

State: GUJARAT

Agriculture Contingency Plan for District: JUNAGADH

1.0 District Agriculture profile																																			
1.1	Agro-Climatic/Ecological Zone																																		
	Agro Ecological Sub Region (ICAR)																																		
	Arid Western Plain(5.1)																																		
	Agro-Climatic Zone (Planning Commission)																																		
	Gujarat Plains & Hills Region (XIII)																																		
	Agro Climatic Zone (NARP)																																		
	South Saurashtra Agro Climatic Zone (GJ.7)																																		
	List all the districts or part thereof falling under the NARP Zone																																		
Porbandar, GirSomnath Junagadh, and part of Bhavnagar, Amreli and Rajkot																																			
Geographic coordinates of district headquarters																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%;">Latitude</th> <th style="width:25%;">Longitude</th> <th style="width:25%;">Altitude</th> </tr> </thead> <tbody> <tr> <td style="text-align:center;">21⁰.31'.23.29" N</td> <td style="text-align:center;">70⁰. 27'.17.90" E</td> <td style="text-align:center;">86 m</td> </tr> </tbody> </table>											Latitude	Longitude	Altitude	21 ⁰ .31'.23.29" N	70 ⁰ . 27'.17.90" E	86 m																			
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Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS																																			
Directorate of Research, Junagadh Agricultural University, Junagadh, Gujarat																																			
Mention the KVK located in the district																																			
At present there is no KVK in Junagadh district.																																			
1.2	Rainfall (Avg. of 2006 to 2015)																																		
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	-	-	-	-																															
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994	43	-	-																																
SW monsoon (June-Sep):																																			
NE Monsoon(Oct-Dec):																																			
Winter (Jan- March)																																			
Summer (Apr-May)																																			
Annual																																			
1.3	Land use pattern of the district (latest statistics)																																		
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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																										
503.659	355.079	33.055	24.016	46.703	3.348	0	32.609	8.849	0																										
Area ('000 ha)																																			

(Source: Statistical reports by District Panchayat, Junagadh (2015) and C-DAP, Junagadh, 2012)

1.4	Major Soils (common names like red sandy loam deep soils (etc.))	Area ('000 ha)	Percent (%) of total
	1 Medium to Shallow Black	310.87	87.55
	2.Mixed Red and Black	21.48	6.05
	3.Coastal Alluvial	17.04	4.80
	4. Others (<i>Ghed region</i> *):	5.68	1.2

* In Ghed region land remains submerged during monsoon.

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	355.1	124.22
	Area sown more than once	89.8	
	Gross cropped area	444.9	

(Source: Statistical reports by District Panchayat, Junagadh, 2015, PMKSY District irrigation plan, Junagadh district, GGRC, 2016)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	110.542		
	Gross irrigated area	133.492		
	Rainfed area	240.882		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	(93 km)	8.72	7.89
	Tanks	-	0.1	0.09
	Open wells/ bore wells	70056	100.186	90.63
	Lift irrigation schemes	-	0	0.00
	Minor/Micro-irrigation schemes		0.2	0.18
	Other sources, Ponds & Check dams	6	1.336	1.21
	Total Irrigated Area		110.542	
	Pump sets	60222		
	No. of Tractors	3276		

1.7 Area under major field crops years (2011-12 to 2015-16)& horticulture (as per latest figures of the 2015-16)

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	-	-	Saline (with sea water intrusion)
Critical	-	-	Saline
Semi- critical	-	-	Moderate saline
Safe	9	100	-
Wastewater availability and use	-	-	-
Ground water quality	Saline groundwater with higher TDS, Sea water intrusion problem in coastal aquifers		

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

(Source : Statistical reports by District Panchayat, Junagadh, 2015 PMKSY District irrigation plan, Junagadh district, GGRC, 2016)

1.7	Major field crops cultivated	Area ('000 ha)							Summer	Grand total
		Kharif			Rabi					
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
	Groundnut	-	247.80	247.80	-	-	-	1.10	278.9	
	Cotton	72.18	-	72.18	-	-	-	-	72.18	
	Wheat	-	-	-	79.40	-	79.40	-	79.40	
	Sesame	-	0.61	0.61	-	-	-	10.10	10.71	
	Chickpea	-	-	-	-	10.22	10.22	-	10.22	
	Black gram	-	4.10	4.10	-	-	-	-	4.10	
	Horticulture crops - Fruits	Total Area ('000 ha)								
	Mango	8.18								
	Sapota(<i>Chiku</i>)	3.68								
	Banana	0.48								
	Citrus	0.47								

	Horticulture crops - Vegetables	Total Area ('000 ha)		
	Onion	0.85		
	Garlic	0.77		
	Brinjal	1.53		
	Garlic	0.77		
	Cabbage	1.03		
	Clusterbean	0.91		
	Cowpea	0.91		
	Tomato	0.99		
	Other vegetables creepers etc.	2.04		
	Spices , Medicinal and Aromatic crops	Total Area ('000 ha)		
	Coriander	42.8		
	Cumin	1.51		
	Fenugreek	0.01		
	Isabgul	0.01		
	Others	-		
	Plantation crops	Total Area ('000 ha)		
	Coconut	4.85		
	e.g., industrial pulpwood crops etc.	-		
	Fodder crops	Total	Irrigated	Rainfed
	Sorghum, Lucerne and other grasses	17.76	8.58	9.18
	Total fodder crop area	21.77	11.26	10.51
	Grazing land	46.70	-	46.70
	Sericulture etc.	-	-	-
	Others (specify)	-	-	-
1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	3025	5032	8057
	Crossbred cattle	193	1734	1927
	Non descriptive Buffaloes (local low yielding)			
	Graded Buffaloes	836	9550	10386
	Goat	1119	3890	5009

	Sheep	381	1326	1708			
	Others (Camel, Pig, Yak, horse etc.)	49.59	42.00	91.59			
	Commercial dairy farms (Number)	-	-	0.104			
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial	2	3.185				
	Backyard	0	150.03				
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
		2424	1924	7	-	68050	16
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
		-		-		-	
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water	-		-		-	
	ii) Fresh water	-		-		-	
	Others	-		-		-	

(Source: Statistical reports by District Panchayat, Junagadh, 2015, Reports of Junagadh District Panchayat, Department of Agriculture (2015), Horticulture (2016-17), Government of Gujarat, The Potential Linked Plan (PLP) 2016-17 Junagadh District)

