

State: PUNJAB

Agriculture Contingency Plan for District: MOGA

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Northern Plain (And Central Highlands) In (4.1)			
	Agro-Climatic Zone (Planning Commission)	Trans Gangetic Plain Region			
	Agro Climatic Zone (NARP)	Western Plain Zone (PB-4)			
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Faridkot, Moga and Barnala			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		30°48'44.19" N	75°10'15.71" E	249 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS				
Mention the KVK located in the district with address	Krishi Vigyan Kendra, VPO Budh Singh Wala, Moga-142 001				
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)	187.9	-	July 1 st week	Sept. 2 nd week
	NE Monsoon(Oct-Dec)	15.7	-	-	-
	Winter (Jan- Feb)	38.7	-	-	-
	Summer (Mar-May)	20.4	-	-	-
	Annual	262.7	-	-	-

1.3	Land use pattern of the district (latest statistics)	Geographical Area ('000ha)	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)	173	149	2	23	-	-	-	-	(a)	(a)

(a) – Less than 500 ha

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Per cent (%) of total geographical area
	Coarse loamy and fine loamy associations	55	31.8
	Fine loamy associations	35	20.2
	Coarse loamy	10	5.8

* 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	149	224
	Area sown more than once	185	
	Gross cropped area	334	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area			
	Gross irrigated area	383.5		
	Rainfed area			
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals (10%area is canal irrigated)		5	
	Tanks			
	Open wells			
	Bore wells	58583	144	
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		149	
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	
	Over exploited			
	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 e.g., 2008-09)

1.7	S. No.	Major field crops cultivated	Area ('000 ha)							Summer	Grand total
			<i>Kharif</i>			<i>Rabi</i>					
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
1	Rice	174	-	174	-	-	-	-	174		
2	Wheat	-	-	-	177	-	177	-	177		
3	Barley	-	-	-	1	-	1	-	1		
4	Rapeseed & Mustard	-	-	-	1	-	1	-	1		
5	Cotton	5	-	5	-	-	-	-	5		
	Others (specify)										

S.No.	Horticulture crops - Fruits	Area ('000 ha)	
			Total
1	Kinnow		0.1
2	Peach		0.01
3	Guava		0.2
4	Ber		0.1
	Horticulture crops - Vegetables		Total
1	Potato		
	Medicinal and Aromatic crops		
1			
	Others (specify)		
	Plantation crops		Total
1			-
	Others (Specify) Eg., industrial pulpwood crops etc.		
	Fodder crops		

	1		
	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)	12.3	14.2	26.5		
	Crossbred cattle	9.1	56.4	65.5		
	Non descriptive Buffaloes (local low yielding)	0.8	7.9	8.7		
	Graded Buffaloes	26.04	209.7	235.8		
	Goat	2.0	8.6	10.6		
	Sheep	1.2	4.1	5.3		
	Others Equine (Horse & Pony)	0.6	1.6	2.3		
	Commercial dairy farms (Number)			0.1		
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial	16	98.2			
	Backyard	-	23.9			
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		
	-	-	-	-	-	
ii) Inland (Data Source: Fisheries	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	

Department)	20	-	214
B. Culture			
	Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
i) Brackish water (Data Source: MPEDA/ Fisheries Department)	425.1	5.4	2.3
ii) Fresh water (Data Source: Fisheries Department)	-	-	-

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

1.11	Name of crop	<i>Kharif</i>		<i>Rabi</i>		Summer		Total		Crop residue as fodder (‘000 tons)
		Production (‘000 t)	Productivity (kg/ha)							
Major Field crops (Crops to be identified based on total acreage)										
	Rice	80040`	4600					80000	4600	
	Wheat			87300	4932			87300	4932	
	Barley			300	3244			300	3244	
	Rapeseed & Mustard			1	1158			1	1158	
	Cotton	549	1098					549	1098	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Kinnow	246600								
	Peach	13700								

	Guava	426600								
	Ber	122600								
	Others									

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Paddy	Wheat	Cotton	Oilseeds
	<i>Kharif</i> - Rainfed	-	-	-	-
	<i>Kharif</i> -Irrigated	2 nd week of June to 1 st week of July	-	2 nd week of April to 4 th week of May	-
	<i>Rabi</i> - Rainfed	-	-	-	-
	<i>Rabi</i> -Irrigated	-	4 th week of Oct. to 1 st week of Dec.	-	2 nd week Oct. to 1 st week of Dec.

