

State: BIHAR

Agriculture Contingency Plan for District: JAMUI

| 1.0 District Agriculture profile | | | | |
|--|--|--|-----------------------|----------|
| 1.1 | Agro-Climatic/Ecological Zone | | | |
| | Agro Ecological Sub Region (ICAR) | Eastern Plain, Hot Subhumid (moist) Eco-Region (13.1) | | |
| | Agro-Climatic Zone (Planning Commission) | MIDDLE GANGETIC PLAIN REGION (IV) | | |
| | Agro Climatic Zone (NARP) | SOUTH BIHAR ALLUVIAL PLAIN ZONE (BI-3) | | |
| | List all the districts falling under the NARP Zone* (*>50% area falling in the zone) | (Bhojpur, Patna, Nalanda, Nawada, Rohtas, Aurangabad, Gaya, Buxer, Jahanabad, Bhagalpur, Kaimur, Banka, Shekhpura, Munger and Jamui) | | |
| | Geographic coordinates of district headquarters | Latitude | Longitude | Altitude |
| | | 24 ⁰ 55' 24 ⁰ 92' N | 85 ⁰ 13' E | 86.2 m |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | Agriculture Research Institute, Patna | | |
| | Mention the KVK located in the district with address | Krishi Vigyan Kendra, Shramabharati Khadigram, Jamui, Bihar-811313 | | |
| Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone | Krishi Vigyan Kendra, Shramabharati Khadigram, Jamui, Bihar-811313 | | | |

| | | | | | |
|------------|-----------------------|----------------------|-----------------------------------|--|--|
| 1.2 | Rainfall | Normal RF(mm) | Normal Rainy days (number) | Normal Onset (specify week and month) | Normal Cessation (specify week and month) |
| | SW monsoon (June-Sep) | 920.1 | 62 | 2 nd week of June | 2 nd week of October |
| | NE Monsoon(Oct-Dec) | -- | -- | | |
| | Winter (Jan- March) | 72.5 | 05 | - | - |
| | Summer (Apr-May) | 104.5 | 07 | - | - |
| | Annual | 1097.1 | 74 | - | - |

| | | | | | | | | | | | |
|------------|---|------------------------|--------------------|----------------|---|---------------------------|---------------------------------|--|---|--------------------|------------------|
| 1.3 | Land use pattern of the district (latest statistics) | Geogra- phical area | Cultivable area | Forest area | Land under non- agricultu ral use | Permane nt pastures | Cultivab le wastelan d | Land under Misc. tree crops and groves | Barren and uncultiv able land | Current fallows | Other fallows |
| | Area ('000 ha) | 312.200 | 76.950 | 38.680 | NA | 21.00 | 44.90 | NA | 30.20 | 13.50 | NA |

| | | | |
|------------|---|-----------------------|-----------------------------|
| 1.4 | Major Soils (common names like red sandy loam deep soils (etc.,)*) | Area ('000 ha) | Percent (%) of total |
| | 1. Sandy Loam (Deep soil) | 55.000 | 46.4 |
| | 2. Red and lateritic soil (Low deep soil) | 36.000 | 30.6 |
| | 3. Clay Loam (Medium deep soil) | 28.000 | 23.6 |

| | | | |
|------------|------------------------------|----------------|----------------------|
| 1.5 | Agricultural land use | Area ('000 ha) | Cropping intensity % |
| | Net sown area | 95.000 | 125% |
| | Area sown more than once | 60.000 | |
| | Gross cropped area | 119.000 | |

| | | | | |
|--|---------------------------------|----------------|---|------------------------------------|
| 1.5 | Irrigation | Area ('000 ha) | | |
| | Net irrigated area | 28.900 | | |
| | Gross irrigated area | 38.000 | | |
| | Rainfed area | 66.100. | | |
| | Sources of Irrigation | Number | Area ('000 ha) | Percentage of total irrigated area |
| | Canals | 18 | 0.900 | 2.36 |
| | Tanks | 19 | 0.200 | 0.52 |
| | Open wells | | 2.880 | 7.58 |
| | Bore wells | | 26.880 | 70.74 |
| | Lift irrigation schemes | | NA | |
| | Micro-irrigation | | NA | |
| | Other sources (please specify) | | 12.000 | 31.58 |
| | Total Irrigated Area | | 38.000 | |
| | Pump sets | | NA | |
| No. of Tractors | | NA | | |
| 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) | |
| 1.6 | Over exploited | | | |
| | Critical | | | |
| | Semi- critical | | | |
| | Safe | 10 | 100% | Safe |
| | Wastewater availability and use | | | |

| |
|---|
| Ground water quality |
| *over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70% |

1.7 Area under major field crops & horticulture (2008-09)

| 1.7 | S. No. | Major field crops cultivated | Area ('000 ha) | | | | | | | |
|-----|---------------|------------------------------|----------------|---------|-------|-------------|---------|-------|--------|-------------|
| | | | <i>Kharif</i> | | | <i>Rabi</i> | | | Summer | Grand total |
| | | | Irrigated | Rainfed | Total | Irrigated | Rainfed | Total | | |
| 1 | Rice | - | - | 73.0 | - | - | 0 | - | 73.0 | |
| 2 | Wheat | - | - | 0 | - | - | 22.0 | - | 22.0 | |
| 3 | Maize | - | - | 6.30 | - | - | 3.80 | - | 10.1 | |
| 4 | Lentil | - | - | - | - | - | 3.00 | - | 3.0 | |
| 5 | Mustard | - | - | - | - | - | 1.00 | - | 1.0 | |
| 6 | Linseed | - | - | - | - | - | 1.00 | - | 1.0 | |
| 7 | Other legumes | - | - | - | - | - | - | 0.45 | 4.5 | |
| 8 | Others | - | - | - | - | - | 3.02 | - | 3.02 | |

| S. No. | Horticulture crops – Fruits | Area ('000 ha) | | |
|--------|--|----------------|------------------|----------------|
| | | Total | Irrigated | Rainfed |
| 1 | Mango | 1.028 | - | - |
| 2 | Guava | 0.221 | - | - |
| 3 | Banana | 0.412 | - | - |
| | Horticulture crops - Vegetables | Total | Irrigated | Rainfed |
| 1 | Potato | 3.315 | - | - |
| 2 | Onion | 0.732 | - | - |
| 3 | Chilli | 0.862 | - | - |
| 4 | Onion | 0.732 | - | - |
| 5 | Brinjal | 0.578 | - | - |

| | | Medicinal and Aromatic crops | Total | Irrigated | Rainfed |
|--|---|-------------------------------------|--------------|------------------|----------------|
| | 1 | Tulsi | .002 | - | - |
| | 2 | Kalmegh | .001 | - | - |
| | 3 | Ashwagandha | .001 | - | - |
| | 4 | Lemon grass | .001 | - | - |
| | 5 | Citronella | .001 | - | - |
| | | Plantation crops | Total | Irrigated | Rainfed |
| | | Fodder crops | Total | Irrigated | Rainfed |
| | | Total fodder crop area | - | - | - |
| | | Grazing land | - | - | - |
| | | Sericulture etc | - | - | - |

