

# State: GUJARAT

## Agriculture Contingency Plan for District: Morbi

1.0 District Agriculture profile					
1.1	<b>Agro-Climatic/Ecological Zone</b>	Agro climate Zone No.6			
	Agro Ecological Sub Region (ICAR)	Western Plain, Kachchh and Part of Kathiawar Peninsula, Hot Arid Eco-Region (2.4)			
	Agro-Climatic Zone (Planning Commission)	Gujarat Plains & Hills Region (XIII)			
	Agro Climatic Zone (NARP)	North Saurashtra (GJ-6)			
	List all the districts or part there of falling under the NARP Zone	Amreli, Jamnagar, Rajkot, Surendranagar, Morbi, Devbhumi Dwarka and part of Bhavnagar,			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		22°51'24" N	70°49'30" E	74.44 m	
	Name and address of the concerned ZARS	Main Dry Farming Research Station, Junagadh Agricultural University, Targhadia (Rajkot)-360 003			
	Mention the KVK located in the district	KVK , JAU, Morbi at Gorkhijadia -363641			
	1.2	<b>Rainfall (Mentioned period-2003-12)</b>	Average(mm) (10 Years)	Normal Rainy days(number)	Normal Onset ( week and month)
SW monsoon (June-Sep):		612	29	3 <sup>rd</sup> week of June	3 <sup>rd</sup> week of September
NE Monsoon(Oct-Dec):		-	-	NA	NA
Winter (Jan- March)		-	-	NA	NA
Summer (Apr-May)		-	-	NA	NA
Annual		612	29	NA	NA

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
	<b>Area ('000ha)</b>	536.924	294.202	27.886	14.772	41.989	68.383	0	59.012	12.924	0.480

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

1.4	Major Soil types	Area ('000 ha)	% Area
	Medium black soil (Clayey)	202.42	68.80
	Alluvial soil (Sandy-loam, Loamy)	91.78	31.20
	Total	294.202	

(Source: District Irrigation Plan, PMKSY, 2016)

1.5	Agricultural land use	Area ( ha)	Cropping intensity %
	Net sown area	294.202	120.87
	Area sown more than one	61.409	
	Gross sown area	355.611	

(Source: District Irrigation Plan, PMKSY, 2016)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	119.547		
	Gross irrigated area	123.174		
	Rain fed area	194.878		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		30.776	25.7
	Tanks	45	5.721	4.78
	Open wells	20720	75.223	62.9
	Bore wells	5829		-
	Lift irrigation schemes	-	-	-
	Micro-irrigation		-	-
	Other sources, Ponds & Check dams	849	7.827	6.5
	Total Irrigated Area		119.547	
	Pump sets	22480		
	No. of Tractors	8020		

	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	Moderate Saline
	Critical	-	-	-
	Semi- critical	1	22.36	Saline
	Safe	4	77.64	Moderate Saline
	Wastewater availability and use	-	-	-
	Ground water quality	Good quality water is available up to 500-650 feet ,but more than that poor water quality		

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

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

#### 1.7 Area under major field crops (year 2014 to2016) & horticultural crops (2015-16 )

1.7	Major field crops cultivated	Area ('000 ha)							Grand total
		Kharif			Rabi			Summer	
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	Cotton Hybrid	94.2	85.200	179.600	-	-	-	-	179.800
	Cotton Deshi	-	0.200	0.200	-	-	-	-	
	Groundnut	-	34.920	34.920	-	-	-	1.188	45.738
	Sesame	-	20.095	20.095	-	-	-	2.884	22.979
	Castor	-	23.593	23.593	-	-	-	-	23.593
	Pearl millet	-	0.569	0.569	-	-	-	0.639	1.208
	Cluster bean-seed	-	4.893	4.893					
	Black gram	-	2.472	2.472					
	Green gram	-	0.523	0.523					
	Wheat				14.100	-	14.100	-	14.100
	<b>Horticulture crops - Fruits</b>	<b>Area ('000 ha)</b>							
		<b>Total</b>							
	Acid lime	1.039							
	Pomegranate	0.593							
	Ber	0.340							
	Mango	0.203							

	Papaya	0.132
	Anola	0.103
	<b>Horticulture crops - Vegetables</b>	<b>Total</b>
	Onion	1.500
	Brinjal	0.850
	Ladies figure	0.780
	Cabbage	0.655
	Tomato	0.625
	Cucumbers	0.604
	Cluster bean	0.510
	<b>Spices crops</b>	<b>Total</b>
	Cumin	18.650
	Garlic	1.000
	Coriander	6.500
	Chilies (Dry)	0.468
	<b>Fodder crops</b>	<b>Total</b>
	<b>Total fodder crop area</b>	36.731
	<b>Grazing land</b>	31.482
	<b>Sericulture etc</b>	-
	<b>Others (specify)</b>	-

( Source: Reports of Rajkot and Surendranagar District Panchayat, District wise estimated area & production of Horticultural crops YEAR 2015-16 Horticulture Dept Gujrat State)

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	40.964	119.463	161.427
	Crossbred cattle	0.419	1.000	1.419
	Non descriptive Buffaloes (local low yielding)	14.543	177.337	191.920
	Graded Buffaloes	-	-	-
	Goat	-	-	70.841
	Sheep	-	-	101.67
	Others (Camel, Pig, Yak, horse etc.)	-	-	6.437
	Commercial dairy farms (Number)	198		

<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>
	Commercial	-	1086.090
	Backyard	-	-

<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)						
	<b>A. Capture</b>						
	<b>i) Marine</b>	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		840	81	4	85	-	NIL
	<b>ii) Inland</b>	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
		-		60		49	
	<b>B. Culture</b>						
			<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>
	<b>i) Brackish water</b>		6270				
<b>ii) Fresh water</b>		21673.27		63.10		6646	
<b>Others</b>		-		-		-	

(Source: Reports of Rajkot and Surendranagar District Panchayat 2015-16)

**1.11 Production and productivity of major field crops (year 2011-12 to 2013-14) & horticultural crops (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)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>										
	a. Cotton Hybrid	366.743	2042	-	-	-	-	366.743	2042	476.77
	b. Cotton Deshi	0.251	1256	-	-	-	-	0.251	1256	0.320
	Groundnut	33.174	950	-	-	3.200	2082	35.374	1516	47.75
	Sesame	19.096	380	-	-	3.146	1091	22.242	735.5	22.46
	Castor	17.696	750	-	-	-	-	30.966	1810	47.09
	Pearl millet	0.563	990	-	-	1.897	2969	2.466	1980	5.25
	Green gram	1.78	446	-	-	-	-	1.78	446	3.820
	Cluster bean	5.162	1055	-	-	-	-	5.162	1055	10.256
	Black gram	2.21	452	-	-	-	-	2.21	452	3.957
	Cumin	-	-	20.476	1080	-	-	20.476	1080	29.890
	Wheat	-	-	51.225	3633	-	-	51.225	3633	98.34
<b>Major Horticultural crops- Fruit (Crops to be identified based on total acreage)</b>										
	Acid lime	-	-	-	-	-	-	13351	12850	-
	Pomegranate	-	-	-	-	-	-	8302	14000	-
	Ber	-	-	-	-	-	-	3573	10509	-
	Mango	-	-	-	-	-	-	1244	6128	-
	Papaya	-	-	-	-	-	-	10428	79000	-
	Anola	-	-	-	-	-	-	792	7689	-
<b>Major Horticultural crops- Vegetable(Crops to be identified based on total acreage)</b>										
	Onion	-	-	-	-	-	-	37500	25000	-
	Brinjal	-	-	-	-	-	-	15954	18769	-
	Ladies figure	-	-	-	-	-	-	6197	7945	-
	Cabbage	-	-	-	-	-	-	13918	21249	-
	Tomato	-	-	-	-	-	-	15152	24243	-
	Cucumbers	-	-	-	-	-	-	8749	14485	-
	Cluster bean	-	-	-	-	-	-	3621	7100	-

