State: GUJARAT

Agricultural Contingency Plan: DAHOD

1.0 District Agricultural Profile					
1.1	**Agro-climatic /Ecological zones**				
	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)	Gujrat Plains And Hills Region (XIII)			
	Agro-Climatic Zone (NARP)	Middle Gujarat Zone (GJ-3)			
	List of all the districts or part thereof falling under NARP zone	Anand, Kheda, Vadodara, Ahmedabad, Dahod and Panchmahals			
	Geographical coordinates of district	**Latitude**	**Longitude**		**Altitude**
		22°49'56.28"N	74°15'12.47"E		334m
	Name and address of the concerned ZRS/ZARS/RARS/RRTTS	Agricultural Research Station, Dahod; Tribal Research –cum-training Centre, Devgadh Baria			
	Mention the KVK located in the district	Krushi Vigyan Kendra, Anand Agricultural University, Dahod			
1.2	**Rain fall**	**Average (mm)**	**No. of rainy days**	**Normal Onset**	**Normal cessation**
	SW monsoon (June-sep.)	800	33	3rd Week of June	2nd Week of Sept.
	NE Monsoon (Oct-Dec)	-		-	-
	Winter (Jan –February)	-			
	Summer (Mar-May)	-			
	Annual	800	33		

1.3	Land Use Pattern of the district	Geographical Area	Cultivable Land	Forest Area	Land under non-agril. use	Permanent pasture	Cultivable wasteland	Land under Misc.tree crops and grooves	Barren and uncultivable land	Current fallows	Others fallows
	Area (000' ha)	365	206	48	-	78	-	-	15	-	-

1.4	Major soils	Area (000' ha)	Percent (%) of total geographical area
	Hilly light soils	155.9	42.7
	Sandy loam shallow soils	39.2	10.7
	Deep black shallow soils	31.6	8.6
1.5	**Agricultural Land use**	**Area (ha.)**	**Cropping intensity %**
	Net sown area	224.3	134 %
	Area sown more than once	76.0	
	Gross cropped area	300.2	

1.6	Irrigation water availability and use	Area ('000 ha)		
	Net irrigated area	80.9		
	Gross irrigated area	94.8		
	Rainfed area	143.37		
	Sources of irrigation	**Number**	**Area (ha)**	**Percentage of total irrigated area**
	Canals		2.6	15.4
	Tanks	61	12.0	8.8
	Open wells	39453	30.2	32.8
	Bore wells	-	-	
	Lift irrigation schemes	74	50.0	43.0
	Other sources			
	Total Pump sets	6021	-	

	Checkdam / check wall	820	-	
	farm pond	49	-	
	Village pond	38	-	
	Boriband	10970	-	
	Total Irrigated Area	-	94.8	
	Ground water availability and use*	**No. of Blocks/Tehsils**	**(%) area**	
	Over exploited	Nil		
	Critical	Nil		
	Semi-critical	Nil		
	Safe	07	61%	
	Wastewater availability and use	Nil		
	Ground water quality	Good (61%)		

1.7 Area under major field crops and horticulture etc.

		Major Field Crops Cultivated				**Area (000' ha)***				
			Khariff			**Rabi**			**Summer**	**Total**
			Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**		
	1	Maize	-	102.1	102.1	33.4	-	33.4	-	135.5
	2	Paddy	-	90.6	90.6	-	-	-	-	90.6
	3	Wheat	-			65.3	-	65.3	-	65.3
	4	Gram	-	-	-	-	56.7	56.7	-	56.7
	5	Soybean	-	36.0	36.0	-	-	-	-	36.0
	6	Pigeonpea	-	15.4	15.4	-	-	-	-	15.4
		Horticultural crops-Fruits	**Total**							
	1	Mango	2.2							
	2	Aonla	1.2							
	3	Lemon	1.1							
	4	Custard apple	0.5							
	5	Guava	0.2							
		Horticultural crops-Vegetables	**Total**							
	1	Cabbage	1.2							
	2	Brinjal	1.0							
	3	Onion	0.8							
	4	Cauliflower	0.7							
	5	Okra	0.5							

