

State: GUJARAT

Agriculture Contingency Plan for District: SURAT

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa), Gujarat plain (5.2)			
	Agro-Climatic Zone (Planning Commission)	Gujarat Plain and Hills Region (XIII)			
	Agro Climatic Zone (NARP)	South Gujarat Zone (GJ-2)			
	List all the districts or part thereof falling under the NARP Zone	Surat, Bharuch, Narmada			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		21 ⁰ 11' 42.00" N	72 ⁰ 49' 10.00" E	39 ft above MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Main Cotton Research Station, Navsari Agricultural University, Surat 396 001 Main Sorghum Research Station, Navsari Agricultural University, Surat			
Mention the KVK located in the district	----				
1.2	Rainfall	Normal RF(mm)	Normal Rainy days	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	1400 - 1700	45-56	3 rd week of June	4 th week of September
	NE Monsoon(Oct-Dec):	-	-	-	-
	Winter (Jan- March)	-	-	-	-
	Summer (Apr-May)	-	-	-	-
	Annual	1400 – 1700	45-56	-	-

(Source :District Panchayat reports, reports of Agriculture department)

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)	524	331	26	73	16	31	10		37	

(Source :District Panchayat reports, reports of Agriculture department)

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))	Area ('000 ha)
	Hilly and highly undulating fine texture	87
	Mid plains, fine texture, high rainfall	165
	Mid plains, fine texture, medium rainfall	139
	Coastal plain, deep fine texture, salt affected	42

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	331	122.66
	Area sown more than once	75	
	Gross cropped area	406	

(Source :District Panchayat reports, reports of Agriculture department)

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	199		
	Gross irrigated area	224		
	Rain fed area	132		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	1024 km	148.0	66.07
	Tanks			
	Open wells	13164	76.0	33.93
	Bore wells	939		
	Lift irrigation schemes	5456		
	Micro-irrigation	22		
	Other sources (please specify)	204		
	Total Irrigated Area	-	224.0	100.0
	Pump sets	7003		
	No. of Tractors	5341		
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-	-	-
	Critical	-	-	-
	Semi- critical	3	25	saline
	Safe	4	65	-
	Wastewater availability and use	-	-	-
	Ground water quality	Medium to good		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures) (2008-09)

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rain fed	Total	Irrigated	Rain fed	Total		
Rice	447	137	584	-	-	-	97	681	
Sorghum	-	162	162	25	-	25	-	187	
Wheat	-	-	-	61	-	-	-	61	
Sugarcane	-	-	-	1,124	-	-	-	1,124	
Cotton	19	15	-	-	-	-	-	34.0	

(Source :District Panchayat reports, reports of Agriculture department)

Horticulture crops - Fruits	Area ('000 ha)
	Total
Banana	10.8
Mango	7.1
Sapota	2.0
Papaya	1.3
Coconut	0.1
Lemon, Amla, Sitafal	0.3
Horticulture crops - Vegetables	Total
Brinjal	4.8
Okra	4.7
Tomato	1.1
Cowpea	1.2
Cabbage-flower	1.1
Guvar bottle guard,palvar	4.6

Medicinal and Aromatic crops	Total
Kuvarpathu	17.5
Ashvagandha	16.0
Pacholi	21.0
Plantation crops	Total
	-
Eg., industrial pulpwood crops etc.	
Fodder crops	Total
Sorghum	1429
Total fodder crop area	
Grazing land	
Sericulture etc	

Source : District Panchayat reports, reports of Agriculture department)

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)	
	Non descriptive Cattle (local low yielding)	124.1	128.3	252.5	
	Crossbred cattle	52.7	98.5	151.2	
	Non descriptive Buffaloes (local low yielding)	-	-	-	
	Graded Buffaloes	-	246.6	246.6	
	Goat	192.0	16.2	208.2	
	Sheep	2.4	1.0	3.5	
	Others (Camel, Pig, Yak etc.)	19.4	63.6	83.0	
	Commercial dairy farms (Number)				
1.9	Poultry	No. of farms	Total No. of birds ('000)		
	Commercial	903	460.1		
	Backyard	>2000	330.6		
1.10	Fisheries (Data source: Chief Planning Officer)				
	A. Capture				
	i) Marine (Data Source: Fisheries)	No. of fishermen	Boats	Nets	Storage facilities (Ice plants)

