**AGRICULTURE CONTINGENCY PLAN FOR DISTRICT: IMPHAL WEST**
**STATE: MANIPUR**
KVK, IMPHAL WEST DISTRICT, ICAR RESEARCH COMPLEX FOR NEH REGION
LAMPHELPAT, IMPHAL, 795004
**18th June, 2013**
**ICAR Research Complex for NEH Region**
**Umroi Road, Umiam, Meghalaya**

| **1.0 District Agriculture profile** | | | | |
|---|---|---|---|---|
| | **Agro climatic /ecological zone** | | | |
| | Agro Ecological Sub Region (ICAR) | North-Eastern Hills (Purvachal), Warm Perhumid Eco-sub region (17.2) | | |
| | Agro-climatic Region (Planning Commission) | Eastern Himalayan Region (II) | | |
| | Agro Climatic Zone (NARP) | Sub-Tropical Zone (NEH-4) | | |
| | List all the districts or part thereof falling under the NARP Zone | Imphal West, Imphal East, Thoubal, Bishnupur and foothills of Senapati | | |
| | Geographic coordinates of district | Latitude | Longitude | Altitude |
| | | 24 $^{0}$ 45' N | 93 $^{0}$ 54' E, | 775 msl |
| | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS | ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat-795 004 | | |
| | Mention the KVK located in the district | Imphal West District , Manipur | | |

| 1.2 | **Rainfall** | **Normal rainfall (mm)** | **Normal rainy days (nos.)** | **Normal onset** | **Normal cessation** |
|---|---|---|---|---|---|
| | Pre monsoon | 830.2 | 55 | 1st week of April | |
| | SW monsoon (June-Sep) | | | 1st week of June | - |
| | NE Monsoon (Oct-Dec) | 200.8 | 15 | - | - |
| | Winter (Jan-March) | 122.4 | 9 | - | - |
| | Summer (Apr-May) | 316.3 | 21 | - | - |
| | Annual | 1469.7 | 100 | - | - |

| 1.3 | Land use pattern of the district (latest statistics) | Geograp hical area | Cultiva ble area | Forest area | Land under agril. use | Permanen t pastures | Cultivable waste land | Land under Misc tree crops and groves | Barren and uncultivab le land | Current fallows | Other fallows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area (000' ha) | 51.9 | 21.23 | 2.13 | 28.25 | - | 0.24 | - | 0.22 | 0.14 | - |

| 1.4 | Major Soils (common names like shallow red soils etc.) | Area ('000 ha) | Per cent of total |
|---|---|---|---|
| | Alluvial soils | - | - |
| | Black soils | - | - |
| **1.5** | **Agricultural land use** | **Area ('000 ha)** | **Cropping intensity %** |
| | Net sown area | 21.24 (21236.40 ha) | 132.99 |
| | Area under more than once | 7.01 | |
| | Gross cropped area | 28.24 | |

| 1.6 | Irrigation | Area ('000 ha) | Percent (%) | |
|---|---|---|---|---|
| | Net irrigated area | 2.73 | 12.85 | |
| | Gross irrigated area | 3.15 | 14.83 | |
| | Rainfed area | 25.51 | - | |
| | **Sources of Irrigation** | **Number** | **Area (000' ha)** | **% area** |
| | Canal | - | 2.03 | 74.36 |
| | Tanks | | | |
| | Open wells | | | |
| | Bore wells | | | |

| | | | | |
|---|---|---|---|---|
| | Lift irrigation | | 0.70 | 25.64 |
| | Micro-irrigation | | | |
| | Other sources | | | |
| | Total Irrigated Area | 2.73 | | |
| | Pump sets | 685 | | |
| | No. of Tractors | 249 | | |
| | **Ground water availability and use** | **No of blocks** | **% area** | **Quality of water** |
| | Over exploited | | | |
| | Critical | | | |
| | Semi-critical | | | |
| | Safe | | | |
| | Ground water quality | | | |
| | Wastewater availability and use | | | |

