State: PUNJAB

Agriculture Contingency Plan: District- BARNALA

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Northern Plain (And Central Highlands) Including Aravallis, Hot Semi-Arid Eco-Region (4.1)			
	Agro-Climatic Region (Planning Commission)	Trans Gangetic Plain Region (VI)			
	Agro Climatic Zone (NARP)	Western Plain Zone (PB-4)			
	Geographic co-ordinates of district headquarters	Latitude	Longitude	Altitude	
		30º22'51.48" N	75º32'47.57" E	254 M	
	Name & Address of concerned ZRS/ZARS/RARS/RRS/RRTTS	RS, Bathinda Pin -151001			
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Near Kheti Bhavan, Dabwali Road, Bathinda, Pin -151001			
	Name & Address of the nearest Agromet. Field Unit (AMFU, IMD) for agroadvisories in the zone	AMFU, Bathinda			
1.2	**Rainfall (2004-08)**	**Normal RF (mm)**	**Normal rainy days (number)**	**Normal Onset (specify week and month)**	**Normal Cessation (specify week and month)**
	SW monsoon (June-September):	301.7		End of June	After 2nd week of September
	NE Monsoon(October-December):	1.4		-	-
	Winter (January- February)	21.0			
	Summer (March-May)	6.3			
	Annual:	330.4			

1.3	Land use pattern of the district	Geographical area	Cultivated area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivated wasteland	Land under Misc. tree crops and groves	Barren and un cultivated land	Current fallows	Other fallows
	Area ('000 ha)	141.0	124.5	1.7	12.5	0.1	0.1	1.0	0.7	0.3	0.7

1. 4	Major Soil types	Area ('000 ha)	% of total geographical area
	Sandy loam soils	124.5	88.2

1.5	Agricultural land use	Sown area ('000ha)	Cropping intensity (%)
	Net area sown	124.5	200
	Area sown more than once	124.5	
	Gross cropped area	249.0	

1.6	**Irrigation**	**Area (‘000 ha)**		**Percent**
	Net irrigated area	124.5		100
	Gross irrigated area	124.5		
	Rainfed area	-		
	Source of irrigation	**Number**	**Area (‘000ha)**	**Percentage of total irrigated area**
	Canals		54.8	44
	Tanks /	-	-	-
	Open wells/ Bore wells	40.0	69.7	60
	Lift irrigation schemes	-	-	-
	Micro-irrigation	28	0.03	-
	Other sources (underground pipes)	42	0.3	-
	Total irrigated area	-	124.5	-
	Pump sets	40.0	-	-
	No. of tractors	10.7	-	-
	Groundwater availability and use* (Data source: State/ Central Ground water Department/ Board)	No. of blocks/ Tehshils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	All 3 blocks (Barnala, Sehna and Mehal kalan)	100	Marginal to saline (With high RSC)

	Critical	-	-	-
	Semi-critical	-	-	-
	Safe	-	-	-
	Wastewater availability and use	-	-	-
	Ground water quality	Marginal to saline		

1.7	**Area under major field crops (‘000ha)**	***Kharif***	***Rabi***	**Summer**	**Total**
	Crop	-	-	-	
	Wheat	-	112.1	-	112.0
	Cotton	13.9	-	-	13.9
	Rice	1.0	-	-	1.0
	Rapeseed-mustard	-	1.0	-	1.0
	Horticulture crops	**Area (‘000 ha)**			
	Fruits	**Total**			
	Ber	0.2			
	Guava	0.1			
	Peach	0.02			
	Grapes	0.02			
	Vegetable crops	**Area (‘000 ha)**			
		Total			
	Potato	1917			
	Chilli	88			
	Cauliflower	62			
	Peas	61			
	Sericulture	-			
	Medicinal and Aromatic crops	-			

	Plantation crops	-
	Grazing lands (ha)	-
	Fodder crops (2007-08)	**Area ('000 ha)**
		Total
	Jowar	5.4
	Bajra	2.0
	Makh chari (teosinte)	0.6
	Berseem	4.7
	Oats	2.2
	Others (cowpea, Lucerne, Senji, etc)	0.2

