

STATE :GUJARAT
Agriculture Contingency Plan for District :AHMEDABAD

1.0 District Agriculture Profile

1.1	Agro-Climatic / Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Western plain, kachchh and part of kathiawar peninsula, hot arid eco-region (2.3)			
	Agro-Climatic Region (Planning Commission)	Coastal Plains and Hills (XIII)			
	Agro Climatic Zone (NARP)	Bhal and Coastal area (GJ-8) 14.26% North Gujarat (GJ-4) 19.87% North west zone (GJ-5) 36.38 North Saurashtra (GJ-6) 29.49			
	List all the districts or part thereof falling under the NARP Zone	1. Bavla, Dholka,Dhandhuka, Barvala and Ranpur 2. Viramgam ,Detroj, Mandal and Sanand 3. Daskroi,Part of Bavla and Dholka			
	Geographic coordinates of District	Latitude	Longitude	Altitude	
		23° 02' 22.45" N	72° 33' 57.61 E	45 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	1. Agricultural Research Station, Anand Agricultural University, Arnej – 382 230. 2. Agricultural Research Station, Anand Agricultural University, Dhandhuka-382460 3. Regional Cotton Research Station, Anand Agricultural University, Viramgam-382150 4. Agricultural Research Station, Anand Agricultural University,Sanand-382110			
	Mention the KVK located in the District	KrishiVigyan Kendra, Anand Agricultural University, Arnej – 382 230. Tel:02714-242028			
1.2	Rainfall	Average (mm)	No. of rainy days	Normal Onset (Specify week and month)	Normal Cessation (Specify week and month)
	SW monsoon (June-Sept)	756 mm	32	3 rd week of June	2 nd week of September
	NE monsoon (Oct-Dec)	-	-	-	-
	Winter (Jan-February)	-	-	-	-
	Summer (March-May)	-	-	-	-
	Annual	756 mm	32	-	-

1.3	Land use pattern of the district (Latest Statistics)	Geographical area	Cultivable Land, ha	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)	793	527	13	70	29	28	-	66	74	-

Source : Directorate of Agriculture, Gandhinagar

1.4	Major Soils	Area (lakh ha)	Percent (%) of total
	1. Black soil	84.0	15.64
	2. Medium black	284.9	52.91
	3. Sandy loam	159.0	29.59
	4. Sandy	10.0	1.86
	Others (Specify)		

1.5	Agricultural Land use	Area (000 ha)	Cropping Intensity %
	Net sown Area	499.0	137.0 %
	Area sown more than once	185.0	
	Gross cropped area	684.0	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	185.0		
	Gross irrigated area	185.0		
	Rainfed area	314.0		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	1	43.68	23.77
	Tanks	66	15.64	8.48
	Open wells	6295	37.00	20.00
	Bore wells	24.55	83.00	44.98
	Lift irrigation		0.20	
	Micro-irrigation			
	Total Irrigated Area		188.50	
	Pump sets	8284		
	No. of Tractors	8017		
	Other sources :			
Farm pond,	7900	5.00	2.71	
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area		
Over exploited	-			
Critical	-			
Semi- critical	8	72.00%		
Safe	-			
Wastewater availability and use	-			
Ground water quality	Sefe to doubtful			
*Over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				
Source : Director of Agriculture, Gandhinagar				

1.7 Area under major field crops & horticulture etc. (2008-09)

Major Field Crops cultivated	Area (000' ha)					
	<i>Kharif</i>		<i>Rabi</i>	<i>Rabi</i>	Total	
	<i>Irrigated</i>	<i>Rainfed</i>	<i>Irrigated</i>	<i>Rainfed</i>		
Cotton	27.2	158.0	-	-	-	175.2
Wheat	-	-	92.3	57.9	-	150.2
Paddy	105.2	-	-	-	2.8	108.0
Gram	-	-	-	26.4	-	26.4
Pearlmillet	-	21.2	-	-	1.2	22.4
Horticulture crops-Fruits	Total area		Irrigated		Rainfed	
Ber	2.176		-		2.176	
Citrus	1.548		1.548		-	
Anola	0.918		0.918		-	
Mango	0.635		0.635		-	
Guava	0.311		-		0.311	
Horticultural crops-Vegetables	Total area		Irrigated		Rainfed	
Cucurbits	3.880		3.880			
Brinjal	1.841		1.841			
Tomato	1.628		1.628			
Cabbage	0.970		0.970			
Califlower	0.650		0.650			

Medicinal and Aromatic crops		Total area	Irrigated	Rainfed
1	Cumin	17.370	17.370	
2	Dilseed	2.294		2.294
3	Isabgul	0.297	0.297	
4	Chilli	0.156	0.156	
	Fodder crops			
	Sorghum	5		5
Total Fodder crops		5		5

Source : Directorate of Agriculture / Horticulture, Gandhinagar

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non descriptive Cattle (local low yielding)	4.733	11.712	61.183
	Crossbred cattle	3.324	14.108	17.432
	Non descriptive Buffaloes (local low yielding)	3.286	20.026	23.312
	Graded Buffaloes	33616	286.771	320.387
	Goat	-	-	125.800
	Sheep	-	-	23.150
	Others (Camel, Pig, Yak etc.)	-	-	716914
	Commercial dairy farms (Number)			
1.9	Poultry	No. of farms		Total No. of birds ('000)
	Commercial	--		45.568
	Backyard	--		406.902

Source : Directorate of Animal Husbandry, Gandhinagar

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	
		---		4		5	
	B. Culture						
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)	
	i) Brackish water	Inland		---		---	
	ii) Fresh water	Resourvoir(No.)		4		---	
	Others	---		---		---	

Source : Commissioner, Fisheries Board, Gandhinagar

	<i>Kharif</i>		<i>Rabi</i>		Summer		Total		
	Production ('000 q)	Productivity (kg/ha)	Production ('000 q)	Productivity (kg/ha)	Production ('000 q)	Productivity (kg/ha)	Production ('000 q)	Productivity (kg/ha)	CROP RESIDUE Production ('000 q)
Cotton	2569	236	-	-	-	-	2569	236	-
Paddy	2141	2035	-	-	86	3065	2227	2550	3264
Wheat	-	-	2756	1835	-	-	2756	1835	4685
Gram	-	-	148	560	-	-	148	560	185
Pearlmillet	191	902	-	-	-	-	191	902	420
Major horticultural crops									
Cumin	-	-	8109	470	-	-			
Dilseed	-	-	2294	1000					
Brinjal	29456	1600							
Curcubits	37848	975							
Citrus	17028	1100							