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

2.0 Strategies for weather related contingencies

2.1 Drought: N A

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

2.1.1 Rainfed situation: N A

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

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed/ limited release of water in canals due to low rainfall	Canal / Tube well irrigated alluvial soils	Cotton - Wheat	Cotton - oilseeds	Cotton i. Ridge planting with each furrow irrigation, ii. Gap filling by transplanting 21 days old cotton seedlings. iii. Alternate furrow irrigation with poor quality Tube well water after PSI with Canal water. Rice Wheat i. Bi-directional sowing / Bed planting ii. closed spacing (7.5x22.5 cms) iii. Seed priming Rapeseed-mustard	-
		Rice – Wheat	Cotton - MRC7017 BG-II MRC7031BG-II Torla (PBT 37) Raya (PBR 210 and PBR 97) Gobhi Sarson (PGSH 51 and GSL 2) Rice i. Grow short duration varieties (PR 115) ii. Basmati plantation Wheat i. Grow late sown varieties (PBW 590 and PBW 509) Rapeseed-mustard Prefer raya var. PBR 97 under scarce water supply.		

Condition	Major Farming situation	Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment			N A		

Condition	Suggested Contingency measures				
	Major Farming situation	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			N A		

Condition	Suggested Contingency measures				
	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall			N A		
Any other condition (specify)			N A		

2.2 Un-timely (unseasonal) rains

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Heavy rainfall with high speed winds in a short span ²				
Cotton	Ridge planting, pumping out excess rain water	Pumping out excess rain water, application of nitrogenous fertilizer, foliar spray of 2 % KNO ₃	Pumping out excess rain water and chemical control of pests/ diseases	Storage of produce at safer place
Rice	Pumping out excess rain water, Nitrogenous fertilizer application	Pumping out excess rain water.	Pumping out excess rain water	Shifting of produce at safer place for

				drying.
Wheat	Bed / bidirectional sowing, Pumping out excess rain water, apply Nitrogenous fertilizer and Gypsum(100 kg/acre) to check nitrogen & sulphur Deficiency respectively	Pumping out excess rain water, foliar spray of 3% urea solution	-do-	Shifting of produce at safer place for drying
Rapeseed-mustard	Drain out excess rain water, Nitrogenous fertilizer application	Drain out excess rain water,		Shifting of produce at safer place for drying
Horticulture				
Ber	Drainage of excess water	Drainage of excess water and Chemical control of powdery mildew	Cultivation of early ripening cultivars, clean cultivation/ sanitation for control of fruit fly. Chemical control of powdery mildew and fruit fly	Pick the mature but firm fruit and shift at proper place
Guava	Drainage of excess water, raising of soil surface around the trunk to control guava wilt	Drain out excess rain water and adopt crop regulation measures to avoid rainy season crop	Drainage of excess water, clean cultivation/sanitation for control of fruit fly	Pick the mature but firm fruit and shift at proper place
Peach	Drainage of excess water	Drainage of excess water, chemical control of insects and pests.	Cultivation of early ripening cultivars, Drainage of excess water, clean cultivation/ sanitation for control of fruit fly	Shifting and storage of harvested fruits at proper place.
Grapes	Drainage of excess water, chemical control of anthracnose	Drain out excess rain water, chemical control of Anthracnose	Cultivation of early ripening cultivars and application of Israeli technique f or quality improvement	Shifting and storage of rainy season harvested fruits at proper place.
Chillies	Replanting	Drain out excess rain water and earthing up of ridges.	Wilting and lodging. Pumping of excess rain water and spray the crop with Dithane M-45 or Blitox @ 3 gm per litter water	Avoid Rotting and discolouration of fruits