| 1.8 | Livestock | Male ('000) | Female ('000) | Total ('000) |
|------------|--|--------------------|----------------------|---------------------|
| | Non descriptive Cattle (local low yielding) | 39.000 | 22.000 | 61.000 |
| | Improved cattle | - | - | - |
| | Crossbred cattle | 1.92 | 3.96 | 5.900 |
| | Non descriptive Buffaloes (local low yielding) | - | - | - |
| | Descript Buffaloes | 16.000 | 61.000 | 77.000 |

| | | | | | | |
|---------------|---|-------------------------------|----------------------------------|-------------------------------|------------------------------------|---|
| | Goat | - | - | 0.299 | | |
| | Sheep | - | - | .001 | | |
| | Others (Camel, Pig, Yak etc.) | - | - | .026 | | |
| | Commercial dairy farms (Number) | | | | | |
| 1.9 | Poultry | No. of farms | Total No. of birds ('000) | | | |
| | Commercial | - | 246.800 | | | |
| | 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) | |
| | ii) Inland (Data Source: Fisheries Department) | No. Farmer owned ponds | | No. of Reservoirs | No. of village tanks | |
| | | NA | | NA | NA | |
| | B. Culture | | | | | |
| | | | | Water Spread Area (ha) | Yield (t/ha) | Production ('000 tons) |
| | i) Brackish water (Data Source: MPEDA/ Fisheries Department) | | | | | |
| | ii) Fresh water (Data Source: Fisheries Department) | | | 580.00 | 3.2/ha | 916 |
| Others | | | | | | |

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08;)

| 1.11 | 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) | | | | | | | | | | |
| 1 | Rice | 160.6 | 2200 | - | - | - | - | 160.6 | 2200 | - |
| 2 | Wheat | - | - | 33.8 | 1500 | - | - | - | - | - |
| 3 | Maize | - | - | - | - | - | - | 25.4 | 2500 | - |
| 4 | Sugarcane | - | - | - | - | - | - | 102.7 | 34000 | - |
| Major Horticultural crops (Crops to be identified based on total acreage) | | | | | | | | | | |
| 1 | Mango | - | - | - | - | - | - | 9.792 | 9525 | - |
| 2 | Banana | - | - | - | - | - | - | 8.637 | 20963 | - |
| 3 | Guava | - | - | - | - | - | - | 1.995 | 9027 | - |
| 4 | Lemon | - | - | - | - | - | - | 1.251 | - | - |
| 5 | potato | - | - | 2.6 | 4000 | - | - | 2.600 | 4000 | - |

| | | | | | | |
|-------------|---|--|--|---|---|---|
| 1.12 | Sowing window for 5 major field crops (start and end of normal sowing period) | Rice | Wheat | Maize | Lentil | Potato |
| | <i>Kharif</i> - Rainfed | 3 rd week of June to 4 th week of July | - | - | - | - |
| | <i>Kharif</i> - Irrigated | - | - | - | - | - |
| | <i>Rabi</i> - Rainfed | - | - | - | 3 rd week of October to 4 th week of November | - |
| | <i>Rabi</i> - Irrigated | - | 2 nd week of November to 4 th week of December | 2 nd week of October to 2 nd week of November | - | 2 nd week of October to 2 nd week of November |

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

| | | | |
|------|--|---|----------------|
| 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 |

