

State: PUNJAB

Agriculture Contingency Plan for District: AMRITSAR

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Punjab and Rohilkhand plains, hot dry, subhumid eco-subregion (9.1), North Punjab plain, Ganga-Yamuna Doab and Rajasthan upland, hot, dry, semi-arid eco-subregion (4.1).			
	Agro-Climatic Zone (Planning Commission)	Trans Gangetic Plain 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)	Barnala, Fathehgarhsahib, Ferozpur, Gurdaspur, Jullundur, Kapurthala, Ludhiana, Moga, Patiala, Sangrur, Taran.			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		31 ^o 37' 50. 20" N	74 ^o 52' 17. 59' E	254 m MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional Research Station, Amritsar			
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Usman Distt, Amritsar-143001			
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone				
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep):	533.4	26	1 st week of July	2 ND week OF Sept
	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)	267.7	218	10	32	-	-	-	-	4	-

1.4	Major soils	Area (000 ha)	Percent of total (%)
	Coarse loamy soils	40.1	15
	Coarse loamy and fine loamy associations	120.4	45
	Fine loamy associations	107.1	40
	Total	267.7	

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	218	194
	Area sown more than once	204	
	Gross cropped area	422	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	218		
	Gross irrigated area	422		
	Rainfed area	-		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals (15 % area of Amritsar is canal irrigated)		54	
	Tanks		-	
	Open wells		-	
	Bore wells	82847	164	
	Lift irrigation schemes		-	
	Micro-irrigation		-	
	Other sources (please specify)		-	
	Total Irrigated Area		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 unfit water with respect to RSC. No problem of salinity (EC) 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) (2008-09)

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>				
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Rice	183	-	183					183
	Maize	01	-	01					01
	Arhar	0.2	-	0.2					0.2
	Moong	0.1	-	0.1					0.1
	Cotton	-	-	-					-
	Wheat		-		187	-	187		187
	Barley				-	-	-		-
	Rapeseed and Mustard				1	-	1		1
	Sunflower				-		-	0.5	0.5

	Horticulture crops - Fruits	Area ('000 ha)
		Total
	Kinnow	0.4
	Orange and Malta	0.07
	Lemon	0.03

	Mangoes	0.128
	Litchi	0.05
	Guava	0.3z
	Pear	0.80
	Peach	0.05
	Plum	0.02
	Grapes	0.0002
	Ber	0.0008
	Misc	0.09
	Vegetables	Total
	Potato	3.09
	Onion	0.5
	Winter Vegetables	0.4
	Summer vegetables	0.6
	Medicinal and Aromatic crops	Total
	Plantation crops	
	Fodder crops	

	Total fodder crop area	
	Grazing land	
	Sericulture etc	

1.8	Livestock (in number)	Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)	1.7	12.1	13.8		
	Crossbred cattle	7.9	80.0	79.9		
	Non descriptive Buffaloes (local low yielding)	1.1	9.2	10.3		
	Graded Buffaloes	25.7	261.9	287.6		
	Goat	3.0	8.3	11.3		
	Sheep	2.	2.9	8.1		
	Others Equine (Horse &Pony)	1.4	0.9	2.4		
	Commercial dairy farms (Number)			177		
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial	63	245222			
	Backyard		26423			
1.10	Fisheries (Data source: Chief Planning Officer of district)					
	A. Capture : Not Applicable					
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds	No. of Reservoirs		No. of village tanks	
121		01		231		
	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)	509.8	6.1	3.1

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	532	2907					532	2907	
	Maize	4	3857					4	3857	
	Arhar	0.2						0.2		
	Moong	0.1						0.1		
	Cotton			-	-					
	Wheat			757	4049			757	4049	
	Barley			-	-			-	-	
	Rapeseed and Mustard			1	1030			1	1030	
	Sunflower			-	-	0.8	1545	0.8	1545	
	Potato			78.9	25440			78.9	25440	

