State: KARNATAKA

Agriculture Contingency Plan for District: SHIMOGA

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Western Ghats And Coastal Plain, Hot Humid region (19.2)		
	Agro-Climatic Region (Planning Commission)	West coast plains and Ghat region (XII) Southern plateau and Hills region (X)		
	Agro Climatic Zone (NARP)	Nothern transition zone (KA-8) Hilly zone (KA-9)		
	List all the districts or part thereof falling under the NARP Zone	KA-8 Mysore, Hassan Chikmagalur,Davanagere Shimoga	KA-9 Chikmagalur, Shimoga, Kodagu, Hassan, Uttara Kannada, Dharwad , Haveri, Belgaum	
	Geographic coordinates of district	**Latitude**	**Longitude**	**Altitude**
		$13^0$55'20.10"N	75°34'14.73"E	631m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station , Navile, Shimoga- 577 204		
	Mention the KVK located in the district	Krishi Vignan Kendra, Navile, Shimoga -577 204		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (No.)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-September):	1470.3	52	June 1st week	September 4th week
	NE Monsoon(October-December):	200.2	21	October 1st week	December 1st week
	Winter (January-February)	11.2	2		
	Summer (March-May)	130.8	11		
	Annual	1812.5	86		

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)	847.8	223.7	276.9	88.5	163.5	16.3	26.9	13.3	11.3	30.3

1. 4	Major Soils (common names like shallow red soils etc.,)	Area ('000 ha)	Percent (%) of total geographical area
	Laterite clayey soils	118.3	22.0
	Red gravelly loam and Red loamy soils	84.4	15.7
	Alluvial loamy soils	61.1	11.4
	Red gravelly mixed with deep black soils	58.9	11.0
	Alluvial clayey and black clayey soils	37.8	7.0
	Red clayey soils	33.9	6.3
1.5	**Agricultural land use**	**Area ('000 ha)**	**Cropping intensity %**
	Net sown area	223.7	116.2 %
	Area sown more than once	36.2	
	Gross cropped area	259.9	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	133.8		
	Gross irrigated area	163.3		
	Rainfed area	89.9		
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**Percentage of total irrigated area**
	Canals		42.2	30.8
	Tanks	326	57.6	42.1
	Open wells	-	-	-
	Bore wells	14752	26.3	19.2
	Lift irrigation	-	-	-
	Micro-irrigation	-	-	-
	Other sources	-	10.8	7.9
	Total Irrigated Area	-	137.0	100.0
	Pump sets	-	-	-
	No. of Tractors	-	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited	-	-	
	Critical	2	Shikaripura - 47 Sorab - 4	
	Semi- critical	2	Shikaripura- 4 Shimoga - 20	
	Safe	7	89	
	Wastewater availability and use			
	Ground water quality	Presence of chemical constituent more than the permissible limit	Chemical quality of ground water in the district in general is suitable for all uses. Saline ground water in some selected areas of Tungabhadra command area in Shimoga and Bhadravati taluks have also been reported.	
		Type of water	Neutral to Alkaline type	
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

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

1.7		Major Field Crops cultivated	Area ('000 ha)					
			Kharif		*Rabi*		**Summer**	**Total**
			Irrigated	***Rainfed***	***Irrigated***	***Rainfed***		
	1	Paddy	66.9	41.4	-	-	17.9	126.1
	2	Maize	-	66.6	-	-	15.4	82.0
	3	Greengram	-	-	-	-	17.9	18
	4	Sugarcane	-	5.0	-	-	8.9	14
	5	Cotton	-	2.8	-	-	-	2.8
	6	Groundnut						0.8
		Horticulture crops - Fruits	**Total area**					
			11.5					
		Horticultural crops - Vegetables	**Total area**					
			0.9					
		Medicinal crops	**Total area**					
			0.03					
		Plantation crops	**Total area**					
			4.6					
		Fodder crops	**-**					
		Total fodder crop area	**-**					
		Grazing land	**-**					
		Sericulture etc	**-**					
		Others (Specify)	**-**					

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	214.3	284.5	498.9
	Crossbred cattle	9.9	70.8	80.7
	Non descriptive Buffaloes (local low yielding)	39.0	152.1	191.1
	Graded Buffaloes			
	Goat			61.6
	Sheep			25.1

