

Union Territory: Andaman & Nicobar Islands
Agriculture Contingency Plan for District: South Andaman

| 1.0 District Agriculture profile | | | | |
|--|--|--|------------------|-----------------|
| 1.1 | Agro-Climatic/Ecological Zone | | | |
| | Agro Ecological Sub Region (ICAR) | 20.1 | | |
| | Agro-Climatic Zone (Planning Commission) | The Islands Region-XV | | |
| | Agro Climatic Zone (NARP) | Not listed in NARP ACZ | | |
| | List all the districts falling under the NARP Zone* (*>50% area falling in the zone) | | | |
| | Geographic coordinates of district headquarters | Port Blair | | |
| | Geographic coordinates of district headquarters | Latitude | Longitude | Altitude |
| | | 11.40° N | 92.45° E | 79 MSL |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | Kolkata | | |
| | Mention the KVK located in the district with address | KVK Sippighat, Port Blair, South Andaman Pin- 744103 | | |
| Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone | NRM Division, CIARI, Port Blair | | | |

| 1.2 | Rainfall | Normal RF (mm) | Normal Rainy days (number) | Normal Onset (specify week and month) | Normal Cessation (specify week and month) |
|------------|------------------------|------------------------|-----------------------------------|--|--|
| | | Mean of 2000-15 | Mean of 2000-14 | | |
| | SW monsoon (June-Sep): | 1795.2 | 85.0 | 20 th May | |
| | NE Monsoon (Oct-Dec): | 621.4 | 31.5 | | |
| | Winter (Jan-March) | 134.1 | 7.9 | - | - |
| | Summer (Apr-May) | 569.9 | 19.3 | - | - |
| | Annual | 3120.6 | 143.7 | - | - |

*Mean rainfall of 1967-2015: 3005.5 mm

| | | | | | | | | | | | |
|------------|--|-------------------|-----------------|-------------|---------------------------------|--------------------|----------------------|--|------------------------------|-----------------|---------------|
| 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) | 310.6 | 6.894 | 267.3 | 267.3 (Uncultivated land) | - | - | - | - | 0.34 | 1.32 |

| | | | |
|------------|--|------------------|-----------------------------|
| 1.4 | Major Soils (common names like red sandy loam deep soils (etc.,))* | Area (ha) | Percent (%) of total |
| | 1. Inceptisols (Ochrepts) | 11733 | 26.20 |
| | 2. Entisols (Orthrents) | 10915 | 24.38 |
| | 3. Entisols (Aquepts) | 4933 | 11.02 |
| | 4. Alfisols (Ustalfs) | 4445 | 9.93 |
| | 5. Entisols (Psamments) | 3954 | 8.83 |
| | Others (specify): Entisols (Fluvents, aquepts) and Inceptisols (aquepts and orthrents) | 8795 | 19.64 |

* 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 (ha) | Cropping intensity % |
| | Net sown area | 6,894.20 | 103.6 |
| | Area sown more than once | 246.85 | |
| | Gross cropped area | 7,141.05 | |

| | | | | |
|------------|------------------------------|--------------------------------|------------------|---|
| 1.6 | Irrigation | Area (ha) | | |
| | Net irrigated area | 247 (area sown more than once) | | |
| | Gross irrigated area | - | | |
| | Rainfed area | | | |
| | Sources of Irrigation | Number | Area (ha) | Percentage of total irrigated area |
| | Canals | | - | - |
| | Tanks | - | - | - |
| | Open wells | 396 | - | - |
| | Bore wells | - | - | - |

| | | | |
|--|---------------------------|----------|---|
| Lift irrigation schemes | - | - | - |
| Micro-irrigation | | - | - |
| Other sources (please specify): ponds | 718 | - | - |
| Total Irrigated Area | | | |
| Pump sets | 1,118 | | |
| No. of Tractors | 28 | | |
| 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 | - | - | - |
| Critical | - | - | - |
| Semi- critical | - | - | - |
| Safe | Safe | - | - |
| Wastewater availability and use | - | - | - |

1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2013-14)

| 1.7 | S. No. | Major field crops cultivated | Area (ha) | | | | | | | |
|-----|------------------|---|-----------|---------|-------|-----------|---------|-------|--------|-------------|
| | | | Kharif | | | Rabi | | | Summer | Grand total |
| | | | Irrigated | Rainfed | Total | Irrigated | Rainfed | Total | | |
| 1 | Rice | | 317.3 | 317.3 | | | | | 317.3 | |
| 2 | Sugarcane | 57.5 | | 57.5 | | | | | 57.5 | |
| 3 | Maize | | | | | 45.0 | 45.0 | | 45.0 | |
| 4 | Green gram | | | | | 14.0 | 14.0 | | 14.0 | |
| 5 | Black gram | | | | | 6.5 | 6.5 | | 6.5 | |
| | Others (specify) | Tapioca, sweet potato, other root crops | | | | 186.0 | 186.0 | | 186.0 | |

