State: GUJARAT

Agriculture Contingency Plan for District: Surendranagar

1.0 District Agriculture profile						
1.1	**Agro-Climatic/Ecological Zone**					
	Agro Ecological Sub Region (ICAR)	Arid Western Plains (4.2)				
	Agro-Climatic Zone (Planning Commission)	Gujarat Plains & Hills Region(XIII)				
	Agro Climatic Zone (NARP)	North Saurashtra Zone (GJ-6)				
	List all the districts or part thereof falling under the NARP Zone	Amreli,Bhavnagar,Jamnagar,Rajkot,Surendranagar, Devbhoomi Dwarka, Morbi, Botad				
	Geographic coordinates of district headquarters	Latitude		Longitude		Altitude
		22.0° 43'07.42" N		71°38 15.61" E		74 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Main Dry farming Research Station, Junagadh Agricultural University, Targhadia (Rajkot)-360003				
	Mention the KVK located in the district	Krishi Vigyan Kendra, Nana Kandasar (Surendranagar)-363520				
1.2	**Rainfall** (Avg. of 2005-06-2014-15)	Normal RF(mm)	Normal Rainy Days (number)	Normal Onset (specify week and month)		Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	603	28	3rd week of June		3rd week of September
	NE Monsoon(Oct-Dec):	-	-	NA		NA
	Winter (Jan- March)	-	-	NA		NA
	Summer (Apr-May)	-	-	NA		NA
	Annual	603	28	NA		NA

Source: District Agriculture officer, District Panchayat-2015-16

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)	922.5	623.93	44.8	50.86	40.99	14.21	0.6	104.16	39.42	2.93

(Source: District Panchayat Reports, Agriculture department-2015-16)&, District Irrigation Plan,PMKSY, 2016

1. 4	Major Soils (common names like red sandy loam deep soils (etc.,)*	Area (‘000 ha)	Percent (%) of total	Talukas
	1. Medium blacksoils	212.84	28.01	Dhanghdhra ,Wadhwan,Chuda
	2Saline_Alkaliblack soils	151.57	19.95	Limbadi, Lakhatar
	3. Sandy soils	395.46	52.04	Chotila, Than, Patdi-Dasada, Muli, Sayla

(Source: District Irrigation Plan, PMKSY, 2016)

1.5	Agricultural land use	Area (‘000 ha)	Cropping intensity %
	Net sown area	623.93	129.02
	Area sown more than once	181.07	
	Gross cropped area	805.00	

(Source: District Irrigation Plan, PMKSY, 2016)

1.6	Irrigation	Area (‘000 ha)		
	Net irrigated area	233.10		
	Gross irrigated area	359.02		
	Rainfed area	390.83		
	Sources of Irrigation	**Number**	**Area (‘000 ha)**	**Percentage of total irrigated area**
	Canals	37	212.41	59.2
	Tanks	2586	13.11	3.7
	Open wells	18719	108.1	30.1
	Bore wells			
	Lift irrigation schemes	-		
	Micro-irrigation	9637		
	Other sources	-	25.4	7.1
	Total Irrigated Area		359.02	100.0
	Pump sets	17398		
	No. of Tractors	18650		

	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	
	Critical	-	-	
	Semi- critical	1	9.20	saline
	Safe	8	90.80	-
	Wastewater availability and use	-	-	
	Ground water quality			
	*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%			

(Source: District Irrigation Plan, PMKSY, 2016)

1.7 Area under major field crops & horticulture (Year: 2012-13 to 2015-16**)**

Sr.No.	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***			**Summer**	**Grand total**
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		
1	Cotton	202.3	182.0	384.3					384.3
2	Sesame	-	29.8	29.8				2.2	32.0
3	Pearl millet		6.9					1.5	8.4
4	Wheat				33.2	2.7	35.9		35.9
5	Castor		66.5	66.5					66.5
6	Groundnut		13.7	13.7				0.33	14.0
7	Chickpea				3.7	13.7	17.4		17.4
8	Pulses		3.4	3.4	-	-			3.4
9	Mustard				3.4				3.4
Sr.No.	**Horticulture crops – Fruits (2015-16)**	**Area ('000 ha) Total**							
1	Ber	1.5							
2	Acid lime	1.1							
3	Pomegranate	0.6							
4	Mango	0.3							
5	Sapota	0.2							
6	Aonla	0.2							

Sr.No.	Horticulture crops – Vegetables (2015-16)	Total
1	Brinjal	2.9
2	Okra	2.1
3	Cluster bean	1.5
4	Cucurbits	1.3
5	Tomato	1.2
6	Onion	1.3
	Spices crops	**Total**
1	Cumin	89.5
2	Fennel	16.6
3	Chili	1.2
4	Coriander	5.9
5	Isabgul	1.0
	Fodder crops	**Total**
1	**Total fodder crop area**	132.2
	Grazing land	41.0
	Sericulture etc	**-**
	Others (specify)	**-**

(Source: Statistical reports, District Panchayat, 2012-13 to 2015-16 & Director of Horticulture, Govt. of Gujarat-2015-16)

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	N.A	N.A	331.3
	Crossbred cattle	N.A	N.A	4.0
	Non descriptive Buffaloes (local low yielding)	N.A	N.A	360.2
	Graded Buffaloes	N.A	N.A	
	Goat	N.A	N.A	141.2
	Sheep	N.A	N.A	67.6
	Others (Camel, Pig, Yak etc.)	N.A	N.A	2.4
	Commercial dairy farms (Number)	N.A	N.A	
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial		10	
	Backyard			

1.10	**Fisheries**							
	A. Capture							
	i) Marine	**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)		
		11769	0	464	0	NA	0	
	ii) Inland	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**		
		-		175		24		
	B. Culture							
			Water Spread Area (ha)		**Yield (t/ha)**		**Production ('000 tons)**	
	i) **Brackish water**		33.0		-		-	
	ii) **Fresh water**		7144.59		1		7144.6	
	Others		-		-		-	

(Source: District Statistical Report-2015-16)

1.11 Production and Productivity of major crops (Average of last 3 years: 2013-14 to 2015-16)

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)										
	Groundnut	32.4	2389	-	-	0.8	2188	33.2	2288	43
	Cotton- Irrigated	204.4	1052	-	-	-	-	204.4	1052	255
	Cotton-Rainfed	65.6	361	-	-	-	-	65.6	361	72.2
	Wheat- irrigated	-	-	103.4	3086	-	-	103.4	3086	129
	Wheat unirrigated	-	-	2.0	747	-	-	2.0	747	2.4
	Cumin	-	-	75.3	837	-	-	75.3	837	83
	Perl millet	8.7	890	-	-	1.3	818	10.0	854	15
	Chickpea	-	-	17.8	1124	-	-	17.8	1124	17
	Green gram			1.6	536.0	-	-	1.6	536.0	2
	Sesame	12.8	423.0	-	-	-	-	12.8	423.0	17
	Castor	166	2505	-	-	-	-	166	2505	249
* 00 bales 170 kg										

