

State: GUJARAT

Agriculture Contingency Plan for District: PANCHMAHALS

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Madhya Bharat plateau Western Malwa plateau, Eastern Gujarat plain, Vindhyan and Satpura range and Narmada Valley hot, moist semi-arid eco-subregion (5.2)			
	Agro-Climatic Region (Planning Commission)	Gujarat Plains and Hills Region (XIII)			
	Agro Climatic Zone (NARP)	Middle Gujarat Agro Climatic Zone (GJ-3)			
	List all the districts or part thereof falling under the NARP Zone	Anand, Ahemdabad, Kheda, Panchmahals, Dahod, Vadodara and Narmada			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		22° 49'15.10" N	77°45'01.67" E	187.6 M	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Main Maize Research Station, Godhra- 389 001 Agricultural Research Station, Kankanpur Agricultural Research Station, Derol			
Mention the KVK located in the district	Krushi Vigyan Kendra, National Research Centre for Horticulture Crops(ICAR), Vejalpur, Godhra, Distt. Panchmahals -389340				
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-September):	753	38	3 rd week of June	1 st week of October
	NE Monsoon(October-December):	-	-	-	-

	Winter (January-February)	-	-		
	Summer (March-May)	-	-		
	Annual	753	38		

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable land	Forest area	Land under non-agricultural use	Permanent Pastures Lakhs	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current Fallows (%)	Other fallows (%)
	Area (000' ha)	513	296	115	36	15	-	10	41	-	-

1.4	Major Soils (common names like shallow red soils etc.,)	Area ('000 ha)	Percent (%) of total Geographical area
	Sandy loam shallow soils	133.2	26.0
	Medium black shallow soils	103.6	20.2
	Hilly light soils	41.4	8.1
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	236.8	125
	Area sown more than once (%)	59.2	
	Gross cropped area	296.0	

Source : Directorate of Agriculture, Gandhinagar

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	45.0		
	Gross irrigated area	51.5		
	Rainfed area	251		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area

Canals (Major and Minor)		10	20.0 %
Tanks	120	-	-
Check Dams	6800	-	-
Open wells	24991	35	68 %
Bore wells	106	-	-
Dams	11	-	68 %
Total Irrigated Area ('000 ha)	45.0	45	
Pump sets	7064		
No. of Tractors	2383		
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils(Not Available)	(%) area	
Over exploited	82 (11 Tehsils)	-	
Critical	Not available	-	
Semi- critical	Not available	-	
Safe	525 (11 Tehsils)	-	
Wastewater availability and use	-	-	
Ground water quality	Good (59%)		

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

Major Field Crops cultivated	Area ('000 ha)							
	<i>Kharif</i>			<i>Rabi</i>			Summer	Grand Total
	<i>Irrigated</i>	<i>Rainfed</i>	Total	<i>Irrigated</i>	<i>Rainfed</i>	Total		
Maize	32.0	100.1	132.1	22.3	-	22.3	-	154.4
Paddy	18.5	53.6	72.1	-	-	-	0.3	72.4
Pigeon pea	-	25.9	25.9	-	-	-	-	25.9
Wheat	-	-	-	19.7	0.9	20.6	-	20.6
Castor	-	3.0	3.0	-	-	-	-	3.0
Horticulture crops - Fruits	Total area							
Mango	2.2							
Citrus	0.5							

	Aonla	0.4
	Sapota	0.2
	Ber	0.1
	Horticultural crops - Vegetables	Total area
	Onion	0.7
	Brinjal	0.5
	Okra	0.5
	Cluster bean	0.4
	Cabbage	0.3
	Medicinal and Aromatic crops	Total area
	Garlic	1.2
	Ginger	0.6
	Plantation crops	Total area
	Teak	0.7ha.
	Neem	
	Eucalyptus	
	Bomboo	
	Mahua	
	Fodder crops	Total area
	Maize	Maize is main crop for food and feed and also used as natural grass land for grazing of animals.
	Total fodder crop area	
	Grazing land	-
	Sericulture etc	-
	Others (Specify)	

Source : Directorate of Agriculture and Horticulture, Gandhinagar

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)
	Non-descriptive cattle(local cows)			645
	Improved cattle			
	Crossbred cattle			517
	Non – descriptive Buffaloes			
	Commercial dairy farms			-
	Goat			450
	Sheep			4
	Others (Camel, Pig, Yak etc.)			1660
1.9	Poultry	No. of farms		Total No. of birds ('000)
	Commercial			8
	Backyard			472
	Poultry			482
1.10	A. Capture			
	Marine	No. of fishermen	Boats	Nets
	Marine fisheries not available			
	Inland	No. farmer owned ponds	No. of reservoir	No. of village tanks
	B. Culture	not available		
Inland Fisheries	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	-	-	-

