

State: GUJARAT

Agricultural Contingency Plan for District: NAVSARI

1.0 District Agriculture profile					
1.1	Agro-Climatic / Ecological Zone				
	Agro Ecological Region / Sub Region (ICAR)	Western Ghats And Coastal Plain, Hot Humi-per humid eco region (19) : North Sahyadris and Konkan Coast, hot, humid eco-subregion(19.1)			
	Agro-Climatic Region (Planning Commission)	Gujarat plains and hills region (XIII)			
	Agro Climatic Zone (NARP)	South Gujarat Heavy Rainfall area (GJ-1)			
	List all the districts or part thereof falling under the NARP Zone	Navsari, Valsad ,Dangs ,Tapi			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		20 ⁰ 57' 07.05" N	72 ⁰ 55' 16.50" E	12.33 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Navsari Agricultural University, Navsari-369 450 (Gujarat)			
	Mention the KVK located in the district	KVK, Navsari Agricultural University, Navsari (Gujarat)			
1.2	Rainfall	Normal RF (mm)Average of last 10 years	Normal Rainy Days (number) Average of last 10 years	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1959	52	2 nd Week of June	4 th week of September
	NE Monsoon(Oct-Dec):	-	-	-	-
	Winter (Jan- March)	-	-	-	-
	Summer (Apr-May)	-	-	-	-
	Annual	1959	52	-	-

(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)	400.0	140.1	81.9	36.0	12.0	27.0	20.0	20.0	63.0	-

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

1.4	Major Soils	Area (*000 ha)	Percent (%) of total
	Heavy black soil with poor drainage (Plain area)	225.2	56.3
	Sandy loam soils with shallow depth (Hilly area)	124.8	31.2
	Heavy black soil with water logging and problematic soils (Coastal area)	49.6	12.4

1.5	Agricultural land use	Area (*000 ha)	Cropping intensity %
	Net sown area	140.1	151.7
	Area sown more than once	72.462	
	Gross cropped area	212.562	

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

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	72.4		
	Gross irrigated area	109.9		
	Rain fed area	67.6		
	Sources of Irrigation	Number	Area ('000 ha)	% of total irrigated area
	Canals		63.0	45.0
	Tanks		19.6	14.0
	Open wells	17843	57.4	41.0
	Bore wells		66	
	Lift irrigation schemes			
	Other sources		0.3	
	Total irrigated area		69.5	
	Pump sets	9402		
	Micro-irrigation	2733		
	Groundwater availability and use (Data source: State/Central Ground Water Department/Board)	No. of blocks	% area	Quality of water
	Over exploited			
	Critical			
Semi- critical				
Safe	yes			
Wastewater availability and use				
Ground water quality				

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

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

Area under major field crops & horticulture etc.

*If break-up data (irrigated, Rain fed) is not available, give total area

1.7	Major Field Crops cultivated	Area ('000 ha)*					
		<i>Kharif</i>		<i>Rabi</i>		Summer	Total
		<i>Irrigated</i>	<i>Rain fed</i>	<i>Irrigated</i>	<i>Rain fed</i>		
	Paddy						78.6
	Sugarcane						14.6
	sorghum						2.7
	Indian bean						17.9
	Ragi						0.78
	Horticulture crops – Fruits	Total area					
	Mango						
	Sapota	21.0					
	Banana						
	Horticultural crops – Vegetables	Total area					
	Vegetable	9.5					
	Flowers	0.6					
		-					

Medicinal and Aromatic crops	Total area	Irrigated	Rain fed
Medicinal and Aromatic crops	3		
Plantation crops	Total area	Irrigated	Rain fed
coconut	0.3		
cashew nut	0.044		
Fodder crops	Total area	Irrigated	Rain fed
Sorghum	1.0		
Total fodder crop area	-	-	-
Grazing land	--	-	-
Sericulture etc	22	-	-
Others (Specify)	-	--	-

1.8	Livestock	Male (*000)	Female Total (*000)	Total (*000)
	Non descriptive cattle(local non yielding)			111.7
	Cross breed cattle			
	Non descriptive buffalo (local non yielding)			
	Cross breed buffalo			
	Buffaloes			82.9
	Goat			46.0
	Sheep			0.9
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			Total Livestock =331
1.9	Poultry	No. of farms	Total number of birds	
	Commercial		249.0	

	Backyard	-	362.0					
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)		

	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks		
17		3		15				
	B. Culture							
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)		
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)							
	ii) Fresh water (Data Source: Fisheries Department)							
	Others							