Major Horticultural crops (Crops to be identified based on total acreage- 2015 - 16)										
	Citrus	-	-	-	-	-	-	14.6	12850	
	Ber	-	-	-	-	-	-	16.8	11350	
	Mango	-	-	-	-	-	-	1.4	4850	
	Pomegranate	-	-	-	-	-	-	7.6	13800	
	Sapota	-	-	-	-	-	-	1.7	7850	
	Aonla	-	-	-	-	-	-	1.8	12040	

(Source : Reports, District Panchayat, Agriculture Department and Horticulture Department, year 2013-14 to 2015-16)

1.12	**Sowing window for major field crops** (start and end of normal sowing period)	Cotton	Sesame	Castor	Perl millet	Cumin	Wheat
	Kharif- Rainfed	3rd week of June to 1st week of July	3rd week of June to 1st week of July	3rd week of June to 1st week of July	3rd week of June to 1st week of July	-	-
	Kharif-Irrigated	3rd week of May	-			-	-
	Rabi- Rainfed	-			-	-	-
	Rabi-Irrigated	-				2nd to 4th week of Nov.	2nd to 4th week of Nov.

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasion**	**None**
	Drought		√	
	Flood		√	
	Cyclone		√	
	Hail storm			√
	Heat wave		√	
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Pests and disease outbreak (specify) Pests-Aphid, Jassid, Thrips, white fly, Mealy bug, scale insect, early shoot borer, heliothis, leaf roller,white grub, pink boll worm Diseases-Wilt, Red rot, ,Rust, ,Tikka & Downy Mildew, collor rot	√		
	Others (specify)			

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Annual rainfall map as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Change in crop/ cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks (July 1st wk)*	Medium black soils	Cotton(Cotton hybrid-4,6,8,10, & Govt. approved Bt. hybrids)	No change	• Follow standard recommended package of practices	-
		Perl millet(GHB-558, 577, 538,719,744,732 and Govt. approved hybrids)	No change	• Follow standard recommended package of practices	
		Castor(GC-3, GCH-4, GCH-6, GCH-7)	No change	• Follow standard recommended package of practices	
		Sesame(GT-2,3,4,5)	No change	• Follow standard recommended package of practices	
	Sandy soils	Cotton (Rainfed) (G-Cot-13,15,21, 23,25)	No change	• Follow standard recommended package of practices	-
		Perl millet (GHB-558, 577, 538, 719, 744, 732 and Govt. approved hybrids)	No change	• Follow standard recommended package of practices	
		Castor (GC-3, GCH-4, GCH-6, GCH-7)	No change	• Follow standard recommended package of practices	
		Sesame(GT-2,3,4,5)	No change	• Follow standard recommended package of practices	
	Saline-alkali black soils (Heavy texture)	Cotton (Rainfed) (G-Cot-13,15,21, 23,25)	No change	• Follow standard recommended package of practices	-
		Perl millet(GHB-558, 577, 538,719,744,732 and Govt. approved hybrids)	No change	• Follow standard recommended package of practices	

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 15th) i.e. July 3rd week	Medium black soils	Cotton	No change	• Follow standard recommended package of practices	Agencies for quality seed supply are National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC), University, Gujcomasol
		Perl millet	No change	• Follow standard recommended package of practices	
		Castor	No change	• Follow standard recommended package of practices	
		Sesame	No change	• Follow standard recommended package of practices	
	Sandy soils	Cotton (rainfed)	No change	• Follow standard recommended package of practices	
		Perl millet	No change	• Follow standard recommended package of practices	
		Castor	No change	• Follow standard recommended package of practices	
		Sesame	No change	• Follow standard recommended package of practices	
	Saline-alkali black soils (Heavy texture)	Cotton (rainfed)	No change	• Follow standard recommended package of practices	
		Perl millet	No change	• Follow standard recommended package of practices	

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 (Specify month)* August 1st week	Medium black soils	Cotton	Rainfed cotton (G.Cot. 13,15,21,23, 25,V-797), Castor (GC-3,GCH-4,6,7) Sorghum (Gundhari,GFS-3, GAFS-11,CSV-21F, S-1049), Sesame (GT-2,3,4,5) Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	Agencies for quality seed supply are National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC), University, Gujcomasol. Supply of quality seed from NSC, GSSC, SAU, and zero till seed drill, seed dressing equipment, sprayers & dusters from Government Schemes (Implements like seed drill, seed dressing are available in Rajkot).
		Perl millet	No change	-	
		Castor	No change	• Follow standard recommended package of practices	
		Sesame	No change	• Follow standard recommended package of practices	
	Sandy soils	Cotton (Rainfed)	No change	• Follow standard recommended package of practices	
		Perl millet	No change	• Follow standard recommended package of practices	
		Castor	No change	• Follow standard recommended package of practices	
		Sesame	No change	• Follow standard recommended package of practices	
	Saline-alkali black soils (Heavy texture)	Cotton (rainfed)	No change	• Follow standard recommended package of practices	
		Perl millet	No change	• Follow standard recommended package of practices	

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 3rd week)	Medium black soils	Cotton	Sesame (Purva-1)(Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049),Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	Agencies for quality seed supply National (NSC), Gujarat State Seed Corporation (GSSC), University, and Gujcomasol, zero till seed drill, seed dressing equipments, Sprayers & dusters to farmers through government schemes(Implements like seed drill and seed dressing are available at Rajkot)
		Perl millet	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Castor	No change	• Follow standard recommended package of practices	
		Sesame	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
	Sandy soils	Cotton (Rainfed)	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Perl millet	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Sesame	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Castor	No change	• Follow standard recommended package of practices	
	Saline-alkali black soils (Heavy texture)	Cotton (Rainfed)	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Perl millet	Sesame (Purva-1) Castor (GC-3, GCH-4, 6, 7) Sorghum (Gundhari, GFS-3, GAFS-11,CSV-21F, S-1049), Pigeon pea (BDN-2,Vaishali,GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Crop Management**	**Soilnutrient&Moisture Conservation masures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc	Medium black soils	Cotton	• Gap filling	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	• Supply cotton stalk shredding machine which is available in Jasdan town of Rajkot district through Govt. schemes
		Perl millet	• Thinning to maintain 10 cm plant to plant distance	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	
		Castor	• Gap filling	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	
		Sesame	• Thinning to maintain 10 cm plant to plant distance	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	
	Sandy soils	Cotton (Rainfed)	• Gap filling	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	• Supply cotton stalk shredding machine which is available in Jasdan town of Rajkot district through Govt. schemes
		Perl millet	• Thinning to maintain 10 cm plant to plant distance	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	
		Castor	• Gap filling	• Interculturing to fill soil cracks • mulching with wheat straw or shredded cotton stalk	
		Sesame	• Thinning to maintain 10 cm plant to plant distance	• Interculturing to fill soil cracks • mulching with wheat straw or shredded cotton stalk	
	Saline-alkali soils black (Heavy texture)	Cotton (Rainfed)	• Gap filling	• Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk	• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district through Govt. schemes
		Perl millet	• Thinning	• Interculturing to fill soil cracks • mulching with wheat straw or shredded cotton stalk	