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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	
		(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Maize	1076	927	95*	4250*	-	-	1171	2588	1464
	Paddy	659	820	266	1482	20	2965	614	839	
	Wheat	-	-	356	1751	-	-	356	1751	
	Pigeon pea	384	1400	-	-	-	-	384	1400	
	Castor	42	1879	-	-	-	-	42	1879	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	9889	5.0	9889	5000	-
	Citrus	3656	9.0	-	-	-	-	3656	9000	-
	Sapota	-	-	1260	7.0	-	-	1260	7000	-
	Aonla	3185	8.2	-	-	-	-	3185	8250	-
	Ber	691	7.0	-	-	-	-	691	7000	-

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	
		(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	(‘000 t)	(kg/ha)	
Horticultural crops – Vegetables										
	Brinjal	-	-	5606	10.7	-	-	5606	10750	-
	Onion	-	-	-	-	12839	18.6	12839	18600	-

	Cluster bean	1833	5.7	-	-	-	-	1833	5750	
	Okra	2550	5.0	-	-	-	-	2550	5080	-
	Cabbage			2766	12	-	-	2766	12000	-
Medicinal and Aromatic crops										
	Garlic	-	-	4916	4.7	-	-	4916	4730	-
	Ginger	-	-	8248	13.6	-	-	8248	13630	-

Source : Directorate of Agriculture and Horticulture, Gandhinagar

1.12	Sowing window for 5 major field crops	Maize	Paddy	Wheat	Castor	Pigeonpea
	Kharif- Rainfed	3 rd week of June – 4 th week of July	2 nd week of July - 4 th week of July	-	2 nd week of July - 3 rd week August	1 st week of July – 4 th week of July
	Kharif-Irrigated	-	2 nd week of July – 3 rd week July	-	-	2 nd week of June – 2 nd week of July
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	2 nd week of October – 2 nd week of November	-	2 nd week of November – 2 nd week of December	-	-

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 intrusion	-	-	√

	Pests and diseases Rice: Stem borer, Leaf hopper/Jassids, Castor: Capsule borer, White fly, Pigeonpea: Pod borer	√	-	
	Others	-	-	√

1.14	Digital maps of the district	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 Rainfed 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 (1 st week of)	Medium black shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	No change	Seed drill in RKVY project and GSSC supply quantity seed to
		Drilled Paddy	Drilled Paddy(ADR-1)		

July)		Pigeonpea	Pigeonpea (BDN-2)		farmers	
		Castor	Castor (GCH-2,GCH-4, GCH-7)			
		Maize + Pigeonea/Greengram/Blackgram	Maize + Pigeonea/Greengram/Blackgram			
	Hilly light soils		Maize	Maize(GM-4,GM-6 & N. Moti)	No change	Supply of inputs through National food security mission and Tribal Development Board
			Drilled Paddy	Drilled Paddy(ADR-1)		
			Pigeonpea	Pigeonpea(BDN-2)		
			Castor	Castor (GCH-2,GCH-4, GCH-7)		
			Maize + Pigeonea/Greengram/Blackgram	Maize + Pigeonea/Greengram/Blackgram		
	Sandy loam shallow soils		Maize	Maize(GM-4,GM-6 & N. Moti)	No change	
			Pigeonpea	Pigeonpea(BDN-2)		
			Maize + Pigeonea/Greengram/Blackgram	Maize + Pigeonea/Greengram/Blackgram		

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 (3 rd week)	Medium black shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	No change	Seed drill in RKVY project and GSSC supply quantity seed to farmers

of July)		Drilled Paddy	Drilled Paddy(ADR-1)		
		Pigeonpea	Pigeonpea(BDN-2)		
		Castor	Castor (GCH-2,GCH-4, GCH-7)		
		Maize + Pigeonea/Greengram/Blackgr am	Maize + Pigeonea/Greengram/Black gram		
	Hilly light soils	Maize	Maize(GM-4,GM-6 & N. Moti)	No need of contingency plan	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy	Drilled Paddy(ADR-1)		
		Pigeon Pea	Pigeon Pea(BDN-2)		
		Castor	Castor (GCH-2,GCH-4, GCH-7)		
		Maize + Pigeonea/Greengram/Blackgr am	Maize + Pigeonea/Greengram/Black gram		
	Sandy loam shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	No need of contingency plan	Supply of inputs through National food security mission and Tribal Development Board
		Pigeonpea	Pigeonpea(BDN-2)		
		Maize + Pigeonea/Greengram/Blackgr am	Maize + Pigeonea/Greengram/Black gram		

