

State: PUNJAB

Agriculture Contingency Plan for District: SANGRUR

| 1.0 District Agriculture profile | | | | | |
|--|--|---|-----------------------------------|---------------------|--------------------------------|
| 1.1 | Agro-Climatic/Ecological Zone | | | | |
| | Agro Ecological Sub Region (ICAR) | North Punjab plain, Ganga-Yamuna Doab and Rajasthan upland, hot, dry, semi-arid eco-subregion (4.1) | | | |
| | Agro-Climatic Zone (Planning Commission) | Trans-Gangetic Plain Region (VI) | | | |
| | Agro Climatic Zone (NARP) | Western Plain Zone (PB-4) | | | |
| | List all the districts falling under the NARP Zone* (*>50% area falling in the zone) | Barnala, Faridkot, Mogab and Sangrur | | | |
| | Geographic coordinates of district headquarters | Latitude | Longitude | Altitude | |
| | | 30 ⁰ 14'25.51" N | 75 ⁰ 50'34.32" E | 257 m | |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | - | | | |
| Mention the KVK located in the district with address | Krishi Vigyan Kendra, Ranbirclub road, Kheri village, Sangrur-148 001 | | | | |
| 1.2 | Rainfall | Normal RF(mm) | Normal Rainy days (number) | Normal Onset | Normal Cessation |
| | SW monsoon (June-Sep): | 392.1 | 44 | Last Week of June | After second week of September |
| | NE Monsoon(Oct-Dec): | - | - | | |
| | Winter (Jan- March) | - | - | - | - |
| | Summer (Apr-May) | 6.3 | - | Mid April | - |
| | Annual | 398.4 | - | - | - |

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|------------|---|-------------------|-----------------|-------------|---------------------------------|--------------------|----------------------|--|------------------------------|-----------------|---------------|
| 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) | 361 | 311 | 5 | 42 | - | - | - | - | 3 | - |

| | | | |
|------------|--|-----------------------|-----------------------------|
| 1.4 | Major Soils (common names like red sandy loam deep soils (etc.,)) | Area ('000 ha) | Percent (%) of total |
| | Light Sandy | 173.7 | 48 |
| | Sandy Loam | 187.7 | 52 |

| | | | | |
|-----------------|---------------------------------------|---|-----------------------------|---|
| 1.5 | Agricultural land use | Area ('000 ha) | Cropping intensity % | |
| | Net sown area | 311 | 198 | |
| | Area sown more than once | 309 | | |
| | Gross cropped area | 620 | | |
| 1.6 | Irrigation | Area ('000 ha) | | |
| | Net irrigated area | 292 (Tubewells and Wells) and 19 (Canals) | | |
| | Gross irrigated area | 311 | | |
| | Rainfed area | 19 | | |
| | Sources of Irrigation | Number | Area ('000 ha) | Percentage of total irrigated area |
| | Canals (10% area is canal irrigated) | Sirhind canal & its tributaries | 72.5 | |
| | Tanks | - | | |
| | Open wells | - | | |
| | Bore wells | 1,27,236 | 1027.5 | |
| | Lift irrigation schemes | | | |
| | Micro-irrigation | | | |
| | Other sources (please specify) | | | |
| | Total Irrigated Area | | | |
| | 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 | 9 blocks (Sangrur, Bhawanigarh, Malerkotla-1, Malerkotla-II, Dhuri, Sherpur, Sunam Lehragage, Andara) | 100 | Marginal to Saline |
| Critical | | | |
| Semi- critical | | | |
| Safe | | | |
| Wastewater availability and use | | | |
| Ground water quality | Marginal to saline | | |
| *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 _2009-2010)

| 1.7 | Major field crops cultivated | Area ('000 ha) | | | | | | | | |
|-----|------------------------------|---------------------|---------|-------|-------------|-----------|---------|-------|--------|-------------|
| | | <i>Kharif</i> | | | <i>Rabi</i> | | | Total | Summer | Grand total |
| | | Irrigated (2008-09) | Rainfed | Total | Crop | Irrigated | Rainfed | | | |
| | Paddy | 267 | - | 267 | Wheat | 286 | - | 286 | | |
| | Cotton (D) | 2 | - | 2 | Barley | 3 | - | 3 | | |
| | Cotton(A) | 12 | - | 12 | Gram | 0.2 | - | 0.2 | | |
| | Moong | 1 | - | 1 | Mustard | 1 | - | 1 | | |