Potato	Manual weed control, earthing up and apply second dose of Nitrogen fertilizer	Drain out excess water, spray Ridomil @500 g/acre to check late blight	Keep the crop under sheds for curing before storage
Cauliflower	Replanting	Drain out excess rain water	-
Peas	Spray the standing crop with Bavistin or Captan@3g/litre and Drain out excess rain water	Spray Mancozeb @ 3g / litre to check rotting of pods and Drain out excess rain water. Prefer bed sowing.	-
Outbreak of pests and diseases due to unseasonal rains			
Cotton	Spray Larwin@250g Or Ekalux 800ml/acre to check Mealy bug	Insect/Pests: Spray Imidachloprid 40 ml/ Pride20ml/acre for Jassid; Hostathion 600 ml/acre against white fly; Larwin@250g Or Ekalux 800ml/acre to check Mealy bug; synthetic pyrethroids/Carbamate insecticides against Pink/ spotted /American (small size) boll worm; Organophosphate/Naturalite/ oxadiazine against American(big size) boll worm and Carbamate/ Organochlorinate/ Organophosphates against Tobacco boll worm. Diseases: grow LH 144/LH 2076 against Leaf curl; Cobalt chloride(CoCl_2) to check para wilt, Spray blitox+streptocycline against Bacterial Blight and Blitox/Captan for control of Anthracnose, leaf blight and leaf spot .	Storage of produce in dry place
Rice	Spray Nuvacron/Monocil @ 560 ml/acre against leaf folder and stem borer.	Insect/Pests: Spray Nuvacron /Monocil @ 560 ml/acre against leaf folder and stem borer; Confidor @40 ml/acre/ Ekalux @ 800 ml/acre against Plant hoppers/ Rice ear cutting caterpillar. Diseases: Grow PR 120, PR 111 against Bacterial leaf blight (BLB); spray Blitox(500ml)/Tilt (200ml) per acre to control False smut; Spray Tilt @ 200m l/acre against sheath blight ,Sheath rot and Bunt diseases.	Storage of produce in dry place
Wheat	Spray pesticide to control Pink boll worm especially in rice fields.	Spray Nuvacron @150ml/acre to control sucking pest (Aphid)	Spray Nuvacron @150ml/acre to control Aphid, Ekalux for Army worm (@400 ml); Boll worm (800 ml) per acre and Tilt @200ml/acre to check Karnel bunt & rusts.
Rapeseed-mustard	-	Diseases: Two Sprays of Indofil M-45/ Blitox @ 250 g/acre at interval of	Treat the produce meant for seed with 250gm Malathion dust (5%) and disinfect 10gunny bags with 5 ml cymbush/10 litres water, Godowns with 100 ml ythion/10 litres water.
			Shifting of produce

		15 days to control the incidence of White rust and <i>Alternaria</i> blight. Aphids: spray 40g Actara 25 WG or 400 ml Endosulfan 35EC in 80-125 litres of water per acre to check aphid.		at safer place for drying
Horticulture				
Ber	Chemical control (At early and smaller scale pluck the leaves with egg masses and young caterpillars destroy And spray 750 g Hexavin 50 WP (Carbaryl in 250 L of water) of Leaf eating caterpillar and diseases like powdery mildew.	Chemical control (At early and smaller scale pluck the leaves with egg masses and young caterpillars destroy And spray 750 g Hexavin 50 WP (Carbaryl in 250 L of water) of Leaf eating caterpillar and diseases like powdery mildew (Spray 0.25 % wettable Sulphur or Karathane 40 EC in September, mid October, Mid November and mid December..	Clean cultivation/ sanitation and spray of Rogar 30 EC @ 500 ml in 300 l water for control of fruit fly and Chemical control of diseases like powdery mildew/leaf mould	Pick the fruit at green and firm stage and shift at proper place
Guava	Chemical control (Clean cultivation/ sanitation and spray of Sumicidin 20 EC @ 1250 ml in 500 l water for control of fruit fly and Chemical control (Spray the trees with 300 g of Blitox or 300 g Captan in 100 l of water) of anthracnose of guava) of sucking pests and diseases and drain out excessive water to avoid guava wilt.	Chemical control Clean cultivation/ sanitation and spray of Sumicidin 20 EC @ 1250 ml in 500 l water for control of fruit fly and Chemical control (Spray the trees with 300 g of Blitox or 300 g Captan in 100 l of water) of anthracnose of guava) of sucking pests and diseases like anthracnose.	Clean cultivation/ sanitation and spray of Sumicidin 20 EC @ 1250 ml in 500 l water for control of fruit fly and Chemical control (Spray the trees with 300 g of Blitox or 300 g Captan in 100 l of water) of anthracnose of guava	Pick the fruit at green and firm stage and shift at proper place
Peach	Chemical control (spray the tree with Malathion 800 ml in 500 L of water) of sucking pests and diseases. Apply Mashobra paste after clearing wound for control of bacterial canker and gummosis.	Spray 800 ml Rogar 30EC in 500 l of water for control of Peach leaf curl aphid.	Cultivation of early ripening cultivars, Clean cultivation/ sanitation and spray of Sumicidin 20 EC @ 1250 ml in 500 l water for control of fruit fly	Pick the fruit at green and firm stage, storage in CFB boxes
Grapes	Chemical control (chemical control Spray 500 ml Malathion 50 EC and 1)Prune the shoots in in Jan and Feb, Spray Bordeaux mixture in last week of March, Spray Bavistan 50 WP @ 500g in last week of May in 500 L of water , Spray	Chemical control (chemical control Spray 500 ml Malathion 50 EC and 1)Prune the shoots in in Jan and Feb, Spray Bordeaux mixture in last week of March, Spray Bavistan 50 WP @ 500g in last week of May in 500 L of water , Spray Bavistan 50 WP @ 500g in mid July in 500 L of water,	Chemical control Spray 500 ml Malathion 50 EC and 1)Prune the shoots in in Jan and Feb, Spray Bordeaux mixture in last week of	Timely harvesting of grapes, storage in proper CFB boxes

