State: CHHATTISGARH

Agriculture Contingency Plan for District: Rajnandgaon

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR With Deep Loamy To Clayey Red And Yellow Soils, Medium AWC LGP 150 - 180 days (11.0)		
	Agro-Climatic Zone (Planning Commission)	Eastern plateau and hills region (VII)		
	Agro Climatic Zone (NARP)	Chhattisgarh plain zone		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Raipur, Bilaspur, Korba, Raigarh, Janjgir-champa, Kabirdham, Rajnandgaon, Durg, Dhamtari, Mahasamund, Kanker (11 districts)		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21°05’ N	81°02’E	304 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ZARS, Raipur		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Rajnandgaon (C.G.)		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Department of Agrometeorology, College of Agriculture, IGKV, Raipur (C.G.)		

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):	1027.5		2nd week of June	4th week of September
	NE Monsoon(Oct-Dec):	74.4		Post monsoon (October-December)	-
	Winter (Jan- March)	40.2		Winter rains	-
	Summer (Apr-May)	22.3		-	-
	Annual	1164.3		-	-

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)	802.252	19.403	193.13	46.804	53.11		0.129	46.39	25.420	22.851

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

1. 4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Vertisols (Kanhar-clayey)	153.88	40
	2. Alfisols (Dorsa-clayloam)	115.39	30
	3. Inceptisol (Matasi-Sandyloam)	80.77	21
	4. Entisol (Bhata-gravely)	15.38	4
	5.Sandy	19.23	5
	Total	384.66	100

Source: Directorate of Agriculture, Govt. of Chhattisgarh

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	354.213	126
	Area sown more than once	92.829	
	Gross cropped area	447.042	

1.6	Irrigation	Area ('000 ha)

	Net irrigated area	75.974		
	Gross irrigated area	89.438		
	Rainfed area	357.604		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	153	56.516	63
	Tanks	565	4.526	5
	Open wells	8351	3.061	3
	Bore wells	6581	23.059	26
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		2.276	3
	Total Irrigated Area		89.438	100
	Pump sets	6156		
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	Nil		
	Critical	Nil		
	Semi- critical	Nil		
	Safe	NIL		
	Wastewater availability and use	Nil		
	Ground water quality	Potable and suitable for irrigation as well		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

1.7 Area under major field crops & horticulture (eg., 2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**			
		Kharif	***Rabi***		

		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Rice	-	-	225.2	-	-		2.1	227.3
	Wheat	-	-		-	-	15.2	-	15.2
	Sorghum	-	-	0.1	-	-		-	0.1
	Maize	-	-	4.4	-	-	1.1	-	5.5
	Millets	-	-	8.5	-	-		-	8.5
	Total Cereals	**-**	**-**	**238.3**	**-**	**-**	**18.3**	**-**	256.6
	Pigeonpea	-	-	21.3	-	-		-	21.3
	Gram	-	-		-	-	37.3	-	37.3
	Greengram	-	-	6.8	-	-	1.0	-	7.8
	Blackgram	-	-	19.3	-	-	3.5	-	22.8
	Horsegram	-	-	0.4	-	-	4.2	-	4.6
	Pea	-	-		-	-	1.5	-	1.5
	Lentil	-	-		-	-	1.7	-	1.7
	Lathyrus	-	-		-	-	25.6	-	25.6
	Total Pulses	-	-	**47.8**	-	-	**74.9**	-	122.7
	Rapeseed-mustard	-	-		-	-	3.1	-	3.1
	Linseed	-	-		-	-	16.4	-	16.4
	Groundnut	-	-	0.1	-	-	-	-	0.1
	Seasame	-	-	5.7	-	-	-	-	5.7
	Soybean	-	-	45.8	-	-	-	-	45.8
	Sunflower	-	-	0.1	-	-	0.2	-	0.3
	Niger/Safflower	-	-	0.4	-	-	0.5	-	0.9
	Total Oilseeds	-	-	**51.9**	-	-	**20.1**	-	72
	Vegetables	-	-	11.5	-	-	12.0	-	23.5
	Sugarcane						0.1	-	0.1
	All Crops			**349.5**			**125.3**	-	474.8

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

	Horticulture crops - Fruits	Area (‘ 000 ha)		
		Total	Irrigated	Rainfed
	Mango	1.215	-	-
	Banana	0.162	-	-
	Papaya	0.265	-	-
	Gauva	0.195	-	-