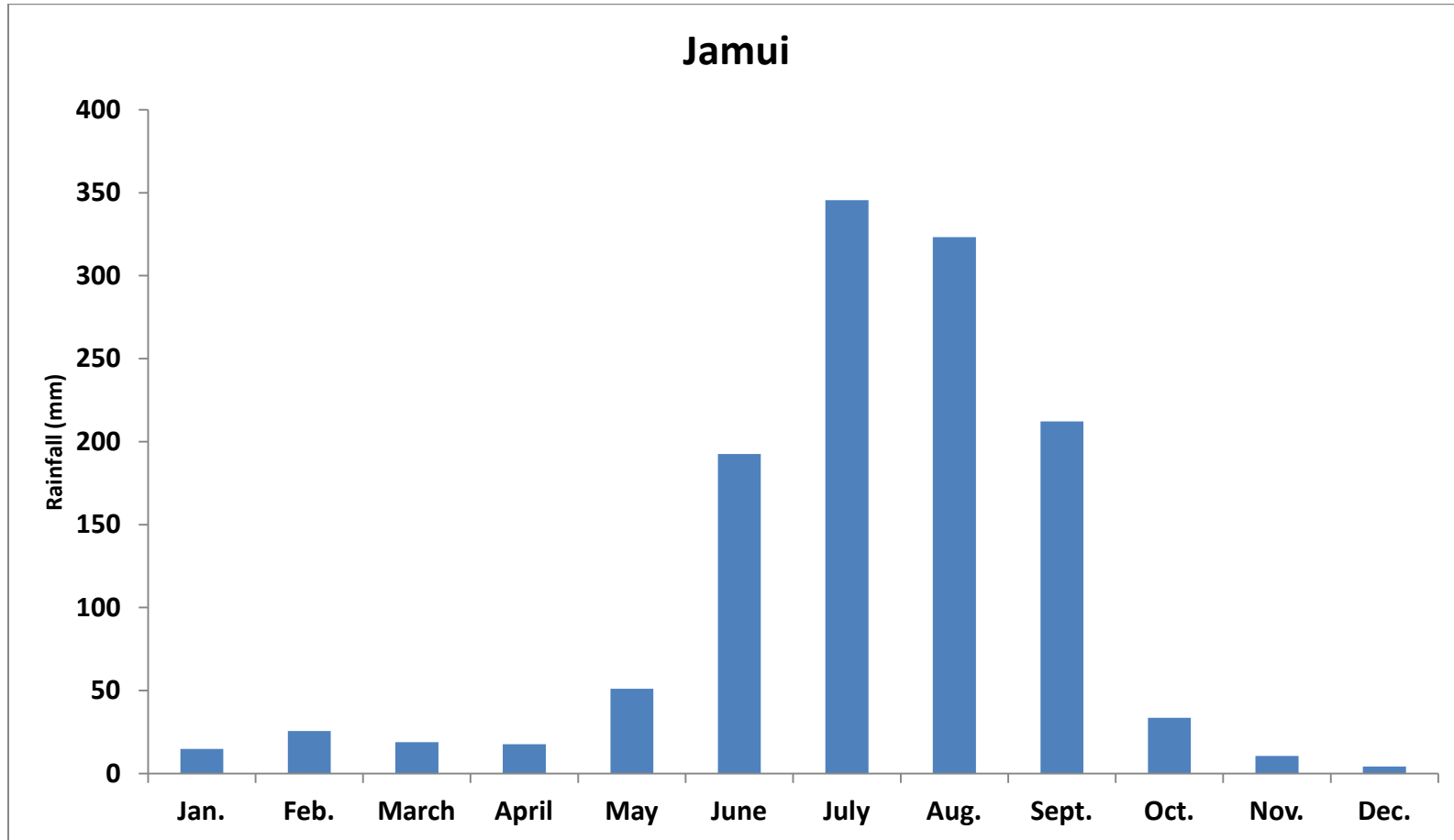
Annexure I

Agro climatic Zones of Bihar

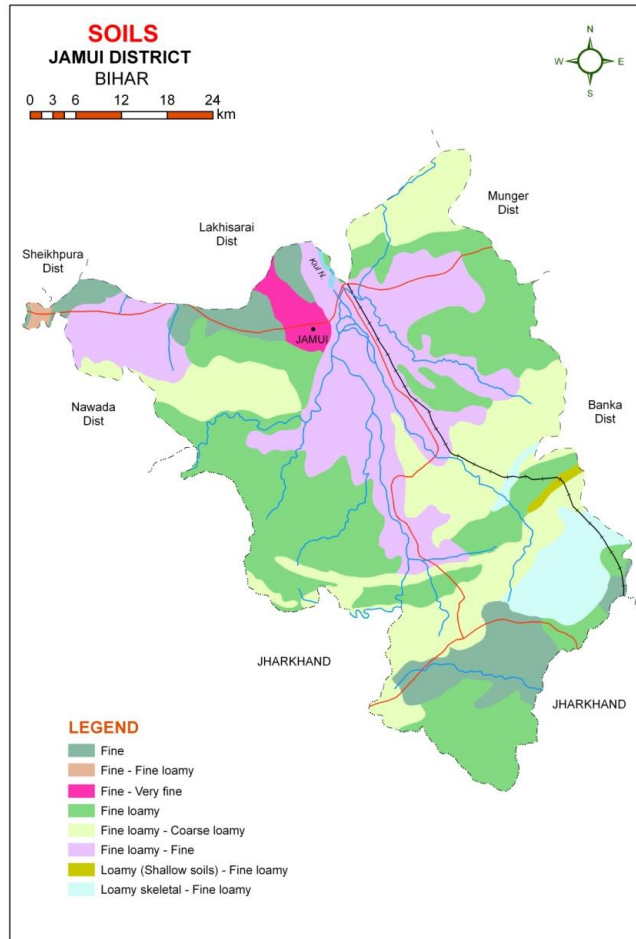


Source: krishi.bih.nic.in

Annexure-II



Annexure-III



Source : NBSS& LUP, Regional Centre, Kolkata

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

| Condition | Major Farming situation | Normal Crop / Cropping system | Suggested Contingency measures | | |
|--|--|---|--|--|--|
| | | | Change in crop / cropping system including variety | Agronomic measures | Remarks on Implementation |
| Early season drought (delayed onset) Delay by 2 weeks 4 th week of June | Up land Medium to low deep soil Sandy loam to clay loam soil | 1.Maize- Fallow 2. Pigeonpea- Fallow | Maize-Pigeonpea Maize Shaktiman-1,2,3,4 Suwan, Ganga-11,Deoki, Pusa early hybrid Maka-3 Extra Early Pigeonpea ICPL- 8803 | <ul style="list-style-type: none"> • Normal package of Practices • Life saving irrigation • Use of mulches • Gap filling | Seeds from BRBN, BAU, Sabour, NSC, TDC |
| | Mid land | 1.Rice- Wheat 2.Rice- Maize | Rice –Wheat Rice-Maize Medium duration Rice Rice – Pusa 2-21, Rajendra Suwasni,Sita Safed Wheat- HD-2733, PBW-343, HP-1731 Maize Shaktiman-1,2,3,4 ,5 Suwan, Ganga-11, Deoki, | <ul style="list-style-type: none"> • Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation | |

| | | | Pusa early hybrid Maka-3 | | |
|--|--|--|--|--|--|
| 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 |
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram | Rice- Wheat Rice- Maize- Greengram Medium to long duration Rice- Rajendra Suwasni, Rajendra Sweta Rajendra Mansoori-1 Wheat- HD-2733, PBW-343, K-9107, HP-1731 Greengram Pusa Bashaki, SML 668, Samrat PDM-54 | <ul style="list-style-type: none"> • Normal package of Practices • Direct seeding of rice can be done • Life saving irrigation • Gap filling | |
| Delay by 4 weeks 2 nd week of July | Up land Medium to low deep soil Sandy loam to clay loam soil | Maize- Fallow Pigeonpea- Fallow | Maize-Pigeonpea Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 Extra Early Pigeon pea ICPL- 88039 Bahar | <ul style="list-style-type: none"> • Normal package of Practices • Life saving irrigation • Use of mulches • Gap filling • Balanced dose of | Seeds from BRBN, BAU, Sabour, NSC, TDC |

| | | | | | |
|--|--|--|--|-----|--|
| | | | | NPK | |
|--|--|--|--|-----|--|

| 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) | Mid land | 1.Rice- Wheat 2.Rice- Maize | Rice –Wheat Rice-Miaze Short duration Rice Rice – , Prabhat, Richarria Dhanlaxmi, Turanta Wheat- HD-2733, PBW-343, HP-1731 Maize- Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 | <ul style="list-style-type: none"> ▪ Normal seedling of rice can be used with adequate NPK ▪ Old age 30-35 days seedlings of early rice variety may also be used ▪ Direct seeding of rice | |

| | | | | | |
|--|----------|--|--|---|--|
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram | 1.Rice- Wheat 2.Rice- Maize- Green gram Medium duration Rice- Rajendra Suwasni Prabhat , Sita safed Wheat- HD-2733, PBW-343, HP-1731 Greengram- Pusa Bashakhi, SML 668, PDM-54 | <ul style="list-style-type: none"> Enhanced dose of nitrogen with full basal dose of NPK at transplanting Old age rice seedling of 40-45 days may be used with three seedling per hill with close spacing | |
|--|----------|--|--|---|--|

| 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 4 th week of July | Up land Medium to low deep soil Sandy loam to clay loam soil | 1.Maize- Fallow 2.Pigeonpea- Fallow | Finger millet Finger millet- RAU 7&8 | <ul style="list-style-type: none"> Normal package of Practices Life saving irrigation Adequate dose of NPK IPM | Seeds from BRBN, BAU, Sabour, NSC, TDC |

| | | | | | |
|--|----------|---------------------------------|--|--|--|
| | Mid land | 1.Rice- Wheat 2. Rice- Maize | Finger millet – Linseed Finger millet- RAU 7&8 Linseed- Subhra, Shekhar | <ul style="list-style-type: none"> • Normal package of Practices • Life saving irrigation • Adequate dose of NPK • IPM | |
|--|----------|---------------------------------|--|--|--|

| 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 |
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram | Mustard & Chickpea Wheat- Greengram Mustard: Rajendra Suflam Rajendra sarson-1 Wheat: HD-2733, PBW-343, HD-2824 Greengram: Pusa Bashakhi, SML 668, PDM-54 | <ul style="list-style-type: none"> • Application of Potassic fertilizer at vegetative stage • Protective spray of pesticides • Enhanced basal dose of NPK • Adequate dose of NPK • IPM | Seeds from BRBN, BAU, Sabour, NSC, TDC |

| | | | | | |
|--|--|--|--|--|--|
| Delay by 8 weeks 2 nd week of August | Up land Medium to low deep soil Sandy loam to clay loam soil | 1.Maize- Fallow 2.Pigeonpea- Fallow | Finger millet- Fallow Chickpea- Fallow Finger millet- RAU 7&8 Chickpea- Pusa-236, KPG-39 (Uday) , Pusa-372, SG-2 | <ul style="list-style-type: none"> • Normal package of Practices • Life saving irrigation | Seeds from BRBN, BAU, Sabour, NSC, TDC |
| 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 |
| | Mid land | 1.Rice- Wheat 2.Rice- Maize | Finger millet – Linseed Finger millet- RAU 7&8 Linseed- Subhra, Shekhar | <ul style="list-style-type: none"> • Normal package of Practices • Life saving irrigation • Adequate dose of NPK • IPM | |
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram | 1.Mustard +Chickpea 2.Wheat- Greengram Mustard: Rajendra suflam Rajendra sarson-1 Wheat: HD-2733, PBW-343, HD-2824 | <ul style="list-style-type: none"> • Application of Potassic fertilizer at vegetative stage • Protective spray of pesticides <ul style="list-style-type: none"> • Enhanced basal dose of NPK | |