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

| 1.7 | Major Field Crops cultivated | Area ('000 ha)* | | | | | |
|---|---|---|---|---|---|---|---|
| | | Kharif | | Rabi | | Summer | Total |
| | | Irrigated | Rainfed | Irrigated | Rainfed | | |
| | Rice | 8.97 | 13.57 | - | - | - | 22.54 |
| | Pea | | | 0.09 | 020 | - | 0.29 |
| | Potato | | | 0.25 | | - | 0.25 |
| | Rapeseed-mustard | - | - | 0.10 | 0.54 | - | 0.64 |
| | Maize | - | 0.10 | - | - | - | 0.10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Other | | | | | 1.63 | 1.63 |

| 1.7 | **Horticulture crops-Fruits** | **Total area ('000 ha)*** | **Irrigated *** | **Rainfed *** |
|---|---|---|---|---|
| | Pineapple | 0.5 | | |
| | Banana | 0.53 | | |
| | Passion fruit | 0.09 | | |
| | Lime/lemon | 0.08 | | |
| | Mango | 0.48 | | |
| | Other crops | 0.74 | | |

*For Horticulture crops, only total area need to be given

| 1.7 | **Horticultural crops -Vegetables** | **Total area ('000 ha) (2008-09)** | **Irrigated ('000 ha)** | **Rainfed** |
|---|---|---|---|---|
| | Cauliflower ; Variety: Snow Crown, White Flash, White Shot, Sweta | 0.30 | 0.30 | |
| | Cabbage; Variety: Green Hero, Rare Ball, Wonder Ball, Green Express | 0.35 | 0.35 | |
| | Tomato; Variety: rc Mani khamenasinba-1, Hybrids from private seed company | 0.15 | 0.15 | |
| | Onion Variety: Nasik Red, Prema, Local (Small) | 0.1 | 0.1 | |
| | Other | 0.29 | 0.20 | 0.09 |

| **1.7** | **Flowers** | **Total area** | **Irrigated** | **Rainfed** |
|---|---|---|---|---|
| **1.7** | **Medicinal and Aromatic crops** | **-** | **-** | **-** |
| **1.7** | **Spice & Plantation crops (000' ha)** | **1.26** | | |

| 1.7 | **Fodder crops** | **Total area (‘000 ha)** | **Irrigated** | **Rainfed** |
|---|---|---|---|---|
| | Sericulture etc | 0.10 | | 0.10 |
| | Others (specify) | | | |

| 1.8 | **Livestock** | **Male (‘000)** | **Female (‘000)** | **Total (‘000)** |
|---|---|---|---|---|
| | Non descriptive Cattle (local low yielding) | 27.08 | 16.64 | 43.72 |
| | Crossbred cattle | 2.8 | 7.52 | 10.41 |
| | Non descriptive Buffaloes (local low yielding) | 1.02 | 0.93 | 1.95 |
| | Graded Buffaloes | NA | NA | NA |
| | Goat | 1.08 | 1.50 | 2.58 |
| | Sheep | 0.57 | 0.54 | 1.11 |
| | Others ( Pig) | 4.37 | 6.12 | 10.49 |
| | Commercial dairy farms (number) | - | - | - |

| 1.9 | **Poultry** | **No. of farm (‘000)** | **Total No. of birds** |
|---|---|---|---|
| | Commercial | | 171.49 |
| | Backyard | | 211.51 |

| 1.10 | **Fisheries (**Data source : Chief Planning Officer) |
|---|---|
| | A. Capture |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **i) Marine** (Data source: Fisheries Department) – Not available | **No. of fishermen** | **Boats** | | **Nets** | | **Storage facilities (Ice plants etc)** |
| | | | Mechanized | Non-mechanized | Mechanized (Trawl nets, Gill nets) | Non-mechanized (Shore Seines, Stake& trap nets) | |
| | | | | | | | |
| | **ii) Inland** (Data source: Fisheries Department) | No. of farmer owned ponds | | No. of reservoirs | | No. of village tanks | |
| | | C 4500 | | 1no. (Singda Dam) | | C-70 | |

| | **B. Culture** | | | |
|---|---|---|---|---|
| | | **Water Spread Area (ha)** | **Yield (t/ha)** | **Production (‘000 tons)** |
| | **i) Brackish water** (Data source: MPEDA/ Fisheries Dept) | - | - | - |
| | **ii) Fresh water** (Data source: Fisheries Dept) | 1355.6 | 2.5 | 3.39 |
| | Others | - | - | - |