	Others (Camel, Pig, Yak etc.)			1.3
	Commercial dairy farms (Number)			-
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	-	
	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)	**Farmer owned ponds (No.)**		**No. of Reservoirs**		**No. of village tanks**	
		100		09		4441	
	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)	10003.6		1.1		10712.1	
	Others	-		-		–	

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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
1	Rice	328.3	3094	-	-	61.9	3953	390.3	3522	-
2	Maize	214.3	3355	-	-	2.2	4563	216.5	3959	-
3	Sugarcane	79.6	105 (t/ha)	-	-	348.7	105	428.3	105 (t/ha)	-
4	Cotton	15.4	298	-	-	-	-	15.4	298	-
5	Groundnut	0.7	891	-	-	2.2	1670	2.9	1280.5	-
Others	Redgram	0.2	472	-	-		-	2.1	472	-
Major Horticultural crops										
1	Arecanut	-	-	-	-	-	-	44.4	1320	-
2	Coconut	-	-	-	-	-	-	0.7	103	-
3	Banana	-	-	-	-	-	-	107.1	21710	-
4	Ginger	-	-	-	-	-	-	29.4	10480	-
5	Mango	-	-	-	-	-	-	19.0	7850	-
6	Cashew	-	-	-	-	-	-	2.3	1490	-
7	Pepper	-	-	-	-	-	-	0.2	290	
8	Chilli	-	-	-	-	-	-	7.0	12530	-
9	Tomato	-	-	-	-	-	-	2.4	18700	-

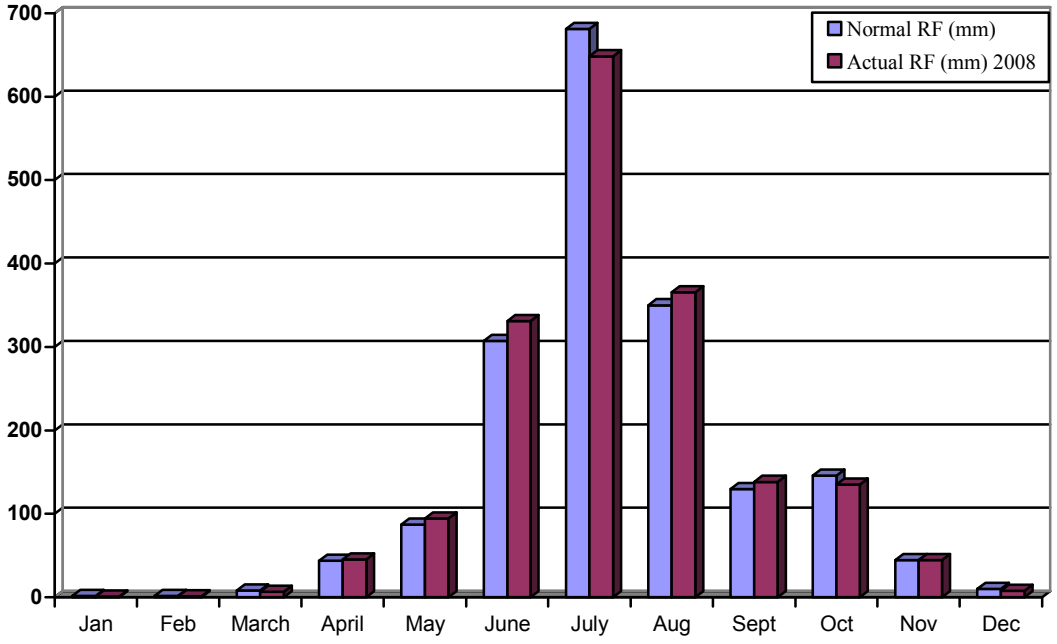
1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Maize**	**Paddy**	**Groundnut**	**Cotton**	**Redgram**
	Kharif- Rainfed	May 1st week to June 4th week	June 1st week to July 1st week	May to July 15th	May 1st week to June 15th	May 1st week to June Last week
	Kharif-Irrigated	June 1st week to July 4th week	June 1st week to July Last week	June 1st week to June 15th	-	-
	Rabi- Rainfed	-	-	November 2nd week to January 2nd week	-	-
	Rabi-Irrigated	-	-	December 4th week to January 2nd week	-	-