Department)		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	etc.)
	4309	155	870	-	95942	ICF plant-44 Cold storage-3
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	45		7		567	
B. Culture						
	Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	19200		15.21		1262	
ii) Fresh water (Data Source: Fisheries Department)					1684	
Others					8161	

(Source :District Panchayat reports, reports of Agriculture department)

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

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)										
	Rice	1100	2462	-	-	332	3440	1432	2103	1821
	Sorghum	187	1150	34	1360	-	-	221	1182	663
	Wheat	-	-	122	2503	-	-	122	2000	183
	Sugarcane	-	-	7974	7094	-	-	7974	70943	-
	Cotton	86	430 lint	-	-	-	-	86	430 lint	177
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Major Horticultural crops (Crops to be identified based on total acreage)										
	Banana	-	-	-	-	670	62000	670	62000	-
	Mango	-	-	-	-	578	8100	57.8	8100	-

	Sapota	-	-	210	10300	-	-	210	10300	-
	Papaya	-	-	77	5800	-	-	77	5800	-
	Coconut	-	-	-	-	1.2	7700	1.2	7700	-

1.12	Sowing window for 5 major field crops	Paddy	Sorghum	Wheat	Sugarcane	Cotton
	Kharif- Rainfed	June-July	June-July	-	-	June -July
	Kharif-Irrigated	May-June	June-July	-	-	May-June
	Rabi- Rainfed	-	October	October	Oct-Feb.	-
	Rabi-Irrigated	-	-	Oct-Nov.	-	-

(Source :District Panchayat reports, reports of Agriculture department)

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 disease outbreak (specify)	-	√	
	Others (specify)	-		√

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rain fed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (June 2 nd week)	Hilly and highly undulating fine texture	Rice	No Change	Intercultivation Use weedicide	Seed drills under RKVY Supply of seeds through GSSC Supply of seeds through NFSM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, high rainfall	Rice	No Change	Protective Irrigation should be given in sugarcane, vegetables if available	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, medium rainfall	Rice	No Change	Intercultivation Use weedicide	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Coastal plain, deep fine texture, salt affected	Rice	No Change	Intercultivation Use weedicide	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset) Delay by 4 weeks 4 th week of June	Hilly and highly undulating fine texture	Rice	No Change	<ul style="list-style-type: none"> • Wider spacing • Mulching • Micro irrigation 	<ul style="list-style-type: none"> • GSSC • NSC • RKVY • NHM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, high rainfall	Rice	No Change	<ul style="list-style-type: none"> • Wider spacing • Mulching • Micro irrigation • Interculturing 	<ul style="list-style-type: none"> • GSSC • NSC • RKVY • NHM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, medium rainfall	Rice	No Change	<ul style="list-style-type: none"> • Higher seed rate • Higher fertilizer • Moisture conservation • Salt tolerant varieties 	<ul style="list-style-type: none"> • GSSC • NSC • RKVY • NHM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Coastal plain, deep fine texture, salt affected	Rice	No Change	<ul style="list-style-type: none"> • Wider spacing • Mulching • Micro irrigation • Interculturing 	<ul style="list-style-type: none"> • GSSC • NSC • RKVY • NHM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks (Specify month)	Situation does not arise				

Condition	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 8 weeks	Situation does not arise				

Condition	Major Farming situation	Normal Crop/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.	Hilly and highly undulating fine texture	Rice	Gap filling Thinning Give protective irrigation	Adopt foliar sprays of nutrients Avoid intercultivation	Supply of inter cultural implements through RKVY Seeds supply through NFSM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, high rainfall	Rice	-do-	-do-	Seeds through GSSC
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, medium	Rice	-do-	-do-	Interculturing implements through
		Sorghum			

	rainfall	Wheat			RKVY Seeds from NSC		
		Sugarcane					
		Cotton					
	Coastal plain, deep fine texture, salt affected	Rice			-do-	-do-	Supply of inter cultural implements through RKVY Seeds supply through NFSM
		Sorghum					
		Wheat					
		Sugarcane					
		Cotton					

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	Hilly and highly undulating fine texture	Rice	Use antitranspirant chemical	Use plastic or grass mulch.	As above
		Sorghum	Repeated Intercultivation	Application of foliar nutrients		
		Wheat	Use antitranspirant chemical	Give protective irrigation		
		Sugarcane	Alternate furrow irrigation	Use plastic or grass mulch.		
		Cotton	Alternate furrow irrigation	Application of foliar nutrients		
	Mid plains, fine texture, high rainfall	Rice	-do-	-do-	As above	
		Sorghum				
		Wheat				
		Sugarcane				
		Cotton				
	Mid plains, fine texture, medium rainfall	Rice	-do-	-do-	As above	
		Sorghum				
		Wheat				

