State: PUNJAB

Agriculture Contingency Plan for District: GURDASPUR

1.0 District Agriculture profile				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Northern Plain, Hot Subhumib (Dry) Eco-Region (9.1) Western Himalayas, Warm Subhumid (To Humid With Inclusion Of Perhumid) Eco-Region (14.2)		
	Agro-Climatic Zone (Planning Commission)	West Himalayan Region (I)		
	Agro Climatic Zone (NARP)	Sub-Mountainous Undulating Zone (PB-1) Undulating Plain Zone (PB-2)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Chandigar, Roopnagar, Fathehgarhsahib, Nawanshahr		
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**
		32º02'01.35" N	75º24'26.73" E	285 M
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, Gurdaspur Pin- 143521		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, PAU Regional Research Station, Gurdaspur, Pin- 143521		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Regional Research Station, Gurdaspur, KVK Gurdaspur Pin- 143521		

1.2	**Rainfall**	**Normal RF(mm)**	**Normal Rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-September):	752.1	-	1st week of July	2nd week of Sept.
	NE Monsoon(October - December):	56.3	-	-	-
	Winter (January - February)	140.7	-		
	Summer (March - May)	46.9	-		
	Annual	996.0	-		

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	356	287	37	21	-	-	-	6	-	-

1. 4	**Major Soils**	**Area ('000 ha)**	**Percent (%) of total geographical area**
	Coarse loamy and fine loamy associations	178.2	50
	Fine loamy associations	124.7	35
	Coarse loamy soils	53.5	15

* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets (data source: Soil Resource Maps of NBSS & LUP)

1.5	**Agricultural land use**	Area (‘000 ha)	Cropping intensity %
	Net sown area	287	176
	Area sown more than once	219	
	Gross cropped area	506	

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	233		
	Gross irrigated area	439		
	Rainfed area	54		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals (5% area under canal irrigation)		55	
	Tanks	-	-	
	Open wells		-	
	Bore wells	86639	178	
	Lift irrigation schemes		-	
	Micro-irrigation		-	
	Other sources (please specify)		-	
	Total Irrigated Area		233	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	7	63	Fit water with respect to residual sodium carbonate, no problem of salinity and fluoride in water.
	Critical	-		
	Semi- critical	-		
	Safe	4	37	
	Wastewater availability and use	-		
	Ground water quality	-		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

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

1.7	S. No.	Major field crops cultivated	Area ('000 ha)							
			Kharif			*Rabi*			Summer	Grand total
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	1	Rice	201	-	201	-	-	-	-	201
	2	Maize	13	-	13	-	-	-	-	13
	3	Sesamum	2	-	2	-	-	-	-	2.0
	4	Arhar (Redgram)	-	-	-	-	-	-	-	-
	5	Moong (Greengram)	-	-	-	-	-	-	-	-
	6	Cotton	-	-	-	-	-	-	-	-
	7.	Wheat	-	-	-	231	-	231	-	231
	8	Barley	-	-	-	-	-	-	-	-
	9	Rapeseed and Mustard	-	-	-	1	-	1	-	1
	10	Sunflower	-	-	-	-	-	-	-	-

	S. No.	Horticulture crops - Fruits	Area ('000 ha)	Production (000 t)	Productivity (kg / ha)
			Total		
	1	Mangoes	2.1	30.567	14824
	2	Litchi	1.0	16.436	14874
	3	Kinnow	0.5	10.219	18648

	4	Guava	0.2	3.300	21430
	5	Orange and malta	0.1	0.461	7550
	6	Amla	0.1	1.248	13424
	7	Pear	0.1	1.485	22844
	8	Plum	0.02	0.436	17450
	9	Peach	0.04	0.620	17720
	10	Lemon	0.005	0.038	7530
	11	Ber	0.005	0.069	17145
	12	Misc	0.01		
		Horticulture crops -Vegetables	**Total**		
	1	Potato	0.3		
	2	Onion	0.03		
	3	Winter Vegetables	0.4		
	4	Summer vegetables	0.7		
		Medicinal and Aromatic crops	-		
	Others (specify)		-		
		Plantation crops	-		
	Others (Specify)	Eg., industrial pulpwood crops etc.	-		
		Fodder crops	-		
	Others (Specify)		-		
		Total fodder crop area	-		
		Grazing land	-		
		Sericulture etc	-		
		Others (specify)	-		