	Lemon	0.205	-	-
	Custard Apple	0.235	-	-
	All fruits	2.522		
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Cauliflower	0.450	-	-
	Cabbage	0.175	-	-
	Brinjal	1.135	-	-
	Tomato	1.636	-	-
	Bhendi	0.940	-	-
	Potato	1.260	-	-
	Cowpea	0.545	-	-
	Greenpea	0.535	-	-
	Bitter guard	0.470	-	-
	Beans	0.365	-	-
	Arbi	0.515	-	-
	Radish	0.745	-	-
	Onion	0.445	-	-
	Spices	2.446	-	-
	All vegetables	10.486	-	-
	Medicinal and Aromatic crops	Total	-	-
	Plantation crops	Total	Irrigated	Rainfed
	Fodder crops	Total	Irrigated	Rainfed
	Total fodder crop area			
	Grazing land			
	Sericulture etc			
	Others (specify)			

Source: Directorate of Horticulture, Govt. of Chhattisgarh

1.8	Livestock	Male (‘000)	Female (‘000)	Total (‘000)
	All kinds of cattle	-	-	**664.153**
	Non descriptive Cattle (local low yielding)	-	-	-
	Improved cattle	-	-	-
	Crossbred cattle	-	-	-
	Non descriptive Buffaloes (local low yielding)	-	-	-
	Descript Buffaloes	-	-	143.336

	Goat	-	-	103.371
	Sheep	-	-	4.613
	Pig	-	-	16.752
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial		664.411	
	Backyard			

1.10 **Fisheries** (Data source: Chief Planning Officer)

A. Capture

i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	

ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**
	1012	**205**	**3691**

B. Culture

	Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)			
ii) **Fresh water** (Data Source: Fisheries Department)	5654.90	3.899	18.267

Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh
Directorate of Fisheries, Govt. of Chhattisgarh

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08)

1.11	Name of crop	***Kharif***		***Rabi***		**Summer**		**Total**		**Crop residue as fodder**
		Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	

		('000 m t)	(kg/ha)	('000 m t)	(kg/ha)	('000 m t)	(kg/ha)	('000 m t)	(kg/ha)	('000 tons)
Major Field crops (Crops to be identified based on total acreage)										
	Rice	294.5	1310.2	-	--	4.0	1583.4	298.5	1447	-
	Soybean	35.2	933.0	-	-	-	-	35.2	933	-
	Blackgram	7.0	353.6	--	-	-	-	7	354	-
	Pigeonpea	13.7	596.8	-	-	-	-	13.7	597	-
	Maize	5.9	1296.0	-	-	-	-	5.9	1296	-
	Chickpea	-	-	24.7	691.6	-	-	24.7	692	-
	Wheat	-	-	13.9	811.2	-	-	13.9	811	-
	Lathyrus	-	-	14.9	419.8	-	-	14.9	420	-
	Linseed	--	-	6.2	263.8	-	-	6.2	264	-
	Rapeseed-mustard	-	-	1.3	493.1	-	-	1.3	493	-
	All crops	**311.0**	**889.2**	**70.7**	**499.4**	**-**	-	**381.7**	**694**	-
Major Horticultural crops (Crops to be identified based on total acreage) – Fruits & Vegetables										
	Mango	-	-	-	-	-	-	4.252	3500	-
	Banana	-	-	-	-	-	-	4.212	26000	-
	Papaya	-	-	-	-	-	-	4.902	18498	-
	Gauva	-	-	-	-	-	-	1.560	8000	-
	Lemon	-	-	-	-	-	-	1.230	6000	-
	Custard apple	-	-	-	-	-	-	0.587	2498	-
	Greenpea	-	-	-	-	-	-	24.075	45000	-
	Tomato	-	-	-	-	-	-	17.587	10750	-
	Brinjal	-	-	-	-	-	-	17.025	15000	-
	Potato	-	-	-	-	-	-	14.490	11500	-
	Spices	-	-	-	-	-	-	13.619	5568	-
	Radish	-	-	-	-	-	-	12.665	17000	-
	Bhendi	-	-	-	-	-	-	8.460	9000	-
	Arbi	-	-	-	-	-	-	7.210	14000	-
	Onion	-	-	-	-	-	-	7.031	15800	-

