State: CHHATTISGARH

Agriculture Contingency Plan for District: Kabirdham

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 –(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
		22°01’ N	81°15’E	345 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, Kawarhda (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):	**685.1**		2nd week of June	4th week of September
	NE Monsoon(Oct-Dec):	**57.7**		Post monsoon (October-December)	-
	Winter (Jan- March)	**29.0**		Winter rains	-
	Summer (Apr-May)	**19.1**		-	-

	Annual	**791.0**		-	-

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)	**441.23**	**3.085**	**35.80**	**19.517**	**27.89**	-	**0.023**	**12.20**	**6.177**	**5.169**

Source: Agricultural statistics 2009, Commissioner of land record, Raipur, Govt. of Chhattisgarh

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Vertisols (Kanhar-clayey)	103.34	52.1
	Inceptisol (Matasi-Sandyloam)	27.62	13.9
	Alfisols (Dorsa-clayloam)	23.13	11.7
	Entisol (Bhata-gravely)	23.06	11.6
	Others (Sandy)	16.35	8.2
	Total	198.50	100.0

* mention colour, 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) Source: Directorate of Agriculture, Govt. of Chhattisgarh

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	184.662	131
	Area sown more than once	56.796	
	Gross cropped area	241.458	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	43.769		
	Gross irrigated area	63.635		
	Rainfed area	177.823		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	39	16.864	27

	Tanks	46	1.824	3
	Open wells	2018	0.706	1
	Bore wells	6438	43.187	68
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		1.044	2
	Total Irrigated Area		63.635	100
	Pump sets	2742		
	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 record, Raipur, Govt. of Chhattisgarh

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2008-09)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	-	-	80.1					**80.1**
	Wheat	-	-				7.2		**7.2**
	Jowar	-	-	0.3					
	Maize	-	-	3.5					**3.5**
	Millets	-	-	8.2					
	Total Cereals	**-**	**-**	**92.0**			**7.2**		**99.2**
	Pigeonpea	-	-	10.0					**10**

	Gram	-					67.0		**67**
	GreenGram	-		0.5					**0.5**
	BlackGram	-		8.5					**8.5**
	HorseGram	-		0.3					
	Pea	-					0.5		**0.5**
	Lentil	-					1.4		**1.4**
	Lathyrus	-					9.2		**9.2**
	Total Pulses			**19.2**			**78.1**		**97.3**
	Rapeseed-mustard						3.1		**3.1**
	Linseed						1.4		**1.4**
	Groundnut			0.7					**0.7**
	Seasamum			2.9					**2.9**
	Soybean			33.8					
	Sunflower								**0**
	Niger/Safflower			0.4			0.1		**0.5**
	Total Oilseeds			**37.8**			**4.6**		**42.4**
	Vegetables			10.9			3.4		**14.3**
	Sugarcane						0.1		**0.1**
	All Crops			**159.9**			**94.3**		**254.2**

Source: Agricultural statistics 2009, Commissioner of land record, Raipur, Govt. of Chhattisgarh

	Horticulture crops - Fruits	**Area (' 000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Mango	**1.577**		
	Banana	**0.058**		
	Papaya	**0.032**		
	Gauva	**0.177**		
	Lemon	**0.325**		
	Aonla & others	**0.105**		
	All fruits	**2.274**		
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Cauliflower	**0.221**		
	Cabbage	**0.105**		
	Brinjol	**0.631**		
	Tomato	**0.622**		
	Bhindi	**0.337**		
	Potato	**0.274**		
	Custard beans	**0.102**		

	Leafy Veg,	**0.157**		
	Bitter guard	**0.139**		
	Beans	**0.123**		
	Arbi	**0.263**		
	Radish	**0.227**		
	Onion	**0.325**		
	Spices	**1.816**		
	All vegetables	**4.295**		
	Medicinal and Aromatic crops			
	Plantation crops			
	Eg., industrial pulpwood crops etc.			
	Fodder crops			
	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			**304.066**
	Non descriptive Cattle (local low yielding)			-
	Improved cattle			-
	Crossbred cattle			-
	Non descriptive Buffaloes (local low yielding)			-
	Descript Buffaloes			61.776
	Goat			57.576
	Sheep			1.778
	Pig			8.890
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds (‘000)**	
	Commercial		78.582	
	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**	
		488		**61**		**1654**	
	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)			2912.57	3.198	9.036	
	Others						