1.8	**Livestock (in number)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	6.2	20.7	26.8
	Crossbred cattle	14.8	101.5	116.2
	Non descriptive Buffaloes (local low yielding)	1.02	12.0	13.03
	Graded Buffaloes	26.7	241.6	268.4
	Goat	3.1	7.5	10.6
	Sheep	1.4	2.9	4.3
	Others Equine (Horse &Pony)	1.9	0.8	3.8
	Commercial dairy farms (Number)			0.1
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	561	3022.8	
	Backyard	-	18.6	

1.10	**Fisheries (Data source: Chief Planning Officer of district)**						
	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**	
		379		01		224	

	B. Culture			
		Water Spread Area (ha)	**Yield (t/ha)**	**Production ('000 tons)**
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	-	-	-
	ii) Fresh water (Data Source: Fisheries Department)	623.3	5.8	3.6

1.11 Production and Productivity of major crops (2008-09)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder (‘000 tons)
		Production ('000 M t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
1	Rice	663	3298	-	-	-	-	663	3298	-
2	Maize	30	2292	-	-	-	-	30	2292	-
3	Arhar	-	-	-	-	-	-	-	-	-
4	Moong	-	-	-	-	-	-	-	-	-
5	Cotton	-	-	-	-	-	-	-	-	-
6	Wheat	-	-	927	4013	-	-	927	4013	-
7	Barley	-	-	-	-	-	-	-	-	-
8	Rapeseed and Mustard	-	-	3	1089	-	-	3	1089	-
9	Sesamum	0.2	-	-	-	-	-	0.2	-	-
10	Potato	-	-	7.0	23215	-	-	7.0	23215	-

Major Horticultural crops (Crops to be identified based on total acreage)		
	Crop	**Production (‘000 t)**
1	Kinnow	8.7
2	Orange and malta	0.4

3	Lemon	0.04
4	Mangoes	29.8
5	Litchi	15.0
6	Guava	3.3
7	Pear	1.8
8	Peach	0.7
9	Plum	0.4
10	Amla	1.1
11	Ber	0.1
12	Misc	0.1

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Paddy**	**Wheat**	**Spring Maize**	**Maize**	**Oilseeds**
	Kharif- Rainfed	-	-	-	-	-
	Kharif-Irrigated	2nd week of June to 1st week july	-	-	4th week of May to 4th week of June	-
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	4th week October to 1st week December	-	-	2nd week of October to 1st week of December
	Spring-Irrigated	-	-	4th week of January to 2nd week of February	-	-

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood		✓	
	Cyclone			✓
	Hail storm		✓	
	Heat wave	✓		
	Cold wave	✓		
	Frost		✓	
	Sea water intrusion			✓
	Pests and disease outbreak (Yellow rust on wheat, BLB on paddy, Late blight on potato, Sucking pests like aphids, jassid, whitefly, Mealy bug in cotton)		✓	
	Others Yellow vein mosaic virus in Mungbean		✓	

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes / No
		Mean annual rainfall as Annexure 2	Enclosed: Yes / No
		Soil map as Annexure 3	Enclosed: Yes / No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation (100 per cent area is irrigated)

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (Specify month)*	NA				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (Specify month)	NA				

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 (Specify month)	NA				

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 (Specify month)	NA				

Condition			Suggested Contingency measures		
Early season drought **(Normal 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.	NA				

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	NA				

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/ fruiting stage	NA				

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	NA				

2.1.2 Drought - 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	**Tube well irrigated alluvial soils**	Paddy Maize Wheat Rapeseed and Mustard	Coarse rice should be replaced with short duration varieties (PR-115) and Basmati rice (Pusa Basmati-1, Pusa 1121, Punjab Basmati-2, Punjab Mehak)	• Direct seeding of paddy and laser land leveling should be done which saves 20-25% irrigation water • Zero till sowing of Raya which saves irrigation water	Pun seed, NSC, P A U and progressive farmers**.**

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	Tubewell irrigated alluvial soils	Paddy Maize	Paddy should be replaced with Basmati Rice, Maize. Wheat can	• Direct seeding of paddy and	**Pun seed NSC, P A U and**

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
low rainfall		Wheat Rapeseed and Mustard Summer Moong	be rep oilseeds maize (PMH 2 and JH 3459), Soybean (SL 744 and SL 525) Toria (PBT 37) Raya (PBR 210 and PBR 97) Gobhi Sarson (PGSH 51 and GSL 2)laced with oilseeds	laser land leveling should be done which saves 20-25% irrigation water • Bed planting of summer Moong (67.5×37.5 cm) which saves 20-30% irrigation water	**Progressive farmer**