1.11 Production and Productivity of major crops (Average of last 5 years: 2011-12 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	393.75	1589	-	-	21.98	1998	415.73	1676	677
	Cotton	43.52	603	-	-	-	-	43.52	603	377
	Wheat	-	-	196.31	4112	-	-	196.31	4112	239
	Sesame	0.25	416	-	-	7.42	734	7.67	684	18
	Blackgram	2.77	676	-	-	0.1	591	2.87	674	5.4
	Chickpea	-	-	13.24	1296	-	-	13.24	1296	12
Major Horticultural crops (Crops to be identified based on latest total acreage of 2016-17)										
	Mango	-	-	-	-	-	-	43.35	5300	
	Sapota	-	-	-	-	-	-	37.48	10180	
	Coriander	-	-	61.18	1430	-	-	43.8	1180	
	Cumin	-	-	12.79	850	-	-	12.3	742	
	Coconut	-	-	-	-	-	-	48.29 (nuts)	9950 (nuts/ha)	
	Brinjal			29.38	19200			29.38	19200	
	Cucurbits					30.00	14710	30.00	14710	
	Cabbage			18.75	18200			18.75	18200	
	Tomato			25.34	25600			25.34	25600	

(Source: Reports of Junagadh District Panchayat, Department of Agriculture (2011-12 to 2016-17), Horticulture department (2016-17), Government of Gujarat)

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Groundnut	Cotton	Wheat	Black gram	Sesame
	Kharif- Rainfed	June 2 nd week to July 1 st week	June 2 nd week to July 1 st week	-	June 2 nd week to July 2 nd week	-
	Kharif-Irrigated	-	May 4 th week to June 2 nd week	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi/ Summer - Irrigated	Feb.2 rd week to Feb.4 th week	-	Nov.2 nd week to Nov.4 th week	Feb.1 st week to Feb.4 th week	Feb.3 rd week to Feb.4 th week

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	√	-
	Cyclone	-	√	-
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	-	√
	Frost	-	-	√
	Sea water 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	√	-	-
	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 a and b	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 (June 4 th week)	Medium & shallow black to deep black soils	Groundnut (Spreading Semi- spreading) (Spreading GG10, 11, GJG 17, 31 and Semi spreading GG 20,GJG-22)	No change	• As per crop follow the package of practices	-
		Cotton (Cotton hybrid 4,6,8,10, GJC 101 & Govt. approved Bt. hybrids)	No change	• As per crop follow the package of practices	-
		Black gram(T-9, GU-1)	No change	• As per crop follow the package of practices	-
	Coastal alluvial soil	Groundnut (Spreading GG10, 11, GJG 17, 31 and Semi spreading GG 20,GJG-22)	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	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (July 2 nd week)	Medium & shallow black to deep black soils	Groundnut (Spreading Semi-spreading)	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	• Keep 45cm and 60cm row spacing for bunch and semi-spreading varieties respectively. • Other practices will be as such.	• Agencies for quality seed supply National (NSC), Gujarat State Seed Corporation (GSSC), University, and Gujcomasol.
		Cotton	No change	-	
		Black gram	No change	• As per crop follow the package of practices.	
	Coastal alluvial soil	Groundnut (Spreading Semi-spreading)	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	• Keep 45cm and 60cm row spacing for bunch and semi-spreading varieties respectively.	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	NormalCrop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (July 4th week)	Medium & shallow black to deep black soils	Groundnut (Spreading Semi- spreading)	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)	<ul style="list-style-type: none"> • Agencies for quality seed supply National (NSC), Gujarat State Seed Corporation (GSSC), University, and Gujcomasol. • zero till seed drill, seed dressing equipment, Sprayers & dusters to farmers through government schemes (Implements like seed drill and seed dressing are available in Rajkot)
		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	
		Black gram	No change	• Follow the package of practices	
	Coastal alluvial soil	Groundnut (Spreading Semi- spreading)	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)	

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^{2nd} week)	Medium & shallow black to deep black soils	Groundnut (Spreading Semi-spreading)	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	<ul style="list-style-type: none"> • Agencies for quality seed supply National (NSC), Gujarat State Seed Corporation (GSSC), University, and Gujcomasol. • Zero till seed drill, seed dressing equipment, Sprayers & dusters to farmer through Government schemes (Implements like seed drill and seed dressing are available at Rajkot)
		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	
		Black gram	No change	• As per crop follow the package of practices	
	Coastal alluvial soil	Groundnut (Spreading Semi-spreading)	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	NormalCrop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient &moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset) Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Medium & shallow black to deep black soils	Groundnut	<ul style="list-style-type: none"> • Gap filling with maize or sesame 	<ul style="list-style-type: none"> • Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk • Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> • Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.
		Cotton	<ul style="list-style-type: none"> • Gap filling 	<ul style="list-style-type: none"> • Interculturing to fill soil cracks • Mulching with wheat straw or shredded cotton stalk • Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> • Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.
		Black gram	-	<ul style="list-style-type: none"> • Interculturing to fill soil cracks, • Mulching with wheat straw or shredded cotton stalk 	<ul style="list-style-type: none"> • Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.
	Coastal alluvial soil	Groundnut	Gap filling with maize or sesame	<ul style="list-style-type: none"> • Interculturing to fill soil cracks, • Mulching with wheat straw or shredded cotton stalk • Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> • Cotton stalk shredding machine which is available in Jasdan town of Rajkot district to be supplied by Govt.

Condition			Suggested Contingency measures		
Mid-season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	NormalCrop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Medium & shallow black to deep black soils	Groundnut	<ul style="list-style-type: none"> • Weeding • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation 	<ul style="list-style-type: none"> • Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> • Ensure supply of electricity for life saving irrigation.
		Cotton	<ul style="list-style-type: none"> • Weeding • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation 	<ul style="list-style-type: none"> • Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water) 	
		Black gram	<ul style="list-style-type: none"> • Weeding • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation 	<ul style="list-style-type: none"> • Mulching with wheat straw or crushed cotton stalk. • Inter tilling. 	
	Coastal alluvial soil	Groundnut	<ul style="list-style-type: none"> • Weeding • Protection against sucking pests (control of jassid and aphid, spray imidachlopride 17.8 SL (4 ml/10 lit. water). • Lifesaving irrigation 	<ul style="list-style-type: none"> • Mulching with wheat straw or crushed cotton stalk. • Inter tilling. • Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> • Ensure supply of electricity for life saving irrigation.