		Medicinal and Aromatic crops	**Total**
	1	Ginjer	1.4
	2	Garlic	1.2
		Fodder crops	**Total area (ha)**
	1	-	-
		Total fodder area	-
	1	Grazing land	78.4
	2	Sericulture etc.	-
	3	others (specify)	-

Source: Directorate of Agriculture, Gandhinagar and Directorate of Horticulture, Gandhinagar

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Cattle	-	-	586.2
	Buffaloes	-	-	283.8
	Goat	-	-	469.7
	Sheep	-	-	5.5
	Others (Camel, Pig, Yak etc.)			3.1
	Commercial dairy farms (Number)			-
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	583.9	
	Backyard	-	-	

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.)**
			Mecha-nized	**Non-mechanized**	**Mechanized (Trawl nets, Gill nets)**	**Non-mechanized (Shore Seines, Stake & trap nets)**	
		-	-	-	-	-	-
		No. Farmer owned ponds		**No. of Reservoirs**		**No. of village tanks**	

	ii) Inland (Data Source: Fisheries Department)	-	81	36
	B. Culture			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production (m. tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)	-	-	
	ii) **Fresh water**	-	0.4	2,222
	Others Marine water	-	-	-

Source: Fisheries Department

1.11 Production and Productivity of major crops (Average of last 5 years: 2004 - 08)

	Crop	**Kharif**		**Rabi**		**Summer**		**Total**	
		Production (000' t)	**Productivity (kg/ha)**	**Production (000' t)**	**Productivity (kg/ha)**	**Production (000' t)**	**Productivity (kg/ha)**	**Production (000' t)**	**Productivity (kg/ha)**
1	Maize	93.2	882	30.5	1333	-	-	123.7	1108
2	Paddy	49.7	878	-	-	-	-	49.7	878
3	Soybean	31.2	867	-	-	-	-	31.2	867
4	Wheat	-	-	111.9	2140			111.9	2140
5	Gram	-	-	40.4	869			40.4	869
6	Pigeonpea	20.5	1251	-	-	-	-	20.5	1251

Source : Directorate of Agriculture, Gandhinagar

Major Horticultural crops - Fruits (Crops to be identified based on total acreage)

	Crop	Kharif		Rabi		Summer		Total	
		Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (t/ha)
1	Mango	-	-	-	-	-	-	703.4	3.2
2	Aonla	-	-	-	-	-	-	1043.0	8.7
3	Lemon	-	-	-	-	-	-	532.8	4.2
4	Custard apple	-	-	-	-	-	-	914.3	12.7
5	Guava	-	-	-	-	-	-	60.4	2.3

Major Horticultural crops – Vegetables

	Crop	Kharif		Rabi		Summer		Total	
		Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)
1	Cabbage	-	-	113.5	15000	-	-	113.5	15000
2	Brinjal	-	-	104.0	18000	-	-	104.0	18000
3	Onion	-	-	78.7	15000	-	-	78.7	15000

Medicinal and Aromatic crops

	Crop	Kharif		Rabi		Summer		Total	
		Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)	Production (000' t)	Productivity (kg/ha)
1	Ginger	136.5	14289	-	-	-	-	136.5	14289
2	Garlic	-	-	116.3	8000	-	-	116.3	8000

Source : Directorate of Horticulture, Gandhinagar

1.12 Sowing window for 5 major crops (start and of sowing period)

1.12		Maize	Paddy	Soybean	Pigeonpea	Gram	Wheat
	Kharif-Rainfed	3rd week June – 4th week July	3rd week June – 4th week July (Drill Paddy)	3rd week June – 4th week July	3rd week June – 4th week July	-	-
	Kharif-Irrigated	-	1st week July – 4th week July (Trans planted Paddy)	-	-	-	-
	Rabi-Rainfed	-	-	-	-	2nd week Oct - 2nd week November	-
	Rabi-Irrigated	2nd week Oct - 2nd week November	-	-	-	2nd week November- 2nd week December	2nd week November- 2nd week December