| | | | | | | |
|---|--|-------------------------|---------------------------|---------------------|-----------------------------|---|
| 1.8 | Livestock (in number) | Male ('000) | Female ('000) | Total ('000) | | |
| | Non descriptive Cattle (local low yielding) | 52.9 | 30.4 | 73.3 | | |
| | Crossbred cattle | 11.5 | 38.1 | 49.6 | | |
| | Non descriptive Buffaloes (local low yielding) | 3.9 | 40.7 | 44.6 | | |
| | Graded Buffaloes | 41.8 | 399.9 | 441.7 | | |
| | Goat | 5.7 | 15.5 | 21.2 | | |
| | Sheep | 3.7 | 10.9 | 14.6 | | |
| | Others Equine (Horse & Pony) | 0.6 | 1.04 | 1.6 | | |
| | Commercial dairy farms (Number) | | | 0.07 | | |
| 1.9 | Poultry | No. of farms | Total No. of birds | | | |
| | Commercial | 133 | 1166.1 | | | |
| | Backyard | - | 6.1 | | | |
| 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 Department) | No. Farmer owned ponds | | No. of Reservoirs | | No. of village tanks | |
| | 86 | | - | | 419 | |

| | | | |
|---|-------------------------------|---------------------|-------------------------------|
| 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) | 685.8 | 5.48 | 3.7557 |

1.11 Production and Productivity of major crops (Average of last 4 years: 2005-06 to 2008-09; specify years)

| 1.11 | Name of crop | Kharif | | Rabi | | 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) | | | | | | | | | | |
| | Wheat | - | - | 15130 | 4340 | - | - | 15130 | 4340 | - |
| | Barley | - | - | 61 | 3424 | - | - | 61 | 3424 | - |
| | Gram | - | - | 3.25 | 1019 | - | - | 3.25 | 1019 | - |
| | Paddy | 10458 | 3941 | - | - | - | - | 10458 | 3941 | - |
| | Maize | 482 | 3168 | - | - | - | - | 482 | 3168 | - |
| | Groundnut | 3.15 | 888 | - | - | - | - | 3.15 | 888 | - |
| | Moong | - | - | | | 9.58 | - | 9.58 | - | - |
| Major Horticultural crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| | Guava | 148477 | 21264 | | | | | 148477 | 21264 | |
| | Ber | 43306 | 28340 | | | | | 43306 | 28340 | |
| | Mango | 74866 | 12745 | | | | | 74866 | 12745 | |
| | Grapes | 27415 | 28344 | | | | | 27415 | 28344 | |
| | Kinnow | 513840 | 17410 | | | | | 513840 | 17410 | |
| | Orange and malta | 20567 | 7520 | | | | | 20567 | 7520 | |
| | Pear | 55424 | 22544 | | | | | 55424 | 22544 | |

| | | | | | | | | | |
|--|-------|-------|-------|--|--|--|-------|-------|--|
| | Peach | 23903 | 17220 | | | | 23903 | 17220 | |
|--|-------|-------|-------|--|--|--|-------|-------|--|

| | | | | | |
|-------------|--|------------------|--|--|--|
| 1.12 | Sowing window for 5 major field crops | Cotton (A) | Paddy | Wheat | Rapeseed-Mustard |
| | Kharif- Rainfed | - | - | - | - |
| | Kharif-Irrigated | April to Mid May | 15 th May to 30 th May | - | - |
| | Rabi- Rainfed | - | - | - | - |
| | Rabi-Irrigated | - | - | 4 th week of October to End of November | 10 th 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 intrusion | | | √ |
| | Pests and disease outbreak (specify) | √ | | |
| Others (specify) | | | | |

| | | | |
|-------------|---|---|---------------|
| 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: Yes |
| | | Soil map as Annexure 3 | Enclosed: No |

