State: CHHATTISGARH

Agriculture Contingency Plan for District: Raigarh

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)	North Hill Zone Of Chattisgarh		
	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°55' N	83°24'E	215 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	RARS, Raigarh		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Raigarh (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):	**1056.8**		2nd week of June	4th week of September
	NE Monsoon(Oct-Dec):	**48.4**		Post monsoon (October-December)	-
	Winter (Jan- March)	**37.0**		Winter rains	-
	Summer (Apr-May)	**50.1**		-	-
	Annual	**1192.3**		-	-

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)	**504.06**	**6.632**	**58.30**	**51.932**	**64.32**	-	**-**	**30.35**	**16.561**	**16.732**

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

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**Percent (%) of total**
	Entisol (Bhata-gravely)	48.22	16.0
	Inceptisol (Matasi-Sandyloam)	141.03	46.8
	Alfisols (Dorsa-clayloam)	86.89	28.9
	Vertisols (Kanhar-clayey)	22.76	7.6
	Others (Sandy)	2.13	0.7
	Total	301.03	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	275.582	112
	Area sown more than once	32.243	
	Gross cropped area	307.825	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	61.636		
	Gross irrigated area	64.053		
	Rainfed area	243.772		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	80	18.269	28.5

	Tanks	2724	4.723	7.4
	Open wells	3809	0.784	1.2
	Bore wells	10101	33.448	52.2
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)		6.829	10.7
	Total Irrigated Area		64.053	100.0
	Pump sets	**3328**		
	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

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice			241.0				10.0	**251**
	Wheat						6.8		**6.8**
	Maize			1.5			0.4		**1.9**
	Millets			0.3					
	Total Cereals			**242.7**			**17.2**		**259.9**

	Pigeonpea			4.6					**4.6**
	Gram						3.0		**3**
	Greengram			2.2					**2.2**
	Blackgram			20.0					**20**
	Horsegram			3.4					
	Pea						3.5		**3.5**
	Lentil						0.5		**0.5**
	Lathyrus						2.2		**2.2**
	Total Pulses			**30.2**			**25.5**		**55.7**
	Rapeseed-mustard						8.0		**8**
	Linseed						1.0		**1**
	Groundnut			6.1			11.9		**18**
	Seasamum			3.6					**3.6**
	Soybean								
	Sunflower			0.1			10.0		**10.1**
	Niger/Safflower			0.7			0.5		**1.2**
	Total Oilseeds			**10.5**			**31.6**		**42.1**
	Vegetables			8.4			16.5		**24.9**
	Sugarcane						1.0		**1**
	All Crops			**291.8**			**91.7**		**383.5**

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

	Horticulture crops - Fruits	**Area (' 000 ha)**		
		Total	**Irrigated**	**Rainfed**
	Cashew nut	7.500		
	Mango	4.929		
	Jack fruit	0.790		
	Gauva	0.675		
	Lemon	0.632		
	Banana	0.630		
	Ber	0.500		
	Others	2.624		
	All fruits	18.775		
	Horticulture crops - Vegetables	**Total**	**Irrigated**	**Rainfed**
	Tomato	3.390		
	Potato	3.200		
	Brinjol	1.235		

	Bhindi	1.230		
	Onion	1.120		
	Cabbage	0.890		
	Leafy Veg.	0.665		
	Cauliflower	0.640		
	Bottle guard	0.580		
	Green pea	0.570		
	Cow pea	0.540		
	Beans	0.415		
	Radish	0.280		
	Others	2.085		
	All vegetables	18.056		
	Medicinal and Aromatic crops			
	Total			
	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			**431.897**
	Non descriptive Cattle (local low yielding)			-
	Improved cattle			-
	Crossbred cattle			-
	Non descriptive Buffaloes (local low yielding)			-
	Descript Buffaloes			**85.313**
	Goat			**134.830**
	Sheep			**14.218**
	Pig			**10.336**

