STATE: KARNATAKA

AGRICULTURE CONTINGENCY PLAN FOR DISTRICT: BAGALKOT

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Karnataka Plateau (including Rayalaseema region of A.P.) AER (3.0)			
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hill Region (X)			
	Agro Climatic Zone (NARP)	Northern Dry Zone (KA-3)			
	List all the districts or part thereof falling under the NARP Zone	Entire district: Bagalkot, Bijapur, Gadag, Bellary, Koppal Part of district: Belgaum, Dharwad, Raichur, Davanagere			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		16º 12′ N - 16º 46′ N	74º 59′ E 76º 20′ E	533.0 m AMSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Associate Director of Research Regional Agricultural Research Station, P. B.No. 18 BIJAPUR - 586 101			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Badami Road , Bagalkot-587 101			
1.2	**Rainfall**	**Average (mm)**	**No. of Rainy Days**	**Normal Onset**	**Normal Cessation**
	SW monsoon (June-Sep):	360	25	2nd week of June	-
	NE Monsoon (Oct-Dec):	136	8		2nd week of November
	Winter (Jan- Feb)	8	1		-
	Summer (Mar-Apr-May)	80	6		-
	Annual	585	40		-

1.3	Land use pattern of the district (latest statistics)	Geographical 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)	658.9	81.1	28.8	3.4	2.0	0.3	24.8	40.1	10.0

1. 4	Major Soils	Area ('000 ha)	Percent (%) of total
	Medium black soils	149	27
	Deep black soils	134	24
	Red sandy soils	77	14
	Red and black mixed soils	76	14
	Shallow black soils	69	12
	Red loamy soils	40	7

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	459.8	119.1
	Area sown more than once	88.0	
	Gross cropped area	547.9	

1.6	**Irrigation**	**Area ('000 ha)**	**Per cent (%)**	
	Net irrigated area	214.4	37	
	Gross irrigated area	241.3		
	Rainfed area	245.4	63	
	Sources of Irrigation	**Number**	**Area ('000 ha)**	**% area**
	Canals	NA	47.5	20.8
	Tanks	NA	0.8	0.4
	Open wells	NA	11.6	5.0
	Bore wells	6227	80.3	35.1
	Lift irrigation	NA	23.0	10.0
	Other sources	NA	85.6	37.4

	Total	NA	228.7	100
	Pumpsets	NA		
	Micro-irrigation	NA		
	Groundwater availability and use	**No. of blocks**	**% area**	**Quality of water**
	Over exploited	-		
	Critical	critical		
	Semi- critical	-		
	Safe	-		
	Wastewater availability and use	-		

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

1.7		Major Field Crops cultivated	Area ('000 ha)*					
			Kharif		*Rabi*		*Summer*	*Total*
			Irrigated	**Rainfed**	**Irrigated**	**Rainfed**		
	1	Sorghum	3.045	2.194	20.048	114.735	-	140.02
	2	Sugarcane	65.74	-	15.98	-	2.33	84.04
	3	Maize	44.41	-	20.43	-	2.83	67.67
	4	Greengram	0.006	19.90	-	-	-	19.91
	5	Groundnut	0.980	1.20	-	-	16.61	18.79
	6	Chickpea	-	0.002	0.069	0.035	0.11	0.22

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	128.9	145.2	274.2
	Crossbred cattle	3.3	27.5	30.9
	Non descriptive Buffaloes (local low yielding)	24.356	229.2	253.6
	Graded Buffaloes			
	Goat			430.6
	Sheep			673.6
	Others (Pig +Dogs + Rabbit)			35.78
	Commercial dairy farms (Number)			93
1.9	**Poultry**	**No. of farms**	**Total No. of birds (number)**	
	Commercial	206	767330	
	Backyard		286857	
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)	
		Not Applicable	**-do-**	**do-**	**do-**	**do-**	**do-**
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		10		**0**		**26**	
	B. Culture						
		Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**	
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	**Not Applicable**		**-do-**		**-do-**	
	ii) **Fresh water** (Data Source: Fisheries Department)	6.0		0.25		1.50	
	Others						