| | | | | | |
|--|--|--|---|--|--|
| | | | Chickpea- Pusa-236, KPG-39 (Uday) , Pusa-372, SG-2 Greengram: Pusa Bashakhi, SML 668, PDM-54 | | |
|--|--|--|---|--|--|

| 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. | Up land Medium to low deep soil Sandy loam to clay loam soil. | 1.Maize- Fallow 2.Pigeonpea- Fallow Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 Pigeonpea: NDA-1, NDA-2, Bahar, Malviya-9 | <ul style="list-style-type: none"> Life saving irrigation Gap filling of existing crop | <ul style="list-style-type: none"> Application of potash Mulching through mechanical weeding for moisture conservation Conservation tillage Protective spray of pest with adjuvant against Pesticides and disease | Seeds from BRBN, BAU, Sabour, NSC, TDC |
| | Medium land | 1.Rice- Wheat 2.Rice- Maize Rice – Pusa 2-21, Rajendra Suwasni Prabhat , Sita safed | <ul style="list-style-type: none"> Normal package of Practices Direct Seeding of Rice | <ul style="list-style-type: none"> Application of potash Use of Bio-fertilizers | |

| | | | | | |
|--|--|--|---|---|--|
| | | Wheat - HD-2733, PBW-343, HP-1731 Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 | <ul style="list-style-type: none"> • Life saving irrigation • Gap filling | <ul style="list-style-type: none"> • Spilt dose of urea fertilizer • Use of mulches | |
|--|--|--|---|---|--|

| Condition | | | Suggested Contingency measures | | |
|--|--------------------------------|---|---|--|--|
| Early season drought (Normal onset) | Major Farming situation | Normal Crop/cropping system^b | Crop management^c | Soil nutrient & moisture conservation measures^d | Remarks on Implementation^e |
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram Rice - Sita safed Rajendra Suwasini, Rajendra Sweta Rajendra Mansoori-1 Wheat - HD-2733, PBW-343, PBW-502, HP-1731 Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11,Deoki, Pusa early hybrid Maka-3 | <ul style="list-style-type: none"> • Direct Seeding of Rice • Life saving irrigation • Gap filling | <ul style="list-style-type: none"> • Application of potash • Use of Bio-fertilizers • Spilt dose of urea fertilizer • Use of mulches | |

| | | | | | |
|--|--|---|--|--|--|
| | | Greengram: Pusa Bashakhi, SML 668, PDM-54 | | | |
|--|--|---|--|--|--|

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|---|--|--|---|--|
| | | | Crop management | Soil nutrient & moisture conservation measues | Remarks on Implementation |
| Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) | | | | | |
| At vegetative stage | Up land Medium to low deep soil Sandy loam to clay loam soil. | 1.Maize- Fallow 2.Pigeonpea- Fallow Maize: Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 Pigeonpea: NDA-1, NDA-2 Bahar, Malviya-9 | <ul style="list-style-type: none"> • Life saving irrigation • Gap filling of existing crop | <ul style="list-style-type: none"> • Application of potash • Mulching through mechanical weeding for moisture conservation • Conservation tillage • Protective spray of pesticides with adjuvant against Pest and disease | Seeds from BRBN, BAU, Sabour, NSC, TDC |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|---|-------------------------|-----------------------------|--------------------------------|---|---------------------------|
| | | | Crop management | Soil nutrient & moisture conservation measues | Remarks on Implementation |
| Mid season drought (long dry spell, consecutive 2 | | | | | |

| | | | | | |
|--|-------------|--|---|---|--|
| weeks rainless (>2.5 mm) period) | | | | | |
| | Medium land | <p>Rice- Wheat Rice- Maize</p> <p>Rice – Pusa 2-21, Rajendra Suwasni Prabhat , Sita safed</p> <p>Wheat- HD-2733, PBW-343, HP-1731</p> <p>Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3</p> | <ul style="list-style-type: none"> • Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & BPH • Life saving irrigation | <ul style="list-style-type: none"> • Mulching through weeds, • Direct seeding of rice • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops and zinc sulphate | |

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

| | | | | | |
|--|----------|---|---|---|--|
| | Low land | <p>1.Rice- Wheat 2.Rice- Maize- Green gram</p> <p>Rice- Sita safed Rajendra Suwasni, Rajendra Sweta Rajendra Mansoori-1</p> <p>Wheat- HD-2733, PBW-343, HP-1731</p> <p>Maize Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3</p> <p>Greengram Pusa Bashakhi, SML 668, PDM-54</p> | <ul style="list-style-type: none"> • Gap filling of existing crop • Postponement of top dressing • Protective spray of pesticides with adjuvant against BLB, BLAST & BPH • Life saving irrigation | <ul style="list-style-type: none"> • Mulching through weeds, • Direct seeding of rice • Spray of potassic fertilizer with adjuvant • Spray (1%) Urea on the crops and zinc sulphate | |
|--|----------|---|---|---|--|

| 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 | Up land Medium to low deep soil Sandy loam to clay loam soil. | 1.Maize- Fallow 2Pigeonpea- Fallow Maize Shaktiman-1,2,3,4 ,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 Pigeonpea: NDA-1, NDA-2, Bahar, Malviya-9 | <ul style="list-style-type: none"> • IPM practices • Life saving irrigation • Spray of pesticides with spreader | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • Mulching through weeds & residue • Spraying of micronutrient | Seeds from BRBN, BAU, Sabour, NSC, TDC |
| | Medium land | 1.Rice- Wheat 2.Rice- Maize Medium duration Rice Rice – Pusa 2-21, Rajendra Suwasni Prabhat , Sita safed Wheat- HD-2733, PBW-343, HP-1731 Maize- Shaktiman-1,2,3,4,5 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 | <ul style="list-style-type: none"> • IPM practices • Life saving irrigation • Spray of pesticides with spreader | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • Mulching through weeds & residue • Spraying of micronutrient | |

| Condition | | | Suggested Contingency measures | | |
|------------|---------------|----------------------|--------------------------------|--------------------------|------------|
| Mid season | Major Farming | Normal Crop/cropping | Crop management ^c | Soil nutrient & moisture | Remarks on |

| drought (long dry spell) | situation | system | | conservation measues | Implementation |
|---------------------------------|------------------|--|--|---|-----------------------|
| | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram Rice- Sita safed Rajendra Suwasini, Rajendra Sweta Rajendra Mansoori-1 Wheat- HD-2733, PBW-343, PBW-502, HP-1731 Maize Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 Greengram Pusa Bashakhi, SML 668, PDM-54 | <ul style="list-style-type: none"> • IPM practices • Life saving irrigation • Spray of pesticides with spreader | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • Mulching through weeds & residue • Spraying of micronutrient | |