Source: Directorate of Fisheries, Govt. of Chhattisgarh

1.11 Production and Productivity of major crops

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** ('000 tons)
		Production ('000 m t)	Productivity (kg/ha)	Production ('000 m t)	Productivity (kg/ha)	Production ('000 m t)	Productivity (kg/ha)	Production ('000 m t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	117.8	1436.6					117.8	1436.6	
	Soybean	28.4	1062.0					28.4	1062.0	
	Pigeonpea	6.3	575.4					6.3	575.4	
	Maize	2.9	834.8					2.9	834.8	

	BlackGram	2.3	386.6					2.3	386.6	
	Gram			41.2	629.5			41.2	629.5	
	Sugarcane			15.2	2160.2			15.2	2160.2	
	Wheat			5.1	797.2			5.1	797.2	
	Lathyrus			4.8	370.4			4.8	370.4	
	Rapeseed-mustard			1.2	341.6			1.2	341.6	
	All crops	162.9	974.9	69.0	669.2			231.9	822.05	
Major Horticultural crops (Crops to be identified based on total acreage) – Fruits & Vegetables										
	Mango							5.156	3269	
	Banana							1.218	21000	
	Papaya							0.576	18000	
	Gauva							1.052	5944	
	Lemon							1.960	6031	
	Aonla							0.550	5238	
	Spices							9.907	5455	
	Brinjol							9.25	14659	
	Tomato							6.667	10719	
	Radish							3.72	16388	
	Onion							3.646	11218	
	Arbi							3.603	13700	
	Potato							3.468	12657	
	Cauliflower							3.315	15000	
	Bhindi							2.982	8849	