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 6 weeks (1 st Week of August)	Medium black shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	Tide ridging Apply organic manure before sowing	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	Drilled Paddy(ADR-1)	Cultivation of aerobic rice (Use water soaking seed)	
		Pigeonpea	Pigeonpea(BDN-2)	Wider spaces 90x30cm	
		Castor	Castor (GCH-2,GCH-4, GCH-7)	Seed soaking in water Dry method of sowing	
		Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	
	Hilly light soils	Maize	Maize(GM-4,GM-6 & N. Moti)	Tide ridging Apply organic manure before sowing	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy	Drilled Paddy(ADR-1)	Cultivation of aerobic rice (Use water soaking seed)	
		Pigeonpea	Pigeonpea(BDN-2)	Wider spaces (90x30cm)	
		Castor	Castor (GCH-2,GCH-4, GCH-7)	Seed soaking in water Dry method of sowing	

		Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	
	Sandy loam shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	Tide ridging Apply organic manure before sowing	
		Pigeonpea	Pigeonpea(BDN-2)	Wider spaces (90x30cm)	
		Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/ cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks (3 rd week of August)	Medium black shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti) Maize+Pigeon pea	Tide ridging Apply organic manure before sowing, Wider spacing (90x30cm)	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	Drilled Paddy(ADR-1)	Cultivation of aerobic rice (Use water soaking seed)	
		Pigeonpea	Pigeonpea(BDN-2)	Wider spacing (90x30cm)	
		Castor	Castor (GCH-2,GCH-4,	Seed soaking in water	

		GCH-7)	Dry method of sowing	
	Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	
Hilly light soils	Maize	Maize(GM-4,GM-6 & N. Moti)	Tide ridging Apply organic manure before sowing, Wider spacing (90x30cm)	Supply of inputs through National food security mission and Tribal Development Board
	Drilled Paddy	Drilled Paddy(ADR-1)	Cultivation of aerobic rice (Use water soaking seed)	
	Pigeonpea	Pigeonpea (BDN-2)	Wider spacing (90x30cm)	
	Castor	Castor (GCH-2,GCH-4, GCH-7)	Seed soaking in water Dry method of sowing	
	Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	
Sandy loam shallow soils	Maize	Maize(GM-4,GM-6 & N. Moti)	Tide ridging Apply organic manure before sowing, Wider spacing (90x30cm)	Supply of inputs through National food security mission and Tribal Development Board
	Pigeonpea	Pigeonpea (BDN-2)	Wider spacing (90x30cm)	
	Maize + Pigeonpea/Greengram/Blackgram	Maize + Pigeonpea/Greengram/Blackgram	Tide ridging Apply organic manure before sowing	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Medium black shallow soils	Maize	Thinning Life saving irrigation	Inter culturing and weeding	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	-	Inter culturing and weeding	
		Pigeonpea	Thinning		
		Castor	-		
		Maize + pigeon pea/Greengram/Blackgram	-	Weeding	
	Hilly light soils	Maize	Thinning Life saving irrigation	Inter culturing and weeding	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy	-	Inter culturing and weeding	
		Pigeonpea	Thinning		
		Castor	-		
		Maize + Pigeonpea/Greengram/Blackgram	-	Weeding	
	Sandy loam shallow soils	Maize	Thinning Life saving irrigation	Inter culturing and weeding	Supply of inputs through National food security mission and Tribal Development Board
		Pigeon Pea	-	Inter culturing and weeding	
		Maize + Pigeonpea/Greengram/	-	Weeding	

		Blackgram			
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Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At vegetative stage	Medium black shallow soils	Maize	Life saving irrigation	Alternate furrow irrigation Interculturing	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	Life saving irrigation	Interculturing	
		Pigeonpea	Life saving irrigation	Interculturing	
		Castor	Alternate furrow irrigation	Interculturing	
		Maize + Pigeonpea/Greengram/Blackgram	Life saving irrigation	Weeding	
	Hilly light soils	Maize	Life saving irrigation	Alternate furrow irrigation Interculturing	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy	Life saving irrigation	Interculturing	
		Pigeonpea	Life saving irrigation	Interculturing	