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**	**Soilnutrient&Moisture Conservation measures**	**Remarks on Implementation**
At vegetative stage	Medium black soils	Cotton	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water)	Ensure electric supply for life saving irrigation.
		Perl millet	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation • Thinning.	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	
		Castor	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	
		Sesame	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation • Thinning.	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	

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**	**Soilnutrient&Moisture Conservation measures**	**Remarks on Implementation**
	Sandy soils	Cotton	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water)	
		Perl millet	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation • Thinning.	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	
		Castor	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	
		Castor	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	
		Sesame	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation • Thinning.	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	

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**	**Soilnutrient&Moisture Conservation measures**	**Remarks on Implementation**
	Saline-Alkali black soils (Heavy texture)	Cotton (rainfed)	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water)	
		Perl millet	• Weeding. • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Life saving irrigation • Thinning.	• Mulching with wheat straw or crushed cotton stalk. • Inter tilling.	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Crop Management**	**Soilnutrient&Moisture Conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Medium black soils	Cotton	• Supplemental irrigation if possible followed byweeding. • Install light trap • Install pheromone trap@40/ha • Spray recommended insecticide	• Spray kaolin @ 4% (400g/10 lit.water).	Ensure electric supply by PGVCL for life saving irrigation. Interculturing implements by Govt. agencies.
		Perl millet	• Weeding. • Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.	• Interculturing if possible, • Top dressing of N through urea after relief of drought	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Crop Management**	**Soilnutrient&Moisture Conservation measures**	**Remarks on Implementation**
		Castor	• Supplemental irrigation if possible followed by weeding.	• Interculturing if possible,	
		Sesame	• Supplemental irrigation if possible followed by weeding.	• Interculturing if possible,	
	Sandy soils	Cotton (Rainfed	• Supplemental irrigation if possible followed by weeding. • Install light trap • Install pheromone trap@40/ha • Spray recommended insecticide	• Spray kaolin @ 4% (400g/10 lit. water).	
		Perl millet	• Weeding. • Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.	• Interculturing if possible. • Top dressing of N through urea after relief of drought	
		Castor	• Supplemental irrigation if possible followed by weeding.	• Interculturing if possible,	
		Sesame	• Supplemental irrigation if possible followed by weeding.	• Interculturing if possible,	
	Saline-Alkali black soils (Heavy texture)	Cotton (Rainfed)	• Supplemental irrigation if possible followed by weeding. • Install light trap • Install pheromone trap@40/ha • Spray recommended insecticide	• Spray kaolin @ 4% (400g/10 lit. water).	
		Perl millet	• Weeding. • Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.	• Interculturing if possible. • Top dressing of N through urea after relief of drought	

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/ Cropping system**	**Crop Management**	***Rabi* crop planning**	**Remarks on Implementation**
	Medium black soils	Cotton	• Harvest mature bolls. • Supplemental irrigation if possible.	-	Ensure electric supply for life saving irrigation by PGVCL
		Perl millet	• Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.		
		Castor	• Harvest spikes. • Supplemental irrigation if possible.		
		Sesame	• Supplemental irrigation if possible.		
	Sandy soils	Cotton (rainfed)	• Harvest mature bolls. • Supplemental irrigation if possible.	-	
		Perl millet	• Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.		
		Castor	• Harvest spikes. • Supplemental irrigation if possible.		
		Sesame	• Supplemental irrigation if possible.		
	Saline-Alkali black soil (Heavy texture)	Cotton (rainfed)	• Harvest mature bolls. • Supplemental irrigation if possible.	-	
		Perl millet	• Supplemental irrigation if possible. • Harvest non flowering plants for fodder purpose if water is not available.		

2.1.2 Drought - Irrigated situation

Condition			Suggested Contingency measures		
Delayed/ limited release of water in canals due to low rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium black soil	NA	NA	NA	-
	Sandy Soil	NA	NA	NA	

Condition			Suggested Contingency measures		
Delayed/ limited release of water in canals due to low rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium black soil	NA	NA	NA	-
	Saline-Alkali black soils (Heavy texture)	NA	NA	NA	

Non release of water in canals under delayed onset of monsoon in catchment	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium black soil	NA	NA	NA	-
	Sandy soil	NA	NA	NA	
	Saline-Alkali black soil (Heavy texture)	NA	NA	NA	

Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**Major Farming situation**	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	NA				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient ground water recharge due to low rainfall	Medium black soils	Wheat	Wheat (Arnej-206, Lok-1, GW-1, 2) in conserve moisture	• Supply irrigation during night time to reduce transpiration.	• Ensure electric supply for life saving irrigation by Paschim Gujarat Vij Company(PGVCL). • Supply MIS and quality seeds through Govt. agencies
			Chickpea (GG1,GJG- 3,5) / Cumin (GC-3,4/ Coriander (GC-2,3)/ Fenugreek (GM-2)/ Leafy vegetables / carrot.(GDC-1)	• Adoption of MIS irrigation system. • Reduce area of irrigation.	
		Cotton	No change	• Adoption of MIS system. • Reduce area of irrigation. • Alternate furrow irrigation.	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Cumin	No change	• Adoption of MIS irrigation system. • Reduce area of irrigation. • Light irrigation. • Supply irrigation during night time to reduce transpiration.	
	Sandy soils	Wheat	Wheat (Arnej-206, Lok-1, GW-1, 2) in conserve moisture	• Supply irrigation during night time to reduce transpiration.	• Ensure electric supply for life saving irrigation by Paschim Gujarat Vij Company Ltd (PGVCL). • Supply MIS and quality seeds through Govt. agencies
			Chickpea (GG1, GJG- 3,5) / Cumin (GC-3,4/ Coriander (GC-2,3)/ Fenugreek (GM-2)/ Leafy vegetables / carrot.(GDC-1)	• Adoption of MIS irrigation system. Reduce area of irrigation.	
		Cumin	No change	• Adoption of MIS irrigation system. • Reduce area of irrigation. • Light irrigation. • Supply irrigation during night time to reduce transpiration.	
		Cotton	No change	• Adoption of MIS system. • Reduce area of irrigation. • Alternate furrow irrigation.	• Ensure electric supply for life saving irrigation by Paschim Gujarat Vij Company Ltd (PGVCL). • Supply MIS and quality seeds through Govt. agencies.
			Chickpea (GG1, GJG- 3,5) / Cumin (GC-3,4/ Coriander (GC-2,3)/ Fenugreek (GM-2)/ Leafy vegetables / carrot.(GDC-1)	• Adoption of MIS system. • Reduce area of irrigation.	
	Saline-Alkali black soils (Heavy texture)	Wheat	Wheat (Arnej-206, Lok-1, GW-1, 2) in conserve moisture	• Supply irrigation during night time to reduce transpiration.	Ensure electric supply for life saving irrigation by Paschim Gujarat Vij Company Ltd (PGVCL).
			Chickpea (GG-1,GJG- 3)	• Adoption of MIS system. • Reduce area of irrigation.	