1.13	What is the major contingency district is prone to? (Tick mark)	Regular	Occasional	None
	Drought	-	√	-
	Flood	-	-	√
	Cyclone	-	√	-
	Hail storm	-	-	√
	Heat wave	-	√	-
	Cold wave	-	√	-
	Frost	-	-	√
	Sea water inundation	-	-	√
	Pest and diseases Rice: Stem borer, Leaf hopper/Jassids, Hispa, Rice blue beetle, grass hopper and Root weevil Maize: Shootfly	-	√	-

1.14	**Include Digital maps of the district for**	Location map district with in State as Annexure I	Enlcose : Yes
		Mean annual rainfall as Annexure 2	Enlcose : Yes
		Soil map as Annexure 3	Enlcose : Yes

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition		**Normal**	**Suggested Contingency measures**		
Early season drought (delayed onset) Delay by 2 weeks (1^{st} week of July)	**Major Farming situation**	**Crop /cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Maize: GM-4,6, Narmada Moti	No change	Supply of seed through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeonpea	Pigeonpea: ICPL-87, GT-100		
		Maize + Soybean	Maize + Soybean: Soybean :JS-335, NRC-37		
		Paddy (drill)	Drill Paddy: ADR-1, GR-5, 8 & 9		
	Medium rainfall, Medium black shallow soils	Maize	Maize: GM-4,6, Narmada Moti	No change	
		Maize + Pigeonpea	Pigeonpea: ICPL-87, GT-100		
		Maize + Soybean	Maize + Soybean: Soybean: JS-335, NRC-37		
		Paddy (TP)	Paddy : GR-8, GR-9, Ashoka - 200F		
	Hilly light soils	Maize Maize + Pigeonpea	Maize: GM-4,6, Narmada Moti Pigeonpea: ICPL-87, BDN-2	No change	Supply of seed through NFSM, RKVY, ATMA, MGNREGA

Condition		Normal	Suggested Contingency measures		
Early season drought (delayed onset) Delay by 4 Weeks (3rd week of July)	**Major Farming situation**	**Crop/cropping system**	**Change in crop** **/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Shift to GM-4,6, Narmada Moti varieties	No change	Supply of seed and organic manure through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeonpea	Pigeonpea: ICPL-87, GT-100 or change to Blackgram + Pigeon pea Blackgram: T-9, GBG-1		
		Maize + Soybean	-		
		Paddy (drill)	Drill Paddy: GR-5, 8 & 9		
	Medium rainfall, Medium black shallow soils	Maize	Use GM-4,6, Narmada Moti	No change	
		Maize + Pigeon pea	Use ICPL-87, GT-100 or change to Blackgram + Pigeon pea Blackgram: T-9, GBG-1		Supply of seed through NFSM
		Maize + Soybean	Maize + Greengram		
		Paddy (TP)	use GR-8, GR-9, Ashoka -200F		Supply of seed through RKVY, ATMA, MGNREGA
	Hilly light soils	Maize Maize + Pigeonpea	Change to Kodo millet, Nagli (GN – 4),	No change	

Condition		Normal	Suggested Contingency measures		
Early season drought (delayed onset) Delay by 6 weeks	**Major Farming situation**	**Crop/cropping system**	**Change in crop** **/cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Either use GM-6, Narmada Moti varieties of shift to Castor	- Apply nutrient as per soil health card	Supply of seed, organic manure through NFSM, RKVY, ATMA,

(1st week of August)				- Open tide ridge - Use higher seed rate (25%) - Use soaked seed - Apply organic manure before sowing	MGNREGA
		Maize + Pigeon pea	Use ICPL-87, BDN-2 Blackgram + Pigeonpea (1:1)	- Apply organic manure before sowing - Apply nutrient as per soil health card	Supply of improved plough through TSP
		Maize + Soybean	Maize + Greengram (1:2)	- Furrowing after sowing - Apply organic manure before sowing	
		Paddy (drill)	Use GR-5, 8 & 9	- Apply nutrient as per soil health card - Use soaked seeds	
	Medium rainfall, Medium black shallow soils	Maize	Maize: GM-6, Narmada Moti Fodder maize – African tall	- Apply nutrient as per soil health card - Apply organic manure before sowing - Open tide ridge	Supply of seed, organic manure through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea	Shift to Blackgram + Pigeon pea (2:1) Pigeonpea: ICPL-87, BDN-2	- Adopt higher seed rate - Open tide ridge	
		Maize + Soybean	Maize + Greengram (1:2)	- Water soaking treatment	

