State: PUNJAB

Agriculture Contingency Plan for District: TARN TARAN

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	North Punjab plain, Ganga-Yamuna Doab and Rajasthan upland, hot, dry, semi-arid eco-sub region (4.1)			
	Agro-Climatic Zone (Planning Commission)	Trans-Gangetic Plains Region (VI)			
	Agro Climatic Zone (NARP)	Central Plain Zone (PB-3)			
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Amritsar, North Kaputhala, firozpur, west side pakistan			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		31°26'59"N	74°55'12"E	251 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	**P A U Ludhiana 141004**			
	Mention the KVK located in the district with address	**KVK is not still established**			
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	**Punjab Agricultural University, Ludhiana 141004**			
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-Sep):	533.4	26	July 1st week	Sept. 2nd week
	NE Monsoon(Oct-Dec):	34.6	3	-	-

	Winter (Jan- March)	99.3	9	-	-
	Summer (Apr-May)	45.4	4	-	-
	Annual	712.7	42	-	-

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)	241	218	05	18	-	-	-	-	-	-

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***		
	Major soils	**Areas (000 ha)**	***Per cent of total (%)**
	Coarse loamy	36.28	15
	Coarse loamy and fine loamy associations	96.76	40
	fine loamy associations	108.86	45

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	218	182
	Area sown more than once	179	
	Gross cropped area	397	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	218		
	Gross irrigated area	397		
	Rainfed area	-		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area

	Canals		114	
	Tanks		-	
	Open wells		-	
	Bore wells	**59076**	104	
	Lift irrigation schemes		-	
	Micro-irrigation		-	
	Other sources (please specify)		-	
	Total Irrigated Area	11502	218	
	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	08	100	Fit to marginal water with respect to residual sodium carbonate, no problem of salinity and fluoride in water.
	Critical	-		
	Semi- critical	-		
	Safe			
	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	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Rice	169	-	169					169
	Moong	1.4	-	1.4					1.4
	Maize	1	-	1					1

	Arhar	0.9	-	0.9					0.9
	Cotton	1	-	1					1
	Wheat				186	-	269		269
	Barley				-	-	2		2
	Rapeseed and Mustard				-	-	1		1
	Sunflower							0.4	0.4
	Sesamum	1.7	-	1.7					1.7

	Horticulture crops - Fruits	**Area (000' ha)**		
		Total	**Irrigated**	**Rainfed**
	Kinnow	0.1	0.1	-
	Orange and malta	0.02	0.02	-
	Lemon	0.03	0.03	-
	Mangoes	0.1	0.1	-
	Litchi	0.001	0.001	-
	Guava	0.3	0.3	-
	Pear	0.8	0.8	-

	Peach	0.05	0.05	-
	Plum	0.01	0.01	-
	Grapes	0.003	0.003	-
	Ber	0.02	0.02	-
	Amla	0.002	0.002	
	Misc	0.05	0.05	-
	Vegetables	**Total**	**Irrigated**	**Rainfed**
	Potato	0.3	0.3	-
	Onion	0.01	0.01	-
	Winter Vegetables	0.5	0.5	-
	Summer vegetables	0.2	0.2	-
	Medicinal and Aromatic crops	**Total**	**Irrigated**	**Rainfed**
		-	-	-
	Plantation crops	**Total**	**Irrigated**	**Rainfed**
		-	-	-
	Fodder crops	**Total**	**Irrigated**	**Rainfed**
		-	-	-

	Total fodder crop area	-	-	-
	Grazing land	-	-	-
	Sericulture etc	-	-	-

1.8	**Livestock (in number)**	**Male**	**Female**	**Total**
	Non descriptive Cattle (local low yielding)	942	3943	4885
	Crossbred cattle	12561	57087	69648
	Non descriptive Buffaloes (local low yielding)	2789	11736	14525
	Graded Buffaloes	33359	243231	276590
	Goat	4333	11307	15640
	Sheep	3102	8890	11992
	Others Equine (Horse &Pony)	811	632	1443
	Commercial dairy farms (Number)			100
1.9	**Poultry**	**No. of farms**	**Total No. of birds**	
	Commercial	28	492228	
	Backyard		22120	

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	**No. Farmer owned ponds**	**No. of Reservoirs**	**No. of village tanks**

	Department)	**70**	**-**	**155**

	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)	324.55	6.11	1.9839

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

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)										
	Rice	525	3105					525	3105	
	Maize	03	3403					03	3403	
	Arhar	1.1	-					1.1	-	
	Moong	0.1	-					0.1	-	
	Cotton	0.74	743					0.74	743	
	Wheat			856	4603			856	4603	
	Barley			-	-			-	-	
	Rapeseed and			-	-					