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	Tube well irrigated alluvial soils	Paddy Maize Wheat Rapeseed and Mustard	Paddy may be replaced by Maize(PMH 2 and JH 3459),, Soybean (SL 744 and SL 525) Moong varities like ML-267 and ML-613 can be grown	Bed planting of Soybean and Maize laser land leveling should be done Which saves 20-25% irrigation water	**Punseed, N S C, P A U and Progresive farmer**

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	Tubewell irrigated alluvial soils	Paddy Maize Wheat Rapeseed and Mustard Summer moong	**"No change")**	• Laser land leveling should be done which saves 20-25% of irrigation water • Wheat can be sown with Happy seeder technology immediately after harvesting of paddy which saves pre sowing irrigation • Summer moong can also be sown with Happy seeder technology.	Punseed, N S C, P A U and Progresive farmer

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Paddy	Drain away the excess water	Drain away the excess water	Drain away the excess water	
Maize	Drain away the excess water and spray 6kg urea/acre in two sprays at weekly interval or broadcast additional nitrogen @ 25-50 kg urea per acre after flooding is over	Do not allow the rain water to stand in the main crop as this crop is highly sensitive to standing water and	-	-

		promotes bacterial stalk rot		
Wheat				Store new grains in clean godowns or receptacles. Plug all cracks, cervices and holes in the godowns thoroughly. Disinfest old gunny bags by dipping them in emulsion of 6 ml Sumicidin 20EC or 5 ml Cymbush 25 EC in 10 litres of water for 10 minutes and dry them in shade before filling with grains or use new gunny bags.
Summer Moong	Sowing of Summer mungbean should not be delayed after 3rd week of April otherwise it will result in yield loss if heavy rains comes at maturity			
Horticulture crops				
Mango		Drain out excess water		
Kinnow (Mandarin)				
Guava				
Crop4				
Crop5				
Heavy rainfall with high speed winds in a short span				
Wheat			Do not irrigate on windy or stormy days	
Rice	Avoid early planting of rice to keep the incidence of BLB under check.			
Maize	Trench sowing of maize resists lodging			
Horticulture				

Crop1 (specify)	The excess rain water when stagnates for several days is harmful to the orchard trees. Adopt prompt measures to drain out excess water.			
Outbreak of pests and diseases due to unseasonal rains				
Rice	-	Blight develops more in high humid conditions. Farmers should not allow stagnation of water in the fields.	If high humidity and cloudy weather prevails the crop may be sprayed with Blitox/ copper oxychloride 50 WP @ 500 g in 200 litres of water/acre to control False smut and after 10 days of its application spray Tilt @ 200 ml/acre in 200 litres of water. Start the spray at the boot stage.	
Maize	Brown stripe downy mildew disease: Keep the field well drained spray Indofil M-45 @ 200 g /acre after fortnight of sowing	Bacterial Stalk rot of maize: Keep the fields well drained and destroy the diseased plant debris		
Wheat		Grow yellow rust resistant varieties	Spray of Tilt 500 ml in 500 litres of water for one hectare.	Do not grow PBW 343
Horticulture				
Crop1	In case of occurrence of root damage due to water stagnation in Pear, Peach etc. apply 10 g Bavistin 50 WP + 5 g Vitavax 75 WP in 10 litres of water along the trunk after draining out the excess water and drying of soil. Prune the dried ends of the branches alongwith 5-8 cm of the live wood.			
Mango				

Citrus				
Guava				

2.3 Floods: In general there are no floods

Condition	**Suggested contingency measure**			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Rice				
Wheat				
Maize				
Horticulture				
Mango				
Citrus				
Guava				
Continuous submergence for more than 2 days				
Rice				
Wheat				
Maize				
Horticulture				
Mango				
Citrus				
Guava				
Sea water intrusion	NA			

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

Extreme event type	Suggested contingency measures			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave				
Maize	Sowing of spring maize should not be delayed after 15 February since it will results in yield loss due to high temperature.		Spread the mulching material in the standing maize crop in the last week of August to avoid moisture stress	
Horticulture				
Crop1 (specify)	Apply frequent and light irrigations			
Cold wave				
Wheat	To late sown wheat, apply second dose of N with first irrigation.			
Mustard	To save the crop from frost damage, apply irrigation.			
Horticulture				
	The growers are advised to adopt the measures to save their valuable fruit trees from drought, windstorm and sun injury.			
Frost				
Horticulture				
Tomato	Complete transplanting of tomato seedling in the first fortnight of this month. **(end of November** Provide Sarkanda/kahi/Rice straw to save the plants from frost. Dwarf tomato varieties			