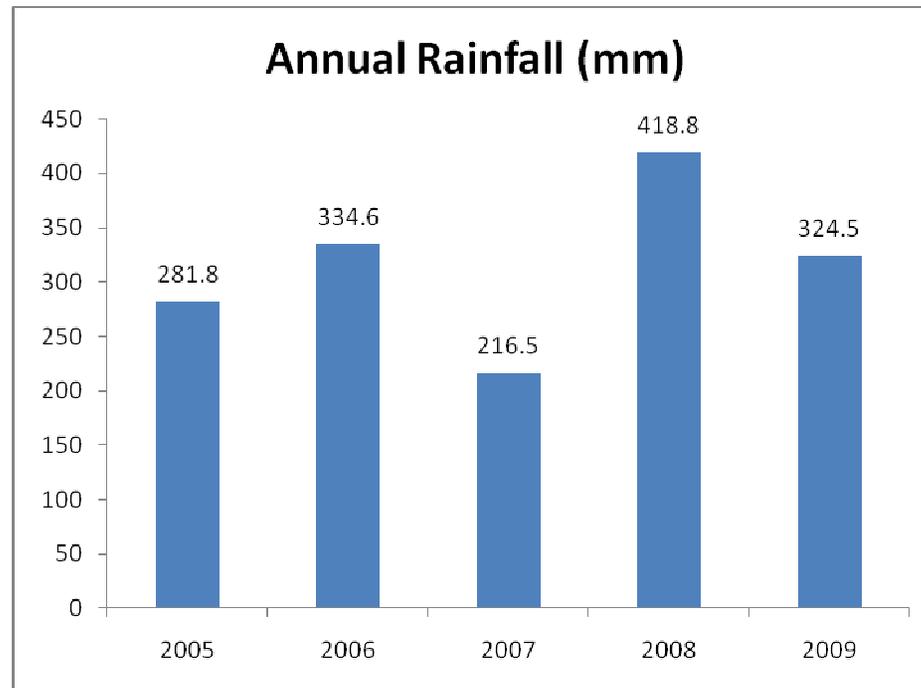
Annexure I





Annexure II

Annual Rainfall of Sangrur District for the last five years (2005-2009)



2.0 Strategies for weather related contingencies

2.1 Drought: N A

2.1.1 Rainfed situation: N A

2.1.2 Irrigated situation

| Condition | Major Farming situation | 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 / Tubewell irrigated alluvial soils | Cotton - Wheat | A. Cotton B. Rice C. Wheat D. Rapeseed-mustard | A. 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. B. Rice: i.Grow short duration varieties ii. Basmati plantation C. Wheat: i. Grow late sown varieties ii. Bi-directional sowing / Bed planting iii. closed spacing (7.5x22.5 cms) iv.Seed priming D. Rapeseed-mustard Prefer raya var. PBR 97 under scarce water supply. | - |
| | | Rice – Wheat | | | |

| 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 | 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 | | | | |

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 | | | | |
| Cotton | Ridge planting, less groundwater pumping due to excess rain water | Use of excess rain water, application of nitrogenous fertilizer, foliar spray of 2 % KNO ₃ | Use of excess rain water and chemical control of pests/ diseases | Storage of produce at safer place |
| Rice | Pumping out excess rain water, Nitrogenous fertilizer application | Use of excess rain water | Use of 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 | Pumping out excess rain water | 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, | Shifting and storage of harvested fruits |

| | | | | |
|---|--|---|--|--|
| | | | Drainage of excess water, clean cultivation/sanitation for control of fruit fly | 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 for 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 liter water | Avoid Rotting and discolouration of fruits |
| Potato | Manual weed control , earthing up and apply second dose of Nitrogen fertilizer | Derain 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 | 1.Insect/Pests: Spray Imedachloprid 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. 2.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 | 1.Insect/Pests: Spray Nuvacron /Monocil@ 560 ml/acre against leaf | | Storage of produce |

| | | | | |
|---------------------|---|--|---|--|
| | ml/acre against leaf folder and stem borer. | folder and stem borer; Confidor @40 ml/acre/ Ekalux @ 800 ml/acre against Plant hoppers/ Rice ear cutting caterpillar. 2. Diseases: Grow PR 120, PR 111 against Bacterial leaf blight (BLB); spray Blitox(500ml)/Tilt (200ml) per acre to control False smut; Spray Tilt @ 200ml/acre against sheath blight ,Sheath rot and Bunt diseases. | | 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. | Treat the produce meant for seed with 250gmMalathion dust(5%)and disinfect 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 <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. | | Shifting of produce at safer place for drying |
| Horticulture | | | | |
| Ber | Chemical control of Leaf eating caterpillar and diseases like powdery mildew. | Chemical control of Leaf eating caterpillar and diseases like powdery mildew. | 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 of sucking pests and diseases and drain out excessive water to avoid guava wilt. | Chemical control 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 of anthracnose of guava | Pick the fruit at green and firm stage and shift at proper place |

