

**State: KARNATAKA**  
**Agriculture Contingency Plan for District: BELGAUM**

1.0 District Agriculture profile				
1.1	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	Deccan Plateau, Hot Semi-Arid Eco-Region (6.4)		
	Agro-Climatic Region (Planning Commission)	Southern Plateau and Hills Region ( X )		
	Agro Climatic Zone (NARP)	Northern Transitional Zone (KA-8)		
	List all the districts or part thereof falling under the NARP Zone	Belgaum (Zone 8 : Belgaum, Chikkodi, Hukkeri, Bailahongal Zone-3 : Raibag,Gokak, Athani, Ramdurg, Savdatti Zone 9 : Khanapur & Haveri )		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		15° 51 '01.30 "N	74° 30'16.81" E	836 m MSL
	Name and address of the concerned RARS	Regional Agricultural Research Station, UAS campus, Bijapur Karnataka State -586 101		
Mention the KVK located in the district	Krishi Vignana kendra Tukanatti Gohak, Dist : Belgaum -591319 (Karnataka)			
1.2	Rainfall	Average (mm)	Normal Onset	Normal Cessation
	SW monsoon (June -Oct 15 <sup>th</sup> )	560.6	2 <sup>nd</sup> week of June	2 <sup>nd</sup> week of October
	NE Monsoon (Oct 15 <sup>th</sup> -Dec 31st )	148.0	2 <sup>nd</sup> week of October	Last week of December
	Winter (January - February)	9.3		
	Summer (March-May)	105.4		
	Annual	823.3		

<b>1.3</b>	<b>Land use pattern of the district</b> (latest statistics)	Geographical area (000 ha)	Forest area	Land under non-agricultural use	Net sown area	Permanent pastures	Cultivable waste land	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	<b>Area( '000 ha)</b>	1344.4	190.4	69.4	841.9	24.8	12.8	3.1	44.3	159.6	7.0

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	1. Black soils	612.4	46
	2. Red soils	346.0	26
	3. Sandy soils	161.0	12
	4. Sandy loam	63.2	5
	Others (specify):	161.6	11
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	841.9	127.5 %
	Area sown more than once	231.3	
	Gross cropped area	1073.2	

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>		
	Net irrigated area	431.2		
	Gross irrigated area	472.5		
	Rainfed area	410.7		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>% area</b>
	Canals		91.0	20.7
	Tanks	898	2.4	0.5
	Open wells	61998		
	Bore wells	24279	222.4	50.6
	Lift irrigation schemes	2751		

Other sources				
Total			124.0	28.2
Pumpsets			439.8	100.0
Micro-irrigation				
Groundwater availability and use	No. of blocks	% area	Quality of water	
Over exploited	-	-	-	
Critical	-	-	-	
Semi- critical	-	-	-	
Safe	-	-	-	
Wastewater availability and use	-	-	-	

\*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		
	Maize	85.2	15.7	34.64	0.74	3.56	139.95
	Sugarcane	137.6	-	0	0	0	137.63
	Soybean	31.2	72.2	-	0	0.40	103.84
	Groundnut	3.0	29.6	-	0	6.82	39.56
	Sorghum	2.5	20.7	-	0	0	23.33
	Cotton	5.4	16.9	-	0.07	0.37	22.87
	<b>Horticulture crops - Fruits</b>	<b>Total area (*000 ha)</b>					
	Mango	4.3					
	Banana	2.3					
	Sapaota	1.9					
	Grapes	1.3					
	Guava	0.4					
	<b>Horticultural crops - Vegetables</b>	<b>Total area</b>					
	Onion	7.49					
	Green Chilli	6.86					
	Potato	5.04					

	Tomato	4.79		
	Khol crops	2.04		

	<b>Medicinal and Aromatic crops</b>	<b>Total area</b>		
	-	-		
	<b>Spices</b>	4.7		
	<b>Plantation crops</b>	<b>Total area</b>		
		9.1 ha		
	Cashew	5.76		
	Coconut	3.32		
	Dry chillies	2.66		
	Turmeric	1.34		
	<b>Fodder crops</b>	<b>Total area</b>		
	Total fodder crop area	9.3		
	<b>Grazing land</b>	-		
	<b>Sericulture etc</b>	0.6		
	Others (Specify)			