Major Horticultural crops- Spices (Crops to be identified based on total acreage)										
	Cumin	-	-	-	-	-	-	20476	1080	-
	Funnel							12090	1950	
	Garlic	-	-	-	-	-	-	8800	8800	-
	Coriander	-	-	-	-	-	-	10400	1600	-
	Chilies (Dry)	-	-	-	-	-	-	691	2399	-

( Source: Reports of Rajkot and Surendranagar District Panchayat , District wise estimated area & production of Horticultural crops, Directorate of Horticulture, Gujarat State, 2015-16)

<b>1.12</b>	<b>Sowing window (start and end of sowing period)</b>	Cotton	Groundnut	Sesame	Castor	Wheat	Cumin	
	<i>Kharif- Rain fed</i>	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	-	-	
	<i>Kharif-Irrigated</i>	3 <sup>rd</sup> week of May	3 <sup>rd</sup> week of May	-	-	-	-	
	<i>Rabi-Irrigated</i>	-	-	-	-	2 <sup>nd</sup> week of Nov. to 4 <sup>th</sup> week of Nov.	2 <sup>nd</sup> week of Nov. to 4 <sup>th</sup> week of Nov.	
<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>					Regular	Sporadic	None
	Drought					-	√	-
	Flood					-	√	-
	Cyclone					-	√	-
	Hail storm					-	-	√
	Heat wave					-	√	-
	Cold wave					-	-	√
	Frost					-	-	√
	Sea water intrusion					-	-	-
	Pests and diseases Pests-Aphid, Jassids, Thrips, white grub, White fly & Fruit fly, Pink boll worm Diseases-Powdery Mildew, Rust, Leaf spot, Tikka & Downy Mildew, Collar rot					√	-	-
	<b>What is the major contingency the district is prone to? (Tick mark)</b>					Regular	Sporadic	None
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I			Enclosed: Yes / No Yes			
		Annual rainfall map as Annexure II			Enclosed: Yes / No Yes			
		Soil map as Annexure III			Enclosed: Yes / No Yes			

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks  July 1 <sup>st</sup> wk 27 <sup>th</sup> Std week	Medium black Soils	Cotton (Cotton hybrid-4,6,8,10, & Govt. approved Bt. hybrids)	No change	• As per crop follow the package of practices	NA
		Groundnut (Spreading GG10, 11, GJG 17, 31 and Semi spreading GG 20,GJG-22)	No change	• As per crop follow the package of practices	
		Sesame(GT-2,3,4)	No change	• As per crop follow the package of practices	
		Castor(GC-3, GCH-4, GCH-6, GCH-7)	No change	• As per crop follow the package of practices	
	Alluvial soils	Cotton (Cotton hybrid-4,6,8,10, & Govt. approved Bt. hybrids)	No change	• As per crop follow the package of practices	
		Groundnut (Spreading GG10, 11, GJG 17, 31 and Semi spreading GG 20,GJG-22)	No change	• As per crop follow the package of practices	
		Sesame(GT-2,3,4)	No change	• As per crop follow the package of practices	
		Castor(GC-3, GCH-4, GCH-6, GCH-7)	No change	• As per crop follow the package of practices	



Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
<b>Early season drought (delayed onset)</b>  <b>Delay by 4 weeks</b>  <b>July 3<sup>rd</sup> wk</b> <b>29<sup>th</sup> Std week</b>	Medium black Soils	Cotton	No change	-	Agencies for quality seed supply are National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC), University, Gujcomasol
		Groundnut	Prefer bunch varieties like GG-2, GG-5, GG-7, GJG-9, TG37A Semi- spreading of groundnut GG-20,GJG-22, Soybean GJS-3 G.S.1, Sesame GT 2,3,4	<ul style="list-style-type: none"> <li>• Keep 45cm and 60cm row spacing for bunch and semi-spreading varieties respectively.</li> <li>• Other practices will be as such.</li> </ul>	
		Castor	No change	<ul style="list-style-type: none"> <li>• As per crop follow the package of practices</li> </ul>	
		Sesame	No change	<ul style="list-style-type: none"> <li>• As per crop follow the package of practices</li> </ul>	
		Alluvial soils	Cotton	No change	
	Groundnut	Prefer bunch varieties like GG-2, GG-5, GG-7, GJG-9, TG37A Semi- spreading of groundnut GG-20,GJG-22, Soybean GJS-3 G.S.1, Sesame GT 2,3,4	<ul style="list-style-type: none"> <li>• Keep 45cm and 60cm row spacing for bunch and semi-spreading varieties respectively.</li> <li>• Other practices will be as such.</li> </ul>		
	Castor	No change	<ul style="list-style-type: none"> <li>• As per crop follow the package of practices</li> </ul>		
	Sesame	No change	<ul style="list-style-type: none"> <li>• As per crop follow the package of practices</li> </ul>		

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
<b>Delay by 6 weeks (Specify month)*</b>  <b>August 1<sup>st</sup> wk</b> <b>31<sup>st</sup> Std week</b>	Medium black Soils	Cotton	Green gram (GM-4) Castor (GC-3, GCH-4, 6, 7) Sorghum ( Gundhari, GFS-3, GAFS-11, CSV-21F, S-1049), Sesame (GT-2,3,4) 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, Gujcomsol. Supply of quality seed from NSC, GSSC, SAU, and zero till seed drill, seed dressing equipments, sprayers & dusters from Government Schemes (Implements like seed drill, seed dressing are available in Rajkot).
		Groundnut	Green gram (GM-4) Castor (GC-3, GCH-4, 6, 7) Sorghum ( Gundhari, GFS-3, GAFS-11, CSV-21F, S-1049), Sesame (GT-2,3,4) Pigeon pea (BDN-2, Vaishali, GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Castor	No change	• As per crop follow the package of practices	
		Sesame	No change	• As per crop follow the package of practices-	
	Alluvial soils	Cotton	Green gram (GM-4) Castor (GC-3, GCH-4, 6, 7) Sorghum ( Gundhari, GFS-3, GAFS-11, CSV-21F, S-1049), Sesame (GT-2,3,4) Pigeon pea (BDN-2, Vaishali, GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices	
		Groundnut	Green gram (GM-4) Castor (GC-3, GCH-4, 6, 7) Sorghum ( Gundhari, GFS-3, GAFS-11, CSV-21F, S-1049), Sesame (GT-2,3,4) Pigeon pea (BDN-2, Vaishali, GJP-1), Soybean (GS-1,3)	• As per crop change follow the package of practices (other than groundnut)	
		Castor	No change	• As per crop follow the package of practices	
		Sesame	No change	• As per crop follow the package of practices-	

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
<b>Delay by 8 weeks</b>  <b>August 3<sup>rd</sup> wk</b> <b>33<sup>rd</sup> Std week</b>	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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• 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 equipments, sprayers & dusters from Government Schemes (Implements like seed drill, seed dressing are available in Rajkot).
		Groundnut	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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• As per crop change follow the package of practices	
		Castor	No change	• As per crop 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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• As per crop changefollow the package of practices-	
	Alluvial 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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• As per crop change follow the package of practices	

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)		Groundnut	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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• As per crop change follow the package of practices(	
		Castor	No change	• As per crop 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) /Green gram (Variety GM-4)/ Black gram (GU 1, T-9)/Soybean (GS-1, GS-3)/ Pearl millet(GHB-538 and Govt. approved hybrids)	• As per crop change follow the package of practices-	

Condition	Major Farming situation	Normal 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.	Medium black Soils	Cotton	• Gap filling	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.
		Groundnut	• Gap filling with maize or sesame	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.