| | S. No. | Horticulture crops- Fruits | Area (ha) | | |
|--|--------|-------------------------------|-----------|-----------|---------|
| | | | Total | Irrigated | Rainfed |
| | 1 | Banana | 304.0 | 304.0 | |
| | 2 | Sapota | 96.5 | | 96.5 |
| | 3 | Mango | 80.5 | | 80.5 |
| | 4 | Papaya | 66.0 | 66.0 | |
| | 5 | Pine apple | 30.2 | 30.2 | |

| | | | | | |
|------------|---|--|--------------|------------------|----------------|
| | Others (specify) | Citrus and other minor fruits | 104.15 | | 104.15 |
| | | Horticulture crops - Vegetables | Total | Irrigated | Rainfed |
| | 1 | Chillies | 117.5 | 117.5 | |
| | 2 | Sweet Potato | 55.5 | | 55.5 |
| | 3 | Tapioca | 33.0 | | 33.0 |
| | Others (specify) | | | | |
| | | Medicinal and Aromatic crops | Total | Irrigated | Rainfed |
| | 1 | | | | |
| | 2 | | | | |
| | Others (specify) | | | | |
| | | Plantation crops | Total | Irrigated | Rainfed |
| | 1 | Coconut | 3560.0 | | 3560.0 |
| | 2 | Areca nut | 2235.0 | | 2235.0 |
| | 3 | Cashew nut | 29.5 | | 29.5 |
| | 4 | Rubber | 264.7 | | 264.7 |
| | 5 | Red oil palm | 1,593 | | 1,593 |
| | Others (Specify) | Eg., industrial pulpwood crops etc. | - | - | - |
| | | Fodder crops | Total | Irrigated | Rainfed |
| | 1 | - | 10 | | 10 |
| | 2 | - | | | |
| | Others (Specify) | | | | |
| | | Total fodder crop area | 10 | | 10 |
| | | Grazing land | NA | | |
| | | Sericulture etc | NA | - | - |
| | | Others (specify) | | | |
| 1.8 | Livestock | | Male | Female | Total |
| | Non descriptive Cattle (local low yielding) | | - | - | - |
| | Improved cattle | | 4102 | 13825 | 17927 |

| | | | | | | | |
|-------------|---|-------------------------------|-------------------------------|--------------------------|------------------------------------|--|---|
| | Crossbred cattle (Total) | 2223 | 5377 | 7600 | | | |
| | Non descriptive Buffaloes (local low yielding) | | | | | | |
| | Descript Buffaloes | 266 | 719 | 985 | | | |
| | Goat | 8626 | 18938 | 27564 | | | |
| | Sheep | - | - | - | | | |
| | Others ((Pig) | 1286 | 1789 | 3075 | | | |
| | Commercial dairy farms (Number) | | | | | | |
| 1.9 | Poultry (chicken, Duck, Turkey, | No. of farms | Total No. of birds | | | | |
| | Commercial | 47 | 665422 | | | | |
| | Backyard | - | | | | | |
| 1.10 | Fisheries (Data source: Chief Planning Officer) | | | | | | |
| | A. Capture | | | | | | |
| | i) Marine (Data Source: Fisheries Department) | No. of fishermen | Boats | | Nets | | Storage facilities (Ice plants etc.) |
| | | | Mechanized | Non-mechanized | Mechanized (Trawl nets, Gill nets) | Non-mechanized (Shore Seines, Stake & trap nets) | |
| | | - | 58 | 682 | 1342 | 1510 | ice plant :12 cold storage: 06 |
| | ii) Inland (Data Source: Fisheries Department) | No. Farmer owned ponds | | No. of Reservoirs | | No. of village tanks | |
| | | 760 | | 6 | | - | |
| | B. Culture | | | | | | |
| | | | Water Spread Area (ha) | | Yield (t/ha) | Production (tons) | |
| | i) Brackish water (Data Source: MPEDA/ Fisheries Department) | | 0 | | 0 | 0 | |
| | ii) Fresh water (Data Source: Fisheries Department) | | 233.0 | | 10.31 | 73 | |
| | Others | | | | | | |

1.11 Production and Productivity of major crops (Average of last 5 years: 2013-14):

| 1.11 | Name of crop | <i>Kharif</i> | | <i>Rabi</i> | | Summer | | Total | | Crop residue as fodder (tons) |
|--|--------------|----------------|----------------------|----------------|----------------------|---------------------|----------------------|----------------|----------------------|-------------------------------|
| | | Production (t) | Productivity (kg/ha) | Production (t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | Production (t) | Productivity (kg/ha) | |
| Major Field crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| Crop 1 | Paddy | 1187.9 | 3744 | - | - | - | - | 1187.9 | 3744 | 1782 |
| Crop 2 | Sugarcane | 2058 | 37800 | - | - | - | - | 2058 | 37800 | 618 |
| Crop 3 | Maize | - | - | 111.5 | 247.8 | - | - | 111.5 | 2478 | - |
| Crop 4 | Greengram | - | - | 7.6 | 542 | - | - | 7.6 | 542 | 38 |
| Crop 5 | Black gram | - | - | 3.1 | 477 | - | - | 3.1 | 477 | 16 |
| Major Horticultural crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| Crop 1 | Coconut | 16.0 million | 4494 nuts | - | - | - | - | 16.0 million | 4494 nuts | - |
| Crop 2 | Areca nut | 5610.5 | 2510 | - | - | - | - | 5601.5 | 2510 | - |
| Crop 3 | Black pepper | 61.3 | 151.1 | - | - | - | - | 61.3 | 151.1 | - |
| Crop 4 | Banana | 3478 | 1441 | - | - | - | - | 3478 | 1441 | - |
| Crop 5 | Chilly | 289 | 2459.6 | - | - | - | - | 289 | 2459.6 | - |