Condition			Suggested Contingency measures		
			Normal Crop/ cropping system	Crop management	Soil nutrient & moisture conservation measures
Mid-season drought (long dry spell)	Major Farming situation	Normal Crop/ cropping system			
		Groundnut	<ul style="list-style-type: none"> Supplemental irrigation if possible followed by weeding, Protection against White grub (control measures : Mix 4 lit. quinalphos or chlorpyriphos in 100 kg sand and broadcast) 	Spray kaolin @ 4% (400g/10 lit. water)	<ul style="list-style-type: none"> Ensure supply of electricity for life saving irrigation by PGVCL.
		Cotton	<ul style="list-style-type: none"> 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)	
	Black gram	Supplemental irrigation by MIS / Furrow followed by weeding	-		
Coastal alluvial soil	Groundnut	<ul style="list-style-type: none"> Supplemental irrigation if possible followed by weeding Protection against white grub (control measures : Mix 4 lit. quinalphos or chlorpyriphos in 100 kg sand and broadcast) 	Spray kaolin @ 4% (400 g/10 lit. water)		
Terminal drought (Early withdrawal of monsoon)	Major Farming situation	NormalCrop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium & shallow black to deep black soils	Groundnut	<ul style="list-style-type: none"> Lifesaving irrigations from harvested/ground water Spray kaolin @ 4% (400 g/10 lit. water) 	-	<ul style="list-style-type: none"> Ensure supply of electricity for life saving irrigation by PGVCL.
		Cotton	<ul style="list-style-type: none"> Harvest mature bolls. Supplemental irrigation. Spray kaolin @ 4% (400 g/10 lit. water) 	-	
		Black gram	<ul style="list-style-type: none"> Supplemental irrigation. Thin out plant population, Harvest plants at physiological maturity 	-	
	Coastal alluvial soil	Groundnut	<ul style="list-style-type: none"> Lifesaving irrigations from harvested/ground water Spray kaolin @ 4% (400 g/10 lit. water) 	-	<ul style="list-style-type: none"> Ensure supply of electricity for life saving irrigation by PGVCL.

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 & shallow black to deep black soils	Wheat	<ul style="list-style-type: none"> Delay sowing upto 4th week of November for prevailing cropping patterns There after adopt late sowing varieties like GW-173 of wheat. 	<ul style="list-style-type: none"> Conjunctive use of groundwater/harvested water and canal water Use MIS on community base according to crops. 	-
		Coriander	<ul style="list-style-type: none"> Delay sowing upto 4th week of November for prevailing cropping patterns 	<ul style="list-style-type: none"> Conjunctive use of groundwater/harvested water and canal water Use MIS on community base according to crops. 	
	Coastal alluvial soil	Wheat	NA	NA	

Note: Very limited canal irrigation facility exists in Junagadh district.

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 catchment	Medium & shallow black to deep black soils		NA		
	Coastal alluvial soil				

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 & shallow black to deep black soils		NA		
	Coastal alluvial soil				

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Medium & shallow black to deep 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"> • Adoption of MIS. • Reduce area of irrigation • Supply irrigation during night times to reduce transpiration. • Alternate furrow irrigation • Give irrigation during night times to reduce transpiration. 	<ul style="list-style-type: none"> • Construct well recharge structures • Timely supply of MIS and seeds through Govt. Agencies.
		Cotton	No change	<ul style="list-style-type: none"> • Adoption of MIS. • Reduce area of irrigation • Alternate furrow irrigation • Give irrigation during night times to reduce transpiration. 	<ul style="list-style-type: none"> • Provision of MIS through Govt. schemes.
	Coastal alluvial soil	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"> • Adoption of MIS • Deficit irrigation • Reduce area of irrigation • Alternate furrow irrigation 	<ul style="list-style-type: none"> • Construct well recharge structures • Timely supply of MIS and seeds through Govt. Agencies
Sea water intrusions	Coastal alluvial soil	Wheat	Semi rabiPearlmillet(GHB-538 and Govt. approved varieties),Leafy vegetables, carrot(GDC 1), beet, Lucerne(Anand 2)	<ul style="list-style-type: none"> • Adoption of MIS. • Limited area under irrigation • Light frequent irrigation to reduce over exploitation to some extent and limit depth of pumping • Alternate furrow irrigation 	<ul style="list-style-type: none"> • Construct well recharge structures • Timely supply of MIS and seeds through Govt. Agencies.

2.2 Unusual rains (untimely, unseasonal etc.)(For both rainfed and irrigated situations)

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Wheat	<ul style="list-style-type: none"> • Surface drainage (to control water logging condition) 	<ul style="list-style-type: none"> • Surface drainage (to control water logging condition) 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging, lodging of crop), • To control black point in grain spray mancozeb 0.2% (27g/10 lit water) 	<ul style="list-style-type: none"> • 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 • Separate good lot and bad lot.
Cotton	<ul style="list-style-type: none"> • Surface drainage (for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate. 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate. 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging. • Harvesting of mature bolls. 	<ul style="list-style-type: none"> • Protect produce with plastic sheet (100µ UV stabilized colour plastic) or shift produces to farm shed. • Preparation of quick drying techniques • Separate good lot and bad lot.
Groundnut	<ul style="list-style-type: none"> • Surface drainage(For management of water logging 	<ul style="list-style-type: none"> • Surface drainage for management of water logging 	<ul style="list-style-type: none"> • Delay harvesting of spreading groundnut if possible. • Immediately harvest bunch groundnut. • Harvesting is done immediately for bunch groundnut. • Quick surface drainage by open channel around field. 	<ul style="list-style-type: none"> • 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 • Separate good lot and bad lot.
Black gram	<ul style="list-style-type: none"> • Surface drainage(For management of water logging 	<ul style="list-style-type: none"> • Surface drainage for management of water logging 	<ul style="list-style-type: none"> • Provide drainage • Harvest mature pods. 	<ul style="list-style-type: none"> • 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 • 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 water logging				
Horticulture				
Coriander	<ul style="list-style-type: none"> Surface drainage(For management of water logging 	<ul style="list-style-type: none"> Surface drainage for management of water logging 	<ul style="list-style-type: none"> Surface drainage for management of water logging. Spray 0.2% (30g/10 lit water) wettablesulphur for protection against powdery mildew disease. 	<ul style="list-style-type: none"> 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.
Cumin	<ul style="list-style-type: none"> Surface drainage(For management of water logging 	<ul style="list-style-type: none"> Surface drainage for management of water logging 	<ul style="list-style-type: none"> 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) wettablesulphur for protection against powdery mildew disease. 	<ul style="list-style-type: none"> 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.
Mango	<ul style="list-style-type: none"> Provision of drainage. Spray 0.005% hexaconazole (10ml /10 lit water) for control leaf blight under unusual rains with cloudy weather 	<ul style="list-style-type: none"> Spray 0.2% (27g/10 lit water) wettablesulphur or 0.005% hexaconazole (10ml /10 lit water) for protection against powdery mildew after cessation of heavy rain. 	<ul style="list-style-type: none"> Harvest at pre maturity stage Hang methyleeuginol trap, one/acre for control of fruit fly. 	<ul style="list-style-type: none"> Unripe fruit may be used for pickles.
Sapota	-	-	-	-
Coconut	-	-	-	-