1.13	**What is the major contingency the district is prone to?** (Tick mark and mention years if known during the last 10 year period)	**Regular**	**Occasional**	**None**
	Drought		√	
	Floods		√	
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Pests and diseases (specify) Pl. give names of the crops and the pests Paddy: Blast, Brown Plant Hopper, Stem borer Maize: Downy mildew Arecanut: Koleroga		√	

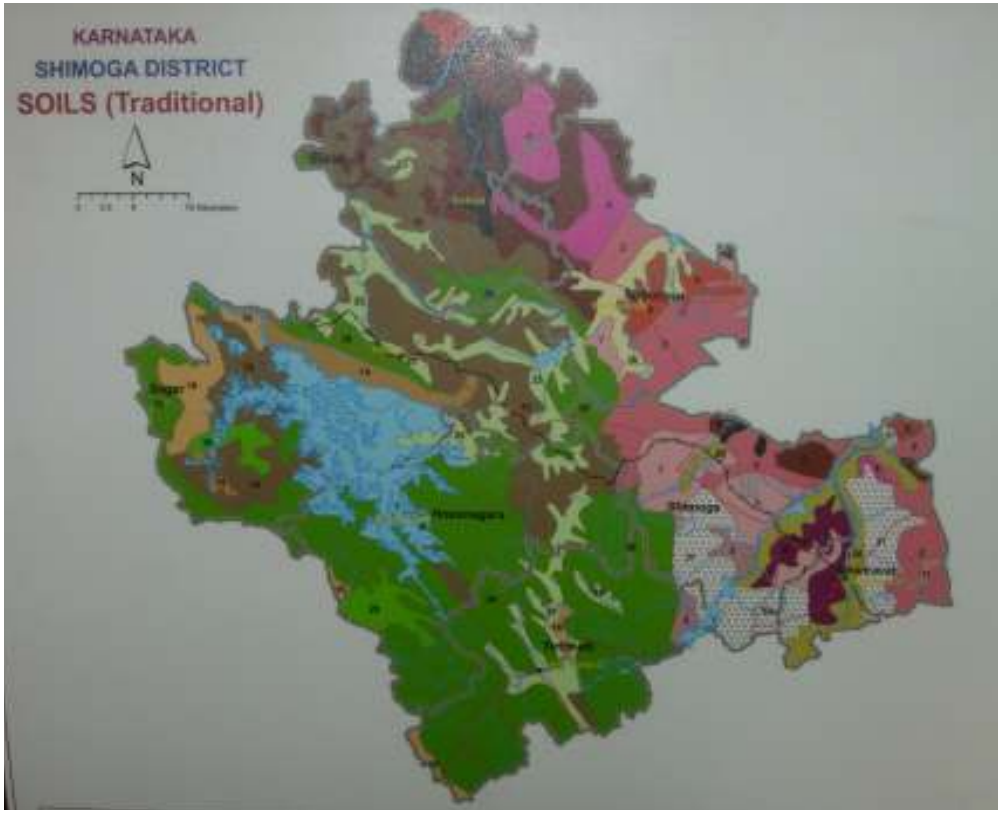
1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure 1	Enclosed: **Yes**
		Mean annual rainfall as Annexure 2	Enclosed: **Yes**
		Soil map as Annexure 3	Enclosed: **Yes**

Annexure – 1: Location Map Of Shimoga District In Karnataka

Annexure – 2: Actual (2008) and mean monthly rainfall of Shimoga.