Major Horticultural crops (Crops to be identified based on total acreage)										
Crop	Production (Metric tonnes)	Productivity (kg/ ha)								
Kinnow	7420	18424								
Orange and malta	573	7650								
Lemon	236	7610								
Mangoes	1684	13344								
Litchi	690	13814								
Guava	7710	21150								
Pear	18104	22824								
Peach	924	17324								
Plum	360	17424								
Grapes	56	28434								
Ber	137	17234								
Misc	1130									

1.12	Sowing window for 5 major field crops	Paddy	Wheat	Sunflower	Maize	Oilseeds
	Kharif- Rainfed					
	Kharif-Irrigated	2 nd week of June to 1 st week July			4 th week May to 4 th week June	
	Rabi- Rainfed					
	Rabi-Irrigated		4 th week October to 1 st week December			2 nd week October to 1 st week December
	Spring-Irrigated			2 nd week to 4 th week of January		

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

Location map of district within State as Annexure I



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation –Not applicable

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				

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 4 weeks	Not applicable				

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 6 weeks	Not applicable				

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 8 weeks	Not applicable				

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					
At flowering/ fruiting stage					
Terminal drought (Early withdrawal of monsoon)					

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed of water in release canals due to low rainfall	Tube well irrigated alluvial soils	Paddy	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.	Direct seeding of rice saves about 20% of irrigation water Laser leveling of field also saves 20-25 % of irrigation water.
		Maize	Short duration maize varieties like PMH2 and JH -3459 can be grown		
		Wheat	Gram (PDG 4 and PDG 3)	Deep tillage should be done upto 22.5 cm found to be increase the yield	
		Sunflower	No Change	Sunflower can be grown by transplanting of nursery in February	Transplanted crop of sunflower gives higher yield and takes less time to maturity

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Tubewell irrigated alluvial soils	Paddy	Paddy should be replaced with basmati rice, maize.	Direct seeding of paddy and laser land leveling should be done	Direct seeding of Rice saves about 20% of irrigation water Laser leveling of field also saves 20-25 % of irrigation water
		Maize	No Change		
		Wheat	Toria (PBT 37) Raya (PBR 210 and PBR 97)		

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
			Gobhi Sarson (PGSH 51 and GSL 2)		
		Sunflower	No Change		

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	Tubewell irrigated alluvial soils	Paddy	Maize (PMH 2 and JH 3459), Soybean (SL 744 and SL 525) Moongbean (ML 818 and P A U 911)	Bed planting of soybean and maize, laser land leveling should be done. Short duration varieties of maize like PMH 2 and JH 3459 can be grown. Mulching can be used in standing maize crop in last week of August	Bed planting saves 20-25 % irrigation water Laser leveling of field also saves 20-25 % of irrigation water
		Maize	No Change		
		Wheat			
		Sunflower			

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	Tube well irrigated alluvial soils	Paddy -Wheat	Paddy may be replaced by Maize (PMH 2 and JH 3459), Soybean (SL 744 and SL 525) and Moong bean (ML 818 and PAU 911)	Bed planting of soybean and Maize laser land leveling should be done. Short duration varieties of Maize like PMH 2 and JH 3459 can be grown. Mulching can be used in standing maize crop in last week of August	Farmers use tube well irrigation and water tanks are not used

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Tubewell irrigated alluvial soils	Paddy	Paddy may be replaced with the Less water consuming crops like kharif moongbean(ML 818 and P A U 911), soybean(SL 744 and SL 525) and Groundnut (SG99 and M522)	Laser land leveling should be done Wheat: Wheat can be sown with Happy seeder technology immediately after harvesting of paddy.	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
		Maize			
		Wheat			
		Sunflower			

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Maize	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.
Soybean	Sowing of soybean on raised beds in medium to heavy soils saves the crop from damage by rains especially at emergence			
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.			
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		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.		
Gram			Blight, If the rainy days persists in the month of Feb-March than spray Indofil M-45/ Captan @ 360g/100 litres of water. 3-5 sprays at 15 days interval should be done.	
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: Not applicable

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
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			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		Mulching in the standing maize crop will reduce evaporation losses and reduces weeds population		
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.		

