# State: Madhya Pradesh

# Agriculture Contingency Plan: Khargone (West Nimar) District

| 1.0 District Agriculture profile | | | | |
|---|---|---|---|---|
| **1.1** | **Agro-Climatic/Ecological Zone** | | | |
| | Agro Ecological Sub Region (ICAR) | Madhya Bharat plateau , western Malwa plateau, eastern Gujarat plain, Vindhyan and Satpura range and Narmada valley | | |
| | Agro-Climatic Region (Planning Commission) | 9 Western Plateau & Hills Region | | |
| | Agro Climatic Zone (NARP) | XI Nimar Valley | | |
| | List all the districts or part thereof falling under the NARP Zone | Khargone, Khandwa, Barwani, Harda and Dhar (Manawar, Dharampuri and Gandhwani tehsils) | | |
| | Geographic coordinates of district | Latitude | Longitude | Altitude |
| | | 75°36' 28" E | 21°49' 20" N | 283 meters |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | Zonal Agricultural Research Station, RVSKVV<br>Khandwa Road, Khargone (West Nimar)<br>Madhya Pradesh (451001) | | |
| | Mention the KVK located in the district | KVK, ZARS, West Nimar, Khargone dist., 451 001 (MP) | | |
| **1.2** | **Rainfall** | Average (mm) | Normal Onset<br>( specify week and month) | Normal Cessation<br>(specify week and month) |
| | SW monsoon (June-Sep): | 835 | Last week June | II$^{nd}$ Week October |
| | NE Monsoon(Oct-Dec): | | | |
| | Winter (Jan- March) | | - | - |
| | Summer (Apr-May) | | - | - |
| | Annual | 835 | - | - |

| 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 | Old fallows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Area (Lakh ha)** | 6.47790 | 405.7 | 1.68595 | 0.68598 | 58.6 | 0.22769 | 0.0 | 0.08790 | 1.8 | 8.5 |

Source – Directorate of Farmers welfare and Agriculture, Development of Madhya Pradesh, Bhopal, Agriculture Statistics 2009.

| 1. 4 | **Major Soils** | Area (‘000 ha) | Percent (%) of total |
|---|---|---|---|
| | Deep soil | 184.60 | 23.04 |
| | Medium deep soil | 190.20 | 23.76 |
| | Shallow soils | 426.40 | 53.19 |
| **1.5** | **Agricultural land use** | Area (‘000 ha) | Cropping intensity % |
| | Net sown area | 405.668 | 131.80 |
| | Area sown more than once | 51.760 | |
| | Gross cropped area | 534.706 | |

| 1.6 | **Irrigation** | Area (‘000 ha) | Percent (%) | |
|---|---|---|---|---|
| | Net irrigated area | 166.939 | 36.65 | |
| | Gross irrigated are**a** | 166.939 | | |
| | Rainfed area | | 63.35 | |
| | **Sources of Irrigation** | Number | Area (‘000 ha) | % area |
| | Canals | 108 | 26.555 | 12.93 |
| | Tanks | 144 | 24.396 | 11.87 |
| | Open wells | 62611 | 93.662 | 45.57 |
| | Bore wells | 8885 | 30.926 | 15.04 |
| | Lift irrigation | | | |
| | Other sources (Ponds) | | | |
| | Total | | | |
| | Pumpsets | | | |
| | Micro-irrigation | | | |

| | **Groundwater availability and use** | No. of blocks | % area | Quality of water |
|---|---|---|---|---|
| | Over exploited | | | |
| | Critical | | | |
| | Semi- critical | | | |
| | Safe | | | |
| | Wastewater availability and use | | | |

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

**Area under major field crops & horticulture etc.**

| **1.7** | | **Major Field Crops cultivated** | **Area ('000 ha)*** | | |
|---|---|---|---|---|---|
| | | | | **Irrigated** | **Rainfed** |
| | 1 | Cotton | 211.450 | | 211.450 |
| | 2 | Wheat | 114.199 | 114.199 | |
| | 3 | Soybean | 64.465 | | 64.465 |
| | 4 | Sorghum | 47.005 | | 47.005 |
| | 5 | Maize | 26.973 | | 26.973 |
| | 6 | Pigeon pea | 13.879 | | 13.879 |
| | 7 | Bengal gram | 10.478 | 10.478 | |
| | 8 | Ground nut | 10.387 | | 10.387 |
| | 9 | Green gram | 9.905 | | 9.905 |
| | 10 | Black gram | 4.065 | | 4.065 |
| | | **Horticultural crops – Fruits** | **Total area** | **Irrigated** | **Rainfed** |
| | | Mango | 0.020 | | |
| | | Guava | 0.362 | | |
| | | Banana | 0.259 | | |
| | | Papaya | 0.169 | | |
| | | Others (Water Melon, Musk melon, etc. | 0.204 | | |
| | | **Horticultural crops - Vegetables** | | | |
| | | Potato | 0.115 | | |
| | | Onion | 0.315 | | |
| | | Tomato | 0.202 | | |
| | | **Spices crops** | **Total area** | | |
| | | Chilly | 17.583 | **Irrigated** | **Rainfed** |
| | | Coriander | 0.405 | | |
| | | Ginger | 0.160 | | |
| | | Garlic | 0.122 | | |
| | | **Medicinal and Aromatic crops** | **Total area** | **Irrigated** | **Rainfed** |
| | | **Fodder crops** | **Total area** | **Irrigated** | **Rainfed** |

| | | | | | |
|---|---|---|---|---|---|
| | | **Total fodder crop area** | | | |
| | | **Grazing land** | | | |
| | | **Sericulture etc** | | | |
| | | **Others (Specify)** | | | |