	Bavistan 50 WP @ 500g in mid July in 500 L of water, chemical control of sucking pests and diseases like downy mildew/ powdery mildew/ anthracnose	chemical control of sucking pests and diseases like downy mildew/ powdery mildew/ anthracnose	March, Spray Bavistan 50 WP @ 500g in last week of May in 500 L of water , Spray Bavistan 50 WP @ 500g in mid July in 500 L of water,) of sucking pests, diseases like powdery mildew/ downy mildew /anthracnose/ hen and chicken disease/shot berry etc	
Chilli	-	Spray Endosulfan @ 1 litre/ acre to check fruit borer and spray the crop with M -45 or Blitox @ 3 gm per litter water		Keep in dry place
Potato	-	spray Ridomil @500 g/acre to the late blight		-
Cauliflower	Spray Mencozeb @ 3g / litre to check downy mildew		-	-
Peas	-	Spray Endosulfan @ 1 litre/ acre to check pod borer		

2.3 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Cotton	Heavy rainy? (psi) with canal water, planting of crop on eastern side Of N-S ridge, gap filling and light irrigation	Apply light irrigation	NA	NA
Rice	Correct Iron deficiency with 0.5 per cent iron sulphate spray, light and frequent irrigation	Pounding of water for fifteen days after transplanting to check iron deficiency and for crop establishment	NA	NA
Wheat	NA	NA	Apply light irrigation	NA

Rapeseed-mustard	NA			
Horticulture				
Ber	Light and frequent irrigation and shelter from western side	Light and frequent irrigation, application of white wash paint on main stem		NA
Guava	Light and frequent irrigation and shelter from western side	Light and frequent irrigation, application of white wash paint on main stem		NA
Chilli	Mulching and frequent irrigation	Mulching and frequent irrigation		NA
Cold wave				
Field crops	NA			
Horticulture				
Ber	Light and frequent irrigation and shelter from North-western side, smoking	Installation of wind breaks, apply light irrigation and smoke		NA
Guava	Light and frequent irrigation and shelter from North-western side, smoking	Installation of wind breaks, apply light irrigation and smoke		NA
Frost				
Rapeseed-mustard	Apply light irrigation		NA	NA
Horticulture				
Ber	Protection of nursery with Sarkanda etc/ growing of nursery under protected structures.	Installation of wind breaks. Apply light irrigation and smoke		NA
Guava	Protection of nursery with Sarkanda etc/ growing of nursery under protected structures	Installation of wind breaks, apply light irrigation and smoke		NA
Potato	Burning of leaves and twigs, apply light irrigation frequently or use sprinkler irrigation system after mid-night Apply light irrigation or use sprinkler irrigation mid night			-
Cauliflower	-	-	-	-
Peas	-	Apply light irrigation	-	-
Capsicum	Apply light irrigation or cover the crop with Ploythene, sarkanda.	-	-	-
Hailstorm				
Cotton	Re-sowing	Not curable	Not curable	-
Rice	Re-transplanting	Not curable	Not curable	-