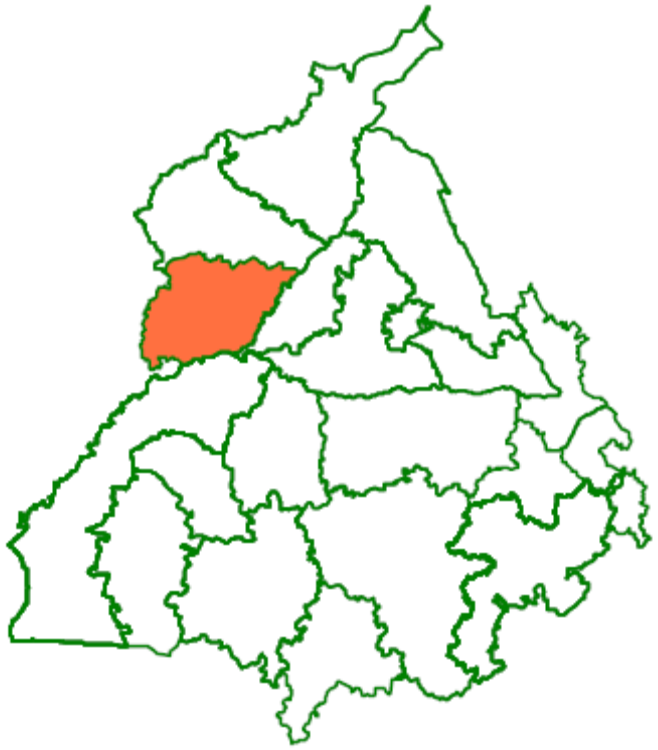
	Mustard									
	Sunflower					0.7	1752	0.7	1752	
	Sesamum	0.70						0.7		
	Potato			9.4	23474			9.4	23474	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Crop	**Production Meteric tonnes**	**Productivity Kg/ha**							
	Kinnow	2006	18520							
	Orange and malta	159	7610							
	Lemon	274	7640							
	Mangoes	1378	13245							
	Litchi	13	1262							
	Guava	6882	21240							
	Pear	18027	21940							
	Peach	890	17540							
	Plum	240	17744							
	Grapes	84	28124							
	Ber	360	17471							
	Amla	26	13172							
	Misc	692								

1.12	**Sowing window for 5 major field crops**	Paddy	Wheat	Cotton	Maize	Oilseeds
	Kharif- Rainfed	-	-	-	-	-
	Kharif-Irrigated	2nd week of June to 1st week july	-	2nd week April to 4th week May	4th week May to 4th week june	
	Rabi- Rainfed	-	-	-	-	-
	Rabi-Irrigated	-	4th week Oct. to 1st week Dec.	-	-	2nd week Oct. to 1st week Dec.
	Spring-Irrigated	-	-	-	Sunflower 2nd week to 4th week	-

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
		Mean annual rainfall as Annexure 2	Enclosed: No
		Soil map as Annexure 3	Enclosed: No

TARN TARAN DISTRICT PUNJAB



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	Not applicable				
Delay by 4 weeks					
Delay by 6 weeks					
Delay by 8 weeks					

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.	Not applicable				

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	Not applicable				

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	Not applicable				

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**
	Not applicable				

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	Tubewell irrigated alluvial soils	Paddy Maize Wheat Cotton Sunflower	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. Sowing of cotton on ridges prepared with cotton planter in furrows Sowing of sunflower may be delayed upto end of January. PSH-569 variety can be grown upto Ist week of February	Direct seeding of rice saves about 20% of irrigation water. Laser leveling of field also saves 20-25 % of irrigation water. Delayed sowing of Sunflower saves the irrigation water.

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	Tube well irrigated alluvial soils	Paddy Maize Wheat Cotton Sunflower Gobhi Sarson	Paddy should be replaced with basmati rice, maize. Wheat can be replaced with oilseeds	Direct seeding of paddy and laser land leveling should be done. Trench planting of maize can be done Sunflower can be grown by transplanting of nursery in February. Bed planting of Gobhi sarson can be done	Direct seeding of rice saves about 20% of irrigation water. Laser leveling of field also saves 20-25 % of irrigation water. Trench planting of maize saves irrigation water.. Bed planting of Gobhi sarson saves 20-25% irrigation watertt

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 Sunflower Cotton	Paddy may be replaced by maize, Soybean and mung bean	Bed planting of soybean and maize laser land leveling should be done Cotton nursery of 3 weeks old can be transplanted for gap filling.	Bed planting saves 20-25 % irrigation water. Laser leveling of field also saves 20-25 % of irrigation water