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|-------------|---|---|---|--|
| Peach | Chemical control 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 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 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 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 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 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 | NA | 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 | NA | | |
| 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 | Not applicable | | |
| Floods | Not applicable | | |
| <i>Cyclone</i> | 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) | <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 the animal during cold waves</p> <p>In severe cases, put on the heaters at night times</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia</p> | <p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p> |

| | | | |
|------------------|---|--|---|
| | | 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 (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 / 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 | Not applicable | | | |
| Floods | Not applicable | | | |

| | | | | |
|---------------------------------------|--|--|--------------------------------|--|
| <i>Cyclone</i> | Not applicable | | | |
| <i>Heat wave and cold wave</i> | | | | |
| 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 | <ul style="list-style-type: none"> i) Critical analysis of long range forecast data. ii) Storage of water. iii) Afforestation program iv) Conservation of rivers, wetlands/village ponds. v) Re-excavation of local canals/ponds. | <ul style="list-style-type: none"> i) Use stored water. ii) Make judicious use of available water sources. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of fish ponds. | <ul style="list-style-type: none"> i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoir. v) Adoption of rain harvesting methods. vii) Prepare vulnerability map. |
| (ii) Changes in water quality | <ul style="list-style-type: none"> i) Dumping of solid, liquid and waste should be stopped. ii) Store chemicals, disinfectants and therapeutic drugs. | <ul style="list-style-type: none"> i) Use disinfectants and therapeutic drugs. ii) Adoption of bio remedial measures | <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) Any other | | | |
| B. Aquaculture | | | |
| (i) Shallow water in ponds due to insufficient rains/inflow | <ul style="list-style-type: none"> i) Critical evaluation of long range forecast data. ii) Storage of water. iii) Afforestation program. iv) Installation of tube wells. v) Conservation of rivers/wetlands/dams. vi) Re-excavation of local canals and | <ul style="list-style-type: none"> i) Use stored water. ii) Make judicious use of available water sources. iii) Divert water from unutilized areas. iv) Utilize canal water. v) Aeration of fish ponds. | <ul style="list-style-type: none"> i) Need based monitoring through research plan. ii) Intensive afforestation program. iii) Augmentation of surface water flow. iv) Construction of water reservoir. v) Adoption of rain harvesting methods. |

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| | ponds | | vii) Prepare vulnerability map. |
| (ii) Impact of salt load build up in ponds/Changes in water quality | i) Store chemicals, disinfectants and therapeutic drugs. | i) Immediate examination of water samples. ii) Use appropriate disinfectants and therapeutic drugs. iii) Adoption of bio-remedial measures. iv) Reduce salinity to moderate levels for increasing survival rate of fish/prawn/other organisms with the application of scientific techniques. | i) Need based research data should be generated. ii) Cleaning of water bodies. iii) Regular water monitoring and bio-monitoring of water bodies. |
| (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) Mobilize local committees for protection. | i) Human evacuation from the area. ii) Coordination of assistance. iii) Damage and need assessment. iv) Immediate management of relief supplies. v) Immediate help and compensation delivery during emergency. | i) Arrangement for rescue and casualty care. ii) Arrangement for burial control room. iii) Restoration of essential services, security and protection of property iv) Support to rehabilitation, logistics, training and awareness build up & testing and updating the plan v) Insurance claim. |

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| | vi) Enhancement in coping capabilities of common people. vii) Insurance for the life of people/fishermen. | | |
| (ii) No. of boats/nets damaged | i) Annual repair of boats/nets and gears. ii) Insurance of boats/nets/gears. | i) Coordination of assistance. iii) Immediate management of relief supplies. iv) Govt. support and compensation. | i) Education/ training for technical knowledge for the repair of boats/nets and gears. ii) Provision for evacuation. iii) Loss assessment & insurance claim. |
| (iii) No. of houses damaged | i) Educate and provide training for the repair of houses. ii) Store raw materials for repairing of houses. iii) House insurance. | i) Damaged house enumeration and loss assessment. ii) Coordination of assistance. iii) Immediate management of relief supplies. iv) Immediate support and compensation. | i) Repair of damaged houses. ii) Loss assessment & insurance 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) Mobilize local people for protection ii) Hire stock/inputs from areas/company/ farmers who are not affected by flood. | i) Locate backup stocks and verify its usability. ii) Follow flood control management plan. iii) Notify utilities of the critical demand about loss of stock and inputs. iv) Loss assessment & insurance claim. |
| (v) Changes in water quality | i) Provision to stop/close the | i) Do not use contaminated water. | i) Need based research data should be |