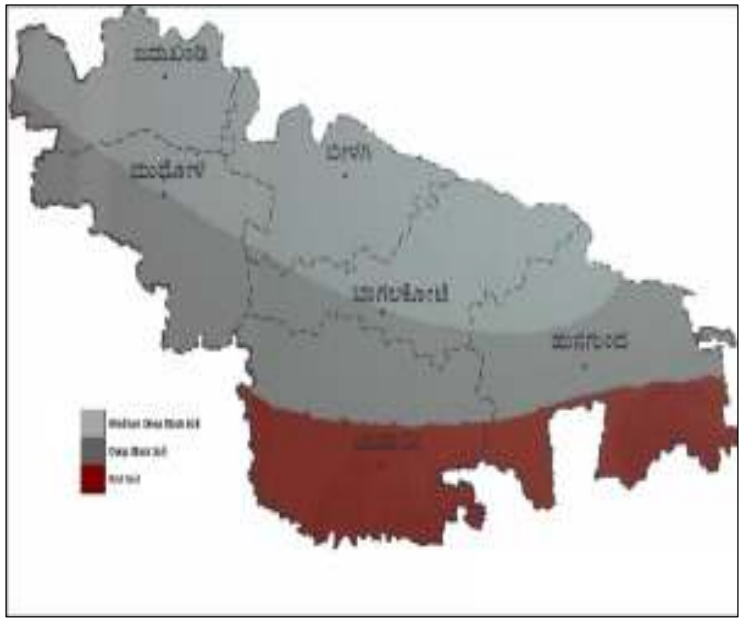
1.11	**Production and Productivity of major crops)**	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production ('000 t)	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**
	Sorghum	122.5	2200	90.2	750	-	-	102.4	814
	Sugarcane	5439.6	90000	763.8	95000	96.9	95000	6,300.3	90000
	Maize	223.9	4000	85.3	4000.0	7.2	4000	316.4	4000
	Greengram	13.0	349	-	-	-	-	13.0	349
	Groundnut	7.1	1250	-	-	35.2	1250	42.3	1250
	Chickpea	-	-	36.5	550.0	-	-	36.5	550

1.12	**Sowing window for 5 major crops (start and end of sowing period)**	**Sorghum**	**Sugarcane**	**Maize**	**Greengram**	**Groundnut**
	Kharif- Rainfed	3 rd June to 1 st July	-	-	14 th May to17 th June	3 rd June to 15 th July
	Kharif-Irrigated	3 rd June to 1 st July	1st July to 20 th August	3 rd June – 23 rd July	-	3 rd June – 15 th July
	Rabi- Rainfed	3 rd September to 28 th October	-	-	-	-
	Rabi/summer-Irrigated		3 rd September to 28 th October	1st October to 19 th November	-	2 nd December to 4 th - January

1.13	**What is the major contingency the district is prone to?**	Regular	Occasional	None
	Drought	√		
	Flood		√	
	Cyclone		√	
	Hail storm		√	
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Pests and diseases (specify)		√	

`` 1.14	**Include Digital maps of the district for**	**Location map of district with in State as Annexure I**	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes


Agro Climatic Zones of Karnataka
NORTH EASTERN TRANSITION ZONE
NORTH-EASTERN DRY ZONE
NORTHERN DRY ZONE
NORTHERN TRANSITION ZONE
HILLY ZONE
COASTAL ZONE
CENTRAL DRY ZONE
SOUTHERN TRANSITION ZONE
EASTERN DRY ZONE
SOUTHERN DRY ZONE
KSRSAC



Bagalkot district map

Source : NBSS & LUP

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situations

Condition	**Major Farming situation**	**Crop/cropping system**		**Suggested Contingency measures**			
Delayed onset				**Change in crop/ cropping system**		**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (June 4th week)	Kharif cropping area in shallow black soils and red soils	Pearl millet		No change			
		Ground nut - bunch /spreading					
		Pigeonpea					
		Greengram					
		Bajra + Pigeonpea (2:1)					
		Ground nut (bunch/spreading) + Pigeonpea (4:2)					
		Sunflower					
Kharif sowing : I FN of July	Cropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	-	
		Follow *in situ* moisture conservation practices like .ridges and furrows, compartment bunding and mulching with crop residues.	Rabi sorghum, Safflower, Sunflower, Cotton, Chickpea, Rabi sorghum + Chickpea (2:1) Chickpea + Safflower (4:2)	No change	No change	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *rabi* crops	
		Greengram	Sorghum	-	-	-	
		Greengram	Safflower	-	-	-	
		Groundnut bunch/ Spreading	Sunflower	-	-	-	
		Pigeonpea	-	No change	-	-	
	Cropping in margina/denuded shallow soils	Horsegram	-	No change	-	-	
		Mothbean (BMB-40)	-		-	-	
		Pearl Millet+Horsegram/ mothbean	-	No change	-	-	

		Natural pastures	-	Tree borne oilseed (TBO) based silvipasture systems like Pongamia+ Anjan grass/Stylo			
		Setaria (RS-118, HMT-1)	-	No change			

Condition	**Major Farming situation**	**Crop/cropping system**		**Suggested Contingency measures**			
Delayed onset				**Change in crop/ cropping system**		**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks (July 2nd week)	Kharif cropping area in shallow black soils and red soils	Pearl millet		No Change			
		Ground nut - bunch Spreading		Pearl millet (ICTP 8203 and ICMV 221)			
		Pigeon pea		No change			
		Greengram		Sunflower (KBSH-41 and KBSH-53)			
		Pearl millet + Pigeonpea (2:1)		No change			
		Ground nut (bunch) + Pigeonpea (4:2)		Pigeonpea (Maruti, TS 3 R)			
		Sunflower		-			
Kharif sowing: II FN of July	Cropping area in Rabi Season in Deep black soils and both .kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***		
		Follow in situ moisture conservation practices like .ridges and furrows, compartment bunding and mulching of crop residues.	Rabi sorghum, Safflower, Sunflower, Cotton, Chickpea, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change	No change	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during kharif for regular sowing of *Rabi* crops	