Annexure – 3: Soil Map of Shimoga District



Source: NBSSLUP

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**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks June 3rd week	Red gravelly mixed with deep black soils	Maize	No change	Seed treatment with Metalaxyl @ 4g./kg	Supply of seeds through KSSC/NSP
		Cotton	Cotton + Chilli Cotton + Soybean Cotton + Greengram	-	-do-
		Redgram	No change	3 ft row spacing	Supply of seeds through NFSM, KSSC & KOP
	Red sandy soils under heavy and assured rainfall situation	Paddy	Drill sown paddy Use of medium duration Paddy varieties like IET-7191, KHP-2, KHP-5, IET-13901	-	Supply of seeds through NFSM & KSSC/NSP
	Red loamy soils	Groundnut	Groundnut(TMV -2) + Redgram (8:2) Prefer BRG-2 short duration Redgram variety for vegetable purpose	Seed treatment with Rhizobium soil application of Gypsum, earthing up, $ZnSO_4$ application @ 10 kg/ha.	Supply of seeds through KSSC & KOF/NSP

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 1st week	Red gravelly mixed with deep black soils	Maize	Maize + Redgram (3:1) Use BRG-2(Redgram variety) as intercrop	Seed treatment with Metalaxyl @ 4g./kg	Supply of seeds through KSSC/NSP

		Cotton	Maize + Redgram (3:1)	-	-do-
		Redgram	No change	2 ft row spacing	Supply of seeds through NFSM
	Red sandy soils Heavy and assured rainfall situation	Paddy	Drill sown paddy Use of medium duration Paddy varieties like IET-7191, KHP-2, KHP-5, IET-13901	-	-do-
	Red loamy soils	Groundnut	Sunflower / Ragi / Groundnut (TMV – 2) + Redgram (8:2)		Breeder seeds supply- UAS(B) F1 seeds supply – KSSC & KOP

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 3rd week	Red gravelly mixed with deep black soils	Maize	Maize intercropped with pulse crops viz., Cowpea, Blackgram, Greengram, Fieldbean	Seed treatment with Metalaxyl @ 4 g/kg	Supply of seeds through KSSC & NSP
		Cotton	-do-	Seed treatment with Metalaxyl @ 4 g/kg	-do-
		Redgram	Redgram (Use BRG-1 for vegetable purpose)/ Sunflower/ Frenchbean/ Fieldbean	60 cm row spacing	Supply of seeds through NFSM
	Red sandy soils Heavy and assured rainfall situation	Paddy	Low land – Prefer short duration Paddy varieties Up land - change to pulse crops viz.,Greengram, Blackgram, Cowpea, Fieldbean	-	Supply of seeds through NFSM
	Red loamy soils	Groundnut	Cowpea- KBC 1&2, TVX944 Soybean- KHSB-2 Sunflower – Morden French bean- S9	-	Supply of seeds through KSSC & NSP

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks August 1st week	Red gravelly mixed with deep black soils	Maize	Ragi Sowing of short duration Pulses and oil seeds viz., Cowpea/ Soybean/ Sunflower/ Blackgram	Seed hardening	Supply of seeds through KSSC, NSP Sunflower**:** Breeder seeds supply- UAS(B) F1 seeds supply – KSSC
		Cotton	-do-	-do-	Supply of seeds through KSSC, NSP Sunflower**:** Breeder seeds supply- UAS(B) F1 seeds supply – KSSC
		Redgram	Redgram / change to other pulses crop / short duration crops viz., Cowpea: KBC 1&3 Soybean: KHSB-2 Sunflower: Morden Ragi : GPU-45 & 48	-	-do
	Red sandy soils Heavy and assured rainfall situation	Paddy	Low land – Paddy (short duration) Up land -Cowpea Soybean, Hebbal avare 3 & 4	-	Supply of seeds through NFSM Supply of seeds through KSSC
	Red loamy soils	Groundnut	Short duration Ragi variety GPU-48, PR- 202, GPU-45 intercropped with Cowpea Soybean Sunflower	-do-	Supply of seeds through KSSC Sunflower: Breeder seeds supply- UAS(B) F1 seeds supply – KSSC & KOP

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Red gravelly mixed with deep black soils	Maize	Protective irrigation, re-sowing	Intercultivation, soil mulching and weed management practices.	Linkage with RKVY for Inter cultural implements and IWMP for Farm ponds
		Cotton	Intercultivation, weed management Protective irrigation	Mulching practices to conserve soil moisture	
		Redgram	Gap filling	Intercultivation, weed management	
	Red sandy soils Heavy and assured rainfall situation	Paddy	Use rock phosphate as fertilizer source, use of PSB, reduction in quantity of basal fertilizer dose	Weed management practices	
	Red loamy soils	Groundnut	Early season stress induces uniform flowering	Inter cultivation, weed management	