| | | | | |
|---|---|---|---|---|
| **1.8** | **Livestock** | **Number ( '000)** | | |
| | Cattle | 476.007 | | |
| | Buffaloes total | 166.129 | | |
| | Commercial dairy farms | - | | |
| | Goat | 302.003 | | |
| | Sheep | 4.996 | | |
| | Others (Camel, Pig, Yak etc.) | 4.993 | | |
| **1.9** | **Poultry** | | | |
| | Commercial | | | |
| | Backyard | 296.474 Total | | |
| **1.10** | **Fisheries** | Area (ha) | Yield (t/ha) | Production (tones) |
| | Brackish water | | | |
| | Fresh water | | | |
| | Others | | | |

| 1.11 | **Production and Productivity of major crops** (Average of last 3 years: 2006, 07, 08) | **Kharif** | | **Rabi** | | **Summer** | | **Total** | |
|---|---|---|---|---|---|---|---|---|---|
| | | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) | Production ('000 t) | Productivity (kg/ha) |
| Crop 1 | Cotton | - | 659.3 | | | | | - | 659.3 |
| Crop 2 | Wheat | | | 200.5 | 2035.3 | | | 200.5 | 2035.3 |
| Crop 3 | Soybean | 59.7 | 1001.0 | | | | | 59.7 | 1001.0 |
| Crop 4 | Sorghum | 83.4 | 1327.7 | | | | | 83.4 | 1327.7 |
| Crop 5 | Maize | 40.1 | 1551.0 | | | | | 40.1 | 1551.0 |
| Crop 6 | Pigeon pea | 10.7 | 708.3 | | | | | 10.7 | 708.3 |
| Crop 7 | Gram | | | 6.4 | 828.0 | | | 6.4 | 828.0 |
| Crop 8 | Ground nut | 10.5 | 929.7 | | | | | 10.5 | 929.7 |
| Crop 9 | Green gram | 3.9 | 373.3 | | | | | 3.9 | 373.3 |
| Crop 10 | Black gram | 2.2 | 340.0 | | | | | 2.2 | 340.0 |
| | **Horticultural crops – Fruits** | | | | | | | | |
| | Mango | | | | | | | 6 | 30000 |
| | Guava | | | | | | | 7.250 | 20000 |
| | Banana | | | | | | | 23.310 | 90000 |
| | Papaya | | | | | | | - | - |
| | Others (Water Melon, Musk melon, etc. | | | | | | | - | - |
| | **Horticultural crops - Vegetables** | | | | | | | | |
| | Potato | | | | | | | 2.530 | 22000 |
| | Onion | | | | | | | 7.875 | 25000 |
| | Tomato | | | | | | | 4.040 | 20000 |
| | **Medicinal and Aromatic crops** | | | | | | | | |
| | **Spices crops** | | | | | | | | |
| | Chilly | | | | | | | 43.957 | 2500 |
| | Coriander | | | | | | | 0.607 | 1200 |
| | Ginger | | | | | | | 2.400 | 15000 |
| | Garlic | | | | | | | 0.158 | 1300 |
| | **Fodder crops** | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Total fodder crop area** | | | | | | | | |
| | **Grazing land** | | | | | | | | |
| | **Sericulture etc** | | | | | | | | |

| **1.12** | **Sowing window for 5 major crops (start and end of sowing period)** | Crop 1: Cotton | 2: Chilli | 3: Soybean | 4: Jowar | 5: Wheat |
|---|---|---|---|---|---|---|
| | Kharif- Rainfed | II$^{nd}$ Week of June | II$^{nd}$ Week of June to I$^{st}$ week of July | Last week of June to I$^{st}$ week of July | Last week of June to I$^{st}$ week of July | |
| | Kharif-Irrigated | II$^{nd}$ Week of May to Last week of June | II$^{nd}$ Week of June to I$^{st}$ week of July | | | |
| | Rabi- Rainfed | | | | | |
| | Rabi-Irrigated | | | | | IInd week of Nov. to Ist week Janu. |

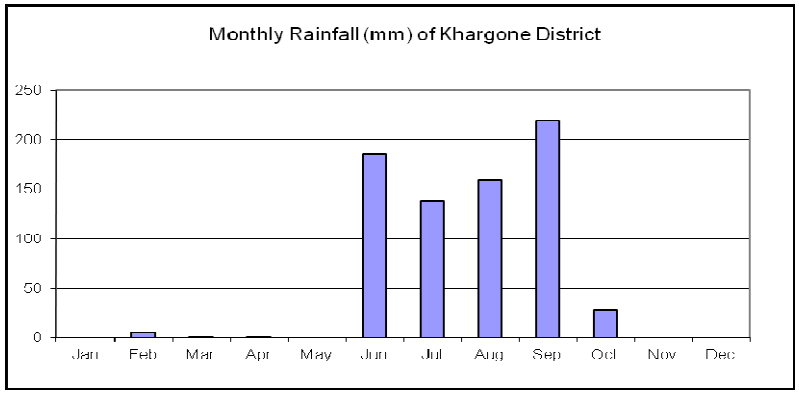
| **1.13** | **What is the major contingency the district is prone to? (Tick mark)** | Regular | | | Sporadic (specify month of occurrence in brackets) | | | None |
|---|---|---|---|---|---|---|---|---|
| | | Severe | Moderate | Mild | Severe | Moderate | Mild | |
| | Drought | | | | | √ (Aug.-Sep.) | | |
| | Flood | | | | | √ (Aug.) | | |
| | Cyclone | | | | | | | |
| | Hail storm | | | | | | | |
| | Heat wave | | √ (May-June) | | | | | |
| | Cold wave | | | | | | | |
| | Frost | | | | | | | |
| | Sea water inundation | | | | | | | |
| | Pests and diseases (specify) | √ (Heliothis & Sucking pest) | √ (Wilting) | √ (Leefspot) | | | | |

| **1.14** | **Include Digital maps of the district for** | Location map of district with in State as Annexure I | Enclosed: Yes |
|---|---|---|---|
| | | Mean annual rainfall as Annexure 2 | Enclosed: Yes |
| | | Soil map as Annexure 3 | Enclosed: Yes |