	Coastal plain, deep fine texture, salt affected	Sugarcane	-do-	-do-	As above
		Cotton			
		Rice			
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
		Rice			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Hilly and highly undulating fine texture	Rice	Harvest at physiological harvest stage Give protective irrigation Follow proper weeding management practice	Adopt foliar application of nutrients Give protective irrigation Use plastic or grass mulch Repeated Intercultivation	As above
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, high rainfall	Rice	-do-	-do-	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, medium rainfall	Rice	-do-	-do-	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Coastal plain, deep fine texture, salt	Rice	-do-	-do-	-do-
		Sorghum			

	affected	Wheat			
		Sugarcane			
		Cotton			

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)	Hilly and highly undulating fine texture	Rice	Harvest at physiological harvest stage Give protective irrigation Follow proper wedding management practice	wider spacing Mulching Life saving irrigation Irrigate at critical stage water saving technique	As above
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, high rainfall	Rice	-do-	-do-	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Mid plains, fine texture, medium rainfall	Rice	-do-	-do-	-do-
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			
	Coastal plain, deep fine texture, salt affected	Rice	-do-	-do-	-do-
Sorghum					
Wheat					
Sugarcane					
Cotton					

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall	Canal command area high to medium rain fall area, heavy to medium textured soil	Rice	Prefer rainfed paddy varieties Prefer rainfed cotton varieties G cot 23 Prefer castor crop	Use mulching Use FYM & compost	Seeds through GSSC and NFSM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Canal command area high to medium rain fall area, heavy to medium textured soil	Rice	Prefer rain fed paddy varieties Prefer rainfed cotton varieties GJ 35 Prefer castor crop	Use mulching Use FYM & compost	Seeds through GSSC and NFSM
		Sorghum			
		Wheat			
		Sugarcane			
		Cotton			

Condition					
	Major Farming situation	Normal 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	This is not expected in this district				

Condition					
	Major Farming situation	Normal 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	This is not expected in this district				

Condition					
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	This is not expected in this district				

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
Rice	Resowing Provide drainage	Use early maturity variety GR-5	Select suitable rabi crop	Shift to safer place
Sorghum	Resowing Provide drainage	Use early maturity variety GJ35	Select suitable rabi crop	Shift to safe place dry in shade and turn frequently
Wheat	-	-	-	Safe storage against storage pest and disease
Sugarcane	-	-	-	----
Cotton	Resowing Provide drainage	Use early maturity variety Gcot 23	Select suitable rabi crop	Shift to safe place dry in shade and turn frequently
Horticulture				
Banana	-	-	-	-do-
Mango	-	-	-	-do-
Sapota	-	-	-	-do-
Papaya	-	-	-	-do-
coconut	-	-	-	-do-
Heavy rainfall with high speed winds in a short span				
Rice	Resowing, Gap filling Provide drainage	Use early maturity variety GR5	Select suitable rabi crop Indian bean	-do-
Sorghum	-do-	-do-	-do-	-do-
Wheat	-	-	-	-do-
Sugarcane	Propping &twisting	Propping &twisting	Propping &twisting	-----

Cotton	Resowing, Gap filling Provide drainage	Use early maturity variety Gcot 23	Select suitable rabi crop Indian bean	-do-
Horticulture				
Banana	Protect with wind break crop (Shevari, Castor)	-	-	-do-
Mango	-do-	-	-	-do-
Sapota	-do-	-	-	-do-
Papaya	-do-	-	-	-do-
coconut	-			
Outbreak of pests and diseases due to unseasonal rains				
Rice	Carbofuradan @3%	Carbofuradan @3%	Carbofuradan @3%	Safe storage against storage pest and diseases
Sorghum	Carbofuradan @3%	Carbofuradan @3%	Carbofuradan @3%	-do-
Wheat	-	--	---	
Sugarcane	Carbofuradan @3%	Carbofuradan @3%	Carbofuradan @3%	
Cotton	Carbofuradan @3%	Carbofuradan @3%	Carbofuradan @3%	
Horticulture	-do-	-do-	-do-	
Banana	-do-	-do-	-do-	Safe storage against storage pest and diseases
Mango	-do-	-do-	-do-	-do-
Sapota	-do-	-do-	-do-	-do-