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	Not Applicable				

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 Sunflower Cotton	Paddy may be replaced with the low water requiring crops like kharif mungbean, soybean and Groundnut	Laser land leveling should be done Wheat: Wheat can be sown with Happy seeder technology immediately after harvesting of paddy. Cotton can be grown on ridges	Laser leveling of field saves 20-25 % of irrigation water. Sowing of wheat with happy seeder immediately after harvest of paddy saves pre sowing irrigation

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**
Cotton	Drain out the Excess water, grow the cotton crop on ridges	Cotton crop is highly sensitive to standing water during early growth stages. Hence, drain out the excess water from the cotton fields	-	-

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 mungbean	Sowing of Summer mungbean should not be delayed after IIIrd week of April otherwise it will results in yield loss if heavy rains comes at maturity	-	-	-
Horticulture crops	-	Drain out excess water	-	-
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	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	-	-	-	-
Maize	Brown stripe downy mildew disease. Keep the field swell 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 debrisvm,	-	-
Cotton	Bacterial blight, Spray the crop with Blitox 50 (5600g)+ Agrimycin (20g)/ Streptocyclin (3g) per acre at 15-20days interval starting just after first shower of rain Parawilt occurs when heavy rain occurs. The affected plants can be saved by spraying cobalt chloride (10ppm)	-	-	-
Horticulture	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.	-	-	-

2.3 Floods:

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days	Not applicable			
Sea water intrusion				

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				
Sunflower	Sowing of sunflower on ridges saves the water during the hot months.	-	Since the weather is quite hot during April, apply irrigations at 8-10 days interval for good growth of sunflower. The crop should not be under stress at flowering, soft dough and hard dough stages.	-
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	-
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.		
Tomato	Complete transplanting of tomato seedling in the frost fortnight of this month. 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.	-	-	-
Frost	Not applicable			
Hailstorm	Not applicable			
Cyclone	Not applicable			

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	Increase area under fodder cultivation. Collection and storage of wheat/paddy straw. Processing & storage of dry roughages in the form of blocks. Establishing fodder banks and preserving	Utilizing fodder from fodder bank reserves. Utilizing fodder stored in silos. Transporting fodder and dry roughages to the affected area.	Educating farmers for feed & fodder storage. Maintenance/repair of silo pits.

	excess fodder as silage and hay.	Arrange concentrate feeds.	
Drinking water	Preserving water in the village ponds for drinking purpose. Excavation of bore wells. Rain water harvesting on individual farm/community basis.	Using preserved water from village ponds for drinking. Ground water resources to be exploited for drinking purposes.	Maintenance & cleaning of village ponds. Create rain harvesting facilities.
Health and disease management	Preparedness with sufficient stocks of medicines. Vaccination of animals. Insurance of animals.	Conducting mass animal health camps and treating the affected animals.	Culling sick animals. Insurance claims.
Floods			
Feed and fodder availability	Establishing feed & fodder reserves at places safe from floods. Processing & storage of dry roughages in the form of blocks. Using excess fodder for silage/hay making.	Moving feed and fodder from the reserves to affected areas.	Maintenance and strengthening of feed & fodder storage facilities. Ensure availability of quality feed and fodder for high yielding animals.
Drinking water	Excavation of deep bore wells.	Supply of clean and safe water to the animals.	Cleaning and disinfection of village ponds.
Health and disease management	Provision of community shelters at safe places. Proper & timely vaccination along with sufficient stock of medicines. Constitution of Rapid Action Veterinary force.	Shifting of animals from affected areas to safe places at short notice. Quick action by Rapid Action Veterinary force for animal treatment.	Proper disposal of carcasses of dead animals. Culling of sick animals. Insurance & govt. relief claims.
Cyclone	**Not a cyclone prone district**		
Feed and fodder availability			
Drinking water			
Health and disease management			

Heat wave and cold wave			
Shelter/environment management	Shady tree plantation around animal facilities. Encourage low cost environmentally effective well ventilated shelters. Cleaning of village ponds on community basis. ***Preponderances*** for stress related diseases.	Use protective measures to reduce the effects of cold / heat wave with the use of suitable techniques/feed supplements. Use village ponds for wallowing during heat wave. Ensure fresh drinking water supplies. Take special care of high yielding animals.	Plantation of shady trees and wind breakers around animal facilities/farms. Strengthening of water supply resources/village ponds.
Health and disease management	Provision of community shelters/hospitals for animal treatments. Proper & timely vaccination. Ensure sufficient stock of medicines.	Visits of rapid action force teams in affected area & treatment of animals. Testing the immunity.	Keep the hyper sensitive animals under observation. Proper feed and fodder supply for reconditioning the affected 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	Establishing feed reserve banks.	Utilizing feed from feed reserve banks.	Strengthening of feed storage facilities.	
Drinking water	Strengthening of water supply sources.	Ensure sufficient drinking water supplies. Judicious use of water.	Creating rain harvesting facilities at individual farms.	

