

State: GUJARAT

Agriculture Contingency Plan for District: Bhavnagar

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Cetral Highlands (Malwa), Gujarat Plan and Kathiawar Peninsula, Semi-Arid Eco-Region (5.3)			
	Agro-Climatic Zone (Planning Commission)	Gujarat Plains and Hills Region (XIII)			
	Agro Climatic Zone (NARP)	South Saurashtra Agro Climatic Zone (GJ.7) North Saurashtra Agro Climatic Zone (GJ.6)			
	List all the districts or part thereof falling under the NARP Zone	Amreli, Bhavnagar, Jamnagar, Rajkot, Surendranagar, Devbhoomi Dwarka, Morbi, Botad, Porbandar, Junagadh, Gir somnath			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		21° 46'10.93" N	72° 08'36.93"E	30m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Directorate of Research, Junagadh Agricultural University, Junagadh-362001, Gujarat, (India)			
	Mention the KVK located in the district	Krishi Vigyan Kendra, At- Lok Bharati Sanosara, Pin: 364230 Ta- Sihor, Dist.-Bhavnagar, Gujarat,			
1.2	Rainfall (Average of 2005-12)	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	612.10	32	2 nd week of June	2 nd week of October
	NE Monsoon(Oct-Dec):	-	-	NA	NA
	Winter (Jan- March)	-	-	NA	NA
	Summer (Apr-May)	-	-	NA	NA
	Annual	612.10	32	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
	Area ('000 ha)	613.44	411.06	14.84	19.07	43.31	20.26	4.52	54.52	17.84	28.01

(Data Source: Census of India, 2011)

1.4	Major Soils (common names like red sandy loam deep soils (etc..))*	Area ('000 ha)	Percent (%) of total
	1 Medium to Shallow Black	282.52	68.73
	2. Coastal Alluvial	128.54	31.27

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	411.06	115.26
	Area sown more than once	62.74	
	Gross cropped area	473.80	

Source: Report, District Panchayat, Agricultural Department (2015-16) and Census of India, 2011

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	155.60		
	Gross irrigated area	162.65		
	Rain fed area	248.41		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		24.35	14.97
	Tanks	63	6.02	3.70
	Open wells	6540	131.78	81.02
	Bore wells	--	--	--
	Lift irrigation schemes	--	--	--
	Micro-irrigation	--	--	--
	Other sources, Ponds & Check dams	--	0.50	0.31
	Total Irrigated Area		162.65	100
	Pump sets	39,560		
	No. of Tractors			
	Ground water availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc),
	Over exploited	-	-	-
	Critical	-	-	-

	Semi- critical	-	-	-
	Safe	10	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 : Data source : Census of India, 2011)

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2009-10 to 2013-14)

Sr. No.	Major field crops cultivated	Area ('000 ha)							
		Kharif			Rabi			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
1	Cotton	194.18	81.85	276.03	-	-	-	-	276.03
2	Groundnut	-	90.74	90.74	-	-	-	15.57	106.31
3	Pearl Millet	-	36.98	36.98	-	-	-	3.47	40.45
4	Wheat	-	-	-	13.37	0.55	13.92	-	13.92
5	Green Gram	-	2.17	2.17	-	-	-	1.14	3.31

Sr.No.	Horticulture crops - Fruits(2015-15)	Area ('000 ha)
		Total
1	Citrus	7.00
2	Mango	6.40
3	Guava	4.00
4	Sapota (Chiku)	2.36
5	Banana	2.07
6	Pomegranate	0.51
	Horticulture crops - Vegetables	Total
1	Onion	35.50
2	Brinjal	1.90
3	Cucurbits	1.50
4	Tomato	1.30

Medicinal and Aromatic crops		Total		
1	Cumin	--		
2	Fenugreek	--		
3	Coriander	--		
Others (specify)	Others	--		
Plantation crops		Total Area ('000 ha)		
1	Coconut	3.59		
Others (Specify)	e.g., industrial pulpwood crops etc.	--		
Fodder crops		Total Area ('000 ha)		
1	Sorghum	51.8		
2	Maize	1.50		
3	Lucerne	0.40		
Total fodder crop area		59.25		
Grazing land		43.31		
Sericulture etc		-	-	-
Others (specify)		-	-	-

Source: Report, District Panchayat, Agricultural Department (2015-16) and Directorate of Horticulture, 2015-16

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	112.34	148.6	260.94
	Crossbred cattle			
	Non descriptive Buffaloes (local low yielding)	15.7	289.59	305.29
	Graded Buffaloes			
	Goat	1.5	0.08	1.58
	Sheep	1.9	0.1	2.0
	Others (Camel, Pig, Yak, horse etc.)	-	-	-
	Commercial dairy farms (Number)			

1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial	170	1248.6				
	Backyard	-	-				
1.1	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)
		10700	180	22	20985	13221	-
	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 (Data Source: MPEDA/ Fisheries Department)		20.0	0.8	0.02		
	ii) Fresh water (Data Source: Fisheries Department)		-	-	-		
	Others		-	-	-		

Source: Report, District Panchayat, Agricultural Department (2011-12)

1.11 Production and Productivity of major crops (Specify year 2009-10 to 2013-14)

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)										
Others	Groundnut	106.92	1143.40	--	--	30.78	1809.39	137.70	1172	206.55
	Cotton (Lint)	706.23	681.80	-	-	-	-	706.23	681.80	1377.15
	Wheat	--	--	39.21	2917.20	--	--	39.21	2917.20	86.26
	Pearl Millet	74.86	2009.99	-	-	8.62	2482.76	94.40	1999.50	236.00
	Green Gram	0.90	404.99	-	-	0.65	554.71	1.90	431.00	2.85

Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	51.21	8000	-
	Sapota	-	-	-	-	-	-	25.02	10600	-
	Banana	-	-	-	-	-	-	99.88	48250	-
	Citrus	-	-	-	-	-	-	91.28	13050	-
	Guava	-	-	-	-	-	-	47.60	11900	-
	Coconut	-	-	-	-	-	-	354.10 lakh(Nuts)	9880 (Nuts)	-

(Source: Directorate of Agriculture, Gujarat State, Gandhinagar. Year: 2015; Reports of Department of Horticulture, Govt. of Gujarat Year: 2015)

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Cotton	Groundnut	Pearl Millet	Onion	Wheat
	Kharif- Rainfed	2 nd week of June to 1 st week of July	2 nd week of June to 1 st week of July	2 nd week of June to 2 nd week of July	-	-
	Kharif-Irrigated	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	-	-	2 nd week of September to 2 nd week of October	2 nd week of November to 4 th week of November

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 (Vallabhipur, Ghogha, Talaja, Mahuva)	√		

	Pests and disease outbreak (specify) Pests- Cotton: Aphid, Jasad, Thrips, Whitefly, Pink boll worm; Groundnut: White grub; Citrus:Fruit fly Diseases- Mango: Powdery mildew ; Groundnut: Collar rot, Leaf spot, Rust; Pearl Millet: Downey mildew	√		
	Others (specify)			

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes / No	Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes / No	Yes
		Soil map as Annexure III a & b	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)	1 Medium & shallow black	Cotton (Cotton hybrid-4,6,8,10, & Govt. approved Bt. hybrids)	No change	Follow standard recommended package of practices	-
		Groundnut (Spreading GG10, 11, GJG 17, 31 and Semi spreading GG 20,GJG-22)	No change	Follow standard recommended package of practices	-
		Pearl Millet (GHB 558,577,538,719, 744,732 & Govt. approved hybrids)	No change	Follow standard recommended package of practices	-
	2.Coastal alluvial	Cotton (Cotton hybrid-4,6,8,10, & Govt. approved Bt. hybrids)	No change	Follow standard recommended package of practices	-

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)		Pearl Millet (GHB 558,577,538,719, 744,732 & Govt. approved hybrids)	No change	Follow standard recommended package of practices	-
Delay by 4 weeks (July 2 nd week)	1 Medium & shallow black	Cotton	---- No change -----	-	<ul style="list-style-type: none"> Seed sources: National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC).
		Ground nut	Bunch (GG-2, GJG-5, GG-6, GG-7, TG-37A) / Semi Spreading (GG-20, GJG-22)	<ul style="list-style-type: none"> Keep 45 cm and 60 cm row spacing for bunch and semi spreading groundnut, respectively 	
		Pearl Millet	Castor (GCH-7) / Pigeon pea (GJP-1) / Sorghum (GFS-4&5, Gundari, S-1049)	-	
	2.Coastal alluvial	Cotton	No change	-	
		Pearl Millet	Castor: GCH-7 Pigeon pea : GJP-1 Sorghum: GFS-4&5, Gundari, S-1049	-	
Delay by 6 weeks (July 4 th week)	1 Medium & shallow black	Cotton	Green gram (GM-4) / Black gram (Guj. Udad-1) / Sesame (GT-2,3,4) / Sorghum (GFS 4 & 5, Gundhari, S-1049) / Castor (GCH-7),/ Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	<ul style="list-style-type: none"> Seed sources: National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC), University, Gujcomasol.
		Ground nut	Green gram (GM-4) / Black gram (Guj. Udad-1) / Sesame (GT-2,3,4) / Sorghum (GFS 4 & 5, Gundhari, S-1049) / Castor (GCH-7),/ Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
		Pearl Millet	Green gram (GM-4) / Black gram (Guj. Udad-1) / Sesame (GT-2,3,4) / Sorghum (GFS 4 & 5, Gundhari, S-1049) / Castor (GCH-7),/ Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation ^a	Normal Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
	2.Coastal alluvial	Cotton	Green gram (GM-4) / Black gram (Guj. Udad-1) / Sesame (GT-2,3,4) / Sorghum (GFS 4 & 5, Gundhari, S-1049) / Castor (GCH-7),/ Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
		Pearl Millet	Green gram (GM-4) / Black gram (Guj. Udad-1) / Sesame (GT-2,3,4) / Sorghum (GFS 4 & 5, Gundhari, S-1049) / Castor (GCH-7),/ Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
Delay by 8 weeks (Aug 2nd week)	1 Medium & shallow black	Cotton	Sesame (GT-2,3 & 4) / Sorghum (GFS-4 & 5) / Gundari (S1049) / Castor(GCH-7) / Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. Straw/plastic mulch 	<ul style="list-style-type: none"> Seed sources: National Seed Corporation (NSC), Gujarat State Seed Corporation (GSSC), Gujcomasol Linkage with Government schemes for supply of implements : Zero till seed drill seed dressing equipment, sprayers & dusters available in Jasdan of Rajkot district
		Groundnut	Sesame (GT-2,3 & 4) / Sorghum (GFS-4 & 5) / Gundari (S1049) / Castor(GCH-7) / Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
		Pearl Millet	Sesame (GT-2,3 & 4) / Sorghum (GFS-4 & 5) / Gundari (S1049) / Castor(GCH-7) / Pigeon pea (GJP-1)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
	2.Coastal alluvial	Cotton	Sorghum (GFS-4 & 5, Gundari, S-1049) / Castor (GCH-7)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	
		Pearl Millet	Sorghum (GFS-4 & 5, Gundari, S-1049) / Castor (GCH-7)	<ul style="list-style-type: none"> As per crop, change / follow the package of practice. 	