| 1.12 | Sowing window for 5 major field crops (start and end of normal sowing period) | Crop 1: Paddy | 2: Maize | 3: Pulses | 4: --- | 5: --- |
|------|---|----------------------|----------|-----------|--------|--------|
| | Kharif- Rainfed | Mid July- early Sept | - | | | |
| | Kharif-Irrigated | - | - | | | |
| | Rabi- Rainfed | - | Nov-Dec | Dec-Jan | | |
| | Rabi-Irrigated | - | | | | |

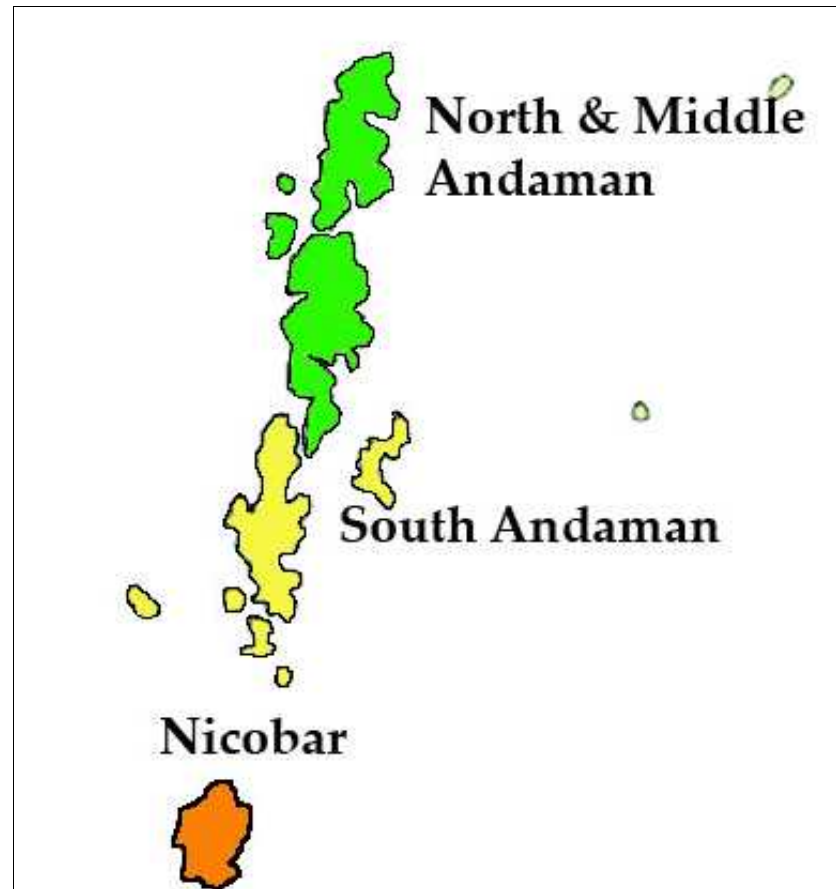
| 1.13 | What is the major contingency the district is prone to? (Tick mark) | Regular | Occasional | None |
|------|---|---------|------------|------|
| | Drought | | - | - |
| | Flood (low lying and coastal areas) | | - | - |
| | Cyclone | | - | - |
| | Hail storm | - | - | |
| | Heat wave | - | - | |

| | | | | |
|--|---|---|---|---|
| | Cold wave | - | - | |
| | Frost | - | - | |
| | Sea water intrusion | | - | - |
| | Pests and disease outbreak (specify) <ul style="list-style-type: none"> • Bacterial leaf blight, Sheath blight; stem borers, leaf folder, sucking pests and rats of rice • Dry root rot of pulses • Coconut/ bud rot, areca nut bud rot, yellow leaf disease, leaf blight/spot and rhinoceros beetle • Banana Bunchy Top Virus, leaf spot/ blight • Rhizome rot/ leaf blight of ginger and turmeric; pepper leaf blight | | - | - |
| | 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 |

