

State: ARUNACHAL PRADESH
Agriculture Contingency Plan for District: PAPUMPARE

| 1.0 District Agriculture profile* | | | | |
|--|--|---|------------------|-----------------|
| 1.1 | Agro-Climatic/Ecological Zone | | | |
| | Agro Ecological Sub Region (ICAR) | Eastern Himalayas, Warm Perhumid Eco-sub region (16.3) | | |
| | Agro-Climatic Zone (Planning Commission) | Eastern Himalayan Zone (II) | | |
| | Agro Climatic Zone (NARP) | Sub-Tropical Plain Zone (NEH-4) | | |
| | List all the districts falling under the NARP Zone* (*>50% area falling in the zone) | Papumpare, Tirap | | |
| | Geographic coordinates of district headquarters head-quarters | Latitude | Longitude | Altitude |
| | | 26.55°N – 28.40°N | 92.40° – 94.21°E | 459-1250 msl |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | - | | |
| | Mention the KVK located in the district with full address | Karsingsa, Directorate of AH & Veterinary, Government of Arunachal Pradesh, Nirjuli-791109 | | |
| | Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone | ICAR Research Complex for NEH Region, Arunachal Pradesh Centre at Basar | | |

| 1.2 | Rainfall | Normal RF(mm) | Normal Onset (specify week and month) | Normal Cessation (specify week and month) |
|------------|------------------------|----------------------|---|--|
| | SW monsoon (June-Sep): | 1938.7 | 1 st week of June – 2 nd week of June | 3 rd week of September – 4 th week of September |
| | NE Monsoon(Oct-Dec): | 217.7 | 2 nd week of October- 4 th week of October | 2 nd week of December – 4 th week of December |
| | Winter (Jan- February) | 137.2 | - | - |
| | Summer (March-May) | 743.7 | - | - |
| | Annual | 3037.3 | - | - |

| | | | | | | | | | | | |
|------------|---|------------------------|-----------------|------------------|---------------------------------|--------------------|----------------------|--|------------------------------|-----------------|---------------|
| 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) | 346.2 Sq. K.m. | 20.56 | 324.7 | 1.93 | 0.25 | 2.94 | 1.0 | 0.63 | 2.31 | 2.33 |

Census of India 2011, Ministry of Home Affairs, Govt. of India

*FST: Forest Survey of India, Ministry of Environment, Forest climate change-2011

2011-12 States Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India

| | | | |
|------------|---|-------------------------|---|
| 1.4 | Major Soils (common names like red sandy loam deep soils (etc.,))* | Area ('000 ha)** | Percent (%) of total geographical area |
| | Loam to clay loam soils | | 39.6 |
| | Loam to sandy loam soils | | 5.2 |
| | Loam to loamy sand soils | | 0.4 |
| | Loam to sandy clay loam soils | | 3.9 |
| | Loam to strong clay loam soils | | 12.6 |
| | Loam soils | | 9.5 |
| | Silt clay loam to clay loam soils | | 0.1 |

(data source: Soil Resource Maps of NBSS & LUP);

Soil pH – 4.0 - 6.8

| | | | |
|------------|------------------------------|-----------------------|-----------------------------|
| 1.5 | Agricultural land use | Area ('000 ha) | Cropping intensity % |
| | Net sown area | 11.99 | 127.2 |
| | Area sown more than once | 3.26 | |
| | Gross cropped area | 15.25 | |

| | | |
|------------|--------------------|-----------------------|
| 1.6 | Irrigation | Area ('000 ha) |
| | Net irrigated area | 4.7 |

| | | | | |
|---|--|--|----------------|---|
| | Gross irrigated area | 4.7 | | |
| | Rainfed area | 8.9 | | |
| | Sources of Irrigation | Number | Area ('000 ha) | Percentage of total irrigated area |
| | Canals | 1550 | 2.054 | 42.9 |
| | Tanks | | | |
| | Open wells | | | |
| | Bore wells | | | |
| | Lift irrigation schemes | | | |
| | Micro-irrigation | 78 | | |
| | Other sources (please specify) | 2864 | 2.72 | 57.03 |
| | Ponds, river | | | |
| | Total Irrigated Area | | 4.7 | |
| | Pump sets | 20 | | |
| | No. of Tractors | 10 | | |
| | 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 | 5 | 100 | |
| | Wastewater availability and use | - | - | |
| | Ground water quality | Good (50.70% i.e. 1717.57 Sq. Km) Poor (49.30% i.e. 1669.82 Sq. Km) | | |
| *over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70% | | | | |

1.7 Area under major field crops & horticulture

| 1.7 | Major field crops cultivated | Area ('000 ha) | | | | | | | |
|-----|------------------------------|----------------|---------|-------|-------------|---------|-------|--------|-------------|
| | | <i>Kharif</i> | | | <i>Rabi</i> | | | Summer | Grand total |
| | | Irrigated | Rainfed | Total | Irrigated | Rainfed | Total | | |
| | Paddy | 4.7 | 5.4 | 10.1 | - | - | - | - | 10.1 |
| | Wheat | - | - | - | - | 0.1 | 0.1 | | 0.1 |

| | | | | | | | | | |
|--|----------|---|-----|------|---|-----|-----|-----|------|
| | Maize | - | - | - | - | 2.5 | 0.2 | 2.2 | 2.5 |
| | Millets | - | 0.5 | 0.5 | - | - | - | - | 0.5 |
| | Pulses | - | - | 0.41 | - | - | - | - | 0.41 |
| | Oilseeds | - | 0.5 | 0.5 | - | 1.1 | 1.1 | - | 1.7 |
| | Potato | | | | | 0.2 | 0.2 | | 0.2 |

Source: Statistical abstracts of Arunachal Pradesh (Year 2007-08)

| | Horticulture crops - Fruits | Area ('000 ha) | | |
|--|--|-----------------------|------------------|----------------|
| | | Total | Irrigated | Rainfed |
| | Orange | 0.27 | | 0.271 |
| | Pineapple | 0.14 | | 0.148 |
| | Banana | 0.12 | | 0.126 |
| | Guava | 0.004 | | 0.004 |
| | Litchi | 0.027 | | 0.027 |
| | Horticulture crops – Vegetables / spices | Total | Irrigated | Rainfed |
| | Tomato, chilli, brinjal, okra, cabbage, pumpkin, sweet potato, colocasia | 0.212 | 0.212 | NA |
| | Ginger | 0.031 | | 0.031 |
| | Black pepper | 0.030 | | 0.030 |
| | Large cardamom | 0.060 | | 0.060 |
| | Medicinal and Aromatic crops | Total | Irrigated | Rainfed |
| | Plantation crops | Total | Irrigated | Rainfed |
| | Arecanut | Not available | | |
| | Coconut | -do- | | |
| | Tea | -do- | | |
| | Jatropha | -do- | | |
| | Fodder crops | | | |
| | Total fodder crop area | | | |
| | Grazing land, reserve | 1.461 | | |

| | | | | |
|--|--|--|--|--|
| | areas etc | | | |
| | Availability of unconventional feeds/by products eg., breweries waste, food processing, fermented feeds bamboo shoots, fish etc | | | |
| | Sericulture etc Other agro enterprises (mushroom cultivation etc specify) | | | |