1.11 Production and productivity of major crops (Average of last 3 years: 2006-07-08)

1.12	Sowing window for 5 major crops (Start and End of Sowing period)	Paddy	Cotton	Wheat	Gram	Pearlmillet
	Kharif-rainfed	---	3 rd week of Jun- 1 st week of Aug	---	---	3 rd week of June- 2 nd week of July
	Kharif-irrigated	1 st week of July- 1 st week of Aug	3 rd week of May- 4 th week of June	---	---	---
	Rabi-rainfed	---	---	2 nd week of Oct- 2 nd week of Nov	2 nd week of Oct- 2 nd week of Nov	---
	Rabi-Irrigated	---	---	3 rd week of Nov- 1 st week of Dec	---	---
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 inundation	-	√	-	
Pests and Diseases (Specify)	-	√	-			
1.14	Include Digital Maps of the District for	Location Map of District within State as Annexure 1			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 Rainfed situation

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset) Delay by 2 weeks (July 1 st week)	1. Medium rainfall medium black upland soil	Cotton (G.Cot-13, G.Cot-21 and ADC-1)+Green gram(GM-4')	No change	• Apply K@20 kg/ha at 6cm depth at the time of sowing	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor (GCH-2,GCH-4,GCH-5, GCH-7)	No change	No change	
		Pearl millet (GHB-526,GHB-528, GHB-538, GHB-732)	No change	No change	
	2. Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat Grow GR-11,GR-12,13, Jaya,Gurjary, Dandi varieties	No change	No change	
		Fallow–Wheat (durum), GW-1 (under conserve moisture)	No change	No change	
	Fallow –Gram, GG-2 (under conserve moisture)		No change	No change	
	4. Medium rainfall medium black upland saline soil	Cotton (G.Cot-13, 21 and ADC-1)+Sesamume(GT--2) or Bt Cotton	No change	No change	
		Castor (GCH-2,GCH-4,GCH-5, GCH-7)	No any change	• No need of contingency	
		Sesamume(GT--2)		• No need of contingency	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset)	Medium rainfall medium black upland soil	Cotton (G.Cot-13 , 21 and ADC-1)+Green gram(GM-4)	No change	<ul style="list-style-type: none"> Dry sowing with 15 -20 % higher seed rate. Apply K @ 20kg /ha at 6cm depth at the time of sowing 	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor (GCH-2,GCH-4,GCH-5 , GCH-7)	No change	<ul style="list-style-type: none"> Dry sowing with 15 -20 % higher seed rate. 	
		Pearl millet (GHB-526, GHB-528)	No change	<ul style="list-style-type: none"> No need of contingency 	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat Grow GR-11,GR-12, 13,Jaya,Gurjary, Dandi varieties	No change	<ul style="list-style-type: none"> Follow the SRI technique 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow–Wheat (durum), GW-1 (under conserve moisture)	No change	<ul style="list-style-type: none"> --- 	
		Fallow –Gram GG-2 (under conserve moisture)	No change	<ul style="list-style-type: none"> --- 	
	Medium rainfall medium black upland saline soil	Cotton (G.Cot-13 , 21 and ADC-1)+ Sesamum (GT--2)	No change	<ul style="list-style-type: none"> Dry sowing with 15 -20 % higher seed rate. 	
		Castor (GCH-2,GCH-4,GCH-5 , GCH-7)	No change	<ul style="list-style-type: none"> Dry sowing with 15 -20 % higher seed rate. 	
		Sesamum (GT--2)	No change	<ul style="list-style-type: none"> No need of contingency 	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset)					

Delay by 6 weeks (August 1 st week)	Medium rainfall medium black upland soil	Cotton	Cotton(G.Cot-13 , 21 and ADC-1) Green gram(GM-4)	<ul style="list-style-type: none"> • Dry sowing with 15 -20 % higher seed rate. • Apply K @ 20kg /ha at 6cm depth at the time of sowing 	COTTON MISSION,ISOPOM RKVY,NFSM NFSM
		Castor	Castor(GCH-2,GCH-4,GCH-5, GCH-7)	<ul style="list-style-type: none"> • Dry sowing with 15 -20 % higher seed rate. 	
		Pearl millet	Shift on Fodder sorghum (S 1049) or Safflower (Tara) inoculated with Azospirillum + 30 kg Sulphur/ha through gypsum	---	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat	Grow GR-11,GR-12,13,Jaya,Gurjary, Dandi varieties	<ul style="list-style-type: none"> • Adopt SRI technique • Staggering of nursery • Use of sprouted seed for sowing 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	Durum Wheat, GW-1	-	
		Fallow –Gram	Gram, GG-2(under conserve moisture)	-	
	Medium rainfall medium black upland saline soil	Cotton (rainfed)	Cotton(G.Cot-13 , 21 and ADC-1)	<ul style="list-style-type: none"> • Dry sowing with 20 % higher seed rate. 	
		Castor	Castor(GCH-2,GCH-4,GCH-5 , GCH-7)	<ul style="list-style-type: none"> • Dry sowing with 20 % higher seed rate. 	
		Sesamume	Sesamum(GT-2)	---	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Early season drought (delayed onset) Delay by 8 weeks (August 3 rd week)	Medium rainfall medium black upland soil	Cotton (rainfed)	Cotton(G.Cot-13 , 21 and ADC-1) Apply K @ 20kg /ha at 6cm depth at the time of sowing	<ul style="list-style-type: none"> • Dry sowing with 20 % higher seed rate. • Apply K @ 20kg /ha at 6cm depth at the time of sowing 	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor	Castor(GCH-5, GCH-7)	<ul style="list-style-type: none"> • Dry sowing with 20 % higher seed rate. 	
		Pearl millet	Shift on Fodder sorghum (S -1049) or Safflower (Tara) inoculated with Azospirilum + 30 kg Sulphur/ha through gypsum	---	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat	Grow GR-11, GR-12,13,Jaya,Gurjary, Dandi varieties Wheat:GW-496, GW-322, GW-366	<ul style="list-style-type: none"> • Adopt SRI technique • Staggering of nursery • Use sprouted seed for sowing 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	Durum Wheat, GW-1 (under conserve moisture)	-	
		Fallow –Gram	Gram, GG-2 (under conserve moisture)	-	
	Medium rainfall medium black upland saline soil	Cotton (rainfed)	Cotton(G.Cot-13 , 21 and ADC-1)	<ul style="list-style-type: none"> • Dry sowing with 15 -20 % higher seed rate. 	
		Castor	Castor(GCH-2,GCH-4,GCH-5 , GCH-7)	<ul style="list-style-type: none"> • Dry sowing with 15 -20 % higher seed rate. 	
		Sesamum	Sesamum(Purva-1)	-	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measure	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	Medium rainfall medium black upland soil	Cotton Deshi	Gap filling	<ul style="list-style-type: none"> Intercultivation, Weeding 	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor	Gap filling	<ul style="list-style-type: none"> Intercultivation, Weeding 	
		Pearl millet	Gap filling	<ul style="list-style-type: none"> Intercultivation, Weeding 	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (durum)	Gap filling	<ul style="list-style-type: none"> Apply irrigation if require Weeding 	
		Fallow –Wheat (durum)	-	-	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow – Gram	-	-	
		Cotton Deshi	Gap filling	<ul style="list-style-type: none"> Intercultivation, Weeding 	
	Medium rainfall medium black upland saline soil	Castor	Gap filling	<ul style="list-style-type: none"> Intercultivation, Weeding 	
		Sesamum	Gap filling Thinning	<ul style="list-style-type: none"> Intercultivation, Weeding 	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measure	Remarks on implementation
Mid season drought (long dry spell , consecutive 2 weeks rain less (<2.5 mm) period)					
At vegetative stage	Medium rainfall medium black upland soil	Cotton Deshi	Topping	<ul style="list-style-type: none"> Intercultivation, Weeding, Delay top dressing of N till occurrence of next rain 	COTTON MISION,ISOPOM RKVY,NFSM NFSM