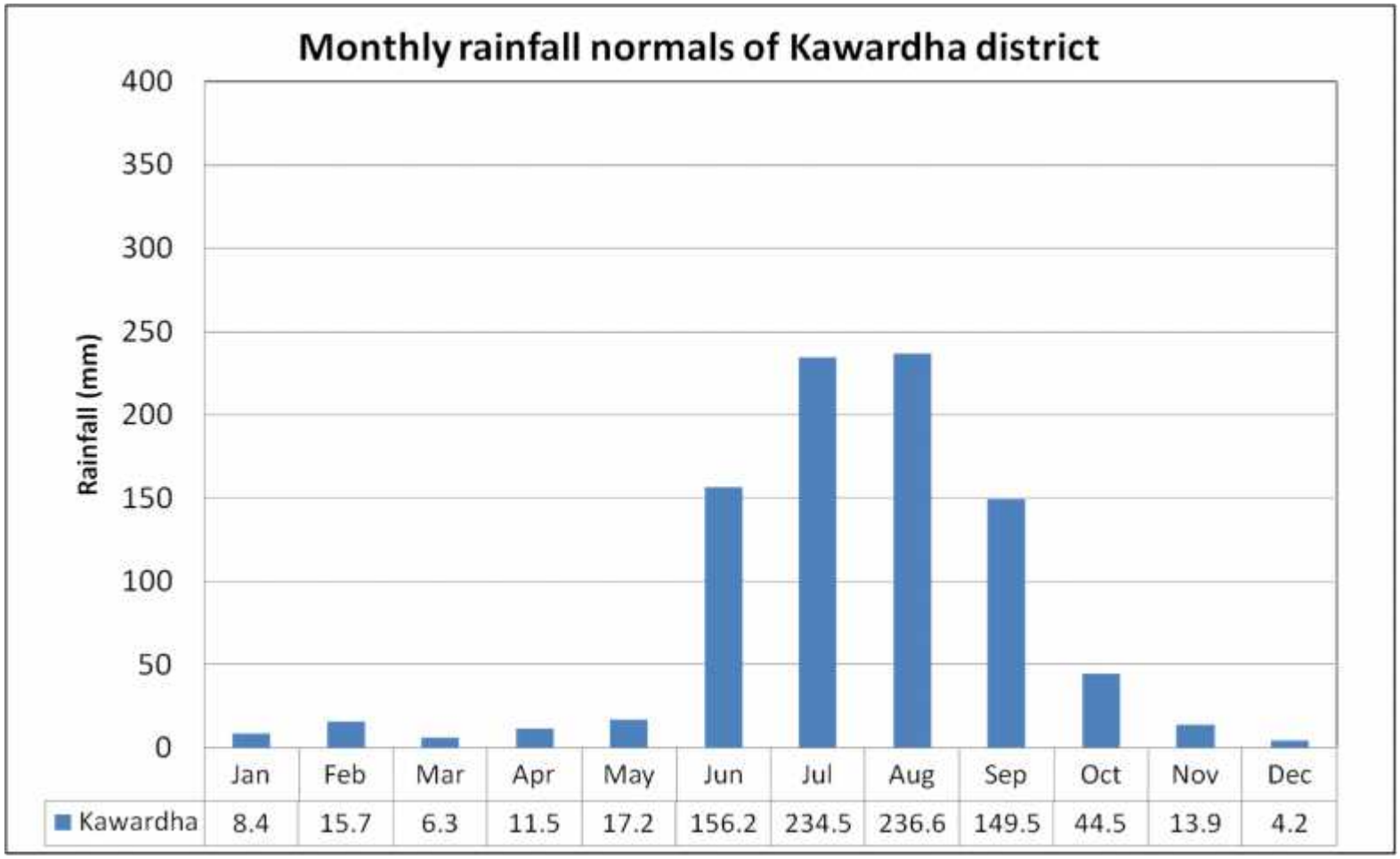
1.12	**Sowing window for 5 major field crops**	**Rice**	**Soybean**	**Pigeon pea**	**Maize**	**Black gram**
	Kharif- Rainfed	20 June -10 July	18 June - 05 July	18 June - 05 July	20 June - 05 July	25 June - 10 July
	Kharif-Irrigated	10 June - 20 June	-	-	-	-
	Major Rabi Crops	**Gram**	**Sugarcane**	**Wheat**	**Lathyrus**	**Rapeseed- mustard**
	Rabi- Rainfed	15 Oct - 05 Nov	-	15 Oct - 05 Nov	15 Oct - 05 Nov	15 Oct - 05 Nov
	Rabi-Irrigated	20 Nov- 30 Nov	05 Nov-25 Nov	20 Nov-05 Dec	-	20 Nov- 30 Nov

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

Annexure I


Dindori
Kabirdham
N
Neur
Taregaon
Kui
Sarbhuipar
Pandari
Bilaspur
Hanp
Chilpi
Perdatarai
Burle
Bhoramdeo
Kawardha
Balaghat
Rengakhar
Maharajpurdih
Dasrangpur
Lohara
Map not to Scale
Salewara
Silheti
Birora
Mohgaon
Thakurtola
Gardai
Durg
Raj
Nandgaon
District Boundary
River
State Highway
Road
Trekking Routes
District Headquarter
Taluk Headquarter
Town


Monthly rainfall normals of Kawardha district
Rainfall (mm)
400
350
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Kawardha 8.4 15.7 6.3 11.5 17.2 156.2 234.5 236.6 149.5 44.5 13.9 4.2

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[a]**	**Normal Crop / Cropping system[b]**	**Change in crop / cropping system[c] including variety**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks **(June 4th week)***	**Shallow to Medium 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	Normal	-
		Soybean	Indira Soya-9, JS-335, JS -93-05, J.S. 80-21 and PK 472	Normal	-
		Pigeon pea	UPAS -120, ICPL-87, Pragati, Prabhat	Normal	-
		Maize	Chandan Maize-1, Chandan Maize2, Chandan Maize-3	Normal	-
		Black gram	T.U-94-2, Pant U-30, Barkha, K.U.96-3, T.P.U.4	Normal	-