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

1.11	Production and Productivity of major crops (Average of last 3 years: 2006, 07, 08)	Kharif		Rabi		Summer		Total	
		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)									
	Paddy							202.89	2580
	Sorghum(grain)							2.98	1091
	Indian bean							15.6	871
	Sugarcane							1168	80000

	Ragi							0.473	600
Major Horticultural crops (Crops to be identified based on total acreage)									
	Mango							137.04	9496.88
	Sapota							52.5	10000
	Banana							22.5	50000

1.12	Sowing window for 5 major crops	Paddy	Sorghum(grain)	Indian bean	Sugarcane	Ragi
	Kharif- Rain fed	-	-	-	-	-
	Kharif-Irrigated	2 nd week of June to 2 nd week	2 nd week of June to 2 nd week	-	-	2 nd week of June to 2 nd week
	Rabi- Rain fed	-	-	2 nd week of November to 4 th week November	-	-
	Rabi-Irrigated	-	-		1 st week of October to end of January.	-

1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought			√
	Flood			√
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave			√
	Frost			√

	Sea water inundation			√
	Pests and diseases (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: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rain fed situation

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 2 weeks June 4 th week	Heavy black soil with poor drainage (Plain area)	Paddy	No Change	Irrigation through canal and well	Linkage with RKVY, GSSC and University
		Sorghum(grain)	-Do-	Sowing with irrigation	
		Indian bean	-Do-	This crop is taken in reserve moisture	
		Sugarcane	-Do-	Irrigate the crop if necessary	
		Ragi	-Do-	Sowing with irrigation	
	Sandy loam soils with shallow depth (Hilly area)	Paddy	-Do-	SRI method, Aerobic rice, sprouted seed	
		Sorghum(grain)	-Do-	Sowing the crop with available irrigation	

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
		Indian bean	-Do-	No suggestion	
		Sugarcane	-Do-	Irrigate the crop if necessary	
		Ragi	-Do-	Sowing the crop with available irrigation	
	Heavy black soil with water logging and problematic soils (Coastal area)	Paddy	-Do-	No suggestion	
		Sorghum(grain)	-Do-	Sowing with own irrigation facility	
		Indian bean	-Do-	No suggestion	
		Sugarcane	No Change	Irrigation through canal and well	
		Ragi	No Change		

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 (Specify month) July 2 nd week	Heavy black soil with poor drainage (Plain area)	Paddy	No Change	Irrigation through canal and well	Linkage with RKVY, GSSC and University
		Sorghum(grain)	-Do-	Sowing with irrigation	
		Indian bean	-Do-	No suggestion	
		Sugarcane	-Do-	Irrigate the crop if necessary	
		Ragi	-Do-	Sowing with irrigation	
	Sandy loam soils with shallow depth (Hilly area)	Paddy	-Do-	SRI method, Aerobic rice, sprouted seed	
		Sorghum(grain)	-Do-	Sowing the crop with available irrigation	

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
		Indian bean	-Do-	No suggestion	
		Sugarcane	-Do-	Irrigate the crop if necessary	
		Ragi	-Do-	Sowing the crop with available irrigation	
	Heavy black soil with water logging and problematic soils (Coastal area)	Paddy	-Do-	No suggestion	
		Sorghum(grain)	-Do-	Sowing with own irrigation facility	
		Indian bean	-Do-	No suggestion	
		Sugarcane	-Do-	Irrigation through canal and well	
		Ragi	-Do-		

Condition	Not applicable				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks July 4 th week					

Condition					
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. 2 nd week	Not applicable				

Condition	Not applicable				
	Major Farming situation	Normal Crop/cropping system	Crop management	Soil & water conservation measures	Remarks on Implementation
Early season drought (Normal onset, followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.)	Heavy black soil with poor drainage (Plain area)	Paddy			
		Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			
	Sandy loam soils with shallow depth (Hilly area)	Paddy			
		Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			
Heavy black soil	Paddy				

Condition	Not applicable				
	Major Farming situation	Normal Crop/cropping system	Crop management	Soil & water conservation measures	Remarks on Implementation
	with water logging and problematic soils (Coastal area)	Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			

Condition	Not applicable				
Mid season drought (long dry spell) At vegetative stage	Heavy black soil with poor drainage (Plain area)	Paddy			
		Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			
	Sandy loam soils with shallow depth (Hilly area)	Paddy			
		Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			
	Heavy black soil with water logging and problematic soils (Coastal area)	Paddy			
		Sorghum(grain)			
		Indian bean			
		Sugarcane			
		Ragi			