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.	1 Medium & shallow black	Cotton	<ul style="list-style-type: none"> • Gap filling 	<ul style="list-style-type: none"> • Inter culturing 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.
		Groundnut	<ul style="list-style-type: none"> • Gap filling with maize, green gram, black gram 		
		Pearl Millet	<ul style="list-style-type: none"> • Thinning to maintain 10 cm plant to plant spacing 	<ul style="list-style-type: none"> • Inter culturing to fill soil cracks. • Mulching with wheat straw or shredded cotton stalk 	
	2.Coastal alluvial	Cotton	<ul style="list-style-type: none"> • Gap filling 	<ul style="list-style-type: none"> • Inter tilling to fill soil cracks, mulching with wheat straw or shredded cotton stalk • Spray kaolin @ 4% (400g/10 lit. water) 	
		Pearl Millet	<ul style="list-style-type: none"> • Thinning to maintain 10 cm plant to plant spacing 	<ul style="list-style-type: none"> • mulching with wheat straw or shredded cotton stalk 	

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)					
At vegetative stage	1 Medium & shallow black	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 if possible 	<ul style="list-style-type: none"> Mulching with wheat straw or shredded cotton stalk. Inter tilling Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> Supply of pesticides through Govt. schemes. Ensure electric supply for life saving irrigation through electricity supply by PGVCL
		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 if possible 	<ul style="list-style-type: none"> Mulching with wheat straw or shredded cotton stalk. Inter tilling Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> Supply of pesticides through Govt. schemes. Ensure electric supply for life saving irrigation through electricity supply by PGVCL
		Pearl Millet	<ul style="list-style-type: none"> Weeding/thinning to maintain 10 cm plant to plant spacing. Lifesaving irrigation if possible 	<ul style="list-style-type: none"> Inter tilling. Spray 1 % N in the form of urea after relief of drought. 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation through electricity supply by PGVCL
	2.Coastal alluvial	Pearl Millet	<ul style="list-style-type: none"> Weeding/thinning to maintain 10 cm plant to plant spacing Lifesaving irrigation if possible 	<ul style="list-style-type: none"> Inter tilling. Spray 1 % N in the form of urea after relief of drought. 	<ul style="list-style-type: none"> Ensure electric supply 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 if possible 	<ul style="list-style-type: none"> Mulching with wheat straw or crushed cotton stalk Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> Supply of pesticides through Govt. schemes. Ensure electric supply for life saving irrigation through electricity supply by PGVCL

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)	1 Medium & shallow black	Cotton	<ul style="list-style-type: none"> Supplement irrigation if possible followed by weeding 	<ul style="list-style-type: none"> Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation through electricity supply by PGVCL
		Groundnut	<ul style="list-style-type: none"> Supplement irrigation if possible followed by weeding 	<ul style="list-style-type: none"> Spray kaolin @ 4% (400g/10 lit. water) 	
		Pearl Millet	<ul style="list-style-type: none"> Supplement irrigation if possible. Harvest non flowering plants for fodder purpose if water is not available 	-	
	2.Coastal alluvial	Pearl Millet	<ul style="list-style-type: none"> Supplement irrigation if possible. Harvest non flowering plants for fodder purpose if water is not available 	<ul style="list-style-type: none"> Inter culturing, spray 1 % N through urea after relief of drought 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation through electricity supply by PGVCL
		Cotton	<ul style="list-style-type: none"> Supplement irrigation if possible followed by weeding 	<ul style="list-style-type: none"> Spray kaolin @ 4% (400g/10 lit. water) 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation through electricity supply by PGVCL

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	1 Medium & shallow black	Cotton	<ul style="list-style-type: none"> Harvest mature bolls, Supplement irrigation if possible Spray kaolin @ 4% (400g/10 lit. water) 	-	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation by PGVCL
		Groundnut	<ul style="list-style-type: none"> Lifesaving irrigation if possible Spray kaolin @ 4% (400g/10 lit. water) 	-	
		Pearl Millet	<ul style="list-style-type: none"> Supplement irrigation if possible. Harvest non flowering plants for fodder purpose if water is not available 	-	
	2.Coastal alluvial	Cotton	<ul style="list-style-type: none"> Harvest mature balls Supplement irrigation if possible Spray kaolin @ 4% (400g/10 lit. water) 	-	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation by PGVCL
		Pearl Millet	<ul style="list-style-type: none"> Supplement irrigation if possible Harvest non flowering plants for fodder purpose if water is not available 	-	

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			----- NA -----		

Note: Very limited canal irrigation facility exists in Bhavnagar

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	1. Medium & shallow black		Irrigate the sown crop in alternate furrow		
	2. Coastal alluvial				

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment			----- NA -----		

Condition			Suggested Contingency measures		
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	1. Medium & shallow black		----- NA -----		
	2. Coastal alluvial		----- NA -----		

