State: CHHATTISGARH

Agriculture Contingency Plan for District: Janjgir

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 (11.0)		
	Agro-Climatic Zone (Planning Commission)	Eastern plateau and hills region (VII)		
	Agro Climatic Zone (NARP)	Chhattisgarh plain zone (MP-1)		
	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	82°35'E	262 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ZARS, Bilaspur		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Janjgir (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)	1134		3rd week of June	4th week of September
	NE Monsoon(Oct-Dec)	53			-
	Winter (Jan- Feb)	23.5			-
	Summer (Mar -May)	16.8		-	-
	Annual	1228		-	-

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)	446.6	260	89.1	35.3	37.6		0.14	10.9	4.9	6.2

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

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total**
	Entisol (Bhata-gravely)	53.3	19.9
	Inceptisol (Matasi-Sandyloam)	93.6	35.0
	Alfisols (Dorsa-clayloam)	66.8	24.9
	Vertisols (Kanhar-clayey)	33.4	12.5
	Others (Sandy)	18.4	6.9
	Total	268	100.0

Source: Directorate of Agriculture, Govt. of Chhattisgarh

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	260.7	127
	Area sown more than once	70.4	
	Gross cropped area	330.5	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	190.46		
	Gross irrigated area	236.89		
	Rainfed area	98.63		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	13	213.1	90.0
	Tanks	7640	3.5	1.5
	Open wells	7346	4.2	1.8
	Bore wells	2825	13.3	5.7
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources		2.5	1.1
	Total Irrigated Area		236.6	100
	Pump sets	10493		
	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			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	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, Raipur, Govt. of Chhattisgarh

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

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice			249.7				41.2	290.9
	Maize			0.7			0.2		0.9
	Wheat						4.7		4.7
	Millets								
	Total Cereals			**250.3**			**46.1**		296.4
	Pigeonpea			1.7					1.7
	Chickpea						0.6		0.6
	Greengram			0.6			0.2		0.8
	Blackgram			1.8			0.2		2
	Horsegram								
	Pea						0.9		0.9
	Lentil						0.3		0.3
	Lathyrus						20.5		20.5
	Total Pulses			**4.1**			**22.8**		26.9
	Rapeseed-mustard						6.9		6.9
	Linseed						8.1		8.1
	Groundnut			1.0			0.6		1.6
	Seasame			1.3					1.3
	Soybean								
	Sunflower			0.1			0.6		0.7
	Niger						0.7		0.7
	Total Oilseeds			**2.4**			**17.0**		19.4
	Vegetables			3.2			6.8		10
	Sugarcane						0.1		0.1
	All Crops			**260.0**			**91.7**		351.7

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

	Horticulture crops - Fruits	Area (‘ 000 ha)		
		Total	**Irrigated**	**Rainfed**
	Mango	1.8		
	Banana	0.5		
	Papaya	0.5		
	Gauva	1.6		
	Lemon	0.3		
	Water Melon	0.1		
	Musk Melon	0.2		
	Ber	0.3		
	others	0.2		
	All fruits	5.3		
	Horticulture crops - Vegetables	Total	**Irrigated**	**Rainfed**
	Cauliflower	0.6		
	Cabbage	0.6		
	Brinjal	1.3		
	Tomato	2.1		
	Bhindi	1.1		
	Potato	0.8		
	Beans	0.5		
	Kaddu	0.8		
	Leafy Vegetable	0.4		
	Green Pea	0.3		
	Radish	0.2		
	Onion	0.2		
	Bitter Guard	0.2		
	Others	0.4		
	All vegetables	11.9		
	Medicinal and Aromatic crops			
	Total			
	Plantation crops			
	Fodder crops			
	Total fodder crop area			
	Grazing land			
	Sericulture etc			

Source: Directorate of Horticulture, Govt. of Chhattisgarh

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	All kinds of cattle			460.4
	Non descriptive Cattle (local low yielding)			-
	Improved cattle			-
	Crossbred cattle			-
	Non descriptive Buffaloes (local low yielding)			-
	Descript Buffaloes			121.8
	Goat			51.6
	Sheep			5.7
	Pig			3.7
	Commercial dairy farms (Number)			

1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**
	Commercial		255.9
	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**
	2123	85	6454