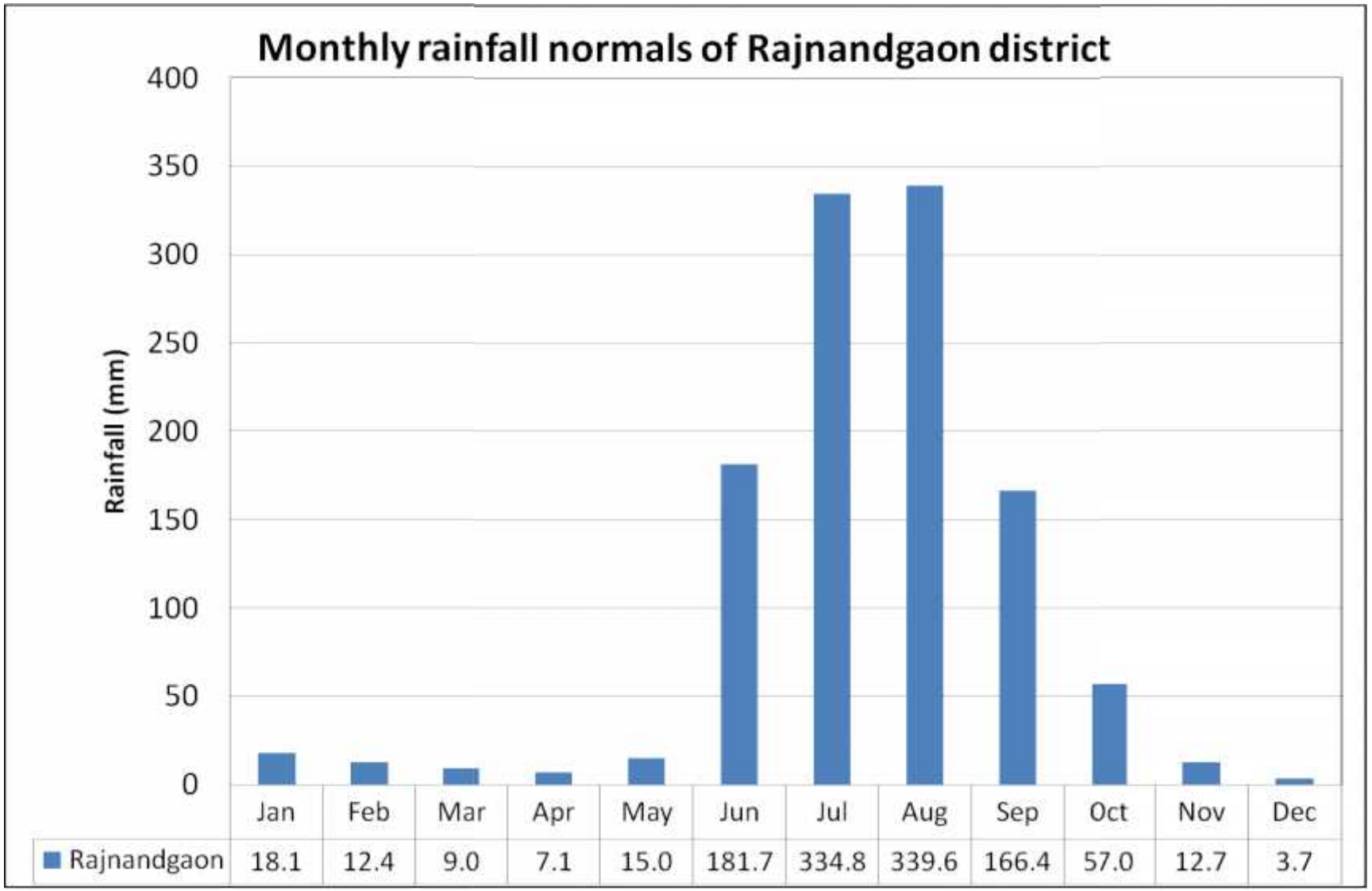
Source: Agricultural Statistics, 2009, Commissioner of land records, Govt. of Chhattisgarh