Horticulture			
Tomato	<p>Complete transplanting of tomato seedling in the frost fortnight of this month. Provide Sarkanda/kahi/rice straw to save the plants from frost.</p> <p>Dwarf tomato varieties can 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.</p>		
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	<p>As the district is occasionally prone to drought the following measures to be taken to ameliorate the fodder deficiency</p> <p>Avoid burning of wheat/paddy straw</p> <p>Establishment of fodder bank at village level with available dry fodder (paddy /wheat straw)</p> <p>Increase area under perennial fodder cultivation with high yielding Hybrid Napier varieties.</p> <p>Conservation of maize green fodder as silage</p> <p>Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production</p>	<p>Harvest and use biomass of dried up crops (paddy/wheat/barley/maize) material as fodder</p> <p>Utilizing fodder from fodder bank reserves.</p> <p>Utilizing stored silage/hay.</p> <p>Transporting complete feed/fodder and dry roughages to the affected areas.</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Continuous supplementation of mineral mixture to prevent infertility.</p>	<p>Training/educating farmers for feed & fodder storage.</p> <p>Maintenance / repair of silo pits and feed/fodder stores.</p> <p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall etc.,</p> <p>Supply of quality fodder seed (multi cut sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass well before</p>

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

		Organize with community, daily lifting of dung from relief camps	
Floods			
Feed and fodder availability	<p>In case of early forewarning (EFW), harvest all the crops (paddy/wheat/ maize/barley etc.) that can be useful as feed/fodder in future (store properly)</p> <p>Keeping sufficient of dry fodder to transport to the flood affected villages</p> <p>Don't allow the animals for grazing if severe floods are forewarned</p> <p>Keep stock of bleaching powder and lime</p> <p>Carry out Butax spray for control of external parasites</p> <p>Identify the Clinical staff and trained paravets and indent for their services as per schedules</p> <p>Identify the volunteers who can serve in need of emergency</p> <p>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</p>	<p>Transportation of animals to elevated areas</p> <p>Proper hygiene and sanitation of the animal shed</p> <p>In severe storms, un-tether or let loose the animals</p> <p>Use of unconventional and locally available cheap feed ingredients for feeding of livestock.</p> <p>Avoid soaked and mould infected feeds / fodders to livestock</p> <p>Emergency outlet establishment for required medicines or feed in each village</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Bring back the animals to the shed</p> <p>Cleaning and disinfection of the shed</p> <p>Bleach (0.1%) drinking water / water sources</p> <p>Encouraging farmers to cultivate short-term fodder crops like sunhemp, Lucerne, berseem, maize etc.,.</p> <p>Deworming with broad spectrum dewormers</p> <p>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</p> <p>Drying the harvested crop material and proper storage for use as fodder.</p>
Cyclone	Not applicable		
Cold wave	<p>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)</p>	<p>Allow for late grazing between 10AM to 3PM during cold waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing</p>

		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	(normal timings)
Heat wave	Arrangement for protection from heat wave i) Plantation around the shed ii) H ₂ O 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 / sprinklers/fans during heat waves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H ₂ O 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	Supplementation to all the birds	

		laying 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 lime 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 management	In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak	Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia accumulation due to dampness	Disposal of dead birds by burning / burying with lime 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	Routine practices are followed	

		Don't allow for scavenging during mid day		
	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.	i) Use stored water. ii) Use surface water flow. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of water in	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Strengthening of water

	v) Re-excavation of local canals and reservoirs.	ponds/reservoirs.	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	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 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	i) Use disinfectants and therapeutic	i)Need based research data should

	and waste in water sources. ii) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.	drugs. ii) Adoption of bio-remedial measures	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. 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.	i) Human evacuation from the area. ii) Coordination of assistance. iii) Damage and need assessment. iv) Immediate management of relief supplies. v) Immediate help delivery.	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 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	<ul style="list-style-type: none"> i) Education and training for the repair of houses. ii) Store raw material for emergency repair of houses. iii) House insurance. 	<ul style="list-style-type: none"> i) Arrangement of temporary shelters for homeless people. ii) Damaged house enumeration and need assessment. iii) Coordination of assistance. iv) Immediate management of relief supplies. 	<ul style="list-style-type: none"> i) Loss assessment & insurance claim. ii) Govt. assistance claim.
(iv) Loss of stock	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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