	Commercial dairy farms (Number)							
1.9	**Poultry**	**No. of farms**			**Total No. of birds ('000)**			
	Commercial				**388.161**			
	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**		
		1823		**70**		**5267**		
	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)			5395.24		3.364	16.500	
	Others							

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

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	317.9	1374.6			13.8	2260.9	331.7	1817.75	
	BlackGram	8.3	361.4					8.3	361.4	
	Groundnut	8.2	1162.4					8.2	1162.4	
	Pigeonpea	2.6	639.6					2.6	639.6	
	Sesame	2.3	478.8					2.3	478.8	
	Horsegram	1.2	307.1					1.2	307.1	
	Groundnut			8.3	1163.6			8.3	1163.6	
	Sunflower			2.0	263.8			2	263.8	
	Rap-mustard			2.4	418.8			2.4	418.8	
	Wheat			5.4	1396.4			5.4	1396.4	
	Lathyrus			2.9	490.4			2.9	490.4	
	Greengram			1.5	286.8			1.5	286.8	
	All crops	344.5	1093.9	44.2	610.4	13.8	2260.9	402.5	1321.7	
Major Horticultural crops (Crops to be identified based on total acreage) – Fruits & Vegetables										
	Cashew nut							3.213	428	
	Mango							15.821	3210	
	Jack fruit							14.025	17753	
	Gauva							5.360	7941	
	Lemon							3.372	5335	
	Banana							16.701	26510	
	Ber							9.450	18900	
	Tomato							36.340	10720	
	Potato							35.710	11159	
	Brinjol							18.110	14660	
	Bhindi							10.890	8850	
	Onion							17.660	15770	
	Cabbage							13.990	15719	
	Leafy Veg.							4.510	6782	
	Cauliflower							9.600	15000	
	Bottle guard							9.510	16397	

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

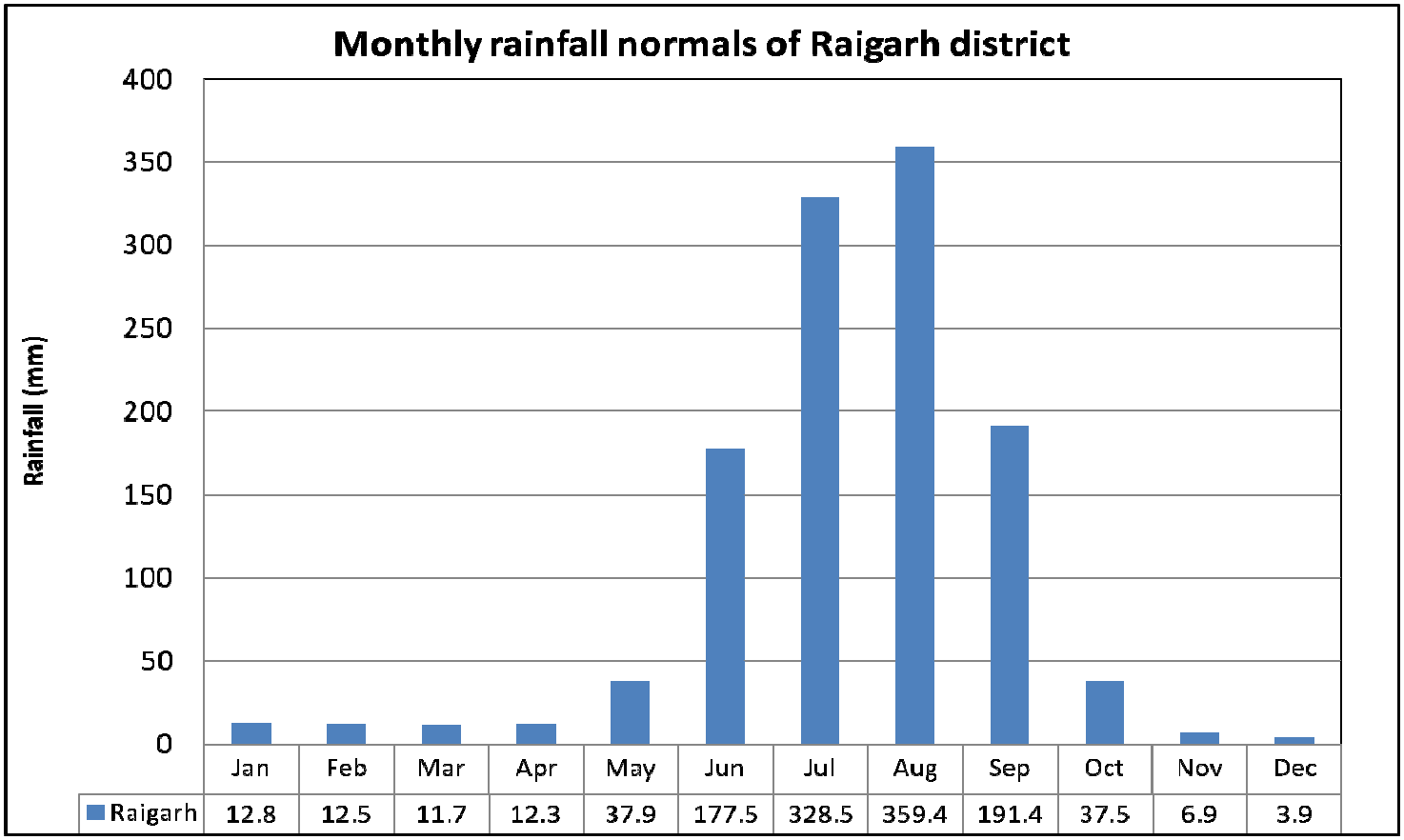
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Rice**	**Blackgram**	**Groundnut**	**Pigeonpea**	**Sesame**
	Kharif- Rainfed					
	Kharif-Irrigated					
	Major Rabi crops	**Groundnut**	**Sunflower**	**Rapeseed-mustard**	**Wheat**	**Lathyrus**
	Rabi- Rainfed					
	Rabi-Irrigated					