Papaya	-do-	-do-	-do-	-do-
Coconut	-do-	-do-	-do-	-do-

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Rice	Provide proper drainage	Provide proper drainage	Provide proper drainage	Provide proper drainage
Sorghum	-do-	-do-	-do-	-do-
Wheat	-	-	-	-
Sugarcane	-	-	-	-
Cotton	Provide proper drainage	Provide proper drainage	Provide proper drainage	Provide proper drainage
Horticulture				
Banana	-do-	-do-	-do-	-do-
Mango	-do-	-do-	-do-	-do-
Sapota	-do-	-do-	-do-	-do-
Continuous submergence for more than 2 days				
Rice	Provide proper drainage	Provide proper drainage	Provide proper drainage	Provide proper drainage
Sorghum	-do-	-do-	-do-	
Wheat	-	-	-	-
Sugarcane	-	-	-----	---
Cotton	Provide proper drainage	Provide proper drainage	Provide proper drainage	Provide proper drainage
Horticulture				
Banana	-do-	-do-	-do-	-do-

Mango	-do-	-do-	-do-	-do-
Sapota	-do-	-do-	-do-	-do-
Sea water intrusion	Not expected			

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				
Rice	Application of irrigation Protection with wind break crop Use mulching	Application of irrigation Protection with wind break crop Use mulching	Application of irrigation Protection with wind break crop Use mulching	Application of irrigation Protection with wind break crop Use mulching
Sorghum				
Wheat				
Sugarcane				
Cotton				
Horticulture				
Banana	-do-	-do-	-do-	-do-
Mango				
Sapota				
Cold wave	Not Observed			
Horticulture	Not Observed			
Frost	Not Observed			
Horticulture				
Hailstorm	Not Observed			
Horticulture				
Cyclone	Not Observed			
Horticulture				

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	Insurance Encourage perennial fodder on bunds and waste land on community basis Establishing fodder banks, encouraging fodder crops in irrigated area Silage – using excess fodder for silage	Utilizing fodder from perennial trees and Fodder bank reserves Utilizing fodder stored in silos Transporting excess fodder from adjoining districts Use of feed mixtures	Availing Insurance Remove unproductive livestock
Drinking water	Preserving water in the tank for drinking purpose Excavation of Bore wells	Using preserved water in the tanks for drinking Wherever ground water resources are available priority for drinking purpose	
Health and disease management	Veterinary preparedness with medicines and vaccines	Conducting mass animal Health Camps and treating the affected once in Campaign	Remove sick animals
Floods			
Feed and fodder availability	Not Observed		
Drinking water			
Health and disease management			
Cyclone			
Feed and fodder availability	Not Observed		
Drinking water			
Health and disease management			
Heat wave and cold wave			
Shelter/environment management	Not Observed		
Health and disease management			

2.5.2 Poultry

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
Drought			
Shortage of feed ingredients	Insurance & Integration Establishing geed serve Bank	Utilizing from feed serve banks	Availing insurance Strengthening feed Reserve Banks
Drinking water	Preparing of tank of water	Campaign and Mass Vaccination	Culling affected birds
Health and disease management	Emergency Veterinary preparedness with medicines vaccination to birds		
Floods			
Shortage of feed ingredients	Livestock should be transfer high level area	Shift to other farms	After flood cleaning the farm and replace at original farm.
Drinking water	Water storage at high level		Supply pure drinking water
Health and disease management	-	-	Emergency Veterinary preparedness with medicines vaccination to birds
Cyclone	Not Observed		
Shortage of feed ingredients			
Drinking water			
Health and disease management			
Heat wave and cold wave	Not Observed		
Shelter/environment management			
Health and disease management			