Wheat	Re-sowing	Not curable	Not curable	-
Rapeseed-mustard	Re-sowing	Not curable	Not curable	-
Horticulture				
Ber	Protection of nursery with Sarkanda etc/ growing of nursery under protected structures.	Removal of broken limbs and apply light irrigation		NA
Guava	Protection of nursery with Sarkanda etc/ growing of nursery under protected structures	Removal of broken limbs and apply light irrigation		NA
Chillies	Spray fungicides to check the further spread of diseases			
Potato				
Cauliflower				
Peas				

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>Harvest and use biomass of dried up crops (Paddy Wheat, barley, Maize, etc..) material as fodder</p> <p>Utilizing fodder from fodder bank reserves.</p> <p>Utilizing stored silage/hay.</p> <p>Transporting complete feed/fodder and dry roughages to the affected areas.</p> <p>Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured</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</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>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>from Govt. Godowns for feeding as supplement for high productive animals during drought</p> <p>Continuous supplementation of mineral mixture to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	<p>sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass well before 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. 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</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</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p>

	regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	
Floods			
Feed and fodder availability	In case of early forewarning (EFW), harvest all the crops (paddy/wheat/barley/maize 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	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

		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	
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 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 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 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	i) Use stored water.	i) Need based monitoring through

	<p>forecast data.</p> <p>ii) Storage of water.</p> <p>iii) Afforestation program.</p> <p>iv) Conservation of surface water flow in village ponds/tanks.</p> <p>v) Re-excavation of local canals.</p>	<p>ii) Use surface water flow.</p> <p>iii) Divert water from unutilized areas.</p> <p>iv) Utilize canal water.</p> <p>v) Aeration of water in ponds/tanks.</p>	<p>research plan.</p> <p>ii) Intensive afforestation program.</p> <p>iii) Augmentation of surface water flow.</p> <p>iii) Rain water harvesting .</p> <p>vi) Compensation claims.</p> <p>vii) Prepare vulnerability map.</p>
(ii) Changes in water quality	<p>i) Adopt suitable action plan to reduce salt load in water bodies.</p> <p>ii) Generate scientific research data on the survival and tolerance limit of fish and prawn species in saline water.</p> <p>iii) Prohibit dumping of solid, liquid and waste in water sources.</p> <p>iv) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.</p>	<p>i) Use disinfectants and therapeutic drugs.</p> <p>ii) Adoption of bio-remedial measures</p>	<p>i) Need based research data should be generated on water quality.</p> <p>ii) Dumping of solid, liquid and waste in water bodies should be stopped through enactment of legislation.</p>
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	<p>i) Critical analysis of long range forecast data.</p> <p>ii) Storage of surface flow water .</p> <p>iii) Afforestation program.</p> <p>iv) Conservation of rivers/reservoir/ponds.</p> <p>v) Re-excavation of local canals.</p>	<p>i) Use stored water.</p> <p>ii) Use surface water flow.</p> <p>iii) Divert water from unutilized areas.</p> <p>iv) Utilize canal water.</p> <p>v) Aeration of ponds.</p>	<p>i) Need based monitoring through research plan.</p> <p>ii) Intensive afforestation program.</p> <p>iii) Augmentation of surface water flow.</p> <p>vi) Adoption of rain harvesting methods.</p> <p>v) Compensation claims .</p> <p>vi) Prepare vulnerability map.</p>

(ii) Impact of salt load build up in ponds/Changes in water quality	<ul style="list-style-type: none"> i) Prohibit dumping of solid, liquid and waste in water sources. ii) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs. 	<ul style="list-style-type: none"> i) Adopt suitable action plan to reduce salt load in water bodies. ii) Generate scientific research data on the survival and tolerance limit of fish and prawn species in saline water. iii) Use disinfectants and therapeutic drugs. iv) Adoption of bio-remedial measures 	<ul style="list-style-type: none"> i) Need based research data should be generated on water quality. ii) Dumping of solid, liquid and waste in village ponds 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> i) Annual repair of boats/nets and gears. ii) Insurance of boats/nets/gears. 	<ul style="list-style-type: none"> i) Coordination of assistance. iii) Immediate management of relief 	<ul style="list-style-type: none"> i) Education and training for the repair of boats/nets and gears.