Health and disease management	Vaccination of birds. Veterinary preparedness with sufficient medicine stocks.	Critical observation of flocks for any infection on daily basis.	Culling and disposal of affected birds.	
Floods				
Shortage of feed ingredients	Ensure feed reserves to meet requirements for 2-3 months.	Use feed from feed reserves. Arrange feed from other area.	Cleaning & disinfection of feed stores. Dispose of fungal contaminated feed.	
Drinking water	Excavation of deep bore wells.	Use water from deep bore well.	Maintenance of water supply sources.	
Health and disease management	Emergency veterinary preparedness with sufficient stocks of medicines.	Deworming of birds. Visit of rapid action force to the affected area for emergency treatment.	Culling affected birds. Proper disposal of dead carcasses. Cleaning and disinfection of poultry houses.	
Cyclone				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management	Build comfortable shelter. Tree plantation/wind breakers around poultry facilities.	Ensure supply of fresh drinking water. Use cooling or heating devices for comfort of birds. Use protective measures to reduce the effects of cold / heat wave with the use of suitable techniques/feed	Repair/maintenance of shelters.	

		supplements.		
Health and disease management	Vaccination of birds. Emergency veterinary preparedness with medicines.	Watch the flocks for any infection critically Testing the titer against RD Quick treatment of birds against any disease outbreak.	Reconditioning of birds. Culling and disposal of affected birds.	

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, wetlands/village ponds. v) Re-excavation of local canals/ponds.	i) Use stored water. ii) Make judicious use of available water sources. iii) Divert water from unutilized areas. iv) Utilize canal water. v)Aeration of fish ponds.	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoir. v) Adoption of rain harvesting methods. vii) Prepare vulnerability map.
(ii) Changes in water quality	i) Dumping of solid, liquid and	i) Use disinfectants and therapeutic	i) To maintain water quality, need

	waste should be stopped. ii)Store chemicals, disinfectants and therapeutic drugs.	drugs. ii) Adoption of bio remedial measures	based research data should be generated. ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	i) Critical evaluation of long range forecast data. ii) Storage of water. iii) Afforestation program. iv) Installation of tube wells. v) Conservation of rivers/wetlands/dams. vi) Re-excavation of local canals and ponds	i) Use stored water. ii) Make judicious use of available water sources. iii) Divert water from unutilized areas. iv) Utilize canal water. v)Aeration of fish ponds.	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoir. v) Adoption of rain harvesting methods. vii) Prepare vulnerability map.
(ii) Impact of salt load build up in ponds/Changes in water quality	i) Store chemicals, disinfectants and therapeutic drugs.	i) Immediate examination of water samples. ii) Use appropriate disinfectants and therapeutic drugs. iii) Adoption of bio-remedial measures. iv)Reduce salinity to moderate levels for increasing survival rate of fish/prawn/other organisms with the application of scientific techniques.	i) Need based research data should be generated. ii) Cleaning of water bodies. iii) Regular water monitoring and bio-monitoring of water bodies.
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. iii) Warning dissemination and precautionary response. iv) Formation of flood management committee. v) Mobilize local committees for protection. vi)Enhancement in coping capabilities of common people. vii) Insurance for the life of people/fishermen.	i) Human evacuation from the area. ii) Coordination of assistance. iii) Damage and need assessment. iv) Immediate management of relief supplies. v) Immediate help and compensation delivery during emergency.	i) Arrangement for rescue and casualty care. ii) Arrangement for burial control room. 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 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/ training for technical knowledge for the repair of boats/nets and gears. ii) Provision for evacuation. iii) Loss assessment & insurance claim.
(iii) No. of houses damaged	i) Educate and provide training for the repair of houses. ii) Store raw materials for repairing	i) Damaged house enumeration and loss assessment. ii)Coordination of assistance.	i) Repair of damaged houses. ii) Loss assessment & insurance claim.