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
		Cotton	No change	• Adoption of MIS system. • Reduce area of irrigation. • Alternate furrow irrigation.	• Ensure electric supply for life saving irrigation by Paschim Gujarat Vij Company Ltd (PGVCL). • Supply MIS and quality seeds through Govt. agencies
Seawater intrusion	NA				

2.2 Un-timely (unseasonal) rains (for both rainfed and irrigated situation)

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Wheat	• Surface drainage (to control water logging condition)	• Surface drainage (to control water logging condition)	• Surface drainage (for management of water logging, lodging of crop), • To control black point in grain spray mancozeb 0.2%	• Protect produce with plastic sheet (100µ UV stabilized colour plastic) or shift produces to farm shed. • Protection against pest/disease damage in storage etc. • Preparation of quick drying techniques and techniques to separate good lot and bad lot.
Cotton	• Surface drainage (for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate.	• Surface drainage (for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate.	• Surface drainage (for management of water logging. • Harvesting of mature bolls.	
Perl millet	• Surface drainage(For management of water logging	• Surface drainage for management of water logging	• For quick Surface drainage open channel around field. • Harvest mature ear heads.	

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Sesame	• Surface drainage(For management of water logging	• Surface drainage for management of water logging	• Surface drainage (For management of water logging). • Harvesting at Physiological maturity stage.	
Castor	• Surface drainage(For management of water logging	• Surface drainage for management of water logging	• Surface drainage (For management of water logging). • Harvesting at Physiological maturity stage.	
Horticulture				
Cumin	• Surface drainage(For management of water logging	• Surface drainage for management of water logging	• Surface drainage for management of water logging. • To prevent/control cumin blight spray mancozeb 0.2 % (27g/10 lit water) and 0.2% (30g/10 lit water) wettable sulphur for protection against powdery mildew disease.	
Acid lime	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	-
Ber	-	• Spray 0.2 % (30g/10 lit water) wettable sulphur for protection against powdery mildew	• Spray 0.2 % (30g/10 lit water) wettable sulphur for protection against powdery mildew. • Harvest mature fruits.	-

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Heavy rainfall with high speed winds in a short span				
Wheat	• Surface drainage (to control water logging condition).	• Surface drainage (to control water logging condition).	• Surface drainage for management of water logging and lodging crop. • Spray mancozeb 0.2%.(27g/10 lit water) to control black point in grain.	• Protect produce with plastic sheet (100µ UV stabilized colour plastic) or shift produces to farm shed. • Protection against pest/disease damage in storage etc. • Preparation of quick drying techniques and techniques to separate good lot and bad lot.
Cotton	• Surface drainage (for management of waterlogging. • After drainage, apply 199 kg/ha ammonium sulphate	• Surface drainage (for management of water logging. • After drainage, apply 199 kg/ha ammonium sulphate. • Upright the lodged plant and press the soil around the plant.	• Surface drainage (for management of water logging) harvesting of mature bolls,	
Castor	• Surface drainage (for management of waterlogging.	• Surface drainage (for management of waterlogging.	• Surface drainage (for management of water logging), Harvest spikes	
Perl millet	• Surface drainage (for management of waterlogging.	• Surface drainage (for management of waterlogging.	• Harvest mature ear heads • Quick surface drainage.	
Sesame	• Surface drainage (for management of waterlogging.	• Surface drainage (for management of waterlogging.	• Surface drainage (for management of water logging)	

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Horticulture				
Cumin	• Surface drainage (for management of water logging & diseases. • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight)	• Surface drainage (for management of water logging & diseases. • Spray mancozeb 0.2% (27g/10 lit water)to control cumin blight)	• Surface drainage (for management of water logging). • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. • Harvesting at physiological maturity immediately	• Protect produce with plastic sheet (100µ UV stabilized colour plastic) or shift produces to farm shed. • Protection against pest/disease damage in storage etc. • Preparation of quick drying techniques and techniques to separate good lot and bad lot.
Acid lime	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water). • collect mature fruits	-
Ber	-	• Spray 0.2 % (30g/10 lit water) wettable sulphur for protection against powdery mildew	• Spray 0.2 % (30g/10 lit water) wettable sulphur for protection against powdery mildew. • Harvest mature fruits.	-
Outbreak of pests and diseases due to unseasonal rains				
Cotton	-	-	-	-
Wheat	• Spray mencozeb 0.2 % (27g/10 lit water) to control blight and rust	• Spray mencozeb 0.2 % (27g/10 lit water) to control blight and rust	• Spray mencozeb 0.2 % (27g/10 lit. water) to control blight and rust	-

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post-harvest**
Cumin	• Spray mencozeb 0.2 % (27g/10 lit. water) to control cumin blight	• Spray mencozeb 0.2 % (27g/10 lit. water) to control cumin blight	• Spray mencozeb 0.2 % (27g/10 lit. water) to control cumin blight & 0.2 % (30g/10 lit water) wettablesulphur to control powdery mildew.	-
Perl millet	-	-	• Spray mancozeb 0.2% (27g/10 lit. water) to controlrust.	-
Sesame	• Spray mancozeb 0.2% (27g/10 lit water) to control phytophthora blight	• Spray mancozeb 0.2% (27g/10 lit water) to control phytophthora blight	• Spray hexaconazole 5%(10 ml/10 lit water) to control PM & mancozeb 0.2% (27g/10 lit water) to control phytophthora blighr	-
Horticulture		•	•	
Acid lime	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 g/10 lit water). • collect mature fruits	-
Ber	-	• Spray 0.2 % (27g/10 lit water) wettable sulphur for protection against powdery mildew	• Spray 0.2 % (27g/10 lit water) wettable sulphur for protection against powdery mildew. • Harvest mature fruits.	-