Heavy rainfall with high speed winds in a short span	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Wheat	<ul style="list-style-type: none"> • Surface drainage (to control water logging condition). 	<ul style="list-style-type: none"> • Surface drainage (to control water logging condition). 	<ul style="list-style-type: none"> • Surface drainage for management of water logging and lodging crop. • Spray mancozeb 0.2%. (27g/10 lit water) to control black point in grain. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Surface drainage for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate 	<ul style="list-style-type: none"> • Surface drainage for management of water logging. • After drainage apply 199 kg/ha ammonium sulphate. 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging), Harvesting mature bolls. 	<ul style="list-style-type: none"> • Protect produce with plastic sheet (100µ UV stabilized colour plastic) or shift produces to farm shed. • Preparation of quick drying techniques and techniques to separate good lot and bad lot.
Groundnut	<ul style="list-style-type: none"> • Surface drainage (for management of waterlogging). 	<ul style="list-style-type: none"> • Surface drainage (for management of waterlogging). 	<ul style="list-style-type: none"> • Delay harvesting of spreading groundnut if possible. • Immediately harvest bunch groundnut. • Quick surface drainage, Open channel around field. 	<ul style="list-style-type: none"> • 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.
Black gram	<ul style="list-style-type: none"> • Surface drainage (for management of waterlogging). 	<ul style="list-style-type: none"> • Surface drainage (for management of waterlogging). 	<ul style="list-style-type: none"> • Provide drainage, harvest mature pods. 	<ul style="list-style-type: none"> • 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.

Heavy rainfall with high speed winds in a short span	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Horticulture				
Coriander	<ul style="list-style-type: none"> Surface drainage (for management of water logging & diseases). 	<ul style="list-style-type: none"> Surface drainage (for management of water logging & diseases). 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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.
Cumin	<ul style="list-style-type: none"> Surface drainage (for management of water logging & diseases). Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) 	<ul style="list-style-type: none"> Surface drainage (for management of water logging & diseases). Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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.
Mango	-	Spray mancozeb 0.2 % (27g/10 lit. water) & 0.2 % (30g/10 lit water) wettable sulphur to control powdery mildew.	<ul style="list-style-type: none"> Collect fallen fruits 	Unripe fruit may be used for pickles.
Sapota	-	-	-	-
Coconut	-	-	-	-
Outbreak of pests and diseases due to unseasonal rains				
Wheat	<ul style="list-style-type: none"> Spray mancozeb 0.2 % (27g/10 lit water) to control blight and rust 	<ul style="list-style-type: none"> Spray mancozeb 0.2 % (27g/10 lit water) to control blight and rust 	<ul style="list-style-type: none"> Spray mancozeb 0.2 % (27g/10 lit. water) to control blight and rust 	-

Heavy rainfall with high speed winds in a short span	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Cotton	<ul style="list-style-type: none"> Control pest with systemic pesticides 	<ul style="list-style-type: none"> Adopt integrated pest management techniques for pink boll worm control. Like Pheromone trap @ 20/ha, Azadirachtin@ 1.2 lit/ha, Beauveriabassiana @ 2 kg/ha, Quanalphosh 25 EC @ 600 ml/ha. 	<ul style="list-style-type: none"> Adopt integrated pest management techniques for pink boll worm control. Like Pheromone trap @ 20/ha, Azadirachtin @ 1.2 lit/ha, Beauveriabassiana @ 2 kg/ha, Quanalphosh 25 EC @ 600 ml/ha. 	-
Groundnut	<ul style="list-style-type: none"> Spray hexaconazole0.005%(10ml /10 lit. water) for rust & tikka disease control. Protection against White grub (control measures : Mix 4 lit. quinalphos or chlorpyriphos in 100 kg sand and broadcast) 	<ul style="list-style-type: none"> Spray hexaconazole0.005%%(10ml /10 lit. water) for rust & tikka disease control. 	<ul style="list-style-type: none"> Spray hexaconazole0.005%%(10ml /10 lit. water) for rust & tikka disease control. 	-
Blackgram	-			

Heavy rainfall with high speed winds in a short span	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Horticulture				
Coriander	<ul style="list-style-type: none"> • Surface drainage (for management of water logging & diseases). 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging & diseases). 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging). • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	-
Cumin	<ul style="list-style-type: none"> • Surface drainage (for management of water logging & diseases). • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging & diseases). • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) 	<ul style="list-style-type: none"> • Surface drainage (for management of water logging). • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	-
Mango	<ul style="list-style-type: none"> • Provision of drainage • Spray 0.005% hexaconazole (10ml /10 lit water) for control leaf blight under unusual rains with cloudy weather 	<ul style="list-style-type: none"> • Spray 0.2%(30g/ 10 lit. water) wettable sulphur or hexaconazole 0.005%(10 ml/10 lit. water) to control powdery mildew after cessation of heavy rain 	<ul style="list-style-type: none"> • Hang methyl euginol trap one/ acre to control fruit fly 	-