Condition					
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil Nutrient and moisture conservation measures	Remarks on Implementation
At flowering/fruiting stage	Heavy black soil with poor drainage (Plain area)	As above	Not applicable		
	Sandy loam soils with shallow depth (Hilly area)	As above			
	Heavy black soil with water logging and problematic soils (Coastal area)	-Do-			

Condition					
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Heavy black soil with poor drainage (Plain area)	As above	Not applicable		
	Sandy loam soils with shallow depth (Hilly area)	-Do-			
	Heavy black soil with water logging and problematic soils (Coastal area)	-Do-			

2.1.2 Irrigated situation

Condition					
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Heavy black soil with poor drainage (Plain area)	As above	Not applicable		
	Sandy loam soils with shallow depth (Hilly area)	As above			
	Heavy black soil with water logging and problematic soils (Coastal area)	As above			

Condition					
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall			Not applicable		

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			Not applicable		

Condition	Suggested contingency measure				
	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					Not applicable

Condition	Suggested contingency measure				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Tube well red soil	Paddy			Not applicable

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Paddy	Provide drainage	Provide drainage	Removal excess water Harvesting at physiological maturity stage	Shift to safer place
Sorghum(grain)	-Do-	-Do-	-Do-	-Do-
Indian bean	-Do-	-Do-	-Do-	-Do-
Sugarcane	-Do-	-Do-	-Do-	Propping should be carried out
Ragi	-Do-	-Do-	-Do-	Shift to safe place dry in shade and turn frequently

Horticulture				
Mango	Provide drainage	Provide drainage	Need base insect pest management	-Do-
Sapota	-Do-	-Do-	-Do-	-Do-
Banana	-Do-	-Do-	-Do-	-Do-
Heavy rainfall with high speed winds in a short span				
Paddy	Provide drainage	Provide drainage	Wind break and shelter belt	Shift to safe place dry in shade and turn frequently
Sorghum(grain)	-Do-	-Do-	-Do-	-Do-
Indian bean	-Do-	-Do-	-Do-	-Do-
Sugarcane	-Do-	-Do-	-Do-	Propping should be carried out
Ragi	-Do-	-Do-	Wind break and shelter belt	Shift to safe place dry in shade and turn frequently
Horticulture				
Mango	-Do-	-Do-	-Do-	-Do-
Sapota	-Do-	-Do-	-Do-	-Do-
Banana	-Do-	-Do-	-Do-	-Do-
Outbreak of pests and diseases due to unseasonal rains				
Paddy	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases
Sorghum(grain)	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases

Indian bean	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases
Sugarcane	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases
Ragi	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases
Horticulture				
Mango	IPDM	IPDM	Wind break and shelter belt	Safe storage against storage pest and diseases
Sapota				
Banana				

2.3 Floods: Not expected in this district

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Horticulture				
Continuous submergence for more than 2 days				
Horticulture				
Sea water inundation				

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone: Not expected in this district

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Horticulture				
Cold wave				
Horticulture				
Frost				
Horticulture				
Hailstorm				
Horticulture				
Cyclone				
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	Not applicable		
Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone	Not applicable		
Feed and fodder availability			
Drinking water			
Health and disease management			
Heat wave and cold wave	Not applicable		
Shelter/environment management			
Health and disease management			

2.5.2 Poultry

	Suggested contingency measures		
	Before the event^a	During the event	After the event
Drought	Insurance & Integration Establishing feed serve Bank	Utilizing from feed serve banks	Availing insurance Strengthening feed Reserve Banks
Shortage of feed ingredients			
Drinking water	Emergency Veterinary preparedness with medicines vaccination to birds	Campaign and Mass Vaccination	Culling affected birds
Health and disease management			
Floods	Not applicable		
Shortage of feed ingredients			

Drinking water			
Health and disease management			
Cyclone	Not applicable		
Shortage of feed ingredients			
Drinking water			
Health and disease management			
Heat wave and cold wave	Not applicable		
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 Disilting 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			

2) Floods			
A. Capture			
Marine	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
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			
B. Aquaculture			
(i) Inundation with flood water			
(ii) Water continuation and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
3. Cyclone / Tsunami	Not applicable		
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			

(ii) Avg. no. of boats / nets/damaged			
(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)			
4. Heat wave and cold wave	Not applicable		
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			

LOCATION MAP OF NAVSARI