2.3 Floods

Condition	**Suggested contingency measures**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Cotton	N.A	• As a preventive step opendrainage channel.	• As a preventive step open drainage channel.	-
Castor	NA	• As a preventive step opendrainage channel.	• As a preventive step open drainage channel.	-
Perl millet	N.A	• As a preventive step opendrainage channel.	• As a preventive step open drainage channel.	-
Sesame	N.A	• As a preventive step opendrainage channel.	• As a preventive step open drainage channel.	-
Horticulture	-	-	-	-
Citrus	• Shift to safe place with proper drainage	• Surface drainage	• Surface drainage	• Surface drainage
Ber	• Shift to safe place with proper drainage	• Surface drainage	• Surface drainage	• Surface drainage
Continuous submergence for more than 2 days				
Cotton	• As a preventive step open drainage channel. • Give well irrigation if possible and apply 199 Kg/ha ammonium sulphate.	• As a preventive step open drainage channel. • Give well irrigation if possible and apply 199 Kg/ha ammonium sulphate.	• As a preventive step open drainage channel give well irrigation if possible. • Harvesting mature bolls	-
Castor	• As a preventive step open drainage channel.	• As a preventive step open drainage channel. .	• As a preventive step open drainage channel • Give well water irrigation if possible.	• Harvest mature spikes
Perl millet	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) control downy mildew.	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) control downy mildew.	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) control downy mildew.	• Harvest mature ear head

Condition	Suggested contingency measures			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Sesame	• As a preventive step open drainage channel. • Spray mancozeb 0.2%(27g/10 lit water) to control phytophthora blight	• As a preventive step open Drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) control phytophthora blight.	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) control phytophthora blight.	• Harvest mature plants
Horticulture				
Citrus	• Shift to safe place & with • Proper surface drainage	• Surface drainage	• Surface drainage	• Surface drainage
Ber	• Shift to safe place & • Provide proper surface drainage	• Surface drainage	• Surface drainage	• Surface drainage
Sea water inundation[3]	NA	NA	NA	NA

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

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	N.A	N.A	N.A	N.A
Cold wave	N.A	N.A	N.A	N.A
Frost	N.A	N.A	N.A	N.A
Hailstorm	N.A	N.A	N.A	N.A
Cyclone				
Wheat	• Quick drainage	• Quick drainage	• Quick drainage and spray mancozeb 0.2% (27g/10 lit water) to control black point in grain.	Shift produce at safer places
Cumin	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight and 0.2 % (30 g/10 lit water) wettable sulphur for powdery mildew	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight and 0.2 % (30 g/10 lit water) wettable sulphur for powdery mildew	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight and 0.2 % (30 g/10 lit water) wettable sulphur for powdery mildew	

Extreme event type	Suggested contingency measure[r]			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Cotton	• Earthing up. • Quick drainage	• Earthing up. • Quick drainage	• Earthing up. • Quick drainage	
Perl millet	• Quick drainage	• Quick drainage	• Quick drainage. • Spray mancozeb 0.2% to control rust disease.	
Sesame	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27 g/10 lit water) to control phytophthora blight	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27 g/10 lit water) to control phytophthora blight	• As a preventive step open drainage channel. • Spray mancozeb 0.2% (27 g/10 lit water) to control phytophthora blight	
Horticulture				
Citrus	• Shift to safe place if possible & • Build cyclone proof nursery • Grow wind barrier trees around nursery.	• Reduce canopy & tying plants diagonally if possible. • Grow wind barrier trees around field.	• Reduce canopy	• Early harvesting of crop
Ber	-	-	• Reduce canopy	• Early harvesting of crop

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			
Feed and fodder availability	• Store fodder (silage and hay). • Conventional feeds should be used for feeding (Roughages & concentrates) of maize, sorghum, groundnut fodder and wheat straw	• Stored feed & fodder in silage & hay. Treated wheat straw with 4 % urea solution. • Use chaff cutter for fodder. • Use press for making compact bundles of fodder for easy transportation. • Establish feed block preparation facilities for animals. • Arrange bulk transportation of fodder	• Feed little green fodder along with unconventional feed (5 kg) green feed/mature animal

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drinking water	• Rain water harvesting and create water bodies/watering points. • When water is scarce use only for drinking water for animals.	• Avoid wallowing. • Judicious use of drinking water. • Establish and arrange the community based drinking water facilities. • In coastal area community based R.O. plant to be established for drinking water. • Add bleaching powder to drinking water (1%)	• Give sufficient water as per the animal requirement
Health and disease management	• Foot & Mouth disease vaccination in June, • Vaccination for Bacterial diseases e.g., HS,B.Q. • Deworming of the animals (cattle & buffaloes). • Add mineral mixtures 25 g/animal/day along with feed. • Animals to be covered cover under insurance schemes.	• Add mineral mixtures 25 g/Animal/day along with feed, • Deworming of the animals. • Arrange mobile dispensary for animal heath in the region. • Establish link with Agricultural/Veterinary University for animal health. • Involve vet. Science students for health management of animal. • Carry out disease diagnosis camps.	• Add vitamin mineral mixtures 25 g/animal/day along with feed. • Quarantine diseased animals and deworming of the animals.
Floods			
Feed and fodder availability	• Harvest available fodder and store it at safe place if floods forecast. • Shift animals to safe place. Identify rescue places for safety of animals	• Give stored fodder with mineral mixture. • Fodder should be stored at safe place. • In severe rain and flood unteather animals.	• Feed silage & hay material along with concentrate feed. • Use chaff cutter for fodder. • Use press for making compact bundles of fodder for easy transportation. • Establish community based shelter houses for animals. • Establish feed block preparation facilities for animals. • Arrange bulk transportation of fodder.

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drinking water	• Add bleaching powder (1%) to drinking water when heavy rains occur and flood expected.	• Add bleaching powder to drinking water • (1%).	• Add bleaching powder to drinking water (1%).
Health and disease management	• Provide insurance cover to the animals.	• Vaccination of animals against HS, BQ • Add mineral mixtures 25 g/Animal/day along with feed. • Deworming of the animals. • Arrange mobile dispensary for animal heath in the region. • Establish link with Agricultural/Veterinary University for animal health. • Involve vet. Science students for health management of animal. • Carry out disease diagnosis camps.	• Disposal of dead animals by burning the carcass and sanitation measures to control spread of diseases. • Health checking to diseases outbreak.
Cyclone			
Feed and fodder availability	• Early harvesting & storage of fodder,	• Shift animals to safe place. • Give stored fodder with mineral mixture along with concentrated feed. • In severe rain and flood unteather animals.	• Feed silage & hay material along with concentrated feed. • Use chaff cutter for fodder. • Use press for making compact bundles of fodder for easy transportation. • Establish community based shelter houses for animals. • Establish feed block preparation facilities for animals. • Arrange bulk transportation of fodder.
Drinking water	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Health and disease management	• Provide insurance cover to the animals.	• Vaccination of animals against HS& BQ. • Add mineral mixtures 25 g/animal/day along with feed, deworming of the animals. Arrange mobile dispensary for animal heath in the region. Establish link with Agricultural/Veterinary University for animal health. Involve vet. Science students for health management of animal. Carry out disease diagnosis camps.	• Disposal of dead animals by burning the carcas and sanitation measures to control spread of diseases. • Health checking to diseases outbreak.
Heat wave and cold wave	NA	NA	NA
Heat wave	NA	NA	NA