**1.11 Production and productivity of major crops**

| **1.11** | **Name of the crop** | **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) |
| | Major Field crops | | | | | | | | |
| | Rice | 57.5 | 3045.53 | - | - | - | - | 57.5 | 3045.53 |
| | Rapeseed- | - | - | 0.51 | 800.0 | - | - | 0.5 | 800.0 |

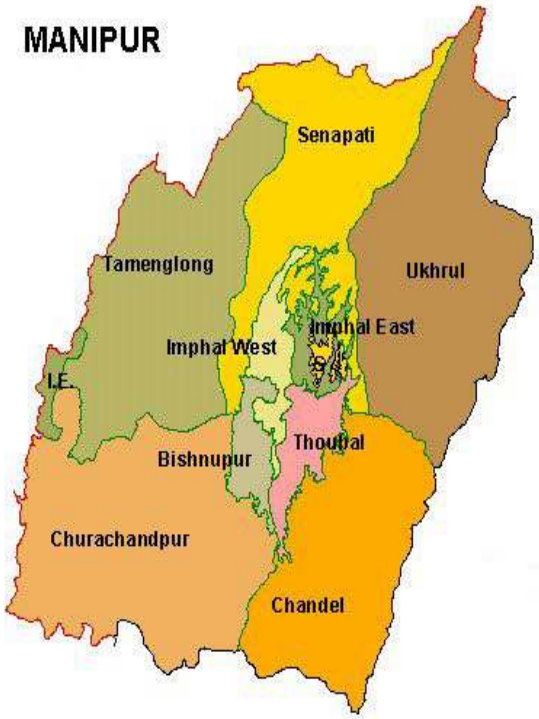
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | mustard | | | | | | | | |
| | Pea | - | - | 1.61 | 1900 | - | - | 1.6 | 1900.0 |
| | Cabbage | - | - | 6.19 | 11050 | - | - | 3.6 | 3115.2 |
| | Cauliflower | - | - | 3.59 | 9960 | - | - | 2.3 | 2247.5 |
| | Potato | - | - | 2.04 | 8160 | - | - | 2.0 | 8160 |
| | Chilli | 8.49 | 7510 | - | - | - | - | 8.4 | 7510 |
| | Banana | 8.79 | 12930 | - | - | - | - | 8.7 | 12930 |
| | Tomato | 2.59 | 12639 | - | - | - | - | - | - |
| | Others | - | - | - | - | 5.91 | 10622 | 5.9 | 10622 |

| **1.12** | **Sowing window for 5 major crops (start and end of sowing period)** | **Rice** | **Maize** | **Pea** | **Mustard** | **Cabbage** | **Cauliflower** |
|---|---|---|---|---|---|---|---|
| | Kharif –Rainfed | June to July | June to July | - | - | - | July –Sep (off season) |
| | Kharif- Irrigated | June to July | | - | - | - | - |
| | Rabi- Rainfed | - | | October-November | October-November | October-November | October-November |
| | Rabi-Irrigated | - | | - | October | November | October-November |