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)	9252.4	3.2	28

Source: Agricultural Statistics, 2009, Commissioner of land records, Raipur, Govt. of Chhattisgarh
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
		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 identified based on total acreage)										
	Rice	464.7	1898.4					464.7	1898.4	
	Pigeonpea	2.2	691.8					2.2	691.8	
	Blackgram	0.7	330.2					0.7	330.2	
	Greengram	0.1	308.0					0.1	308	
	Groundnut	1.1	1099.1					1.1	1099.1	
	Chickpea			41.2	629.5			41.2	629.5	
	Sugarcane			15.2	2160.0			15.2	2160	
	Wheat			5.1	797.2			5.1	797.2	
	Lathyrus			4.8	370.2			4.8	370.2	
	Rapeseed-mustard			1.2	341.6			1.2	341.6	
	All crops	470.9	1516.1	69.0	669.2			539.9	1092.6	
Major Horticultural crops (Crops identified based on total acreage) – Fruits & Vegetables										
	Mango							5.9	3270	
	Banana							14.3	26509	
	Ber							6.8	21705	
	Gauva							8.4	7940	
	Lemon							2.0	6009	
	Musk Melon							1.8	8819	

	Papaya							10.2	18370	
	Water Melon							0.8	4906	
	Tomato							23.3	10720	
	Brinjol							19.4	14659	
	Cabbage							10.2	15720	
	Bhindi							10.1	8850	
	Cauliflower							10.2	15000	
	Kaddu							9.9	11160	
	Potato							9.8	11159	

1.12	**Sowing window for 5 major field crops**	**Rice**	**Pigeonpea**	**Blackgram**	**Greengram**	**Groundnut**
	Kharif- Rainfed	4th week of June to 3rd week of July	3rd week of June to 1st week of July	3rd week of June to 1st week of July	3rd week of June to 4th week of June	3rd week of June to 4th week of June
	Kharif-Irrigated					
	Major Rabi crops	**Chickpea**	**Sugarcane**	**Wheat**	**Lathyrus**	**Rapeseed-Mustard**
	Rabi- Rainfed					
	Rabi-Irrigated				3rd week of October to 4th week of October	

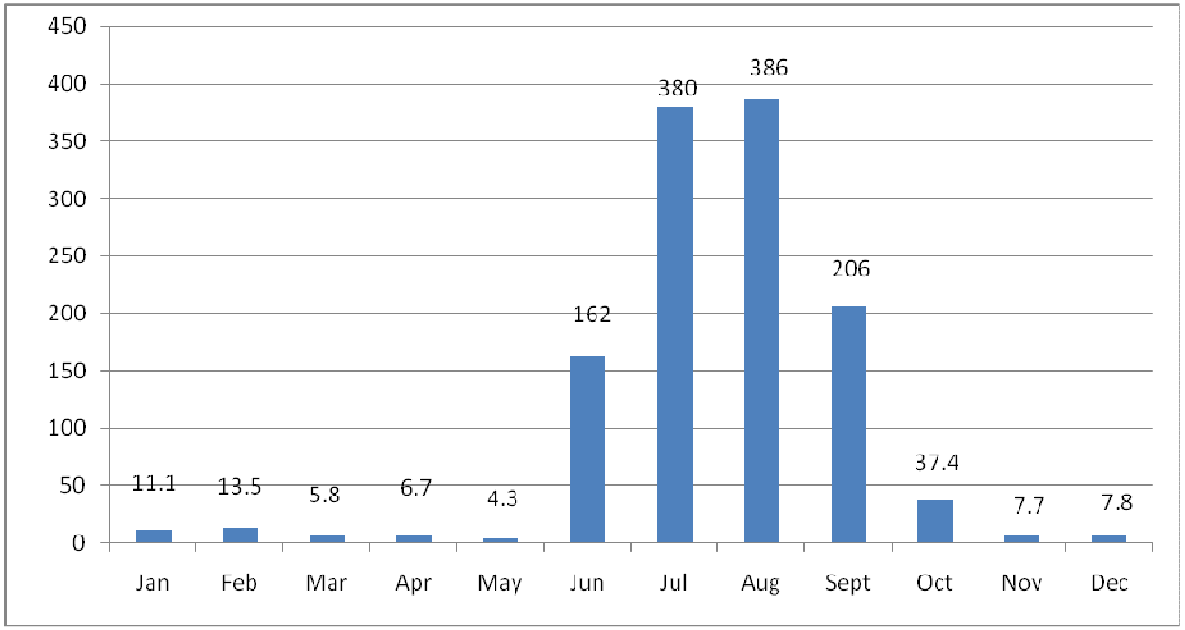
1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood		✓	
	Cyclone			✓
	Hail storm			✓
	Heat wave			✓
	Cold wave			✓
	Frost			✓