\*If break-up data (irrigated, rainfed) is not available, give total area

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	277.0	210.7	487.7
	Crossbred cattle	14.8	95.8	110.6
	Non descriptive Buffaloes (local low yielding)	72.2	787.8	860.0
	Graded Buffaloes			
	Goat			610.7
	Sheep			899.8
	Others (Camel, Pig, Yak etc.)			27.9
	Commercial dairy farms (Number)			
<b>1.9</b>	<b>Poultry</b>			
	Commercial	847		

	Backyard			
<b>1.10</b>	<b>Fisheries</b>	<b>Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production (tones)</b>
	Brackish water	-	-	Total Fish production is 324.8 tn. (2005-06)
	Fresh water	-	-	
	Others	-	-	

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

1.11	(2008-09)	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)
1	Sorghum	41.8	1793	142.3	1170	-	0	184.1	1259
2	Sugarcane	1279	93000	-	-	-	0	1279	93000
3	Maize	407.1	4003	144.6	4088	16.04	4500	567.7	405.55
4	Soybean	101.1	980	-	1800	-	0	101.2	980
5	Groundnut	281.1	860	-	0	10.24	1500	291.4	736
6	Cotton	12.6	562	1.0	750	0	0	13.6	571
	Horticultural crops								

1.12	Sowing window for 5 major crops (start and end of sowing period)	Sugarcane	Maize	Soybean	Groundnut	Cotton
	Kharif- Rainfed	-	June-July	May-July	May 15-July 15	June-July
	Kharif-Irrigated	June-July	June-July	May-July	May 15-July 15	June-July
	Rabi- Rainfed	-	Oct -Nov	-	Dec-Jan	-
	Rabi-Irrigated	Sept 15-Oct 15	Oct -Nov	Dec-Jan	Dec-Jan	Jan-Feb

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 inundation			√
	Pests and diseases (specify)	√		

1.14	Include Digital maps of the district for	Location map of district with in State as Annexure I	Yes
		Mean annual rainfall as Annexure 2	No
		Soils map as Annexure 3	Yes



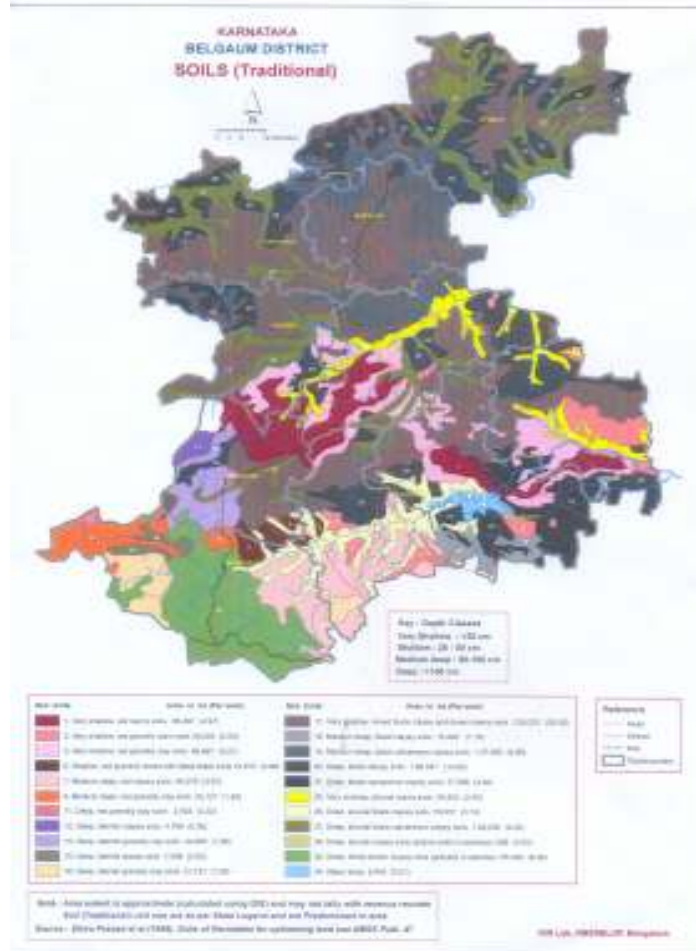




**Average Rainfall of Belgaum district**

<b>Sl. No.</b>	<b>Year</b>	<b>Average in mm</b>	<b>No. of rainy days</b>
<b>1</b>	<b>2003</b>	<b>777.7</b>	<b>40</b>
<b>2</b>	<b>2004</b>	<b>714.2</b>	<b>48</b>
<b>3</b>	<b>2005</b>	<b>1010.6</b>	<b>61</b>
<b>4</b>	<b>2006</b>	<b>886.4</b>	<b>62</b>