	cane be saved from frost injury with 100 gauge thick white plastic bags of 35 x 25 cm size. Twenty five kg bags are sufficient for an acre and these can be used for 2 to 3 years.			
Potato			To save the potato crop from frost damage use the sprinkler irrigation and give light irrigation through sprinkler during frosty nights	
Hailstorm				
Crop1				
Horticulture				
Crop1 (specify)				
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 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	Harvest and use biomass of dried up crops (Paddy Maize, Wheat, barley, soybean, Mungbean 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.	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,

	yielding Hybrid Napier varieties. Conservation of maize green fodder as silage Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production Encourage fodder production with Maize, Jowar, Bajra , Cowpea, Makkchari, Barseem, Jawi , Rayi grass, Lucerne and Japense grass Processing & storage of feed/fodder and roughages in the form of complete feed/blocks.	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 Continuous supplementation of mineral mixture to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	GAINT BAJRA, L-74, K-677, Ananad/African Tall etc., Supply of quality fodder seed (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 Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office	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	Keep close surveillance on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants

	in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	Restricting movement of livestock in case of any epidemic 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	Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods			
Feed and fodder availability	In case of early forewarning (EFW), harvest all the crops (paddy/wheat/barley/maize/ soybean/mungbean 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.
Cyclone	**Not applicable**		
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)
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)
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			Convergence/ linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice, barley etc, Culling of weak birds	Supplementation for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds	Supplementation to all the birds	
Drinking water	Rain water harvesting	Sanitation of drinking water	Give sufficient water as per the bird's requirement	
Health and disease management	Culling of sick birds. Deworming and vaccination against RD and fowl pox	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with line powder in pit	
Floods				
Shortage of feed ingredients	In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds	Use stored feed as supplement Don't allow for scavenging	Routine practices are followed	
Drinking water	Provide clean drinking water	Sanitation of drinking water	Sanitation of drinking water	
Health and disease	In case of EFW, add antibiotic powder in	Sanitation of poultry house	Disposal of dead birds by	

management	drinking water to prevent any disease outbreak	Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	burning / burying with line powder in pit Disposal of poultry manure to prevent protozoal problem Supplementation of coccidiostats in feed Vaccination against RD	
Cyclone	**Not a cyclone prone district.**			
Heat wave and cold wave				
Shelter/environment management	***Heat wave:*** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed	
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed	
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed	

2.5.3. Fisheries/ Aquaculture

	Suggested Contingency measures		
	Before the event	**During the event**	**After the event**
1. Drought			
A. Capture			
Marine	-	-	-
Inland			
(i) Shallow water depth due to insufficient rains/inflow	I) Critical analysis of long range forecast data. ii) Storage of water. iii) Afforestation program. iv) Conservation of rivers/reservoir/ponds. v) Re-excavation of local canals and reservoirs.	i) Use stored water. ii) Use surface water flow. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of water in ponds/reservoirs.	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Strengthening of water reservoirs. v) Rain water harvesting . vi) Compensation claims. vii) Prepare vulnerability map and place it to management committee.
(ii) Changes in water quality	i) Prohibit dumping of solid, liquid and waste in water sources. ii) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.	i) Use disinfectants and therapeutic drugs. ii) Adoption of bio-remedial measures	i)Need based research data should be generated on water quality. ii) Dumping of solid, liquid and waste in water bodies should be stopped through enactment of legislation.
(iii) Any other			
B. Aquaculture			

(i) Shallow water in ponds due to insufficient rains/inflow	) Critical analysis of long range forecast data. ii) Storage of water. iii) Afforestation program. iv) Conservation of rivers/reservoir/ponds. v) Re-excavation of local canals and reservoirs.	i) Use stored water. ii) Use surface water flow. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of ponds.	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoirs. v) Adoption of rain harvesting methods. vi) Compensation claims . vii) Prepare vulnerability map and place it to management committee.
(ii) Impact of salt load build up in ponds/Changes in water quality	i) Prohibit dumping of solid, liquid and waste in water sources. ii) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.	i) Use disinfectants and therapeutic drugs. ii) Adoption of bio-remedial measures	i)Need based research data should be generated on water quality. ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.
(iii) Any other	-	-	-
2. Flood			
A. Capture			
Marine	-	-	-
Inland			
(i) Average compensation paid due to loss of human life	i) Be prepared to evacuate at a short notice. ii) Preparation of flood control action plan.	i) Human evacuation from the area. ii) Coordination of assistance. iii) Damage and need assessment. iv) Immediate management of relief	i) Arrangement for rescue and casualty care. ii) Arrangement for burial control room.