[a] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	• Use stored feed, conventional feed, antibiotics and probiotics	• Use stored feed, conventional feed, antibiotics and probiotics	• Use conventional feed, • Vaccination for viral diseases –Marek's and Ranikhet diseases (MD & RD).	• Linkage Govt. schemes with public/NGOs at grass root levels.
Drinking water	• Rain water harvesting	• Give water for drinking only	• Give sufficient water as per the bird's requirement	• Linkage Govt. schemes with public/NGOs at grass root levels.
Health and disease management	• Vaccination for viral diseases –against MD & RD. • Cover birds under insurance	• Provide ventilation. • Add more calcium with feed. • Assure supply of electric power.	• Routine practices to be followed. • Culling affected birds disposal by burning.	• Vaccination for viral diseases –against MD & RD.

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Floods				
Shortage of feed ingredients	• Use conventional feed, ingredients	• Use stored feed, antibiotics, pro biotic, and assure supply of electric power.	• Routine practices to be followed	• Linkage Govt. schemes with public/NGOs at grass root levels.
Drinking water	• -	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).	• Linkage Govt. schemes with public/NGOs at grass root levels.
Health and disease management	• Cover birds under insurance	• For suspected cases, give antibiotic in the feed, prevent water logging surrounding sheds. Assure supply of electric power.	• Dispose dead birds by burning.	• Vaccination for viral diseases –against MD & RD.
Cyclone				
Shortage of feed ingredients	• Use stored feed ingredients.	• Use stored feed & use conventional feed, antibiotics, pro biotic	• Routine practices to be followed.	• Use stored feed ingredients.
Drinking water	-	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).	-
Health and disease management	• Cover birds under insurance	• For suspected cases give antibiotics.	• Dispose dead birds by burning.	-
Heat wave and cold wave				
Heat wave				
Shelter/environment management.	• Arrangement of good ventilation by fan, foggers.	• Operate fans, foggers; keep open ventilators in night and cool period.	• Routine practices to be followed.	

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Health and disease management	• Cover birds under insurance	• Viral vaccination add calcium in the poultry feed.	• Routine practices to be followed.	-
Cold wave				
Shelter/environment management	NA	NA	NA	-
Health and disease management	NA	NA	NA	-

[a] based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	During the event	After the event
1)Drought			
A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	• Desilting/deepening of pond so that more water can be stored	• Provision of additional bore wells. • Use Euryhaline species.	• Maintaining pond water level at least 1 m depth.
(ii) Impact of salt load build up in ponds / change in water quality	• Replenishment of water in pond with fresh water.	• 30 % exchange of water.	• 10 % exchange of water.
(iii) Any other	-	-	-
2) Floods			
A.Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA

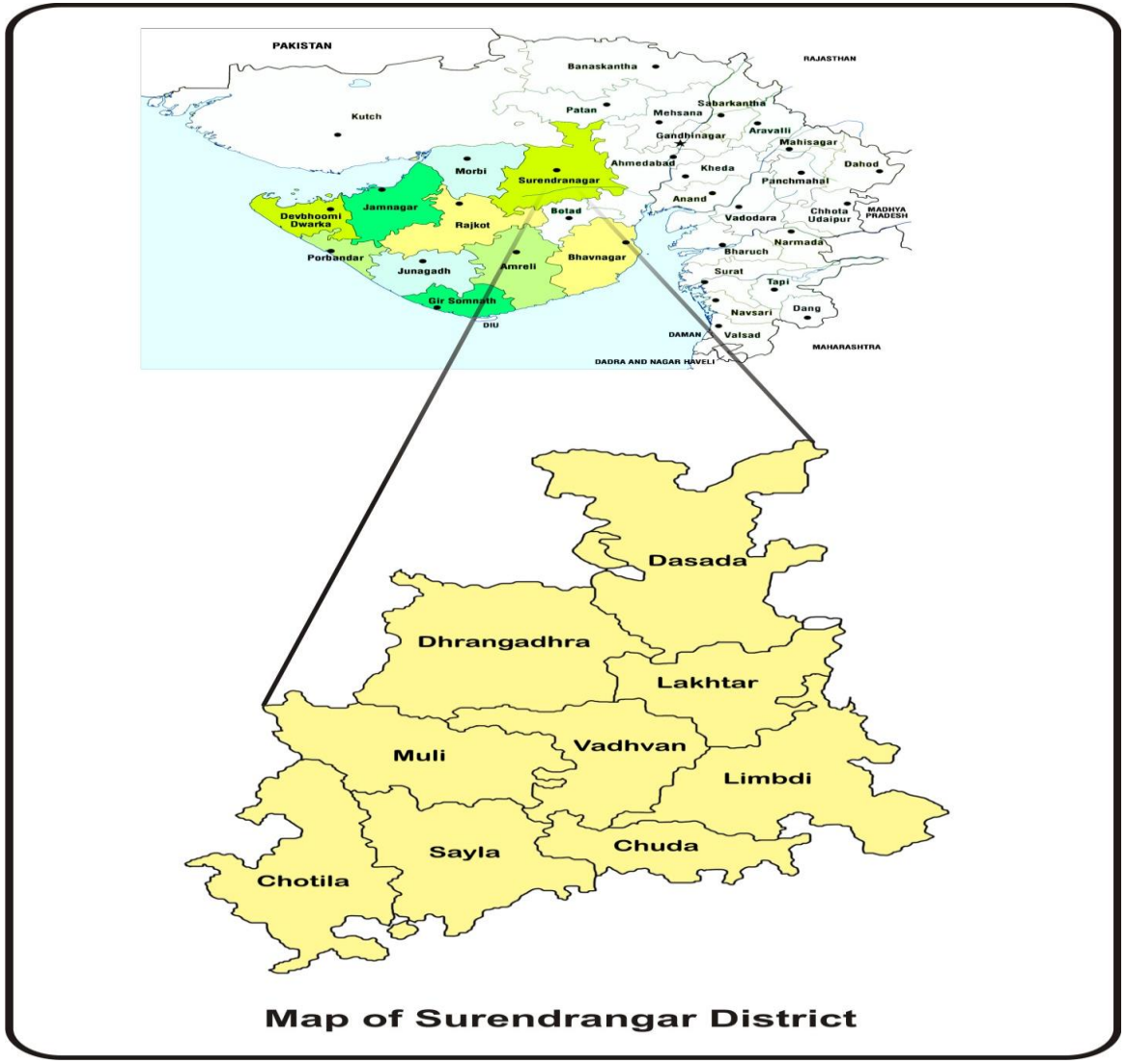
	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
B. Aquaculture			
(i) Inundation with flood water.	• Deepening of ponds, repair, strengthening of dykes	• Enhancement of dykes height by sand bags.	-
(ii) Water contamination and changes in water quality.	• Use of calcium hydroxide @ 150 kg/ha.	• Use of $KMnO_4$ for bath of fish as prophylactics.	• Lime treatment for oxidation.
(iii) Health and diseases.	• Antibiotics fortified feeding as prophylactics.	• Disinfectants formalin treatments as prophylactics.	-do-
(iv) Loss of stock and inputs (feed, chemicals etc).	• Stock cover under insurance	• -	-
(v) Infrastructure damage (pumps, aerators, huts etc.)	-	-	• Repaire & maintenance of aqua structures to begiven.
(vi) Any other	-	-	-
3. Cyclone / Tsunami			
A.Capture	-	-	-
Marine	-	-	-
(i) Average compensation to be paid due to loss of fishermen lives	• Forewarning systems to be installed. • Insurance & communication instruments supplied to fisher man. • Warning systems to be installed.	• Warning systems to be installed.	• Compensations to be paid for repair & maintenance of boats & gears on actual survey basis.
(ii) Avg. no. of boats / nets/damaged			• Compensation on assessment of actual losses & damage of boats &nets to be given.
(iii) Avg. no. of houses damaged	-	-	• Compensation on assessment of actual losses & damage of houses to be given.
Inland	NA	NA	NA
B. Aquaculture			
(i) Overflow / flooding of ponds	• Strengthening of dykes.	• Enhancement of dykes height by sand bags.	-
(ii) Changes in water quality (fresh water / brackish water ratio)	• Maintain salinity by addition of fresh water up to 20-25 ppt.	• Use euryhaline species.	• Use Euryhaline species for culture.