		Green gram	Rabi sorghum				
		Green gram	Safflower				
		Ground nut	Sunflower				
		Pigeon pea	-				
	Cropping in denuded shallow soils	Horsegram	-				
		Mothbean	-				
		Pearl Millet+Horsegram/mothbean	-				
		TBO based silvipasture systems like Pongamia+ Anjan grass/Stylosanthus	-				
		Setaria	-				

Condition	**Major Farming situation**	**Crop/cropping system**	**Suggested Contingency measures**		
Delayed onset			**Change in crop/ cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks (July 4th week) **Kharif sowing: I FN of Aug**	Kharif cropping area in shallow black soils and red soils	Pearl millet	No Change		
		Ground nut bunch (or) Spreading	Ground nut (spreading)		
		Pigeon pea	No change		
		Greengram	Sunflower (KBSH-41 and KBSH-53)		
		Pearl millet + Pigeonpea (2:1)	No change		
		Ground nut (bunch/Spreading) + Pigeonpea (4:2)	Pigeonpea (KBSH-41 and KBSH-53)		

		Sunflower		-		-	
	Ccropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	-	
		Follow in situ moisture conservation practices like .Ridges and furrows, compartment bunding and mulching of crop residues..	Rabi sorghum, Safflower, Sunflower, Bt Cotton, Chickpea, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change		Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during kharif for regular sowing of *Rabi* crops	
		Green gram	Rabi sorghum				
		Green gram	Safflower				
		Ground nut	Sunflower				
		Pigeon pea	-				
	Cropping in denuded shallow soils	Horsegram					
		Mothbean					
		Pearl Millet+Horsegram/mothbean					
		TBO based silvipasture systems like Pongamia+ Anjan grass/Stylosanthus					
		Setaria (RS-118, HMT-1)					

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures				
Delayed onset			**Change in crop/ cropping system**		**Agronomic measures**		**Remarks on Implementation**
Delay by 8 weeks (Aug 2nd week) **Kharif sowing: II FN of Aug**	Kharif cropping area in shallow black soils and red soils	Pearl millet	Horse gram (GPM-6)		-		-
		Ground nut bunch or Spreading	Sunflower (KBSH-1, KBSH-53)		Early maturing genotypes (90-95 days)		Wide row spacing (120-135 cms)
		Pigeon pea	Horse gram (GPM-6)		-		-
		Greengram	Sunflower (KBSH-1, KBSH-53)		Early maturing genotypes (90-95 days) duration may be mentioned		Wide row spacing (120-135 cms) (spacing may be given)
		Pearl millet + Pigeonpea (2:1)	Horse gram (GPM-6)				
		Ground nut (bunch) + Pigeonpea (4:2)	Sunflower (KBSH-1, KBSH-53)				
		Sunflower	-				
	Cropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	-	-
		Follow *in situ* moisture conservation practices like .Ridges and furrows, compartment bunding and mulching of crop residues..	Rabi sorghum, Safflower, Sunflower, Cotton, Chickpea, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No Change	No Change	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *Rabi* crops	
		Green gram	Rabi sorghum	Fallow	Rabi sorghum (M 35-1, DSV-4, DSV-5, 5-4-1, CSV-22)	-	
		Green gram	Safflower		Safflower (A-1, A-2)	-	

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures				
Delayed onset			Change in crop/ cropping system		Agronomic measures		Remarks on Implementation
		Ground nut	Sunflower		Sunflower (KBSH-1, KBSH-53)	-	
		Pigeon pea	-	Sunflower (KBSH-1, KBSH-53)	-	-	
	Cropping in denuded shallow soils	Horsegram		No change			
		Mothbean		-			
		Pearl Millet+Horsegram/mothbean		Horse gram (GPM-6)			
		TBO based silvipasture systems like Pongamia+ Anjan grass/Stylosanthus		No change			
		Setaria (RS-118, HMT-1)					