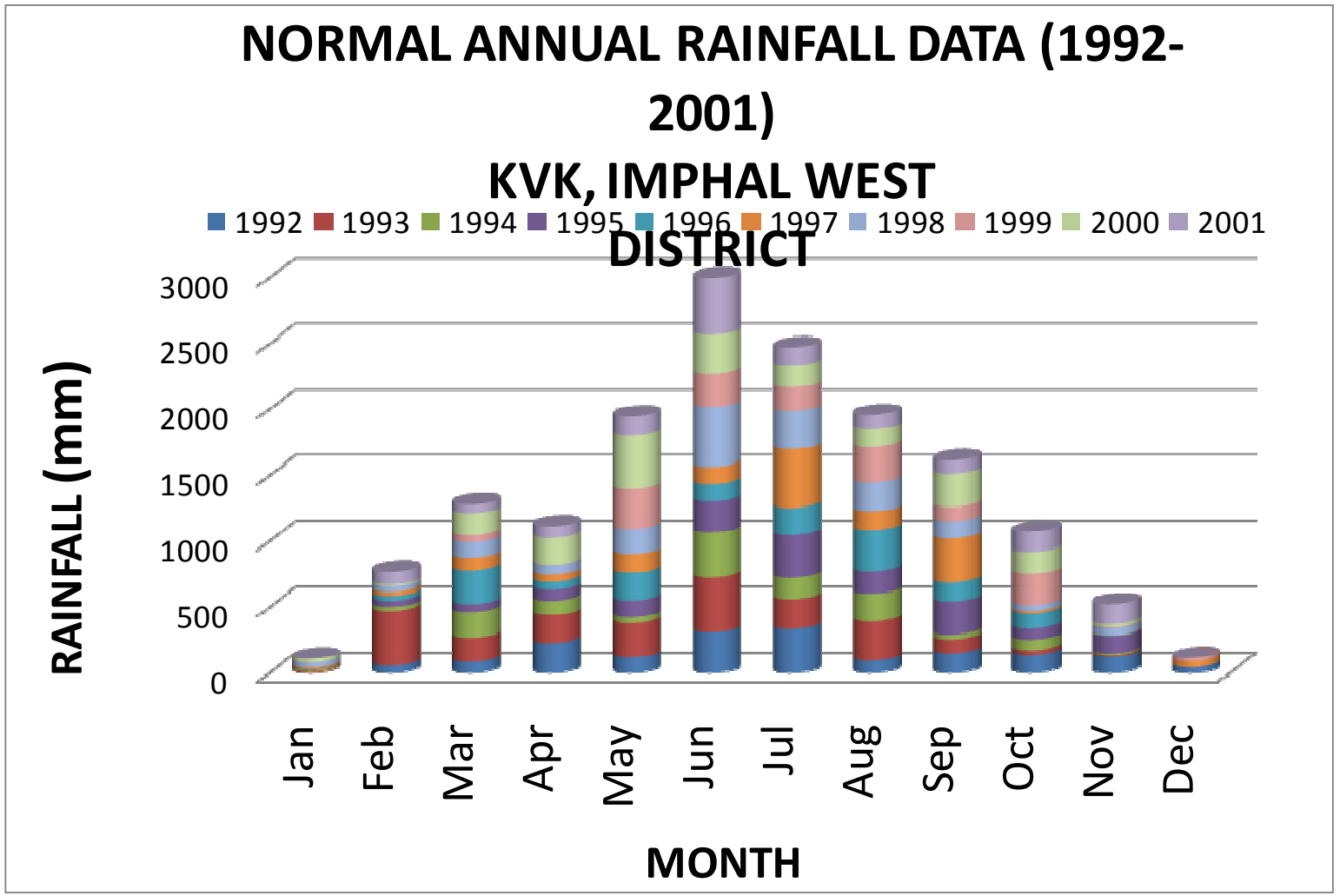
| 1.13 | **What is the major contingency the district is prone to? (Tick mark)*** | **Regular** | **Occasional** | **None** |
|---|---|---|---|---|
| | Drought | | √ | |
| | Flood | √ | | |
| | Cyclone | | | √ |
| | Hail storm | | √ | |
| | Heat wave | | | √ |
| | Cold wave | | √ | |
| | Frost | √ | | |
| | Sea water intrusion | | | √ |
| | Pests and diseases others(specify) | √ | | |
| | Rice | Blast, Stem borer, gall midge, case worm | Hopper | |
| | Potato | Late/early blight, rust | Scab | |
| | Tomato | Blight, fruit Borer, bacterial wilt | Leaf Curl | |

| 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 II | Enclosed: Yes |
| | | Soil map as Annexure III | Enclosed: Yes |

**Annexure I**


MANIPUR
Senapati
Tamenglong
Ukhrul
Imphal East
Imphal West
I.E.
Thoubal
Bishnupur
Churachandpur
Chandel