**Annexure I**

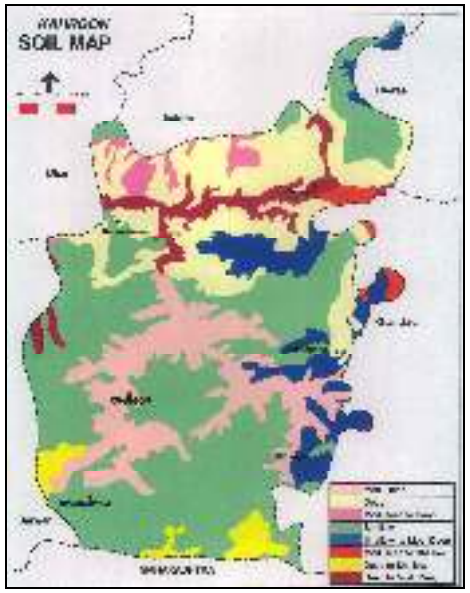
**Location map**

**Annexure II**
**Mean annual rainfall**




**Annexure III**

**Soil map of Khargone district**




(Source: NBSS&LUP, Amravati Road, Nagpur)

**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** | **Crop/ cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Delay by 2 weeks (July 1st wk) 27MW | Shallow soils | Cotton | No change | Sowing of short duration Bt varieties,<br>Making field free of weeds full utilization of water and nutrients by the crop | Link RKVY for the seed cum fertilizer drills<br>-Supply of certified seeds through seed societies<br>Seeds seed corporation,<br>Agriculture universities |
| | | Sorghum | Sorghum JJ 938, JJ 1041 | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers | |
| | | Soybean | JS 9305, JS 335 | | |
| | | Maize | Maize HPQM 1, | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | JGN 3, JGN23, TAG -22 | Sowing in ridge and furrow system.<br>Seed treatment with culture & fungicides | |
| | Moderate Deep Soils | Cotton | No change | Sowing of short duration Bt varities,<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Sorghum | Sorghum JJ 938, JJ 1041 | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers | |
| | | Soybean | JS 9305, JS 335 | | |
| | | Maize | Maize HPQM 1, | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | JGN 3, JGN23, TAG -22 | Sowing in ridge and furrow system.<br>Seed treatment with culture & fungicides | |

| | | | | | |
|---|---|---|---|---|---|
| | Deep soils | Cotton | No change | Sowing of short duration Bt varieties,<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Soybean | JS 9305, JS 335 | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers<br>- Intercropping of pigeonpea with soybean (2:4) | |
| | | Pigeonpea | (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | | |
| | | Maize | Maize<br>HPQM 1, JVM 421, Hybrids | -Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>seed treatment by PSB 5g./kg. | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **Delay by 4 weeks (July III$^{rd}$ Week)** | Shallow soils | Cotton | No change | Sowing of short duration Bt varieties,<br>Making field free of weeds full utilization of water and nutrients by the crop | Link RKVY for the seed cum fertilizer drills<br>-Supply of certified seeds through seed societies<br>Seeds seed corporation, Agriculture universities |
| | | Sorghum | Maize JVM 421, Early varieties | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers | |
| | | Soybean | JS 9560 | | |
| | | Maize | Maize HPQM 1, | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | JGN 3, JGN23, TAG -22 | Sowing in ridge and furrow system.<br>Seed treatment with culture & fungicides | |
| | Moderate Deep Soils | Cotton | No change | Sowing of short duration Bt varieties,<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Sorghum | Sorghum JJ 938, JJ 1041 | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers | |
| | | Soybean | JS 9305, JS 335 | | |
| | | Maize | Maize HPQM 1, | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | JGN 3, JGN23, TAG -22 | Sowing in ridge and furrow system.<br>Seed treatment with culture & fungicides | |
| | Deep soils | Cotton | No change | Sowing of short duration Bt varieties,<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Soybean | JS 9305, JS 335 | -Select short duration varieties for sowing<br>-Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>- Rhyzobium culture + PSB 5g./kg. seed each. 1.0 g. Ammonium Molibdate/kg. of seed for soybean and chickpea cropping sequence<br>-Cultivate the field on receiving pre monsoon showers<br>- Intercropping of pigeonpea with soybean (2:4) | |
| | | Pigeonpea | (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | | |
| | | Maize | HPQM 1, JVM 421, Hybrids | -Seed dressing with Thirum + carbendazim in 2:1 ratio 3g/kg seed<br>seed treatment by PSB 5g./kg. | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **Delay by 6 weeks ( Aug I$^{st}$ Week)** | Shallow soils | Cotton | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate<br>Making field free of weeds full utilization of water and nutrients by the crop | Link RKVY for the seed cum fertilizer drills<br>-Supply of certified seeds through seed societies<br>Seeds seed corporation, Agriculture universities |
| | | Sorghum | | | |
| | | Soybean | JS 9560 | | |
| | | Maize | No change | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate | |
| | Moderate Deep Soils | Cotton | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Sorghum | | | |
| | | Soybean | JS 9560 | | |
| | | Maize | No change | | |
| | | Pigeonpea | No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) + Soybean (early) JS 95-60 (2:4 rows) | |
| | | Groundnut | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate | |
| | Deep soils | Cotton | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate<br>Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Sorghum | | | |
| | | Soybean<br>Maize<br>Pigeonpea | JS 9560<br>No change<br>No change | Pigeon pea (medium) JKM 189, TJT 501, RVICPH 2671 (Hy.) | |
| | | Groundnut | Greengram/ Blackgram | Sowing of short duration crops,<br>20% increase seed rate | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **Delay by 8 weeks ( Aug 3rd Week)** | Shallow soils | Cotton | Fallow/ Plan for rabi crops | Green manuring, Moisture conservation practices | Link RKVY for the seed cum fertilizer drills<br>-Supply of certified seeds through seed societies |
| | | Sorghum | | | |
| | | Soybean | | | |
| | | Maize | | | |
| | | Pigeonpea | | | |
| | | Groundnut | | | |
| | Moderate Deep Soils | Cotton | Fallow/ Plan for rabi crops | Green manuring, Moisture conservation practices | |
| | | Sorghum | | | |
| | | Soybean | | | |
| | | Maize | | | |
| | | Pigeonpea | | | |
| | | Groundnut | | | |
| | Deep soils | Cotton | Fallow/ Plan for rabi crops | Green manuring, Moisture conservation practices | |
| | | Sorghum | | | |
| | | Soybean Maize Pigeonpea | | | |
| | | Groundnut | | | |