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| | <p>effluent/sewage discharge point in to water bodies.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Develop flood control management plan.</p> | <p>ii) Proper preparation and management through emergency aeration.</p> <p>iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p> <p>iv) Immediate support of govt./industrial organization for maintaining the purity and quality of water bodies.</p> <p>v) Need based bioremediation.</p> | <p>generated to maintain water quality,</p> <p>ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.</p> <p>iii) Contact govt. and industrial organization for immediate remedy and cleaning of the water bodies.</p> <p>iv) Regular water monitoring and bio-monitoring of water bodies for formulation of management plan.</p> |
| (vi) Health and disease | <p>i) Advance planning and preparedness.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Stock sufficient stock of medicines.</p> | <p>i) Prompt action or immediate removal of disease causing agents/ dead fish.</p> <p>ii) Proper disposal of dead fish.</p> <p>iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p> <p>iv) Emergency aeration or splashing in water bodies.</p> | <p>i) Laboratory diagnosis of disease fish, generation of data about type or kind of disease spread.</p> <p>ii) Eradicating the disease where possible.</p> <p>iii) Follow up surveillance and monitoring after disease outbreak.</p> <p>iv) Bio-monitoring and maintaining water quality.</p> <p>v) Need based research data should be generated.</p> <p>vi) Loss assessment & insurance claim.</p> |
| B. Aquaculture | | | |
| (i) Inundation with flood water | i) Proper facility construction | i) Arrangement for evacuation | i) Support to rehabilitation, logistics, |

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| | <p>/strengthening for ponds and its stock safety.</p> <p>ii) Development of flood control management plan.</p> <p>iii) Arrangement of emergency backup equipment on site.</p> <p>iv) Insurance of stocks.</p> <p>v) Prevention from entry of alien/wild organisms through flood water.</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 supplies.</p> <p>viii) Release excess water from height of T.</p> <p>ix) Lower the water level in culture facilities.</p> | <p>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 wastes causes decrease in dissolved oxygen level.</p> <p>iv) Strengthening of water bodies/ponds.</p> <p>v) Loss assessment & insurance claim.</p> |
| <p>(ii) Water contamination and changes in water quality</p> | <p>i) Provision to stop/close the effluent/sewage discharge into water bodies.</p> <p>ii) Store chemicals, disinfectants and therapeutic drugs.</p> <p>iii) Develop flood control management plan.</p> | <p>i) Do not use contaminated water.</p> <p>ii) Proper preparation and management through emergency aeration.</p> <p>iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs.</p> <p>iv) Immediate support of govt./industrial organization for maintaining the purity and quality of water bodies.</p> <p>iv) Need based bioremediation.</p> | <p>i) Need based research data should be generated to maintain water quality,</p> <p>ii) Dumping of solid, liquid and waste should be stopped through enactment of legislation.</p> <p>iii) Contact govt. and industrial organization for 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> |

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| (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) Identification of type of disease outbreak, prompt action or immediate removal of disease causing agents/ dead fish. ii) Proper disposal of dead fish. iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iv) Determination of nature and speed of transmission of diseases. v) Proper preparation and management through emergency aeration. | <ul style="list-style-type: none"> i) laboratory diagnosis of disease fish, generation of data about type or kind of disease occurrence. ii) Eradicating the disease. iii) Follow up surveillance and monitoring after disease outbreak. iv) Proper disposal of dead fish. vii) Loss assessment & insurance claim. |
| (iv) Loss of stock and input (feed, chemicals) | <ul style="list-style-type: none"> i) Keep the stock/input in safer place for emergency purpose. ii) Store fuels, food/other items. iii) Develop flood control management plan. iv) Stock material insurance. | <ul style="list-style-type: none"> i) Search/locate the stock/input, if the condition is good can be used for the purpose otherwise discard it. ii) Mobilize local people for protection. iii) Purchase/hire valuable stock/inputs from areas/company/farmers who are not affected by flood | <ul style="list-style-type: none"> i) Strengthening of stock. ii) Assessment of total loss. iii) Insurance claims. |
| (v) Infrastructure damage (pumps, aerators, huts etc) | <ul style="list-style-type: none"> i) Training for emergency the repair of infrastructure. ii) Store raw materials for repairing of pumps aerators, huts etc. iii) Infrastructure insurance. | <ul style="list-style-type: none"> i) Damaged infrastructure enumeration and need assessment. ii) Locate backup equipment and verify its operation. iii) Coordination of assistance. iv) Immediate management of relief | <ul style="list-style-type: none"> i) Locate backup equipment and verify its operation. ii) Notify utilities of the critical demand. iii) Repair of damaged infrastructure. iv) Loss assessment & insurance |