### Annexure-3: Soil map of Belgaum district



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
			Change in crop/cropping system	Agonomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>			
Delay by 2 weeks (June 4 <sup>th</sup> week)	Medium deep black soils	Groundnut	No change (JL-24, GPBD-4)	Compartmental bunding for moisture conservation	Subsidy provided for implements by KSDA may be availed
		Soybean	No change	Compartmental bunding for moisture conservation	
		Blackgram	No change	Compartmental bunding for moisture conservation	
		kharif sorghum	No change	Compartmental bunding for moisture conservation	
		Sunflower	No change	Compartmental bunding for moisture conservation	
		Greengram – Sorghum	No change	Compartmental bunding for moisture conservation	
		Fallow - Safflower / Chickpea	No change	- Conservation practice by opening dead furrow for every 10 rows	
		Hybrid Cotton	No change		
		Maize - Chickpea	No change		
		Sunhemp	No change		
	Tobacco	No change		NSC –PEMH series of Maize	
Red Loamy soils	Spreading Groundnut	No change			

		Hybrid cotton (Bt.)	No change	Crow bar method of cotton sowing.	
		Hy.Bajra	No change	Compartmental bunding for moisture conservation	
		Groundnut	No change	Compartmental bunding for moisture conservation	
		Chilli,	No change	Detop old seedlings in nursery before transplanting	
		Horsegram,	No change	Compartmental bunding for moisture conservation	
		Foxtail millet	No change	Compartmental bunding for moisture conservation	
		Hy.Sorghum + Redgram (Maruti) (4:2)	No change	Compartmental bunding for moisture conservation	
		Groundnut +Redgram (4:1)	No change	Compartmental bunding for moisture conservation	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 4 weeks (July 2 <sup>nd</sup> week)	Medium deep black soils	Groundnut	Prefer varieties like JL-24, GPBD-4	Apply enriched compost (FYM+ press mud + poultry manure) to tobacco.	NSC/UASD/KSSC as seed source
		Soybean	Avoid Soybean. Alternatively go for sole Tobacco		
			Groundnut	Compartmental bunding for moisture conservation	

			Cotton,	Compartmental bunding for moisture conservation
			Transplanted Chilli,	Compartmental bunding for moisture conservation, Detop old seedlings in nursery before transplanting
			Bt.Cotton+ Red gram –TS 3R (1:2)	
			Maize (Arjun, 900 M)+ Red gram TS 3R (4:2) Tobacco-Bhagyashree) + Onion- Nashik Red (1:2)	
		Blackgram	Avoid Black gram and go for Maize, cow pea & sunflower	
		kharif sorghum	Avoid kharif sorghum and go for Maize, cow pea & sunflower	
		Sunflower (Morden, SB 275)	Sunflower Morden, SB 275	
		Green gram in Kharif – Rabi Sorghum	Avoid Green gram, Blackgram, Soybean, kharif sorghum and plan for Sunflower Morden, SB 275)/ Cowpea (C-152)/ Maize (Arjun, 900M)	
		Wheat	Bijaga Yellow, DWR-2006	Compartmental bunding for moisture conservation
		Fallow - Safflower (A1, A2) / Chickpea (A1, JG11)		