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

At vegetative stage	Red gravelly mixed with deep black soils	Maize	Reducing plant population. Protective irrigation	Seed hardening, soil mulch, inter cultivation, weed management	Implements under RKVY
		Cotton	use of anti transpirants	Inter cultivation, weed management, alternate furrow irrigation.	
		Redgram	Protective irrigation	Intercultivation, weed management, dead furrow opening	
	Red sandy soils Heavy and assured rainfall situation	Paddy	Protective irrigation	Weed management, use of stored water from tank and river, top dressing	
	Red loamy soils	Groundnut	-	Inter cultivation, weed management	

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Red gravelly mixed with deep black soils	Maize	Intercrops harvested for vegetable purpose	Mulching with leaves (Ex-situ), intercrops, protective irrigation. Tank silt application to conserve soil moisture.	Implements under RKVY
		Cotton	split application of fertilizer and mixing with soil Harvest of intercrops as vegetables	Mulching, Topping to reduce vertical growth	
		Redgram	Protective irrigation	Mulching	
	Red sandy soils Heavy and assured rainfall situation	Paddy	Split application of potash	-do-	

	Red loamy soils	Groundnut	Earthing up, protective irrigation	-do-	

Condition			Suggested Contingency measures		
Terminal drought	**Major Farming situation**	**Normal Crop/ cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	Red gravelly mixed with deep black soils	Maize	Protective irrigation, Maize crop to be harvested for table purpose, Redgram to be harvested as green pods, topping of maize if grain filling stage completed.	Dolichos bean-Hebbal avare 3 & 4 Horsegram variety KBH-1, PHG-9	-
		Cotton	Mulching with intercrop foliage	Cotton : DCH-32, DHB-105, NHH-44/ Chilli :Bellary red, Arka bindu, Arkalaalima, Byadagi, Arkalohit / Jowar : KHSB-2, KB-79, PS-16, PDM-84-178 (Hybrid jowar cultivars)/ Horsegram variety KBH-1, PHG-9	
		Redgram	Mulching with intercrop foliage	Horsegram, minor millets Horse gram variety KBH-1, PHG-9	
	Red sandy soils Heavy and assured rainfall situation	Paddy	Harvest the crop even at 75% maturity in Hemavathi and other long duration varieties	Blackgram varieties T-9, LBG-625/ Greengram varieties PDM-84-178, PS-16/ Soybean varieties KHSB-2, KB-79/ Chilli varieties Byadagi, Arkalohit	
	Red loamy soils	Groundnut	If possible protective irrigation, application of 0.1% borax	Sunflower/ Blackgram varieties T-9, LBG-625/ Greengram varieties PDM-84-178, PS-16,	

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed release of water in canals due to low rainfall	Low lands, canal irrigated red sandy soils and loamy soils	Paddy	Prefer Short duration verities Rasi, Mangala, KRH-1, KRH-2,IR-20, IR-64, Jyoti, MTU 1010	SRI method	
	Canal irrigated red soils	Sugarcane	No change	Improved package of practices, mulching in standing crop	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Limited release of water in canals due to low rainfall	Low lands, canal irrigated red sandy soils and loamy soils	Paddy	Prefer Short duration verities Rasi, Mangala, KRH-1, IR-20, Jyoti	SRI (System of Rice Intensification) method	Supply of seeds through KSSC & NSP
	Canal irrigated red soils	Sugarcane	No change	Paired row technique, single eye budded (seedlings raised in nursery), skip row irrigation, trash mulching, intercrop mulching	

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/ cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non release of water in canals under delayed onset of monsoon in catchment	Low lands, canal irrigated red sandy soils and loamy soils	Paddy (Upland)	Maize, Cowpea, Sunflower, Soybean, Groundnut, Ragi	Cover crops (Short duration pulses)	Supply of seeds through KSSC & NSP
		Paddy (Low land)	Prefer Short duration paddy varieties viz.,KHP-10, IR-20, Mangala		
	Canal irrigated red soils	Sugarcane	Ragi, Sunflower, Soybean, Pulses	-	-