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Soybean**	**Blackgram**	**Pigeon pea**	**Maize**
	Kharif- Rainfed	3rd week of June to 2nd week of July	3rd week of June to 1st week of July	3rd week of June to to 2nd week of July	3rd week of June to 1st week of July	3rd week of June to 1st week of July
	Kharif-Irrigated	2nd week of June to 3rd week of June	-	-	-	-
	Major Rabi crops	Chickpea	Wheat	Lathyrus	Linseed	Rapeseed-mustard
	Rabi- Rainfed	2nd week of October to 1st week of November	2nd week of October to 1st week of November	2nd week of October to 1st week of November	-	2nd week of October to 1st week of November
	Rabi-Irrigated	3rd week of November to 4th week of November	3rd week of November to 1st week of December	-	-	3rd week of November to 4th week of November

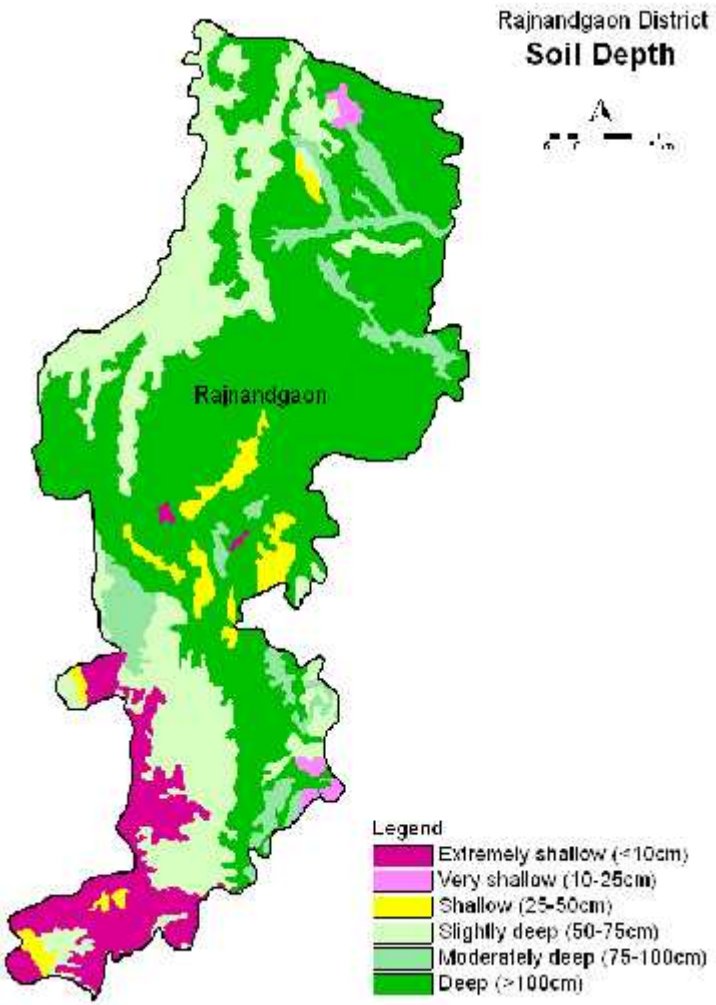
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	✓	×	×
	Flood	×	×	×
	Cyclone	×	×	×
	Hail storm	×	×	×
	Heat wave	×	✓	×
	Cold wave	×	✓	×
	Frost	×	×	×
	Sea water intrusion	×	×	×
	Pests and disease outbreak (specify)	×	✓	×
	Others (specify)	×	×	×

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: No


Raj Nandgaon
Kabirdham
N
Balaghat
Bandeli
Chhuikhadan
Khairagarh
Pandadah
Barhaitola
Gumka
Murhipar
Bhandarpur
To Gondia
To Durg
Paniajob
Dongargarh
Tilai
To Durg
Baghnadi
Bhanpur
Raj Nandgaon
6
Chichola
Arjuni
To Sakoli
Durg
Bendari
Dongargaon
Maharashtra
Hat Banjari
Amgaon
Bandha
Map not to Scale
Ambagarh Chauki
Arajkund
Dangarh
District Boundary
River
National Highway
State Highway
Road
Railway Track
Trekking Routes
District Headquarter
Taluk Headquarter
Town
Mohala
Gotatola
Boria Tibhu
Manpur
Sitagaon
Kanker
Anndhi
Parali


Monthly rainfall normals of Rajnandgaon district
Rainfall (mm)
400
350
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Rajnandgaon 18.1 12.4 9.0 7.1 15.0 181.7 334.8 339.6 166.4 57.0 12.7 3.7