		Hybrid cotton	No change	Adopt 60 x 60 cm in Cotton	
		Maize-Chickpea	No change	Compartmental bunding for moisture conservation	
		Spreading groundnut(DSG-1)	No change	Contour cultivation Conservation furrows	
		Hy.Bajra, Horse gram, Groundnut, <b>Chilli</b>	Horse gram (local)	Compartmental bunding for moisture conservation	
			Cowpea (C-152)	Compartmental bunding for moisture conservation	
			Castor (GCH-4),	Compartmental bunding for moisture conservation	
			Sunflower (Morden SB 275)	Compartmental bunding for moisture conservation	
		Red Loamy soils	Spreading groundnut	No change (variety: DSG-1)	
			<u>Hy.Bajra, Horse gram, Hybrid cotton(Bt.), Groundnut, <b>Chilli</b>, Foxtail millet</u>	Horse gram no change Others,	
			Cowpea (C-152)	Compartmental bunding for moisture conservation	
Castor GCH -4,	Compartmental bunding for moisture				

				conservation	
			Sunflower Morden, SB 275	Compartmental bunding for moisture conservation	
		Hy.Sorghum + Redgram (Maruti) (4:2)	Avoid sorghum+ Red gram go for		
			Horse gram -Local		
			Cowpea (C-152)		
			Castor GCH -4,		
			Sunflower Morden, SB 275		
		Groundnut +Redgram (4:1)	Horse gram -Local		
			Cowpea (C-152)		
			Castor GCH -4,		
			Sunflower Morden, SB 275		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)	Med-Deep Black soils	Groundnut/ Soybean / Black gram/ kharif sorghum//Sunflower	Go for Maize, sunflower, Tobacco+ Onion (1:2), Cotton Green fodder crops (SA Tall+ cowpea)	Ridges and furrow method of sowing, compartment bunding for rabi crops Seed hardening, seed pelleting Protective irrigation wherever possible	
Delay by 6 weeks August -2nd week					

		Green gram in Kharif -R.Sorghum /Wheat /Chickpea / Safflower in Rabi	Maize Desi Cotton Green fodder crops (SA Tall+ cowpea)	-	
		Hybrid cotton	No change	Adopt 60 x 60 cm Apply 50% RDF Take up IPM	
		Maize-Chickpea	No change	Early maturing hybrids (Vivek-9), PEMH-2 /composites (Renuka.)	
		Sunhemp -Tobacco	Tobacco	Apply enriched compost (FYM+ press mud +poultry manure) to Tobacco.	
Red Loamy soils	Spreading groundnut (DSG-1)	Maize/ Sunflower / Horse gram			
	Hy.Bajra, Horse gram, Hybrid cotton(Bt.), Groundnut, Chilli,	Maize,/ Sunflower, Horse gram			
	Foxtail millet Hy.Sorghum + Redgram (Maruti) (4:2)	Maize/ Sunflower/ Horse gram			
	Groundnut +Redgram(4:1)				



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 Aug, 4 <sup>th</sup> week	Med-Deep Black soils	Groundnut ( JL-24, GPBD-4) / Soybean / Black gram/ kharif sorghum//Sunflower	Go for Maize, sunflower, Tobacco+ Onion(1:2), Horse gram Castor Desi Cotton Sesamum Green fodder crops (SA Tall+ cowpea)	Increasing the quantity of organics in tobacco.	Link up with UASD /NSSC/KSSC  Sowing in the month of August is rare case
		Green gram in Kharif - R.Sorghum /Wheat /chickpea / Safflower in Rabi	Go for sunflower, Horse gram Desi Cotton Green fodder crops(SA Tall+ cowpea)		
		Hybrid Cotton	No change		
		Maize-Chickpea	No change		
		Sunhemp-Tobacco	Go for direct Tobacco		
	Red Loamy soils	Paddy- Black green gram Sugarcane Hybrid Cotton	Avoid paddy and go for Maize, R-Sorghum Sunhemp and fodder Maize in mid lands	---	
		Groundnut ( JL-24, GPBD-4) / Soybean / Black gram/Kharif Sorghum//Sunflower	Avoid paddy and go for Maize, R-Sorghum Sunhemp and Fodder Maize in mid lands		
		Greengram in Kharif - R.Sorghum /Wheat /Chickpea / Safflower in Rabi	Go for only Rabi crops		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures			
			Crop management	Soils nutrient & moisture conservation measues	Remarks on Implementation	
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Med-Deep Black soils	Groundnut	JL-24, GPBD-4 Frequent Intercultivation	Protective irrigation Spraying of MOP ( 2%) / Kaolin (1%)		
		Soybean	Frequent Intercultivation	Urea spray (2.0% ) in maize Repeated Intercultivation Conservation furrows,		
		Black gram	Frequent Intercultivation			
		Green gram /black gram - R.Jowar/wheat/chickpea/ safflower	Frequent Intercultivation	-do-		
		Hybrid cotton	Gap filling in cotton Frequent Intercultivation Crop Residue Mulching	-do-		
		Maize-Chickpea		-do-		
		Sunhemp-Tobacco	Gap filling in tobacco Crop Residue Mulching	-do-		
	Red Loamy soils	Spreading groundnut(DSG-1)	Intercultivation	-		
		Hy.Bajra, Hybrid cotton (Bt.), Maize, Groundnut,Chilli, Foxtail millet		Stubble mulching Furrow opening Ridge tying Spraying of MOP (2%) /Kaoline (6%) Urea spray (2% ) in maize Repeated Intercultivation Crop Residue Mulching		
		Hy.Sorghum + Redgram(Maruti) (4:2)	-	-do-		