***Matrix for specifying condition of early season drought due to delayed onset of monsoon (2, 4, 6 & 8 weeks) compared to normal onset (2.1.1)**

| Normal onset (Month and week) | **Month and week for specifying condition of early season drought due to delayed onset of monsoon** | | | |
|---|---|---|---|---|
| | **Delay in onset of monsoon by** | | | |
| | **2 wks** | **4 wks** | **6 wks** | **8 wks** |
| June 1st wk | June 3rd wk | July 1st wk | July 3rd wk | Aug 1st wk |
| June 2nd wk | June 4th wk | July 2nd wk | July 4th wk | Aug 2nd wk |
| June 3rd wk | July 1st wk | July 3rd wk | Aug 1st wk | Aug 3rd wk |
| June 4th wk | July 2nd wk | July 4th wk | Aug 2nd wk | Aug 4th wk |
| July 1st wk | July 3rd wk | Aug 1st wk | Aug 3rd wk | Sep 1st wk |
| July 2nd wk | July 4th wk | Aug 2nd wk | Aug 4th wk | Sep 2nd wk |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| Early season drought **(Normal onset)** | **Major Farming situation[a]** | **Crop/cropping system[b]** | **Crop management[c]** | **Soil nutrient & moisture conservation measues[d]** | **Remarks on Implementation[e]** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.** | Shallow soil | Cotton | No change | Sowing of short duration Bt varieties, Making field free of weeds full utilization of water and nutrients by the crop | Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills |
| | | Soybean | Gap filling with seed , spray 2% solution of DAP water during the dry spell<br>Spraying of PMA@ 3 ppm solution during dry spell | Frequent intercultural operations and mulching with green leaves. | |
| | | Sorghum | -do- | | |
| | | Maize | Gap filling with seed of same variety | -do- | |
| | | Pigeonpea | Gap filling with seed of same variety | -do- | |
| | | Groundnut | Gap filling with maize seed | -do- | |
| | Moderate Deep soil | Cotton | No change | Sowing of short duration Bt varieties, Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Sorghum | Gap filling with seed , spray 2% solution of DAP water during the dry spell<br>Spraying of PMA@ 3 ppm solution during dry spell | Frequent intercultural operations and mulching with green leaves. | |