	iii) Warning dissemination and precautionary response. iv) Formation of flood management committee. v) Enhancement in coping capabilities of common people. vi) Insurance for the life of people/fishermen.	supplies. v) Immediate help delivery.	iii) Restoration of essential services, security and protection of property. iv) Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan. v) Insurance and compensation claim.
(ii) No. of boats/nets damaged	i) Annual repair of boats/nets and gears. ii) Insurance of boats/nets/gears.	i) Coordination of assistance iii) Immediate management of relief supplies. iv) Govt. support and compensation.	i) Education and training for the repair of boats/nets and gears. ii) Loss assessment & insurance claim.
(iii) No. of houses damaged	i) Education and training for the repair of houses. ii) Store raw material for emergency repair of houses. iii) House insurance.	i) Arrangement of temporary shelters for homeless people. i) Damaged house enumeration and need assessment. ii)Coordination of assistance. iii) Immediate management of relief supplies.	i)Loss assessment & insurance claim. ii) Govt. assistance claim.
(iv) Loss of stock	i) Keep boats, nets/gears ready for emergency use. ii) Store fuels, food/other item iii) Develop flood control management plans. iv) Stock material insurance.	i) Search/locate the stock/input. ii) Mobilize local people for protection. iii) Hire stock/inputs from distant areas/company/ farmers who are not affected by flood.	i) Locate backup stocks and verify its usability time. ii) Follow flood control management plan. iii) Notify utilities of the critical demand about loss of stock and inputs. iv) Loss assessment & insurance

			claim.
(v) Changes in water quality	i) Provision to stop/close the effluent/sewerage discharge point in water bodies ii) Store chemicals, disinfectants and therapeutic drugs. iii) Develop flood control management plan.	i) Do not use contaminated water ii) Proper preparation and management through emergency aeration. iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iv) Immediate support of Govt./industrial organizations for maintaining the purity and quality of water bodies. v) Need based bioremediation	i) Need based research data should be generated to maintain water quality, iii) Dumping of solid, liquid and waste should be stopped through enactment of legislation. iv) Contact Govt. and industrial organization for immediate remedy and cleaning of the water bodies. v) Regular water monitoring and bio-monitoring of water bodies for formulation of management plan
(vi) Health and disease	i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Stock sufficient stores of medicines.	i) Prompt action or immediate removal of disease causing agents/ dead fish, followed by sterile or landfill disposal. ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iii) Emergency aeration or splashing in water bodies.	i) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. iv) Eradicating the disease where possible. v) Follow up surveillance and monitoring after disease outbreak. vi) Bio-monitoring and maintaining water quality. vii) Need based research data should be generated. vii) Loss assessment & insurance claim.

B. Aquaculture			
(i) Inundation with flood water	i) Proper facility construction for ponds and its stock safety. ii) Development of flood control management plan. iii)Preparedness with emergency backup equipment on site. iv) Stock insurance. v) Preventive measures against entry of alien/wild organisms through flood water.	i) Arrangement for evacuation. ii) Arrangement for rescue and casualty care. iii) Arrangement for burial control room. iv) Restoration of essential services, security and protection of property. v) Coordination of assistance. vi) Damage and need assessment. vii) Immediate management of relief supplies. viii) Release excess water from height of T. viii) Lower the water level in culture facilities.	i) Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan ii) Reallocate fish to maintain appropriate biomass so that waste assimilation capacity of pond is not exceeded. iii) Reduce or cease feeding because uneaten food and fish waste decreases the dissolved oxygen level. iv) Strengthening of water bodies/ponds. v) Loss assessment & insurance claim.
(ii) Water contamination and changes in water quality	i) Store chemicals, disinfectants and therapeutic drugs ii) Develop flood control management plan	i) Do not use contaminated water. ii) Proper preparation and management through emergency aeration (paddle wheel aerator/circulating aerator), that may improve water quality in affected areas. iii) Use appropriate amount of disinfectants, chemicals and	i) To maintain water quality, need based research data should be generated ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation. iii) Immediate remedy and cleaning of water bodies. iv) Regular water monitoring and bio-