ANNEXURE-III



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**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks **June 4th week**	Medium to shallow black soil	Rice	Direct line sowing of early to medium rice varieties such as Danteswari, Samleshwari, Chandrahasini, MTU-1010, IR-64, IR-36, Karma masuri, Kranti and Mahamaya	As recommended	
		Soybean	Indira Soya-9, JS-335, JS -93-05, J.S. 80-21 and PK 472	As recommended	
		Pigeon pea	UPAS -120, ICPL-87, Pragati, Prabhat	As recommended	
	Light to Dark brown soil	Rice	Direct line sowing of Early rice varieties Such as Danteswari, Samleshwari, Chandrahasini, MTU-1010, IR-64, IR-36,	As recommended	
		Maize	Chandan Maize-1, Chandan Maize-2, Chandan Maize-3	As recommended	
		Blackgram	T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4	As recommended	

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 2nd week of July	Medium to shallow black soil	Rice	Direct line sowing of early rice varieties such as Danteswari, IR- 36, IR-64, Samleshwari, Poornima, MTU-1010	As recommended	
		Soybean	JS-335, JS -93-05 and PK 472	As recommended	
		Pigeonpea	UPAS -120, ICPL-87, Pragati, Prabhat	As recommended	
	Light to dark brown soil	Rice	Direct line sowing of early rice varieties such as Danteswari, IR- 36, IR-64, Samleshwari, Poornima, MTU-1010	As recommended	
		Maize	Chandan Maize-1, Chandan Maize-2, Chandan Maize-3	As recommended	
		Black gram	T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4	As recommended	
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 (4th week of July)	Medium to shallow black soil	Rice	Direct line sowing of extra early rice varieties such as Danteswari, Samleshwari, Poornima, Annada, Tulsi, Aadity, MTU-1010	20 % higher seed rate	
		Soybean	JS-335, JS -93-05 and PK 472, Soybean + Pigeon pea (3:1)	20 % higher seed rate	
		Pigeon pea	UPAS -120, ICPL-87, Pragati, Prabhat	20 % higher seed rate	
	Light to dark brown soil	Rice	Direct line sowing of extra early rice varieties such as Danteswari, Samleshwari,	20 % higher seed rate	

			Poornima, Annada, Tulsi, Aadity, MTU-1010		
		Maize	Chandan Maize-1, Chandan Maize-2, Chandan Maize-3	20 % higher seed rate	
		Black gram	T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4	As recommended	

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 8 weeks **(2nd week of August)**	Medium to shallow black soil	Rice Soybean Pigeon pea	Black gram (var. T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4) / Green Gram (var. Pusa vishal, B.M-4, HUM-12, HUM-1, J.M.-721) / Red gram (UPAS -120, ICPL-87, Pragati, Prabhat, Laxmi) / Sunflower (KBSH-1, KBSH-44, MSFH-7, MSFH-8) / Niger (J.N.S.-1, J.N.S - 6) / Sesame (Selection-5, T.C.-25, J.T.-21)	25 % higher seed rate	
	Light to dark brown soil	Rice Maize Black gram	Black gram (var. T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4) / Greengram (var. Pusa vishal, B.M-4, HUM-12, HUM-1, J.M.-721) / Red gram (UPAS -120, ICPL-87, Pragati, Prabhat, Laxmi) / Sunflower (KBSH-1, KBSH-44, MSFH-7, MSFH-8) / Niger (J.N.S.-1, J.N.S - 6) / Sesame (Selection-5, T.C.-25, J.T.-21)	25 % higher seed rate	

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Medium to shallow black soil	Rice	Gap filling/re-sowing	Spray 2% potash,	
		Soybean	Gap filling/ if germination is less than 35%, take up re-sowing with wider spacing 45 cm with sufficient soil moisture	Hoeing at 25 DAS	
		Pigeon pea	Gap filling /re-sowing	Hoeing at 25 DAS	
	Light to dark brown soil	Rice	Gap filling/ re-sowing	Spray 2% potash,	
		Maize	Gap filling/ re-sowing	Hoeing at 25 DAS	
		Black gram	Gap filling/ re-sowing	Hoeing at 25 DAS	

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 measues**	**Remarks on Implementation**
At vegetative stage	Medium to shallow black soil	Rice	Repeated intercultivation / Weeding-Hoeing / thining / life saving irrigation/Stripping of crop leaves	Mulching, inter tilling, 2% urea spray	
		Soybean			
		Pigeon pea			
	Light to dark brown soil	Rice	Repeated intercultivation / Weeding-Hoeing / thining / life saving irrigation/Stripping of crop leaves	Mulching, inter tilling, 2% urea spray	
		Maize			
		Black gram			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measues**	**Remarks on Implementation**