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)			

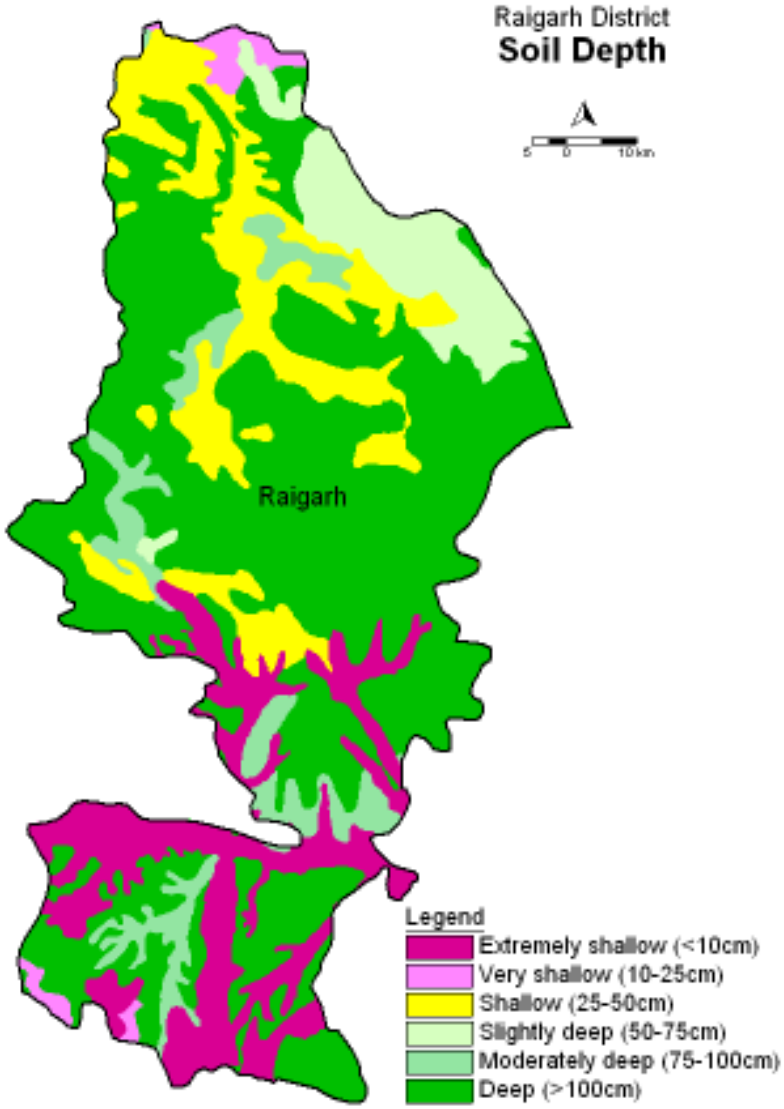
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: No