		therapeutic drugs. iv) Maintaining the purity and quality of water bodies. iv) Need based bioremediation.	monitoring of water bodies for formulation of management plan.
(iii) Health and diseases	i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Stock sufficient emergency medicines.	i)Identification of type of disease outbreak, immediate removal of disease causing agents/ dead fish. ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iii) Determination of nature and speed of transmission of diseases. vi)Emergency aeration or splashing in water bodies.	i) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. ii) Eradicating the disease. iii) Follow up surveillance and monitoring. iv) Proper disposal of dead fish. v) Loss assessment & insurance claim.
(iv) Loss of stock and input (feed, chemicals)	i) Keep the stock/input at safe place for emergency purpose. ii) Store fuels, food/other item. iii) Develop flood control management plan. iv) Stock material insurance.	i) Search/locate the stock/input. ii) Purchase/hire valuable stock/inputs from distant areas not affected by flood.	i) Strengthening of stocks. ii) Assessment of total loss. iii) Insurance claims.
(v) Infrastructure damage (pumps, aerators, huts etc)	i) Educate and provide training for the repair of infrastructure. ii) Follow flood control management plan. iii) Store raw materials for repairing of pumps aerators, huts etc.	i) Notify utilities of the critical demand. ii)Coordination of assistance. iii) Immediate management of relief supplies.	i)Damaged infrastructure enumeration and need assessment. ii) Locate backup equipment and verify its operation. iii) Repair of damaged infrastructure. iv) Loss assessment & insurance

	iv) Infrastructure insurance.		claim.
(vi) Any other			
3. Cyclone / Tsunami	**Not a cyclone affected district.**		
A. Capture	-	-	-
Marine	-	-	-
(i) Average compensation paid due to loss of fishermen lives	-	-	-
(ii) Avg. no. of boats/nets damaged	-	-	-
(iii) Avg. no. of houses damaged	-	-	-
Inland	-	-	-
B. Aquaculture	-	-	-
(i) Overflow / flooding of ponds	-	-	-
(ii) Changes in water quality (freshwater/brackish water ratio)	-	-	-
(iii) Health and disease	-	-	-
(iv) Loss of stock and input (feed, chemicals etc.)	-	-	-
(v) Infrastructure damage (pumps, aerators, shelters/huts etc.)	-	-	-
(vi) Any other	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	i)Stay aware of upcoming temperature changes. ii) Arrange the aerators. iii) Ensure sufficient water level in	i) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves. ii) Use dark materials to cover the	i) Intensive afforestation program for reducing heat waves. ii) Collect basic weather data and incidence of extreme and physical

	water bodies. vi) Formulate strategic fishing management during the heat/ cold waves. v) Tree plantation around fish ponds	water bodies during excessive heat waves. iii) Stay hydrated by drinking plenty of fluids during fishing/field work. iv) Educating the farmers through electronic or print media	data of water bodies, water chemistry and seasonal changes, plankton profile and seasonal blooms, topography and soil composition. iii) Gather information about history of catch per unit effort as well as fish yield rate during heat wave and cold wave and accordingly simulate future plan for sustainable fishing. v) Loss assessment & insurance claim.
B. Aquaculture			
(i) Changes in pond environment (water quality)	i)Listen to local weather forecasts and stay aware of upcoming temperature changes. ii) Arrange the aerators. iii) Ensure sufficient water quantity in water bodies. iv)Formulate strategic fishing management for the heat /cold waves. v) Tree plantation around fish ponds	i) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves. ii) Use dark materials to cover the water bodies during excessive heat waves. iii) Stay hydrated by drinking plenty of fluids during fishing/field work. vi) Adopt proper care and management during the fishing period of cold/heat wave like keeping stock of drinking water and extra cloths. vi) Educating the farmers through electronic or print media	i) Intensive afforestation program for reducing heat waves. ii) Collect basic weather data and incidence of extreme and physical data of water bodies, water chemistry and seasonal changes, plankton profile and seasonal blooms, topography and soil composition. iii) Gather information about history of catch per unit effort as well as fish yield rate during heat wave and cold wave and accordingly simulate future plan for sustainable fishing. vi) Loss assessment & insurance claim.

(ii) Health and disease management	i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Develop heat/ cold wave control management plan. iv) Stock sufficient emergency medicines.	i)Identification of type of disease outbreak, immediate removal of disease causing agents/ dead fish. ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iii) Determination of nature and speed of transmission of diseases. vi)Emergency aeration or splashing in water bodies .	i) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread. ii) Eradicating the disease. iii) Follow up surveillance and monitoring. iv) Proper disposal of dead fish. v) Loss assessment & insurance claim.
(iii) Any other	-	-	-

[a] **based on forewarning wherever available**