At flowering/ fruiting stage	Medium to shallow black soil	Rice	Repeated intercultivation -weeding / life saving irrigation/ Pre-mature harvest of maize and black gram as a fodder or incorporation of black gram	Mulching, inter tilling, Use 2% DAP spray or 5% kaolin	
		Soybean			
		Pigeonpea			
	Light to dark brown soil	Rice	Repeated intercultivation -weeding / life saving irrigation/ Pre-mature harvest of maize and black gram as a fodder or incorporation of black gram	Mulching, inter tilling, Use 2% DAP spray or 5% kaolin	
		Maize			
		Blackgram			

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**
	Medium to shallow black soil	Rice	Harvest mature or physiological mature plants, irrigation if possible,	Mustard / Chickpea / Lathyrus / Linseed	
		Soybean			
		Pigeon pea			
	Shallow to medium and Light to dark brown soil	Rice	Harvest mature or physiological mature plants, irrigation if possible,	Mustard / Chickpea / Lathyrus / Linseed	
		Maize			
		Black gram			

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**
Delayed release of water in canals due to low rainfall	Medium to shallow black soil or Shallow to medium and Light to dark	Rice (Transplanting)	Raise rice seedlings by Dapog method, In aged nurseries, spray 2% potash solution to increase tolerance to moisture stress	When rice nurseries are over matured than transplanting such nurseries 1/3rd upper portion can be cut/ removed before	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	brown soil			planting, SRI practice and pre-germinated seed sown on puddle field	
		Wheat	Chickpea/ Lathyrus / Lentil/Pea/Linseed/Wheat	• Sowing of rabi crops immediately after harvest of kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown for proper germination in the ensuring rabi season. Ridge and furrow cultivation, sprinkler irrigation system use and irrigate crop at critical stage of crop as possible as in order to use water efficiently	
		Mustard	No change / utera cultivation,		
		Chickpea			

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	Medium to shallow black soil or Shallow to medium and Light to dark brown soil	Rice (Transplanting)	In aged nurseries, spray 2% potash solution to increase tolerance to moisture stress, direct seeded line sowing of rice	SRI practice adopt, Irrigation at 1 to 4 days after disappearance of ponded water	
		Wheat	Chickpea/ Lathyrus / Lentil/Pea/Linseed/Wheat	• Sowing of rabi crops immediately after harvest of kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown for proper germination in the ensuring rabi season.	
		Mustard	No change / utera cultivation,		
		Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				Ridge and furrow cultivation, sprinkle irrigation system use and irrigate crop at critical stage of crop as possible as in order to use water efficiently	

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	Medium to shallow black soil or Shallow to medium and Light to dark brown soil	Rice (Transplanting)	Direct seeded line sowing of Rice/Soybean	Use 2% DAP spray	
		Wheat	Chickpea / Lathyrus / lentil / Pea / Linseed / Wheat	• Sow Rabi crops immediately after harvest of Kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown for proper germination in the ensuring Rabi season.	
		Mustard	Utera cultivation, Chickpea+Mustard		
		Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping syste[M]**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Medium to shallow black soil or Shallow to medium and Light to dark brown soil	Rice (Transplanting)	Direct seeded line sowing of rice/soybean	Use 2% DAP spray	
		Wheat	Chickpea / Lathyrus / Lentil / Pea / Linseed / Wheat	• Sowing of rabi crops immediately after harvest of kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown for proper germination in the	
		Mustard	No change / utera cultivation,		
		Chickpea			

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping syste[M]**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
				ensuring rabi season. Ridge and furrow cultivation, use sprinkler irrigation system and irrigate crop at critical stage of crop as possible as in order to use water efficiently	

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	Medium to shallow black soil or Shallow to medium and Light to dark brown soil	Rice (Transplanting)	Direct seeded line sowing of Rice/Soybean	Use 2% DAP spray	
		Wheat	Chickpea / Lathyrus / Lentil / Pea / Linseed / Wheat	• Sowing of rabi crops immediately after harvest of kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown for proper germination in the ensuring rabi season. Ridge and furrow cultivation, sprinkler irrigation system use and irrigate crop at critical stage of crop as possible as in order to use water efficiently	
		Mustard	No change / utera cultivation,		
		Chickpea			