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 4 weeks **(July 2nd week)**	**Shallow to Medium Black soil**	Rice	Direct line sowing of early rice varieties such as Danteswari, IR-36, IR-64, Samleshwari, Poornima, MTU-1010	Normal	
		Soybean	JS-335, JS -93-05 and PK 472	Normal	

		Pigeon pea	UPAS -120, ICPL-87, Pragati, Prabhat	Normal	
		Maize	Chandan Maize-1, Chandan Maize-2, Chandan Maize-3	Normal	
		Black gram	T.U-94-2, Pant U-30, Barkha, K.U. 96-3, T.P.U.4	Normal	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 6 weeks (July 4th week)	**Shallow to Medium 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	
		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	Normal	

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Change in crop/cropping system[c]**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
	Shallow to	Rice	Black gram (var. T.U-94-2,	25 % higher seed rate	

Delay by 8 weeks (August 2nd week)	**Medium Black soil**	Soybean Pigeon pea Maize Black gram	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)		

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	**Shallow to Medium 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	
		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	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation**	**Remarks on Implementation[e]**

spell, consecutive 2 weeks rainless (>2.5 mm) period)				**measues[d]**	
At vegetative stage	**Shallow to Medium Black soil**	Rice	Repeated intercultivation / Weeding-Hoeing / thining / life saving irrigation/Stripping of crop leaves	Mulching, inter tilling, 2% urea spray	
		Soybean			
		Pigeon pea			
		Maize			
		Black gram			

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation[e]**
At flowering/ fruiting stage	**Shallow to Medium 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			
		Pigeon pea			
		Maize			
		Black gram			
Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Rabi Crop planning[d]**	**Remarks on Implementation[e]**
	Shallow to Medium Black soil	Rice	Harvest mature or physiological mature plants, irrigation if possible,	Mustard / Chickpea / Lathyrus / Linseed	
		Soybean			
		Pigeon pea			
		Maize			
		Black gram			

2.1.2 Drought - Irrigated situation

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]**
Delayed release of water in canals due to low rainfall	**Shallow to Medium Black soil**	Rice (Transplanting)	raise rice seedlings by Daipog 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 planting, SRI practice and pre-germinated seed sown on puddle field	
		Chick pea	No change / utera cultivation,	• 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. 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	
		Rapeseed/Mustard			
		Wheat	Chickpea/ Lathyrus / lentil/Pea/linseed/Wheat		
		Sugarcane	sugarcane may be intercropped with short duration high value mid season income generating crops like toria, mustard, peas, gram and spices etc.	Drip and sprinkler irrigation systems, Skip furrow irrigation system	

Condition	**Major Farming situation[f]**	**Normal Crop/cropping system[g]**	**Suggested Contingency measures**		
			Change in crop/cropping system[h]	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall	**Shallow to Medium Black soil**	Rice (Transplanting)	In aged nurseries, spray 2% potash solution to increase tolerance to moisture stress, Direct seeded line	SRI practice adopt, Irrigation at 1 to 4 days after disappearance of ponded water	

Condition	Major Farming situation[f]	Normal Crop/cropping system[g]	Suggested Contingency measures		
			Change in crop/cropping system[h]	Agronomic measures[i]	Remarks on Implementation[j]
			sowing of rice		
		Chick pea	No change / utera cultivation,	• 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. 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	
		Rapeseed/Mustard			
		Wheat	Chickpea / Lathyrus / lentil / Pea / linseed / Wheat ()		
		Sugarcane	sugarcane may be intercropped with short duration high value mid season income generating crops like toria, mustard, peas, gram and spices etc.	Drip and sprinkler irrigation systems, Skip furrow irrigation system	

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]
Non release of water in canals under delayed onset of monsoon in catchment	**Shallow to Medium Black soil**	Rice (Transplanting)	Direct seeded line sowing of rice/soybean	Use 2% DAP spray	
		Chick pea	Utera cultivation, Chickpea+Mustard	• Sow Rabi crops immediately after harvest of Kharif crops taking advantages of residual moisture. • Pre-soaked seeds be sown	
		Rapeseed/Mustard			
		Wheat	Chickpea / Lathyrus / lentil / Pea / linseed / Wheat ()		