		Castor	GCH-5, GCH-7	<ul style="list-style-type: none"> • Intercultivation, • Weeding, • Delay top dressing of N till occurrence of next rain 	
		Pearl millet	Thinning	<ul style="list-style-type: none"> • Intercultivation • Weeding, • Delay top dressing of N till occurrence of next rain 	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (durum)	Spraying of thiourea (0.2%)	<ul style="list-style-type: none"> • Apply life saving irrigation • Delay top dressing of N till occurrence of next rain 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	-	-	
		Fallow – Gram	-	-	
	Medium rainfall medium black upland saline soil	Cotton Deshi	Topping	<ul style="list-style-type: none"> • Intercultivation • Weeding, • Delay top dressing of N till occurrence of next rain • Spray 2% Urea • Spray 2% KNO₃, 2 times when crop shows reddening symptoms 	
		Castor	GCH-5, GCH-7	<ul style="list-style-type: none"> • Intercultivation • Weeding, • Delay top dressing of N till occurrence of next rain 	
		Sesame	Thinning	<ul style="list-style-type: none"> • Intercultivation&Weeding, 	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient and moisture conservation measure	Remarks on implementation
Mid season drought (long dryspell) At reproductive stage	Medium rainfall medium black upland soil	Cotton Deshi	Spray 2% urea	<ul style="list-style-type: none"> • Follow frequent Intercultivation (soil mulch) to avoid cracks in the soil • Weeding, • Delay top dressing of N till occurrence of next rain • Alternate furrow irrigation if available 	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor	-	<ul style="list-style-type: none"> • Follow frequent Intercultivation (soil mulch) to avoid cracks in the soil 	

				<ul style="list-style-type: none"> • Alternate furrow irrigation. 	
		Pearl millet	No need of contingency	--	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (durum)	Spraying of thiourea (0.2%)	<ul style="list-style-type: none"> • Apply life saving irrigation if available, • Delay top dressing of N till occurrence of next rain 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	---		
		Fallow – Gram	---		
	Medium rainfall medium black upland saline soil	Cotton Deshi	---	<ul style="list-style-type: none"> • Intercultivation • Weeding • Delay top dressing of N till occurrence of next rain, Alternate furrow irrigation if require 	
		Castor	---	<ul style="list-style-type: none"> • Harrowing • Weeding • Delay top dressing of N till occurrence of next rain • Alternate furrow irrigation if require 	
		Sesamum	No need of contingency	<ul style="list-style-type: none"> • Weeding 	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		Remarks on implementation
			Crop management	Rabi crop planning	
Terminal drought	Medium rainfall medium black upland soil	Cotton Deshi	Picking mature balls	<ul style="list-style-type: none"> • Apply irrigation if require in alternate furrow 	COTTON MISION,ISOPOM RKVY,NFSM NFSM
		Castor	Harvest mature raceme	<ul style="list-style-type: none"> • Apply irrigation if require in alternate furrow 	
		Pearl millet	Harvest as a fodder	---	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (durum)	Harvest at physiological maturity	<ul style="list-style-type: none"> • Wheat (GW-1) sown in conserve moisture 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	---	<ul style="list-style-type: none"> • Wheat (GW-1) sown in conserve moisture 	
		Fallow – Gram	---	<ul style="list-style-type: none"> • Gram (GG-2)sown in conserve moisture 	

	Medium rainfall medium black upland saline soil	Cotton Deshi	---	<ul style="list-style-type: none"> Apply irrigation if require in alternate furrow
		Castor	---	<ul style="list-style-type: none"> Apply irrigation if require by furrow method
		Sesamum	Harvest at physiological maturity	<ul style="list-style-type: none"> Cumin (GC-4)