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	1. Medium & shallow black	Wheat	Gram (GJG-3) / Cumin (Guj 2, 3 & 4) / Coriander (Guj 1& 2) / Fenugreek (Guj 1, GM-2) / Leafy vegetables / carrot (GDC 1).	<ul style="list-style-type: none"> Adoption of MIS. 	<ul style="list-style-type: none"> Construction of Well recharge structures, Timely supply of MIS and seeds through Govt. schemes.
		Cotton	No change	<ul style="list-style-type: none"> Supply irrigation during night time to reduce transpiration 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation by PGVCL.
	2.Coastal alluvial	Wheat	Gram (GJG-3) / 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 	<ul style="list-style-type: none"> Construction of well recharge structures Timely supply of MIS and seeds through Govt. schemes.
		Cotton	No change	<ul style="list-style-type: none"> Supply irrigation during night time to reduce transpiration 	<ul style="list-style-type: none"> Ensure electric supply for life saving irrigation by PGVCL
Sea water intrusion	2.Coastal alluvial	Wheat	Leafy vegetables / Carrot(GDC 1) / Beet / Lucerne	<ul style="list-style-type: none"> Adoption of MIS, limited area under irrigation, Light frequent irrigations, to reduce over exploitation some extent & limit depth of pumping 	<ul style="list-style-type: none"> The policy should decide for limiting the depth of well in coastal area.

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Wheat	-	-	<ul style="list-style-type: none"> Surface drainage (for management of water logging, lodging crop and to control black point in grain, spray mancozeb 0.2%(27 g/10 lit. water) 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. Protection against pest / disease damage in storage etc Preparation of quick drying techniques to separate good lot and bad lot.
Cotton	<ul style="list-style-type: none"> Surface drainage for management of water logging. Apply ammonium sulphate @ 199 kg/ha. 	<ul style="list-style-type: none"> Surface drainage for management of water logging. Apply ammonium sulphate @ 199 kg/ha. 	<ul style="list-style-type: none"> Surface drainage for management of water logging. Apply ammonium sulphate @ 199 kg/ha. Harvest mature bolls 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. 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"> Harvesting delay for spreading groundnut if possible. Immediately harvest bunch Groundnut. Quick surface drainage 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. 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 water logging				
Pearl Millet	<ul style="list-style-type: none"> Surface drainage 	<ul style="list-style-type: none"> Surface drainage 	<ul style="list-style-type: none"> Harvest mature ear heads 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100µm,UV stabilized colour plastic) or shift produces to farm shed Protection against pest / disease damage in storage etc. Preparation of quick drying techniques to separate good lot and bad lot.
Horticulture				
Mango	<ul style="list-style-type: none"> Provision of drainage Fertilizer application. Control leaf blight under unusual rains with cloudy weather 	-	<ul style="list-style-type: none"> Hang methyle euginol trap for control of fruit fly. 	<ul style="list-style-type: none"> Unripe fruit may be used for pickles.
Citrus	<ul style="list-style-type: none"> Control Citrus canker by spray of copper oxychloride 0.2 % (40g / 10lit water) + streptocycline 100 ppm (1 gram In 10 lit of water). Collect mature fruits 			-
Heavy rainfall with high speed winds in a short span				
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 (to control water logging condition) To control black point grain, spray mancozeb 0.2 % (27 g/10 lit. water) 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. 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 water logging				
Cotton	<ul style="list-style-type: none"> Surface drainage (to control water logging condition). After drainage apply ammonium sulphate @ 199 kg/ha. 	<ul style="list-style-type: none"> Surface drainage (to control water logging condition). After drainage apply ammonium sulphate @ 199 kg/ha. 	<ul style="list-style-type: none"> Surface drainage (to control water logging condition). Harvesting mature bolls. 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. 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"> Harvesting delay for 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 (100 µm, UV stabilized colour plastic) or shift produces to farm shed. Protection against pest/disease damage in storage etc., Preparation of quick drying techniques to separate good lot and bad lot.
Pearl Millet	-	-	<ul style="list-style-type: none"> Harvesting mature ear heads, Quick surface drainage 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. 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 water logging				
Horticulture				
Onion	<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. 	<ul style="list-style-type: none"> Surface drainage (to control water logging condition) and harvesting at physiological maturity 	<ul style="list-style-type: none"> Protect produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed. Protection against pest/disease damage in storage etc., Preparation of quick drying techniques to separate good lot and bad lot.
Mango	-.	<ul style="list-style-type: none"> Spray 0.2%(30g/10 lit water) wettable sulphur or 0.005% (10ml /10 lit. water)hexaconazole for protection against powdery mildew 	<ul style="list-style-type: none"> Collect fallen fruits 	<ul style="list-style-type: none"> Utilize unripe fruits may for pickles.
Citrus	<ul style="list-style-type: none"> Control Citrus canker by spray of copper oxychloride 0.2 %(40g/ 10lit water) + streptocycline 100 ppm (1 gram In 10 lit of water). Collect mature fruits 			-
Outbreak of pests and diseases due to unseasonal rains				
Wheat	-	-	-	-