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/ cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tank fed irrigated red sandy soils and loamy soils	Paddy for kharif/ Blackgram- Rabi	Cowpea, HA - 3 & 4, Pulses, Black gram, Greengram, Niger, Sunflower	-	-
	Tank fed red soils	Sugarcane	Ragi, Sunflower, Soybean, Pulses	-	-

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Tube well irrigated alluvial soils	Arecanut	-	Use of advanced irrigation system for water saving, mulching	-
		Banana	No change		
		Floriculture	No change		
		Vegetables (for both kharif and rabi season)	No change		

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	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Maize	Safe disposal of water, and application of Herbicide 2,4 -D Foliar application of NPK and micro nutrients in early stages, for crop recovery from excess moisture. .	Safe disposal of water Take up plant protection measures with endosulfan and mancozeb (both@ 0.2%) to manage stem borer, cob worm and diseases. De-top at physiological maturity to provide aeration for effective management of sheath blight and to avoid crop lodging	Safe disposal of water Postpone harvesting of crop till dry weather prevails	Transport to nearer ware house, store in dry and sheds, storage pest management

Paddy	Top dressing with 25 % of RFD	-	Take up Plant Protection measures to manage grain discoloration disease (0.2% mancozeb).	Transport to nearest ware house, store in dry sheds, storage pest management
Groundnut	Safe disposal of water	Safe disposal of water Take up PP measures to protect from foot rot, with carbendazim @ 0.1 %.	Safe disposal of water	Store in dry and shade sheds, storage pest management
Redgram	Safe disposal of water, chemical herbicide application	Safe disposal of water	Safe disposal of water	Store in dry sheds, storage pest management
Horticulture				
Arecanut	Draining out of excess water			Protected Storage
Banana				
Coconut				
Vegetables				
Floriculture				
Heavy rainfall with high speed winds in a short span				
Maize	Draining out of excess water Foliar spray with 2% urea	Drain out of excess water Foliar spray with 2% urea	Drain out of excess water	Protected Storage
Paddy				
Groundnut				
Cotton				
5. Redgram				
Horticulture				
Areca	Drain out of excess water	Drain out of excess water Wrapping and propping	Drain out of excess water Wrapping and propping	Protected Storage
Banana				
Coconut				
Vegetables				
Floriculture				

Outbreak of pests and diseases due to unseasonal rains	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Paddy	Blast (Carbendazim 0.1% Spraying) Stem borer (Spraying of Cartap hydrochloride 0.2 % or Carbofuran granules 8 kg/acre Brown plant hopper(Bufrofezin 0.02%) Root knot nematode (Applying carbofuran 8 kg/acre)	Blast (Carbendazim 0.1% Spraying) Sheath blight Sheath rot Brown plant hopper(Bufrofezin 0.02%) Gundhi bug Udubatta disease Grain Discoloration	Neck blast Sheath rot	Rice weevil Khapra beetle Rice moth
Maize	Shoot fly (Spraying of Quinolphos 2ml/l Stem borer (Profenophos @ 2ml/l) Downey mildew (Mancozeb 0.2%)	Downey mildew (Mancozeb 0.2%) Turcicum leaf blight Sheath blight Grain mould	-	Grain smut
Sugarcane	Internode borer (quinolphos and releasing of parasitoids) Top shoot borer (quinalphos and releasing of parasitoids) Cercospora leaf spot (Carbendazim 0.1 %) Wooly aphid (Parasite Dipha aphidivora)	Internode borer (quinalphos and releasing of parasitoids) Smut Wooly aphid (Parasite Dipha aphidivora)	Wooly aphid (Parasite Dipha aphidivora)	Red rot
Groundnut	Early leaf spot (Mancozeb 0.1 %)	Tikka leaf spot (Carbendazim 0.1%)	Collar rot	Afflatoxin
Cotton	Aphids Thrips White fly (Spraying of indaxacarb 0.1% for all these insect pests)	Bollworms Angular Leaf spot / Blackarm disease - Streptocycline sulphate 1gm/10 l + COC 3gm/l	Bollworms Angular leaf spot / black arm Boll rot	-
Horticulture				