2.1.2 Irrigated situation

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Delayed/limited release of water in canals due to low rainfall	Medium rainfall medium black upland soil	Cotton	Cotton Deshi (ADC-1, G.Cot.21)	<ul style="list-style-type: none"> Use other source of water for irrigation Apply one irrigation if require at the time of long dry spell Apply irrigation in alternate furrow if require 	COTTON MISION ISOPOM - 1.Seed drills under RKVY 2.Supply of seeds through GSSC 3.Supply of seeds through NFSM NFSM RKVY
		Castor	Castor (GCH-4, GCH-5, GCH-7)	<ul style="list-style-type: none"> Apply irrigation in alternate furrow if require 	
		Pearl millet	No need of contingency	-	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (GW-1)	Grow early and medium duration varieties – Sukhvel, -20, GR-3, GR-4, GR-6, GR-11, GAR-13, Ashoka- 200F, Gurjari, GR-12	<ul style="list-style-type: none"> Use SRI technique Sowing of aerobic rice Use other source of water for TP 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (durum)	--		
		Fallow –Gram(GG-2)	--		
	Medium rainfall medium black upland saline soil	Cotton	Cotton : Bt cotton	<ul style="list-style-type: none"> Use other source of water for sowing Apply irrigation through drip / furrow for sowing 	
Castor		GCH-4, GCH-5, GCH-7	<ul style="list-style-type: none"> Use other source of water for sowing Apply irrigation through drip / furrow for sowing 		

		Sesamum	Sesamum : Purva-1		
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Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Non release of water in canals under delayed onset of monsoon in catchment	Medium rainfall medium black upland soil	Cotton	Cotton Deshi (ADC-1, G.Cot.21)	<ul style="list-style-type: none"> Use of other sources of irrigation (Tubewell& pond) for sowing, if monsoon delayed upto July 	COTTON MISION ISOPOM - 1.Seed drills under RKVY 2.Supply of seeds through GSSC 3.Supply of seeds through NFSM
		Castor	Castor (GCH-4, GCH-5, GCH-7)	<ul style="list-style-type: none"> Use of other sources of irrigation (Tubewell& pond) for sowing, if monsoon delayed upto August 	
		Pearl millet	No need of contingency	<ul style="list-style-type: none"> Sowing of pearlmillet is possible if rain occur up to the end of July If rain is to be occur after july, sow the sorghum crop as a fodder 	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (GW-1)	Grow early and medium duration varieties – Sukhvel, -20, GR-3, GR-4, GR-6, GR-11, GAR-13, Ashoka- 200F, Gurjari, GR-12	<ul style="list-style-type: none"> Use of other sources of irrigation (Tubewell) for TP 	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow–Wheat (GW-1)	--	<ul style="list-style-type: none"> No need of contingency 	
		Fallow–Gram(GG-2)	--	<ul style="list-style-type: none"> No need of contingency 	
	Medium rainfall medium black upland saline soil	Cotton	Cotton : Bt cotton	<ul style="list-style-type: none"> Apply irrigation through drip or in furrow for sowing through other source of water 	
		Castor	GCH-4, GCH-5, GCH-7	<ul style="list-style-type: none"> Use irrigation through drip or in furrow for sowing through other source of water 	
		Sesamum	--	<ul style="list-style-type: none"> Grow the crop as a semi- rabi (Purva-1) 	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on

					implementation
Insufficient ground water recharge due to low rainfall	Medium rainfall medium black upland soil	Cotton	Cotton (G.Cot-13, G.Cot-21, ADC-1)	• Soil mulch through inter culturing	• Every year ground water recharging through farm pond/ deepening the village pond and check dam should be implemented through PPP.
		Castor	Castor (GCH-2, GCH-4, GCH-5, GCH-7)	• Soil mulch through inter culturing	
		Pearl millet	Shift on fodder sorghum (S-1049)	• No need agronomic measures	
	Medium rainfall medium black low land soil (irrigated)	Paddy –Wheat (GW-1)	Grow GR-11, GR-12, GR- 13, Jaya, Gurjary, Dandi varieties	• Since such situation is not arise due sufficient ground water is available	
	Medium rainfall medium black low land saline soil (unirrigated)	Fallow –Wheat (GW-1)	Durum Wheat GW-1	-	• Crops mostly raised under conserve rain water
		Fallow –Gram(dry)	Gram GG-2	-	
	Medium rainfall medium black upland saline soil	Cotton	Cotton (G.Cot-13, G.Cot-21, ADC-1 or Bt Cotton	-	• Due to poor ground water quality (saline) farmer are not prefer to apply irrigation. • Crops mostly raised under conserve rain water • Sesamum crop mostly raised successfully under rainfed condition
		Castor	Castor(GCH-2, GCH-4, GCH-5 , GCH-7)	-	
		Sesamum	Sesamum (GT-2)	-	

Condition	Major farming situation	Crop/ Cropping system	Suggested Contingency measures		
			Change in crop cropping system	Agronomic measures	Remarks on implementation
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	This type of irrigation facilities are not available in This District				

2.2 Unusual rains (untimely, unseasonal etc.) (for both rainfed and irrigation condition)

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stag	Crop maturity stage	Post harvest
Continyous high rainfall in short span leading to water logging				
Cotton	<ul style="list-style-type: none"> Drain out excess water Spraying of monocrotophos 0.04% 	<ul style="list-style-type: none"> Drain out excess water Spraying of monocrotophos 0.04% 	<ul style="list-style-type: none"> Drain out excess water Delay the picking seed cotton 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Drying of seed cotton for maintaining the quality of lint
Wheat	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Paddy		<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest of crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Allow the crop dry before harvest Spray common salt @5% on panicales to prevent seed generation and spoilage of straw from moulds
Gram	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray of endosulfan 0.07% 	<ul style="list-style-type: none"> Drain out excess water Picking the green pods for vegetable 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Pearlmillet	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Nipping in standing crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Cover the plastic sheet on the produce if availabel
Horticulture				
Ber	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spraywetable sulphur @ 0.02% 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Citrus	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Anola	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Mango	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spraying NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Guava	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace

Heavy rainfall with high speed wind in a short span				
Cotton	Drain out excess water Spraying of monocrotophos	<ul style="list-style-type: none"> Drain out excess water Spraying of monocrotophos 	<ul style="list-style-type: none"> Drain out excess water Delay the picking of seed cotton 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Drying of seed cotton for maintaining the quality of lint