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

| | | | | | |
|--|---|--|--|--|--|
| | Up land Medium to low deep soil Sandy loam to clay loam soil. | 1.Maize- Fallow 2.Pigeonpea - Fallow Maize Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 Pigeonpea: NDA-1, NDA-2, Bahar, Malviya-9 | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning • Clipping of leaves in maize | <ul style="list-style-type: none"> • Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like Gram, Lentil, Linseed. • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage | Seeds from BRBN, BAU, Sabour, NSC, TDC |
|--|---|--|--|--|--|

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | Remarks on Implementation |
|--|-------------------------|---|--|---|---------------------------|
| | | | Crop management | Rabi Crop planning | |
| Terminal drought (Early withdrawal of monsoon) | | | | | |
| | Medium land | 1.Rice- Wheat 2.Rice- Maize Medium duration Rice Rice – Pusa 2-21, Rajendra Suwasini Prabhat , Sita safed Wheat - HD-2733, PBW-343, HP-1731 Maize | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning • Clipping of leaves in maize | <ul style="list-style-type: none"> • Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Gram/ Lentil /Mustard/ Linseed • Stored water to be used at critical stage of growth | |

| | | | | | |
|--|--|---|--|---|--|
| | | Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 | | <ul style="list-style-type: none"> • To clean irrigation channel for preventing loss of moisture through seepage | |
|--|--|---|--|---|--|

| 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) | Low land | 1.Rice- Wheat 2.Rice- Maize- Green gram Rice- Sita safed Rajendra Suwasini, Rajendra Sweta Rajendra Mansoori-1 Wheat- HD-2733, PBW-343, PBW-502, HP-1731 Maize Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3 Greengram Pusa Bashakhi, SML 668, PDM-54 | <ul style="list-style-type: none"> • Spray of potassic fertilizer with adjuvant • IPM practices • Life saving irrigation • Mulching • Thinning • Clipping of leaves in maize | <ul style="list-style-type: none"> • Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like wheat, Rabi Maize/Gram/ Lentil /Mustard/ Linseed • Stored water to be used at critical stage of growth • To clean irrigation channel for preventing loss of moisture through seepage | |

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 | Upland | 1.Rice- Wheat 2.Rice- Potato 3.Rice- Maize | 1.Mustard- Greengram 2.Maize- Potato 3.Maize- Lentil Mustard - 66-197-3, Rajendra Sarson-I Lentil- PL-406, Malika, Arun Maize - Shaktiman- 1,2,3,4, Suwan, Ganga- 11, Deok Pusa early hybrid Macca-3 Potato – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti | <ul style="list-style-type: none"> • Spray of Potassic fertilizer • Life saving irrigation • Use of mulches • Spray of micronutrient | Seeds from BRBN, RAU, Pusa, NSC, TDC |

| Condition | Major Farming situation ^f | Normal Crop/cropping system ^g | Suggested Contingency measures | | |
|-----------|--------------------------------------|--|---|---------------------------------|--|
| | | | Change in crop/cropping system ^h | Agronomic measures ⁱ | Remarks on Implementation ^j |

| Condition | Suggested Contingency measures | | | | |
|--|--------------------------------------|--|--|--|--|
| | Major Farming situation ^f | Normal Crop/cropping system ^g | Change in crop/cropping system ^h | Agronomic measures ⁱ | Remarks on Implementation ^j |
| Limited release of water in canals due to low rainfall | Upland | 1.Rice- Wheat- Green gram 2.Rice- Potato- Summer vegetable 3.Rice- Maize- Green gram | 1.Rice- Wheat 2.Rice- Potato 3.Rice- Maize Rice- Prabhat, Dhanlaxmi, Richarria, Saroj Wheat- HD-2733, PBW-343, HP-1731, HD-2824 Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deok, Pusa early hybrid Macca-3 Potato – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti | <ul style="list-style-type: none"> • Spray of Potassic fertilizer • Life saving irrigation • Use of mulches • Spray of micronutrient | Seeds from BRBN, RAU, Pusa, NSC, TDC |
| | Low land | 1.Rice- Wheat- Green gram 2.Rice- Potato 3.Rice- Onion | 1.Rice- Wheat- 2.Rice- Lentil/ Linseed 3.Rice- Chickpea Rice- Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya Linseed- Shubra, Garima, Sweta Lentil- PL-406, Malika, Arun Chickpea- Pusa-236, KPG- | <ul style="list-style-type: none"> • Spray of Potassic fertilizer • Life saving irrigation • Use of mulches • Spray of micronutrient | |

| Condition | Suggested Contingency measures | | | | |
|--|--------------------------------------|--|---|--|--|
| | Major Farming situation ^f | Normal Crop/cropping system ^g | Change in crop/cropping system ^h | Agronomic measures ⁱ | Remarks on Implementation ^j |
| | | | 39 (Uday) , Pusa-372, SG-2 | | |
| Non release of water in canals under delayed onset of monsoon in catchment | Upland | 1.Rice- Wheat- Green gram 2.Rice- Potato- Summer vegetable 3.Rice- Maize- Green gram | 1.Rice- Wheat 2.Rice- Potato 3.Rice- Maize Rice - Prabhat, Dhanlaxmi, Richarria, Saroj Wheat - HD-2733, PBW-343, HP-1731, HD-2824 Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deok Pusa early hybrid Macca-3 Potato – PJ376, Rajendra Aloo-1,2,3, Kufri Jyoti | <ul style="list-style-type: none"> • Spray of Potassic fertilizer • Life saving irrigation • Direct seeding of rice • Use of mulches • Spray of micronutrient | Seeds from BRBN, RAU, Pusa, NSC, TDC |
| | Low land | 1.Rice- Wheat- Green gram 2.Rice- Potato 3.Rice- Onion | 1.Rice- Wheat- 2.Rice- Lentil/ Linseed 3.Rice- Chickpea Rice : Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya Linseed - Shubra, Garima, | <ul style="list-style-type: none"> • Spray of Potassic fertilizer • Life saving irrigation • Direct seeding of rice • Use of mulches | |

| Condition | | | Suggested Contingency measures | | |
|-----------|--------------------------------------|--|--|--|--|
| | Major Farming situation ^f | Normal Crop/cropping system ^g | Change in crop/cropping system ^h | Agronomic measures ⁱ | Remarks on Implementation ^j |
| | | | Sweta Lentil- PL-406, Malika, Arun Chickpea - Pusa-236, KPG-39 (Uday) , Pusa-372, SG-2 | <ul style="list-style-type: none"> Spray of micronutrient | |

| Condition | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures | | |
|--|-------------------------|-----------------------------|--------------------------------|--------------------|---------------------------|
| | | | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Lack of inflows into tanks due to insufficient /delayed onset of monsoon | | | Not Applicable | | |
| Insufficient groundwater recharge due to low rainfall | | | | | |