**Annexure II**


NORMAL ANNUAL RAINFALL DATA (1992-2001)
KVK, IMPHAL WEST
DISTRICT
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
RAINFALL (mm)
3000
2500
2000
1500
1000
500
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
MONTH

**Annexure III**

**SOIL MAP OF IMPHAL WEST**

**2.0 Strategies for weather related contingencies**

**2.1 Drought – Pre- monsoon (Last week of March to First week of April) Normal**

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Normal Crop / Cropping system** | **Change in crop / cropping system including variety** | **Agronomic measures** | **Remarks on Implementation** |
| Delay **by 2 weeks** **(2nd to 3rd week of April)** | Gently slopping valley plains. Deep fine soils. | **Pre kharif rice** *Short duration var. RC Maniphou-4/5/12* | No change | Apply FYM to nurseries and prefer to plan near pond or river Adopt Dapog method | - |
| | | **Turmeric** *Var. Megha turmeric & Lakadong, local* | No change | Sowing on ridge and furrow & Mulching | |
| | | **Ginger** *Var. Nadia, Thinglaidum, Thingria & Thingpui* | No change | | |
| | | **Sponge gourd** *Var. Utsav and local* | No change | | |
| | | **Cucumber** *Sedona, chiatai-380, Alangir, CT-280* | No change | | |
| | | **Bhindi** *Tulsi, Arka Anamika, US-205* | No change | Sowing in lines | |
| | Moderately slopping, side slope of hills-deep fine silting soils | **Pre-kharif Rice** var. RC Maniphou-6/SARS-1/2/5/6 & Bhalum-III | No change | Adopt line sowing in direct seeding method | |
| | | **Pre-kharif maize** *Var. Pusa composite-3, Vijay composite & VL-9* | No change | Contour bunding and line sowing across the slope<br><br>Intercropping with soybean /Ground nut. Mulching is required just immediately after sowing | |
| | | **Ginger** *Var. Nadia, Thinglaidum, Thingria, Thingpui & local* | No change | Sowing in ridge and furrow / Mulching | |

| | | | | | |
|---|---|---|---|---|---|
| | | **Turmeric**<br>Var. Megha Turmeric, Lakadong, local | No change | Sowing in ridge and furrow / Mulching | |

**2.1.2 Rainfed situation – South west monsoon - normal (1st week of June)**

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Normal Crop / Cropping system** | **Change in crop / cropping system including variety** | **Agronomic measures** | **Remarks on Implementation** |
| Delay by 2 weeks<br><br>June 3rd week | Gently slopping valley plains. Deep fine soils. | **Main kharif Rice**<br>*Var. RC Maniphou-7/10/11 & IET-16313* | **No change** | Adopt SRI method , (Land should be leveled)<br><br>Nursery should be prepared near pond or river | |
| | | **Cauliflower**<br>*Var. White Shot, Early Himlata* | **No change** | Line sowing, seed bed should be protected from direct sunlight | |
| | | **Tomato :**<br>*Var. Suraksha, Manikhamenasinba-1, Maharaja-3004, Amitabh-004* | **No change** | | |
| | | **Chilli**<br>*Local (75 days) and hybrid Barnali, KingChilli* | **No change** | Planting when seedling is 6-8 weeks old | |
| | Moderately slopping, side slope of hills-deep fine silting soils | **Main kharif rice**<br>*Var. RC Maniphou-6/10/7/11& IET-16313* | **No change** | Adopt SRI/ICM/Improved methods<br>Direct seeded rice | |
| | | **Maize**<br>*Vijay composite /P. composite-3/HQPM/VL-9* | Intercropping with soybean/Black gram/Green gram /Groundnut. | Ridge and furrow method of sowing | |
| | | **Ginger**<br>*Var. Nadia, local* | No change | Mulching and top dressing | |
| | | **Turmeric**<br>*Var. Megha Turmeric, Lakadong, local* | No change | | |
| | | **Onion (Multiplier)** | No change | Line sowing and mulching | |

| | | | | | |
|---|---|---|---|---|---|
| | | **French bean**<br>***Aanupam,( Devgiri)*** | No change | Sowing in ridge and furrow , mulching with dried biomass & application of FYM | |
| | | **Ash gourd**<br>*Var. Local* | No change | Sowing in pits, incorporated with FYM.<br><br>Mulching with dried biomass | |
| | | **Bitter gourd**<br>**Agriseed US-205** | - | - | |