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
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, Beauveria bassiana @ 2 kg/ha, Quinalphosh 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, Beauveria bassiana @ 2 kg/ha, Quinalphosh 25 EC @ 600 ml/ha. 	-
Groundnut	<ul style="list-style-type: none"> Spray 0.005%(10ml /10 lit. water) hexaconazole for rust & tikka diseases control 	<ul style="list-style-type: none"> Spray 0.005%(10ml /10 lit. water) hexaconazole for rust & tikka diseases control 	<ul style="list-style-type: none"> Spray 0.005%(10ml /10 lit. water) hexaconazole for rust & tikka diseases 	
Pearl Millet	-	-	-	
Horticulture				
Onion	-	Spray mancozeb 0.2%(27 g/10 lit. water) to control purple leaf blotch	Spray mancozeb 0.2% (27 g/10 lit. water) to control purple leaf blotch	-
Mango	<ul style="list-style-type: none"> Provision of drainage, fertilizer application, 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 0.005% hexaconazole for protection against powdery mildew after cessation of heavy rain. 	<ul style="list-style-type: none"> Hang methyle euginol trap, one/acer for control of fruit fly. 	
Citrus	<ul style="list-style-type: none"> Control Citrus canker by spray of copper oxychloride 0.2 %(40g/ 10lit water) + streptocycline 100 ppm (1 gram In 10 lit of water). 	<ul style="list-style-type: none"> Control Citrus canker by spray of copper oxychloride 0.2 %(40g/ 10lit water) + streptocycline 100 ppm (1 gram In 10 lit of water). 	<ul style="list-style-type: none"> Control Citrus canker by spray of copper oxychloride 0.2 % (40g/ 10lit water)+ streptocycline 100 ppm (1 gram In 10 lit of water). Collect mature fruits 	

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
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	-	<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. 	-
Pearl Millet	-	<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				
Mango	<ul style="list-style-type: none"> Surface drainage 	<ul style="list-style-type: none"> surface drainage 	<ul style="list-style-type: none"> surface drainage 	-
Citrus	<ul style="list-style-type: none"> Surface drainage 	<ul style="list-style-type: none"> surface drainage 	<ul style="list-style-type: none"> 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 0.05%(10g /10 lit. water) carbendazim for control of leaf spot. 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray 1 % FeSO₄ + 0.1 % citric acid for control yellowing, 0.005%(10ml /10 lit. water) hexaconazole for rust & leaf spot management. 	<ul style="list-style-type: none"> As a preventive step open drainage channel followed by spray 1 %(100g /10 lit. water) FeSO₄ + 0.1 %(10g /10 lit. water) citric acid for control yellowing, 	-
Cotton	<ul style="list-style-type: none"> As a preventive step open drainage channel and apply amonium sulphate @ 199 kg/ha 	<ul style="list-style-type: none"> As a preventive step open drainage channel and apply amonium sulphate @ 199 kg/ha 	<ul style="list-style-type: none"> As a preventive step open drainage channel. Harvesting mature bolls. 	-
Pearl Millet	<ul style="list-style-type: none"> As a preventive step open drainage channel and apply amonium sulphate @ 199 kg/ha 	<ul style="list-style-type: none"> As a preventive step open drainage channel and apply amonium sulphate @ 199 kg/ha 	<ul style="list-style-type: none"> As a preventive step open drainage channel and spray mancozeb 0.2%(27 g/10 lit. water) to control rusts. 	<ul style="list-style-type: none"> Harvest mature ear heads.

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Horticulture				
Mango	<ul style="list-style-type: none"> shift to safe place & proper surface drainage 	<ul style="list-style-type: none"> Surface drainage 		
Citrus	<ul style="list-style-type: none"> shift to safe place & proper surface drainage 	<ul style="list-style-type: none"> Surface drainage 		
Sea water intrusion	NA			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	<ul style="list-style-type: none"> Light & frequent irrigation to all crops 	<ul style="list-style-type: none"> Light & frequent irrigation to all crops 	<ul style="list-style-type: none"> Light & frequent irrigation to all crops 	
Hailstorm	NA			
Cyclone				
Cotton	<ul style="list-style-type: none"> Earthing up, quick drainage 	<ul style="list-style-type: none"> Earthing up, Quick drainage 	<ul style="list-style-type: none"> Earthing up, Quick drainage 	<ul style="list-style-type: none"> Shift produce at safer place
Groundnut	<ul style="list-style-type: none"> Quick drainage 	<ul style="list-style-type: none"> Quick drainage 	<ul style="list-style-type: none"> Quick drainage 	
Pearl Millet	<ul style="list-style-type: none"> Quick drainage 	<ul style="list-style-type: none"> Quick drainage 	<ul style="list-style-type: none"> Quick drainage 	
Horticulture				
Mango	<ul style="list-style-type: none"> Shift to safe place if possible & build cyclone proof nursery houses, grow wind bearer trees around nursery 	<ul style="list-style-type: none"> Reduce canopy & tying plants diagonally if possible, Grow wind barrier trees around field 	<ul style="list-style-type: none"> Reduce canopy & tying plants diagonally if possible 	<ul style="list-style-type: none"> Early harvesting of crop
Citrus	<ul style="list-style-type: none"> Shift to safe place if possible & build cyclone proof nursery houses, grow wind bearer trees around nursery 	<ul style="list-style-type: none"> Reduce canopy & tying plants diagonally if possible, Grow wind barrier trees around field 	<ul style="list-style-type: none"> Reduce canopy 	-do-

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.

	Suggested contingency measures		
	Before the event	During the event	After the event
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 unteather 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 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	<ul style="list-style-type: none"> Add bleaching powder (1%) to drinking water when heavy rains occur and flood expected. 	<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%).
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.

	Suggested contingency measures		
	Before the event	During the event	After the event
Cyclone			
Feed and fodder availability	<ul style="list-style-type: none"> • Early harvesting & storage of fodder, 	<ul style="list-style-type: none"> • Shift animals to safe place. Give stored fodder with mineral mixture along with concentrated feed. • In severe rain and flood unteather animals. 	<ul style="list-style-type: none"> • 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	<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"> • Add bleaching powder to drinking water (1%).
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 heath in the region. • Establish link with Agricultural/Veterinary University for animal health. Involve vet. • Science students for health management of animal. • Carry out disease diagnosis camps. 	<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	NA	NA	NA
Heat wave	NA	NA	NA

^a based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Shortage of feed ingredients	<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.