Annexure I


Koriya
Surguja
Jashpur
Korba
Raigarh
Bilaspur
Kawardha
Janjgir
Raipur
Mahasamund
K'gaon
Durg
Dhamtari
Kanker
Narayanpur
Bastar
Bijapur
Dantewara


Monthly rainfall normals of Raigarh district
Rainfall (mm)
400
350
300
250
200
150
100
50
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Raigarh 12.8 12.5 11.7 12.3 37.9 177.5 328.5 359.4 191.4 37.5 6.9 3.9

ANNEXURE-111



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**)***	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram- TU 94-2, PU-30, Azad-1,2, 3 and Local.	As such	As recommended	
		Groundnut – TKG- 28, SB-11, JL-24, Jyoti and Local.	As such	-do-	
		Green gram – K-851, Pusa vishal and Local.	As such	-do-	
		Sesame- JT-21, GT-10 and Local.	As such	-do-	
		Niger- IGP-76, GA-10 and Local.	As such	-do-	
		Maize- Hybrid and Local.	As such	-do-	
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy- Annada, Tulsi, Purnima, MTU-1010, MTU-1001, Mahamaya, IR-36 and Local.	As such	Normal	
		Black gram- TU 94-2, PU-30, Azad-1,2,3 and Local.	As such	Normal	
		Groundnut – TKG- 28, SB-11, JL-24, Jyoti and Local.	As such	Normal	
		Green gram – K-851, Pusa vishal and Local.	As such	Normal	
		Horse Gram- Local	As such	Normal	
		Sesame- JT-21, GT-10 and Local.	As such	Normal	
		Pigeonpea- Asha, T-148 and local.	As such	Normal	
		Niger- Utakmand, IGP-76, GA-10 and Local.	As such	Normal	

		Maize- Hybrid and Local.	As such	Normal	
		Jute and Patsan- Local.	As such	Normal	
		Ginger and Turmeric- Local.	As such	Normal	
	Clay loam, deep soils. (Dorsa soil- Alfisol)	Paddy - MTU-1010, MTU-1001, Mahamaya, Swarna, Hybrid rice, Jawaphool,, Dubraaj,	As such	Normal	
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy - MTU-1001, Swarna, Mahamaya, Safri- 17, Jawaphool, Dubraaj, Hybrid rice.	As such	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 wk**)**	Sandy, light textured shallow 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.	-do-	
		Green gram	Pusa vishal and Malviya Jyoty,	-do-	
		Sesame	Krishna and TKG- 8.	-do-	
		Niger	JNS-1, JNS-6	-do-	
		Maize- Hybrid and Local.	Composite Varieties.	-do-	
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy	MTU-1010, MTU-1001, IR-36	Improved Biasi	1. Improved Biasi plough should be provided by Agriculture Department. 2. Suggested variety and required quantity of seed should be provided in time through NSC, State seed corporation etc.
		Black gram	PU-30 and TPU -4.	25 % higher seed rate,	
		Groundnut	ICGS-11/ 37/44.	-do-	
		Greengram	Pusa vishal and Malviya Jyoty,	-do-	
		Horsegram	AK-21	-do-	
		Sesame	Krishna and TKG- 8.	-do-	
		Pigeon pea	Prabhat and Pragati.	-do-	
		Niger	JNS-1, JNS-6	-do-	
		Maize	Composite varieties.	-do-	
		Jute and Patsan- Local.	JRC-698, JRC-232 JRO-6492 and JRO-8432	-do-	
		Ginger and Turmeric- Local.	Turmeric- Roma, Suranjana	-do-	