	Sea water intrusion			✓
	Pests and disease outbreak Rice: Stem borer, Green Leaf Hopper			

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 II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

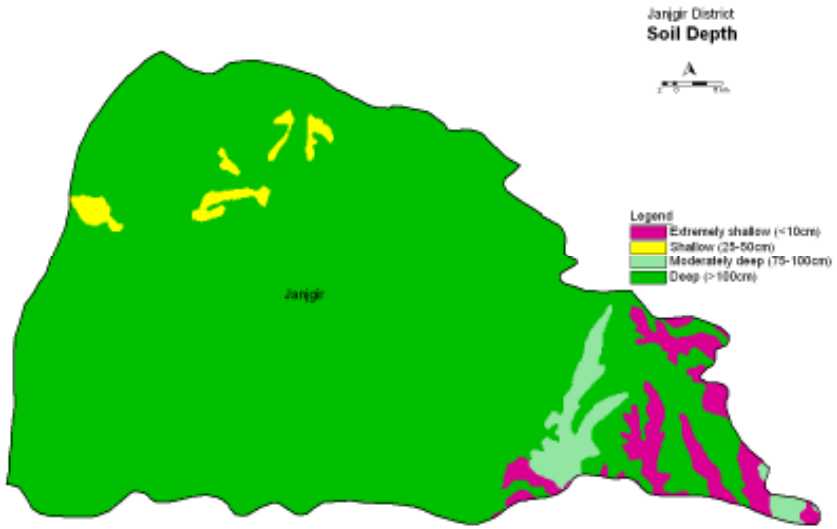
Annexure I

Annexure II



Mean annual rainfall (mm)

Annexure III



Source: NBSS& LUP

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)	Shallow Sandy soils (Bhata soil - Entisol)	Black gram	TU 94-2, PU-30, Azad-1,2, 3 and Local.		
		Groundnut	TKG- 28, SB-11, JL-24, Jyoti and Local.		
		Greengram	K-851, Pusa vishal and Local.		
		Sesame	JT-21, GT-10 and Local.		
		Maize	Hybrid and Local.		
	Medium shallow Loam soils (Matasi soil - Inceptisol)	Rice	Annada, Tulsi, Purnima, MTU-1010, MTU-1001, Mahamaya, IR-36 and Local.		
		Black gram	TU 94-2, PU-30, Azad-1,2,3 and Local		
		Groundnut	TKG- 28, SB-11, JL-24, Jyoti and Local.		
		Green gram	K-851, Pusa vishal and Local.		
		Sesame	JT-21, GT-10 and Local.		
		Maize	Hybrid and Local.		
	Deep clay loam soils	Rice	MTU-1010, MTU-1001, Mahamaya, Swarna, Hybrid rice, Jawaphool, Dubraaj,		
	Deep heavy clayey soils	Rice	MTU-1001, Swarna, Mahamaya, Safri- 17, Jawaphool, Dubraaj, Hybrid rice.		

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 July 2nd week	Shallow sandy soils (Bhata soil - Entisol)	Black gram.	PU-30 and TPU-4.	25 % higher seed rate	Suggested variety and required quantity of seed should be provided in time through NSC, State seed corporation etc.
		Groundnut	ICGS-11/ 37/44.		
		Greengram	Pusa vishal and Malviya Jyoty,		
		Sesame	Krishna and TKG- 8.		
		Maize	Composite varieties.		
	Medium shallow to deep loamy soils	Rice	MTU-1010, MTU-1001, IR-36	Improved Biasi practice should be done	Improved Biasi plough should be provided by Agriculture Department.
		Black gram.	PU-30 and TPU-4.	25 % higher seed rate	
		Groundnut	ICGS-11/ 37/44.		
		Greengram	Pusa vishal and Malviya Jyoty,		
		Sesame	Krishna and TKG- 8.		
		Maize	Composite varieties.		
	Deep clay loam soils	Rice	MTU-1010, MTU-1001, IR-36		
	Deep heavy clayey soils	Rice	MTU-1010, MTU-1001,		