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
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%). 	-
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/environment management.	<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	-

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

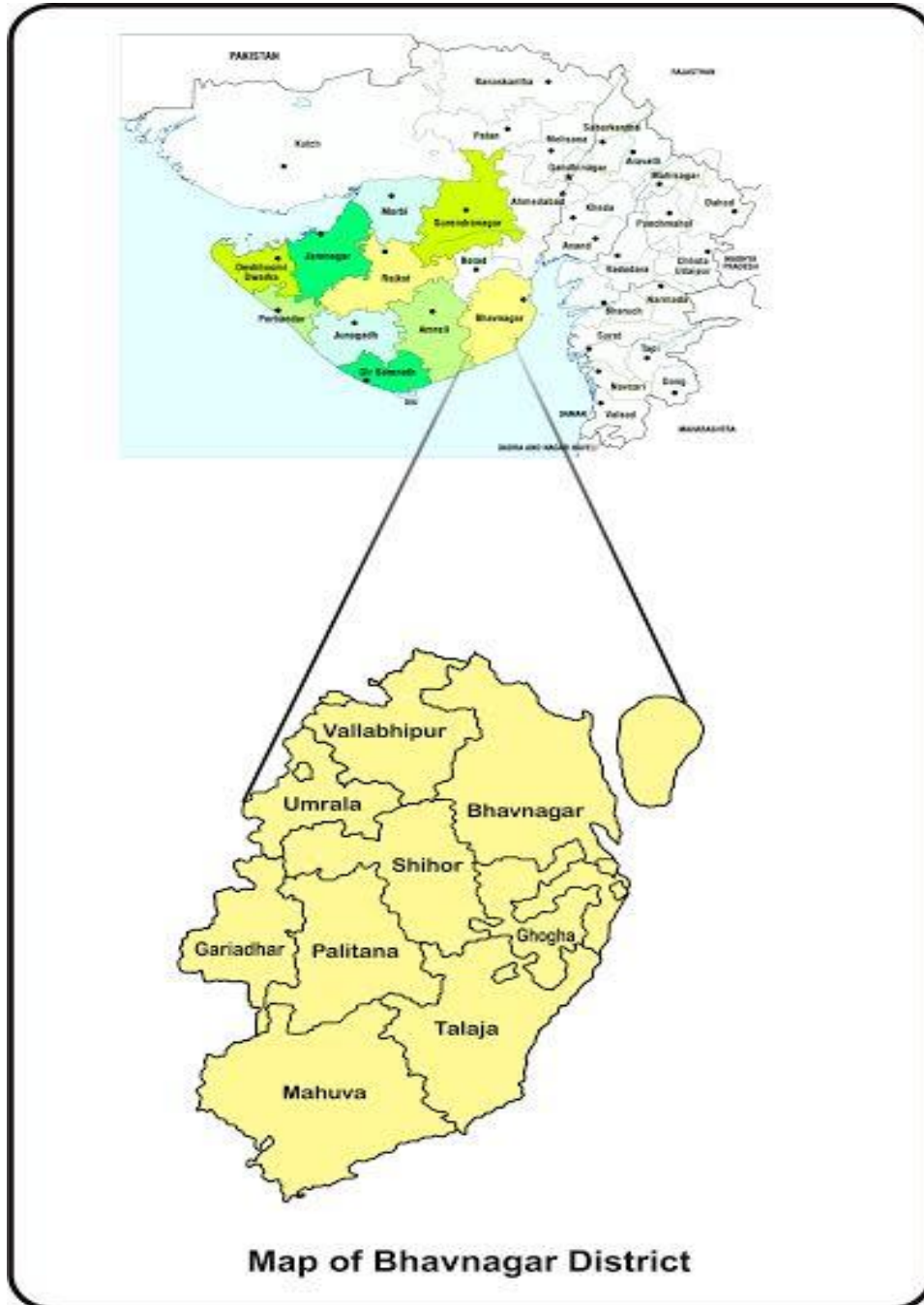
	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<ul style="list-style-type: none"> Desilting/deepening of pond so that more 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. 	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. 	-do-
(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 to be given.
(vi) Any other	-	-	-
3. Cyclone / Tsunami			
A. Capture	-	-	-
Marine	-	-	-

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
(i) Average compensation to be paid due to loss of fishermen lives	<ul style="list-style-type: none"> Forwarning systems to be installed. Insurance & communication instruments supplied to fisher man. 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 Deptt 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 to be given.
(vi) Any other	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	NA	NA	NA
Inland	NA	NA	NA

	Suggested contingency measures		
	Before the event^a	During the event	After the event
B. Aquaculture			
(i) 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	-	-	-