		Castor	Life saving irrigation	Alternate furrow irrigation Interculturing	
		Maize + Pigeonpea/Greengram/ Blackgram	Life saving irrigation	Weed free condition	
	Sandy loam shallow soils	Maize	Life saving irrigation	Alternate furrow irrigation Interculturing	Supply of inputs through National food security mission and Tribal Development Boardo
		Pigeonpea	Life saving irrigation	Interculturing	
		Maize + Pigeonpea/Greengram/ Blackgram	Life saving irrigation	Weed free condition	

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering and fruiting stage	Medium black shallow soils	Maize		Alternate furrow irrigation Interculturing and weeding	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	Life saving irrigation	Weeding	
		Pigeonpea	Life saving irrigation	Interculturing and weeding	
		Castor		Alternate furrow irrigation Interculturing	
		Maize + pigeon pea/Greengram/Blackgram	Life saving irrigation	-	

	Hilly light soils	Maize		Alternate furrow irrigation Interculturing and weeding	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy		Life saving irrigation Weeding	
		Pigeonpea	Life saving irrigation	Interculturing and weeding	
		Castor		Alternate furrow irrigation Interculturing	
		Maize + Pigeonpea/Greengram/ Blackgram	Life saving irrigation		
	Sandy loam shallow soils	Maize		Alternate furrow irrigation Interculturing and weeding	Supply of inputs through National food security mission and Tribal Development Boardo
		Pigeonpea	Life saving irrigation	Weeding	
		Maize + Pigeonpea/Greengram/ Blackgram	Life saving irrigation		

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium black shallow soils	Maize	Harvesting at maturity stage	Gram	Seed drill in RKVY project and GSSC supply quantity seed to farmers
		Drilled Paddy	Harvesting at maturity stage	Gram	
		Pigeonpea	Green pod used as vegetable	Wheat	
		Castor	Harvesting at physiological maturity stage	Wheat	
		Maize + Pigeonpea/Greengram/Blackgram	Harvesting at maturity stage Green pod used as vegetable	Wheat	
	Hilly light soils	Maize	Harvesting at maturity stage	Gram	Supply of inputs through National food security mission and Tribal Development Board
		Drilled Paddy	Harvesting at maturity stage	Gram	
		Pigeonpea	Green pod used as vegetable	Wheat	
		Castor	Harvesting at physiological maturity stage	Wheat	
		Maize + Pigeonpea/Greengram/Blackgram	Harvesting at maturity stage Green pod used as vegetable	Wheat	
Sandy loam shallow soils	Maize	Harvesting at maturity stage	Gram		
	Pigeon Pea	Harvesting at maturity stage	Gram		
	Maize + Pigeonpea/Greengram/Blackgram	Harvesting at maturity stage Green pod used as vegetable	Wheat		

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in canals due to low rainfall			NA		

Condition			Suggested Contingency measures		
	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			NA		

Condition			Suggested Contingency measures		
	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			NA		

Condition			Suggested Contingency measures		
	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	NA				

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	NA				

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				
Maize	Remove excess water from the field (Provision for drainage except paddy)	Remove excess water from the field except paddy field. Spraying of endosulfan (0.07%) in pigeon pea for control of pod borer	Remove excess water from the field.	Produce shift in safer place
Paddy				
Pigeon Pea				

Castor				
Horticulture	Provide proper drainage to remove excess water			
Mango				
Citrus				
Aonla				
Heavy rainfall with high speed winds in a short span				
Maize	Remove excess water from the field. Provision of drainage of water except paddy field.	Drainage of excess water	Harvest at physiological maturity in Maize , Bajra, Nipping of ear head and cob in standing crops	Ear and cobs should be dried in bright sunshine.
Paddy				
Pigeon Pea				
Castor				
Horticulture				
Mango	Remove excess water by providing proper drainage			
Citrus				
Aonla				
Outbreak of pests and diseases due to unseasonal rains				
Crop	Pest	Control measures		
Paddy	Rice stem borer	<ul style="list-style-type: none"> Apply carbofuran 3 G 1.0 kg a.i./ha or Carptap 4 G @ 1.0 kg/100 sq. meter at 5 days after sowing and five days before transplanting in paddy nursery. Application of carbofuran 3 G 1.0 kg a.i./ha or Carptap 4 G @ 1.0 kg/ha or carbosulfan 5 G @ 1.0 kg a.i./ha at 30 and 50 days after transplanting 		