	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy	MTU-1010, MTU-1001, IR-36	-do-	Suggested variety and required quantity of seed should be provided in time through NSC, State seed corporation etc.
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy	MTU-1010, MTU-1001,	-do-	

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 wk)	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram- TU 94-2, PU-30, Azad-1,2,3 and Local.	PU-30 and TPU-4.	1. 25 % higher seed rate. 2. Sowing in closer row. 3. Seed treatment. 4. Proper nutrition.	Related agricultural inputs should be provided in time through different agencies.
		Groundnut – TKG- 28, SB-11, JL-24, Jyoti and Local.	ICGS-11/ 37/44.		
		Green gram – K-851, Pusa vishal and Local.	Pusa vishal and Malviya Jyoty,		
		Sesame- JT-21, GT-10 and Local.	Krishna and TKG- 8.		
		Niger- IGP-76, GA-10 and Local.	JNS-1, JNS-6		
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Black gram- TU 94-2, PU-30, Azad-1,2,3 and Local.	PU-30 and TPU-4.	1. 25 % higher seed rate. 2. Sowing in closer row. 3. Seed treatment. 4. Proper nutrition	
		Groundnut – TKG- 28, SB-11, JL-24, Jyoti and Local.	ICGS-11/ 37/44.		
		Green gram – K-851, Pusa vishal and Local.	Pusa vishal and Malviya Jyoty,		
		Sesame- JT-21, GT-10 and Local.	Krishna and TKG- 8.		
		Niger- IGP-76, GA-10 and Local.	JNS-1, JNS-6		
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy - MTU-1001, Swarna, Mahamaya, Safri- 17, Jawaphool, Dubraaj, Hybrid rice.	MTU-1010, MTU-1001, IR-36	1. Closer spacing in transplanting 2. Increase seedling per hill. 3. 25 % higher seed rate in lehi. 4. Line sowing in direct method. 5. Seed treatment.	Inputs should be provided in time through different agencies.
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy - MTU-1001, Swarna, Mahamaya, Safri- 17, Jawaphool, Dubraaj, Hybrid rice.	MTU-1010, MTU-1001	1. Closer spacing. 2. Increase seedling per hill 3. 25 % higher seed rate in lehi. 4. Line sowing in direct method. 5. Seed treatment	

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)	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Situation not occurred in the district.	Rice (Annada, Tulsi, Purnima) + Post kharif crop as intercrop. 2.Horse gram, Niger, Green gram and Black gram (Post kharif crops)	1. Line sowing 2. Seed treatment. 3. Weed management.	Inputs should be provided in time through different agencies.
	Loamy, shallow deep soils (Matasi soil - Inceptisol)		Rice (Annada, Tulsi, Purnima) + Post kharif crop as intercrop. 2. Horse gram, Niger, Green gram, Black gram and Sesame (Post kharif crops)	1. Line sowing 2. Seed treatment. 3. Weed management	
	Clay loam, deep soils. (Dorsa soil- Alfisol)		Rice- MTU 1010, MTU-1001	1. Lehi / Line sowing 2. 25% higher seed 3. proper water management	
	Deep Clayey soils (Kanhar soil – Vertisol)		Rice- MTU 1010, MTU-1001	1. Lehi / Line sowing 2. 25% higher seed 3. proper water management	

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.	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	Gape filling and / or Re-sowing	Life saving Irrigation In situ SWC measures	-
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils	Paddy	Gape filling and / or Re-sowing	1Intercultural operations. 2. In situ SWC measures	-
		Black gram			
		Groundnut			