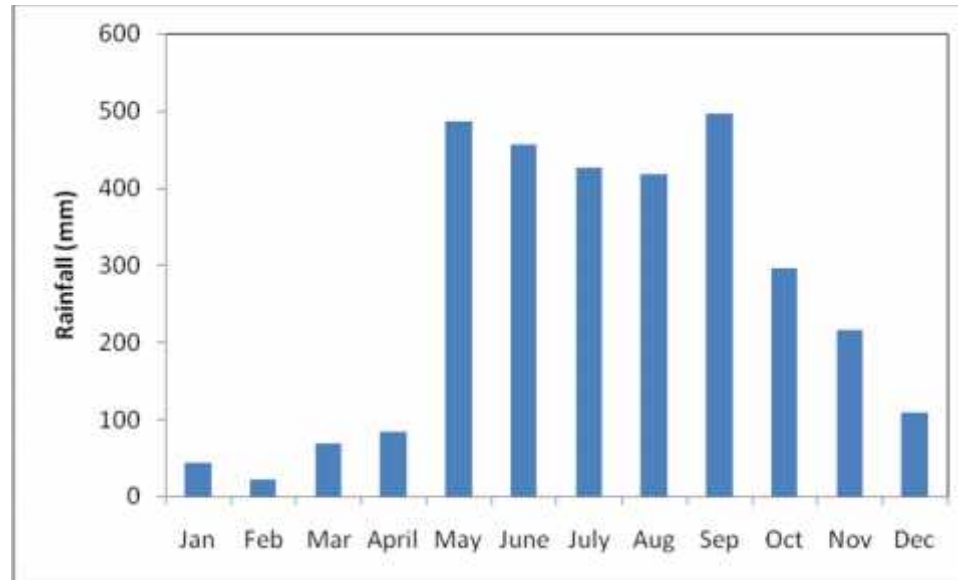
Annexure I

Location map of South Andaman district within Andaman & Nicobar Islands



Annexure 2

Mean annual rainfall of South Andaman district within Andaman & Nicobar Islands



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

| Condition | Suggested Contingency measures | | | |
|---|--------------------------------|-------------------------------|--|--------------------|
| | Major Farming situation | Normal Crop / Cropping system | Change in crop / cropping system including variety | Agronomic measures |
| Early season drought (delayed onset): Delay by 2/4/6/8 weeks | Not Applicable | | | |

| Condition | <i>Rabi / winter/ summer season</i> | | Suggested Contingency measures | | |
|---|-------------------------------------|-----------------------------|---|--|---------------------------|
| | Major Farming situation | Normal Crop/cropping system | Crop management | Soil nutrient & moisture conservation measures | Remarks on Implementation |
| Early season drought (Normal onset) | | | | | |
| Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc. | | Rice-pulse / vegetable | <ul style="list-style-type: none"> Do gap filling of vegetable crops Re-sowing of field crops | <ul style="list-style-type: none"> Mulching of crops with crop residues / plastics Provide crop saving irrigation if available | |
| Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) | | | | | |
| At vegetative stage | | Rice-pulse / vegetable | <ul style="list-style-type: none"> Remove the weeds and use them as mulch | <ul style="list-style-type: none"> Provide life saving irrigation including fertigation | |
| Mid season drought (long dry spell) | | | | | |

| | | | | | |
|--|--|---|---|--|---|
| <p>At flowering/ fruiting stage</p> | | <p>Rice –pulse/ vegetable</p> | <ul style="list-style-type: none"> • Harvest the green pods of mungbean for vegetable purpose | <ul style="list-style-type: none"> • | |
| <p>Terminal drought (Early withdrawal of monsoon)</p> | <p>High rainfall uplands, eroded hill slopes, medium lands, valleys and coastal areas with winter and summer season moisture stress.</p> | <p>Rice- pulse / groundnut / vegetable / maize</p> | | <ul style="list-style-type: none"> • Zero till sowing of post rice (<i>rabi</i>) crops (including <i>paira / utera</i> cropping of pulse crops) • Use of short duration drought tolerant varieties • Mulching with rice stubbles / residues • Optimum plant population maintenance • Life saving irrigation | <ul style="list-style-type: none"> • RKVY funds for micro irrigation |
| | | <p>Coconut / areca nut / fruit crop based homestead farming</p> | <ul style="list-style-type: none"> • Water shed based development • De-silting and raising of embankment of existing water bodies, establishment of community water harvesting structures • Micro irrigation with conserved water • Mulching with coconut / areca nut leaves, shells and other crop wastes in the plant basins • Apply organic manures to enhance soil water storage | | |

2.1.2 Drought - Irrigated situation

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|--|-----------------------------|---|---|---------------------------|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Delayed release of water in canals due to low rainfall | | | Not applicable | | |
| Limited release of water in canals due to low rainfall | | | | | |
| Non release of water in canals under delayed onset of monsoon in catchment | | | | | |
| Lack of inflows into tanks due to insufficient /delayed onset of monsoon | Medium and low lands of valleys and coasts | Rice-vegetables/ pulse | <ul style="list-style-type: none"> • Adopt zero till cultivation of vegetable / pulse crop | <ul style="list-style-type: none"> • Adopt micro irrigation • Mulching | |
| Insufficient groundwater recharge due to low rainfall | Uplands and medium lands | Plantation crops | No change | <ul style="list-style-type: none"> • Take effective control of weeds in tree basins by mulching or by interculture / manual land inversion practices • Don't exploit ground water excessively as it leads to saline water lifting from ground | |
| Any other condition (specify) | | | | | |