				- furrows after conservation	
		Paddy (TP)	Use GR-8, GR-9, Ashoka -200F	- Deep tillage - after conservation furrows	Supply of improved plough through TSP
	Hilly light soils	Maize Maize + Pigeon pea	Plant Kodo millet	- Apply nutrient as per soil health card - Open tide ridge - Tillage across the slope - Sowing across the slope - Apply organic manure before sowing	Supply of seed, organic manure through NFSM, RKVY, ATMA, MGNREGA

Condition		**Normal**	**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation**	**Crop/cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 Weeks (3rd week of August)	Medium rainfall, Sandy loam shallow soils	Maize	Use short duration varieties like GM-6, Narmada Moti or replace with Castor : (GCH-6,7) or Fodder maize (African tall)	- Adopt higher seed rate - Water soaking of seed - Open tide ridge - Apply organic manure before sowing	Supply of seed, organic manure through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea	Blackgram + Pigeon pea (2:1)	- Apply nutrient as per soil health card - Open tide ridge	
		Maize + Soybean	Maize + Greengram	- Open furrows conservation after sowing	

				- Dry sowing of castor	
		Paddy (drill)	Use cultivars GR-5, GR-8, GR-9	- Apply nutrient as per soil health card - Apply organic manure before sowing	
	Medium rainfall, Medium black shallow soils	Maize	Use cultivars like GM-6, Narmada Moti or replace with Fodder maize (African tall)	- Apply nutrient as per soil health card	Supply of seed, organic manure through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea	Blackgram + Pigeon pea (ICPL-87, BDN-2) (2:1)	--	Supply of seed drill through ATMA & TSP
		Maize + Soybean	Shift to Maize + Greengram (1:2)	--	
		Paddy	Paddy : GR-8, GR-9, GR-11, Ashoka -200F	- Deep tillage	Supply of improved plough through TSP
	Hilly light soils	Maize Maize + Pigeon pea	Kodo millet, Blackgram	- Apply nutrient and organic manure as per SHC - Tillage across the slope	Supply of seed, organic manure through NFSM, RKVY, ATMA, MGNREGA

Condition		**Normal**	**Suggested Contingency measures**		
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measure**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Gap filling and thinning	- Interculturing and weeding	Supply of interculturing implements through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea		Weeding and mulching	
		Maize + Soybean			
		Paddy (drill)			
	Medium rainfall, Medium black shallow soils	Maize	Gap filling and thinning	Interculturing and weeding	Supply of interculturing implements through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea		Weeding	
		Maize + Soybean		Weeding	
		Paddy (TP)		Weeding	
	Hilly light soils	Maize	Gap filling and thinning	- Interculturing	Supply of interculturing implements through NFSM,

		Maize + Pigeon pea		- Open Conservation furrow after every 4 lines	RKVY, ATMA, MGNREGA

Condition		Normal	Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (□2.5 mm) period **At vegetative stage**	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measure**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Thinning	Interculturing and weeding Open Conservation furrow after every 4 lines Top Dressing – N should be extended	Supply of interculturing implements through NFSM, RKVY, ATMA, MGNREGA Supply of micro irrigation system through TSP, RKVY
		Maize + Pigeon pea			
		Maize + Soybean			
		Paddy (drill)		- Interculturing and weeding - Top Dressing – N should be extended	
	Medium rainfall, Medium black shallow soils	Maize	Thinning	- Interculturing and weeding - Open the Conservation furrow after every 4 lines - Top Dressing – N should be extended	Supply of seed, interculturing implements through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea			
		Maize + Soybean			
		Paddy (TP)			
	Hilly light soils	Maize Maize + Pigeon pea	Thinning		