	of houses. iii) House insurance.	iii) Immediate management of relief supplies. iv) Immediate support and compensation.	
(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)Mobilize local people for protection ii)Hire stock/inputs from areas/company/ farmers who are not affected by flood.	i) Locate backup stocks and verify its usability. 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/sewage discharge point in to 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 organization 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, ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation. iii) Contact govt. and industrial organization for immediate remedy and cleaning of the water bodies. iv) Regular water monitoring and bio-monitoring of water bodies for formulation of management plan.
(vi) Health and disease	i) Advance planning and	i)Prompt action or immediate	i) Laboratory diagnosis of disease

	preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Stock sufficient stock of medicines.	removal of disease causing agents/ dead fish. ii)Proper disposal of dead fish. iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iv) Emergency aeration or splashing in water bodies.	fish, generation of data about type or kind of disease spread. ii) Eradicating the disease where possible. iii)Follow up surveillance and monitoring after disease outbreak. iv) Bio-monitoring and maintaining water quality. v)Need based research data should be generated. vi) Loss assessment & insurance claim.
B. Aquaculture			
(i) Inundation with flood water	i) Proper facility construction /strengthening for ponds and its stock safety. ii) Development of flood control management plan. iii) Arrangement of emergency backup equipment on site. iv) Insurance of stocks. v) Prevention from 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.	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 wastes causes decrease in dissolved oxygen level. iv) Strengthening of water bodies/ponds. v) Loss assessment & insurance

		ix) Lower the water level in culture facilities.	claim.
(ii) Water contamination and changes in water quality	i) Provision to stop/close the effluent/sewage discharge into 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 organization for maintaining the purity and quality of water bodies. iv) Need based bioremediation.	i) Need based research data should be generated to maintain water quality, ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation. iii) Contact govt. and industrial organization for immediate remedy and cleaning of water bodies. iv) Regular water monitoring and bio-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, prompt action or immediate removal of disease causing agents/ dead fish. ii) Proper disposal of dead fish. iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iv) Determination of nature and speed of transmission of diseases. v) Proper preparation and	i) laboratory diagnosis of disease fish, generation of data about type or kind of disease occurrence. ii) Eradicating the disease. iii) Follow up surveillance and monitoring after disease outbreak. iv) Proper disposal of dead fish. vii) Loss assessment & insurance claim.

		management through emergency aeration.	
(iv) Loss of stock and input (feed, chemicals)	i) Keep the stock/input in safer place for emergency purpose. ii) Store fuels, food/other items. iii) Develop flood control management plan. iv) Stock material insurance.	i) Search/locate the stock/input, if the condition is good can be used for the purpose otherwise discard it. ii) Mobilize local people for protection. iii) Purchase/hire valuable stock/inputs from areas/company/ farmers who are not affected by flood	i) Strengthening of stock. ii) Assessment of total loss. iii) Insurance claims.
(v) Infrastructure damage (pumps, aerators, huts etc)	i)Training for emergency the repair of infrastructure. ii) Store raw materials for repairing of pumps aerators, huts etc. iii) Infrastructure insurance.	i) Damaged infrastructure enumeration and need assessment. ii) Locate backup equipment and verify its operation. iii)Coordination of assistance. iv)Immediate management of relief supplies. .	i) Locate backup equipment and verify its operation. ii) Notify utilities of the critical demand. iii) Repair of damaged infrastructure. iv) Loss assessment & insurance claim.
(vi) Any other			
3. Cyclone / Tsunami	**Not a cyclone prone district.**	**Not a cyclone prone district.**	**Not a cyclone prone 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.)	-	-	-
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	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 during the heat waves or 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) Adopt proper care and management during the fishing period of cold/ heat waves like keeping stock of drinking water and extra cloths. iv) Educating the farmers through electronic / print media	i) Intensive afforestation program. ii) Collect basic weather data on incidence of extreme as well as 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.

			iv) 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 during heat/cold waves. v) Tree plantation around fish ponds.	i) Avoid extreme temperature changes as well as low temperature changes for the safety of fishermen life. ii) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves. iii) Use dark materials to cover the water bodies during excessive heat waves. iv) Adopt proper care and management during the fishing period of cold/ heat waves like keeping stock of drinking water and extra cloths. v) Educating the farmers through electronic/ print media	i) Intensive afforestation program for reducing heat waves. ii)Collect basic weather data on incidence of extremes as well as 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. v) 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.	i) Identification of type of disease outbreak, prompt action or immediate removal of disease causing agents/ dead fish. ii) Proper disposal of dead fish. iii)Use appropriate amount of	i) laboratory diagnosis of disease agents, generation of data about type or kind of disease spread. ii) Eradicating the disease where possible. iii) Follow up surveillance and

	iv) Stock sufficient quantities of emergency medicines.	disinfectants, chemicals and therapeutic drugs. iv)Determination of nature and speed of disease transmission. v)Proper preparation and management through emergency aeration or splashing in water bodies.	monitoring after disease outbreak. iv)Loss assessment and insurance claim.