		<ul style="list-style-type: none"> Spray any one of these Phosphamidon 0.03 % or Endosulfan 0.07 % or Quinalfos 0.05 % or Phosalone 0.05 %
	Paddy leaf hopper/Jassid	<ul style="list-style-type: none"> Avoid the top dressing of nitrogen application and Drain the water from the field Later stage of the crop, spray Imidacloprid 0.05 % or Fenobucarb 0.07 %
	Rice hispa and rice blue beetle	<ul style="list-style-type: none"> Collect the adults and destroy Summer ploughing Spray any one of these Endosulfan 0.07 % or Carbaryl 0.02 % or Fenitrothion 0.05 %
	Rice grass hopper	<ul style="list-style-type: none"> Deep ploughing before rain Dust any one of these, Carbaryl 10 % or Quinalphos 1.5 % @ 20-25 kg/ha

2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
	NA			
Sea water intrusion	NA			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave	Grow in polyhouse / Net house	Frequent irrigation to maintain soil moisture and humidity	Frequent irrigation to maintain soil moisture and humidity.	It is better to harvest crop
Maize,	Frequent sprinkler irrigation applied	Irrigation apply at afternoon	Irrigation apply at afternoon	
Drilled Paddy				
Pigeon Pea				
Castor				
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

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 fodder availability	Development of fodder bank – urea molasses treatment.	Distribution of feed resources for the minimum maintenance requirement	Ample feeding to compensate nutritional loses
Drinking water	Deepings of water body, Water storage.	Supply of minimum requirement and control of wastage and evaporative loses	Local area ponds and recharging ground water
Health and diseases management	Vaccination for HS & FMD Deficiency diseases are likely and hence min. Mix., Vit A and phosphorus inj.	Poor plane of nutrition due to draught can likely to result in stress as well as manifestations of deficiencies which may make animals susceptible to various ailments. Therefore, supplementation with minerals and vitamins besides fodder is essential (1) FMD is common in summer. Treatment of affected animals. (2) Special care of pregnant buffaloes population will be advanced pregnant. (3)Breeding season for goats and hence special care.	The measures mentioned in the previous column will have to be continued Treatment of affected animals. Precaution against GIT infection. Dinfection of areas where dead animal carcass were lying.
Floods			
Feed fodder availability	Make dry hay for future requirement	Protect the fodder from soaking and wastage / drained in flood.	Grow fodder Varity
Drinking water			

Health and diseases management	Vaccination against FMD & HS, untying of animals, taking them to higher places. Routine vaccination for Hoemorrhagic Septicemia (HS) untie animals – move to higher places – avoid tying to electric poles.	Evacuation of animals from flooded areas, drainage of water from and around animal sheds,pasture areas. Deworming of animals. Provision of animals. Provision of clean drinking water as well as feed/fodder	Treatment of animals showing signs of clinical disease, parasitic disease, avoid stagnation of water , parasitic diseases control. Disposition of dead animal carcass. Control of mosquitoes. (1) Treatment of animals for entritis etc. (2) Special care and treatment of young animals for enteric diseases like calf scour, pneumonia
Cyclone			
Feed fodder availability			
Drinking water			
Health and diseases management	Evacuation of animals to safer place particularly from the kuchche dwellings untie animals	Take animals to safe places - free animals	Rehabilitation of animals from affected areas and therapeutic management of injured/diseased. Treatment of injured animals and rehabilitation of affected animals.
Heat wave and Cold wave			
Shelter/environment management	Shed/ Tree plantation provision of drinking water	Ample water available	
Health and diseases management	Provision of shed and drinking water	Animals should be kept under sheds during peak hours with sufficient supply of drinking water. Episodes of heat/sun stroke are common. Feeding during night hours, working during cool hours. Working animals working may show	