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 July 4th week	Sandy shallow soils (Bhata soil - Entisol)	Black gram.	Black gram- PU-30 and TPU-4.	1. 25 % higher seed rate. 2. Seed treatment. 3. Proper nutrition.	Related agricultural inputs should be provided in time through different government schemes
		Groundnut	Groundnut- ICGS-11/ 37/44.		
		Greengram	Greengram- Pusa vishal and Malviya Jyoty,		
		Sesame	Sesame-Krishna and TKG-8.		
	Medium shallow deep soils	Black gram.	Black gram- PU-30 and TPU-4.		
		Groundnut	Groundnut- ICGS-11/ 37/44.		
		Greengram	Greengram- Pusa vishal and		

			Malviya Jyoty,		
		Sesame	Sesame-Krishna and TKG-8.		
	Deep clay loam soils	Rice	Rice - MTU-1010, MTU-1001, IR-36	1. Closer spacing in transplanting 2. Increase the no of seedling per hill. 3. 25 % higher seed rate in lehi. 4. Line sowing in direct method.	
	Deep heavy clayey soils	Rice	Rice - MTU-1010, MTU-1001, IR-36		

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 8 weeks (Aug 2nd wk**)**		Situation not occurred in the district.			

Condition			**Suggested Contingency measures**		
Early season drought **(Normal onset)**	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient & moisture conservation measues[d]**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Shallow Sandy soils (Bhata soil - Entisol)	Blackgram	Gap filling and / or Re-sowing	Life saving Irrigation, In situ soil water conservation measures	
		Groundnut			
		Greengram			
		Sesame			
		Maize			
	Medium shallow deep soils	Rice	Gap filling and / or Re-sowing	Intercultural operations, Life saving Irrigation, In situ soil water conservation measures	
		Black gram			
		Groundnut			
		Greengram			
		Sesame			
		Pigeon pea			
		Maize			

	Deep clay loam soils	Rice	Gap filling and / or Re-sowing in direct sown	Life saving Irrigation, In situ soil water conservation measures	
	Deep heavy clayey soils	Rice	Sprouted seed should be sown if nursery is not available	Life saving Irrigation, In situ soil water conservation measures	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Soil nutrient & moisture conservation measures[d]**	**Remarks on Implementation[e]**
At vegetative stage	Sandy, light and shallow soils (Bhata soil - Entisol)	Black gram Groundnut Greengram Sesame Maize	Weeding/ Thinning, Protection against diseases and pests	Weeding/ Thinning, Life saving irrigation, Opening of conservation furrows	
	Shallow to medium deep loamy soils	Rice Blackgram Groundnut Greengram Sesame Pigeon pea Maize	Weeding/ Thinning Protection against diseases and pests	Weeding/ Thinning, Life saving irrigation , Opening of conservation furrows Spray of 2% urea in Rice.	
	Clay loam soils	Rice	Weeding, Protection against diseases and pests, Spray of 2% Potash	Spray of 2% urea Life saving irrigation Opening of conservation furrows	

	Deep heavy clay soils	Rice	Weeding Protection against diseases and pests Spray of 2% Potash	Spray of 2% urea, Life saving irrigation	

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	Sandy, light and shallow soils	Black gram	Protection against diseases and pests	Life saving irrigation	
		Groundnut			
		Green gram			
		Sesame			
		Maize			
	Shallow to medium deep loamy soils	Rice			
		Black gram			
		Groundnut			
		Green gram			
		Sesame			
		Pigeon pea			
		Maize			

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**
	Sandy, light and shallow soils (Bhata soil - Entisol)	Blackgram	1. Harvest at physiological maturity. 2. Provide supplemental irrigation if needed.		
		Groundnut			
		Greengram			
		Sesame			
		Maize			

	Medium to shallow Loamy soils (Matasi soil - Inceptisol)	Rice			
		Blackgram			
		Groundnut			
		Greengram			
		Sesame			
		Pigeon pea			
		Maize			
	Clay loam, soils (Dorsa soil- Alfisol)	Rice		Early sowing of Chickpea, Pea, Lentil, Linseed, Toria and Safflower.	
	Deep Clay soils (Kanhar soil – Vertisol)	Rice	Provide supplemental irrigation if needed.	1. Early sowing of Chickpea, Pea, Lentil, Linseed, Mustard, Safflower. 2. Rainfed wheat.	