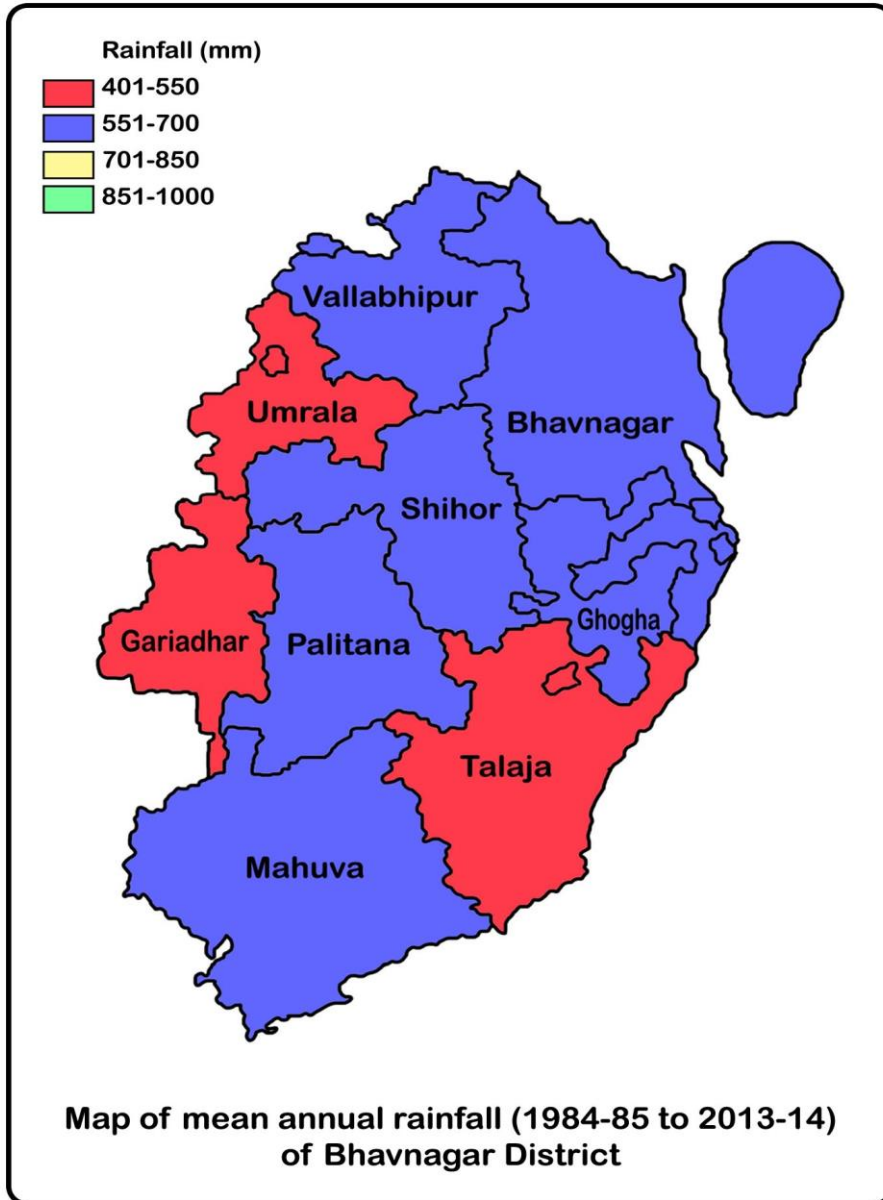
^a based on forewarning wherever available