1.8	**Livestock (in number)**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)	15.7	9.2	24.8
	Crossbred cattle	3.2	16.3	19.5
	Non descriptive Buffaloes (local low yielding)	0	0	0
	Graded Buffaloes	18.2	163.04	181.3
	Goat	1.8	5.9	7.7
	Sheep	0.9	3.5	4.5
	Others Equine (Horse &Pony)	0.3	0.6	0.8
	Commercial dairy farms (Number)			0.05
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	114	1275.1	
	Backyard		7.230	
1.10	**Fisheries (Data source: Chief Planning Officer of district)**			
	A. Capture			

	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilites (Ice plants etc.)**
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		18		-		159	
	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)	223		5.95		1.326	

1.11	**Production and Productivity of 5 major crops (Average of last 3 years)**	***Kharif***		***Rabi***		**Summer**		**Total**	
		Production ('000 t)	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**	**Production ('000 t)**	**Productivity (kg/ha)**
	Cotton (A)	9.1	831	-	-	-	-	9.14	831
	Rice	485	4757	-	-	-	-	485	4757
	Wheat	-	-	554	4859	-	-	554	4859

	Rapeseed-mustard	-	-	2	1547			2	1547
	Horticultural crops								
	Ber	3.3	17150					3.3	17150
	Guava	1.9	22834					1.9	22834
	Peach	0.4	17334					0.4	17334
	Grapes	0.5	28374					0.5	28374
	Chillies	14.8						14.8	16800
	Potato			62.3	32500			62.3	32500
	Cauliflower			1.5	23600			1.5	23600
	Peas			3.6	5900			3.6	5900

1.12	**Sowing window (start and end of sowing period)**	**Cotton**	**Rice**	**Wheat**	**Rapeseed-mustard**
	Kharif- Rainfed	-	-	-	-
	Kharif-Irrigated	April to Mid of May	15th May to 30th May	-	- -
	Rabi- Rainfed	-	-	-	- -
	Rabi-Irrigated	-	-	4th week of October to End of November	10th October to Mid of November
	Non-Horticultural crops	**Chillies**	**Potato**	**Cauliflower**	**Peas**
	Kharif- Rainfed	-	-	-	-
	Kharif-Irrigated	Transplanting Feb to March	-	Transplanting Mid-August to	-

				Mid-September	
	Rabi- Rainfed	-	-	-	-
	Rabi-Irrigated	-	Last week of September to Mid-October	-	Mid-October to Mid-November