| | | | | | |
|---|---|---|---|---|---|
| | | Soybean | -do- | | |
| | | Maize | Gap filling with seed of same variety | -do- | |
| | | Pigeonpea | Gap filling with seed of same variety | -do- | |
| | | Groundnut | Gap filling with maize seed | -do- | |
| | Deep soils | Cotton | No change | Sowing of short duration Bt varieties, Making field free of weeds full utilization of water and nutrients by the crop | |
| | | Soybean | Gap filling with seed , spray 2% solution of DAP water during the dry spell<br>Spraying of PMA@ 3 ppm solution during dry spell | | |
| | | Maize | Gap filling with seed of same variety | | |
| | | Pigeonpea | Gap filling with seed of same variety | | |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)** | **Major Farming situation[a]** | **Crop/cropping system[b]** | **Crop management[c]** | **Soil nutrient & moisture conservation measues[d]** | **Remarks on Implementation[e]** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **At vegetative stage** | Shallow soil | Cotton | Foliar application of 2% DAP solution | Life saving irrigation, Making field free of weeds full utilization of water and nutrients by the crops | Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills |
| | | Soybean | Interculture operation Dora , Foliar application of 2% solution of Urea or DAP with water during draught<br>Spray profenophos 40EC@2 ml/l of water to control girdle beetle. | | |
| | | Sorghum | Delay the spray of urea till optimum soil moisture availability<br>20% defoliation of lower leaves and use as mulching | | |
| | | Maize | -do- | | |
| | | Pigeonpea | -do- | | |
| | | Groundnut | Life saving irrigation / water spray | | |
| | Moderate Deep soil | Cotton | -do- | | |
| | | Sorghum | -do- | | |
| | | Soybean | -do- | | |
| | | Maize | -do- | | |
| | | Pigeonpea | -do- | | |
| | | Groundnut | Life saving irrigation / water spray | | |
| | Deep soils | Cotton | -do- | | |
| | | Soybean | -do- | | |
| | | Maize | -do- | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Pigeonpea | -do- | | |
| **Condition** | | | **Suggested Contingency measures** | | |
| **Mid season drought (long dry spell)** | **Major Farming situation[a]** | **Crop/cropping system[b]** | **Crop management[c]** | **Soil nutrient & moisture conservation measues[d]** | **Remarks on Implementation[e]** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| **At reproductive stage** | Shallow soil | Cotton | Foliar application of 2% DAP solution | Life saving irrigation<br><br>Making field free of weeds full utilization of water and nutrients by the crops<br><br>-Organic mulch/ green leaf mulch | Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms/Agril. University and seed corporations for supply of seed and with RKVY for seed drills |
| | | Soybean | - 20% defoliation in soybean and use as mulching<br>-Spray of 2% solution of MOP/DAP/ water during the dry spell<br>-Spraying of PMA @3 ppm solution during the dry spell | | |
| | | Sorghum | Delay the spray of urea till optimum soil moisture availability<br>20% defoliation of lower leaves and use as mulching | | |
| | | Maize | -do- | | |
| | | Pigeonpea | -do- | | |
| | | Groundnut | Life saving irrigation / water spray | | |
| | Moderate Deep soil | Cotton | -do- | | |
| | | Sorghum | -do- | | |
| | | Soybean | -do- | | |
| | | Maize | -do- | | |
| | | Pigeonpea | -do- | | |
| | | Groundnut | -do- | | |
| | Deep soils | Cotton | -do- | | |
| | | Soybean | -do- | | |
| | | Maize | -do- | | |
| | | Pigeonpea | -do- | | |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Terminal drought** | **Major Farming situation[a]** | **Crop/ cropping system[b]** | **Crop management[c]** | **Rabi Crop planning[d]** | **Remarks on Implementation[e]** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| | Shallow soil | Cotton | Wherever water resources are available such as pond, wells etc. protective irrigation can be provided to the crop, Harvest sorghum crop for fodder | Repeated interculture operations to keep the field weed free and use of organic mulches *Glyricidia* leaves,, uprooted weeds keeping roots upwards. | Linkage with NSC, MPSC, RVSKVV, farmers' societies, state seed firms / Agril. University and seed corporations for supply of seed and with RKVY for seed drills |
| | | Soybean | | | |
| | | Sorghum | | | |
| | | Maize | | | |
| | | Pigeonpea | | | |
| | | Groundnut | | | |
| | Moderate Deep soil | Cotton | | | |
| | | Sorghum | | | |
| | | Soybean | | | |
| | | Maize | | | |
| | | Pigeonpea | | | |
| | | Groundnut | | | |
| | Deep soils | Cotton | | | |
| | | Soybean | | | |
| | | Maize | | | |
| | | Pigeonpea | | | |

**2.1.2 Irrigated situation**

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/ cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Delayed release of water in canals due to low rainfall | Shallow soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Moderate Deep Soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Deep soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation (Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/ cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Limited release of water in canals due to low rainfall | Shallow soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Moderate Deep Soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Deep soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation (Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/ cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Non release of water in canals under delayed onset of monsoon in catchment | Shallow soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Moderate deep Soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | |
| | Deep soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation (Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Crop/ cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remark on implementation** |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Lack of inflows into tank due to insufficient/delayed onset of monsoon | Shallow soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Moderate deep Soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Deep soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation (Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |

| Condition | Major Farming situation | Crop/ cropping system | Change in crop/ cropping system | Agronomic measures | Remark on implementation |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Insufficient ground water recharge due to low rainfall | Shallow soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage<br>Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | | - |
| | Moderate deep Soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation ( Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |
| | Deep soils | Wheat | Wheat ( HW 2004, HI 1554, HI 1500, MP 1203) | Preferred pre sowing Irrigation (Palewa)<br>Balanced fertilization<br>Irrigation at critical growth stage | - |
| | | Chickpea | Chickpea ( JG 130, JG 16, JAKI 9218) | Dry sowing<br>Application of IPNM techniques<br>Irrigation at critical growth stages, branching and seed filling stage<br>Inter-culture operation | - |

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

| **Condition** | **Suggested contingency measure** | | | |
|---|---|---|---|---|
| **Continuous high rainfall in a short span leading to water logging** | **Vegetative stage** | **Flowering stage** | **Crop maturity stage** | **Post harvest** |
| Soybean | • Draining of excess water<br>• Interculture to loosen the soil and to improve aeration<br>• Topdressing with N10-20kg/ha at optimum moisture | • Drain excess water<br>• Interculture to loosen the soil and to improve aeration<br>• Foliar spray with 2% urea/DAP to regain lost vigor | • Drain excess water<br>• Harvesting on a clear sunny day<br>• Shift the produce to safer place | • Maintain optimum moisture content in grain by drying before bagging and marketing |
| Cotton | • Draining of excess water<br>• Apply 25 kg additional N/ha after draining of excess water | • Draining of excess water<br>• Intercultivation with small blade harrow<br>• Apply 25 kg additional N/ha after draining of excess water | • Draining of excess water | • Harvest cotton bolls in bright sunshine periods. |
| Sorghum | • Draining of excess water<br>• Apply 25 kg additional N/ha after draining of excess water | • Draining of excess water<br>• Intercultivation with hoe<br>• Apply 25 kg additional N/ha after draining of excess water | • Draining of excess water<br>• Harvest green cobs from dislodged plants for immediate marketing | • Spread the bundles drenched in the rain on the field bunds/ drying floors to quicken drying<br>• Thresh bundles after they are dried properly<br>• Dry the grain to proper moisture content before bagging and storing |
| Wheat | • Drain excess water<br>• Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour | • Drain excess water<br>• Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour<br>• Adopt need based plant protection measures | • Drain excess water<br>• Adopt need based plant protection measures<br>• Harvest on a clear sunny day | - |
| Chickpea | • Drain excess water<br>• Interculture along with earthing to loosen the soil and to improve aeration | • Drain excess water<br>• Interculture along with earthing to loosen the soil and to improve aeration | • Drain excess water<br>• Timely harvest of produce on a clear sunny day | • Shifting to safer place and drying the produce before bagging and storage |