Source: 18th Quinquennial Livestock Census, 2007, Deptt. of AH & Vety., Govt. of Arunachal Pradesh

| 1.8 | Livestock | Male ('000) | Female ('000) | Total ('000) |
|------------|---------------------------------|--------------------|----------------------|---------------------|
| | Indigenous cattle | 16.46 | 22.15 | 38.62 |
| | Improved / Crossbred cattle | 1.02 | 1.45 | 2.47 |
| | Buffaloes (local low yielding) | Nil | Nil | Nil |
| | Improved Buffaloes | Nil | Nil | Nil |
| | Goat | 10.80 | 15.73 | 26.54 |
| | Sheep | Nil | Nil | Nil |
| | Pig | 11.15 | 13.18 | 24.34 |
| | Mithun | 11.28 | 14.58 | 25.87 |
| | Yak | Nil | Nil | Nil |
| | Others (Dog) | 3785 | 4015 | 7800 |
| | Commercial dairy farms (Number) | 70 | | |

| 1.9 | Poultry (Data source: Live stock Census 2007) | No. of farms | Total No. of birds ('000) |
|-------------|--|---------------------|----------------------------------|
| | Commercial | 250 | |
| | Backyard | | 87.74 |
| 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) | |
| | | | | | | |
| ii) Inland (Data Source: Fisheries Department) | No. Farmer owned ponds | | No. of Reservoirs | | No. of village tanks | |
| | 846 | | | | 261 | |
| B. Culture | | | | | | |
| | | | Water Spread Area (ha) | | Yield (t/ha) | Production ('000 tons) |
| i) Brackish water | | | | | | |
| ii) Fresh water (Data Source: Fisheries Department) | | | 3835 | | 0.15 | 575.25 |
| Others | | | | | | |

1.11 Production and Productivity of major crops

| 1.1 1 | Name of crop | Kharif | | Rabi | | Summer | | Total | | Crop residue as fodder ('000 tons) |
|--|--------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|------------------------------------|
| | | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | |
| Major Field crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| | Paddy | 22.7 | 2230.7 | | | | | 22.7 | 2230.75 | |
| | Maize | - | | | | 4.50 | 1800.0 | 4.5 | 1800.00 | |

| | | | | | | | | | | |
|--|------------|-------|--------|-----|--------|--|--|------|--------|--|
| | Millets | 0.9 | 1300.7 | | | | | 0.9 | 1300.7 | |
| | Wheat | - | | 0.3 | 1800.0 | | | 0.3 | 1800.0 | |
| | Pulses | 0.43 | 1050.6 | | | | | 0.43 | 1050.6 | |
| | | | | | | | | | | |
| Major Horticultural crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| | Orange | 0.315 | 1162 | | | | | 0.31 | 1162 | |
| | Pineapple | 0.640 | 2720 | | | | | 0.64 | 2720 | |
| | Banana | 0.369 | 2930 | | | | | 0.36 | 2930 | |
| | Guava | 0.030 | 750 | | | | | 0.03 | 750 | |
| | Vegetables | 0.144 | NA | | | | | 0.14 | NA | |
| | | | | | | | | | | |

Source: District Horticulture Officer, 2006-07

| | | | | | | |
|-------------|---|--------------|----------------|-------------------|-------------------|--------------------|
| 1.12 | Sowing window for 5 major field crops (start and end of normal sowing period) | Paddy | Maize | Millets | Sesame | Mustard |
| | Kharif- Rainfed | June-October | May-September | April – September | April – September | |
| | Kharif-Irrigated | | | | | |
| | Rabi- Rainfed | | December-April | | October - January | October – February |
| | Rabi-Irrigated | | | | | |

| | | | | |
|-------------|--|-----------------|-------------------|-------------|
| 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 | | | √ |

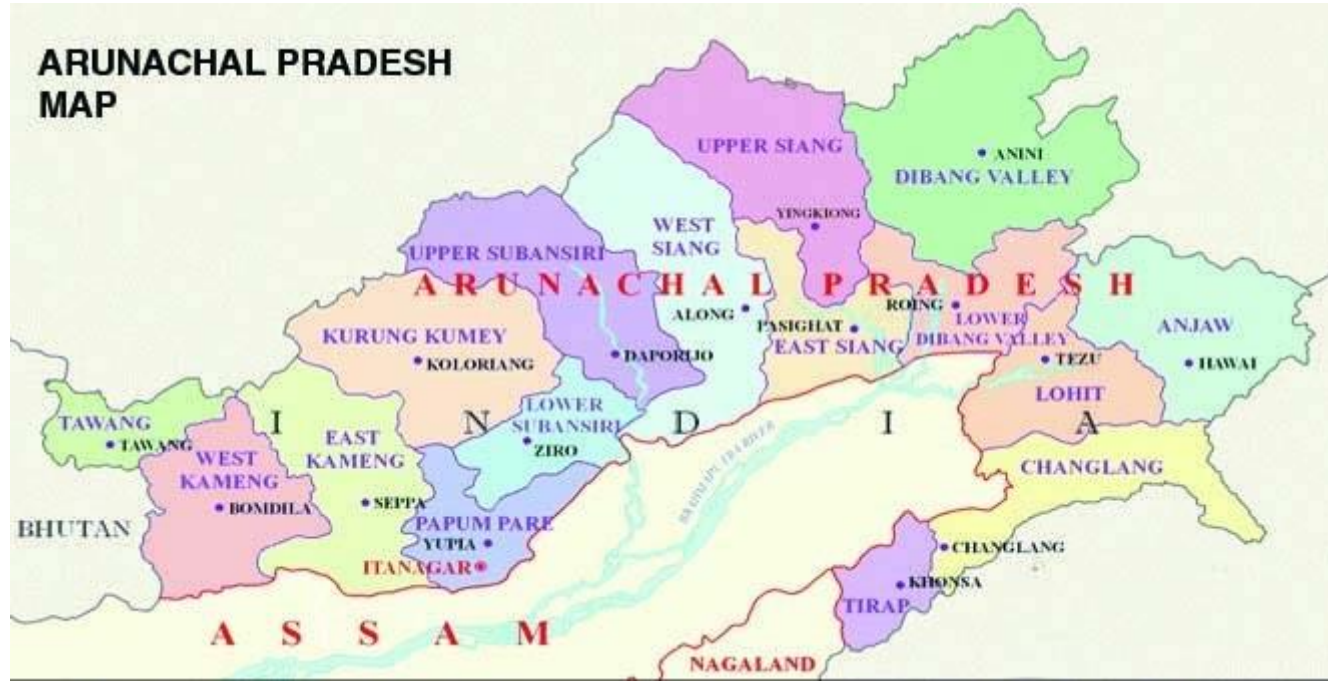
| | | | | |
|--|--|---|---|---|
| | Frost | | √ | |
| | Sea water intrusion | | | √ |
| | Snowfall | | | √ |
| | Landslides | √ | | |
| | Earthquake | | | √ |
| | Pests and disease outbreak (specify) | | √ | |
| | Others (like fog, cloud bursting etc.) | | | |