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

| Condition | Suggested contingency measure | | | |
|--|--|---|--|--|
| | Vegetative stage | Flowering stage | Crop maturity stage | Post harvest |
| Continuous high rainfall in a short span leading to water logging | | | | |
| Rice | <ul style="list-style-type: none"> • Drain out the excess water • Delay N topdressing till water recedes • Take up gap filling with seedlings available from nursery or by splitting the tillers from the surviving hills. | <ul style="list-style-type: none"> • Apply the recommended dose of fertilizers after excess water drainage | <ul style="list-style-type: none"> • Improve drainage facility and establish alleys • Harvest the crop at physiological maturity. | <ul style="list-style-type: none"> • Spread the sheaves loosely in the fields or on field bunds that are devoid of water stagnation. • Dry the grain to proper moisture content before bagging and storage. • Add salt to the grain for removing moisture from grain • Go for drying of grain when weather is clear. |
| Pulse (mungbean and urdbean) | <ul style="list-style-type: none"> • Go for raised bed planting • Drain out excess water as early as possible • Inter cultivation at optimum moisture condition to loosen and aerate the soil and to control weeds • Top dress 20 kg urea or DAP /ha after drainage of water • Foliar spray 1% KNO₃ or water complex (NPK) fertilizers to support nutrition • Spray systemic fungicides two to three times to control fungal diseases and their outbreak following rains • Take up timely control measures against the outbreak of pests like <i>Spodoptera</i> etc. | <ul style="list-style-type: none"> • Spray 2% urea solution for quick recovery | <ul style="list-style-type: none"> • Harvest mungbean for green seeds and incorporate the rest of biomass into soil to act as green manure or dual purpose crop | <ul style="list-style-type: none"> • Dry the produce to proper moisture content before bagging and storage • Quickly dispose the produce |

| | | | | |
|---|---|---|---|--|
| Vegetables (Brinjal, okra, cowpea, cabbage, cauliflower,) | <ul style="list-style-type: none"> Go for raised bed planting Drain out excess water | <ul style="list-style-type: none"> Cover the curd (cauliflower) through tying the outer leaves up over the curd. | | <ul style="list-style-type: none"> Harvest the produce immediately for disposal. |
| Horticulture | | | | |
| Banana Papaya Citrus Mango | <ul style="list-style-type: none"> Provide proper drainage Spray systemic fungicides to control fungal diseases outbreak | | <ul style="list-style-type: none"> Delay the harvest | <ul style="list-style-type: none"> Improve storage facility/ godowns. |
| Coconut, Areca nut, spices | <ul style="list-style-type: none"> Grow cover crops to arrest soil loss from runoff in steep slopes Collect and conservation of rainwater into ponds / check dams for post rainy season use | | | <ul style="list-style-type: none"> Use of copra dryers / solar dryers for quick drying of produce |
| Heavy rainfall with high speed winds in a short span² | | | | |
| Rice | <ul style="list-style-type: none"> Improve drainage facility Establish shelter belts with coconut / areca nut trees | | | <ul style="list-style-type: none"> Improve storage facility |
| Banana | <ul style="list-style-type: none"> Improve drainage Propping of Banana and establish shelter belts / wind breaks | | | |
| Coconut, Areca nut, pepper, fruit crops | <ul style="list-style-type: none"> Provide proper drainage in low lying areas Provide vegetation cover in sloppy lands to prevent soil erosion | | | <ul style="list-style-type: none"> Dry the copra with solar dryers |
| Vegetables | <ul style="list-style-type: none"> Provide proper drainage and establish wind breaks Plant vegetables on raised beds in such areas | | | <ul style="list-style-type: none"> Harvest the produce and dispose immediately |
| Outbreak of pests and diseases due to unseasonal rains | | | | |
| Rice | <ul style="list-style-type: none"> Use bacterial leaf blight (BLB) and sheath blight (SB) resistant varieties. Adopt prophylactic and curative measures Use of disease free seeds and treat the seeds with fungicides / bactericides Adopt balanced application of fertilizers Follow phyto-sanitary measures Rats should be controlled by traps / rodenticide (bromodiolone cake: 0.005%, zinc phosphide 2%) use | | | |
| Coconut | <ul style="list-style-type: none"> Prophylactic and control measures against bud rot and red palm weevil be taken up Rats should be controlled by traps / rodenticide (bromodiolone cake: 0.005%, zinc phosphide 2%) use and banding the trunks of palms with galvanized iron sheets | | | |
| Areca nut | <ul style="list-style-type: none"> Avoid water stagnation in the garden by providing drainage facilities. Prophylactic spray of fungicides and field sanitation be followed | | | |

| | | |
|------------|--|--|
| Banana | <ul style="list-style-type: none"> • Take Sigatoka leaf spot control measures by removing and destroying severely infected and completely dried leaves, • Use disease free healthy planting material. • Avoid any sort of root injury through intercultural operations or by root pests, Provide better drainage, and Spray carbendazim (0.1%) or give alternate sprays of tridemorph (0.05%), mancozeb (0.2 %) and carbendazim (0.1%) soon after the appearance of initial disease symptoms. | |
| Vegetables | <ul style="list-style-type: none"> • Control measures against fungal infections | |