Condition		Normal	Suggested Contingency measures		
Mid season drought (long dry spell) **At reproductive stage**	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Soil nutrients & moisture Conservation measures**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	Maize	Thinning	Weeding Top Dressing – N should be extended	Supply of micro irrigation system and anti transparent through NFSM, RKVY, ATMA, MGNREGA
		Maize + Pigeon pea			
		Maize + Soybean			
		Paddy (drill)			
	Medium rainfall, Medium black shallow soils	Maize	Thinning		
		Maize + Pigeon pea			
		Maize + Soybean			
		Paddy (TP)			
	Hilly light soils	Maize Maize + Pigeon pea	- Weeding - Maize crop harvested as fodder crop - Picking of mature pod green gram, black gram	- Apply alternate furrow irrigation - Pigeonpea harvested for vegetable purpose - Adopt weed mulching	

Condition		Normal	Suggested Contingency measures		
Terminal .Draught	**Major Farming situation**	**Crop/cropping system**	**Crop management**	**Rabi Crop Planning**	**Remarks on Implementation**
Flowering to mature stage	Medium rainfall, Sandy loam shallow soils	Maize Maize + Pigeon pea Maize + Soybean Paddy (drill) Soybean + Maize	Crop should be harvested at physiological maturity stage Green maize cobs should be harvested Picking of green pod of Pigeonpea for vegetable purpose Apply alternate furrow irrigation	-	Supply of seed through NFSM
	Medium rainfall, Medium black shallow soils	Maize Maize + Pigeon pea Maize + Soybean		Gram: GG 2	

		Paddy (Transplanted) Soybean + Maize Pigeonpea			
	Hilly light soils	Maize Maize + Pigeon pea	- Crop should be harvested at physiological maturity stage - Green maize cobs should be harvested - Picking of green pod of Pigeonpea for vegetable purpose	-	

2.1.2 Irrigated Situation

Condition		**Normal**	**Suggested Contingency measures**		
Delayed/ limited release of water in canals due to low rainfall	**Major Farming situation**	**Crop/cropping system**	**Change in crop /cropping system**	**Agronomic measures**	**Remarks on Implementation**
	Medium rainfall, Sandy loam shallow soils	-Not applicable-			
	Medium rainfall, Medium black shallow soils				
	Hilly light soils				
Non release of water in canal under delayed onset of monsoon in catchment	Medium rainfall, Sandy loam shallow soils				
	Medium rainfall, Medium black shallow soils				
	Hilly light soils				
Lack of inflow into tanks due to insufficient/delayed onset of monsoon	Medium rainfall, Sandy loam shallow soils				
	Medium rainfall, Medium				

	black shallow soils Hilly light soils	

Condition		Normal	Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/ cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rain fall	Medium rainfall, Sandy loam shallow soils	Maize Maize + Pigeon pea Maize + Soybean Paddy (drill) Soybean + Maize Pigeonpea	-Kodomillet -Maize + Pigeon pea -Maize + Soybean - Paddy (drill) -Soybean -Pigeonpea	Apply furrow irrigation if it is available	Recharge ground water through farm pond, open well, check dam, deepening of village tank through, MGNREGA**,** NWP
	Medium rainfall, Medium black shallow soils	Maize Maize + Pigeon pea Maize + Soybean Paddy (Transplanted) Soybean + Maize Pigeonpea	-Kodomillet -Maize + Pigeon pea -Maize + Soybean -Paddy (Transplanted) -Soybean -Pigeonpea	- Use SRI method for paddy cultivation - Apply furrow irrigation if it is available	

	Hilly light soils	Maize Maize + Pigeon pea	-Kodomillet -Maize + Pigeon pea -Blackgram	Apply furrow irrigation if it is available Recharge ground water through farm pond, open well, check dam, deepening of village tank through MGNREGA, NWP	
Any other condition (specify)	-	-	-	-	-

2.2 Unusual rain (untimely, unseasonal etc) **(for both rain fed and irrigated situation)**

Condition	**Suggested contingency measures**			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post Harvest**
Maize Paddy Soybean Pigeonpea	Drain out excess water	Drain out excess water	- Harvest the maize cobs in standing crop - Harvest soybean and paddy at physiological maturity stage - Harvest the pigeon pea for vegetable purpose	Shift the produce to safer place
Horticulture Mango Aonla Custard apple Guava Vegetable crops			Drain out the excess water	Shift the produce at safer place
Heavy rainfall with high speed winds in a short span				
Maize Paddy Soybean	Drain out excess water	Drain out excess water	- Harvest the maize cobs in standing crop	Shift the produce to safe place