*When contingency occurs in six out of 10 years

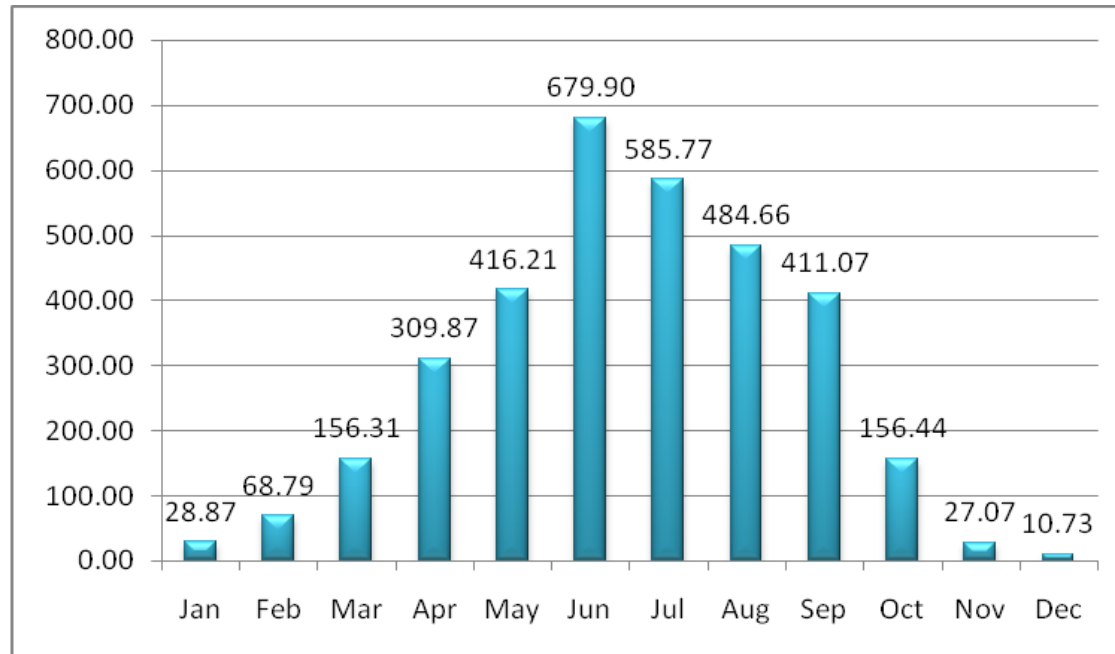
| | | | |
|-------------|---|---|---------------|
| 1.14 | Include Digital maps of the district for | Location map of district within State as Annexure I | Enclosed: Yes |
| | | Mean annual rainfall as Annexure 2 | Enclosed: Yes |
| | | Soil map as Annexure 3 | Enclosed: No |

Annexure-I

Location map of Papumpare



Annexure-II



(Source: IMD district-wise monthly rainfall data from 2004-2010)

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

| 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 June 3 rd week | Medium rainfall, Loam to Sandy loam soils, lowland area. | Paddy | Prefer drought tolerant varieties of Paddy crop- Mahsuri | <ul style="list-style-type: none"> Apply well decomposed organic matter for early seedling vigor Make conservation furrow Inter-cultivation and thinning to maintain plant population per unit area of the crop Water harvesting, summer ploughing, interculture, tillage practices, weed control and adopt close plant and row spacing | - |
| | | Maize | Growing of Drought resistant variety for Rainfed lowland : Prabhat | | |
| | | Millet | Local Variety : Hokum , Pabyo. | | |
| | High rainfall, Loam to clay loam soils, Upland area. | Paddy | Prefer drought tolerant varieties of Paddy crop i.e. Heera & Rasi | <ul style="list-style-type: none"> The field should be ploughed immediately after the harvest of previous rice crop and left until the first rain received. Unbunded uplands converted to bunded uplands | |
| | | Maize | Growing of local sturdy maize varieties : Pocho Top, Nyamo Top | Deep Summer ploughing and control of weeds. | |
| | | Millet | Growing of hardy & sturdy local variety Hokum , Pabyo. | Deep summer ploughing ,contour sowing across the slope to minimize surface run- off | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|---|---|-----------------------------|---|--|---------------------------|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Early season drought (delayed onset) Delay by 4 weeks July 1st week | Medium rainfall, Loam to sandy loam soils, lowland area | Paddy | Growing of drought resistant variety-Bha Lum 1,Bha Lum 2, Heera and Rasi | In-situ moisture conservation, summer ploughing, interculture, weed control and Maintain more plant population for direct seeded rice. | |
| | | Maize | Cultivation of early maturing varieties like- Ganga-11 and Local Variety | In – situ moisture conservation. Follow ridge and furrow method of planting to store excess water during rainfall. | |
| | | Millet | Growing of Local variety Hokum , Pabyo. | Contour ploughing and sowing across the slope in jhum areas to reduce runoff loses | |
| | High rainfall, Loam to clay loam soils, Upland area | Paddy | Cultivation of locally available drought resistant varieties. Such as Shako, Khile Lemi | Maintain more plant population for direct seeded rice. Hedge row planting of Flamengia sp across the slope to minimize the surface runoff. Terrace rice cultivation practices to be followed | |
| | | Maize | Cultivation of early maturing varieties like- NLD and Prabat | Seed treatment and proper plant protection measures should be taken to avoid germination failure. | |
| | | Colocasia | Colocassia intercropping with maize | Deep summer ploughing, soil hoeing and Weed control | |
| | | | | | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|---|---|-----------------------------|--|---|--|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Early season drought (delayed onset) Delay by 6 weeks July 3 rd week | Medium rainfall, Loam to sandy loam soils, Lowland area | Rice | Cultivation of ecommended rainfed lowland varities –IR-64, Mahsuri | In rainfed situation apply full P, K and reduce nitrogen application by 40% of the recommended dose as basal along with well decomposed organic manure for early seedling vigour. Summer ploughing and weed control. | Seeds distributed through State Department and KVK |
| | | Maize | Maize based cropping system: Rice-maize, Maize-potato-sugarcane | Intercropping of maize with Soybean, Greengram and cowpea | -do- |
| | | Sesame | Arhar, Green gram, Cow pea should be grown | Complete hoeing and weeding. Provide dust mulch. | |
| | High rainfall, Loam to clay loam soils, Upland area | Rice | Cultivation of drought resistant varities : Rasi & Heera | Terrace rice cultivation to be followed in upland to collect rainwater for rice cultivation. Contour cultivation in Jhum areas. Hedgerow planting with Flamengia sp, crotalaria sp. | |
| | | Maize | Pigeonpea, green gram, cow pea should be grown | Follow strip cropping in rolling topography for moisture conservation | |
| | | Sesame | Rice-sesame-Soybean | Deep ploughing, Line sowing, proper manuring for quick growth of the crop | |