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
(iii) Health and diseases	• Liming and formalin treatment.	• Disinfectants treatments.	-
(iv) Loss of stock and inputs (feed, chemicals etc).	• Stock cover under insurance.	-	• Seed and feed to be supplied through Deptt of fisheries,
(v) Infrastructure damage (pumps, aerators, shelters/hutsetc)	-	-	• Compensation on assessment of actual losses & damage of pumps, aerators, shelters/huts to begiven.
(vi) Any other	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA
B. Aquaculture			
(i) Changes in pond environment (water quality)	• Plantation of leafy trees on dyke, increase depth.	• Maintain water level in pond. • Use of fountain and peddle wheel aerator.	-
(ii) Health and disease management	-	• Bleaching powder 1 to 2 %, formalin treatment to prevent diseases.	• $KMnO_4$ 2 % to maintain oxygen level
(iii) Any other	-	-	-

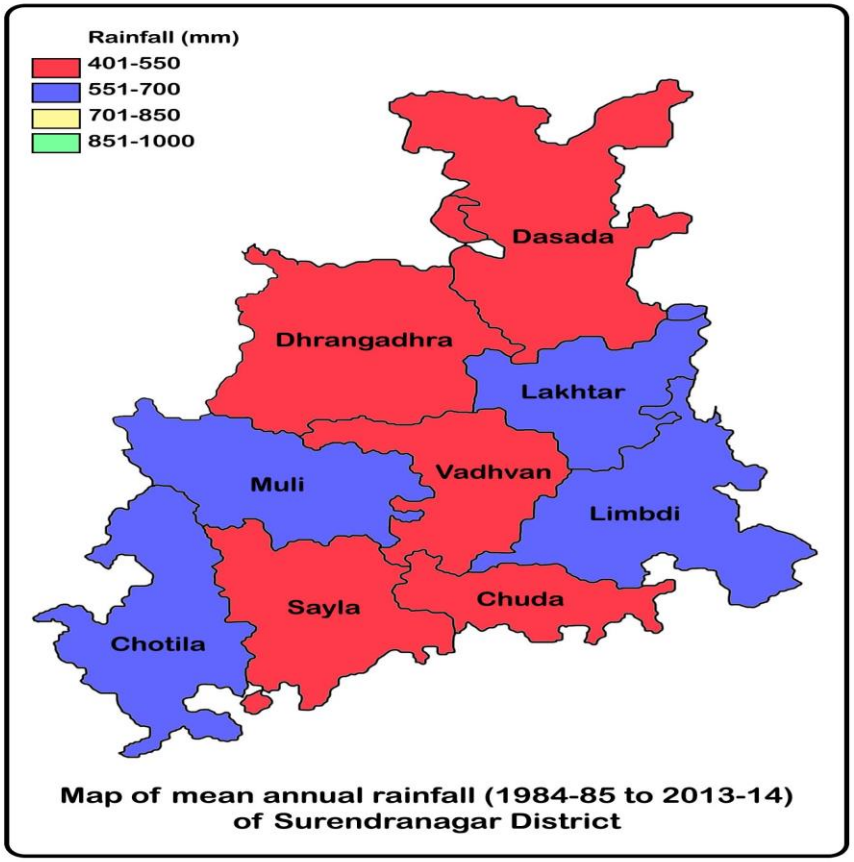
[a] based on forewarning wherever available