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"> Gap filling Removal of excess | <ul style="list-style-type: none"> Drainage management | <ul style="list-style-type: none"> Drainage management Subsequent crop if | Storage at safer place |

| | | | | |
|---|---|--|---|--|
| | water | <ul style="list-style-type: none"> • Sowing of subsequently crop, if totally damaged i.e. Toria | <ul style="list-style-type: none"> • totally damaged • Harvest at physiological maturity | |
| Maize | <ul style="list-style-type: none"> • Gap filling • Removal of excess water • Re sowing, if completely damaged | <ul style="list-style-type: none"> • Drainage management • Sowing of alternative maize or other rabi crop if totally damaged | <ul style="list-style-type: none"> • Drainage management • Subsequent if totally damaged • Harvest at physiological maturity | Storage at safer place |
| Pigeonpea | <ul style="list-style-type: none"> • September sowing of Pigeonpea(var. harad), if, previous Pigeonpea crop is completely damaged • Gap filling, if needed • Removal of excess water | <ul style="list-style-type: none"> • Drainage management • Sowing of alternative rabi maize or other crops like chilly\ tomato\ brinjal if totally damaged | <ul style="list-style-type: none"> • Drainage management • Subsequent if totally damaged • Harvest at physiological maturity | Storage at safer place |
| Horticulture | | | | |
| Mango | <ul style="list-style-type: none"> • Strengthening of Drainage system • Replanting of crop if substantially damaged | <ul style="list-style-type: none"> • Strengthening of Drainage system • Drenching with copper fungicides | <ul style="list-style-type: none"> • Strengthening of Drainage system • Harvesting at proper time | Immediate sale of fruits and safe transportation |
| Condition | Suggested contingency measure | | | |
| Heavy rainfall with high speed winds in a short span | Vegetative stage | Flowering stage | Crop maturity stage | Post harvest |
| Rice | <ul style="list-style-type: none"> • Gap filling • Removal of excess water | <ul style="list-style-type: none"> • Strengthening of Drainage system • Sowing of subsequently crop, if | <ul style="list-style-type: none"> • Strengthening of Drainage system • Subsequent crop if totally damaged | Storage at safer place |

| | | | | |
|---------------------|--|---|--|--|
| | | totally damaged i.e. Toria | <ul style="list-style-type: none"> • Harvest at physiological maturity | |
| Maize | <ul style="list-style-type: none"> • Gap filling • Removal of excess water • Re sowing, if completely damaged | <ul style="list-style-type: none"> • Strengthening of Drainage system • Sowing of alternative maize or other rabi crop if totally damaged | <ul style="list-style-type: none"> • Strengthening of Drainage system • Subsequent if totally damaged • Harvest at physiological maturity | Storage at safer place |
| Pigeonpea | <ul style="list-style-type: none"> • September sowing of Pigeonpea (var. Sharad), if, previous red gram crop is completely damaged • Gap filling, if needed • Removal of excess water | <ul style="list-style-type: none"> • Strengthening of Drainage system • Sowing of alternative rabi maize or other crops like chilly\ tomato\ brinjal if totally damaged | <ul style="list-style-type: none"> • Strengthening of Drainage system • Subsequent if totally damaged • Harvest at physiological maturity | Storage at safer place |
| Horticulture | | | | |
| Mango | <ul style="list-style-type: none"> • Strengthening of Drainage system • Replanting of crop if substantially damaged | <ul style="list-style-type: none"> • Strengthening of Drainage system • Drenching with copper fungicides | <ul style="list-style-type: none"> • Strengthening of Drainage system • Harvesting at proper time | Immediate sale of fruits and safe transportation |

| Condition | Suggested contingency measure | | | |
|---|---|---|---|------------------------|
| | Vegetative stage | Flowering stage | Crop maturity stage | Post harvest |
| Outbreak of pests and diseases due to unseasonal rains | | | | |
| Rice | <ul style="list-style-type: none"> • Removal of excess water • Seedling treatment | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of | Storage at safer place |

| | | | | |
|-----------|---|---|---|------------------------|
| | <ul style="list-style-type: none"> with Carbendazim + Emidachloprid • Implementation of IPM practices • Spray of pesticides with adjuvant | <ul style="list-style-type: none"> IPM practices • Spray of specific pesticides with adjuvant | <ul style="list-style-type: none"> IPM practices • Spray of specific pesticides with adjuvant | |
| Maize | <ul style="list-style-type: none"> • Soil application of granular insecticides viz. Phorate 10 g/Carbofuran 3g in whorl of maize • Implementation of IPM practices • Spray of pesticides with adjuvant | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of IPM practices • Spray of specific pesticides with adjuvant | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of IPM practices • Spray of specific pesticides with adjuvant | Storage at safer place |
| Pigeonpea | <ul style="list-style-type: none"> • Implementation of IPM practices • Spray of pesticides with adjuvant | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of IPM practices • Spray of specific pesticides with adjuvant | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of IPM practices • Spray of specific pesticides with adjuvant | Storage at safer place |

| Condition | Suggested contingency measure | | | |
|--|---|---|---|--|
| | Vegetative stage | Flowering stage | Crop maturity stage | Post harvest |
| Outbreak of pests and diseases due to un-seasonal rains | | | | |
| Horticulture | | | | |
| Mango | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of | <ul style="list-style-type: none"> • Strengthening of Drainage system • Implementation of | Immediate sale of fruits and safe transportation |

| | | | | |
|--|---|---|---|--|
| | IPM practices • Spray of specific pesticides with adjuvant | IPM practices • Spray of specific pesticides with adjuvant | IPM practices • Spray of specific pesticides with adjuvant | |
|--|---|---|---|--|

2.3 Floods

| Condition | Suggested contingency measure | | | |
|--|-------------------------------|------------------|--------------------|------------|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Transient water logging/ partial inundation | | | | |
| Crop1 | Not Applicable | | | |
| Horticulture | | | | |
| Crop1 | | | | |
| Continuous submergence for more than 2 days | | | | |
| Crop1 | | | | |
| Horticulture | | | | |
| Crop1 | | | | |
| Sea water intrusion³ | | | | |
| Crop1 | | | | |

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 | | | | |
| Rice | • Life saving irrigation | • Life saving irrigation • Spray of potassic fertilizer with adjuvant | • Life saving irrigation • Spray of potassic fertilizer with adjuvant | |
| Maize | • Life saving irrigation | • Life saving irrigation | • Life saving irrigation | |

| | | | | |
|---------------------|--------------------------|---|--------------------------|--|
| Pigeonpea | • Life saving irrigation | • Life saving irrigation | • Life saving irrigation | |
| Wheat | • Life saving irrigation | • Life saving irrigation | • Life saving irrigation | |
| Horticulture | | | | |
| Mango | • Life saving irrigation | • Life saving irrigation | • Life saving irrigation | |
| Cold wave | | | | |
| Wheat | | • Light irrigation • Mulching by crop residue \ weed | | |
| Maize | | • Light irrigation • Mulching by crop residue \ weed | | |
| Mustard | | • Light irrigation • Mulching by crop residue \ weed | | |
| Potato | | • Light irrigation • Mulching by crop residue \ weed | | |
| Pulses | | • Light irrigation • Mulching by crop residue \ weed | | |

| Extreme event type | Suggested contingency measure ^r | | | |
|---------------------|--|---|--------------------|------------|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Horticulture | | | | |
| Brinjal | | • Light irrigation • Mulching by crop residue \ weed | | |

| | | | | |
|--------------|--|---|--|--|
| Chilli | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Tomato | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Bhendi | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Frost | | | | |
| Wheat | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Maize | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Mustard | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |

| Extreme event type | Suggested contingency measure ^r | | | |
|--------------------|--|---|--------------------|------------|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Potato | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Pulses | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |

| | | | | |
|---------------------|----------------|---|--|--|
| Horticulture | | | | |
| Brinjal | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Chilly | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Tomato | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Bhindi | | <ul style="list-style-type: none"> • Light irrigation • Mulching by crop residue \ weed | | |
| Hailstorm | Not Applicable | | | |
| Crop1 | | | | |
| Horticulture | | | | |
| Crop1 | | | | |

| Extreme event type | Suggested contingency measure ^r | | | |
|---------------------|--|------------------|--------------------|------------|
| | Seedling / nursery stage | Vegetative stage | Reproductive stage | At harvest |
| Cyclone | Not Applicable | | | |
| Crop1 | | | | |
| Horticulture | | | | |
| Crop1 (specify) | | | | |

Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

| | Suggested contingency measures | | |
|------------------------------|--|--|---|
| | Before the event | During the event | After the event |
| Drought | | | |
| Feed and Fodder availability | <p>1. Reserve feed/ fodder bank at community level</p> <p>Each district should have reserves (feeding 5000 ACU maintenance ration for about 1-3 weeks period) of the following at any point of the year for mobilization to the needy areas. Checking of feed availability may be made at 3 months interval, particularly before onset of summer.</p> <p>Silage:20-50 t</p> <p>Urea molasses mineral bricks (UMMB): and complete feed block (CFB) 50-100 t</p> <p>Hay:100-250 t</p> <p>Concentrates: 20-50 t</p> <p>Minerals and vitamin supplements mixture:1-5 t</p> <p>2. Preparation and storage of silage</p> | <p>Harvest and use all the failed crop (Maize, Rice, Wheat, Horse gram etc) material as fodder.</p> <p>Harvest the top fodder (Neem, Subabul, Acasia, Pipol, Gular, Sessame, Bamboo etc) and unconventional feeds resources like banana plants, babool pods etc for use as fodder for livestock (LS).</p> <p>Sugarcane tops or whole sugarcane plant may be fed to livestock.</p> <p>Aquatic plants like lotus, water hyacinth, duckweed may be fed to livestock mixing with straw.</p> <p>During drought, sorghum may accumulate HCN, which is toxic to livestock. Care may be taken in feeding of stunted grown Sorghum fodder.</p> <p>Available feed and fodder should be collected from CPRs and stall fed in order to reduce the energy requirements of the animals</p> <p>Mild drought : hay should be transported to the</p> | <p>Short duration fodder crops of Sorghum / Bajra / Maize (UP Chari, Pusa Chari, HC-136, HD-2/Rajkoo, Gaint Bajra, L-74, K-6677, Ananand / African tall, Kissan composite, Moti, Manjari, BI-7) and cowpea should be sown in unsown and crop failed areas. Cultivation of fodder Rabi maize if water stagnated upto Nov/ December. Cultivation of Jowar/CowpeaMaize in September.</p> <p>Rapeseed, mustard, Chinese cabbage etc and maize may be grown as fodder where feasible. These crops will be harvested in November to facilitate the sowing of wheat,</p> |

| | | |
|--|--|---|
| <p>and hay at household level</p> <p>Preserve the fodder in the form of hay from Berseem, cowpea, oat & other grasses as well as silage from</p> <p>(a) Maize- harvesting at dough stage. (b) Sorghum - at flowering stage. (c) Oat (d) Hybrid Napier – 40-45 day old. (e) Water hyacinth mixing with Paddy straw in ratio of 4:1 with 70 kg molasses /ton of clean water hyacinth.</p> <p>Bales of hay and other dry fodder should be stored and covered with asbestos sheet or polythene sheet.</p> <p>3, Creation of permanent fodder seed banks in all drought prone areas.</p> <p>2. Establishment of silvi-pastoral system and cultivation of fodder tress</p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component. Fodder trees may be planted around the house, wasteland</p> | <p>needy areas</p> <p>Moderate drought: hay, silage and vitamin & minerals mixture should be transported to the needy areas</p> <p>Severe drought: UMMB, hay, concentrates and vitamin & mineral mixture should be transported to the needy areas. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. In acute drought affected areas, animal camp may be organized along nearby canals or water sources. Farmers along with canal may be persuaded to cultivate fodder crops.</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals (pregnant animals). Due to prolonged under-feeding, there is a chance of abortion in pregnant animals and lactating cows may show the symptoms of hypoglycemia. Comparatively good quality feed may be offered to milch and pregnant animals. Dry and non-productive animals may be reared on dry roughages sprayed with 10% molasses or crude jaggery solution and 2% urea for maintenance of animals.</p> <p>Available kitchen waste should be mixed with dry</p> | <p>pulses etc. Under irrigated conditions sowing of barseem with Chinese cabbage in last week of September may be taken up for early availability of green fodder. Oats may be grown in October as multi cut fodder to ensure the fodder availability for longer period.</p> <p>Concentrates supplementation should be provided to all the animals.</p> |
|--|--|---|

| | | |
|---|---|--|
| <p>etc. Recently, Chaya tree (<i>Cnidoacolus aconitifolius</i>) has been introduced in IGFRI, Jhansi which has high protein value, may be introduced in drought prone regions.</p> <p>3. Management of CPRs</p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production</p> <p>4. Short duration and low water requiring fodder cultivation</p> <p>Increase area under short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti) and cowpea.</p> <p>5. Feeding management</p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop cutters.</p> <p>Establishment of backyard production of Azolla for feeding dairy animals.</p> <p>Establishment of back yard cultivation of para grass/ hybrid</p> | <p>fodder while feeding.</p> <p>Livestock should be kept in shelter or under shed during daytime. In case of hot weather condition, grazing may be done in morning and afternoon. Livestock should not be traveled long distance for grazing to save energy and drinking water intake. Animals should not be watered immediately after return from grazing.</p> <p>Washing of animals may be done at least twice a day.</p> <p>40-50 g of salt and 30-40 g mineral mixture per adult animal and 10-20 g for small ruminants and calves to be provided daily through feed to reduce the imbalances of minerals.</p> <p>Livestock may be provided with drinking water from wells, hand pumps or from pond. In case of bad water quality, bleaching powder or chlorine or lime may be applied to water.</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-</p> | |
|---|---|--|

| | | | |
|----------------|--|--|---|
| | <p>Napier with drain water from bath room/washing area</p> <p>Avoid feed wastage by offering chaffed fodder and less quantity feed for 4 times a day.</p> <p>Avoid burning of wheat straw and maize stover. The big farmers may allow smallholders to collect residual straw after using combine harvester.</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon. If excess grasses are collected, dried grass may be stored.</p> <p>Proper drying, bailing and densification of harvested grass.</p> | <p>20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers.</p> | |
| Cyclone | <p>Harvest all the possible wetted grain (rice/ wheat/maize etc) and use as animal feed after drying.</p> <p>Arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone.</p> <p>Don't allow the animals for grazing in case of early fore warning (EFW)</p> <p>Incase of EFW, shift the animals to</p> | <p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen, arrangement should be made to mitigate the problem</p> <p>Protect the animals from heavy rains and thunder storms</p> <p>In severe cases un-tether or let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> | <p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible out breaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime/ bleaching powder in pit</p> <p>Bleach / chlorinate (0.1%) drinking water or water</p> |