Condition	Major Farming situation	Crop/cropping system		Suggested Contingency measures			
				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.	Kharif cropping area in shallow black soils and red soils	Pearl millet		65-70 % plant population may be maintained and intercultivation,		Opening of conservation furrows at a distance of 15-20 m.The distance is irrespective of row spacing.	
		Pigeon pea					
		Ground nut - bunch		Weeding and intercultivation			
		Greengram		Intercultivation			
		Pearl millet + Pigeonpea (2:1)					
		Ground nut (bunch) + Pigeonpea (4:2)					
		Sunflower		65-70 % plant population may be maintained and intercultivation			
	Cropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *Rabi* crops	
		Follow *in situ* moisture conservation practices like .Ridges and furrows, compartment bunding and mulching of crop residues.	Rabi sorghum, Safflower, Sunflower, Cotton, Chickpea, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change	No change		
		Green gram (Pusa baisaki, S-4)	Rabi sorghum	Intercultivation		Opening of conservation furrows at a distance of 15-20 m. The distance is irrespective of row spacing.	
		Green gram (Pusa baisaki, S-4)	Safflower				
		Ground nut (TMV-2, S-230, Mardur local)	Sunflower	Weeding and intercultivation			
		Pigeon pea	-	Thinning and intercultivation			

Condition	Major Farming situation	Crop/cropping system		Suggested Contingency measures			
				Crop management		Soil nutrient & moisture conservation measures	Remarks on Implementation
	Cropping in denuded shallow soils	Horsegram	-	Intercultivation		Opening of conservation furrows at a distance of 15-20 m. The distance is irrespective of row spacing.	
		Mothbean	-				
		Pearl Millet+ Horsegram/mothbean	-				
		TBO based silvipasture systems like Pongamia+ Anjan grass/ Stylosanthus	-				
		Setaria	-				-
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) **At vegetative stage**	Rainfed Kharif cropping area in shallow black soils and red soils	Pearl millet		Repeated intercultivation		Opening of conservation furrows at a distance of 15-20 m. The distance is irrespective of row spacing.	-
		Ground nut - bunch		Weeding and earthing up			-
		Pigeon pea		Intercultivation			-
		Greengram		-			-
		Pearl millet + Pigeonpea (2:1)		Intercultivation			-
		Ground nut (bunch) + Pigeonpea (4:2)		Weeding and earthing up			-
		Sunflower		Intercultivation			-
	Cropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *Rabi* crops	
		Follow in situ moisture conservation practices like Ridges and furrows, compartment bunding and mulching of crop residues.	Rabi sorghum , Safflower, Sunflower, Cotton, Horse gram, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change	No change		
		Green gram	Rabi sorghum	-		-	

Condition	Major Farming situation	Crop/cropping system		Suggested Contingency measures		
				Crop management	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
		Green gram	Safflower	-		
		Ground nut	Sunflower	Weeding and earthing up	-	
		Pigeon pea	-	Intercultivation	-	
	Cropping in denuded shallow soils	Horsegram	-	Intercultivation	Opening of conservation furrows at a distance of 15-20 m The distance is irrespective of row spacing.	
		Mothbean	-			
		Pearl Millet+Horsegram/ mothbean	-			
		TBO based silvipasture systems like Pongamia+ Anjan grass/Stylosanthus	-	-		
		Setaria	-	-		
Mid season drought (Long dry spell) at flowering/ fruiting stage	Kharif cropping area in shallow black soils and red soils	Pearl millet		Spray anti-transpirants Kaoline (4%) or harvest the crop for fodder and allow for ratooning		
		Ground nut -bunch		-		
		Pigeon pea		Spray anti-transpirants Kaoline (4%)		
		Greengram		Incorporate biomass of Greengram in soil.		
		Sunflower		Spray anti-transpirants Kaoline (4%)		
		Pearl millet + Pigeonpea (2:1)				
		Ground nut (bunch) + Pigeonpea (4:2)		-		

Condition	Major Farming situation	Crop/cropping system		Suggested Contingency measures			
				Crop management		Soil nutrient & moisture conservation measures	Remarks on Implementation
	Cropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *Rabi* crops	
		Follow in situ moisture conservation practices like ridges and furrows, compartment bunding, mulching of crop residues	Rabi sorghum , Safflower, Sunflower,Cotton, Horse gram, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change	No change		
		Green gram	Rabi sorghum	Incorporate biomass of Greengram in soil.		Opening of conservation furrows at a distance of 15-20 m The distance is irrespective of row spacing.	
		Green gram	Safflower				
		Pigeon pea	-	Intercultivation			
		Ground nut	Sunflower	-		-	
	Cropping in denuded shallow soils	Horsegram	-	Harvest as fodder			
		Mothbean	-				
		PearlMillet+ Horsegram/ mothbean	-				
		TBO based silvipasture systems like Pongamia+ Anjan grass/Stylosanthus	-	-		Opening of conservation furrows at a distance of 15-20 m The distance is irrespective of row spacing.	
		Setaria	-	Harvest as fodder			-