| 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 August 1st Week | Medium rainfall, Loam to sandy loam soils, lowland area | Rice | <ul style="list-style-type: none"> • Growing of Medium duration rice variety: mahsuri and Konark • Growing of drought resistant leguminous like green gram ,black gram, cow pea in the event of late onset of monsoon | <ul style="list-style-type: none"> • Transplant seedlings up to 45 days old • Apply life saving irrigation at seedling. Tillering and Panicle Initiation stage • Intercropping of rice with leguminous crops like green gram | - |
| | | Maize | Intercropping of maize with Soybean in 1:2 to manage water Shortage | <ul style="list-style-type: none"> • Follow ridge and furrow method of planting for maize crops. | |
| | | Millet | Growing of leguminous crop like Arhar, Green gram, Soybean | <ul style="list-style-type: none"> • Intercropping with pulse crop like green gram, black gram • Bio Mulching with crops residue and straw | |
| | High rainfall, Loam to clay loam soils, Upland area | Paddy | Growing of drought resistant leguminous plants like green gram ,black gram, cow pea | <ul style="list-style-type: none"> • Close the drainage hole and check the seepage loss in direct sown rice regularly • Follow plant protection measures against stem borer and blast in nursery | |
| | | Maize | Growing of local hardy & sturdy maize variety. | <ul style="list-style-type: none"> • Follow strip cropping in rolling topography for moisture conservation | |
| | | Millet | Growing of leguminous crop like pigeonpea, green gram, Soybean | Summer ploughing and weed control. | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|---|---|-----------------------------|--|---|--|
| | | | 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. | Medium rainfall, Loam to sandy loam soils, lowland area | Rice | <ul style="list-style-type: none"> • Resow the crop if the mortality is more than 50% • Gap Filling of crop if mortality is less than 50 % • Fine nursery bed preparation for quick germination and Healthy seedling growth | <ul style="list-style-type: none"> • Application of FYM & Compost • Strengthen the field bunds & close the holes • Provide life saving irrigation. • Inter-cultivation (Soil mulching). | Supply of seed drills and inter-cultural implements through State Agriculture department |
| | | Maize | Seed treatment and proper plant protection measures should be taken to avoid germination failure. | Complete hoeing weeding and earthing up at 20 DAS for moisture conservation | |
| | | Millet | Selection of suitable early maturing varieties | Bio mulching with crop residues for moisture conservation | |
| | | Colocasia | One or two Ploughing followed by blade harrowing helps in weed free field and facilitates entry of the rain | Organic mulching with previous crop residues | |
| | | Sesame | -do- | Mulching with paddy straw | |
| | High rainfall, Loam to clay loam soils, Upland area | Rice | <ul style="list-style-type: none"> • Resow the crop if the mortality is more than 50% • In rainfed situation apply full P, K and reduce Nitrogen application by 40% of the recommended dose as basal along with well decomposed organic manure for early | <ul style="list-style-type: none"> • Weed out the field. • Strengthen the field bunds & close the holes • Provide life saving irrigation. • Inter-cultivation (Soil mulching). • Organic matter, FYM | |

| | | | | | |
|--|--|-----------|---|---|--|
| | | | seedling vigour | application | |
| | | Maize | Intercropping with pulse crops like green gram, black gram etc | <ul style="list-style-type: none"> Wherever economically viable, mulching should be practiced in between crop rows using locally available mulch material Follow strip cropping in rolling topography for moisture conservation | |
| | | Millet | -do- | <ul style="list-style-type: none"> Strengthen the field and contour bunds for in-situ moisture conservation. Organic matter, FYM application. | |
| | | Colocasia | One or two ploughing followed by blade harrowing helps in weed free field and facilitates entry of the rain | <ol style="list-style-type: none"> Stubbles mulching Organic matter, FYM application | |
| | | Sesame | Resow the crop if the mortality is more than 50% | Mulching with paddy straw | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|---|-----------------------------|--|---|---------------------------|
| | | | Crop management | Soil nutrient & moisture conservation measures | Remarks on Implementation |
| Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) | | | | | |
| At vegetative stage | Medium rainfall, Loam to sandy loam soils, lowland area | Paddy | <ul style="list-style-type: none"> Alternate arrangement of irrigation like construction of well at the farming site Top dressing of | Regular weeding <ul style="list-style-type: none"> Strengthen the field bunds & close the holes Provide life saving irrigation. | |