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

Condition	Suggested contingency measure			
Continuous high rainfall in a	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**

short span leading to water logging or Heavy rainfall with high speed winds in a short span				
Rice	Drain out excess water, 2% urea spray if leaves seems to pale yellow colour	Drain out excess water	Drain out excess water, harvesting at physiological maturity immediately and drying of plants	To cover produce with plastic sheet or shift produces to farm shed and protection against pest/disease damage in storage etc,
Soybean	Drain out excess water	Drain out excess water	Drain out excess water, harvesting at physiological maturity immediately and drying of plants	
Pigeon pea	Drain out excess water	Drain out excess water; Spraying with NAA @ 25 ppm	Drain out excess water, harvesting at physiological maturity immediately and drying of plants	
Maize	Drain out excess water	Drain out excess water, Earthing up,	Drain out excess water, harvesting at physiological maturity immediately and drying of plants	
Black gram	Drain out excess water	Drain out excess water	Drain out excess water, harvesting at physiological maturity immediately and drying of plants	
Heavy rainfall with high speed winds in a short span[2]				
Outbreak of pests and diseases due to unseasonal rains				
Rice				
Soybean	Wilt in low lying patches in field or field border: Drench Carbendazim 1-2 g/l at the base of plants after the event	Maruca leaf and pod webber: Spray Quinalphos 2 ml/l+Dichlorvos 1 ml/l		
Pigeonpea	Wilt in low lying patches in field or field border: Drench Carbendazim 1-2 g/l at the base of plants after the event	Maruca leaf and pod webber: Spray Quinalphos 2 ml/l+Dichlorvos 1 ml/l		

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days				
Sea water intrusion	Not applicable			

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

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	Not applicable			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage Supply of molasses to cattle feed plants.	Arrangement of feeds and fodder from adjoining areas, exploitation of non conventional feed resources, use of area treated straw and feed blocks.	Promotion of fodder seed production, cultivation and storage establishment of fodder block making machines in fodder surplus areas.
Drinking water	Repairs of tube wells, clear of the sludge in the canals and local water catchments	Harvesting water through the existing reservoirs and exploitation of	To strengthen reservoirs by promoting recharging of water and rain water

	and clean the water tanks, large ponds and lakes	groundwater.	harvesting during rainy season.
Health and disease management	Mass vaccination and deworming	Provide shades to animals and water as much as possible. treatment of diseased animals and proper disposal of carcasses.	Treatment of diseased animals and provide vitamin and mineral supplement to regain strength and vigour.
Floods			
Feed and fodder availability	Conservation of the fodder in the form of hay and silage.	Feeding of feed blocks and silages	Provide treated feed and fodder to animals against moulds and fungi.
Drinking water	Regular inspection of ponds and canals for any obstruction.	Provide drinking water in small through and plastic bucket.	Disinfection of contaminated water especially for drinking purpose.
Health and disease management	Storage of medicines	Treatment of injured animals	Disposal of dead animals.
Cyclone			
Heat wave and cold wave			
Shelter/environment management	Construction of wind breaks, shed should have sufficient over hangs, fixing of sprinklers, provide thatch on the roof. Construction of wind breaks, keep curtains ready, arrange for heating devices.	Construct wind breaks keep animals under shade during hot hours of the day, provide cooling fans in shades and also sprinkle water at regular intervals. Construction wind breaks, put gunny bags on all openings of shed.	
Health and disease management		Grazing should be allowed during night and early hours of the day, vaccination and veterinary checkup time to time.	

[s]based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			**Convergence/linkages with ongoing programs, if any**
	Before the event[a]	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Storage of feed	Provide non conventional feed, supplement anti oxidant and anti stress		
Drinking water	Storage of water in tanks	Add Vit-C and other anti stress ingredient with water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one	Disposal of dead birds	
Floods				
Shortage of feed ingredients	Storage of feed in safe storage bins to avoid mould and fungi	Use pellet feeding		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one, proper litter management and addition of lime as per need	Disposal of dead birds	
Cyclone	NA			
Shortage of feed ingredients	Storage of feed	Use stored feed carefully avoiding dampness		
Drinking water	Safe storage of water in tanks	Provide treated water		
Health and disease management		Vaccination and treatment of diseased one, proper litter management	Disposal of dead birds	
Heat wave and cold wave	NA			
Shelter/environment management	Construction of wind breaks, poultry shed should have sufficient over hangs fixing of sprinklers on the	Provide cooling fans in shades and also sprinkle water on the roof at regular intervals. Use of wind breaks, put gunny bags		