	<p>In cold season blood protozoan diseases are common and hence control of vectors like ticks etc should be a routine</p>	<p>dehydration. Control dehydration and restore electrolyte balances. Provision of ample drinking water for all animals and intravenous fluid infusions should be made.</p> <p>(1)Special intensive care of young growing animals by giving proper parenteral nutrition etc. (2) In cold wave highly specific treatment of all the animals particularly the young ones and efforts to prevent the freezing injury to the extremities of the animal body.</p>	
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2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<p>As the district is occasionally prone to drought the following measures to be taken to ameliorate the fodder deficiency</p> <p>Avoid burning of wheat/paddy straw</p> <p>Establishment of fodder bank at village level with available dry fodder (paddy /wheat straw)</p> <p>Increase area under perennial fodder cultivation with high yielding Hybrid Napier varieties.</p> <p>Conservation of maize/bajra green fodder as silage</p> <p>Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during early monsoon under dry land system for fodder production</p> <p>Encourage fodder production with Maize, Jowar, Bajra , Cowpea, Barseem, Lucerne etc.,</p>	<p>Harvest and use biomass of dried up crops (Maize, Paddy, Wheat, Pigeonpea etc..) material as fodder</p> <p>Utilizing fodder from fodder bank reserves.</p> <p>Utilizing stored silage/hay.</p> <p>Transporting complete feed/fodder and dry roughages to the affected areas.</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Continuous supplementation of mineral mixture to prevent infertility.</p> <p>Encourage mixing available kitchen waste with</p>	<p>Training/educating farmers for feed & fodder storage.</p> <p>Maintenance / repair of silo pits and feed/fodder stores.</p> <p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall etc.,</p> <p>Supply of quality fodder seed (multi cut sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass</p>

	Processing & storage of feed/fodder and roughages in the form of complete feed/blocks.	dry fodder while feeding to the milch animals	well before monsoon Replenish the feed and fodder banks
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources</p> <p>Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater.</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
Health and disease management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Vaccination for HS & FMD</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures</p> <p>Procure and stock multivitamins & area specific mineral mixture</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Drainage of water from and around animal sheds, pasture areas.</p> <p>Tick control measures be undertaken to prevent tick borne diseases in animals</p> <p>Rescue of sick and injured animals and their</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

		treatment Organize with community, daily lifting of dung from relief camps	
Floods	Not applicable		
Cyclone	Not applicable		
Cold wave	Not applicable		
Heat wave	<p>Arrangement for protection from heat wave</p> <ul style="list-style-type: none"> i) Plantation around the shed ii) H₂O sprinklers / foggers in the shed iii) Application of white reflector paint on the roof iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress 	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers/fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H₂O during heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>

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 / Zist etc). • Use probiotics (Protexin / Biovet-YC) in 	<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. 	<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

	<ul style="list-style-type: none"> • 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 of electrolytes in feed and drinking water. 	monthly health calendar programme
Floods	Not Applicable		
Cyclones	Not Applicable		
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

2.5.3 Fisheries/ Aquaculture:

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought	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	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			
Inland	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	1. Provide water through cannel and pipeline from major reservoirs to maintain sufficient water depth 2. Taxonomic fish data collection & Preserved fish stock (gene)	1. Migration of fish stock 2. Conservation of breeders/ fish stock at unaffected area	Transplant the fish stock and breed the fish in hatchery to stock the fish seed in affected area
(ii) Changes in water quality	Migration of fish due to change of water quality	-	-
(iii) Any other			
B. Aquaculture	"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	1. Lower the stocking density by harvest the big size (500 gm) fish and place in market. 2. Transfer of under culture fishes to abundance water zone	Pre- harvest all the materials (fish and prawns) & preserved by freezing	Sanitize the dead fish biomass.
(ii) Impact of salt load build up in ponds / change in water quality	Protect the water and use of lime and other probiotics	Cover the pond with plants (duckweed etc) to protect from evaporation.	Flush the pond with fresh water and manure before the next stocking of fish to maintain the food chain
(iii) Any other			
2) Floods	Flood are generally predicted and early warning will protect the lives and livelihood		
A. Capture	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			
Inland	All the fishermen must call back from fishing	No fishing	
(i) Average compensation paid due to loss of human life	1. Recognizing the risk of flood & making the people aware of it 2. Migrate the people at safe	Send the rescue teams to protect the lives of the most vulnerable peoples.	1. Measure social impact of losses risks of diseases, loss of employment. 2. The most vulnerable fishermen be taken care of first and fast