| | | | | |
|--|---|-----------|---|---|
| | | | Fertilizers 2% Urea or 2% DAP or 1% KNO ₃ | <ul style="list-style-type: none"> Organic mulching with previous crop residues |
| | | Maize | <ul style="list-style-type: none"> Follow ridge and furrow method of planting Top dressing of Fertilizers 2% Urea or 2% DAP or 1% KNO₃ | <ul style="list-style-type: none"> Regular weeding Removal of unhealthy and diseased plant Follow strip cropping in rolling topography for moisture conservation |
| | | Millet | -do- | <ul style="list-style-type: none"> Inter cropping with pulse crop Follow strip cropping in rolling topography for moisture conservation |
| | | Colocasia | -do- | <ul style="list-style-type: none"> Provide life saving irrigation. Inter-cultivation (Soil mulching). |
| | | Sesame | -do- | <ul style="list-style-type: none"> Conservation furrow. Organic mulching with previous crop residues |
| | High rainfall, Loam to clay loam soils, Upland area | Paddy | <ul style="list-style-type: none"> Alternate arrangement of irrigation like construction of well at the farming site Top dressing with fertilizers like 2% Urea or 2% DAP or 1% KNO₃ | <ul style="list-style-type: none"> Weeding, removal of unhealthy and diseased plant Strengthen the field bunds & close the holes Provide life saving irrigation. Inter-cultivation (Soil mulching). |
| | | Maize | Intercropping with black gram. | <ul style="list-style-type: none"> Regular weeding Provide life saving irrigation |
| | | Millet | Inter cropping with pulse crop | <ul style="list-style-type: none"> Weeding, removal of unhealthy and diseased plant |
| | | Colocasia | a. Alternate | <ul style="list-style-type: none"> Provide life saving |

| | | | | | |
|--|--|--------|---|--|--|
| | | | arrangement of irrigation like construction of well at the farming site | irrigation. <ul style="list-style-type: none"> • Inter-cultivation (Soil mulching). | |
| | | Sesame | -do- | <ul style="list-style-type: none"> • Weeding, removal of unhealthy and diseased plant | |

| 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 | Medium rainfall, Loam to sandy loam soils, lowland area | Paddy | <ul style="list-style-type: none"> • Proper maintenance of water level. • Remove and destroy pest and disease affected plants | <ul style="list-style-type: none"> • Provide irrigation at flowering and grain filling stage. • In case of complete failure of Kharif crop, go for pre-rabi crops/ minor pulses like Horsegram (var. urmi). | |
| | | Maize | Irrigation needed at such stage but water logging should be avoided. Intercropping with beans, cowpea etc. | Provide life saving irrigation | |
| | | Millet | | Incase of complete failure of Kharif crop, go for pre-rabi crops/ minor pulses like Horsegram (var. Urmi). | |
| | | Colocasia | -do- | Provide life saving irrigation | |
| | | Sesame | -do- | Provide life saving irrigation | |
| | High rainfall, Loam to clay | Paddy | Spray methyl demeton/ dimethioate to control stem | Incase of complete failure of Kharif crop, go for pre- | |

| | | | | | |
|--|-------------------------|-----------|---|--|--|
| | loam soils, Upland area | | borer and Gundhi bug | rabi crops/ minor pulses like Horsegram (var. Urmi). | |
| | | Maize | Irrigation needed at such stage but water logging should be avoided. Intercropping with beans, cowpea etc. | <ul style="list-style-type: none"> Gulli plugging and recycling of rain water Provide life saving irrigation | |
| | | Millet | - | Provide life saving irrigation | |
| | | Colocasia | -do- | Provide life saving irrigation | |
| | | Sesame | -do- | Gulli plugging and recycling of rain water | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|---|-----------------------------|--|---|--|
| | | | Crop management | Rabi Crop planning | Remarks on Implementation |
| Terminal drought (Early withdrawal of monsoon) | Medium rainfall, Loam to sandy loam soils, lowland area | Paddy | Cultivation of early maturing varieties, Crop variety : Sahyadri, application of organic manures or FYM. | Relay cropping with mustard and toria. | Construction of Jhalkund through RKVY Linkage with , NSC for seed supply |
| | | Maize | Cultivation of early maturing varieties | -do- | -do- |
| | | Millet | Weed Management | Cultivation of pulses like Cowpea, Green gram , black gram. | |
| | High rainfall, Loam to clay loam soils, Upland area | Paddy | Harvesting of Rice at physiological maturity will realize 80-85% of normal yield. | Utilization of residual moisture for early sowing of pre-rabi crops like Cowpea, green gram | Construction of Rain Water Harvesting tank at Farm through NABARD, Department Assistance |
| | | Maize | Harvesting of plants for fodder | Grow crucifer vegetables | -do- |

| | | | | | |
|--|--|--------|---|--|------|
| | | | purpose if cob formation hampered. | & other high yielding Solanaceous vegetables | |
| | | Millet | Checking of weeds. Harvesting at physiological maturity | Raise Brinjal seedlings for rabi, which may withstand moisture stress condition. | -do- |

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 | Canal irrigated, Loam to sandy loam, lowland areas. | Paddy | Growing Drought tolerant varieties: Heera & Rasi | Life saving irrigation from the check dam at critical stages of the crop growth, weeding and thinning operation of the diseased /unhealthy plant population. | Seeds through Department of Agriculture & KVK |
| | | Maize | Growing of short duration varieties: Ganga 11 | Operation like mulching, hoeing, weeding etc. | -do- |
| | | Millet | Growing improved varieties of finger millet to withstand adverse condition of weather: RAU-8, VL-148 | Operation like mulching, hoeing, weeding etc. | -do- |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|---|-----------------------------|--|--|---|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Limited release of water in canals due to low rainfall | Canal irrigated, Loam to sandy loam, lowland areas. | Paddy | Growing Drought tolerant varieties: Heera & Rasi | Life saving irrigation from the check dam at critical stages of the crop growth, weeding and thinning operation of the diseased /unhealthy | Seeds through Department of Agriculture and KVK |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|-----------|-------------------------|-----------------------------|--|---|---------------------------|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| | | | | plant population. | |
| | | Maize | Growing of short duration varieties: Ganga 11, Prabhat | Operation like mulching, hoeing, weeding etc. | -do- |
| | | Millet | Growing improved varieties of finger millet to withstand adverse condition of weather: RAU-8, VL-148 | Operation like mulching, hoeing, weeding etc. | -do- |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|--------------------------------|-----------------------------|---|--|---------------------------|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Non release of water in canals under delayed onset of monsoon in catchment | NA | | | | |
| Lack of inflows into tanks due to insufficient /delayed onset of monsoon | NA | | | | |
| Insufficiency of surface water for irrigation | Irrigated loamy to sandy loam, | Paddy | Growing Drought tolerant varieties : Bha Lum 1, Bha Lum 2 | Life saving irrigation from the check dam at critical stages of the crop growth, weeding and thinning operation of the diseased /unhealthy plant population. | |
| | | maize | Growing of short duration varieties: Prabhat | Operation like mulching, hoeing, weeding etc. | |
| | | millet | Growing Improved varieties : RAU-8, VL-148 | Operation like mulching, hoeing, weeding etc. | |

| Condition | Suggested Contingency measures | | | | |
|-----------|--------------------------------|-----------------------------|--------------------------------|--------------------|---------------------------|
| | Major Farming situation | Normal Crop/cropping system | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| | | | | | |

| Condition | Suggested Contingency measures | | | |
|---|--------------------------------|-----------------------------|--------------------------------|--------------------|
| | Major Farming situation | Normal Crop/cropping system | Change in crop/cropping system | Agronomic measures |
| Insufficient groundwater recharge due to low rainfall | Not Applicable | | | |