	(Matasi soil - Inceptisol)	Green gram		3. Life saving Irrigation	
		Horse Gram			
		Sesame			
		Pigeon pea			
		Niger			
		Maize			
		Jute and Patsan			
		Ginger and Turmeric			
	Clay loam, deep soils. (Dorsa soil- Alfisol)	Paddy	Gape filling and / or Re-sowing in direct sown	Life saving Irrigation In situ SWC measures	-
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy	Sprouted seed should be sown if nursery is not available	Life saving Irrigation In situ SWC 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 measues[d]**	**Remarks on Implementation[e]**
At vegetative stage	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	1. Weeding/ Thinning 2.Protection against diseases and pests	1. Weeding/ Thinning. 2. Life saving Irrigation 3. Opening of conservation furrows	
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy	1. Weeding/ Thinning 2. Protection against diseases and pests	1. Weeding/ Thinning. 2. Life saving Irrigation 3. Opening of conservation furrows 4. Spray of 2% urea in paddy.	
		Black gram			
		Groundnut			
		Green gram			
		Horse Gram			
		Sesame			
		Pigeon pea			

		Niger			
		Maize			
		Jute and Patsan			
		Ginger and Turmeric			
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy	1. Weeding 2.Protection against diseases and pests 3. Spray of 2% Potash	1. Spray of 2% urea. 2. Life saving Irrigation 3. Opening of conservation furrows	
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy	1. Weeding 2.Protection against diseases and pests 3. Spray of 2% Potash	1. Spray of 2% urea. 2. 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	1 Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	1. Protection against diseases and pests	1. Life saving Irrigation 2. Rainwater conserve during kharif for rabi crops	Sufficient power supply
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy	1. Protection against diseases and pests	1. Life saving Irrigation 2. Rainwater conserve during kharif for rabi crops	Sufficient power supply
		Black gram			
		Groundnut			
		Green gram			
		Horse Gram			
		Sesame			
		Pigeon pea			

		Niger			
		Maize			
		Jute and Patsan			
		Ginger and Turmeric			
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy	1. Protection against diseases and pests	1. Life saving Irrigation 2. Rainwater conserve during kharif for rabi crops	Sufficient power supply
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy	1. Protection against diseases and pests	1. Life saving Irrigation	Sufficient power supply

Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management[c]**	**Rabi Crop planning[d]**	**Remarks on Implementation[e]**
	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	1. Harvest at physiological maturity. 2. Provide supplemental irrigation if needed.	-	-
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy	1. Harvest at physiological maturity. 2. Provide supplemental irrigation if needed.	-	-
		Black gram			
		Groundnut			
		Green gram			
		Horse Gram			
		Sesame			
		Pigeon pea			
		Niger			

		Maize			
		Jute and Patsan			
		Ginger and Turmeric			
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy	1. Harvest at physiological maturity. 2. Provide supplemental irrigation if needed.	Early sowing of Gram, Pea, Lentil, Linseed, Toria,and Safflower.	Procurement of rabi seeds and Inputs should be provided in time through different agencies.
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy	1. Provide supplemental irrigation if needed.	1. Early sowing of Gram, Pea, Lentil, Linseed, Mustard, Safflower. 2. Rainfed wheat.	Procurement of rabi seeds and Inputs should be provided in time through different agencies.