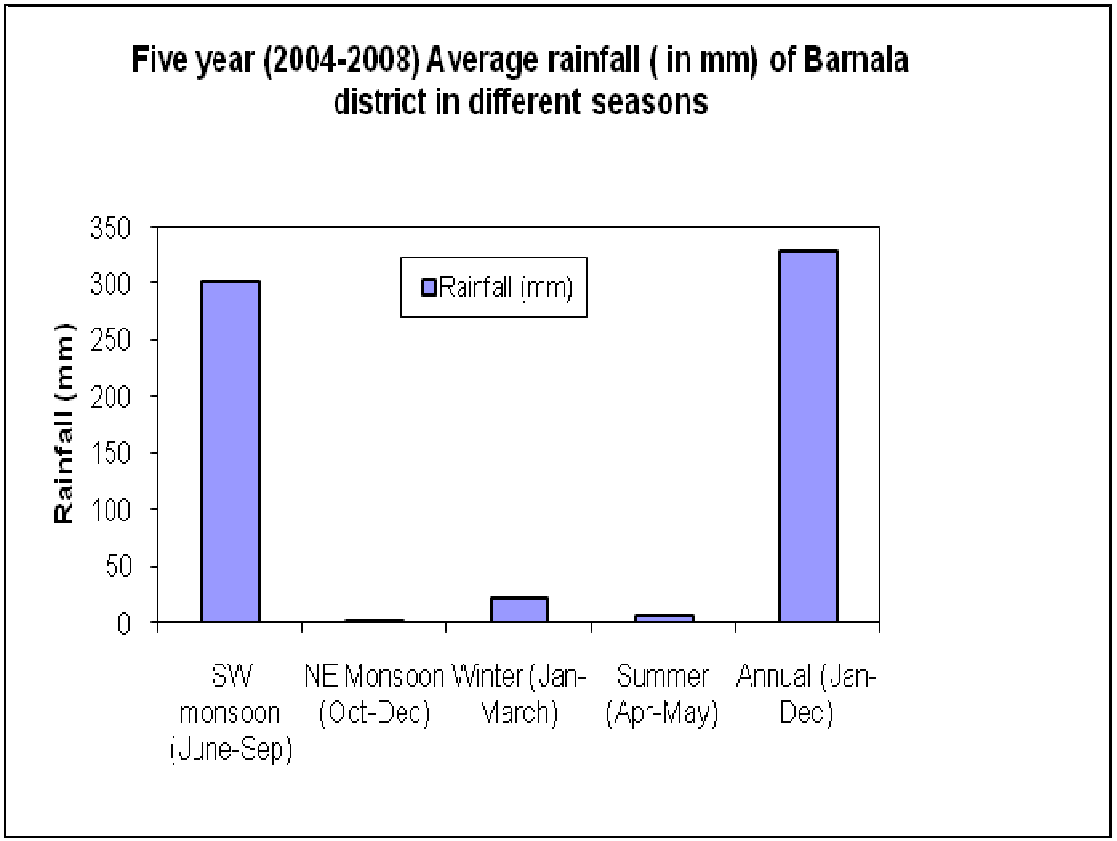
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought			√
	Flood			√
	Cyclone			√
	Hail storm		√	
	Heat wave	√		
	Cold wave		√	
	Frost		√	
	Sea water inundation			√
	Pests and diseases	√		

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

Annexure - I


PUNJAB
District Map
JAMMU & KASHMIR
N
PAKISTAN
HIMACHAL PRADESH
Gurdaspur
GURDASPUR
AMRITSAR
Amritsar
HOSHIARPUR
Hoshiarpur
Taran Taran
TARAN TARAN
Kapurthala
KAPURTHALA
Jalandhar
Nawanshahr
NAWANSHAHR
RUPNAGAR
JALANDHAR
Firozpur
FIROZPUR
Ludhiana
LUDHIANA
Rupnagar
CHANDIGARH
Faridkot
FARIDKOT
MOGA
Moga
Fatehgarh Sahib
FATEHGARH SAHIB
Mohali
BARNALA
Barnala
PATIALA
Patiala
MOHALI
MUKTSAR
Muktsar
Bhathinda
BHATHINDA
Sangrur
SANGRUR
Mansa
MANSA
RAJASTHAN
HARYANA
LEGEND
International Boundary
State Boundary
District Boundary
State Headquarter
District Headquarter
Map not to Scale
Copyright © 2009 www.mapsofindia.com
(Last Updated on 17th Dec 2009)

Annexure - II


Five year (2004-2008) Average rainfall (in mm) of Barnala district in different seasons
Rainfall (mm)
350
300
250
200
150
100
50
0
Rainfall (mm)
SW monsoon (June-Sep)
NE Monsoon (Oct-Dec)
Winter (Jan-March)
Summer (Apr-May)
Annual (Jan-Dec)

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation: N A

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

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

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (Specify month)	NA				

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks (Specify month)	NA				

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	NA				

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	NA				

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	NA				

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

2.1.2 Irrigated situation

Condition			Suggested Contingency measures		
	Major Farming situation	**Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed/ limited release of water in canals due to low rainfall	Canal irrigated Alluvial soils	Cotton - Wheat Rice – Wheat	Cotton Rice: Grow short duration varieties (PR 115) Basmati plantation Wheat: Grow late sown varieties (PBW 509 and PBW 590) Rapeseed-mustard: Prefer Raya var. PBR 97 under scarce water supply	Cotton: Ridge planting with each furrow irrigation Gap filling by transplanting 21 days old cotton seedlings. Alternate furrow irrigation with poor quality Tube well water after PSI with Canal water. Wheat: Bi-directional sowing / Bed planting Closed spacing (7.5x22.5 cms) Seed priming	