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 | Not a substantial problem as uplands don't maintain water logging condition for long time | Provide drainage If possible | Drain out excess water, harvest at physiological maturity | Shifting to a safer place Dry in shade and in a well ventilated space |
| Maize | Provide drainage | Provide drainage | Drain out excess water, harvest at physiological maturity | -do- |
| Sesame | Drainage if water logging persists | Provide drainage | Lodged pods may be harvested at physiological maturity stage | Shifting to a safer place Dry in shade and in a well ventilated space |
| Greengram | -do- | -do- | -do- | Shifting to a safer place Dry in shade and in a well ventilated space |

| | | | | |
|---|--|---|---|--|
| | | | | Safe storage against pest & diseases |
| Milllet | Thinning of plant population | -do- | Harvesting at proper physiological maturity | Proper drying |
| Horticulture | | | | |
| Orange | | | Harvesting ripe fruit before rain | Fruits are to be stored in well aerated farm shed or house to avoid loses |
| Pineapple | | | Delay harvesting | Fruits are to be stored in well aerated farm shed or house to avoid loses |
| Banana | | | Harvest bunches before or after rain for ripening | |
| Guava | | | Harvest mature fruit and marketing. | |
| Vegetables | 1. Provision of drainage to remove excess water. 2. Earthing up of plants. 3. Field bunding to prevent entry of water from surrounding areas. | 1. Provision of drainage to remove excess water. 2. Earthing up of plants. 3. Field bunding to prevent entry of water from surrounding areas. | Harvest the crop and market immediately. | |
| Heavy rainfall with high speed winds in a short span | | | | |
| Horticulture | | | | |
| Orange | 1. Pruning of weak and disease branches. 2. Intercropping with cover crop or sod culture to prevent soil erosion. 3. Earthing up of young plants to avoid uprooting due to wind. | Wind break around the orchard to protect crop from wing damage | 1. Harvest ripe fruit before windstorm. 2. Propping heavy bearing tree and weak tree by bamboo pole. | Fruits are to be stored in well aerated farm shed or house to avoid loses. |
| Pineapple | Earthing up plants for better development and anchorage. | Earthing up to prevent up rooting. | Delay harvesting | NA |
| Banana | Earthing up plants for better development and anchorage. | Earthing up and propping by bamboo pole to prevent up rooting and falling of plants. | Harvest bunches before or after rain for ripening | Artificial ripening |

| | | | | |
|---|--|---|---|--|
| Guava | 1. Pruning of weak and disease branches. 2. Intercropping with cover crop or sod culture to prevent soil erosion. 3. Earthing up of young plants to avoid uprooting due to wind. | Earthing up to prevent up rooting. | Harvest the crop and market immediately | NA |
| Vegetables | 1. Provision of drainage to remove excess water. 2. Earthing up of plants. 3. Field bunding to prevent entry of water from surrounding areas. | 1. Provision of drainage to remove excess water. 2. Earthing up of plants. 3. Field bunding to prevent entry of water from surrounding areas. | Harvest the crop and market immediately. | NA |
| Outbreak of pests and diseases due to unseasonal rains | | | | |
| Paddy (Blast) | Removal and destruction of infected plant | Destruction of weed hosts | Drain out excess water, harvesting at proper physiological stage | Dry in shade and well ventilated place |
| Paddy (Brown Spot) | do | do | do | do |
| Paddy (Yellow Stem Borer) | Flooding and clipping of tips of paddy plants | do | do | do |
| Paddy (Gall Midge) | Removal of alternate host plants including weeds and grasses; destruction of infected plants | Providing proper drainage system | do | do |
| Potato (Early Blight) | Removal and destruction of infected plants and weeds | Water logging should be avoided by providing proper drainage system | Harvesting at proper physiological stage | do |
| Horticulture | | | | |
| Orange | Spraying of fenvalerate, cypermethrin for controlling leaf minor. Praying of wettable sulphur, carbendizim to control powdery mildews | Spraying of fenvalerate, cypermethrin for controlling leaf minor. Praying of wettable sulphur, carbendizim to control powdery mildews | Spraying of Neem formulation control fruit sucking moth and citrus butterfly. | Store harvest fruit in bamboo local bamboo basket in shady room. |

| | | | | |
|------------|---|--|---|---|
| Pineapple | | | | |
| Banana | | | | |
| Guava | | | | |
| Vegetables | Spraying of Ekalux against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & streptomycin against wilting | Spraying Endosulfan against leaf eating caterpillars Metalaxyl against Powdery mildew, Carbendazim against leaf spot & blight | Poison baiting with Malathion & Jaggery against fruit fly | Destruction of overripe & infested fruits |

2.3 Floods

| Condition | Suggested contingency measure | | | |
|--|---|---|--|---|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Transient water logging/ partial inundation¹ | | | | |
| Rice | Drainage of the Nursery bed, If not possible go for re-sowing | Drainage of excess water. In partially damaged field. gap filling may be done by redistributing the tillers. Management of pests & diseases Management of pests & diseases | Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops. Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to compensate the loss during kharif. | Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops Supply of seeds and other agro-inputs of <i>rabi</i> crops at subsidized rate, provision of bank loan etc. Wet seeding of short duration Utilization of residual soil moisture and use of recharged soil profile for growing pulses Growing of cucurbits after receding flood water |
| Horticulture /Plantation | | | | |

| | | | | |
|--|----------------|--|--|--|
| crops | | | | |
| Orange | | | | |
| Pineapple | | | | |
| Banana | | | | |
| Guava | | | | |
| Vegetables | | | | |
| Continuous submergence for more than 2 days² | Not applicable | | | |
| Horticulture / Plantation crops | | | | |
| Sea water intrusion³ | Not applicable | | | |