	0.04%	0.04%		
Wheat	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Paddy	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Allow the crop dry before harvest Spray common salt @5% on panicales to prevent seed generation and spoilage of straw from moulds
Gram	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray endosulfan@0.07% 	<ul style="list-style-type: none"> Drain out excess water Picking the green pods for vegetable 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Cover the plastic sheet on produce if available
Pearlmillet	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Nipping in standing crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Horticulture				
Ber	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Pl. protection measures should be taken Spray wetable sulphur @ 0.02 % 	<ul style="list-style-type: none"> Drain out excess water Harvest mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Citrus	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Anola	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Guava	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Mango	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Outbreak of pest and diseases due to un seasonal rains	Control measure taken as per recommendations as per Appendix			

2.3 Floods

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stag	Crop maturity stage	Post harvest
Continuous high rainfall in short span				

leading to water logging				
Cotton	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray monocrotophos @0.04% 	<ul style="list-style-type: none"> Drain out excess water Delay the picking of seed cotton 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Drying of seed cotton for maintaining in quality of lint
Wheat	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest the crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Paddy	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest the crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Allow the crop dry before harvest Spray common salt @5% on panicles to prevent seed generation and spoilage of straw from moulds
Gram	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water + Spray endosulfan @0.07% 	<ul style="list-style-type: none"> Drain out excess water Picking the green pods for vegetable 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace Cover the plastic sheet on produce if available
Pearlmillet	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest the crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Horticulture				
Ber	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Pl. protection measures Spray wetable sulphur @0.02% 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Citrus	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste the bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Anola	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Spray NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Mango	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Pl. protection measures should be taken Spray NAA @20 ppm 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Guava	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water Paste the bordo mixture on stem 	<ul style="list-style-type: none"> Drain out excess water Harvest the mature fruits 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace

Continuous submergence for more than 2 days²				
Cotton	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the picking of seed cotton 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Wheat	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water Delay the harvest of crop 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace
Paddy	Drain out excess water	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Drain out excess water 	<ul style="list-style-type: none"> Harvested crop should transfer at safer palace

			<ul style="list-style-type: none"> • Delay the harvest the crop 	
Gram	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water 	<ul style="list-style-type: none"> • Drain out excess water • Picking the green pods for vegetable 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace • Cover the plastic sheet on produce if available
Pearlmillet	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water 	<ul style="list-style-type: none"> • Drain out excess water • Nipping in standing crop 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Horticulture				
Ber	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water • Pl. protection measures should be taken • Spray wetable sulphur @0.02% 	<ul style="list-style-type: none"> • Drain out excess water • Harvest the mature fruits 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Citrus	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water • Spray the bordo mixture on stem 	<ul style="list-style-type: none"> • Drain out excess water • Harvest the mature fruits 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Anola	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water • Spray NAA@20 ppm 	<ul style="list-style-type: none"> • Drain out excess water • Harvest the mature fruits 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Guava	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water • Pl. protection measures should be taken • Spray the bordo mixture on stem 	<ul style="list-style-type: none"> • Drain out excess water • Harvest the mature fruits 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Mango	Drain out excess water	<ul style="list-style-type: none"> • Drain out excess water • Spray NAA @20 ppm 	<ul style="list-style-type: none"> • Drain out excess water • Harvest the mature fruits 	<ul style="list-style-type: none"> • Harvested crop should transfer at safer palace
Sea water induction	Such situation not arise in this district			

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

Condition	Suggested contingency measure ^r			
	Seedling/ nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat wave ^p				
Cotton	Apply frequent irrigation with low depth of water			
Wheat				
Paddy				
Gram				
Pearlmillet				
Horticulture				
Ber	Apply frequent irrigation with low depth of water			
Citrus				

Anola	
Mango	
Guava	
Cold wave,Cyclone	Apply frequent irrigation with low depth of water <i>Make the smoke in the field by burning of organic waste</i>
Hailstorm, Frost	<i>Such situation generally not occurred</i>

2.5 Contingent strategies for livestock, poultry & fisheries Poultry

2.5.1 Livestock

	Suggested contingency measures		
Drought	Before the event	During the event	After the event
Feed fodder availability	<ul style="list-style-type: none"> • Insurance • Encourage perennial fodder on bunds and waste land • on community basis • Establishing fodder banks, encouraging fodders in • irrigated area • Silage – using excess fodder for silage 	<ul style="list-style-type: none"> • Utilizing fodder from perennial trees and • Fodder bank reserves • Utilizing fodder stored in silos • Transporting excess fodder from adjoining districts • Use of feed mixtures 	<ul style="list-style-type: none"> • Availing Insurance • Culling unproductive livestock
Drinking water	<ul style="list-style-type: none"> • Preserving water in the tank for drinking purpose • Excavation of Bore wells 	<ul style="list-style-type: none"> • Using preserved water in the tanks for drinking • Wherever ground water resources are available • priority for drinking purpose 	
Health and diseases management	<ul style="list-style-type: none"> • Veterinary preparedness with medicines and vaccines 	<ul style="list-style-type: none"> • Conducting mass animal Health Camps and treating the affected once in Campaign 	<ul style="list-style-type: none"> • Culling sick animals
Floods			
Feed fodder availability			
Drinking water			
Health and diseases management			
Cyclone			
Feed fodder availability			
Drinking water			
Health and diseases management			
Heat wave and Cold wave			
Shelter/environment management			
Health and diseases management			