Arecanut	-	Inflorescence die back	Fruit rot (Koleroga)	
Banana	Panama wilt Sigatoka leaf spot (for both the disease Carbendazim 0.1 %)	Panama wilt -Carbendazim 0.1 %)	Panama wilt -Carbendazim 0.1 %)	Anthracnose
Ginger	Rhizome rot (Soil drenching of 0.2 % Mancozeb + Metalaxyl)	Rhizome rot (Soil drenching of 0.2 % Mancozeb + Metalaxyl)	Rhizome rot (Soil drenching of 0.2 % Mancozeb + Metalaxyl)	Rhizome rot (Soil drenching of 0.2 % Mancozeb + Metalaxyl)
Coconut	Bud rot – Application of Bordeaux 1 % mixture or calixin)	-	Bud rot – Application of Bordeaux 1 % mixture or calixin)	-

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Maize	Safe disposal of water Resowing in affected areas	Safe disposal of water Spray with water soluble NPK fertilisers	Safe disposal of water	
Paddy	Use of flood tolerant varieties viz., Swarna sub-1 Resowing / Transplanting	Safe disposal of water	-do-	
Groundnut	Safe disposal of water Resowing	Safe disposal of water Spray with water soluble NPK fertilizers	Safe disposal of water	
Cotton	Safe disposal of water Sowing of maize	Safe disposal of water	-do-	
Redgram	Safe disposal of water Resowing using short duration varieties	-do-		
Horticulture				
Arecanut	Drain out excess water	Drain out excess water	Drain out excess water	

Banana	-do-	do-	do-	
Coconut	do-	do-	do-	
Continuous submergence for more than 2 days				
Maize	Safe disposal of water	Safe disposal of water	Safe disposal of water	
Paddy	Use of flood tolerant varieties viz., Swarna sub-1	-do-	-do-	
Groundnut	Safe disposal of water Resowing after normalcy restored.	-do-	-do-	
Cotton	Safe disposal of water Sowing maize after normalcy restored.	-do-	-do-	
Redgram	Safe disposal of water Sowing maize after normalcy restored.	-do-	-do-	
Horticulture				
Arecanut	Drain out excess water	Drain out excess water	Drain out excess water	
Banana	-do-	Propping can be done to avoid crop lodging	-do-	
Coconut	-do-	-do-	-do-	
Sea water intrusion	NA			

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

Extreme event type	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	**NA**			
Cold wave				
Frost				
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought	As the district is occasionally prone to drought the following measures to be taken to ameliorate the fodder deficiency Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production. Available Bajra/sorghum stoverand groundnut haulms should be properly stored for future use. Encourage silage making with available maize fodder and sugar cane tops in the villages Collection of groundnut haulms and groundnut cake for use as feed supplement during drought Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality chaff cutters. Harvesting and collection of perennial	Harvest and use biomass of dried up crops (Paddy, Maize, Green gram, Ground nut, Ragi, Soybean, Cowpea, Blackgram, Greengram, Fieldbean etc.,) material as fodder. Use of unconventional and locally available cheap feed ingredients especially groundnut cake and haulms as protein supplement for livestock during drought Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Continuous supplementation of mineral mixture to prevent infertility Harvest the tree fodder (Neem, Subabul, Acasia, Pipal etc) and unconventional feeds resources available and use as fodder for livestock (LS). Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals Advise the farmers about the practice of mixing available kitchen waste with dry fodder while feeding	Training/educating farmers for feed & fodder storage. Maintenance / repair of silo pits and feed/fodder stores. Encourage progressive farmers to grow fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall etc., on their own lands & supporting them with assisting infrastructures like seeds, manure. Supply of quality fodder seed (multi cut sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass well before monsoon Replenish the feed and fodder banks

	vegetation particularly grasses which grow during monsoon Proper drying, bailing and densification of harvested grass from previous season Creation of permanent fodder, feed and fodder seed banks in all drought prone villages		
Floods	In case of early forewarning (EFW), harvest all the crops (Paddy, Maize, Green gram, Ground nut, Ragi, Soybean, Cowpea, Blackgram, Greengram, Fieldbean etc.) that can be useful as fodder in future (store properly) Don't allow the animals for grazing if severe floods are forewarned In flood prone mandals, arrange for storing minimum required quantity of hay (25-50kg) and concentrates (25kgs) per animals in farmer / LS keepers house / shed for feeding animals during floods Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency	Transportation of animals to elevated areas Stall feeding of animals with stored hay and concentrates Proper hygiene and sanitation of the animal shed In severe floods, un-tether or let loose the animals Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Deworming with broad spectrum dewormers Vaccination against possible disease out breaks like HS, BQ, FMD and PPR Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder.

	Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations Capacity building and preparedness of the stakeholders and official staff for the unexpected events Capacity building and preparedness of the stakeholders and official staff for the unexpected events		
Cyclone	**NA**		
Heat & Cold wave	**NA**		
Health and Disease management	List out the endemic diseases (species wise) in that district Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district	Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Rescue of sick and injured animals and their treatment Rescue of sick and injured animals and their treatment	Conducting mass animal health camps Conducting fertility camps Mass deworming camps
Drinking water	Identification of water resources Rain water harvesting and create	Restrict wallowing of animals in water bodies/resources	Bleach (0.1%) drinking water / water sources

	water bodies/watering points (when water is scarce use only as drinking water for animals)		Provide clean drinking water
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2 Poultry

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
Floods			
Shortage of feed ingredients	In case of early forewarning of floods, shift the birds to safer	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed Deworming and vaccination against RD

	place Storing of house hold grain like maize, broken rice, bajra etc,	Culling of weak birds	
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	In case of EFW, add antibiotic powder (Terramycin/Ampicilline/ Ampiclox etc., 10g in one litre) in drinking water to prevent any disease outbreak	Prevent water logging surrounding the sheds through proper drainage facility Assure supply of electricity by generator or solar energy or biogas Sprinkle lime powder to prevent ammonia accumulation due to dampness	Sanitation of poultry house Treatment of affected birds Disposal of dead birds by burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
Cyclone	**NA**		
Heat & Cold wave	**NA**		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
1) Drought			
A. Capture	-	-	-
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	• Sustain the water depth	• Rearing of early stage fish seeds for 15-20 days	• Harvest and sale the crop
(ii) Changes in water quality	• Sustain the inflow of water	• Maintain low stocking density	• Harvest and sale the crop

		• Common carps or Mrugal carps are suitable	
(iii) Any other		• Cultivate commercial aquatic weeds like Azolla, lemna, plankton production	• Harvest and sale • Weeds can be used as feed for other fishes & livestock
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	-	-	-
(ii) Impact of salt load build up in ponds / change in water quality	-	-	-
(iii) Any other	-	-	-
2) Floods			
A. Capture		-	-
Marine	-	-	-
Inland			
(i) Average compensation paid due to loss of human life	• Asses the intensity of loss	• Shifting of domicile	• Temporary sheds have to be provided • Information regarding help line
(ii) No. of boats / nets/damaged	-	-	-
(iii) No.of houses damaged	-	-	-
(iv) Loss of stock	-	-	-
(v) Changes in water quality	-	-	-
(vi) Health and diseases	-	-	-
B. Aquaculture			
(i) Inundation with flood water	• Precautionary measures for inlet and outlet valves of the cultured area	• Flooded water should be diverted away from the culture pond / tanks • Provide drainage for flood water	• Check out water quality parameters and depth of water and confirm the stock
(ii) Water continuation and changes in water quality	• Asses the un towards of the flood water	• Strengthen the pond / tank bunds, dykes	• Maintain the water depth and check out the stock of fish
(iii) Health and diseases	-	• Application of potassium permanganate as per recommendation	• Harvest the crop and remove disease affected stock and apply lime and potassium permanganate
(iv) Loss of stock and inputs (feed, chemicals etc)	• Immoderately harvest the fish before the flood	-	• Maintain the remaining stock of lesser growth fishes
(v) Infrastructure damage (pumps, aerators, huts etc)	• Shift the equipments to the safer places	• Temporary diversion of inflow water through drainage away from the pond	• Re-assemble the infrastructure for sustainability
(vi) Any other	• Information to the flood relief authority for precautionary measures	-	• Insurance may be claimed depending on the intensity of loss

3. Cyclone / Tsunami	NA
4. Heat wave and cold wave	