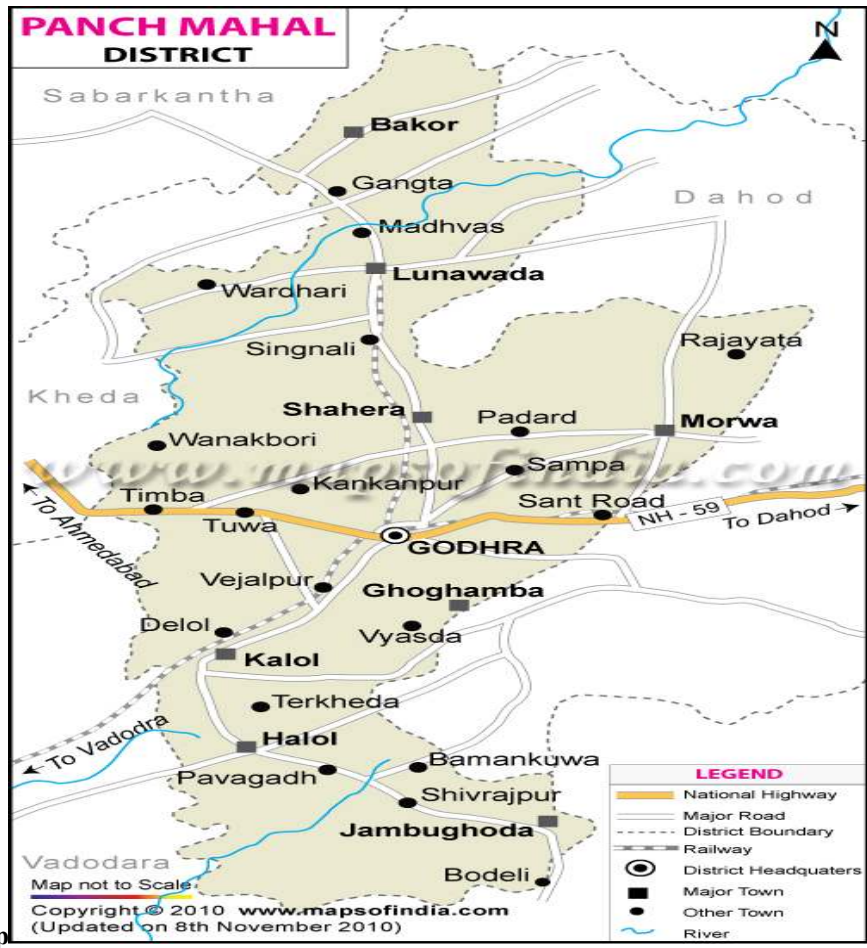
	place 3. Collect the details information of swimmers & life savers appliances.		
(ii) No. of boats/ nets/ damaged	Transfer boats/nets at safe places	If possible protect boats during rescue operation	Identify the damages according to assessment & compensate
(iii) No. of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			
(v) health and diseases	Prepared the medical rescue team	-	1. Proper hygiene & sanitation 2. Send the medical rescue team with drugs.
B. Aquaculture	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	1. Transfer of aquaculture farmers to protected places 2. Harvest fish		1. Harvest the culture fish & wild fish which came with flood water. 2. Disinfect the ponds with chemicals

	from culture ponds and preserved or sale at market 3. Protect the pond dykes with sand bags.		
(ii) Water continuation and changes in water quality	Reduced water level of culture pond.	Flood water fills the pond if empty or reduced before the flood.	Exchange water with fresh water to maintain the water quality.
(iii) health and diseases	Take preventive measures		Destroyed the dead fish with disinfectant
(v) Loss of stock and inputs (feed etc)	Transfer the stock and inputs at safe places	-	Demolish the decayed feed
Infrastructure damage(pumps, aerators, huts etc)	Transfer the detachable infrastructure at safe places	-	Measures impact of losses of infrastructure and provide assist for rehabilitation
(vi) Any other			
3. Cyclone / Tsunami	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	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			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats/nets/ damaged			
(iii) Avg. no. of houses damaged			
Inland	1. Recognizing the risk of cyclone and making the people aware of risk 2. migrate the fishermen at safe place	Protecting the lives and livelihood of the most vulnerable fishermen	1. Measure social impact of losses risks of diseases, loss of employment. 2. The most vulnerable fishermen be taken care of first and fast
B. Aquaculture	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	1.Pre- harvest the materials (fish and prawns) 2. Protect the dykes by putting soil	In case of over flooding open outlet of the pond	1. Measure impact of losses and risks of diseases 2. Provide better hygienic sanitation, disinfected the ponds.
(ii) Changes in water quality (fresh water/ brackish water ratio)			
(iii) Health and			