Annexure-I
Location of district



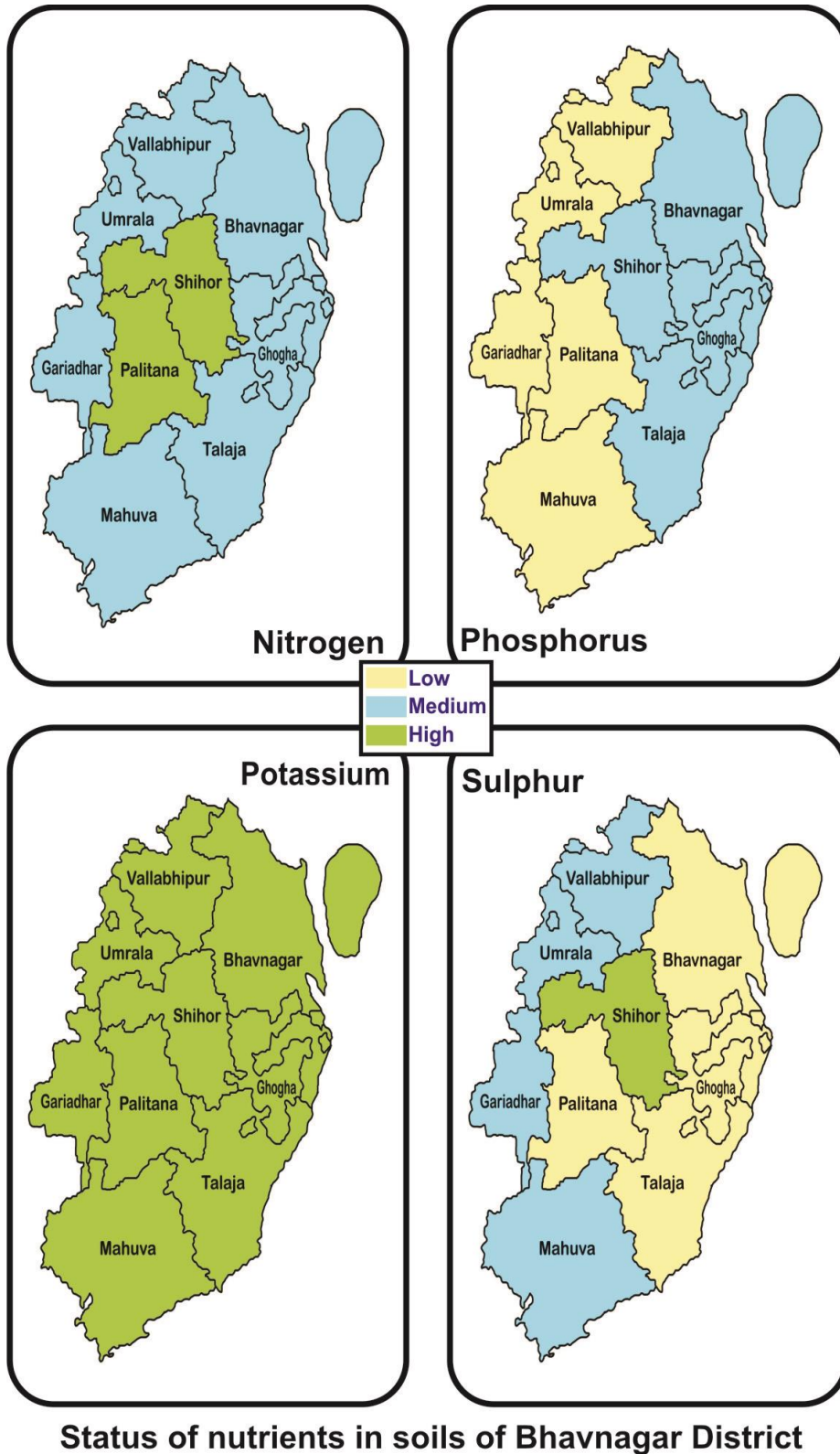
Annexure- II

Mean annual rainfall map



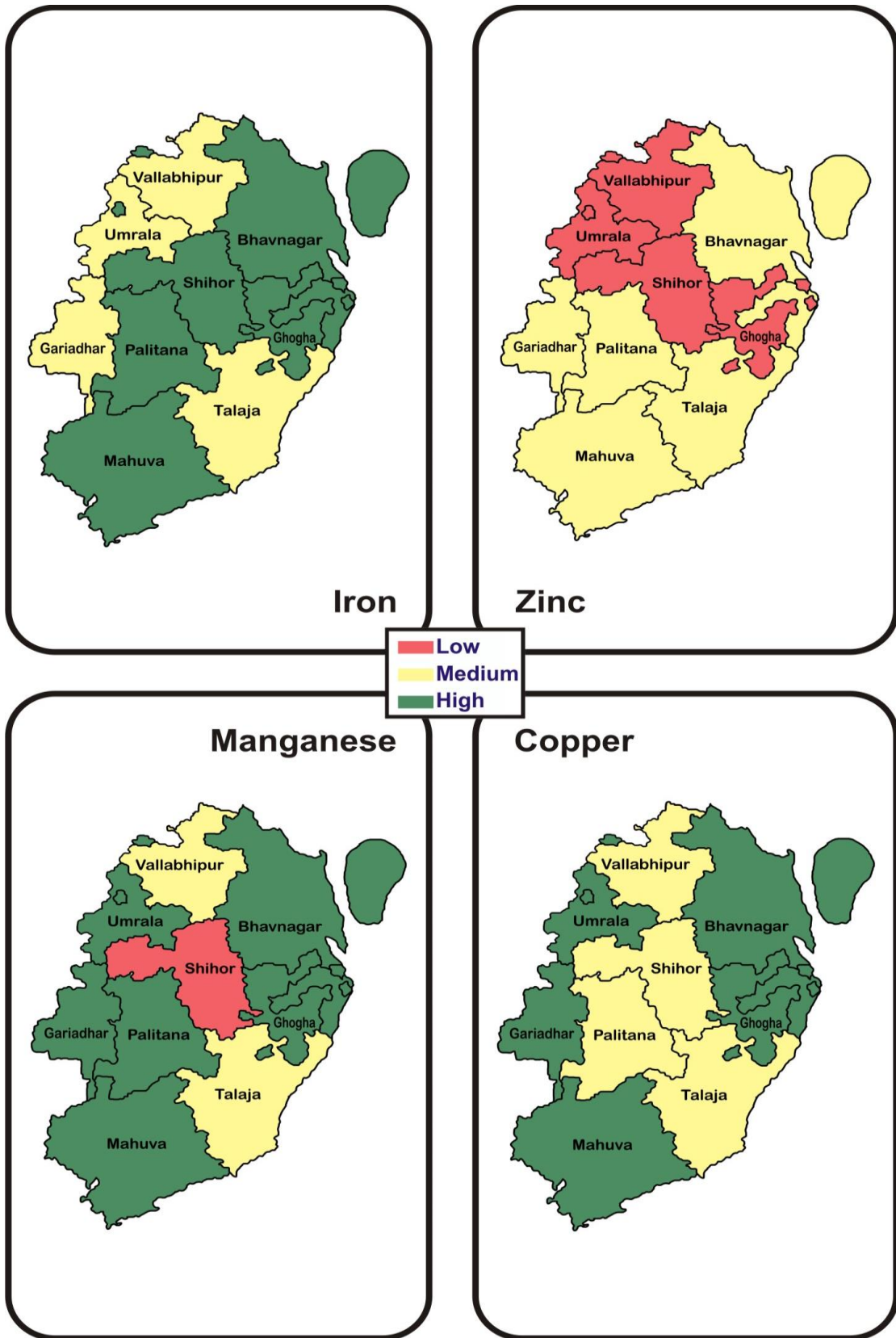
ANNEXURE-III

Annexure IIIa Map of major nutrient status



Status of nutrients in soils of Bhavnagar District

Annexure IIIb Map of micro nutrient status



Status of micronutrients in soils of Bhavnagar District