^s Based on flowering wherever available

2.5.2. Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Shortage of feed ingredients	<ul style="list-style-type: none"> • Purchase sufficient quantity of ready feed / raw feed ingredients as per storage facilities and requirement. • Identify and test available alternative low cost feed resources in feed testing laboratories for their exact composition for formulating balanced feed. • Prepare balanced feed formulation using available feed resources. • Create alternative power generating facilities i.e. Generator set. • Take insurance of poultry sheds, equipments and feed factory well in advance may be in the starting phase of opening the farm. 	<ul style="list-style-type: none"> • Feed formulations using low cost feed ingredients in case of non-availability of high priced conventional ingredients. • Keep check on production performance and modify ration consulting poultry specialist. • Nutrient density should be increased in proportion to feed consumption. • Avoid feed wastage. 	<ul style="list-style-type: none"> • Shift over to good quality feed for optimum production performance.
Drinking water	<ul style="list-style-type: none"> • Tube well and water storage facilities should be adequately created. 	<ul style="list-style-type: none"> • Judicious use of water by avoiding spillage/ leaking through waterers. • Use of cooling facilities like sprinklers, foggers, fans etc. for comfort zone and optimum production performance. 	<ul style="list-style-type: none"> • Use water sanitizers (chlorination/Sokrena / Vigrox etc.) and softeners (pH. 6).
Health and disease management	<ul style="list-style-type: none"> • Use of anti-stress vitamins (AD₃ECB₁₂-Vimeral / Famitone / Stressvell etc.) in feed and drinking water. • Use of adaptogenetic herbal medicines (Zetress / Zistetec). • Use probiotics (Protexin / Biovet-YC) in feed. • Vaccinate birds against important diseases like R.D., IBD, I.B., Fowl pox according to age as per scheduled programme. 	<ul style="list-style-type: none"> • Use anti-stress, vitamins and adaptogenetic herbal drugs. • Perform vaccination for Ranikhet Disease & Infectious Bronchitis . • Prophylactic medication for important diseases like E.coli & CRD. • Use of electrolytes in feed and drinking water. 	<ul style="list-style-type: none"> • Vaccinate birds as per vaccination schedule. • Perform deworming with Levamisole / Albendazole / Piperazine etc) and use antibiotics, vitamins as per monthly health calendar programme

Floods			
Shortage of feed ingredients	<ul style="list-style-type: none"> • Purchase sufficient quantities of ready feed / raw feed ingredients. 	<ul style="list-style-type: none"> • Use of toxin binders (Chek-O-Tox/ UTPP etc.) in the feed. 	<ul style="list-style-type: none"> • Use of Toxin binder should be continued to avoid development of mycotoxins in the feed

	<ul style="list-style-type: none"> • Store feeding material in suitable houses which should be leak proof and without dampness. • Store feed on iron stands away from the wall to avoid increase in moisture & mould growth. • Road repairing for transporting feed and farm products. • Take insurance of poultry sheds, equipments, feed factory and mortality of birds due to drowning in flood water well in advance may be in the starting phase of opening the farm. 	<ul style="list-style-type: none"> • All electric connections should be in good condition to avoid shock and accident. 	
Drinking water	<ul style="list-style-type: none"> • Drinking water should be stored in over head tanks. • Underground water tanks should be repaired and closed properly to avoid contamination. 	<ul style="list-style-type: none"> • Use of water sanitizers and softeners. 	<ul style="list-style-type: none"> • Check water quality and accordingly use water sanitizers and water softeners for optimum pH.
Health and disease management/construction of poultry shed	<ul style="list-style-type: none"> • Complete vaccination as per the programme for various categories of the birds i.e. Layers & Broilers. • Poultry sheds should be constructed at high raised land/or go for raised platform poultry sheds especially in flood affected areas. (conceptional biosecurity) 	<ul style="list-style-type: none"> • Use of probiotics / or antibiotics in feed to protect birds from bacterial infections like E.coli, CRD, Enteritis etc. 	<ul style="list-style-type: none"> • Use of probiotics should be continued in feed for 10-15 days.

Cyclones			
Shortage of feed ingredients	<ul style="list-style-type: none"> • Store feed ingredients / ready feed as per need. • Use curtains to avoid splashing of water in feed stores and poultry houses. 	<ul style="list-style-type: none"> • Avoid direct splashing of water and wind draft on the birds by using proper curtains. 	<ul style="list-style-type: none"> • Use good quality and balanced feed for optimum production performance.
Drinking water	<ul style="list-style-type: none"> • Keep ready stock of water sanitizers and softeners. 	<ul style="list-style-type: none"> • Use of water sanitizers and softeners in drinking water. • Use Toxin binders in feed. • Mixing of lime in the litter to avoid wet litter problems and ammonia production. 	<ul style="list-style-type: none"> • Repair damages to watering systems, if any.

Health and disease management	<ul style="list-style-type: none"> Keep stock of probiotics / antibiotics and anti-stress vitamins. 	<ul style="list-style-type: none"> Use probiotics and anti stress vitamins in feed and water. 	<ul style="list-style-type: none"> Use antibiotics / coccidiostate and anti-mycoplasma drugs in feed / drinking water.
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Heat and cold wave			
Shelter/environment management	<ul style="list-style-type: none"> Install foggers inside the house. Install sprinklers on the roof. Tree plantation surrounding the shed. Purchase of electrolyte and anti-stress vitamins and antibiotics 	<ul style="list-style-type: none"> Try to Keep the house temperature in comfort zone i.e. 70-75° F through use of foggers, sprinklers and air velocity fans. Reduce protein by 2% in feed. Use of fat / Vegetable oil (2-5%) in feed as partial replacement to carbohydrates sources i.e. Maize, Wheat, Rice Kani etc. 	<ul style="list-style-type: none"> Use of cooling mechanisms to maintain house temperature in comfort zone for best production performance.
Health and disease management	<ul style="list-style-type: none"> Birds should be free from bacterial and mycoplasma infections by using antibiotics/ antimycoplasma drugs (Tiamutin/ Tylosin etc.) as mortality in affected birds is high due to heat stress. Vaccinate birds for respiratory diseases like Ranikhet disease /Infectious Bronchitis. 	<ul style="list-style-type: none"> Use anti stress vitamins and electrolytes in drinking water / feed. 	<ul style="list-style-type: none"> Check titres for respiratory disease and accordingly repeat vaccination against Ranikhet disease / Infectious Bronchitis .

* based on forewarning wherever available.

Remarks : Name of only few drugs have been given on example basis. For details poultry specialists should be consulted.