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

| Extreme event type | Suggested contingency measure ^r | | | |
|---|--|------------------|--------------------|------------|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Heat Wave | Not applicable | | | |
| Cold wave | Not applicable | | | |
| Frost | Not applicable | | | |
| Hailstorm | Not applicable | | | |
| Cyclone | | | | |
| Sand deposition or heavy siltation | Not applicable | | | |

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

| | Suggested contingency measures | | |
|-------------------------------|--|---|--|
| | Before the event | During the event | After the event |
| Drought | | | |
| Feed and fodder availability | <ol style="list-style-type: none"> 1. Livestock insurance, 2. Awareness on fodder cultivation in village grazing lands, near rivers, field boundaries and in barren lands. 3. Excess fodder may be stored as hay/silage in the flush season. 4. Stacking of paddy straws. 5. Installation of feed block machines in the block level and creating feed/fodder block banks to be used in emergency. | <ol style="list-style-type: none"> 1. Grazing in the forest areas (indigenous livestock). 2. Good management practices to avoid wastage of feed/fodder. 3. Improving the poor quality roughages (urea treatment, ammoniation etc). 4. Use of feed additives to improve digestibility. 5. Use of unconventional feed/fodders resources. | <ol style="list-style-type: none"> 1. Avail crop insurance, 2. Supplementary feeding of livestock to boost or regain the production ability. 3. Thorough Examination and selective culling. 4. Gradual replacement of the stock. |
| Drinking water | <ol style="list-style-type: none"> 1. Construction of water harvesting structures. 2. Developing watershed areas. | <ol style="list-style-type: none"> 1. Procuring water from watershed areas. 2. Transport subsidy for water tankers. | Analysis of the present experience and remodeling of the planning process. |
| Health and disease management | <ol style="list-style-type: none"> 1. Stocking of veterinary medicines and supplements. 2. Training of the paravets and creating Vet scouts in the potential clusters. 3. Regular radio/TV telecast of management / remedial measures. 4. Phone-in facility in every dispensary / clinic for consultations. 5. Housing / management modifications to reduce heat stress. | <ol style="list-style-type: none"> 1. Massive awareness cum treatment camp. 2. Improved management practices – e.g reducing exercise, feeding during cooler period of the day etc. | -do- |
| Floods | | | |
| Feed and fodder availability | <ol style="list-style-type: none"> 1. Livestock insurance, 2. Awareness on fodder cultivation in village grazing lands, near rivers, field boundaries and in barren lands. 3. Excess fodder may be stored as hay/silage in the flush season. 4. Stacking of paddy straws. | <ol style="list-style-type: none"> 1. Storage of feeds and fodder in high raised platform. 2. Avoid feeding of rotten feeds and fodders. 3. Use of trees leaves as fodder. 4. Shifting of livestock to high raised areas. | Supplementary feeding and use of probiotics etc to improve digestibility. |

| | | | |
|--------------------------------|---|--|---|
| | 5. Installation of feed block machines in the block level and creating feed/fodder block banks to be used in emergency. | | |
| Drinking water | 1. Preserving safe drinking water in community tanks / water harvesting structures which is not prone to seepage of flood water. 2. Arrangement of chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats & shelter places. 3. Installation of large sized sand water filters 3. Training & awareness camp among extension personnel | Chlorination of the drinking water and use of sand filter where chlorine is not available. | Disinfection of the area. |
| Health and disease management | 1. Precautionary vaccination 2. Precautionary Antibiotic feeding 3. Stocking of veterinary medicines and supplements. 4. Training of the paravets and creating Vet scouts in the potential clusters. 5. Construction of shelters / shed in high raised areas. | 1. Massive awareness cum treatment camp. 2. Improved management practices | 1. Vaccination campaign for dreaded diseases 2. Immediate attention to the ailing animals. 3. Sanitization of the shed and surrounding areas. |
| Cyclone | | | |
| Feed and fodder availability | | | |
| Drinking water | | | |
| Health and disease management | | | |
| Heat wave and cold wave | | | |
| Shelter/environment management | | | |
| Health and disease management | | | |
| Snowfall | | | |
| Earthquake | | | |
| Landslides | 1. Livestock insurance, | 1. Storage of feeds and fodder in high raised | 1. Supplementary feeding and use of probiotics |

| | | | |
|--|---|--|--------------------------------------|
| | <p>2. Awareness on fodder cultivation in village grazing lands, near rivers, field boundaries and in barren lands.</p> <p>3. Excess fodder may be stored as hay/silage in the flush season.</p> <p>4. Stacking of paddy straws.</p> <p>5. Installation of feed block machines in the block level and creating feed/fodder block banks to be used in emergency.</p> | <p>platform.</p> <p>2. Avoid feeding of rotten feeds and fodders.</p> <p>3. Use of trees leaves as fodder.</p> <p>4. Shifting of livestock to high raised areas.</p> | <p>etc to improve digestibility.</p> |
| | <p>6. Preserving safe drinking water in community tanks / water harvesting structures which is not prone to seepage.</p> <p>7. Arrangement of chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats & shelter places.</p> <p>8. Installation of large sized sand water filters</p> <p>9. Training & awareness camp among extension personnel</p> | <p>5. Chlorination of the drinking water and use of sand filter where chlorine is not available.</p> | <p>2. Disinfection of the area.</p> |

^s based on forewarning wherever available

2.5.2 Poultry

| | Suggested contingency measures | | | Convergence/linkages with ongoing programs, if any |
|------------------------------|---|--|---|--|
| | Before the event | During the event | After the event | |
| | | | | |
| Drought | <p>1. Insurance of poultry bird</p> <p>2. Procurement of feed ingredients in bulk.</p> <p>3. Installation of feed plant</p> | <p>Availing feed from the local resources / feed plant</p> | <p>Availing insurance for the losses.</p> | |
| Shortage of feed ingredients | <p>Check water source for ensuring sufficient potable water during</p> | <p>1. Procuring water from watershed areas.</p> | <p>Installation of deep bore</p> | |

| | | | | |
|-------------------------------|---|--|------------------------------------|--|
| | draught | 2. Transport subsidy for water tankers. | well for secured water supply | |
| Drinking water | Procurement of vaccines and medicines and anti-stress agent. Feeding antibiotics Procurement of litter materials | Administration of vaccines Continue feeding of antistress agent | Culling of affected birds | |
| Health and disease management | | | | |
| Floods | 1. Insurance of poultry bird 2. Procurement of feed ingredients in bulk from outside the district 3. Installation of feed plant | Availing feed from the local resources / feed plant | Availing insurance for the losses. | |
| Shortage of feed ingredients | 1. Preserving safe drinking water in community tanks / water harvesting structures which is not prone to seepage of flood water. 2. Arrangement of chlorine tablets for sanitization of water and bleaching powder for disinfection of habitats & shelter places. 3. Installation of large sized sand water filters 3. Training & awareness camp among extension personnel | Chlorination of the drinking water and use of sand filter where chlorine is not available. | Disinfection of the area. | |
| Drinking water | Procurement of vaccines and medicines and anti-stress agent. Feeding antibiotics Stocking of litter materials | Administration of vaccines Continue feeding of anti-stress agent | Culling of affected birds | |
| Health and disease management | | | | |
| Cyclone | | | | |