| | | supplies. | claim. |
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| (vi) Any other | | | |
| 3. Cyclone / Tsunami | Not a cyclone prone district. | Not a cyclone prone district. | Not a cyclone prone district. |
| A. Capture | - | - | - |
| Marine | - | - | - |
| (i) Average compensation paid due to loss of fishermen lives | - | - | - |
| (ii) Avg. no. of boats/nets damaged | - | - | - |
| (iii) Avg. no. of houses damaged | - | - | - |
| Inland | - | - | - |
| B. Aquaculture | - | - | - |
| (i) Overflow / flooding of ponds | - | - | - |
| (ii) Changes in water quality (freshwater/brackish water ratio) | - | - | - |
| (iii) Health and disease | - | - | - |
| (iv) Loss of stock and input (feed, chemicals etc.) | - | - | - |
| (v) Infrastructure damage (pumps, aerators, shelters/huts etc.) | - | - | - |
| (vi) Any other | - | - | - |
| 4. Heat wave and cold wave | | | |
| A. Capture | | | |
| Marine | - | - | - |
| Inland | <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 | <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 | <ul style="list-style-type: none"> i) Intensive afforestation program. ii) Collect basic weather data on incidence of extreme as well as physical data of water bodies, water chemistry and seasonal changes, |

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| | <p>in water bodies.</p> <p>iv) Formulate strategic fishing management during the heat waves or cold waves.</p> <p>v) Tree plantation around fish ponds</p> | <p>waves.</p> <p>iii) Adopt proper care and management during the fishing period of cold/ heat waves like keeping stock of drinking water and extra cloths.</p> <p>iv) Educating the farmers through electronic / print media</p> | <p>plankton profile and 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> |
| B. Aquaculture | | | |
| (i) Changes in pond environment (water quality) | <p>i) Listen to local weather forecasts and stay aware of upcoming temperature changes.</p> <p>ii) Arrange the aerators.</p> <p>iii) Ensure sufficient water quantity in water bodies.</p> <p>iv) Formulate strategic fishing management during heat/cold waves.</p> <p>v) Tree plantation around fish ponds.</p> | <p>i) Avoid extreme temperature changes as well as low temperature changes for the safety of fishermen life.</p> <p>ii) Monitor fishing sites frequently to ensure that they are not affected by heat or cold waves.</p> <p>iii) Use dark materials to cover the water bodies during excessive heat waves.</p> <p>iv) Adopt proper care and management during the fishing period of cold/ heat waves like keeping stock of drinking water and extra cloths.</p> <p>v) Educating the farmers through electronic/ print media</p> | <p>i) Intensive afforestation program for reducing heat waves.</p> <p>ii) Collect basic weather data on incidence of extremes as well as physical data of water bodies, water chemistry and seasonal changes, plankton profile and seasonal blooms, topography and soil composition.</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>v) Loss assessment & insurance claim.</p> |

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| (ii) Health and disease management | <ul style="list-style-type: none"> i) Advance planning and preparedness. ii) Store chemicals, disinfectants and therapeutic drugs. iii) Develop heat/cold wave control management plan. iv) Stock sufficient quantities of emergency medicines. | <ul style="list-style-type: none"> i) Identification of type of disease outbreak, prompt action or immediate removal of disease causing agents/ dead fish. ii) Proper disposal of dead fish. iii) Use appropriate amount of disinfectants, chemicals and therapeutic drugs. iv) Determination of nature and speed of disease transmission. v) Proper preparation and management through emergency aeration or splashing in water bodies. | <ul style="list-style-type: none"> i) laboratory diagnosis of disease agents, generation of data about type or kind of disease spread. ii) Eradicating the disease where possible. iii) Follow up surveillance and monitoring after disease outbreak. iv) Loss assessment and insurance claim. |
| (iii) Any other | - | - | - |