| | | | |
|-----------------------------|---|---|---|
| | <p>safer places.</p> <p>Identification of animals may be done.</p> <p>Keep animals untied in the shed in case of EFW.</p> | Spraying of fly repellants in animal sheds | <p>resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of above mention short duration fodder crops in unsown and water logged areas</p> <p>Application of urea (20-25kg/ha) in the CPR's to enhance the bio mass production.</p> |
| Floods | Not Applicable | | |
| Heat & Cold wave | <p>Arrangement for protection from heat wave</p> <p>i) Plantation around the shed</p> <p>ii) Water sprinklers / foggers in the shed ot frequent washing of animals.</p> <p>iii) Application of white reflector paint on the roof or putting rice straw on the roof of the shed.</p> <p>Cold wave : Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day</p> | <p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves. Molasses may be added in the concentrate feed during heat waves.</p> <p>Put on the foggers / sprinklers and frequent washing of animals during heat waves and heaters during cold waves</p> | <p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p> |

| | | | |
|--------------------------------------|---|---|---|
| | time and putting down during night time) | In severe cases, vitamin 'C' and electrolytes should be added in H ₂ O during heat waves. Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation | |
| Health and Disease management | Specify the endemic diseases (species wise) in that region. Identification of veterinary staff and animal health workers. Constitution of Rapid Action Veterinary Force Storage of emergency medicines and medical kits Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases Surveillance and disease monitoring network establishment Provision for mobile ambulatory van. | Rescue of sick and injured animals and their treatment Conducting mass animal health camps Animals may be checked for any external injury and illness, Pregnant animals may be checked for any discomfort and uneasiness. Animals may be dewormed with suitable anti-parasitic drug and be checked and treated for ecto-parasites, if any. Deworming will improve fodder and feed absorption. During flood do not leave halter or headstalls on animals. Do not tie animals together when releasing. Report the location, identification and disposition of livestock and poultry to authorities handling the disaster. During flood cases of malaria, diarrhea, | Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps. Conducting fertility camps. Disposal of carcass by above means. Pregnancy toxemia may occur due to prolonged under-feeding. Hypoglycemia is also observed. Treatment may be provided to affected animals. Adequate attention is to be paid to disinfect the premises of temporary sheds with the help of bleaching powder, phenol, carbolic acid etc. In no case the carcass/ cadaver should come in contact with healthy animals rehabilitated in sheds. During flood cases of malaria, diarrhea, respiratory infection, fever, injury, leg gangrene, water born |

| | | | |
|--|--|--|--|
| | | <p>respiratory infection, fever, injury, leg gangrene and snake bite may be high. Precaution may be taken to treat the affected animals.</p> | <p>diseases and snake bite may be high. Precaution may be taken to treat the affected animals</p> <p>Diseases that can occur during flood should be given special attention and accordingly medicines should be made available in the health camp for the following mentioned diseases.</p> <p>Salmonella spp. Escherichia coli Giardiasis Amoebiasis Rotavirus Leptospirosis Scabies Black leg Malignant Edema Foot rot Anthrax Botulism Tetanus Red water Black disease Entertoxemia Liver fluke Amphistomiasis</p> |
|--|--|--|--|

| | | | |
|------------------|--|---|---|
| | | | Brooders pneumonia Malaria Snake bite. |
| Insurance | Encouraging insurance of livestock | Listing out the details of the dead animals | Submission for insurance claim and availing insurance benefit Purchase of new productive animals |
| Drinking water | Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Identification of water resources | Restrict wallowing of animals in water bodies/resources | Specify the options (place and area) for establishment of drinking water reserves |

Vaccination schedule in small ruminants (Sheep & Goat)

| Disease | Season |
|-------------------------------|--|
| Foot and mouth disease (FMD) | Before rainy season and in winter / autumn |
| PPR | All seasons, preferably in June-July |
| Black quarter (BQ) | May / June |
| Enterotoxaemia (ET) | May |
| Haemorrhagic septicaemia (HS) | March / June |

| | |
|----------------|------------------|
| Sheep pox (SP) | December / March |
|----------------|------------------|

Vaccination programme for cattle and buffalo:

| Disease | Age and season at vaccination |
|----------------|--------------------------------------|
| Anthrax | In endemic areas only, Feb to May |
| HS | May to June |
| BQ | May to June |
| FMD | November to December |

2.5.2 Poultry

| | Suggested contingency measures | | |
|-------------------------------|--|---|---|
| | Before the event^a | During the event | After the event |
| Drought | | | |
| Shortage of feed ingredients | Storing of house hold grain like maize, broken rice, wheat etc, Culling of weak birds | Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds | Supplementation to all |
| Drinking water | Rain water harvesting | Sanitation of drinking water | Give sufficient water as per the bird's requirement |
| Health and disease management | Culling of sick birds. Deworming and vaccination | Mixing of Vit. A,D,E, K and B-complex including vit C in | Hygienic and sanitation of poultry house |

| | | | |
|-------------------------------|--|--|--|
| | against RD and fowl pox | drinking water | Disposal of dead birds by burning / burying with lime powder in pit |
| Floods | Not Applicable | | |
| Cyclone | | | |
| Shortage of feed ingredients | In case of EFW, shift the birds to safer place Storing of house hold grain like maize, broken rice, bajra etc, Culling of weak birds | Use stored feed as supplement Don't allow for scavenging Protect from thunder storms | Routine practices are followed |
| Drinking water | Provide clean drinking water | Sanitation of drinking water | Sanitation of drinking water |
| Health and disease management | In case of EFW, add antibiotic powder in drinking water to prevent any disease outbreak | Sanitation of poultry house Treatment of affected birds Prevent water logging surrounding the sheds Assure supply of electricity Sprinkle lime powder to prevent ammonia | 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 |

| | | | |
|--------------------------------|---|--|--------------------------------|
| | | accumulation due to dampness | |
| Heat wave and cold wave | | | |
| Heat wave | | | |
| Shelter/environment management | Provision of proper shelter with good ventilation | In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day | Routine practices are followed |
| Health and disease management | Deworming and vaccination against RD and fowl pox | Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C In hot summer, add anti-stress probiotics in drinking water or feed. Increase energy and vitamin concentration in feed (supplementation with grain). | Routine practices are followed |
| Cold wave | | | |

| | | | |
|--------------------------------|--|--|--------------------------------|
| Shelter/environment management | Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity | Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening | Routine practices are followed |
| Health and disease management | Arrangement for protection from chilled air | Supplementation of grains Antibiotics in drinking water to protect birds from pneumonia | Routine practices are followed |

^a based on forewarning wherever available

2.5.2 Fisheries/ Aquaculture

| | Suggested contingency measures | | | Convergence/ linkages with ongoing programs, if any |
|------------|--------------------------------|------------------|-----------------|---|
| | Before the event ^a | During the event | After the event | |
| 1) Drought | Not Applicable | | | |
| | Suggested contingency measures | | | Convergence/ linkages with ongoing programs, if any |

| | Before the event^a | During the event | After the event | |
|------------------|-------------------------------------|-------------------------|------------------------|--|
| 2) Floods | Not Applicable | | | |

| | Suggested contingency measures | | | Convergence/ linkages with ongoing programs, if any |
|-----------------------------|---------------------------------------|-------------------------|------------------------|--|
| | Before the event^a | During the event | After the event | |
| 3. Cyclone / Tsunami | | | | |

| | Suggested contingency measures | | | Convergence/ linkages with ongoing programs, if any |
|-----------------------------------|---------------------------------------|-------------------------|------------------------|--|
| | Before the event^a | During the event | After the event | |
| 4. Heat wave and cold wave | | | | |

^a based on forewarning wherever available