Terminal drought	Kharif cropping area in shallow black soils and red soils	Pearl millet		Harvest at physiological maturity			
		Ground nut - bunch		-			
		Pigeon pea		-			
		Greengram		Harvest available pods			
		Pearl millet + Pigeonpea (2:1)		Harvest pearl millet at physiological maturity			
		Ground nut (bunch) + Pigeonpea (4:2)		-			
		Sunflower		-			
	Ccropping area in Rabi Season in Deep black soils and both Kharif & Rabi in medium deep black soils	***Kharif***	***Rabi***	***Kharif***	***Rabi***	Compartment bunding/ridges and furrows/Tied ridges to conserve the rain water during *kharif* for regular sowing of *Rabi* crops	
		Follow in situ moisture conservation practices like ridges and furrows, compartment bunding, mulching of crop residues	Rabi sorghum , Safflower, Sunflower, Cotton, Horse gram, Rabi sorghum + Chickpea (2:1), Chickpea + Safflower (4:2)	No change	No change		
		Green gram	Rabi sorghum	Harvest available pods			
		Green gram	Safflower	Incorporate biomass of Greengram in soil.			
		Ground nut	Sunflower	-			
		Pigeon pea	-	-			
	Cropping in denuded shallow soils	Horsegram		Harvest as fodder			
		Mothbean					
		Pearl Millet+ Horsegram/ mothbean					
		TBO based silvipasture systems like Pongamia+ Anjan grass/ Stylosanthus				Opening of conservation furrows at a distance of 15-20 m	
		Setaria					

2.1.2 Irrigated situation

Condition	Major Farming situation[a]	Crop/cropping system[b]		Change in crop/ cropping system[c]		Agronomic measures[d]	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Cropping with canal irrigation both in black soils and red soils	*Kharif*	*Rabi*	*Kharif*	*Rabi*		
		Maize	Sugarcane	No change	No change	Once in two days give alternate furrow irrigation during *kharif*	
		Sunflower	Maize				
		Maize	Chickpea / Wheat				
		Maize	Groundnut				
		Ground nut	Sunflower / Chickpea	Sunflower (KBSH-41 and KBSH-53)	Groundnut (TMV-2, S-230, Mardur local)/ Chickpea (A-1, ICCV-10, GVS-964, ICCV-2)	Broad bed and furrow irrigation during kharif	
		Groundnut	Sunflower	Sunflower (KBSH-41 and KBSH-53)	Ground nut (TMV-2, S-230, Mardur local)		
		Bt-cotton	-	Bt.Cotton	-	Transplant 25-30 days aged seedlings. Alternatively alternate furrow irrigation	
		Pigeonpea	-	Pigeonpea (Maruti, TS 3 R)	-		
		Sugarcane	-	No Change	-	Once in two days give alternate furrow irrigation during *kharif* Trash mulching	
		Sugarcane + Soybean	-	Sugarcane (COC-671, CO-86032, CO-94012)	-		
		Sunhemp (green manuring)	Sugarcane / wheat/ Maize	No change	No change		

Condition	Major Farming situation[a]	Crop/cropping system[b]		Change in crop/ cropping system[c]		Agronomic measures[d]	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	**Cropping with canal irrigation both in black soils and red soils**	Maize	Sugarcane	-	No Change	Once in two days give alternate furrow irrigation during *kharif*	
		Sunflower	Maize	No change	Chickpea (A-1, ICCV-10, GVS-964, ICCV-2)		
		Maize	Chickpea / Wheat		No change		
		Maize	Groundnut				
		Ground nut	Sunflower Chickpea	Sunflower (KBSH-41 and KBSH-53)	Groundnut (TMV-2, S-230, Mardur local) / chickpea (A-1, ICCV-10, GVS-964, ICCV-2)	Broad bed and furrow irrigation during kharif	
		Groundnut	Sunflower	Sunflower (KBSH-41 and KBSH-53)	Chickpea (A-1, ICCV-10, GVS-964, ICCV-2) / Ground nut (TMV-2, S-230, Mardur local)		
		Cotton	-	Cotton (Rasi and Buuny)	-	Transplant 25-30 days aged seedlings. Alternatively alternate furrow irrigation	
		Pigeonpea	-	Pigeonpea (Maruti, TS 3 R)	-		
		Sugarcane	-		-	Once in two days give alternate furrow irrigation during *kharif*	
		Sugarcane + Soybean	-		Sugarcane (COC-671, CO-86032, CO-94012)		
		Sunhemp	Sugarcane /Wheat / Maize		No change		
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Cropping with tank bed /bore-wel irrigation both in black and red soils**	Maize	Sugarcane	-	No Change	do	
		Sunflower	Maize	No change	Chickpea (A-1, ICCV-10, GVS-964, ICCV-2)		
		Maize	Chickpea /Wheat		No change		
		Maize	Groundnut				