2.3 Floods

| Condition | Suggested contingency measure | | | |
|--|--|--|---|--|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Transient water logging/ partial inundation | | | | |
| Maize (post rainy season) | Do raised bed planting | <ul style="list-style-type: none"> • Drain out the water | | <ul style="list-style-type: none"> • Harvest and dry the cobs |
| Pulse (post rainy season) | | <ul style="list-style-type: none"> • Foliar spray the nutrients | | |
| Coconut / areca nut | - | | <ul style="list-style-type: none"> • Drain out the water | |
| Horticulture | | | | |
| Banana | Drain out the water | | | |
| Continuous submergence for more than 2 days | | | | |
| Rice | Select water logging tolerant varieties for cultivation | Delay N application | Drain out the water | <ul style="list-style-type: none"> • Drain out the water at the earliest possible • Provide support to the lodged crop |
| Maize /pulse | Gap filling should be done at the earliest possible opportunity | Apply fertilizers by top dressing / foliar spray | | Harvest the maize cobs / pulse crop at physiological maturity and dry |
| Horticulture | | | | |
| Banana | Drain out the excess water | | | |
| Sea water intrusion | | | | |
| Rice | <ul style="list-style-type: none"> • Grow salt tolerant varieties like CSR 36, CIARI Dhan 5 & 6 • Cultivate rice in peak rainy season (May-November) so that slats gets diluted and have little adverse impacts • Construction of dykes, sluice gates, drainage & field bunds | | | |

| | | |
|--------------------|--|--|
| | <ul style="list-style-type: none"> • Establishment of shelter belts/ wind breaks / bioshield along coastal line • Land shaping of the sea water intrusions areas by making broad bed and furrows. Use beds for upland crops and furrows for rice cum fish culture • If permitted go for rice-brackish water aquaculture • Mangrove protection/ conservation / rejuvenation | |
| Coconut, Areca nut | <ul style="list-style-type: none"> • Cultivation on mounds for providing way for leaching of salts • Sea wall protection establishment • Mangrove protection/ conservation / rejuvenation • Establishment of shelter belts/ wind breaks / bio shield along coastal line | <ul style="list-style-type: none"> • Paddy land conservation for reduction of sea water intrusion and conversion of sea water intrusion prone plantations into paddy fields |

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

| Extreme event type | Suggested contingency measure | | | |
|-------------------------|--|------------------|--------------------|--|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Heat Wave | Not Applicable | | | |
| Cold wave | | | | |
| Frost | | | | |
| Hailstorm | | | | |
| Cyclone | | | | |
| Rice | Provide field drainage | | | Cleaning and drying of harvested field crops |
| Pulse/ maize/ groundnut | Provide field drainage by making channels | | | Weather based advisory to be followed for harvesting |
| Areca nut, Coconut | Provide staking and propping of plantation crops Plug the erosion holes with boulders | | | |
| Banana | Open deep trenches to between rows to improve drainage | | | |

| | | |
|-------------------------------|----------------------------------|--|
| Mango, citrus, papaya, Sapota | Drain excess water from orchards | Collect the fallen fruits for marketing / processing |
|-------------------------------|----------------------------------|--|

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 | <ul style="list-style-type: none"> • Cultivation of perennial fodders like NBH, Guinea, • Paragrass, perennial sorghum on paddy field bunds, pond banks, plantation crops • Establishment of village level fodder banks with surplus material • Promote <i>Azolla</i> cultivation at backyard • Hay/haylage making at individual and community level. | <ul style="list-style-type: none"> • Harvest and judiciously use crop residues as fodder. • Harvest rice (C-14-8) for fodder and leave ratoon for grain production • Harvest all the top feeds available (<i>Subabul</i>, <i>Glyricidia</i>, etc) from nearby forests and farms • Establish fodder banks • Concentrate feeds be arranged for feeding • high productive animals • Utilize rice fallows for cultivation of annual fodder crops • Resort to innovative fodder production practices like hydroponics • Feeding unconventional feed supplements as per availability in the locality | <ul style="list-style-type: none"> • Encourage farmers to grow fodder crops • Flushing the stock to recoup with balanced ration containing concentrate & mineral mixture • Replenish the feed and fodder banks |
| Drinking water | <ul style="list-style-type: none"> • Adopt various water conservation methods (check dams, ponds) at appropriate places in farm /village to augment water supplies. • Identification of shallow ground water resources for extraction • Desilting of ponds • Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) | <ul style="list-style-type: none"> • Prevent wallowing of animals in water bodies/resources • Add alum in stagnated water bodies • Provide clean drinking water | <ul style="list-style-type: none"> • Watershed management practices shall be promoted to conserve the rain water. • Bleach (0.1%) drinking water / water sources • Provide clean |

