litter materials	Continue feeding antibiotics Prevent entrance of flood water to the shed Replace wet litter Proper disposal of dead birds if any	Disinfection of the farm premises. Feeding antibiotics and deworming. Replace wet litter Disinfection of sheds. Proper disposal of dead birds if any
Cyclone	**N O T P R E V A L E N T**		
Heat wave and cold wave			
Shelter/ environment management	Spreading insulating materials like straw , gunny cloths over roofs and surroundings for heat wave.	Sprinkling water to straw/gunny clothes at 9 A.M. and 4 P.M.	-
Health and diseases management	-	Proper medication against loose motion.	

2.5.3 Fisheries

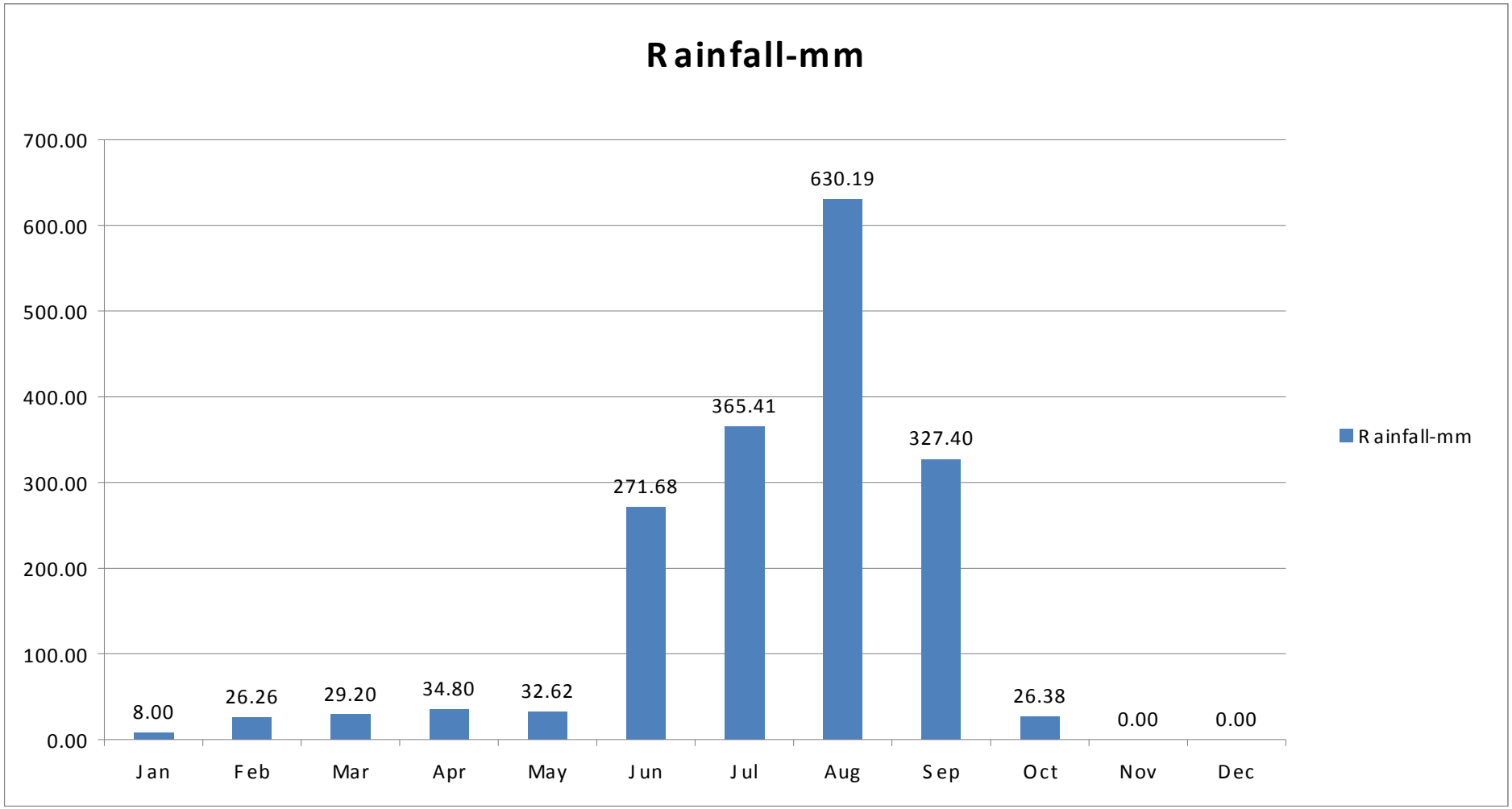
	Suggested contingency measures		
Drought	**Before the event**[a]	During the event	After the event
Shallow water ponds due to insufficient rains/inflow	1. Restricted release of water from reservoir. 2. Supplementary water harvest structures like pond and tanks has to be developed. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season

Impact of heat and salt load build up in ponds / change in water quality	1. Prepare to release water into the habitat	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms
Floods			
Inundation with flood waters	1. Construction of human shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bundhs. 4. Preparedness for relief 5. Insurance coverage provision for life and property	1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation.	1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people.
Water contamination and change in BOD	Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water	Check the water quality and take appropriate action	1. Application of lime and geolite. 2. Application of Alum. 3. Application of $KMnO_4$
Health and diseases management	Stock preventive medicines, vaccines	Prevent influx of diseased fish from outside source, Check through nets Administer medicines through random catch Disinfect water by lime , KMnO4	1. Application of lime and $KMnO_4$. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
Cyclone	**N O T P R E V A L E N T**		
Overflow/ Flooding of ponds			
Change in fresh/brackish water ratio			

Health and diseases management			
Heat wave and cold wave			
Management of pond environment	Discharge the pond with water , if possible , for cold wave.	Manual disturbance with upper surface of the pond water for incorporation of sufficient air (O_2) in water.	-
Health and diseases management			

MAP ORISSA

DISTRICT NABARANGPUR IN ORISSA



ANNUAL RAINFALL IN NABARANGPUR DISTRICT