		Groundnut +Redgram(4:1)			
	Red Lateritic soils	Paddy- Green gram/ Black gram/ Field beans sprinkled cropping of sorghum with paddy	-	Repeated Intercultivation and withholding of fertilizer application till dry spell is over	

Condition	Major Farming situation	Normal crop/cropping system	Suggested Contingency measures		
Mid Season drought (long dry spell) consecutive 2 weeks of rainless period			Crop management	Soils nutrient & moisture conservation measues	Remarks on Implementation
At vegetative stage	Med-Deep Black soils	Groundnut (- JL-24, GPBD-4) / Soybean / Black gram			
		Green gram- R.Jowar/wheat/chickpea/ safflower			
		Hybrid cotton	Frequent intercultivation	Foliar application of nutrients (N/K) Postponement of top dressing with N Life saving irrigation Use anti-transpirants (PMA & Kaoline-6%) for 2-3 times at 15 days interval Spraying of KNO <sub>3</sub> /K <sub>2</sub> SO <sub>4</sub> /KCl (1%)	
		Maize-Chickpea	Thinning Frequent intercultivation		
	Red Loamy soils	Sunhemp-Tobacco			

		Spreading groundnut (DSG-1) Hy.Bajra, Horse gram, Hybrid cotton(Bt.),Groundnut,Chilli, Foxtail millet	Intercultivation and Weeding		
		Hy.Sorghum + Redgram(Maruti) (4:2)	Intercultivation and Weeding		
		Groundnut +Redgram(4:1)	Intercultivation and Weeding		

Condition			Suggested Contingency measures		
<b>Mid season drought (long dry spell)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Soils nutrient &amp; moisture conservation measures</b>	<b>Remarks on Implementation</b>
<b>At flowering/ fruiting stage</b>	Medium deep Black soils	Groundnut (- JL-24, GPBD-4) / Soybean / Black gram	Life saving irrigation Planofix (TIBA/CCA)/PGR spray	Furrow Opening Ridge tieing Foliar application of nutrients	Anti-Tran spirants should be made available
		Green gram-R. Jowar/wheat/chickpea/ safflower	Plan for rabi crops		
		Hybrid cotton	Alternative furrow irrigation	Spray with anti-transpirants (Kaolin 6%), Residue mulching	
		Maize-Chickpea	Removal of alternative rows in cereals Alternative furrow irrigation	Spray with anti-transpirants (Kaoline 6%), Residue mulching	

		Sunhemp-Tobacco	Removal of lower leaves in Tobacco		
	Red Loamy soils	Spreading groundnut(DSG-1) Hy.Bajra, Horse gram, Hybrid cotton(Bt.),Groundnut, Chilli, Foxtail millet Hy.Sorghum + Redgram(Maruti) (4:2) Groundnut +Redgram(4:1)			
	Red Lateritic soils	Paddy- Green gram/ Black gram/ Field beans			