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Groundnut	NA	<ul style="list-style-type: none"> As a preventive step open drainage channel 	<ul style="list-style-type: none"> As a preventive step open drainage channel 	-
Cotton	NA	<ul style="list-style-type: none"> As a preventive step open drainage channel 	<ul style="list-style-type: none"> As a preventive step open drainage channel 	
Black gram	NA	<ul style="list-style-type: none"> As a preventive step open drainage channel 	<ul style="list-style-type: none"> As a preventive step open drainage channel 	
Horticulture				
Coriander	NA	<ul style="list-style-type: none"> As a preventive step open drainage channel 	<ul style="list-style-type: none"> As a preventive step open drainage channel 	
Cumin	NA	<ul style="list-style-type: none"> As a preventive step open drainage channel 	<ul style="list-style-type: none"> As a preventive step open drainage channel 	
Mango	<ul style="list-style-type: none"> Provide surface drainage 	<ul style="list-style-type: none"> Provide surface drainage 	<ul style="list-style-type: none"> Provide surface drainage 	-
Continuous submergence for more than 2 days				
Groundnut	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray of 0.05 % carbendazim (10g/10 lit. water) for control of leaf spot. 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray of 1 % FeSO₄ (100 g/10 lit. water)+citric acid (10g/10 lit. water) for control of yellowing, 0.0025 % hexaconazole (5 ml/10 lit. of water) for rust and leaf spot management 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray of 1 % FeSO₄ (100 g/10 lit. water)+citric acid (10g/10 lit. water) for control of yellowing, 0.0025 % hexaconazole(5 ml/10 lit. of water) for rust and leaf spot management 	-
Cotton	<ul style="list-style-type: none"> As a preventive step open drainage channel Apply 199 kg/ha ammonium sulphate 	<ul style="list-style-type: none"> As a preventive step open drainage channel Apply 199 kg/ha ammonium sulphate 	<ul style="list-style-type: none"> As a preventive step open drainage channel Apply 199 kg/ha ammonium sulphate Harvest mature bolls 	-
Black gram	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray 0.05% carbendazim (10g/10lit water) or 0.0025% 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray 0.05% carbendazim (10g/10lit water) or 0.0025% 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray 0.05% carbendazim (10g/10lit water) or 0.0025% 	<ul style="list-style-type: none"> Picking of mature pods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation ¹	hexaconazole(5 ml/10 lit. water) for control of powdery mildew	hexaconazole(5 ml/10 lit. water) for control of powdery mildew	hexaconazole(5 ml/10 lit. water) for control of powdery mildew	
Horticulture				
Coriander	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	-
Cumin	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	<ul style="list-style-type: none"> As a preventive step open drainage channel, Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation. 	
Mango	<ul style="list-style-type: none"> Shift graft to safe place & surface drainage 	<ul style="list-style-type: none"> Surface drainage 	<ul style="list-style-type: none"> Surface drainage 	Surface drainage
Sapota (Chiku)	<ul style="list-style-type: none"> Shift graft to safe place & surface drainage 	-do-	-do-	-do-
Coconut	<ul style="list-style-type: none"> Shift to safe place & surface drainage 	-do-	-do-	-do-
Sea water intrusion	NA	NA	NA	NA

2.4 Extreme 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	• Light and frequent irrigation to all crops	• Light and frequent irrigation to all crops	• Light and frequent irrigation to all crops	NA
Cold wave	NA	NA	NA	NA
Frost	NA	NA	NA	NA
Hailstorm	NA	NA	NA	NA
Cyclone				
Wheat	• Quick drainage	• Quick drainage	• Quick drainage • Spray mancozeb 0.2 % (27g/10 lit. water) to control black point in grain	• Shift produce at safer place
Cotton	• Earthing up, Quick drainage	• Earthing up, Quick drainage	• Earthing up, Quick drainage	
Groundnut	• Quick drainage	• Quick drainage	• Quick drainage	
Garlic	-	-	-	
/Onion	-	-	-	
Castor	-	-	-	
Horticulture				
Coriander	• As a preventive step open drainage channel, • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	• As a preventive step open drainage channel, • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	• As a preventive step open drainage channel, • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	-
Cumin	• As a preventive step open drainage channel, • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	• As a preventive step open drainage channel, • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	• As a preventive step open drainage channel, • Spray mancozeb 0.2% (27g/10 lit water) to control cumin blight) • Spray 0.2% (30g/10 lit water) wettable sulphur to prevent powdery mildew infestation.	
Mango	• Shift graft to safe place if possible, build cyclone proof nursery houses, grow wind barrier trees around nursery	• Reduce canopy & tying plants diagonally if possible • grow wind barrier trees around nursery	• Reduce canopy & tying plants diagonally if possible	• 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	<ul style="list-style-type: none"> • Store fodder (silage and hay), Conventional feeds are used for feeding (Roughages & concentrates) of maize, sorghum, groundnut fodder and wheat straw 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Feed little green fodder along with unconventional feed, 5 kg green feed/mature animal
Drinking water	<ul style="list-style-type: none"> • Rain water harvesting and create water bodies/watering points. • When water is scarce use only for drinking water for animals. 	<ul style="list-style-type: none"> • 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%) 	<ul style="list-style-type: none"> • Give sufficient water as per the animal requirement
Health and disease management	<ul style="list-style-type: none"> • Foot & Mouth disease vaccination in June • Vaccination for Bacterial diseases e.g. HS,BQ Deworming of the animals (cattle & buffaloes). • Add mineral mixtures 25 g/animal/day along with feed. • Animals to be covered cover under insurance schemes. 	<ul style="list-style-type: none"> • Add mineral mixtures 25 g/Animal/day along with feed, • Deworming of the animals. • Arrange mobile dispensary for animal health 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. 	<ul style="list-style-type: none"> • Add vitamin mineral mixtures 25 g/animal/day along with feed, quarantine diseased animals and deworming of the animals.
Floods			
Feed and fodder availability	<ul style="list-style-type: none"> • Harvest available fodder and store it at safe place if floods forecast. Shift animals to safe place. Identify rescue places for safety of animals 	<ul style="list-style-type: none"> • Give stored fodder with mineral mixture. Fodder should be stored at safe place. In severe rain and flood untether animals. 	<ul style="list-style-type: none"> • Feed silage & hay material along with concentrate feed. • Use chaff cutter for fodder. • Use press for making compact bundles of