Condition	Major Farming situation[a]	Crop/cropping system[b]		Change in crop/ cropping system[c]		Agronomic measures[d]	Remarks on Implementation
		Ground nut	Sunflower / chickpea	Sunflower (KBSH-41 and KBSH-53)	Groundnut (TMV-2, S-230, Mardur local) / chickpea (A-1, ICCV-10, GVS-964, ICCV-2)	Broad bed and furrow irrigation during kharif	
		Groundnut	Sunflower	Sunflower (KBSH-41 and KBSH-53)	Chickpea (A-1, ICCV-10, GVS-964, ICCV-2) / Ground nut TMV-2, S-230, Mardur local)		
		Bt Cotton	-	Bt Cotton (Rasi and Buuny)	-	Transplant 25-30 days aged seedlings. Alternatively alternate furrow irrigation	
		Pigeonpea	-	Pigeonpea (Maruti, TS 3 R)	-		
		Sugarcane	-	No Change	-	Once in two days give alternate furrow irrigation during *kharif* Trash mulching	
		Sugarcane + Soybean	-	-	Sugarcane (COC-671, CO-86032, CO-94012)		
		Sunhemp (green manuring)	Sugarcane / wheat / Maize	No change	No change		
Insufficient groundwater recharge due to low rainfall	**Cropping with bore-wel / Open wel irrigation both in black and red soils or any other sources**	Ground nut	Sunflower / chickpea	Pearl millet (ICTP 8203 and ICMV 221)	Sorghum+ chickpea	Broad bed and furrow irrigation during kharif	
		Groundnut	Sunflower	Sunflower (KBSH-41 and KBSH-53)	Chickpea (A-1, ICCV-10, GVS-964, ICCV-2) / Ground nut (TMV-2, S-230, Mardur local)		
		Bt-Cotton (Rasi, Bunny)	-	Desi Cotton	-	Transplant 25-30 days aged seedlings. Alternatively alternate furrow irrigation	
		Pigeonpea	-	Pigeonpea	-		

Condition	Major Farming situation[a]	Crop/cropping system[b]		Change in crop/ cropping system[c]		Agronomic measures[d]	Remarks on Implementation
		Sunflower	Maize	Pearl millet	Safflower (A-1, A-2) / Chickpea (A-1, ICCV-10, GVS-964, ICCV-2)	Once in two days give alternate furrow irrigation during *kharif*	
		Maize	Groundnut	-	Sorghum (CSH-5, CSH-14, CSH16, CSH-18, DSH-3, M 35-1) / Chickpea (A-1, ICCV-10, GVS-964, ICCV-2)		
		Maize	Chickpea	No Change	No Change		
		Sunhemp (green manuring)	Sugarcane /wheat /Maize	No change	Wheat (HD-2189, DWR-16, DWR-39, DWR-162) /Maize (Deccan 101, Deccan 103,DMH-1, DMH-2)/ chickpea (A-1, ICCV-10, GVS-964, ICCV-2) / Sorghum (CSH-5, CSH-14, CSH16, CSH-18, DSH-3, M 35-1)	Once in two days give alternate furrow irrigation during *kharif*	

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations) and Heavy rainfall with high speed winds in a short span[2]

Condition	**Suggested contingency measure**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Sorghum	Drain out excess water, Weeding and top dressing with urea	Drain out excess water	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting	Proper drying and storage of grains
Sugarcane	Drain out excess water, Weeding and top dressing with urea and foliar application of 19:19:19		Drain out excess water Propping	
Maize	Drain out excess water, earthing up, Weeding and top dressing with urea		Drain out excess water, Harvesting and drying of cobs	
Green gram (Sel-4)	Drain out excess water, Weeding		Drain out excess water, Harvesting and drying of pods	
Groundnut	Drain out excess water, Drenching with fungicides; Weeding and earthing up;	Drain out excess water; earthing up	Drain out excess water	Harvesting and drying of pods
Chickpea	Drain out excess water, Weeding and top dressing with urea	Drain out excess water	Drain out excess water, Harvesting and drying of plants	Proper drying and storage of grains
Onion	Application of Urea for induction of vegetative growth (15-20kg/ha)/ Spray the crop with 1% Urea or 19:19:19	Application of Urea for induction of vegetative growth (15-20kg/ha)/ Spray the crop with 1% Urea or 19:19:19	Provide support to the plants tie the plants together	Harvest the crop immediately and store the produce for proper curing
Tomato	Application of Urea for induction vegetative growth	Application of Urea for induction vegetative	Drain out the excess water immediately	Harvest the crop and market them

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
	(15kg/ha)/Spray the crop with 1% Urea or 19:19:19	growth (15kg/ha)/Spray the crop with 1% Urea or 19:19:19 and provide stalking	Harvest the crop at quicker intervals (3-4 days)	
Turmeric	Take up top dressing of Urea	Provide drainage	Provide drainage	Shifting of produce to safer place
Pomegranate	Provide drainage		Harvest the crop at physiological maturity immediately.	Shifting of produce to safer place Cover the fruits with colured bags
Grapes				Shifting of produce to safer place
Banana				Shifting of produce to safer place
Outbreak of pests and diseases due to unseasonal rains	The control measures may be taken up as per package of practices			
Sorghum	Control measures for shoot bugs and aphids and blight	Control measures for rust	Control measures for grain molds	-
Sugarcane	Control measures for Spodoptera	Control measures for rust	-	
Maize	Control measures for Stem borer and Leaf blight	Control measures for cob worm and rust	-	
Green gram	-	Control measures for pod borer and powdery mildew	Control measures for pod borer and powdery mildew	
Groundnut	Control measures for leaf miner, spodoptera and leaf spot and rust	Control measures for leaf miner, spodoptera, leaf spot and rust	-	
Chickpea	Control measures for pod borer and Wilt	Control measures for pod borer and rust	Control measures for pod borer	