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]**
Limited release of water in canals due to low rainfall	Medium to Shallow Loamy soils (Matasi soil - Inceptisol)	Summer Rice	Summer Rice -Prefer short duration variety		
	Clay loam, soils (Dorsa soil- Alfisol)	Summer Rice	Summer Rice		
	Clayey soils (Kanhar soil – Vertisol)	Summer Rice	Summer Rice		
Non release of water in canals under delayed onset of monsoon in catchment			**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]**
	Loamy, medium shallow deep. (Matasi soil - Inceptisol)	Summer Rice	Summer Rice	Furrow irrigation, Prefer short duration variety	
	Clay loam, heavier deep.	Summer Rice	Summer Rice	Proper bunding,	

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]**
	(Dorsa soil- Alfisol)			Weed control,	
	Clayey heavier deep. (Kanhar soil – Vertisol)	Summer Rice	Summer Rice		

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	-				
Insufficient groundwater recharge due to low rainfall	-				

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

Condition	Suggested contingency measure			
A) Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Rice Black gram Groundnut Green gram Sesame Pigeon pea Maize	1. Drain out excess water from soil surface, 2. Gap filling 3. Spray fungicide	1. Drain out excess water from soil surface, 2. Weeding	1. Drain out excess water from soil surface, 2. Earthing up 3. Spraying with NAA@ 25 ppm in pigeonpea	1. Drain out excess water from soil surface, 2. Tying up of lodged plants, drying of ear heads/ pods/ cobs 3. Harvesting and cover the produce.
B) Heavy rainfall with high speed				

winds in a short span[2]				
Rice Black gram Groundnut Green gram Sesame Pigeon pea Maize	1. Drain out excess water from soil surface, 2. Gap filling 3. Spray fungicide	1. Drain out excess water from soil surface 2. Weeding	1. Drain out excess water from soil surface 2. Earthing up 3. Spraying with NAA@ 25ppm in pigeonpea	1. Drain out excess water from soil surface 2. Tying up of lodged plants, drying of ear heads/ pods/ cobs 3. Harvesting and cover the produce
C) Outbreak of pests and diseases due to un seasonal rains				

2.3 Floods

Condition	**Suggested contingency measure[o]**			
A) Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice Black gram Groundnut Green gram Sesame Pigeonpea Maize	1 Drain out excess water from soil surface, 2 Gap filling 3 Spray fungicide	1 Drain out excess water from soil surface, 2 Weeding 3 Top dressing with urea	1 Drain out excess water from soil surface, 2 Earthing up 3 Spraying with NAA@ 25 ppm in pigeonpea	1 Drain out excess water from soil surface, 2 Tying up of lodged plants, 3 Drying of ear heads/ pods/ cobs 4 Harvesting of produce
B) Continuous submergence for more than 2 days[2]				
Rice Blackgram Groundnut Greengram Sesame Pigeonpea Maize	1 Drain out excess water from soil surface, 2 Gap filling 3 Drenching with fungicides	1 Drain out excess water from soil surface, 2 Weeding 3 Top dressing with urea	1 Drain out excess water from soil surface, 2 Earthing up 3 Staking/Tying up of lodged plants	1 Drain out excess water from soil surface 2 Harvesting and drying of produce.

C) Sea water intrusion[3]	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	Not Applicable			
Frost	Not Applicable			
Hailstorm	Not Applicable			
Cyclone	Not Applicable			

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 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 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 de worming	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			
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			
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.	

[$]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				
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				
Shelter/environment management	Construction of wind breaks, poultry shed should have sufficient over hangs fixing of sprinklers on the roofs, provide thatch on the roof, decrease stocking density, decrease litter depth. Construction of wind breaks, keep curtains ready, arrange	Provide cooling fans in shades and also sprinkle water on the roof at regular intervals. Use of wind breaks, put gunny bags on all openings of shed , use heating devices.		

	for heating devices, increase stocking density, decrease litter depth.			
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 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 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.

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 de weeding, de silting & 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 sun burn.	1. Remove weeds. 2. Liming or bleaching powder need to be added.

[a] based on forewarning wherever available