Condition			Suggested Contingency measures		
	Major Farming situation	**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	NA				

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	NA				

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					
Any other condition (specify)	-	-	-	-	-

2.2 Un-timely (unseasonal) rains

Condition	**Suggested contingency measure**			
Heavy rainfall with high speed winds in a short span	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Cotton	Ridge planting, pumping out excess rain water	Pumping out excess rain water, application of nitrogenous fertilizer, foliar spay 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 to 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-	-do-
Rapeseed-mustard	Drain out excess rain water Nitrogenous fertilizer application	Drain out excess rain water		-do-
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 to 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	Shifting and storage of harvested fruits to

			water, clean cultivation/ sanitation for control of fruit fly	proper place.
Grapes	Drainage of excess water, chemical control (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, of anthracnose	Drain out excess rain water, chemical control (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, of anthracnose of Anthracnose	Cultivation of early ripening cultivars and application of Israeli technique for quality mprovement	Shifting and storage of rainy season harvested fruits at proper place.
Chillies	Replanting	Drain out excess rain water and earthing up of ridges.	To avoid Wilting and lodging Pump excess rain water and spray the crop with Dithane M -45 or Blitox @ 3gm/ liter water	Avoid Rotting and discoloration of fruits
Potato	Manual weeding, 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 pyrithoids/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;		Storage of produce in dry place

		Cobalt chloride($COCl_2$) to check para wilt , Spray blitox+streptocycline against Bacterial Blight and Blitox/Captan for control of Anthrcnose,leaf blight and leaf spot .		
Rice	Spray Nuvacron/Monocil@ 560 ml/acre against leaf folder and stem borer.	Insect/Pests: Spray Nuvacron /Monocil@ 560 ml/acreagainst 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 Kernel bunt & rusts.	Treat the produce meant for seed with 250gmMalathion dust(5%)and disinfest 10gunny bags with 5 ml cymbush/10 litres water ,Godowns with 100 ml ythion/10 litres water.
Rapeseed-mustard	-	**Diseases:** Two Sprays of Indofil M-45/ Blitox @ 250 g/acre at interval of 15 days to control the incidence of White rust and *Alternaria* blight. **Aphids**: spray 40g Actara 25 WG or 400 ml Endosulfan 35EC in 80-125 litres of water per acre to check aphid.		Shifting of produce at safer place for drying
Horticulture				
Ber	Chemical control **(**Control of powdery mildew (spray karathene /Bayleton@0.5g/liter or sulfur @ 2.5 g/liter**)** of Leaf eating caterpillar and diseases like powdery mildew.	Chemical control **(**Control of powdery mildew (spray Karathene /Bayleton@0.5g/liter or sulfur @ 2.5 g/liter**)** of Leaf eating caterpillar and diseases like powdery mildew.	Clean cultivation/ sanitation and spray of Rogar 30 EC @ 500 ml in 300 l of 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 to proper place
Guava	Chemical control of sucking	Chemical control **(**Chemical control of	Clean cultivation/ sanitation and	-do-