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

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	<ul style="list-style-type: none"> Use stored feed, conventional feed, antibiotics and probiotics 	<ul style="list-style-type: none"> Use stored feed, conventional feed, antibiotics and probiotics 	<ul style="list-style-type: none"> Use conventional feed, Vaccination for viral diseases –Marek's and Ranikhet diseases (MD & RD). 	<ul style="list-style-type: none"> Linkage Govt. schemes with public/NGOs at grass root levels.
Drinking water	<ul style="list-style-type: none"> Rain water harvesting 	<ul style="list-style-type: none"> Give water for drinking only 	<ul style="list-style-type: none"> Give sufficient water as per the bird's requirement 	<ul style="list-style-type: none"> Linkage Govt. schemes with public/NGOs at grass root levels.
Health and disease management	<ul style="list-style-type: none"> Vaccination for viral diseases –against MD & RD, cover birds under insurance 	<ul style="list-style-type: none"> Provide ventilation. Add more calcium with feed. Assure supply of electric power. 	<ul style="list-style-type: none"> Routine practices are followed, culling affected birds disposal by burning. 	<ul style="list-style-type: none"> Vaccination for viral diseases –against MD & RD.
Floods				
Shortage of feed ingredients	<ul style="list-style-type: none"> Use conventional feed, ingredients 	<ul style="list-style-type: none"> Use stored feed, antibiotics, pro biotic, and assure supply of electric power. 	<ul style="list-style-type: none"> Routine practices are followed 	<ul style="list-style-type: none"> Linkage Govt. schemes with public/NGOs at grass root levels.
Drinking water	-	<ul style="list-style-type: none"> Add bleaching powder to drinking water (1%). 	<ul style="list-style-type: none"> Add bleaching powder to drinking water (1%). 	<ul style="list-style-type: none"> Linkage Govt. schemes with public/NGOs at grass root levels.
Health and disease management	<ul style="list-style-type: none"> Cover birds under insurance 	<ul style="list-style-type: none"> For suspected cases, give antibiotic in the feed, prevent water logging surrounding sheds. Assure supply of electric power. 	<ul style="list-style-type: none"> Dispose dead birds by burning. 	<ul style="list-style-type: none"> Vaccination for viral diseases –against MD & RD.
Cyclone				
Shortage of feed ingredients	<ul style="list-style-type: none"> Use stored feed ingredients. 	<ul style="list-style-type: none"> Use stored feed & use conventional feed, antibiotics, pro biotic 	<ul style="list-style-type: none"> Routine practices are followed. 	<ul style="list-style-type: none"> Use stored feed ingredients.
Drinking water	-	<ul style="list-style-type: none"> Add bleaching powder to drinking water (1%). 	<ul style="list-style-type: none"> Add bleaching powder to drinking water (1%). 	-

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Health and disease management	<ul style="list-style-type: none"> Cover birds under insurance 	<ul style="list-style-type: none"> For suspected cases give antibiotics. 	<ul style="list-style-type: none"> Dispose dead birds by burning. 	-
Heat wave and cold wave				
Heat wave				
Shelter/environmentmanagement.	<ul style="list-style-type: none"> Arrangement of good ventilation by fan, foggers. 	<ul style="list-style-type: none"> Operate fans, foggers; keep open ventilators in night and cool period. 	<ul style="list-style-type: none"> Routine practices are to be followed. 	
Health and disease management	<ul style="list-style-type: none"> Cover birds under insurance 	<ul style="list-style-type: none"> Viral vaccination add calcium in the poultry feed. 	<ul style="list-style-type: none"> Routine practices are to be followed. 	-
Cold wave				
Shelter/environment management	NA	NA	NA	-
Health and disease management	NA	NA	NA	-

2.5.3 Fisheries/ Aquaculture

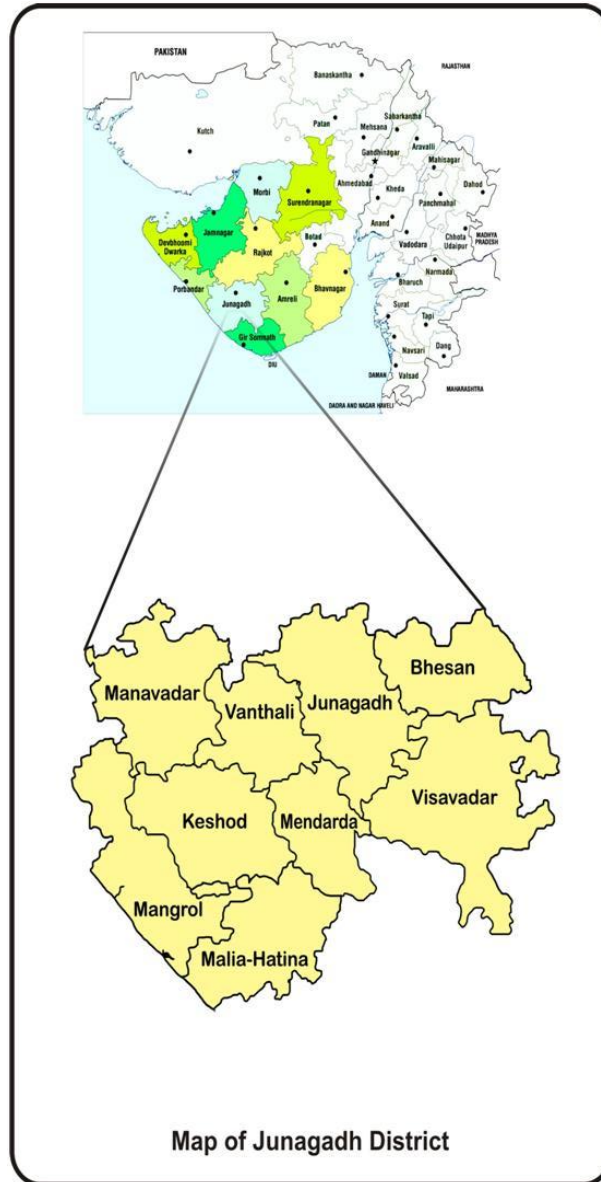
	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought : A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> Desilting/deepening of pond so that more water can be stored 	<ul style="list-style-type: none"> Provision of additional bore wells. Use Euryhaline species. 	<ul style="list-style-type: none"> Maintaining pond water level at least 1 m depth.
(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> Replenishment of water in pond with fresh water. 	<ul style="list-style-type: none"> 30 % exchange of water. 	<ul style="list-style-type: none"> 10 % exchange of water.
(iii) Any other	-	-	-
2) Floods : A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA
B. Aquaculture			
(i) Inundation with flood water.	<ul style="list-style-type: none"> Deepening of ponds, repair, strengthening of dykes 	<ul style="list-style-type: none"> Enhancement of dykes' height by sand bags. 	-
(ii) Water contamination and changes in water quality.	<ul style="list-style-type: none"> Use of calcium hydroxide @ 150 kg/ha. 	<ul style="list-style-type: none"> Use of KMnO₄ for bath of fish as prophylactics. 	<ul style="list-style-type: none"> Lime treatment for oxidation.
(iii) Health and diseases.	<ul style="list-style-type: none"> Antibiotics fortified feeding as prophylactics. 	<ul style="list-style-type: none"> Disinfectants formalin treatments as prophylactics. 	<ul style="list-style-type: none"> Lime treatment for oxidation.
(iv) Loss of stock and inputs (feed, chemicals etc.).	<ul style="list-style-type: none"> Stock cover under insurance 	-	-
(v) Infrastructure damage (pumps, aerators, huts etc.)	-	-	<ul style="list-style-type: none"> Repaire& maintenance of aqua structures
(vi) Any other	-	-	-