2.5.3 Fisheries

Fisheries / Aquaculture: (Ahmedabad&Marine and Inland)

Contingencies strategies for fisheries

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought	<ul style="list-style-type: none"> Connect the all major rivers of state and make network to connect all reservoir and village ponds to defend from drought condition of particular zone. 		
A. Capture	<ul style="list-style-type: none"> Marine sector couldn't effected directly but estuarine biodiversity will effected (some fresh water fish migrate to marine or vice versa for breeding will effected) 		
Marine	<ul style="list-style-type: none"> Prepare fish database of particular zone 	<ul style="list-style-type: none"> Catadromus fish stock affected due to scarcity of river water. 	<ul style="list-style-type: none"> Developed the stock by stocking of fishes during favorable condition, it will auto stock fish in natural condition
Inland	<ul style="list-style-type: none"> Inland sector will affected most during the drought condition. Indian Major Carp, Exotic Carp, Cat fish and other biodiversity will either migrate or not survive. 		
(i) Shallow water depth due to insufficient rains/ inflow	<ul style="list-style-type: none"> Provide water through cannel and pipeline from major reservoirs to maintain sufficient water depth Taxonomic fish data collection & Preserved fish stock (gene) 	<ul style="list-style-type: none"> Migration of fish stock Conservation of breeders/ fish stock at unaffected area 	<ul style="list-style-type: none"> Transplant the fish stock and breed the fish in hatchery to stock the fish seed in affected area
(ii) Changes in water quality	<ul style="list-style-type: none"> Migration of fish due to change of water quality 	-	-
(iii) Any other	-	-	-
B. Aquaculture	<ul style="list-style-type: none"> "Culture of aquatic organisms in confined water body", so this sector will affected most incase of either non availability of water or mismanagement. 		
(i) Shallow water in ponds due to insufficient rains/ inflow	<ul style="list-style-type: none"> Lower the stocking density by harvest the big size (500 gm) fish and place in market. Transfer of under culture fishes to abundance water zone 	<ul style="list-style-type: none"> Pre- harvest all the materials (fish and prawns) & preserved by freezing 	<ul style="list-style-type: none"> Sanitize the dead fish biomass.
(ii) Impact of salt load build up in ponds / change in water quality	<ul style="list-style-type: none"> Protect the water and use of lime and other probiotics 	<ul style="list-style-type: none"> Cover the pond with plants (duckweed etc) to protect from evaporation. 	<ul style="list-style-type: none"> Flush the pond with fresh water and manure before the next stocking of fish to maintain the food chain
(iii) Any other	-	-	-

2) Floods	<ul style="list-style-type: none"> Flood are generally predicted and early warning will protect the lives and livelihood 		
A. Capture	<ul style="list-style-type: none"> Change of breeding grounds, migration of fish against and with the water, and increase of fish stock etc, so positive affect on capture fisheries. 		
Marine	<ul style="list-style-type: none"> All the fishermen must call back from fishing 	<ul style="list-style-type: none"> No fishing 	
Inland	<ul style="list-style-type: none"> All the fishermen must call back from fishing 	<ul style="list-style-type: none"> No fishing 	
(i) Average compensation paid	<ul style="list-style-type: none"> Recognizing the risk of flood & making the 	<ul style="list-style-type: none"> Send the rescue teams to protect the lives of the 	<ul style="list-style-type: none"> Measure social impact of losses risks

due to loss of human life	<ul style="list-style-type: none"> people aware of it Migrate the people at safe place Collect the details information of swimmers & life savers appliances. 	most vulnerable peoples.	<ul style="list-style-type: none"> of diseases, loss of employment. The most vulnerable fishermen be taken care of first and fast
(ii) No. of boats/ nets/ damaged	<ul style="list-style-type: none"> Transfer boats/nets at safe places 	<ul style="list-style-type: none"> If possible protect boats during rescue operation 	<ul style="list-style-type: none"> Identify the damages according to assessment & compensate
(iii) No. of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(v) health and diseases	<ul style="list-style-type: none"> Prepared the medical rescue team 	-	<ul style="list-style-type: none"> Proper hygiene & sanitation Send the medical rescue team with drugs.
B. Aquaculture	<ul style="list-style-type: none"> Flood affects the culture ponds which situated near the river. It demolished the pond dyke, overflows the pond and contaminated the culture. 		
(i) Inundation with flood water	<ul style="list-style-type: none"> Transfer of aquaculture farmers to protected places Harvest fish from culture ponds and preserved or sale at market Protect the pond dykes with sand bags. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Harvest the culture fish & wild fish which came with flood water. Disinfect the ponds with chemicals
(ii) Water continuation and changes in water quality	<ul style="list-style-type: none"> Reduced water level of culture pond. 	<ul style="list-style-type: none"> Flood water fills the pond if empty or reduced before the flood. 	<ul style="list-style-type: none"> Exchange water with fresh water to maintain the water quality.
(iii) health and diseases	<ul style="list-style-type: none"> Take preventive measures 		<ul style="list-style-type: none"> Destroyed the dead fish with disinfectant
(v) Loss of stock and inputs(feed etc)	<ul style="list-style-type: none"> Transfer the stock and inputs at safe places 	-	<ul style="list-style-type: none"> Demolish the decayed feed
Infrastructure damage(pumps, aerators, huts etc)	<ul style="list-style-type: none"> Transfer the detachable infrastructure at safe places 	-	<ul style="list-style-type: none"> Measures impact of losses of infrastructure and provide assist for rehabilitation
(vi) Any other			