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	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	NA	NA	NA
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy			
		Black gram			
		Groundnut			
		Green gram			
		Horse Gram			
		Sesame			
		Pigeon pea			
		Niger			
		Maize			
		Jute and Patsan			
		Ginger and Turmeric			

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]**
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy			
	Deep Clayey soils (Kanhar soil – Vertisol)	Paddy			

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	Sandy, light textured shallow soils. (Bhata soil - Entisol)	Black gram	NA	NA	-
		Groundnut			
		Green gram			
		Sesame			
		Niger			
		Maize			
	Loamy, shallow deep soils (Matasi soil - Inceptisol)	Paddy	No- change.	Furrow irrigation	-
		Black gram			
		Groundnut			
		Green gram			
		Horse Gram			
		Sesame			
		Pigeon pea			
		Niger			
		Maize			
		Jute and Patsan			
		Ginger and Turmeric			
	Clay loam, deep soils. (Dorsa soil-Alfisol)	Paddy	No-change	Proper bunding, Weed control,	Prefer short duration variety
	Deep Clayey soils	Paddy	No-change	Proper bunding,	Prefer short duration

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]**
	(Kanhar soil – Vertisol)			Weed control,	variety

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					

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	Sandy, light textured shallow soils. (Bhata soil - Entisol)				Prefer rainfed crop
	Loamy, shallow deep soils (Matasi soil - Inceptisol)				Prefer rainfed crop
	Clay loam, deep soils. (Dorsa soil- Alfisol)				Prefer rainfed crop
	Deep Clayey soils (Kanhar soil – Vertisol)				Prefer rainfed crop

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	1) Sandy, light and shallow soil. (Bhata soil - Entisol)				Prefer micro-irrigation. Mulching. Weeding.
	Loamy, shallow deep soils (Matasi soil - Inceptisol)				Prefer micro-irrigation. Mulching. Weeding
	Clay loam, deep soils. (Dorsa soil- Alfisol)				Life – saving irrigation, Weeding.
	Deep Clayey soils (Kanhar soil – Vertisol)				Life – saving irrigation, Weeding.

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[k]**	**Flowering stage[l]**	**Crop maturity stage[m]**	**Post harvest[n]**
Paddy	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.
Black gram				
Groundnut				
Green gram				
Horse Gram				
Sesame				
Pigeon pea				
Niger				
Maize				
Jute and Patsan				
Ginger and Turmeric				

B) Heavy rainfall with high speed winds in a short span[2]				
Paddy	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
Black gram				
Groundnut				
Green gram				
Horse Gram				
Sesame				
Pigeon pea				
Niger				
Maize				
Jute and Patsan				
Ginger and Turmeric				
C) Outbreak of pests and diseases due to un seasonal rains	**Recommended agro-chemicals should apply against the particular insects and diseases.**			
Paddy				
Black gram				
Groundnut				
Green gram				
Horse Gram				
Sesame				
Pigeon pea				
Niger				
Maize				
Jute and Patsan				
Ginger and Turmeric				

2.3 Floods

Condition	Suggested contingency measure[o]			
A) Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Paddy Black gram Groundnut Green gram Horse Gram Sesame Pigeon pea Niger Maize Jute and Patsan Ginger and Turmeric	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]				
Paddy Black gram Groundnut Green gram Horse Gram Sesame Pigeon pea Niger Maize Jute and Patsan Ginger and Turmeric	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 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 in Raigarh**			

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone **(Generally not occurs this type situation in Raigarh district)**

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave[p]				
Crop1				
Horticulture				
Crop1 (specify)				
Cold wave[q]				
Crop1				
Horticulture				
Crop1 (specify)				
Frost				
Crop1				
Horticulture				
Crop1 (specify)				
Hailstorm				
Crop1				
Crop2				
Horticulture				
Crop1 (specify)				
Cyclone				
Crop1				
Horticulture				
Crop1 (specify)				

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 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.	Construct wind breaks keep animals under shade during hot hours of the day, provide cooling fans in shades and also	

	Construction of wind breaks, keep curtains ready, arrange for heating devices.	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	Disposal of dead birds	

		management		
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 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.	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.		
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.	1. Harvest all the fish. 2. Stock water bodies with desirable species for culture. 3. Shallow derelict waters can	1. Stocking and management of grow out water bodies to improve growth of stock

	3. Provision for Rainwater harvesting 4. Deepening/Desilting of existing water bodies.	stocked with stunted fish seed for culture. 4. Pens of 0.2 to 0.5 ha may 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