	pests and diseases like Anthracnose/wilt with @300g and insects like fruit fly with Fenvelrate @1250 mi**)** of sucking pests and diseases and drain out excessive water to avoid Guava wilt.	fruit fly with Fenvelrate @1250 ml and diseases like powdery mildew/ anthracnose with Captan/Blitox**) @ 300 g** of sucking pests and diseases like Anthracnose.	spray of Sumicidin 20 EC @ 1250 ml in 500 l water for control of fruit fly and Chemical control of anthracnose of Guava	
Peach	Chemical control of sucking pests and diseases. Apply Mashobra paste after clearing wound for control of bacterial canker and gummosis.	Sray 800 ml Rogar 30EC in 500 l of water for control of Peach leaf curl aphid.	Cultivation of early ripening cultivars**(Partap and Parbhat**), 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 **(**Drainage of excess water, chemical control (1) Prune the shoots 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, for 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	Chemical control **(**Drainage of excess water, chemical control (1)Prune the shoots 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, for control of sucking pests, diseases like powdery mildew/ downy mildew /anthracnose/ hen and chicken disease/shot berry etc	Timely harvesting of grapes, storage in proper CFB boxes
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 Mancozeb @ 3g / litre to check downy mildew		-	-
Peas	-	Spray Endosulfan @ 1 litre/ acre to check pod borer		

2.3 Floods

Condition	Suggested contingency measure			
Transient water logging/ partial inundation	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
NA				

2.4 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 rauni (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% 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	-do-	-do-	NA	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	-do-	-do-		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	-do-	-do-		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 Polythene, Sarkanda.	-	-	-
Hailstorm				
Cotton	Re-sowing	Not curable	Not curable	-
Rice	Re-transplanting	-do-	-do-	-
Wheat	Re-sowing	-do-	-do-	-

Rapeseed-mustard	-do-	-do-	-do-	-
Horticulture				
Ber	Protection of nursery with Sarkanda etc/ growing of nursery under protected structures.	Removal of broken limbs and apply light irrigation		NA
Guava	-do-	-do-		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	**Not applicable**		
Floods	**Not applicable**		
Cyclone	**Not applicable**		
Cold wave	Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)	Allow for late grazing between 10AM to 3PM during cold waves Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves In severe cases, put on the heaters at night times Apply / sprinkle lime powder in the animal shed	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

		during cold waves to neutralize ammonia accumulation	
Heat wave	Arrangement for protection from **heat wave** i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder (maize or perennial fodder)/silage / concentrates/complete feed or feed blocks during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinkerlers/fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)
Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2 Poultry

	Suggested contingency measures			Convergence/ linkages with ongoing programs, if any
	Before the event	**During the event**	**After the event**	
Drought	**Not applicable**			
Floods	**Not applicable**			
Cyclone	**Not applicable**			
Heat wave and cold wave				
Shelter/environment management	***Heat wave:*** Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed	
	Cold wave: Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed	
Health and disease management	Deworming and vaccination against RD and fowl pox	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed	

2.5.3. Fisheries/ Aquaculture

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

(i) Shallow water in ponds due to insufficient rains/inflow	) Critical analysis of long range forecast data. ii) Storage of water. iii) Afforestation program. iv) Conservation of rivers/reservoir/ponds. v) Re-excavation of local canals and reservoirs.	i) Use stored water. ii) Use surface water flow. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of ponds.	i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoirs. v) Adoption of rain harvesting methods. vi) Compensation claims . vii) Prepare vulnerability map and place it to management committee.
(ii) Impact of salt load build up in ponds/Changes in water quality	i) Prohibit dumping of solid, liquid and waste in water sources. ii) Preparedness with stocks of chemicals, disinfectants and therapeutic drugs.	i) Use disinfectants and therapeutic drugs. ii) Adoption of bio-remedial measures	i)Need based research data should be generated on water quality. ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.
(iii) Any other	-	-	-
2. Flood	NA		
3. Cyclone / Tsunami	NA		
4. Heat wave and cold wave			
A. Capture			
Marine	-	-	-
Inland	i)Stay aware of upcoming temperature changes. ii) Arrange the aerators. iii) Ensure sufficient water level in water bodies. vi) Formulate strategic fishing management during the heat/ cold waves.	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	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,

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

	ii) Store chemicals, disinfectants and therapeutic drugs. iii) Develop heat/ cold wave control management plan. iv) Stock sufficient emergency medicines.	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	generation of data about type or kind of disease spread. ii) Eradicating the disease. iii) Follow up surveillance and monitoring. iv) Proper disposal of dead fish. v) Loss assessment & insurance claim.
(iii) Any other	-	-	-