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| | <ul style="list-style-type: none"> • Construction of drinking water tanks in herding places/village junctions • Community drinking water trough can be arranged in shandies /community grazing areas | | drinking water |
| Health and disease management | <ul style="list-style-type: none"> • Procure and stock emergency medicines and vaccines for major endemic diseases • All the stock must be immunized for endemic diseases of the area • Surveillance and disease monitoring network to be established at the district level • Procure and stock multivitamins & area specific mineral mixture • Deworming and deticking measures should be carried out. • Sufficient stock of disinfectants like potassium permanganate, lime, bleaching powder, savlon, dettol should be stocked. • At farmlevel strict biosecurity measures should be adopted. | <ul style="list-style-type: none"> • Carryout deworming to all animals • Identification and quarantine of sick animals • Constitution of Rapid Action Veterinary Force • Performing ring vaccination in case of any outbreak • Restricting movement of livestock in case of any epidemic • Tick control measures be undertaken to prevent tick borne diseases in animals | <ul style="list-style-type: none"> • Surveillance on disease outbreak. • Undertake need based vaccination • Keep the animal houses, milking sheds clean and spray disinfectants • Farmers should be advised to breed their milch animals during July-Sept. so that the peak milk production does not coincide with mid summer |
| Floods | | | |
| Feed and fodder availability | <ul style="list-style-type: none"> • Preparation of haylage and hay from excess fodder • Insurance of livestock • Store sufficient dry fodder for the transportation to the flood affected villages • Keep stock of bleaching powder and lime • Carry out Butax spray for control of external parasites | <ul style="list-style-type: none"> • 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 • Spraying of fly repellents in animal sheds | <ul style="list-style-type: none"> • 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. • Deworming with broad spectrum dewormers • Drying the harvested crop material and proper storage for use as fodder. • Claim insurance |
| Drinking water | | <ul style="list-style-type: none"> • Provide clean drinking water | <ul style="list-style-type: none"> • Disinfectants should be |

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| | | | used in water bodies where animals are drinking |
| Health and disease management | <ul style="list-style-type: none"> • Treatment of animals for both external and internal parasites. • Keep stock of sufficient medicines like anthelmintics, anticoccidials and antimicrobials. | <ul style="list-style-type: none"> • Spraying of fly repellents in animal sheds | <ul style="list-style-type: none"> • Deworming with broad spectrum dewormers |
| Cyclone | <ul style="list-style-type: none"> • Preparation of haylage and hay from excess fodder • Insurance of livestock • Store sufficient dry fodder for the transportation to the flood affected villages • Keep stock of bleaching powder and lime • Treatment of animals for both external and internal parasites. • Keep stock of sufficient medicines like anthelmintics, anticoccidials and antimicrobials. | <ul style="list-style-type: none"> • 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 • Provide clean drinking Water • Spraying of fly repellents in animal sheds. | <ul style="list-style-type: none"> • 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 sunnhemp. |
| Heat wave and cold wave | Not applicable | | |

2.5.2 Poultry

| Condition | Suggested contingency measures | | | Convergence/linkages with ongoing programs, if any |
|------------------------------|--|--|---|--|
| | Before the event | During the event | After the event | |
| Drought | | | | |
| Shortage of feed ingredients | <ul style="list-style-type: none"> • Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought | <ul style="list-style-type: none"> • Supplementation only for productive birds with house hold grain • Supplementation of shell grit (calcium) for laying birds • Culling of weak birds | <ul style="list-style-type: none"> • Supplementation to all survived birds | |
| Drinking water | <ul style="list-style-type: none"> • Adopt various water conservation methods at village level to | <ul style="list-style-type: none"> • Use water sanitizers or offer cool hygienic | <ul style="list-style-type: none"> • Sanitation of drinking | |

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| | improve the ground water level for adequate water supply. | drinking water | water | |
| Health and disease management | <ul style="list-style-type: none"> • Culling of sick birds. • Deworming and vaccination against RD and IBD | <ul style="list-style-type: none"> • Mixing of Vit. A, D, E, K and B-complex including vit C in drinking water (5ml in one litre water) | <ul style="list-style-type: none"> • Hygienic and sanitation of poultry house • Disposal of dead birds by burning /burying with lime powder in pit | |
| Floods | | | | |
| Shortage of feed ingredients | <ul style="list-style-type: none"> • In case of early forewarning of floods, shift the birds to safer place • Storing of house hold feeds like broken rice, pulse etc, | <ul style="list-style-type: none"> • Use stored feed as supplement • Don't allow for scavenging • Culling of weak birds | <ul style="list-style-type: none"> • Routine practices are followed Deworming and vaccination against RD | |
| Drinking water | <ul style="list-style-type: none"> • Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. | <ul style="list-style-type: none"> • Use water sanitizers or offer cool hygienic drinking water | <ul style="list-style-type: none"> • Sanitation of drinking water | |
| Health and disease management | <ul style="list-style-type: none"> • Add antibiotic powder in drinking water to prevent any disease outbreak | <ul style="list-style-type: none"> • Prevent water logging surrounding the sheds through proper drainage facility • Assure supply of electricity by generator or solar energy or biogas • Sprinkle lime powder to prevent ammonia accumulation due to dampness | <ul style="list-style-type: none"> • Sanitation of poultry house • Treatment of affected birds • 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 Applicable | | | |
| Heat wave and cold wave | | | | |