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

	Suggested contingency measures		
	Before the event	During the event	After the event
(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)	<ul style="list-style-type: none"> Plantation of leafy trees on dyke, increase depth. 	<ul style="list-style-type: none"> To maintain water level in pond. Use of fountain and peddle wheel aerator. 	-
(ii) Health and disease management	-	<ul style="list-style-type: none"> Bleaching powder 1 to 2 %, formalin treatment to prevent diseases. 	<ul style="list-style-type: none"> KMnO₄ 2 % to maintain oxygen level
(iii) Any other	-	-	-

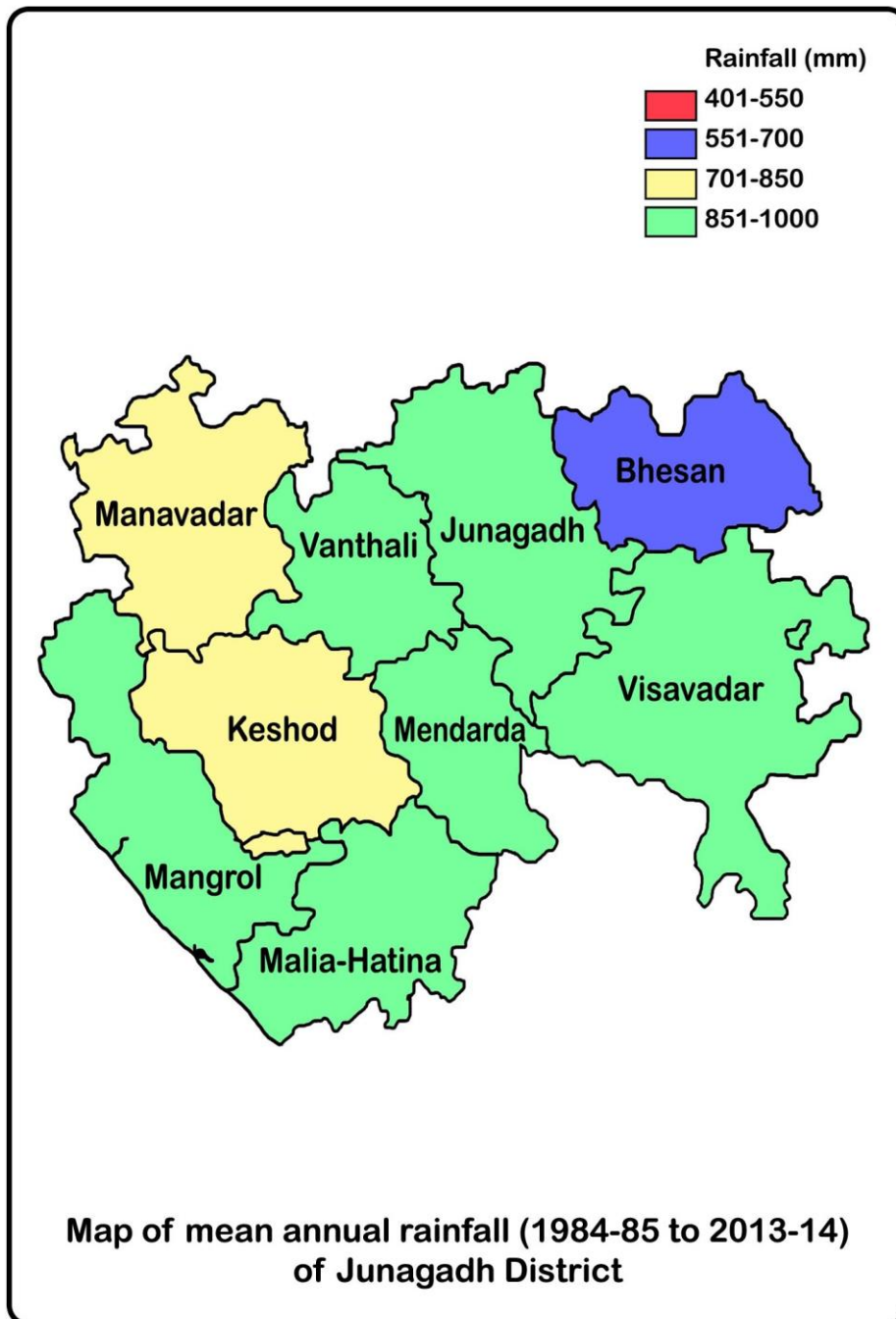
ANNEXURE I

Location map of Junagadh district



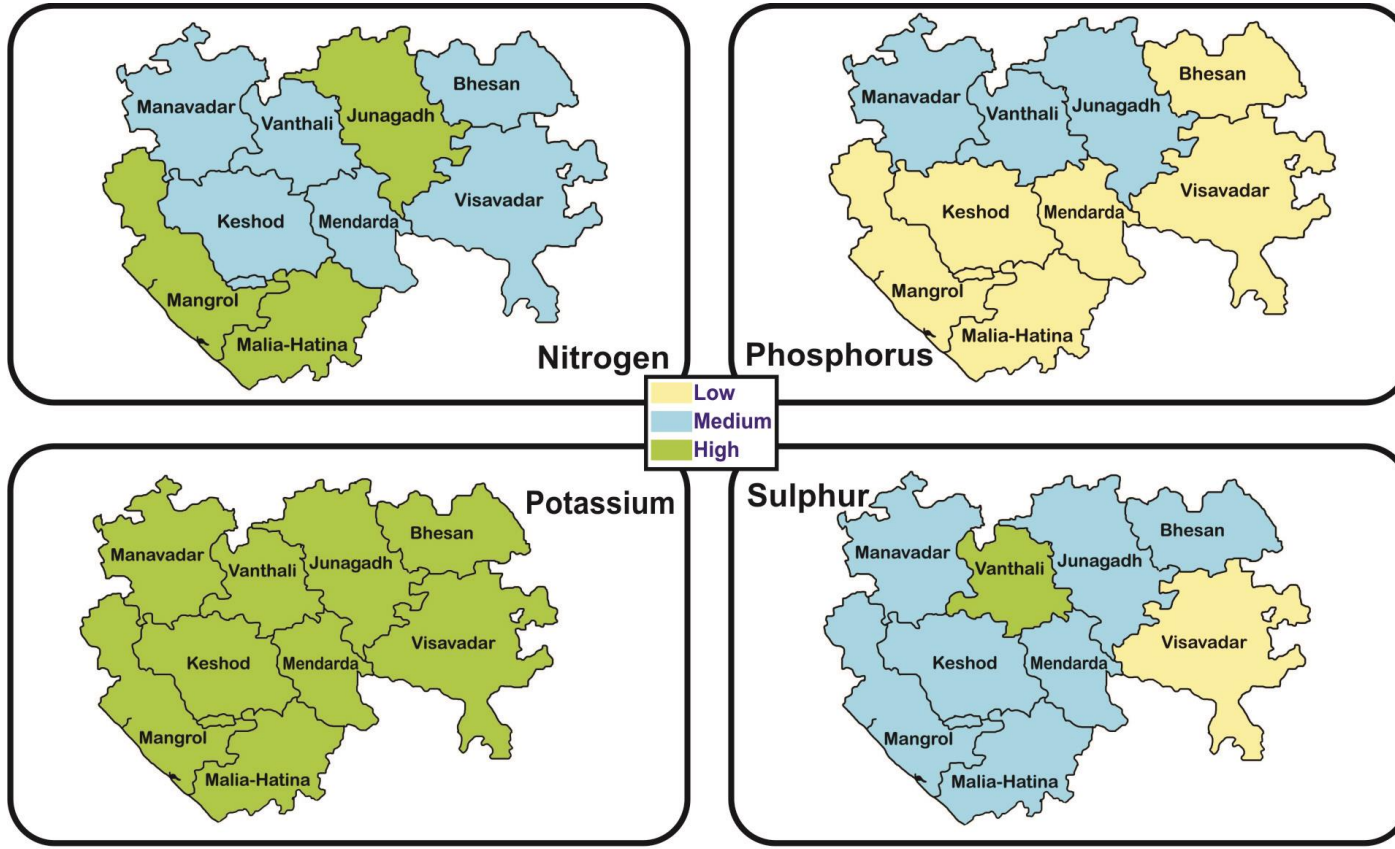
ANNEXURE II

Mean annual rainfall of Junagadh district



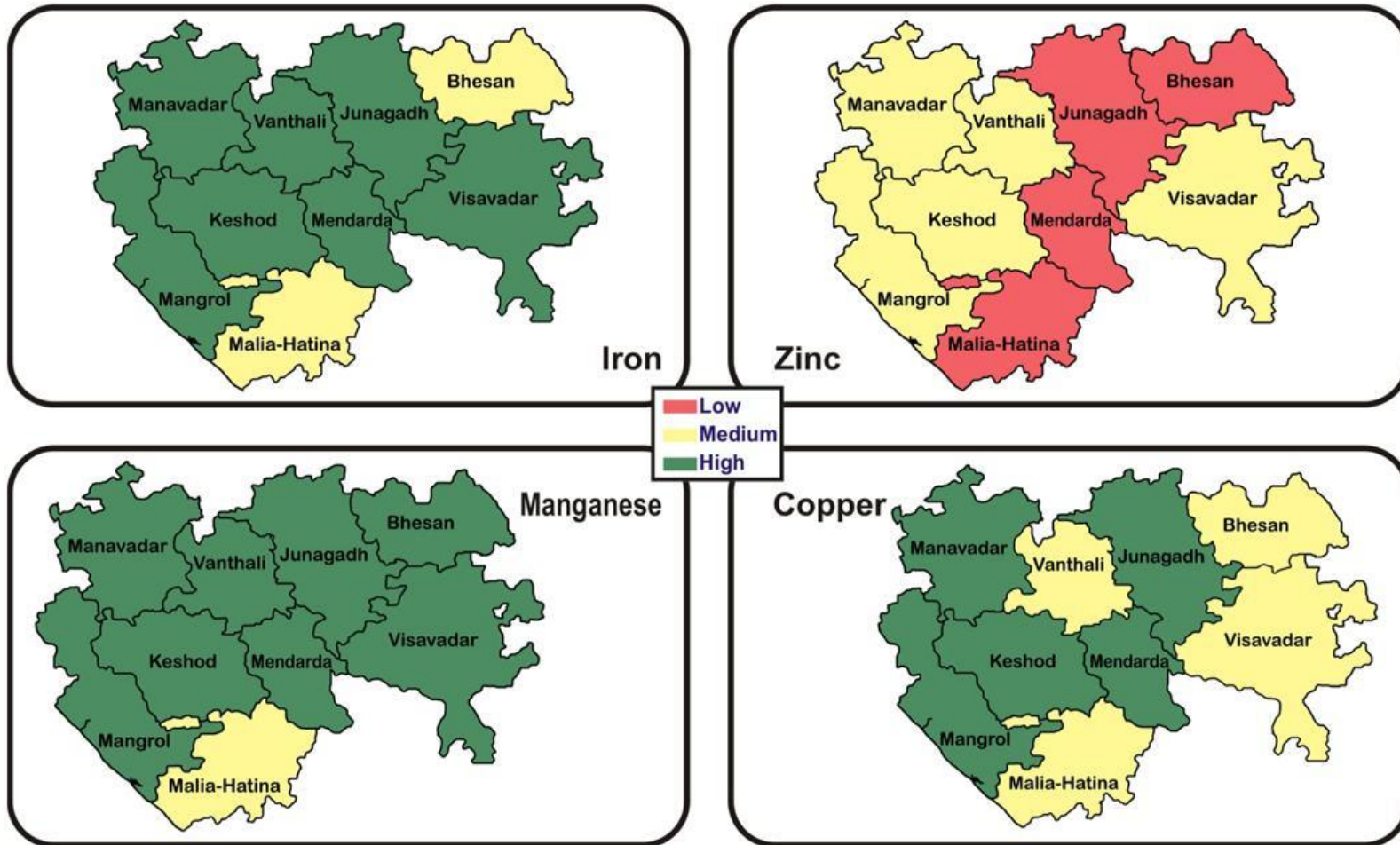
Annexure III

Annexure III a: Soil map of major nutrient status



Status of major nutrients in soils of Junagadh District

Annexure III b: Soil map of micro nutrient status



Status of micronutrients in soils of Junagadh District