| | | | | |
|---|---|---|---|---|
| **Horticulture** | | | | |
| **Fruits (Mango, Guava, Pomegranate, papaya etc.)** | • Application of fungicides to check dumping off (Spray Dithane M-45 3% or Bavistin 1% against anthracnose) | • Immediate drain of water<br>• Application of fertilizers just after drainage | • Earthling and application of fungicides (Spray Dithane M-45 3% or Bavistin 1% against anthracnose)<br>• Harvest on clear weather day | • Store the fruits in well ventilated place before it can be marketed |
| **Vegetables ( Onion, Tomato, Cabbage& cauliflower, Cucurbits, Leafy vegetables and others)** | • Spray mancozeb@3g/lit to check dumping off | • Drain water immediately<br>• Application n-fertilizers just after drainage | • Earthling and application of fungicides<br>• Stop harvesting till weather clear | • Store the v in well ventilated place before it can be marketed |
| **Heavy rainfall with high speed wind in a short span** | | | | |
| Soybean | • Drain excess water<br>• Top dressing with N 10-20 kg/ha at optimum soil moisture | • Drain excess water<br>• Intercultivation at optimum soil moisture to loosen the soil and improve aeration<br>• Foliar spray 2% urea/ DAP to regain lost vigour | • Stop harvesting till weather clear<br>• Drain excess water<br>• Shift the produce to safer place | Well dry the produce up to 10- 12 % moisture before storage |
| Cotton | • Draining of excess water<br>• Apply 25 kg additional N/ha after draining of excess water | • Drain of excess water<br>• Intercultivation with hoe<br>• Apply 25 kg additional N/ha after draining of excess water | • Drain of excess water<br>• | • |
| Wheat | • Drain excess water<br>• Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour | • Drain excess water<br>• Top dressing of nitrogenous fertilizers 20-30 kg/ha at optimum soil moisture to gain vigour<br>• Adopt need based plant protection measures | • Drain excess water<br>• Adopt need based plant protection measures<br>• Harvest on a clear sunny day | • Maintain optimum moisture of grain by drying |
| Chickpea | • Drain excess water<br>• Foilar spray with 2% urea after cessation of rains | • Drain excess water<br>• Foilar spray with 2% urea after cessation of rains | • Drain excess water<br>• Timely harvest of produce on a clear sunny day | • Shifting to safer place and drying thr produce before bagging and storage |

| | | | | |
|---|---|---|---|---|
| **Horticulture** | | | | |
| Fruits (Mango, Guava, Sapota, Pomegranate, papaya etc.) | • Proper drainage and removal of excess water from root zone | • Proper drainage and removal of excess water from root zone | • Proper drainage and removal of excess water from root zone | • Store in well ventilized temporary structures before marketing<br>• Market the produce as early as possible |
| Vegetables (Tomato, Potato, Cabbage& cauliflower, Cucurbits, Leafy vegetables, green peas and others) | • Proper drainage and removal of excess water from root zone | • Proper drainage and removal of excess water from root zone | • Proper drainage and removal of excess water from root zone | • |
| | | | | |
| **Outbreak of pests and diseases due to unseasonal rains** | | | | |
| Soybean | • Early planting to minimize the incidence of girdle beetle and green semilooper<br>• Foliar spray of Triazophos followed by profenophos for the control of girdle beetle and green semilooper | • Monitor moth activity of spodoptera through pheromone traps (10 traps/ha)<br>• Apply Quinalphos 25EC 2ml/l or Emameetin benzoate 5 SG 4 g/10 lit to control spodoptera | - | Well dry the produce up to 10- 12 % moisture before storage |
| Cotton | Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest | . Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest<br>- To control new wilt, drenching of 1% urea solution | Spray for systemic insecticide – imidacloprid/ thimethoxom/ acetameprid for control of sucking pest | |
| Sorghum | Timely sowing of sorghum to control Shootfly and seed treatment by Thiomethixom 25 WG.<br>Use of carbo furodon granules 3G 8-10kg/ha to control stem borer | Spray of Quinolphos/ trizophos for the control of ear head bug | Use of insecticide as dusting with carbrabryl powder (25kg/ha) to control ear head bug<br>Spaying of Earhead bug, web worm, grain mold | Quick drying to prevent molds |
| Pigeonpea | • Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence.<br>• "T" shaped pegs placed in late | • Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. | • Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. | - |

| | | | | |
|---|---|---|---|---|
| | sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 kg /ha with duster. | • T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyl Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Endosulphan 4% 15-20 kg or Quinolphas 1.5 WP 20-25 kg/ha with duster. | • Carry out critical survey of fields for insect and disease attack in crops | |
| Wheat | Spray 0.1% Hexaconezol against wheat rust. | Spray 0.1% Hexaconezol against wheat rust. | Spray 0.1% Hexaconezol against wheat rust. | Well dry the produce up to 10- 12 % moisture before storage |
| Gram | Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyle Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Quinolphos 1.5 WP 20-25 per hectare with duster | Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. · "T" shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinolphos 25 EC or Chlorpyriphos 20 EC C or Methyle Parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Felvunerate 0.4% or Quinolphos 1.5 WP 20-25 per hectare with duster | Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence.<br><br>Carry out critical survey of fields for insect and disease attack in crops | Well dry the produce up to 10- 12 % moisture before storage<br><br>Store in well ventilated temporary structures before marketing |

| | | | | |
|---|---|---|---|---|
| **Horticulture** | | | | |
| **Fruits (Mango, Guava, Sapota, Pomegranate, papaya etc.)** | Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper<br>Drench the seedlings with COC 0.3% against root rot | Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper | Spray Dithane M-45 3 g/l or carbendazim 1 g/l against anthracnose<br>spray sulphur 0.5% to control powdery mildew | Maintain aeration in storage to prevent fungal infection and blackening of fruits |
| **Vegetables – Chilli, Onion, Colecassia** | Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper | Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper | Spray imidacloprid 0.3 ml or dimethoate 1 ml/l to control leaf hopper | Maintain aeration in storage to prevent fungal infection and blackening of fruits |