	roofs, provide thatch on the roof, decrease stocking density, decrease litter depth. Construction of wind breaks, keep curtains ready, arrange for heating devices, increase stocking density, decrease litter depth.	on all openings of shed , use heating devices.		
Health and disease management	Routine health care	Reduce energy content and increase protein content in feed, add anti stress factors, provide cool drinking water. Increase energy content in food		

[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. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters. 3. Provision for Rainwater harvesting 4. Deepening/Desilting of existing water bodies.	1. Harvest all the fish. 2. Stock water bodies with desirable species for culture. 3. Shallow derelict waters can stocked with stunted fish seed for culture. 4. Pens of 0.2 to 0.5 ha may facilitate easy operation of culture.	1. Stocking and management of grow out water bodies to improve growth of stock
(ii) Changes in water quality	1.Monitor water quality 2. Avoid polluting materials entry	1. Monitor water quality as small water bodies have less tolerance to	1. Advent of monsoon will mitigate the water shortage and normal

	into water body.	environmental changes leading to algal blooms and fish mortality.	stocking and culture practice may be adopted.
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	1. Harvest all the large fish except the brood stock. 2. Move other fish into pens or small confined waters with at least one meter depth. 3. Go for low stocking density. 4. Provision for Rainwater harvesting 5. Deepening/Desilting of existing water bodies. 6. Removal of debris and compaction of pond bunds.	1. Harvest all the fish. 2. Stock ponds with desirable species for culture. 3. Transfer the brood stock to deep water ponds if the existing ponds cannot be filled with bore well water. 4. Postpone breeding operations till the first heavy rains or 5. Start breeding if sufficient bore well water is available. 6. Start pond preparations, like deweeding, desilting & repair of dykes.	1. Start breeding operation with full preparations. 2. Undertake nursery and rearing operations. 3. Stocking and management of grow out ponds to improve growth of stock.
(ii) Impact of salt load build up in ponds / change in water quality	1. Add bore well water and if available, canal-water	1. Add bore well/ canal water if available or else harvest the stock. 2. Implement standard water conservation management practices.	1. Exchange pond water with fresh surface runoff water.
2) Floods			
A. Capture			
Marine			
Inland			
(i) No. of boats / nets/damaged			
(ii) No. of houses damaged			
(iii) Loss of stock			
(iv) Changes in water quality		1. Drainage of excess water need to be done. 2. Erect pens to protect the stock 3. Harvest big fish	1. Repair the embankments. 2. Restock with fish
(v) Health and diseases			1.Treat symptomatically

B. Aquaculture			
(i) Inundation with flood water	1. Dyke level shall be 0.5 m higher than highest flood level. Dyke walls should be checked for its strength specially compactness. 2. Inlets & outlets with proper sieves need to be maintained properly. 3. Pens may be erected to check fish stock loss in the periphery of small ponds.	1. Round the clock watch in is necessary. 2. Hapas should be installed in ponds to take care of spawn in case sudden or natural breeding occurs.	1. Check the brood stock condition. 2. Segregate male & female and various fish sizes. 3. Application of bleaching powder or liming must be done to avoid decaying of various organisms.
(ii) Water contamination and changes in water quality	-	1. Turbidity need to be controlled	1. Application of lime/ bleaching powder be done to avoid rotting and decaying of organisms.
(iii) Health and diseases	-	1. Apply lime/ bleaching powder as a prophylactic measure.	1. Apply bleaching powder. 2. Remove severely diseased & injured fishes. 3. Treat the remaining fishes as per symptoms.
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
3. Cyclone / Tsunami	Not applicable		
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland	-	1. Harvest the stock.	1. Stock with fingerlings with the advent of rains.
B. Aquaculture			
(i) Changes in pond environment (water quality)	-	1. Add bore well water and if available, canal-water.	1. Exchange pond water with fresh surface runoff water.
(ii) Health and Disease management	-	1. Provide shelter (weeds) in a small area of the pond to prevent	1. Remove weeds. 2. Liming or bleaching powder need

		sun burn.	to be added.

[a] based on forewarning wherever available