Condition			Suggested Contingency measures		
			Normal onset	Major Farming situation	Normal Crop/cropping system
		Castor	<ul style="list-style-type: none"> <li>• Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>
		Sesame	<ul style="list-style-type: none"> <li>• Thinning to maintain plant to plant distance</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>
	Alluvial soils	Cotton	<ul style="list-style-type: none"> <li>• Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>
		Groundnut	<ul style="list-style-type: none"> <li>• Gap filling with maize or sesame</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>
		Castor	<ul style="list-style-type: none"> <li>• Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>
		Sesame	<ul style="list-style-type: none"> <li>• Thinning to maintain plant to plant distance</li> </ul>	<ul style="list-style-type: none"> <li>• Interculturing to fill soil cracks</li> <li>• Mulching with wheat straw or shredded cotton stalk</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.</li> </ul>

Condition	Major Farming situation	Normal Crop/ cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
<b>Mid season drought</b> (long dry spell, consecutive 2 weeks rainless (>2.5 mm period))					
<b>At vegetable stage</b>	Medium black Soils	Cotton	<ul style="list-style-type: none"> <li>• Weeding</li> <li>• Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>• Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching with wheat straw or crushed cotton stalk.</li> <li>• Inter tilling.</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
		Groundnut	<ul style="list-style-type: none"> <li>• Weeding</li> <li>• Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>• Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching with wheat straw or crushed cotton stalk.</li> <li>• Inter tilling.</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
		Castor	<ul style="list-style-type: none"> <li>• Weeding.</li> <li>• Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>• Life saving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching with wheat straw or crushed cotton stalk.</li> <li>• Inter tilling.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
		Sesame	<ul style="list-style-type: none"> <li>• Weeding</li> <li>• Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>• Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching with wheat straw or crushed cotton stalk.</li> <li>• Inter tilling.</li> <li>• Top dressing of N through urea after relief of drought</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of urea through Govt. Schemes</li> <li>• Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
	Alluvial soils	Cotton	<ul style="list-style-type: none"> <li>• Weeding</li> <li>• Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>• Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching with wheat straw or crushed cotton stalk.</li> <li>• Inter tilling.</li> <li>• Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm period))		Groundnut	<ul style="list-style-type: none"> <li>Weeding</li> <li>Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Mulching with wheat straw or crushed cotton stalk.</li> <li>Inter tilling.</li> <li>Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
		Castor	<ul style="list-style-type: none"> <li>Weeding.</li> <li>Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>Life saving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Mulching with wheat straw or crushed cotton stalk.</li> <li>Inter tilling.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>
		Sesame	<ul style="list-style-type: none"> <li>Weeding</li> <li>Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water).</li> <li>Lifesaving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Mulching with wheat straw or crushed cotton stalk.</li> <li>Inter tilling.</li> <li>Spray kaolin @ 4% (400g/10 lit. water)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd (PGVCL)</li> </ul>

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At flowering/ fruiting stage	Medium black Soils	Cotton	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> <li>• Install light trap</li> <li>• Install pheromone trap @40/ha</li> <li>• Spray recommended insecticide</li> </ul>	Spray kaolin @ 4% (400g/10 lit. water)	Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd PGVCL).
		Groundnut	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding,</li> <li>• Protection against White grub (control measures : Mix 4 lit. quinalphos or chlorpyrifos in 100 kg sand and broadcast )</li> </ul>	Spray kaolin @ 4% (400g/10 lit. water)	
		Castor	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> </ul>	• Interculturing if possible	
		Sesame	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> </ul>	• Interculturing if possible	
	Alluvial soils	Cotton	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> <li>• Install light trap</li> <li>• Install pheromone trap @40/ha</li> <li>• Spray recommended insecticide</li> </ul>	Spray kaolin @ 4% (400g/10 lit. water)	Ensure electric supply for life saving irrigation by Panchim Gujarat Vij Company Ltd PGVCL).
		Groundnut	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding,</li> <li>• Protection against White grub (control measures : Mix 4 lit. quinalphos or chlorpyrifos in 100 kg sand and broadcast )</li> </ul>	Spray kaolin @ 4% (400g/10 lit. water)	
		Castor	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> </ul>	• Interculturing if possible	
		Sesame	<ul style="list-style-type: none"> <li>• Supplemental irrigation if possible followed by weeding.</li> </ul>	• Interculturing if possible	



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	<ul style="list-style-type: none"> <li>•Harvest mature bolls. Supplemental irrigation.</li> <li>•Spray kaolin @ 4% (400 g/10 lit. water)</li> </ul>	-	<ul style="list-style-type: none"> <li>•Ensure supply of electricity for life saving irrigation by PGVCL.</li> </ul>
		Groundnut	<ul style="list-style-type: none"> <li>•Lifesaving irrigations from harvested/ground water</li> <li>•Spray kaolin @ 4% (400 g/10 lit. water)</li> </ul>		
		Castor	<ul style="list-style-type: none"> <li>•Harvest spikes.</li> <li>•Supplemental irrigation if possible.</li> </ul>	-	
		Sesame	<ul style="list-style-type: none"> <li>•Harvest spikes.</li> <li>•Supplemental irrigation if possible.</li> </ul>	-	
	Alluvial soils	Cotton	<ul style="list-style-type: none"> <li>•Harvest mature bolls. Supplemental irrigation.</li> <li>•Spray kaolin @ 4% (400 g/10 lit. water)</li> </ul>	-	<ul style="list-style-type: none"> <li>•Ensure supply of electricity for life saving irrigation by PGVCL.</li> </ul>
		Groundnut	<ul style="list-style-type: none"> <li>•Lifesaving irrigations from harvested/ground water</li> <li>•Spray kaolin @ 4% (400 g/10 lit. water)</li> </ul>		
		Castor	<ul style="list-style-type: none"> <li>•Harvest spikes.</li> <li>•Supplemental irrigation if possible.</li> </ul>		
		Sesame	<ul style="list-style-type: none"> <li>•Harvest spikes.</li> <li>•Supplemental irrigation if possible.</li> </ul>		

### 2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Medium black Soils	NA	NA	NA	NA
	Alluvial soils	NA	NA	NA	NA

Condition	Major Farming situation	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 catchments	Medium black soils	NA	NA	NA	NA
	Alluvial soils	NA	NA	NA	NA