**2.3 Floods** – Not Occurs

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

| **Extreme event type** | **Suggested contingency measure** | | | |
|---|---|---|---|---|
| | **Seedling / nursery stage** | **Vegetative stage** | **Reproductive stage** | **At harvest** |
| **Heat Wave** | | | | |
| Wheat | Light irrigation<br>Provision of Wind breaks | Light irrigation | Light irrigation | Harvest at physiological maturity |
| Chickpea | -do- | -do- | -do- | -do- |
| **Horticulture** | | | | |
| Fruits | -Protect the seedlings by providing the shed<br>-Arrangement of wind breaks | -Bordeaux paste to exposed bark .branches of the tree to protect from Sun scorching<br>- Mulching arrund the base of trunk of the tree | -Bordeaux paste to exposed bark .<br>branches of the tree to protect from<br>Sun scorching<br>-Mulching arrund the base of trunk of the tree | Harvesting of crop as early as possible and marketed or keep in cold store<br>-Store the produce in shed or safe place. |
| Vegetables | -Protect the seedlings by providing the shed<br>-Arrangement of wind breaks | Light irrigation at night hours | Application of N-fertilizers | Harvest and marketed as early as possible |
| **Cold wave** | | | | |
| Chick pea | Light irrigation<br>Smoking during night | Light irrigation<br>Smoking during night | Light irrigation<br>Smoking during night | Harvest at physiological maturity |
| wheat | -do- | -do- | -do- | -do- |

| | | | | |
|---|---|---|---|---|
| **Horticulture** | | | | |
| Fruits | -Protect the seedlings by providing the shed net | -Bordeaux paste to exposed bark branches of the tree to protect from Sun scorching<br>- Mulching around the base of trunk of the tree | -Bordeaux paste to exposed bark .<br>branches of the tree to protect from Sun scorching<br>-Mulching around the base of trunk of the tree | Harvesting of crop as early as possible and marketed or keep in cold store<br>-Store the produce in shed or safe place |
| Vegetables | -Protect the seedlings by providing the shed net | Light irrigation morning / evening time | Application of N-fertilizers | Harvest and marketed as early as possible |
| **Frost** | | | | |
| Wheat | -do- | -do- | -do- | Harvest at physiological maturity |
| Chick pea | -do- | -do- | -do- | -do- |
| **Horticulture** | | | | |
| Fruits | Light irrigation<br>Smoking during night | Light irrigation<br>Smoking during night | Light irrigation<br>Smoking during night | Harvesting of crop as early as possible and marketed or keep in cold store<br>-Store the produce in shed or safe place. |
| Vegetables | -do- | -do- | -do- | Harvest and marketed as early as possible |
| **Hailstorm** | | | | |
| Wheat | - | - | Protect the crop from rodents attack | Keep the produce in protected area preferably under the roof |
| Chick pea | - | - | -do- | -do- |
| **Horticulture** | | | | -do- |
| Fruits | Provide the shed | - | - | -do- |
| Vegetables | -do- | - | - | -do- |
| **Cyclone : Not occur in the district** | | | | |
| **Horticulture** | | | | |
| (specify) | | | | |

[k] Such as drainage in black soils, indicate taking up need based inter-culture operations, outbreak of pests/diseases along with their management etc.

[l] Such as drainage in black soils, application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruiting and indicate possibility of pest/disease outbreak with need based prophylactic / curative management etc.

[m] Such as drainage in black soils, measures for preventing seed germination etc and Indicate possibility of harvesting at physiological maturity immediately and shifting produce to safer place and protection against pest/disease damage in storage etc.

[n] Such as shifting of produce to safer place for drying and maintaining the quality of grain/fodder and protection against pest/disease damage in storage etc

**2.2.5 Contingent strategies for Livestock, Poultry & Fisheries**

**2.5.1 Livestock**

| **Drought** | **Suggested contingency measures** | | |
|---|---|---|---|
| | **Before the event** | **During the event** | **After the event** |
| Feed and fodder availability | • Adoption of fodder bank ,<br>• Use of surplus fodder for silage ,<br>• Urea treatment: 4kg Urea 75 litter of water 100 kg fodder.<br>• Insurance | • Use of reserve fodder<br>• Use of stored silage<br>• Balance ration<br>• Use of chaffed fodder<br>• Transportation of fodder from adjoining districts if excess there<br>• Use unconventional feeds as a source of roughage,<br>• use urea treated roughage,<br>• use urea molasses block as a source of nitrogen and energy.<br>• Use low quality processed with mild acid and alkali treatment. | • Feeding green feed/ fodder and conventional feed.<br>• Regularly sprinkling of water on live stock body.<br>• Use of wet *bhusa*.<br>• Availing the insurance.<br>• Separation of unproductive livestock. . |
| Drinking water | • Provision of hygienic supply of water .<br>• Storage of water in the tank for drinking<br>• Excavations of bore wells . | • Judicious use of stored water .<br>• Use of potassium permanganate 1ppm ,<br>• Heat treatment of Water before use. | • Ensure the cleanlinell of drinking water<br>• Water treated with quick lime |
| Health and disease management | • Deworming ,<br>• Regular vaccination of HS , BQ and FMD<br>• Provision of mineral mixture | • Treatment of sick animal through camp.<br>• Isolation of sick animals<br>. | • Culling of sick animal<br>• Vaccination & deworming |
| Drinking water | Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps | Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps | Arrange clean and potable water supply for all the cattle camps in accordance with the total number of cattle admitted in these camps |
| Health and disease management | Vaccination should be done well in advance. The hygiene should be given top priority | Keep animals under shade to the extent possible. The hygiene should be given top priority | Keep animals under shade to the extent possible. The hygiene should be given top priority |
| **Cyclone** Not Occurs | - | - | - |
| **Heat wave and cold wave** | - | - | - |
| **Cold wave** | | | |
| Shelter/environment management | • House of animal should be N-S direction<br>• Plan of proper housing ,<br>• Collection of waste gunny bags for shelter | • Availability of full sun rays in animal shed, keep animal body warm<br>• Use of gunny bags to cover the windows during night hours | • Adopt curative measures to obtain the milk production level<br>• Keep environment uniformly to recover animal |