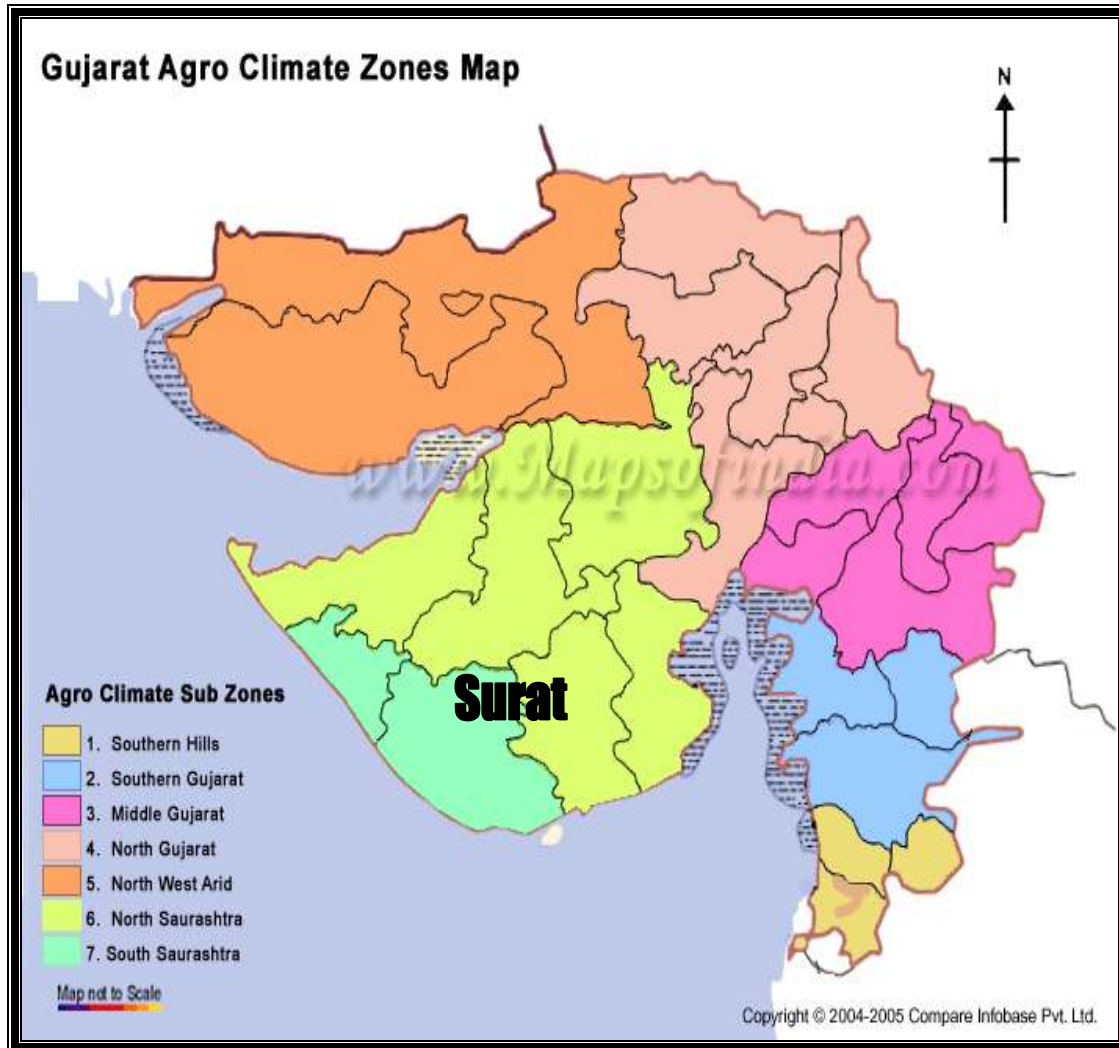
2.5.3 Fisheries / Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture			
Marine	Ponds are filled with breaks water Liming treatment is done	Live stock removed from the ponds	Ponds should be dried and refilled with fresh water and maintain breeding material/live stock.
Inland			
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
B. Aquaculture	Mixing of creek water and fresh water Desilting is practiced	Live stock is removed/sold	Ponds should be drained and refilled with fresh water
(i) Shallow water in ponds due to insufficient rains/inflow			
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods			
A. Capture	Out let of ponds are opened and livestock is shifted to another place	-	Out let are closed and live stock shifted and lime treatment is done
Marine			
Inland			
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged			
(iii) No. of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(vi) Health and diseases			
3. Cyclone / Tsunami	This is not expected in this district		
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damage ed			
(iii) Avg. no. of houses damaged			

Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters /huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine	Village level ponds water quantity should be increased	The live stock is removed as early as possible	The fresh live stock is stocked in the ponds
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)	Fresh water is added	Live stock is removed	Lime treatment is given Disease stock is removed
(ii) Health and Disease management			



Annexure I
Location map of district within state



Annexure II
Mean annual rainfall

Sr. No.	Year	Rainfall in mm
1	1998	1621
2	1999	1064
3	2000	737
4	2001	1340
5	2002	979
6	2003	1864
7	2004	1614
8	2005	2050
9	2006	3653
10	2007	1766
11	2008	1550

Annexure III
Soil map of Surat district