| | | | | |
|--------------------------------|--|--|--|--|
| Shortage of feed ingredients | | | | |
| Drinking water | | | | |
| Health and disease management | | | | |
| Heat wave and cold wave | | | | |
| Shelter/environment management | | | | |
| Health and disease management | | | | |
| Snowfall | | | | |
| Earthquake, Landslides etc | | | | |

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

| | Suggested contingency measures | | |
|--|--|--|---|
| | Before the event | During the event | After the event |
| 1) Drought | | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds. | 1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 1. Prepare to release water into the habitat | 1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 1. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |

| | | | |
|--|---|---|--|
| Innundation with flood waters | 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief 5. Insurance coverage provision for life and property | 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation. | 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people. |
| Water contamination & change in BOD | 1. Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water 2. Application of lime. | 1. Check the water quality & take appropriate action 2. Application of $KMnO_4$ | 1. Application of lime and geolite. 2. Application of Alum. 3. Application of $KMnO_4$ |
| Health and diseases management | Stock preventive medicines, vaccines | 1. Prevent influx of diseased fish from outside source, Check through nets 2. Application of Alum. 3. Administer medicines through random catch Disinfect water by lime, $KMnO_4$ | 1. Application of lime and $KMnO_4$. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds. |
| Cyclone | NA | | |
| Heat wave and cold wave | NA | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 3. Restrict lifting of water for irrigation purpose of crops 4. Catch the stock, market the produce to reduce the density of population in ponds. | 3. Excavate the ponds to increase the depth. 4. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 2. Prepare to release water into the habitat | 2. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 2. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |
| Innundation with flood waters | 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief | 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood | 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people. |

| | | | |
|--|---|---|--|
| | 5. Insurance coverage provision for life and property | shelter areas. 3. Relief operation. | |
| Water contamination & change in BOD | 1. Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water 2. Application of lime. | 1. Check the water quality & take appropriate action 2. Application of KmnO4 | 1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO4 |
| Health and diseases management | Stock preventive medicines, vaccines | 1. Prevent influx of diseased fish from outside source, Check through nets 2. Application of Alum. 3. Administer medicines through random catch Disinfect water by lime , KMnO4 | 1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds. |
| Cyclone | NA | | |
| Heat wave and cold wave | NA | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 5. Restrict lifting of water for irrigation purpose of crops 6. Catch the stock, market the produce to reduce the density of population in ponds. | 5. Excavate the ponds to increase the depth. 6. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 3. Prepare to release water into the habitat | 3. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 3. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |
| Inundation with flood waters | 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief 5. Insurance coverage provision for life and property | 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation. | 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people. |
| Water contamination & change in BOD | 1. Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water | 1. Check the water quality & take appropriate action 2. Application of KmnO4 | 1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO4 |

| | | | |
|--|---|---|--|
| | 2. Application of lime. | | |
| Health and diseases management | Stock preventive medicines, vaccines | 1. Prevent influx of diseased fish from outside source, Check through nets 2. Application of Alum. 3. Administer medicines through random catch Disinfect water by lime , KMnO4 | 1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds. |
| Cyclone | NA | | |
| Heat wave and cold wave | NA | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 7. Restrict lifting of water for irrigation purpose of crops 8. Catch the stock, market the produce to reduce the density of population in ponds. | 7. Excavate the ponds to increase the depth. 8. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 4. Prepare to release water into the habitat | 4. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 4. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |
| Inundation with flood waters | 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief 5. Insurance coverage provision for life and property | 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation. | 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people. |
| Water contamination & change in BOD | 1. Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water 2. Application of lime. | 1. Check the water quality & take appropriate action 2. Application of KmnO4 | 1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO4 |
| Health and diseases management | Stock preventive medicines, vaccines | 1. Prevent influx of diseased fish from outside source, Check through nets | 1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. |

| | | | |
|--|---|--|---|
| | | 2. Application of Alum. 3. Administer medicines through random catch Disinfect water by lime , KMnO ₄ | 3. Control on transport of brooders and seeds. |
| Cyclone | NA | | |
| Heat wave and cold wave | NA | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 9. Restrict lifting of water for irrigation purpose of crops 10. Catch the stock, market the produce to reduce the density of population in ponds. | 9. Excavate the ponds to increase the depth. 10. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 5. Prepare to release water into the habitat | 5. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 5. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |
| Inundation with flood waters | 1. Construction of humane shelter. 2. Storage of sand filled bags for emergency use. 3. Repair and maintenance of bunds. 4. Preparedness for relief 5. Insurance coverage provision for life and property | 1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Evacuation of people to flood shelter areas. 3. Relief operation. | 1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people. |
| Water contamination & change in BOD | 1. Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water 2. Application of lime. | 1. Check the water quality & take appropriate action 2. Application of KmnO ₄ | 1. Application of lime and geolite. 2. Application of Alum. 3. Application of KmnO ₄ |
| Health and diseases management | Stock preventive medicines, vaccines | 1. Prevent influx of diseased fish from outside source, Check through nets 2. Application of Alum. 3. Administer medicines through random catch Disinfect water by lime , KMnO ₄ | 1. Application of lime and KmnO ₄ . 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds. |

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| Cyclone | NA | | |
| Heat wave and cold wave | NA | | |
| Shallow water in ponds due to insufficient rains/inflow | 1. Supplementary water harvest structures like pond and tanks has to be developed. 2. Renovation and maintenance of existing water harvest structures | 11. Restrict lifting of water for irrigation purpose of crops 12. Catch the stock, market the produce to reduce the density of population in ponds. | 11. Excavate the ponds to increase the depth. 12. Try to release water into the pond if it rains in off-season |
| Impact of heat & salt load build up in ponds / change in water quality | 6. Prepare to release water into the habitat | 6. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat. | 6. Monitoring the water quality and health of aquatic organisms |
| Floods | | | |

^a based on forewarning wherever available