| | | | |
|---|---|---|---|
| Health and disease management | • Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event<br>• Storage for balanced ration | • Treatment of sick animals<br>• Balanced ration<br>• Use of warm water<br>• Inhalation of *Eucalyptus* water | Vaccination & deworming<br>Culling of sick animals |
| **Heat wave** | | | |
| Shelter/environment management | • Provision of proper shade<br>• Provision of trees<br>• Reflector paints over roof, two times bathing of animals. | • Provision of cold water<br>• Keep environment uniformly to recover animal | • Vaccination & deworming |
| Health and disease management | • Ensure storage of antibiotics, B-complex, liver tonic, anti-inflammatory drugs, anti-stress drugs, vaccines etc for the event<br>• -Use suitable drugs depending on condition. | Vaccination & deworming | |

based on forewarning wherever available.

**2.5.2 Poultry**

| | **Suggested contingency measure** | | |
|---|---|---|---|
| | **Before the event[s]** | **During the event** | **After the event** |
| **Drought** | | | |
| **Drought** | Insurance of birds | Keep watch on mortality and adopt measures | Materialized the benefit of insurance |
| Shortage of feed ingredients | -Storage of food ingredients | Mineral mixture feeding, use unconven-tional feed in feeding of poultry ration, use animal protein source like fish meal, silk worm pupa, blood meal by products of slaughter house etc, ration should be made from locally available feed ingredients. | Feeding high quality balance fee |
| Drinking water | -Storage of Sanitized drinking water | Judicious use of stored water | Fresh drinking water |
| Health and disease management | • Deworming<br>• Vaccination<br>• Deticking of shed<br>• Provision of rapid growing strain | Use of high weight gain breeding stock<br>Treatment of sick birds | Vaccination and deworming<br>Culling of sick birds |

**2.5.3 Fisheries**

| | Suggested contingency measures | | |
|---|---|---|---|
| | **Before the event** | **During the event** | **After the event** |
| **1) Drought** | | | |
| **A.** Capture | NA | | |
| Marine | NA | - | - |
| Inland | NA | | |
| (i) Shallow water depth due to insufficient rains/inflow | • All the fish should be marketed<br>• Shifting of small sized fishes to i small storage water bodies such as Plastic or cemented structures | • Harvesting of fish<br>• Shifting of small sized fishes to in small storage water bodies such as Plastic or cemented structures<br>• Provision of net-shed over the tank<br>• Dry ponds should be treated with lime | • - Safe disposal of first event of runoff for storage of only clean water<br>• Waste ware should be protected by net for stay of fishes in the tank.<br>• After onset of monsoon and ponds fill with water seedling the fish seed |
| (ii Impact of heat and salt load build up in ponds / change in water quality | Apply the lime to neutralize the concentrated water | Apply the lime to neutralize the concentrated water | • Safe disposal of first event of runoff for storage of only clean water<br>• Waste ware should be protected by net for stay of fishes in the tank.<br>• After onset of monsoon and ponds fill with water seedling the fish seed |
| **B. Aquaculture** | | | |
| (i) Shallow water in ponds due to insufficient rains/inflow | - | Aeration | Rain Gun (Oxygen) |
| (ii) Impact of salt load build up in ponds / change in water quality | - | - | - |
| **2) Floods** | | | |
| NA | | | |
| **B. Aquaculture** | | | |
| (i) Inundation with flood water | Keeps net in waste weir of ponds | Protect the fish to flow with runoff water | |
| (ii) Water contamination and changes in water quality | Lime treatment should be done. | Lime treatment and $KMnO_4$ treatment 2 ppm | No seedling of new fish seed |
| (iii) Health and diseases | -do- | -do- | -do- |
| (iv) Loss of stock and inputs (feed, chemicals etc) | Manufactured feed should be given in ponds | Manufactured feed should be given in ponds | Natural feed should be available in ponds |
| (v) Infrastructure damage (pumps, aerators, huts etc) | Dust and debris should be clean in west wear. | Continuous Dust and debris cleans in west wear. | - |

| | | | |
|---|---|---|---|
| **3. Cyclone / Tsunami : No any possibilities of event in the district** | | | |
| NA | - | - | - |
| **4. Heat wave and cold wave** | | | |
| **A.** Capture | | | |
| Marine | - | - | - |
| Inland | Net-shed | - | - |
| **B**. Aquaculture | | | |
| (i) Changes in pond environment (water quality) | Showering of water by pump for proper $O_2$ in water | Showering of water by pump for proper $O_2$ in water | - |
| (ii) Health and Disease management | $KMnO_4$ treatment 2 ppm | $KMnO_4$ treatment 2 ppm | - |