Pigeonpea			- Harvest the soybean and paddy at physiological maturity stage - Harvest the pigeon pea for vegetable purpose	
Horticulture				
Mango Aonla Custard apple Guava Vegetable crops			Drain out the excess water	Shift the produce to safe place
Outbreak of pest and disease due to unseasonal rains Maize Paddy Pigeonpea Soybean	**Control major suggested as per Appendix-IV**			
Horticulture	-			

APPENDIX –IV Important insect pest/disease on each crop and their control measure in details

A. Pest of major crops of the State and their control measures

No	Crop	Pest	Control measures
1.	Rice	**Rice stem borer**	• 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 • Spray any one of these phosphamidon 0.03 % or Endosulfan 0.07 % or Quinalfos 0.05 % or Phosalone 0.05 %
		Paddy leaf hopper/Jassid	• 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	• 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	• Deep ploughing before rain • Dust any one of these, Carbaryl 10 % or Quinalphos 1.5 % @ 20-25 kg/ha
		Rice root Weevil	• Methyl Parathion 2 % dust @ 20 kg/ha • Apply 100 kg P_2O_5/ha which may help to decrease the incidence of this pest
2.	**Maize**	**Shoot Fly**	• Avoid late sowing • Higher seed rate i.e. 5 kg/ha • Phorate 10 G or Carbofuran 3 G @ 2 gram/meter row length • Spray Endosulfan 0.07 %

2.3 Floods : Such situation is not occurred in Dahod district

Condition	**Suggested contingency measures**			
Transient water logging/partial inundation	**Seedling/ Nursery stage**	**Vegetative stage**	**Reproductive stage**	**At Harvest**
Sea water inundation	**Such type of situation not arise in Dahod district**			

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

Extreme event type	**Suggested contingency measures**			
Heat Wave	**Seedling/ Nursery stage**	**Vegetative stage**	**Reproductive stage**	**At Harvest**
Maize Paddy Soybean	Frequent shallow depth irrigation	Frequent shallow depth irrigation	Frequent shallow depth irrigation	

Pigeonpea				
Horticulture				
Mango	- Leaf mulching surrounding the plant	- Leaf mulching surrounding the plant	- Leaf mulching surrounding the plant	
Aonla				
Custard apple	- irrigation through basin method	- irrigation through basin method	- irrigation through basin method	
Guava				
Vegetable crops				
Cold Wave				
Frost	**Not applicable**			
Hailstorm				
Cyclone				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought			
Feed and fodder availability	As the district is occasionally prone to drought the following measures to be taken to ameliorate the fodder deficiency Avoid burning of wheat/paddy straw Establishment of fodder bank at village level with available dry fodder (paddy /wheat straw) Increase area under perennial fodder cultivation with high yielding Hybrid Napier varieties. Conservation of maize/bajra green fodder as silage Sowing of cereals (Sorghum/Bajra) and leguminous crops	Harvest and use biomass of dried up crops (Maize, Paddy, Wheat, Gram, Soybean, Pigeonpea etc.,) material as fodder Utilizing fodder from fodder bank reserves. Utilizing stored silage/hay. Transporting complete feed/fodder and dry roughages to the affected areas. Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured	Training/educating farmers for feed & fodder storage. Maintenance / repair of silo pits and feed/fodder stores. Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall etc., Supply of quality fodder seed

	(Lucerne, Berseem, Horse gram, Cowpea) during early East monsoon under dry land system for fodder production Encourage fodder production with Maize, Jowar, Bajra , Cowpea, Lucerne etc., Processing & storage of feed/fodder and roughages in the form of complete feed/blocks.	from Govt. Godowns for feeding as supplement for high productive animals during drought Continuous supplementation of mineral mixture to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	(multi cut sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass well before monsoon Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and disease management	Procure and stock emergency medicines and vaccines for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Vaccination for HS & FMD Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures	Carryout deworming to all animals entering into relief camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Drainage of water from and around animal sheds, pasture areas.	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need 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