<b>Terminal drought</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Rabi Crop planning</b>	<b>Remarks on Implementation</b>
	Med-Deep Black soils	Groundnut (- JL-24, GPBD-4) / Soybean / Black gram	Harvest at Physiological maturity. Relay cropping of Rabi crops.	Protective irrigation Rabi sorghum/ wheat/ safflower / Chickpea Seed hardening with CaCl <sub>2</sub> (2%). Zero till drill sowing	
		Greengram-R. Jowar/Wheat/Chickpea/ safflower			
		Hybrid cotton	Clipping of late set flowers/pods.		
		Maize-Chickpea Sunhemp-Tobacco	Harvest the crop for fodder and prepare land for Rabi sowing.		
	Red Loamy soils	Spreading groundnut(DSG-1) Hy.Bajra, Horse gram,	Harvest at physiological maturity except	Spray with anti-transpirants (Kaoline 6%) for cotton	

		Hybrid cotton (Bt.),Groundnut,Chilli, Foxtail millet	groundnut. Relay cropping of Rabi crops		
		Hy.Sorghum + Redgram(Maruti) (4:2)	do		
		Groundnut +Redgram(4:1)	do		
	Red Lateritic soils	Paddy- Green gram/ Black gram/ Field bean	Harvesting early at physiological maturity		

### 2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Canal irrigated medium to deep black soils	Maize-Wheat	Early maturing maize hybrids(PEMH series)	Sow the crop using rain water & irrigate as and when water released from canal Alternate furrow irrigation Conjunctive use of open well water	Pvt. Company/ UASD /NSSC/KSSC
		Soybean-Maize/wheat	Avoid soybean Grow sunflower followed by maize/wheat	-do-	
		Sugarcane	No change	-	
		Maize-Chickpea	-do-	-do-	
		Cotton			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Canal irrigated medium to deep black soils	Soybean-maize/wheat	Soybean-Rabi jowar/ wheat Chickpea Sunflower-- Rabi jowar/ wheat Chickpea/	Alternate furrow irrigation. Residue mulching Frequent intercultivation Use of sprinkler / micro irrigation	Use Govt Subsidy for drip / micro irrigation by KSDA
		Sugarcane	No Change	-do-	
		Maize-chickpea	No Change		
		Cotton	No Change		

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Canal irrigated medium to deep black soils	Maize-Wheat	Sunflower Bajra, Sorghum.	Compartment bunding	
		Soybean-Maize/Wheat	Rabi Sorghum Safflower, Chickpea,	Ridge-Furrow formation, Mulching	
		Sugarcane	No Change	Frequent intercultivation	
		Maize-Chickpea	Sunflower Bajra, Sorghum	Compartment bunding	
		Cotton	No Change	Anti-transpirant spray (Kaolin 6%) Seed hardening	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Tank fed medium to deep black soils	Maize-Wheat	Sunflower Bajra, Sorghum.	Compartment bunding Ridge-Furrow formation, Mulching Frequent intercultivation	
		Soybean-Maize/Wheat	Rabi Sorghum Safflower, Chickpea	Compartment bunding	
		Maize-Chickpea	No Change	Anti-transpirant spray (Kaolin 6%) Seed hardening	
		Cotton	Sunflower, Sorghum	-	
Insufficient ground water recharge due to low rainfall	Well / tube well irrigated Medium to deep black soils	Maize-wheat	No Change	Irrigation at critical stages Alternate furrow irrigation Residue mulching Foliar application of N & K Seed Hardening micro irrigation	Re charging of bore wells
		Soybean-maize/wheat	No Change	-do-	
		Sugarcane	No Change		
		Maize-chickpea	No change		
		Cotton	No Change		