Condition	Major Farming situation	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	Medium black soils	NA	NA	NA	NA
	Alluvial soils (canals)	NA	NA	NA	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	Chickpea (GG 1, GJG 3, GJG 5), Cumin (GC 3,4)/ Coriander (Guj 1,2) Fenugreek (GM-2)/ Leafy vegetables/ carrot (GDC 1)	<ul style="list-style-type: none"> <li>• Adoption of MIS.</li> <li>• Reduce area of irrigation</li> <li>• Supply irrigation during night times to reduce transpiration.</li> <li>• Alternate furrow irrigation</li> <li>• Give irrigation during night times to reduce transpiration.</li> </ul>	<ul style="list-style-type: none"> <li>• Construct well recharge structures</li> <li>• Timely supply of MIS and seeds through Govt. Agencies.</li> </ul>
		Cotton	No change	<ul style="list-style-type: none"> <li>• Adoption of MIS.</li> <li>• Reduce area of irrigation</li> <li>• Alternate furrow irrigation</li> <li>• Give irrigation during night times to reduce transpiration.</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of MIS through Govt. schemes.</li> </ul>
		Cumin	No change	<ul style="list-style-type: none"> <li>• Adoption of MIS.</li> <li>• Give deficit irrigation</li> <li>• Reduce area of irrigation</li> <li>• Give irrigation during night times to reduce transpiration</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of MIS through Govt. schemes.</li> </ul>
	Alluvial soils	Wheat	Chickpea (GG 1, GJG 3, GJG 5), Cumin (GC 3, 4)/ Coriander (Guj 1, 2) Fenugreek(GM-2)/ Leafy vegetables/ carrot(GDC 1)	<ul style="list-style-type: none"> <li>• Adoption of MIS.</li> <li>• Reduce area of irrigation</li> <li>• Supply irrigation during night times to reduce transpiration.</li> <li>• Alternate furrow irrigation</li> <li>• Give irrigation during night times to reduce transpiration.</li> </ul>	<ul style="list-style-type: none"> <li>• Construct well recharge structures</li> <li>• Timely supply of MIS and seeds through Govt. Agencies.</li> </ul>
		Cumin	No change	<ul style="list-style-type: none"> <li>• Adoption of MIS.</li> <li>• Give deficit irrigation</li> <li>• Reduce area of irrigation</li> <li>• Give irrigation during night times to reduce transpiration</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of MIS through Govt. schemes.</li> </ul>

**Unusual rains (untimely, unseasonal etc) (for both rain fed 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 waterlogging</b>				
Cotton	<ul style="list-style-type: none"> <li>• Surface drainage (for management of water logging.</li> <li>• Apply 199 kg/ha ammonium sulphate</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage (for management of water logging.</li> <li>• Apply 199 kg/ha ammonium sulphate</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging.</li> <li>• Harvesting mature bolls</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Groundnut	-	-	<ul style="list-style-type: none"> <li>• Delay harvesting of spreading groundnut if possible.</li> <li>• Immediately harvest bunch groundnut. Quick surface drainage.</li> <li>• Open channel around field.</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Castor	-	-	<ul style="list-style-type: none"> <li>• Surface drainage (for management of water logging).</li> <li>• Harvest mature spikes</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Sesame	-	-	<ul style="list-style-type: none"> <li>• Surface drainage (for management of water logging),</li> <li>• Harvest mature crop</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to waterlogging				
Wheat	<ul style="list-style-type: none"> <li>• Surface drainage (to control water logging condition).</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage (to control water logging condition).</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging.</li> <li>• Spray mancozeb 0.2%.(27g/10 lit.water) to control black point in grain.</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Cumin/ Coriander	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging &amp; diseases.</li> <li>• To control cumin blight spray mancozeb 0.2%(27g/10 lit.water) and 0.2% wettable Sulphur(30 g/10 lit. water) for protection against powdery mildew disease</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging &amp; diseases.</li> <li>• To control cumin blight spray mancozeb 0.2%(27g/10 lit.water) and 0.2% wettable sulpher(30 g/10 lit. water) for protection against powdery mildew disease</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging.</li> <li>• Harvesting at physiological maturity immediately</li> </ul>	Protect produce with plastic sheet (100 micron UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
<b>Horticulture</b>				
Citrus	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm (1g in10 lit water)</li> </ul>	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm (1g in 10 lit water)</li> </ul>	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm ( 1 gram in10 lit water).</li> <li>• Collect mature fruits</li> </ul>	-
Pomegranate	<ul style="list-style-type: none"> <li>• Provision of drainage.</li> <li>• Fertilizer application.</li> </ul>	-	<ul style="list-style-type: none"> <li>• Hang methyle euginol trap,one /acre for control of fruit fly.</li> </ul>	

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to waterlogging</b>				
Ber	-	<ul style="list-style-type: none"> <li>Spray 0.2 % wettable sulphur(30 g/10 lit. water) for protection against powdery mildew</li> </ul>	<ul style="list-style-type: none"> <li>Spray 0.2 % wettable sulphur(30 g/10 lit. water) for protection against powdery mildew</li> </ul>	-
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Cotton	<ul style="list-style-type: none"> <li>Surface drainage for management of water logging.</li> <li>Apply 199 kg/ha ammonium sulphate.</li> <li>Upraised the plants and press soil around plants.</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage for management of water logging.</li> <li>Apply 199 kg/ha ammonium sulphate.</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage for management of water logging</li> <li>Harvest mature bolls</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Groundnut	-	-	<ul style="list-style-type: none"> <li>Harvesting delay for spreading groundnut if possible.</li> <li>Immediately harvested bunch groundnut.</li> <li>Quick surface drainage, open channel around field.</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Castor	-	-	<ul style="list-style-type: none"> <li>Surface drainage (for management of water logging),</li> <li>Harvest mature spikes</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to waterlogging				
Sesame	-	-	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging.</li> <li>• Harvesting at physiological maturity.</li> <li>• Spray mancozeb 0.2% (27g/10 lit.water) or 0.005% hexaconazole (10ml /10 lit. water) to control stem and capsule spot.</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Wheat	<ul style="list-style-type: none"> <li>• Surface drainage (to control water logging condition).</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage ( to control water logging condition ).</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging and lodging crop.</li> <li>• Spray mancozeb 0.2% (27g/10 lit.water) to control black point in grain.</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
Cumin/ Coriander	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging &amp; diseases.</li> <li>• Spray mancozeb 0.2% (27g/10 lit.water) to control cumin blight.</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage for management of water logging &amp; diseases.</li> <li>• Spray mancozeb 0.2% (27g/10 lit. water) to control cumin blight.</li> </ul>	<ul style="list-style-type: none"> <li>• Surface drainage (for management of water logging).</li> <li>• Harvest at physiological maturity immediately</li> </ul>	Protect produce with plastic sheet (100 micron, UV stabilized colour plastic) or shift produces to farm shed and protection against pest /disease damage in storage etc, Preparation of quick drying techniques to separate good lot and bad lot.
<b>Horticulture</b>				
Citrus	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm ( 1 g in10 lit water).</li> </ul>	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm ( 1 g in10 lit water).</li> </ul>	<ul style="list-style-type: none"> <li>• Control citrus canker by spray of copper oxychloride 0.2 % + streptocycline 100 ppm ( 1 g in10 lit water).</li> <li>• Collect mature fruits.</li> </ul>	-

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to waterlogging				
Pomegranate	-	-	• Collect fallen fruits	
Ber	-	• Spray 0.2 % wettable sulphur(30 g/10 lit. water) for protection against powdery mildew	-	-
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
<b>Cotton</b>	-	-	-	-
Groundnut	• Spray 0.005 % hexaconazole(10ml /10 lit. water) for rust & tikka disease control.	• Spray 0.005 % hexaconazole (10ml /10 lit. water) for rust & tikka disease control.	• Spray 0.005 % hexaconazole(10ml /10 lit. water) for rust & tikka disease control.	-
Castor	-	-	-	-
Sesame	-	-	-	-
<b>Horticulture</b>				
Citrus	• Control citrus canker by spray of copper oxychloride 0.2 % ( 40 g in10 lit water) + streptomycin 100 ppm ( 1 g in10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % ( 40 g in10 lit water) + streptomycin 100 ppm ( 1 g in10 lit water).	• Control citrus canker by spray of copper oxychloride 0.2 % ( 40 g in10 lit water) + streptomycin 100 ppm ( 1 g in10 lit water). • Collect mature fruits	-
Pomegranate	• Provision of drainage. • Fertilizer application.	-	• Hang methyle euginol trap, one /acre for control of fruit fly.	-
Ber	-	• Spray 0.2 % wettable sulphur(30 g/10 lit. water) for protection against powdery mildew	• Spray 0.2 % wettable sulphur (30 g/10 lit. water) for protection against powdery mildew. •	-