	Procure and stock multivitamins & area specific mineral mixture	Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	
Floods	**Not applicable**		
Cyclone	In case of early forewarning (EFW), harvest all the crops (Maize, Paddy, Wheat, Gram, Soybean, Pigeonpea etc.) that can be useful as feed/fodder in future (store properly) Keeping sufficient of dry fodder to transport to the flood affected villages Don't allow the animals for grazing if severe floods are forewarned Keep stock of bleaching powder and lime Carry out Butax spray for control of external parasites Identify the Clinical staff and trained paravets and indent for their services as per schedules Identify the volunteers who can serve in need of emergency Arrangement for transportation of animals from low lying area to safer places and also for rescue animal health workers to get involve in rescue operations	Transportation of animals to elevated areas Proper hygiene and sanitation of the animal shed In severe storms, un-tether or let loose the animals Use of unconventional and locally available cheap feed ingredients for feeding of livestock. Avoid soaked and mould infected feeds / fodders to livestock Emergency outlet establishment for required medicines or feed in each village Spraying of fly repellants in animal sheds	Repair of animal shed Bring back the animals to the shed Cleaning and disinfection of the shed Bleach (0.1%) drinking water / water sources Encouraging farmers to cultivate short-term fodder crops like sunhemp, Lucerne, berseem, maize etc.,. Deworming with broad spectrum dewormers Proper disposable of the dead animals / carcasses by burning / deep burying (4-8 feet) with lime powder (1kg for small ruminants and 5kg for large ruminants) in pit Drying the harvested crop material and proper storage for use as fodder.

Heat wave	Arrangement for protection from **heat wave** i) Plantation around the shed ii) H_2O 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	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinkerlers/fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for late grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves In severe cases, put on the heaters at night times Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2. Poultry

	Suggested contingency measures		
	Before the event*	During the event	After the event
Drought			
Shortage of feed ingredients	• Purchase sufficient quantity of ready feed / raw feed ingredients as per storage facilities and requirement. • Indentify 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.	• 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.	• Shift over to good quality feed for optimum production performance.
Drinking water	• Tube well and water storage facilities should be adequately created.	• 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.	• Use water sanitizers (chlorination/Sokrena / Vigrox etc.) and softeners (pH. 6).
Health and disease management	• Use of anti-stress vitamins (AD_3ECB_{12}-Vimeral / Famitone / Stressvell etc.) in feed and drinking water. • Use of adaptogenetic herbal medicines (Zetress / Zist etc). • 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.	• 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.	• 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	• Purchase sufficient quantities of ready feed / raw feed ingredients. • 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.	• Use of toxin binders (Chek–O-Tox/ UTPP etc.) in the feed. • All electric connections should be in good condition to avoid shock and accident.	• Use of Toxin binder should be continued to avoid development of mycotoxins in the feed
Drinking water	• Drinking water should be stored in over head tanks. • Underground water tanks should be repaired and closed properly to avoid contamination.	• Use of water sanitizers and softeners.	• Check water quality and accordingly use water sanitizers and water softeners for optimum pH.
Health and disease management/construction of poultry shed	• 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)	• Use of probiotics / or antibiotics in feed to protect birds from bacterial infections like E.coli, CRD, Enteritis etc.	• Use of probiotics should be continued in feed for 10-15 days.