2.3 Floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Sorghum	Drain out excess water, Gap filling	Drain out excess water, Weeding and top dressing with urea	Drain out excess water,	Drain out excess water, Tying up of lodged plants, Drying of earheads and Harvesting
Sugarcane		Drain out excess water, Weeding and top dressing with urea ; Foliar nutrition with 19:19:19	Drain out excess water; Propping up of cane	Drain out excess water, Harvesting
Maize		Drain out excess water, Weeding and top dressing with urea	Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of cobs
Green gram (Use non-shattering cultivar Sel– 4)		Drain out excess water, Weeding	Drain out excess water	Drain out excess water, Harvesting and drying
Groundnut	Drain out excess water, Gap filling and drenching with fungicides	Drain out excess water, Weeding and earthing up	Drain out excess water; earthing up	Drain out excess water
Chickpea	Drain out excess water, Gap filling	Drain out excess water, Weeding and top dressing with urea	Drain out excess water,	Drain out excess water, Harvesting and drying of plants
Continuous submergence for more than 2 days				
Sorghum	Drain out excess water, Gap filling	Drain out excess water, Weeding and top dressing with urea	Drain out excess water,	Drain out excess water, Tying up of lodged plants drying of earheads and Harvesting

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Sugarcane		Drain out excess water, Weeding and top dressing with urea ; Foliar nutrition with 19:19:19	Drain out excess water; Propping up of cane	Drain out excess water, Harvesting
Maize		Drain out excess water, Weeding and top dressing with urea	Drain out excess water, Earthing up	Drain out excess water, Harvesting and drying of cobs
Green gram (Use non-shattering cultivar Sel– 4)	Drain out excess water; Intercultivation	Drain out excess water, Weeding	Drain out excess water	Drain out excess water, Harvesting and drying
Groundnut	Drain out excess water, Gap filling, intercultivation and drenching with fungicides	Drain out excess water, Weeding and earthing up	Drain out excess water; earthing up	Drain out excess water
Chickpea	Drain out excess water, Gap filling	Drain out excess water, Weeding and top dressing with urea	Drain out excess water	Drain out excess water, Harvesting and drying of plants
Horticulture				
Onion Tomato Turmeric	Provide Drainage Spray the crop with 1% Urea or 19:19:19	Immediately harvest the crop & cure them properly under shade in field condition. Sorting of rotted and good ones should be done immediately. Store them under proper ventilated area or under perforated PVC Pipe storage method		Harvest the produce immediately and use electrical fans for quicker drying under storage. Use well ventilated rooms
Pomegranate Grapes Banana	Provide drainage	Top dress with NPK. Nutrients (75:20:70g/plant) and earth up (Loosen the soil) Apply 2 to 3 kg neem cake around the basin of the plant Banana : Under submerged condition 1) Drain out the excess water 2) Loosen the soil apply 5kg FYM/plant 3) Spray the crop with 0.5% DAP+ZnSo4 once in a week for 2-4 times.		Harvest the produce immediately and used electrical fans for quicker drying under storage.

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone – Not Applicable

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Cold wave				
Frost				
Hailstorm				
Cyclone	Measures to be adopted as suggested under heavy rains with high speed winds			

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	• Available sorghum stover, sugarcane tops and groundnut haulms should be properly stored for future use. • Encourage silage making with available maize fodder in the villages • 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 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 areas	• Harvest and use biomass of dried up crops (Sorghum/groundnut/maize/greengram) material as fodder. • In severe drought, begasse should be supplied on subsidized to the farmers having productive livestock inorder to improve the palatability and digestibility of dry roughages • 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 • Hay should be transported to the needy areas from the near by districts in case of drought • Advise the farmers about the practice of mixing available kitchen waste with dry fodder while feeding	• 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, Kisan composite, Moti, Manjari, B1-7 on their own lands & supporting them with assisting infrastructures like seeds, money manure.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Floods	• In case of early forewarning (EFW), harvest all the crops (Sorghum/groundnut/maize/ greengram) 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 • 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	• 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.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Cyclone	• Harvest all the possible wetted grain (Sorghum/groundnut/maize/greengram etc) and use as animal feed. • As the district is chronically prone for cyclone, arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone. • Stock of anti-diarrheal drugs and electrolytes should be made available for emergency transport • Don't allow the animals for grazing in case of early forewarning (EFW) of cyclone • Incase of EFW of severe cyclone, shift the animals to safer places.	• Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers. • Diarrhea out break may happen. Health camps should be organized • In severe cases un-tether **or** let loose the animals • Arrange transportation of highly productive animals to safer place • Spraying of fly repellants in animal sheds	• Repair of animal shed • Deworm the animals through mass camps • Vaccinate against possible disease out breaks like HS, BQ, FMD and PPR • Proper dispose 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 • Bleach / chlorinate (0.1%) drinking water or water resources • Collect drowned crop material, dry it and store for future use • Sowing of short duration fodder crops in unsown and water logged areas when crops are damaged and no chance to replant • Application of urea (20-25kg/ha) in the inundated areas and CPR's to enhance the bio mass production.
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
Insurance	• Encourage insurance of livestock	• Compensation to for dead animals	• Submission for insurance claim and availing insurance benefit • Purchase of new productive animals
Drinking water	• Identification of water resources • Rain water harvesting and create water storage structures like farm ponds and watering points (when water is scarce use only as drinking water for animals)	• Restrict wallowing of animals in water bodies/resources	• Bleach (0.1%) drinking water / water sources • Provide clean drinking water