## 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
Cotton	NA	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	-
Groundnut	NA	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	-
Castor	NA	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	-
Sesame	NA	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	-
<b>Horticulture</b>				
Citrus	<ul style="list-style-type: none"> <li>Shift to safe place with proper drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>
Pomegranate	<ul style="list-style-type: none"> <li>Proper Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>
Ber	<ul style="list-style-type: none"> <li>Shift to safe place &amp; Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>	<ul style="list-style-type: none"> <li>Surface drainage</li> </ul>
<b>Continuous submergence for more than 2 days</b>				
Cotton	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel and apply 199 kg/ha ammonium sulphate.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel and apply 199 kg/ha ammonium sulphate.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> <li>Harvesting mature bolls</li> </ul>	-
Groundnut	<ul style="list-style-type: none"> <li>As a preventive steps open drainage channel followed by spray of 0.05 % carbendazim(10g /10 lit. water) for control of leaf spot.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive steps open drainage channel followed by spray of 1 %(100 g/10 lit. water) FeSO<sub>4</sub> + 0.1 % citric acid(10 g/10 lit. water) for control yellowing, 0.0025% hexaconazole(10ml /10 lit. water) for rust &amp; leaf spot management.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive steps open drainage channel followed by spray of 1 % FeSO<sub>4</sub> (100 g/10 lit. water) + 0.1% citric acid (10 g/10 lit. water) for control yellowing.</li> </ul>	-
Sesame	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>As a preventive step open drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>Harvest mature plants</li> </ul>

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
Castor	• As a preventive step open drainage channel	-	-	• Harvest mature spikes
<b>Horticulture</b>				
Citrus	• Shift grafts to safe place proper surface drainage.	• Surface drainage	• Surface drainage	• Surface drainage
Pomegranate	• Shift grafts to safe place proper surface drainage.	• Surface drainage	• Surface drainage	• Surface drainage
<b>Sea water inundation</b>	NA	NA	NA	NA

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

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave</b>	• Light & frequent irrigation to all crops	• Light & frequent irrigation to all crops	• Light & frequent irrigation to all crops	-
<b>Cold wave</b>	NA	NA	NA	NA
<b>Frost</b>	NA	NA	NA	NA
<b>Hailstorm</b>	NA	NA	NA	NA
<b>Cyclone</b>				
Cotton	• Earthing up, quick drainage	• Earthing up, quick drainage	• Earthing up, quick drainage	Shift produce at safer place
Groundnut	• Quick drainage	• Quick drainage	• Quick drainage	
Wheat	• Quick drainage	• Quick drainage	• Quick drainage and spray mancozeb 0.2% to control black point in grain.	
Cumin/ Coriander	• Quick drainage	• Quick drainage	• Quick drainage	
<b>Horticulture</b>				
Citrus	• Shift seeding to safe place if possible & build cyclone proof nursery houses	• Reduce canopy & tying plants diagonally if possible. Grow wind barrier trees around field.	• Reduce canopy & tying plants diagonally if possible	• Early harvesting of crop
Pomegranate	-	-	• 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
<b>Drought</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>• Store fodder (silage and hay), Conventional feeds are used for feeding (Roughages &amp; concentrates) of maize, sorghum, groundnut fodder and wheat straw</li> </ul>	<ul style="list-style-type: none"> <li>• Stored feed &amp; fodder in silage &amp; hay. Treated wheat straw with 4 % urea solution. Use chaff cutter for fodder.</li> <li>• Use press for making compact bundles of fodder for easy transportation.</li> <li>• Establish feed block preparation facilities for animals. Arrange bulk transportation of fodder</li> </ul>	<ul style="list-style-type: none"> <li>• Feed little green fodder along with unconventional feed, 5 kg green feed/mature animal</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>• Rain water harvesting and create water bodies/watering points.</li> <li>• When water is scarce use only for drinking water for animals.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid wallowing. Judicious use of drinking water.</li> <li>• Establish and arrange the community based drinking water facilities. In coastal area community based R.O. plant to be established for drinking water.</li> <li>• Add bleaching powder to drinking water (1%)</li> </ul>	<ul style="list-style-type: none"> <li>• Give sufficient water as per the animal requirement</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>• Foot &amp; Mouth disease vaccination in June</li> <li>• Vaccination for Bacterial diseases e.g. HS, BQ Deworming of the animals (cattle &amp; buffaloes).</li> <li>• Add mineral mixtures 25 g/animal/day along with feed.</li> <li>• Animals to be covered cover under insurance schemes.</li> </ul>	<ul style="list-style-type: none"> <li>• Add mineral mixtures 25 g/Animal/day along with feed,</li> <li>• Deworming of the animals.</li> <li>• Arrange mobile dispensary for animal health in the region.</li> <li>• Establish link with Agricultural/Veterinary University for animal health. Involve vet. Science students for health management of animal.</li> <li>• Carry out disease diagnosis camps.</li> </ul>	<ul style="list-style-type: none"> <li>• Add vitamin mineral mixtures 25 g/animal/day along with feed, quarantine diseased animals and deworming of the animals.</li> </ul>

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Floods</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>Harvest available fodder and store it at safe place if floods forecast. Shift animals to safe place. Identify rescue places for safety of animals</li> </ul>	<ul style="list-style-type: none"> <li>Give stored fodder with mineral mixture. Fodder should be stored at safe place. In severe rain and flood untether animals.</li> </ul>	<ul style="list-style-type: none"> <li>Feed silage &amp; hay material along with concentrate feed.</li> <li>Use chaff cutter for fodder.</li> <li>Use press for making compact bundles of fodder for easy transportation.</li> <li>Establish community based shelter houses for animals.</li> <li>Establish feed block preparation facilities for animals.</li> <li>Arrange bulk transportation of fodder.</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>Add bleaching powder (1%) to drinking water when heavy rains occur and flood expected.</li> </ul>	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Provide insurance cover to the animals.</li> </ul>	<ul style="list-style-type: none"> <li>Vaccination of animals against HS, BQ</li> <li>Add mineral mixtures 25 g/ Animal/ day along with feed,</li> <li>Deworming of the animals.</li> <li>Arrange mobile dispensary for animal health in the region.</li> <li>Establish link with Agricultural/Veterinary University for animal health.</li> <li>Involve vet. Science students for health management of animal.</li> <li>Carry out disease diagnosis camps.</li> </ul>	<ul style="list-style-type: none"> <li>Disposal of dead animals by burning the carcass and sanitation measures to control spread of diseases.</li> <li>Health checking to diseases outbreak.</li> </ul>