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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b>				
Sugarcane	Drain out excess water Weeding & intercultivation Soils application of ammonium sulphate		Sugarcane spary- Sod.Borate/ nickel	Spraying of fungicide for avoiding secondary infection & proper drying of produce
Soybean	Plant Protection measures.	Soybean-TIBA	Harvest at Physiological maturity	
Maize		Maize-TLB pp measures	Maize-4 % Melathion dusting	
Ground nut			Uproot groundnut	
Cotton		Cotton-Planofix/MgSo4 Cotton-KNO3		
<b>Horticulture</b>	1. Drain out excess water 2. Weeding & intercultivation 3. Soils application of ammonium sulphate 4. Plant Protection measures	1. Nutrient Spray 2. Onion TIBA 3Green chilli- Planofix/MgSo4 KNO3 4. Tomato pp measures	1. Harvest at Physiological maturity 2. Uproot potato 3. Mango dusting	Spraying of fungicide for avoiding secondary infection & proper drying of produce
Onion				
Green chilli				
Potato				
Tomato				
Mango				
<b>Heavy rainfall with high speed winds in a short span</b>				
Sugarcane	Drainage of excess water	Wrapping & Propping in sugarcane	Wrapping & Propping in sugarcane	Drainage of excess water
Soybean	Drainage of excess water	Drainage of excess water	Drainage of excess water	Drainage of excess water
Maize	Re-sowing sunflower or maize	Maize-Harvest for fodder	Harvest green cobs of maize	Harvest green cobs of maize
Cotton	Drainage of excess water	Drainage of excess water	Drainage of excess	Drainage of

			water	excess water
Ground nut	Drainage of excess water	Drainage of excess water	Drainage of excess water	Drainage of excess water
<b>Horticulture</b>	1. Resowing Potato 2. Drainage of excess water	1. Staking in Chilli and tomato 2. Drainage of excess water	1. Wrapping & propping in Tomato 2. Harvest green pods of chilli 3. Drainage of excess water	Harvest green chilli Drainage of excess water
Onion				
Green chilli				
Potato				
Tomato				
Mango				
<b>Condition</b>	<b>Suggested contingency measure</b>			
<b>Outbreak of pests and diseases due to unseasonal rains</b>	<b>Vegetative stage</b>	<b>Flowering stage</b>	<b>Crop maturity stage</b>	<b>Post harvest</b>
Sugarcane	Plant protection measures for stem borer, army worm in Sugarcane/ Maize.	Plant protection measures for Rust, TLB.	Plant protection measures for Rust / TLB/Leaf spot in Maize	-
Maize				-
Soybean	Plant protection measures for root grub & Defoliators in Soybean / groundnut	Plant protection measures for defoliators in Soybean / groundnut		-
Ground nut				
Cotton	Sucking pests control by Tridemofon @ 0.5 ml/litr	Carbaryl 3.0 g/ litre, Spinosad 0.2ml/lit release trichograma 2.5 lakh/ha	Plant protection measures for Leaf reddening in Cotton	-

## 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation</b>				
Sugarcane	Drain out excess water Intercultivation to improve soil aeration	Drain out excess water Application of N Breaking hard pan	Drain out excess water Top dressing with N Foliar application of N & K IPM measures	Drain out excess water Harvest at physiological maturity
Soybean				
Maize				
Cotton				
Ground nut				
<b>Horticulture</b>	Not applicable			
<b>Continuous submergence for more than 2 days</b>				
Sugarcane	Re-planting with PBS, Re-sowing Avoid soybean	Drain out excess water Application of additional N (25%) IPM for army worm Breaking hard pan	Drain out excess water Harvest maize for fodder purpose / green cobs N & K application in addition to recommended dose (25%)	Drain out excess water Harvest at Physiological maturity Proper drying of produce
Soybean				
Maize				
Cotton				
Ground nut				
<b>Horticulture</b>				
<b>Sea water intrusion</b>	Not applicable			