* 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

	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		

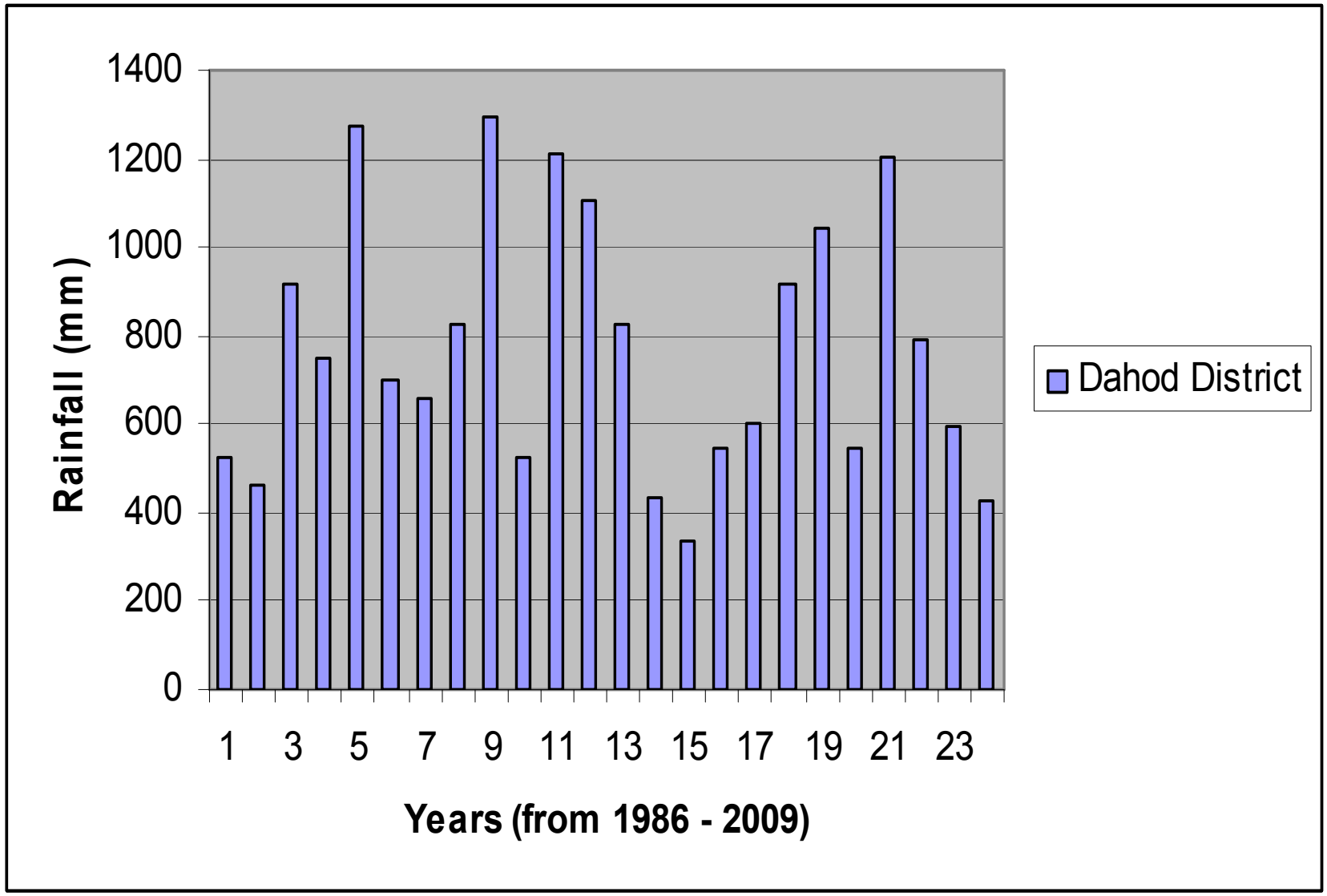
	fisheries.		
Marine			
Inland	All the fishermen must call back from fishing	No fishing	
(i) Average compensation paid due to loss of human life	1. Recognizing the risk of flood & making the people aware of it 2. Migrate the people at safe place 3. Collect the details information of swimmers & life savers appliances.	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
(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 from culture ponds and preserved or sale at market 3. Protect the pond dykes with sand bags.		1. Harvest the culture fish & wild fish which came with flood water. 2. Disinfect the ponds with chemicals
(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	Transfer the stock and inputs at safe	-	Demolish the decayed feed

(feed etc)	places		
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 bags. 3. Place the iron screen on inlet and outlet	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			
(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 pond environment (water quality)	Exchange of water to maintain the water temperature and water parameter	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.	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	Take some preventive measures to protect from disease	Use of probiotics as well as fresh and live feed	
(iii) Any other			

Location of Dahod district in Gujarat - Annexure-1

Mean Annual rainfall of Dahod district – Annexure-II



Soil Map of Gujarat district – Annexure-III