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Cyclone</b>			
• Feed and fodder availability	• Early harvesting & storage of fodder	<ul style="list-style-type: none"> <li>• Shift animals to safe place. Give stored fodder with mineral mixture along with concentrated feed.</li> <li>• In severe rain and flood untether animals.</li> </ul>	<ul style="list-style-type: none"> <li>• Feed silage &amp; hay material along with concentrated feed.</li> <li>• Use chaff cutter for fodder.</li> <li>• Use press for making compact bundles of fodder for easy transportation.</li> <li>• Establish community based shelter houses for animals.</li> <li>• Establish feed block preparation facilities for animals.</li> <li>• Arrange bulk transportation of fodder.</li> </ul>
• Drinking water	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).	• Add bleaching powder to drinking water (1%).
Health and disease management	• Provide insurance cover to the animals.	<ul style="list-style-type: none"> <li>• Vaccination of animals against HS&amp; BQ.</li> <li>• Add mineral mixtures 25 g/animal/ day along with feed, deworming of the animals.</li> <li>• Arrange mobile dispensary for animal health in the region.</li> <li>• Establish link with Agricultural/Veterinary University for animal health.</li> <li>• Involve vet. Science students for health management of animal.</li> <li>• Carry out disease diagnosis camps.</li> </ul>	<ul style="list-style-type: none"> <li>• Disposal of dead animals by burning the carcass and sanitation measures to control spread of diseases.</li> <li>• Health checking to diseases outbreak.</li> </ul>

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Heat wave and cold wave</b>			
<b>Heat wave</b>			
Shelter/environment management	<ul style="list-style-type: none"> <li>Arrangement to be made such as Cover roof with dry grass , Fans &amp; ventilation</li> </ul>	<ul style="list-style-type: none"> <li>Operate fans, sprinklers, keep open ventilators to control temperature.</li> </ul>	Routine practices are followed
Health and disease management	<ul style="list-style-type: none"> <li>Cover animal under insurance</li> </ul>	<ul style="list-style-type: none"> <li>Viral vaccination against FMD</li> <li>Provide ventilation</li> </ul>	-do-
<b>Cold wave</b>			
Shelter/environment management	-	<ul style="list-style-type: none"> <li>Operate heaters protect shed by tying gunny bags</li> </ul>	Routine practices are followed
Health and disease management	<ul style="list-style-type: none"> <li>Cover animal under insurance</li> </ul>	<ul style="list-style-type: none"> <li>Add antibiotics in drinking water to protect young animals from Pneumonia.</li> </ul>	-do-

### 2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
<b>Drought</b>				
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>Use stored feed, conventional feed, antibiotics and probiotics</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Use stored feed, conventional feed, antibiotics and probiotics</li> </ul>	<ul style="list-style-type: none"> <li>Use conventional feed,</li> <li>Vaccination for viral diseases –Marek's and Ranikhet diseases (MD &amp; RD).</li> </ul>	<ul style="list-style-type: none"> <li>Linkage Govt. schemes with public/NGOs at grass root levels.</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>Rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>Give water for drinking only</li> </ul>	<ul style="list-style-type: none"> <li>Give sufficient water as per the bird's requirement</li> </ul>	<ul style="list-style-type: none"> <li>Linkage Govt. schemes with public/NGOs at grass root levels.</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Vaccination for viral diseases – against MD &amp; RD, cover birds under insurance</li> </ul>	<ul style="list-style-type: none"> <li>Provide ventilation.</li> <li>Add more calcium with feed.</li> <li>Assure supply of electric power.</li> </ul>	<ul style="list-style-type: none"> <li>Routine practices are followed, culling affected birds disposal by burning.</li> </ul>	<ul style="list-style-type: none"> <li>Vaccination for viral diseases –against MD &amp; RD.</li> </ul>

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
<b>Floods</b>				
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>Use conventional feed, ingredients</li> </ul>	<ul style="list-style-type: none"> <li>Use stored feed, antibiotics, pro biotic, and assure supply of electric power.</li> </ul>	<ul style="list-style-type: none"> <li>Routine practices are followed</li> </ul>	<ul style="list-style-type: none"> <li>Linkage Govt. schemes with public/NGOs at grass root levels.</li> </ul>
Drinking water	-	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>	<ul style="list-style-type: none"> <li>Linkage Govt. schemes with public/NGOs at grass root levels.</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Cover birds under insurance</li> </ul>	<ul style="list-style-type: none"> <li>For suspected cases, give antibiotic in the feed, prevent water logging surrounding sheds. Assure supply of electric power.</li> </ul>	<ul style="list-style-type: none"> <li>Dispose dead birds by burning.</li> </ul>	<ul style="list-style-type: none"> <li>Vaccination for viral diseases –against MD &amp; RD.</li> </ul>
<b>Cyclone</b>				
Shortage of feed ingredients	<ul style="list-style-type: none"> <li>Use stored feed ingredients.</li> </ul>	<ul style="list-style-type: none"> <li>Use stored feed &amp; use conventional feed, antibiotics, pro biotic</li> </ul>	<ul style="list-style-type: none"> <li>Routine practices are followed.</li> </ul>	<ul style="list-style-type: none"> <li>Use stored feed ingredients.</li> </ul>
Drinking water	-	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>	<ul style="list-style-type: none"> <li>Add bleaching powder to drinking water (1%).</li> </ul>	-
Health and disease management	<ul style="list-style-type: none"> <li>Cover birds under insurance</li> </ul>	<ul style="list-style-type: none"> <li>For suspected cases give antibiotics.</li> </ul>	<ul style="list-style-type: none"> <li>Dispose dead birds by burning.</li> </ul>	-
<b>Heat wave and cold wave</b>				
<b>Heat wave</b>				
Shelter/environment management.	<ul style="list-style-type: none"> <li>Arrangement of good ventilation by fan, foggers.</li> </ul>	<ul style="list-style-type: none"> <li>Operate fans, foggers; keep open ventilators in night and cool period.</li> </ul>	<ul style="list-style-type: none"> <li>Routine practices are to be followed.</li> </ul>	
Health and disease management	<ul style="list-style-type: none"> <li>Cover birds under insurance</li> </ul>	<ul style="list-style-type: none"> <li>Viral vaccination add calcium in the poultry feed.</li> </ul>	<ul style="list-style-type: none"> <li>Routine practices are to be followed.</li> </ul>	-

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
<b>Cold wave</b>				
Shelter/environment management	NA	NA	NA	-
Health and disease management	NA	NA	NA	-

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought : A. Capture</b>			
Marine	NA	NA	NA
Inland	NA	NA	NA
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> <li>Desilting/deepening of pond so that more water can be stored</li> </ul>	<ul style="list-style-type: none"> <li>Provision of additional bore wells. Use Euryhaline species.</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining pond water level at least 1 m depth.</li> </ul>
(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> <li>Replenishment of water in pond with fresh water.</li> </ul>	<ul style="list-style-type: none"> <li>30 % exchange of water.</li> </ul>	<ul style="list-style-type: none"> <li>10 % exchange of water.</li> </ul>
(iii) Any other	-	-	-
<b>2) Floods : A. Capture</b>			
Marine	NA	NA	NA
Inland	NA	NA	NA
<b>B. Aquaculture</b>			
(i) Inundation with flood water.	<ul style="list-style-type: none"> <li>Deepening of ponds, repair, strengthening of dykes</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of dykes' height by sand bags.</li> </ul>	-
(ii) Water contamination and changes in water quality.	<ul style="list-style-type: none"> <li>Use of calcium hydroxide @ 150 kg/ha.</li> </ul>	<ul style="list-style-type: none"> <li>Use of KMnO<sub>4</sub> for bath of fish as prophylactics.</li> </ul>	<ul style="list-style-type: none"> <li>Lime treatment for oxidation.</li> </ul>
(iii) Health and diseases.	<ul style="list-style-type: none"> <li>Antibiotics fortified feeding as prophylactics.</li> </ul>	<ul style="list-style-type: none"> <li>Disinfectants formalin treatments as prophylactics.</li> </ul>	<ul style="list-style-type: none"> <li>Lime treatment for oxidation.</li> </ul>