ANNEURE I

Location map of the district



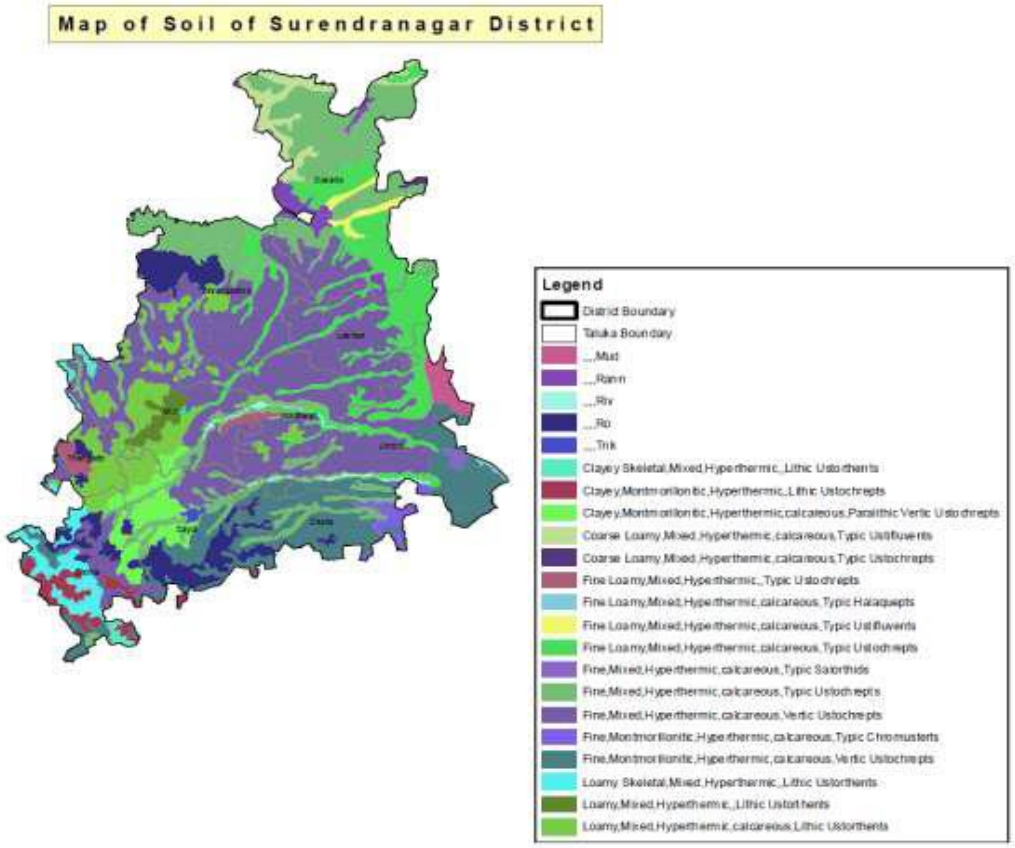
ANNEXURE-II
Mean annual rainfall of map:



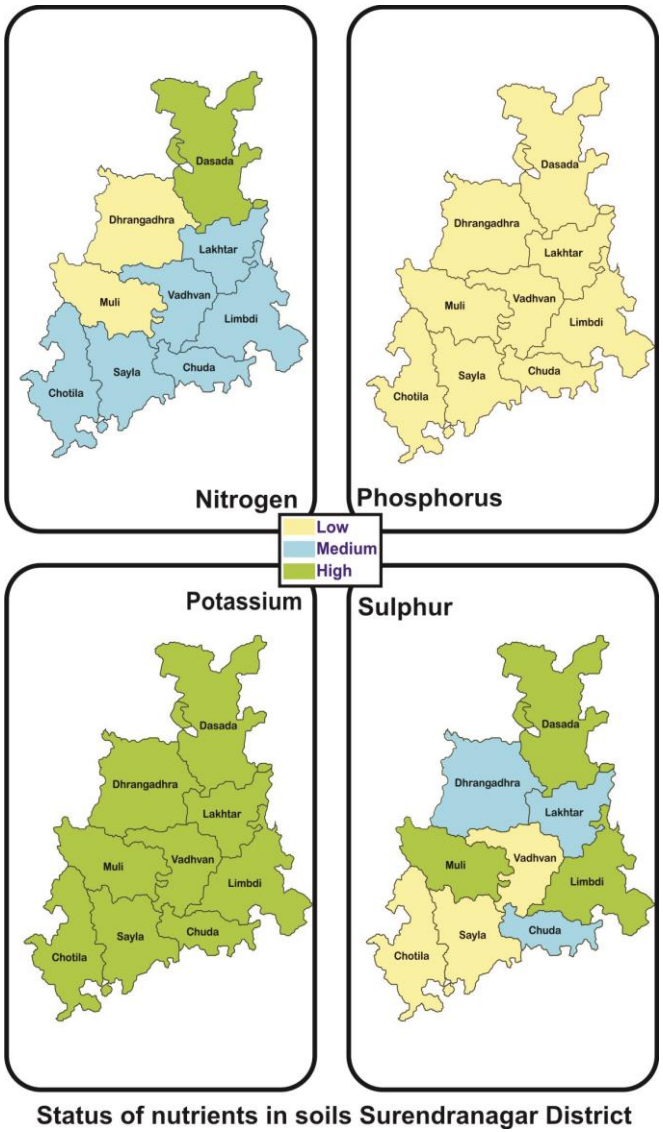
Map of mean annual rainfall (1984-85 to 2013-14)
of Surendranagar District

Annexure-III

Annexure III a: Soil map

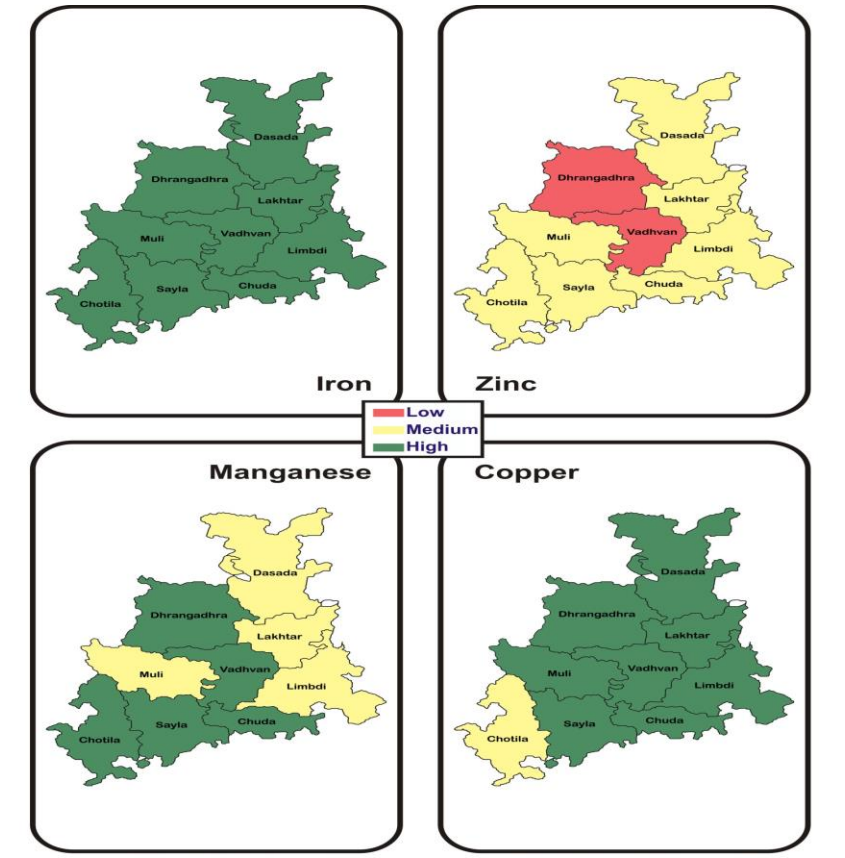


Annexure III b: Soil map of major nutrient status



Status of nutrients in soils Surendranagar District

Annexure III c: Soil map of micro nutrient status



Status of micronutrients in soils of Surendranagart District