2.5.3

Fisheries/ Aquaculture

| | Suggested contingency measures | | |
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| | Before the event | During the event | After the event |
| 1) Drought | | | |
| A. Capture | | | |
| Marine | Not applicable | Not applicable | Not applicable |
| Inland | Not applicable | Not applicable | Not applicable |
| B. Aquaculture | | | |
| (i) Shallow water in ponds due to insufficient rains/inflow | <ul style="list-style-type: none"> Maintaining appropriate water level in ponds Constructing additional ponds for harvesting rainwater (Reservoir ponds) | <ul style="list-style-type: none"> Pumping in harvested rainwater into culture ponds Deepening of ponds Reduce the stocking density or harvest the stock | <ul style="list-style-type: none"> Prestocking management like drying, desilting liming etc.. |
| (ii) Impact of salt load build up in ponds / change in water quality | <ul style="list-style-type: none"> Maintaining appropriate water quality parameters Continuous monitoring of water quality | <ul style="list-style-type: none"> Application of lime in dikes to reduce the effects of acidity | <ul style="list-style-type: none"> Partial water exchange to optimize salinity |
| (iii) Any other | | | |
| 2) Floods | | | |
| A. Capture | | | |
| Marine | Not applicable | Not applicable | Not applicable |
| Inland | Not applicable | Not applicable | Not applicable |
| B. Aquaculture | | | |

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| (i) Inundation with flood water | <ul style="list-style-type: none"> Strengthening of dike Maintain a freeboard of 2-3 feet above water line Fix overflow pipes with nets at the outflow | <ul style="list-style-type: none"> Pumping out water Fixing nets with appropriate size to reduce the loss of stock Harvest the stock to reduce loss | <ul style="list-style-type: none"> Strengthening of dikes and other structures Stock the ponds at appropriate stocking density |
| (ii) Water contamination and changes in water quality | <ul style="list-style-type: none"> Maintenance of appropriate water quality parameters Conduct training programmes for monitoring water quality parameters | <ul style="list-style-type: none"> Apply remedial measures to keep optimum water quality parameters for culture | <ul style="list-style-type: none"> Continuous monitoring of water quality parameters Maintenance of appropriate water quality parameters |
| (iii) Health and diseases | <ul style="list-style-type: none"> Conducting surveillance programmes Identify risks associated with the suspected outbreak of pathogens Suggest suitable remedial measures for common pathogens Follow best management practices | <ul style="list-style-type: none"> Continuous monitoring of pathogens Apply suitable remedial measures | <ul style="list-style-type: none"> Continuous monitoring of pathogens |
| (iv) Loss of stock and inputs (feed, chemicals etc) | <ul style="list-style-type: none"> Stock the ponds at appropriate stocking density Store the feeds in a proper place Apply for crop insurance | <ul style="list-style-type: none"> Harvest the stock Avail the crop insurance | <ul style="list-style-type: none"> Restore the damaged structures and stock seeds at appropriate density |
| (v) Infrastructure damage (pumps, aerators, huts etc) | NA | NA | NA |
| (vi) Any other | | | |
| 3. Cyclone / Tsunami | | | |
| A. Capture | | | |
| Marine | <ul style="list-style-type: none"> Prevention of fishing during cyclone / Tsunami warning times | <ul style="list-style-type: none"> Safely return back to the shore/Stay at home / move to safe places | <ul style="list-style-type: none"> Cyclone / Tsunami shelter Rehabilitation of affected area |
| (i) Average compensation paid due to loss of fishermen lives | As per prevailing Government norms | | |

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| (ii) Avg. no. of boats /nets /damaged | | | |
| (iii) Avg. no. of houses damaged | | | |
| Inland | | | |
| B. Aquaculture | | | |
| (i) Overflow / flooding of ponds | <ul style="list-style-type: none"> Strengthening of dike Maintain a freeboard of 2-3 feet above water line Fix overflow pipes with nets at the outflow | <ul style="list-style-type: none"> Pumping out water Fixing nets with appropriate size to reduce the loss of stock Harvest the stock to reduce loss | <ul style="list-style-type: none"> Strengthening of dikes and other structures Stock the ponds at appropriate stocking density |
| (ii) Changes in water quality (fresh water / brackish water ratio) | <ul style="list-style-type: none"> Maintenance of appropriate water quality parameters Conduct training programmes for monitoring water quality parameters | <ul style="list-style-type: none"> Apply remedial measures to keep optimum water quality parameters for culture | <ul style="list-style-type: none"> Continuous monitoring of water quality parameters Maintenance of appropriate water quality parameters |
| (iii) Health and diseases | <ul style="list-style-type: none"> Conducting surveillance programmes Identify risks associated with the suspected outbreak of pathogens Suggest suitable remedial measures for common pathogens Follow best management practices | <ul style="list-style-type: none"> Continuous monitoring of pathogens Apply suitable remedial measures | <ul style="list-style-type: none"> Continuous monitoring of pathogens |
| (iv) Loss of stock and inputs (feed, chemicals etc) | <ul style="list-style-type: none"> Stock the ponds at appropriate stocking density Store the feeds in a proper place Apply for crop insurance | <ul style="list-style-type: none"> Harvest the stock Avail the crop insurance | <ul style="list-style-type: none"> Restore the damaged structures and stock seeds at appropriate density |
| (v) Infrastructure damage (pumps, aerators, shelters/huts etc) | NA | NA | NA |
| (vi) Any other | | | |
| 4. Heat wave and cold wave | NA | NA | NA |