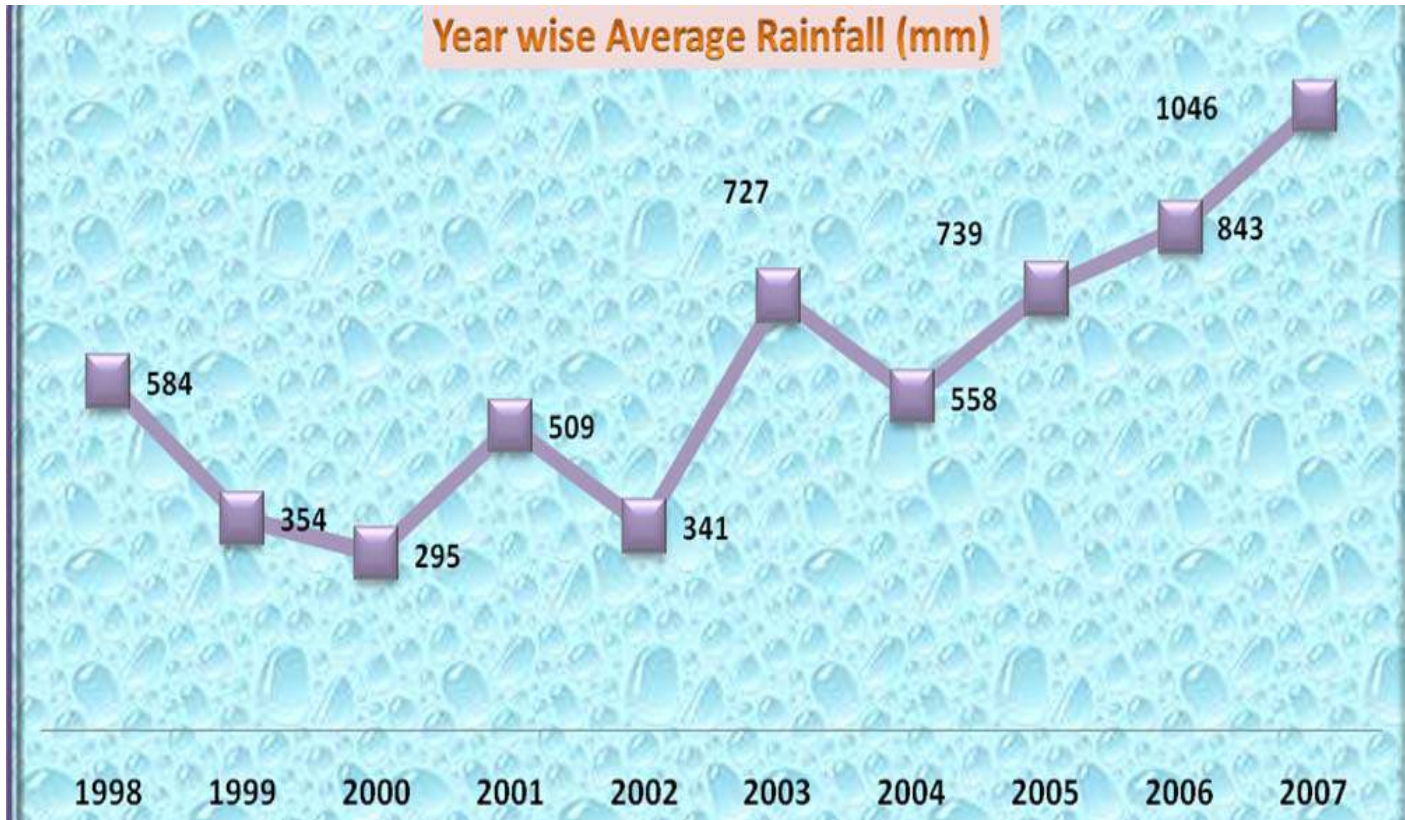
diseases	bags.		
	3. Place the iron screen on inlet and outlet		
(iv) Loss of stock and inputs (feed, chemicals etc)	Transfer the stock and inputs at safe places	-	Destroy the decomposed feed
(v) Infrastructure damage(pumps, aerators, shelters/ huts etc)	Transfer the detachable infrastructure at safe places	-	Measures impact of losses of infrastructure and provide assist for rehabilitation
(vi) Any other			
4. Heat wave and cold wave	This factor will affect indirectly to the fish stock.		
A. Capture	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			
Inland	Assessment of capture fish catch	Study the impact of heat and cold wave on fish capture and biodiversity.	Established the fishery
B. Aquaculture	Due to these factor, fish growth will affect, change in feeding, breeding and rearing of fish larvae.		
(i) Changes in	Exchange	Use equipment to	Acclimatize the fish stock in natural condition and reduced the used equipments from the ponds. Maintain the feed

pond environment (water quality)	of water to maintain the water temperature and water parameter	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.	ration accordingly.
(ii) Health and Disease management	Take some preventive measures to protect from disease	Use of probiotics as well as fresh and live feed	
(iii) Any other			



Annexure 1 : Location Map

Annexure 2: Mean Annual Rainfall



Annexure 3: Soil Map