Vaccination programme for cattle and buffalo

Disease	Age and season at vaccination
Anthrax	In endemic areas only, Feb to May
Haemorrhagic septicaemia (HS)	May to June
Black quarter (BQ)	May to June
Foot and mouth disease (FMD)	July/August and November/December

Vaccination schedule in small ruminants (Sheep & Goat)

Disease	Season
Foot and mouth disease (FMD)	Preferably in winter / autumn
Peste des Petits Ruminants (PPR)	Preferably in January
Black quarter (BQ)	May / June
Enterotoxaemia (ET)	May
Haemorrhagic septicaemia (HS)	March / June
Sheep pox (SP)	November

2.5.2 Poultry

Drought	Suggested contingency measures		
	Before the event[a]	During the event	After the event
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 fowl pox	• 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 place • Storing of house hold grain like maize, broken rice, bajra etc,	• Use stored feed as supplement • Don't allow for scavenging • Culling of weak birds	• Routine practices are followed • Deworming and vaccination against RD
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			
Shortage of feed ingredients	• In case of EFW, shift the birds to safer place • Storing of house hold grain like maize, broken rice, bajra etc, • Culling of weak birds	• Use stored feed as supplement • Don't allow for scavenging • Protect from thunder storms	• Routine practices are followed
Drinking water	• -	• Use water sanitizers or offer cool hygienic drinking water	•
Health and disease management	• In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	• Sanitation of poultry house • Treatment of affected birds • Prevent water logging surrounding the sheds • Assure supply of electricity • Sprinkle lime powder (5-10g per square feet) to prevent ammonia accumulation due to dampness	• Disposal of dead birds by burning / deep burying with lime powder in pit • Disposal of poultry manure to prevent protozoal problem • Supplementation of coccidiostats in feed • Vaccination against Ranikhet Disease (0.5ml S/c)

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event*	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	NA	NA	NA
Inland			
(i) Shallow water depth due to	Observe water level. Advice fishermen to harvest as much as possible fish live stock	Harvest the complete fish live stock	Report the loss to Revenue & Fisheries Dept.
Insufficient rain/inflow	-	-	
(ii) Changes in water quality	Observe water quality like dis- solved Oxygen & pH	Report the matter to Revenue & Fisheries Dept.	-
(iii) Any other	To explore the possibility of shifting the live stock to other water resources	-	-
B. Aquaculture	-	-	-
(i) Shallow water in ponds due to insufficient rain/inflow	Observe water level. Advice for fishermen to harvest maxi-mum fish live stock.	Addition of water, lime for tackling salt load	-
(ii) Impact of salt load build up in ponds/change in water quality	-	Report the matter to Revenue & Fisheries Dept.	Report the loss to Revenue & Fisheries Dept.
(iii) Any other	-	-	-
2) Floods			
A. Capture			
Marine	1		

Inland			
(i) Average compension paid due to loss of human life	Revenue authorities pay the compension to boats / nets / houses / fish live stock damaged	Addition of water, lime for tackling salt load	
(ii) No.of boats/nets/damaged			Report the loss to Revenue & Fisheries Dept.
(iii) No.of houses damaged		Report the matter to Revenue & Fisheries Dept.	
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases	should be reported to Revenue Dept.authorities.		
B. Aquaculture			
(i) Inundation with flood water	Monitor the floods and harvest maximum fish live stock before floods. Report the loss to Revenue and Fisheries Dept. authorities.		
(ii) Water continuation and changes in water quality			
(iii) Health and Diseases			
(iv) Loss of stock and inputs (ffed, chemicals etc.)			
(v) Infrastructure damage (pumps, aerators, huts etc.)			
(vi) Any other			

Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackishwater 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. Head wave and Cold Wave	NA		
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in ponds environment (water quality)			
(ii) Health and disease management			
(iii) Any other			