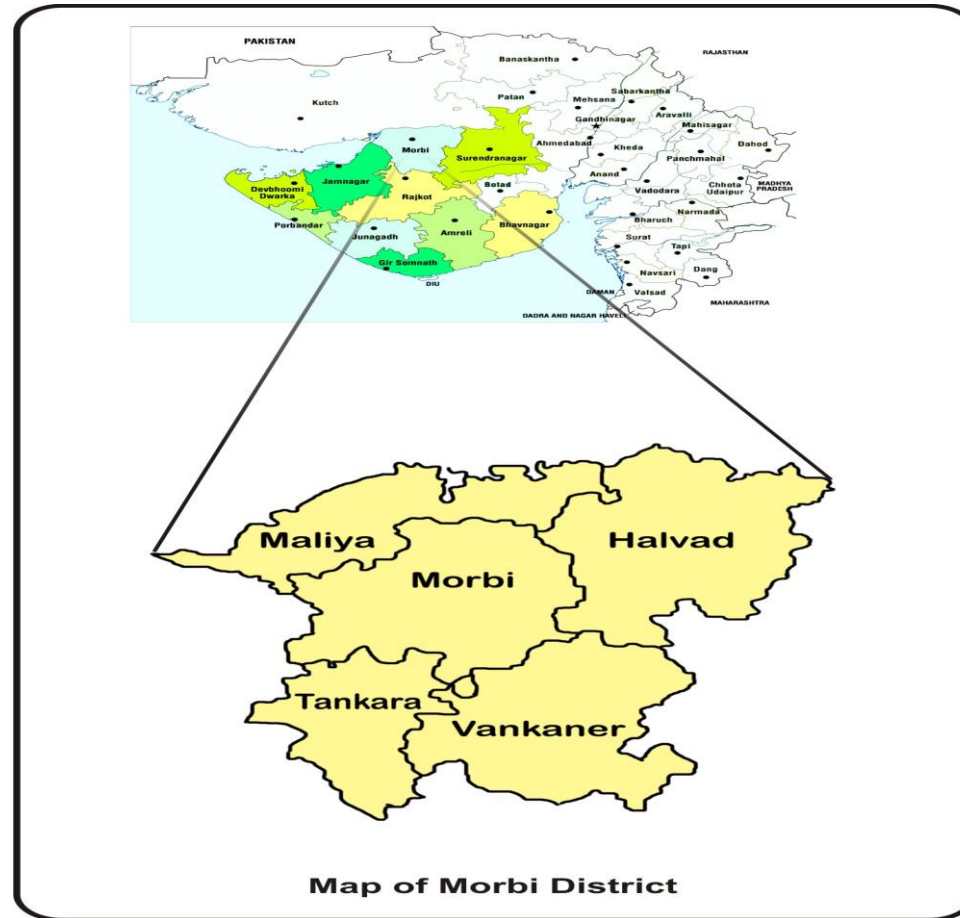


	Suggested contingency measures		
	Before the event	During the event	After the event
(iv) Loss of stock and inputs (feed, chemicals etc.).	<ul style="list-style-type: none"> <li>Stock cover under insurance</li> </ul>	-	-
(v) Infrastructure damage (pumps, aerators, huts etc.)	-	-	<ul style="list-style-type: none"> <li>Repairs &amp; maintenance of aqua structures</li> </ul>
(vi) Any other	-	-	-
<b>3. Cyclone / Tsunami : A. Capture</b>			
Marine			
(i) Average compensation to be paid due to loss of fishermen lives	<ul style="list-style-type: none"> <li>Forewarning systems to be installed.</li> <li>Insurance &amp; communication instruments supplied to fisherman.</li> <li>Warning systems to be installed.</li> </ul>	<ul style="list-style-type: none"> <li>Warning systems to be installed.</li> </ul>	<ul style="list-style-type: none"> <li>Compensations to be paid for repair &amp; maintenance of boats &amp; gears on actual survey basis.</li> </ul>
(ii) Avg. no. of boats / nets/damaged			<ul style="list-style-type: none"> <li>Compensation on assessment of actual losses &amp; damage of boats &amp; nets to be given.</li> </ul>
(iii) Avg. no. of houses damaged	-	-	<ul style="list-style-type: none"> <li>Compensation on assessment of actual losses &amp; damage of houses to be given.</li> </ul>
Inland	NA	NA	NA
B. Aquaculture			
(i) Overflow / flooding of ponds	<ul style="list-style-type: none"> <li>Strengthening of dykes.</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of dykes' height by sand bags.</li> </ul>	-
(ii) Changes in water quality (fresh water / brackish water ratio)	<ul style="list-style-type: none"> <li>Maintain salinity by addition of fresh water up to 20-25 ppt.</li> </ul>	<ul style="list-style-type: none"> <li>Use Euryhaline species.</li> </ul>	<ul style="list-style-type: none"> <li>Use Euryhaline species for culture.</li> </ul>
(iii) Health and diseases	<ul style="list-style-type: none"> <li>Liming and formalin treatment.</li> </ul>	<ul style="list-style-type: none"> <li>Disinfectants treatments.</li> </ul>	-
(iv) Loss of stock and inputs (feed, chemicals etc.)	<ul style="list-style-type: none"> <li>Stock cover under insurance.</li> </ul>	-	<ul style="list-style-type: none"> <li>Seed and feed to be supplied through Dept. of fisheries,</li> </ul>
(v) Infrastructure damage (pumps, aerators, shelters/huts etc.)	-	-	<ul style="list-style-type: none"> <li>Compensation on assessment of actual losses &amp; damage of pumps, aerators, shelters/ huts.</li> </ul>
(vi) Any other	-	-	-

<b>4. Heat wave and cold wave</b>			
<b>A. Capture</b>			
Marine	NA	NA	NA
Inland	NA	NA	NA
<b>B. Aquaculture</b>			
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> <li>Plantation of leafy trees on dyke, increase depth.</li> </ul>	<ul style="list-style-type: none"> <li>To maintain water level in pond.</li> <li>Use of fountain and peddle wheel aerator.</li> </ul>	-
(ii) Health and disease management	-	<ul style="list-style-type: none"> <li>Bleaching powder 1 to 2 %, formalin treatment to prevent diseases.</li> </ul>	<ul style="list-style-type: none"> <li>KMnO<sub>4</sub> 2 % to maintain oxygen level</li> </ul>
(iii) Any other	-	-	-