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]**
				for proper germination in the ensuring Rabi season.	
		Sugarcane	Chickpea / Lathyrus / lentil / Pea / linseed / Wheat	Drip and sprinkler irrigation systems, Skip furrow irrigation system	

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]**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Shallow to Medium Black soil**	Rice (Transplanting)	Direct seeded line sowing of rice/soybean	Use 2% DAP spray	
		Chick pea	No change / utera cultivation,	• 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. 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	
		Rapeseed/Mustard			
		Wheat	Chickpea / Lathyrus / lentil / Pea / linseed / Wheat ()		
		Sugarcane	sugarcane may be intercropped with short duration high value mid season income generating crops like toria, mustard, peas, gram and spices etc.	Drip and sprinkler irrigation systems, Skip furrow irrigation system	

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	**Shallow to Medium Black soil**	Rice (Transplanting)	Direct seeded line sowing of rice/soybean	Use 2% DAP spray	
		Chick pea	No change / utera cultivation,	• 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. 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	
		Rapeseed/Mustard			
		Wheat	Chickpea / Lathyrus / lentil / Pea / linseed / Wheat ()		
		Sugarcane	sugarcane may be intercropped with short duration high value mid season income generating crops like toria, mustard, peas, gram and spices etc.	Drip and sprinkler irrigation systems, Skip furrow irrigation system	

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging or Heavy rainfall with high speed winds in a short span[2]	**Vegetative stage[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Rice	Drain out excess water, 2%	Drain out excess water	Drain out excess water, harvesting at	To cover produce with

	urea spray if leaves seems to pale yellow colour		physiological maturity immediately and drying of plants	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	
Horticulture				
Heavy rainfall with high speed winds in a short span[2]				
Horticulture				
Outbreak of pests and diseases due to unseasonal rains				
Horticulture				
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		
Pigeon pea	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 – Not applicable

Condition	Suggested contingency measure[o]			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days[2]				
Sea water intrusion[3]				

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone - Not applicable

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]				
Horticulture				
Cold wave[q]				
Horticulture				
Frost				
Horticulture				
Hailstorm				
Horticulture				
Cyclone				
Horticulture				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event[s]	**During the event**	**After the event**
Drought			
Feed and fodder	Preservation of surplus fodder, encourage	Arrangement of feeds and fodder from	Promotion of fodder seed production,

availability	fodder cultivation and tree plantation and also encourage Supply of molasses to cattle feed plants.	adjoining areas, exploitation of non conventional feed resources, use of area treated straw and feed blocks.	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 and clean the water tanks, large ponds and lakes	Harvesting water through the existing reservoirs and exploitation of groundwater.	To strengthen reservoirs by promoting recharging of water and rain water 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	NA		
Feed and fodder availability	Stocking of feed and fodder in prone areas.	Feeding of stored feeds or blocks	Provide treated feed and fodder to animals
Drinking water	Storage of water in tanks	Use of stored water	Disinfection of contaminated water especially for drinking purpose.
Health and disease management	Storage of medicines	Treatment of injured animals	Disposal of dead animals
Heat wave and cold wave	NA		
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[a]	**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	1. Stocking and management of grow out water bodies to improve growth of stock

		facilitate easy operation of culture.	
(ii) Changes in water quality	1.Monitor water quality 2. Avoid polluting materials entry into water body.	1. Monitor water quality as small water bodies have less tolerance to environmental changes leading to algal blooms and fish mortality.	1. Advent of monsoon will mitigate the water shortage and normal stocking and culture practice may be adopted.
(iii) Any other			
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.
(iii) Any other			
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)			

(vi) Any other			
3. Cyclone / Tsunami	NA		
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture	NA		
(i) Overflow / flooding of ponds	-	-	-
(ii) Changes in water quality (fresh water / brackish water ratio)	-	-	-
(iii) Health and diseases	-	-	-
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			

(vi) Any other			
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 sun burn.	1. Remove weeds. 2. Liming or bleaching powder need to be added.
(iii) Any other			

[a] based on forewarning wherever available