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

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and fodder availability;	<p>Total 13190 MT Fodder required for 29310 animals (5% of the Total cattle population;-5.86 lacks) @ 5kg /animal /day for 90days. 660 progressive formers are to be entrusted to grow fodder on their own 2 acres of land (yield 20MT)</p> <p>Dry fodder should be stored as precautionary measure considering minimum of 5% of cattle population will be affected in the district .For this 660 No of farmers are selected and made MOU to store the fodder under condition of providing 5MT fodder/each at any given time. Cattle feed factory in the district are order to store minimum 100MTs cattle feed till fresh monsoon begins.</p> <p>Sugar factory are also asked to preserve min 500MT biogas in their godown and supply to the25 cattle camps</p>	<p>During drought season feed/fodder are brought from stored area.</p> <p>Goshala will be opened wherever water facility is available.</p> <p>Further fodder seeds will be given to the irrigated farmers to grow short term fodder crops like African tall maize, multi cut jowar etc.</p> <p>Farmers are advised to sell old age animals, unproductive animals to reduce feed &amp; fodder utility.</p> <p>Further fodder will be transported from irrigated area farmers are given fodder purchase subsidy and transportation cost.</p>	<p>Encourage progressive farmers to grow fodder on their own lands &amp; supporting them with assisting infrastructures like seeds, money manure. and they have been asked to stock the pile and transport to the camps during warranted event</p>
Drinking water	<p>Panchayats are advised to construct/small ponds for storing water for cattle drinking purpose.</p>	<p>Fresh borewells were dug at Goshala or thickly populated cattle areas. Water troughs were given to each village for mass drinking purposes. Chlorine tabs/ bleaching powders will supplied to each panchayat for keeping drinking water clean. Washing of animals at ponds is completely banned to avoid water contamination.</p> <p>Rs.13.50.lak is required for supply of drinking water to 25 cattle camps for/90 days @ Rs,600 /cattle camp</p>	-
Health and disease management	<p>All the animalwere vaccinated for HS and Foot &amp;Mouth disease BQ vaccination in endemic areas.</p> <p>Emergency drugs and Dehydrating fluids are stored at each</p>	<p>Animals are vaccinated in and around the outbreak area with Foot &amp; mouth and H.S. Vaccines</p>	<p>Further survey and controlling measures to control the diseases.</p>

	institution. Farmers are advised to burry the diseased animals away from village limit at least 5-10 Km away from the village	Sheep & Goat are given with Deworming drugs. Fluids and tonic,mineral mixture are given to weaker section farmers. Rs,7.5 lakhs is required for 15 number of cattle Camp for 90 d @ Rs,50.000 per camp	
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<b>Floods</b>			
Feed and fodder availability	Farmers are advised to shift the fodder away from flood affected areas to higher places. Cattle feeds and biogas are kept ready for transport to needy places as and where demand comes.	Dry fodder is supplied to the flood affected areas by revenue authority / all staff from non affected areas. Minimum of 5 truck/2boats are kept in each taluk especially for transport of fodder/feeds. Sugarcane if available is also transported to the needy place or to cattle camps. a)Totally 942 Mt of fodder is required for 10 days @ 5kg fodder / animal for 18843 total animals b) Totally 188 mt concentrated feed is required for 10 days @ 1kg /animal for 18843 animals	Farmers are allowed to purchase limit of 5Mt/farmer from available place under subsidised rate and free transportation facility feeds maximum of 1Mt /farmer is distributed for min of 1 month.
Drinking water	Cattle camps places were identified in each village and water troughs were kept ready to store water. Water supply tanks were identified especially are each per village and kept on alert position.	There are nearly 103 villages identified as flood affected so the water tanks were taken to supply the pure water to the needy place .Rs.5.00 lakhs is required for 10 days for 50 cattle camps @ Rs,1000 /cattle camp	
Health and disease management	-		-
<b>Cyclone</b>			
Feed and fodder availability			
Drinking water			

Health and disease management			
<b>Heat wave and cold wave</b>			
Shelter/environment management			
Health and disease management			

## 2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement
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	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
<b>Floods</b>			

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	Routine practices are followed
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of 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 to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD
<b>Cyclone</b>			
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	Provide clean drinking water	Sanitation of drinking water	Sanitation of 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 to prevent ammonia	Disposal of dead birds by burning / burying with lime powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats

		accumulation due to dampness	in feed Vaccination against RD
<b>Heat wave and cold wave</b>			
<b>Heat wave</b>			
Shelter/environment management	Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed
<b>Cold wave</b>			
Shelter/environment management	Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed
Health and disease management	Arrangement for protection from chilled air	Supplementation of grains Antibiotics in drinking water to protect birds from pneumonia	Routine practices are followed



### 2.5.2 Fisheries/Aquaculture:

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Marine	NA	NA	NA
Inland			
(i) Shallow water depth due to insufficient rain/inflow	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.
(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>B. Aquaculture</b>			
(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			
<b>2) Floods</b>			
<b>A. Capture</b>			
Marine	1) Help the district administration in providing Savi monsoon and boat 2) Prior warning is given for fishermen as per advice of Meteorological Dept.		