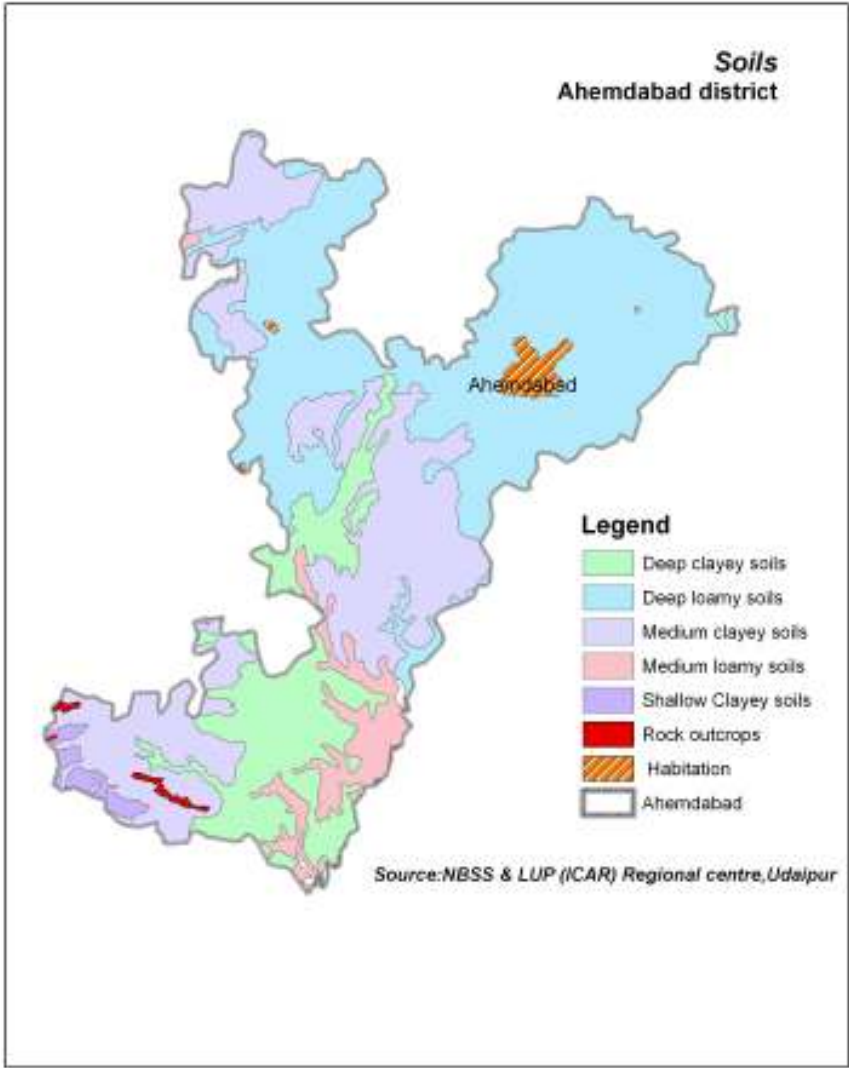
3. Cyclone / Tsunami	<ul style="list-style-type: none"> Cyclone, heavy rain and flooding are generally predicted and early warning are issued by the concern agencies, while Tsunami, Oil spill etc. cannot be forewarned 		
A. Capture	<ul style="list-style-type: none"> Capture fishery affected due to cyclone, as current pattern change & upwelling cause the migration of some fish species, so it will either affect to stock or species variation. 		
Marine	<ul style="list-style-type: none"> On the costal region, fishermen staying away from the vulnerable zone is one way of prevention 		
(i) Average compensation paid due to loss of fishermen lives	<ul style="list-style-type: none"> Recognizing the risk of cyclone and making the people aware of risk Migrate the fishermen at safe place 	<ul style="list-style-type: none"> Protecting the lives and livelihood of the most vulnerable fishermen 	<ul style="list-style-type: none"> Measure social impact of losses risks of diseases, loss of employment. The most vulnerable fishermen be taken care of first and fast
(ii) Avg. no. of boats/nets/ damaged	<ul style="list-style-type: none"> Identify the boats and convey messages of disaster in the sea. 	<ul style="list-style-type: none"> Warning signals, use of flares, seeking help by attracting attention. 	<ul style="list-style-type: none"> Compensation of damages should be provide after real assessment of

	<ul style="list-style-type: none"> Birthing the boats at safe place 	<ul style="list-style-type: none"> Prevent the lives among damaged boats 	damages (boat/net)
(iii) Avg. no. of houses damaged			As above
Inland	<ul style="list-style-type: none"> Recognizing the risk of cyclone and making the people aware of risk Migrate the fishermen at safe place 	<ul style="list-style-type: none"> Protecting the lives and livelihood of the most vulnerable fishermen 	<ul style="list-style-type: none"> Measure social impact of losses risks of diseases, loss of employment. The most vulnerable fishermen be taken care of first and fast
B. Aquaculture	<ul style="list-style-type: none"> Most of coastal aquaculture farms (shrimp culture) will affect most due to cyclone & tsunami, as sea water intrusion, high current & tide & high wind velocity will affect the dyke and infrastructure of aquaculture units. 		
(i) Overflow/ flooding of ponds	<ul style="list-style-type: none"> Pre- harvest the materials (fish and prawns) Protect the dykes by putting soil bags. Place the iron screen on inlet and outlet 	<ul style="list-style-type: none"> In case of over flooding open outlet of the pond 	<ul style="list-style-type: none"> Measure impact of losses and risks of diseases Provide better hygienic sanitation, disinfected the ponds.
(ii) Changes in water quality (fresh water/ brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)	<ul style="list-style-type: none"> Transfer the stock and inputs at safe places 	-	<ul style="list-style-type: none"> Destroy the decomposed feed
(v) Infrastructure damage(pumps, aerators, shelters/ huts etc)	<ul style="list-style-type: none"> Transfer the detachable infrastructure at safe places 	-	<ul style="list-style-type: none"> Measures impact of losses of infrastructure and provide assist for rehabilitation
(vi) Any other	-	-	-

4. Heat wave and cold wave	<ul style="list-style-type: none"> This factor will affect indirectly to the fish stock. 		
A. Capture	<ul style="list-style-type: none"> Due to heat and cold wave some fishes migrate to offshore as well as non affected area so, it will affect the fish catch. 		
Marine	<ul style="list-style-type: none"> Assessment of capture fish catch 	<ul style="list-style-type: none"> Study the impact of heat and cold wave on fish capture and biodiversity. 	<ul style="list-style-type: none"> Established the fishery
Inland	<ul style="list-style-type: none"> Assessment of capture fish catch 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> As above
B. Aquaculture	<ul style="list-style-type: none"> Due to these factor, fish growth will affect, change in feeding, breeding and rearing of fish larvae. 		
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> Exchange of water to maintain the water temperature and water parameter 	<ul style="list-style-type: none"> Use equipment to protect the fish from drastic change in temperature as well as depletion of oxygen, i.e. use of thermostat heater to maintain constant pond temperature & use of aerator to maintain dissolve oxygen in pond. 	<ul style="list-style-type: none"> Acclimatize the fish stock in natural condition and reduced the used equipments from the ponds. Maintain the feed ration accordingly.
(ii) Health and Disease management	<ul style="list-style-type: none"> Take some preventive measures to protect from disease 	<ul style="list-style-type: none"> Use of probiotics as well as fresh and live feed 	<ul style="list-style-type: none">
(iii) Any other	-	-	-



Annexure-I



Annexure-III