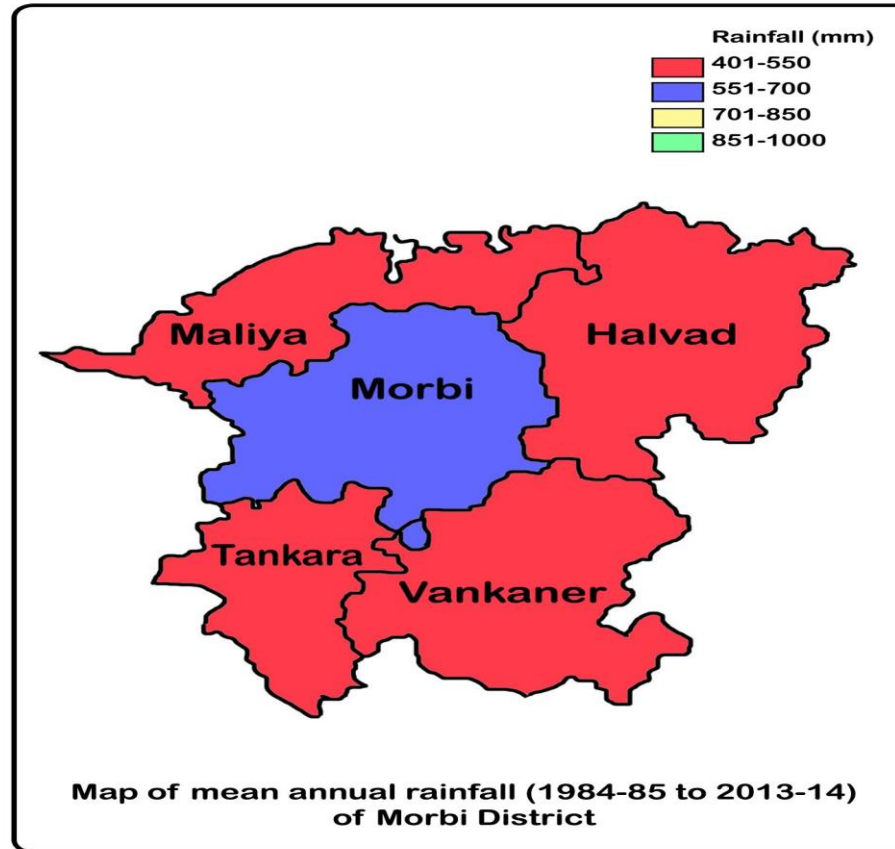
# ANNEURE I

## Location map of Jamnagar district



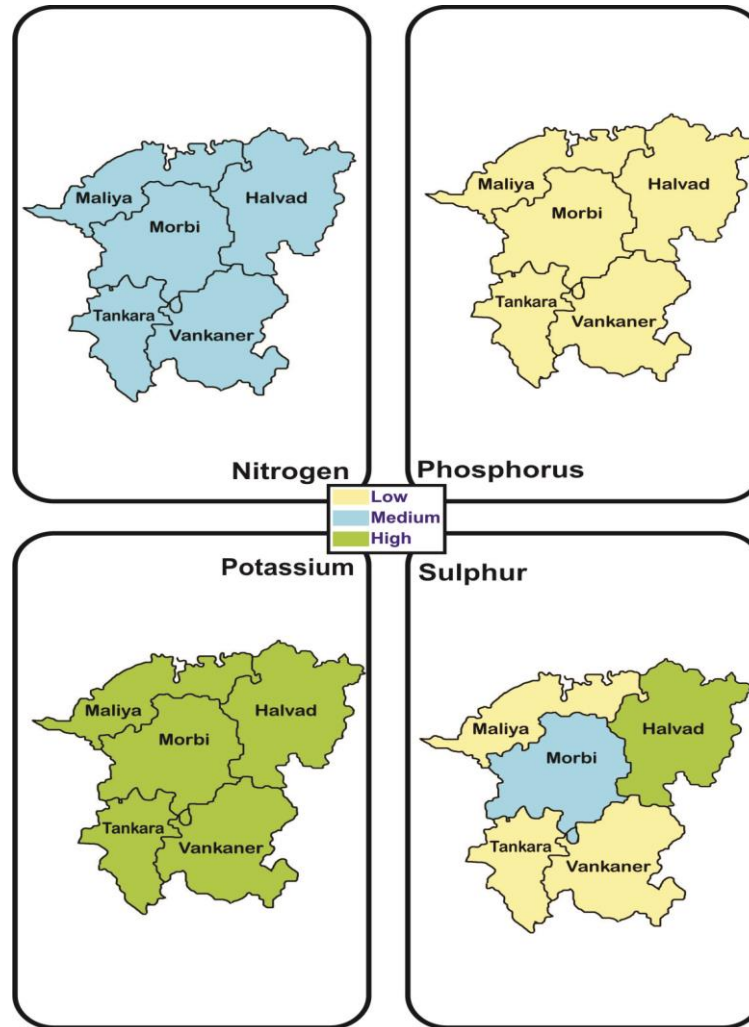
## ANNEXURE-II

Mean annual rainfall of map:



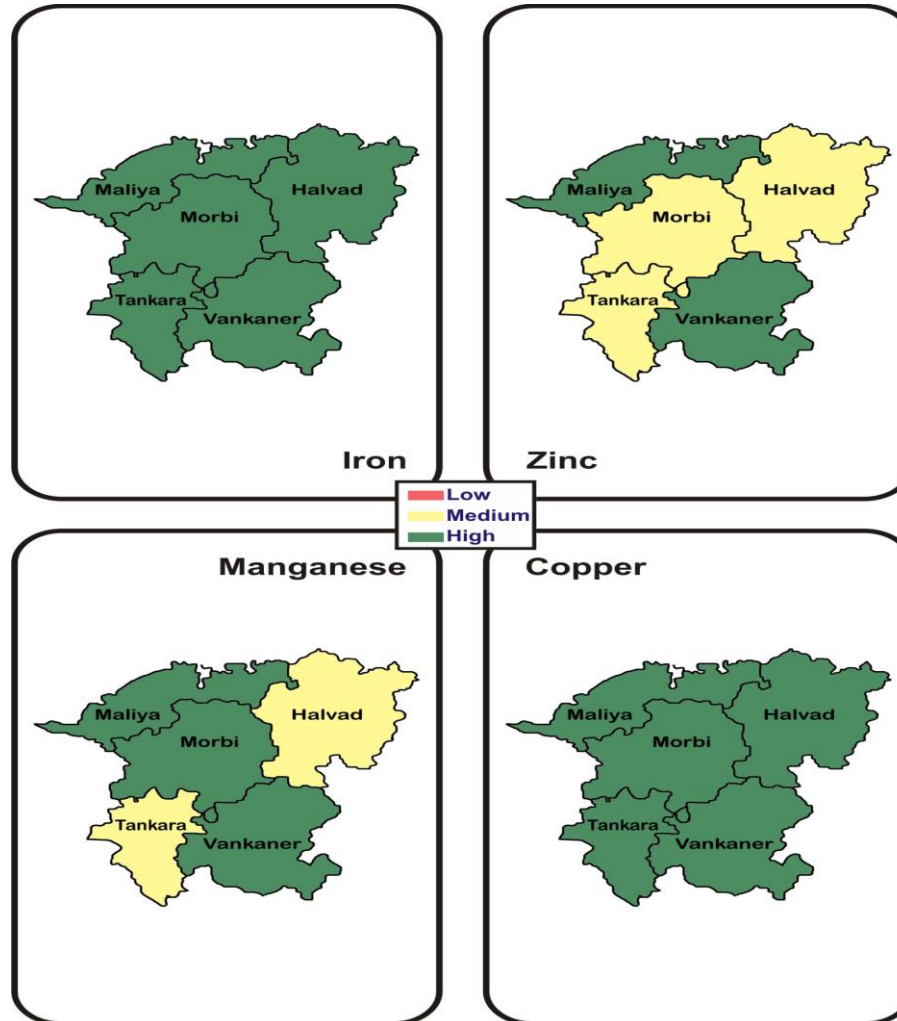
### Annexure-III

Annexure III a: Soil map of major nutrient status



Status of nutrients in soils Morbi District

Annexure III b: Soil map of micro nutrient status



Status of micronutrients in soils of Morbi District