		v) Need based bioremediation	formulation of management plan
(vi) Health and disease	<p>i) Advance planning and preparedness.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Stock sufficient stores of medicines.</p>	<p>i) Prompt action or immediate removal of disease causing agents/ dead fish, followed by sterile or landfill disposal.</p> <p>ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p> <p>iii) Emergency aeration or splashing in water bodies.</p>	<p>i) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread.</p> <p>iv) Eradicating the disease where possible.</p> <p>v) Follow up surveillance and monitoring after disease outbreak.</p> <p>vi) Bio-monitoring and maintaining water quality.</p> <p>vii) Need based research data should be generated.</p> <p>vii) Loss assessment & insurance claim.</p>
B. Aquaculture			
(i) Inundation with flood water	<p>i) Proper facility construction for ponds and its stock safety.</p> <p>ii) Development of flood control management plan.</p> <p>iii) Preparedness with emergency backup equipment on site.</p> <p>iv) Stock insurance.</p> <p>v) Preventive measures against entry of alien/wild organisms through flood water.</p>	<p>i) Arrangement for evacuation.</p> <p>ii) Arrangement for rescue and casualty care.</p> <p>iii) Arrangement for burial control room.</p> <p>iv) Restoration of essential services, security and protection of property.</p> <p>v) Coordination of assistance.</p> <p>vi) Damage and need assessment.</p> <p>vii) Immediate management of relief</p>	<p>i) Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan</p> <p>ii) Reallocate fish to maintain appropriate biomass so that waste assimilation capacity of pond is not exceeded.</p> <p>iii) Reduce or cease feeding because uneaten food and fish</p>

		<p>supplies.</p> <p>viii) Release excess water from height of T.</p> <p>viii) Lower the water level in culture facilities.</p>	<p>waste decreases the dissolved oxygen level.</p> <p>iv) Strengthening of water bodies/ponds.</p> <p>v) Loss assessment & insurance claim.</p>
(ii) Water contamination and changes in water quality	<p>i) Store chemicals, disinfectants and therapeutic drugs</p> <p>ii) Develop flood control management plan</p>	<p>i) Do not use contaminated water.</p> <p>ii) Proper preparation and management through emergency aeration (paddle wheel aerator/circulating aerator), that may improve water quality in affected areas.</p> <p>iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p> <p>iv) Maintaining the purity and quality of water bodies.</p> <p>iv) Need based bioremediation.</p>	<p>i) To maintain water quality, need based research data should be generated</p> <p>ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.</p> <p>iii) Immediate remedy and cleaning of water bodies.</p> <p>iv) Regular water monitoring and bio-monitoring of water bodies for formulation of management plan.</p>
(iii) Health and diseases	<p>i) Advance planning and preparedness.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Stock sufficient emergency medicines.</p>	<p>i) Identification of type of disease outbreak, immediate removal of disease causing agents/ dead fish.</p> <p>ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p>	<p>i) Laboratory diagnosis of diseased fish, generation of data about type or kind of disease spread.</p> <p>ii) Eradicating the disease.</p> <p>iii) Follow up surveillance and monitoring.</p>

		iii) Determination of nature and speed of transmission of diseases. vi) Emergency aeration or splashing in water bodies.	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. iv) Infrastructure insurance.	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 claim.
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	<ul style="list-style-type: none"> i) Stay aware of upcoming temperature changes. ii) Arrange the aerators. iii) Ensure sufficient water level in water bodies. vi) Formulate strategic fishing management during the heat/ cold waves. v) Tree plantation around fish ponds 	<ul style="list-style-type: none"> 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. iv) Educating the farmers through electronic or print media 	<ul style="list-style-type: none"> 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. v) Loss assessment & insurance claim.
B. Aquaculture			
(i) Changes in pond environment (water quality)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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.

<p>(ii) Health and disease management</p>	<p>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.</p>	<p>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</p>	<p>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.</p>
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