		supplies. iv) Govt. support and compensation.	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) Stop/close the effluent/sewerage discharge into water bodies. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Develop flood control management plan.	i) Proper preparation and management through emergency aeration. ii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iii) Immediate support of Govt/industrial organizations for maintaining the purity and quality of water bodies.	i) Need based research data should be generated to maintain water quality, ii) Dumping of solid, liquid and waste into water bodies should be stopped through enactment of legislation. iii) Regular water monitoring and bio-monitoring of water bodies for formulation of management plan.

		iv) Need based bioremediation.	
(vi) Health and disease	<ul style="list-style-type: none"> i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Stock sufficient stores of medicines. 	<ul style="list-style-type: none"> i) 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. vi) Emergency aeration or splashing in water bodies. 	<ul style="list-style-type: none"> i) Laboratory diagnosis of diseased 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> i) Release excess water from height of T. ii) Lower the water level in culture facilities. iii) Coordination of assistance. iv) Damage and need assessment. v) Immediate management of relief supplies. 	<ul style="list-style-type: none"> 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) Cleaning of water bodies/ponds.

			v) Loss assessment & insurance claim.
(ii) Water contamination and changes in water quality	<ul style="list-style-type: none"> i) Store chemicals, disinfectants and therapeutic drugs ii) 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) Maintaining the purity and quality of water bodies. iv) Need based bioremediation. 	<ul style="list-style-type: none"> 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-monitoring of water bodies for formulation of management plan.
(iii) Health and diseases	<ul style="list-style-type: none"> i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Stock sufficient emergency medicines. 	<ul style="list-style-type: none"> i) 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. vi) Emergency aeration or splashing in water bodies. 	<ul style="list-style-type: none"> i) Laboratory diagnosis of diseased 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.
(iv) Loss of stock and input (feed, chemicals)	<ul style="list-style-type: none"> i) Keep the stock/input at safe place for emergency purpose. ii) Store fuels, food/other item. 	<ul style="list-style-type: none"> i) Search/locate the stock/input. ii) Purchase/hire valuable stock/inputs from areas not affected by flood. 	<ul style="list-style-type: none"> i) Strengthening of stocks. ii) Assessment of total loss. iii) Insurance claims.

	iii) Develop flood control management plan. iv) Stock material insurance.		
(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.
(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	<ul style="list-style-type: none"> i) Stay aware of upcoming temperature changes. ii) Arrange the aerators. v) Ensure sufficient water level in water bodies. iii) Formulate strategic fishing management during the heat/ cold waves. iv) Tree plantation around fish ponds 	<ul style="list-style-type: none"> i) Adopt suitable action plan to reduce salt load in water bodies. ii) Generate scientific research data on the survival and tolerance limit of fish and prawn species in saline water. iii) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves. iv) Use dark materials to cover the water bodies during excessive heat waves. v) Stay hydrated by drinking plenty of fluids during fishing/field work. 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. iv) 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 	<ul style="list-style-type: none"> i) Adopt suitable action plan to reduce salt load in water bodies. ii) Generate scientific research data on the survival and tolerance limit of fish and prawn species in saline water. iii) Monitor fishing sites frequently to 	<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

	<p>for the heat /cold waves.</p> <p>v) Tree plantation around fish ponds</p>	<p>ensure that they are not affected by heat or cold waves.</p> <p>iv) Use dark materials to cover the water bodies during excessive heat waves.</p> <p>v) Stay hydrated by drinking plenty of fluids during fishing/field work.</p> <p>vi) Educating the farmers through electronic or print media</p>	<p>seasonal blooms, topography and soil composition.</p> <p>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.</p> <p>iv) Loss assessment & insurance claim.</p>
(ii) Health and disease management	<p>i) Advance planning and preparedness.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Develop heat/ cold wave control management plan.</p> <p>iv) 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>iii) Determination of nature and speed of transmission of diseases.</p> <p>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.</p> <p>ii) Eradicating the disease.</p> <p>iii) Follow up surveillance and monitoring.</p> <p>iv) Proper disposal of dead fish.</p> <p>v) Loss assessment & insurance claim.</p>
(iii) Any other	-	-	-

^a based on forewarning wherever available