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Early season drought (delayed onset)** | **Major Farming situation** | **Normal Crop / Cropping system** | **Change in crop / cropping system[c] including variety** | **Agronomic measures** | **Remarks on Implementation** |
| Delay by 4 weeks<br><br>July 1st week | Gently slopping valley plains. Deep fine soils. | **Main kharif Rice**<br>*Var. RC Maniphou-7/10/6 & IET - 16313* | No change | Transplanting at 4th week of July<br><br>SRI transplanting at 2nd week of june /ICM | |
| | | **Black gram/Green gram/potato**<br>*Var. T-9/SG-1/SG-21-5/T-122* | No change | Broadcasting or line sowing based on crop requirement | |
| | | **Brinjal / Chilli**<br>*Var. Local and Hybrid Silpa, Saya, Pusa Purple long* | No change | Intercultural operation | |
| | | **Capsicum**<br>*Thaiwonder, California* | No change | Planting in protected condition | |
| | | **Early Cauliflower**<br>Var. Himlata, Sweta, White Gems | No change | Line sowing, seed bed should be protected from direct sunlight | |
| | | **Cabbage**<br>*Var. Wonder Ball, Green Hero, Green Express, Rare Ball* | No change | | |
| | | **Cowpea** *: Var. Pusa Komal , Rainy Royal* | | Mulching with dry Biomass and application of FYM | |

| | | | | | |
|---|---|---|---|---|---|
| | Moderately slopping, side slope of hills-deep fine silting soils | **Main kharif Rice** *Var. RC Maniphou-7/10/6* | No change | 1. Direct seeding<br>2. SRI transplanting at 2nd week/ICM | |
| | | **Black gram** *Var. T-9*<br>**Red gram** *Var. ICPL-86/HY-10*<br>**Cowpea** *: Var. Pusa Komal , Rainy Royal* | **Black gram**: Broadcasting or line sowing<br>**Red gram**: Sowing immediately by dibbling method<br>**Cowpea** *:* sowing and mulching with FYM and Biomass | | |
| | | **Soybean** *Var. JS-335/MAUS-71* | Sowing till 1st week of July<br>**Soybean** (*Var.* JS-335, MAUS-71, JS-9560) | - | |
| | | **Chilli**<br>*Var. Local and Hybrid Branali* | No change | Intercultural operation | |
| | | **Cabbage**<br>*Var. Wonder Ball, Green Hero, Green Express* | No change | Line sowing, seed bed should be protected from direct sunlight | |
| | | **Ash gourd** - *Var. local* | No change | Sowing in pits, addition of FYM and mulching | |
| | | **Chow- Chow**<br>*Var.* Local var**.** *White, Green Ovale, Green Round* | No change | | |
| Delay by 6 weeks<br>July 3rd week | Not applicable | | | | |
| Delay by 8 weeks<br>August 1st week | | | | | |

**Pre monsoon- Normal**

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| **Early season drought (Normal onset)** | **Major Farming situation** | **Normal Crop/cropping system** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementation** |
| **Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.** | Gently sloping valley plains. Deep fine soils. | **Soybean** (*Var.* JS-335, MAUS-71, JS-9560) **/** **Blackgram (*Var.* T-9)/** **Red Gram (***Var.* ICPL-87, HY-10**)** | i. If there is poor germination (Less than 30%) re-sowing<br>ii. Gap filling<br>iii. lifesaving irrigation if possible | *In-situ* moisture conservation,<br>Mulching with locally available dried grass and lifesaving irrigation if possible<br>Mulching with uprooted weeds<br>Incorporate the plant parts after harvest | |
| | | **Turmeric ,** *Var.* Megha Turmeric<br>**Ginger ,** var.Nadia | - | Mulching | |
| | | **Sponge gourd** *Var.Utsav* | Gap filling and staking | Application of FYM and mulching the pits | |
| | Moderately slopping, side slope of hills-deep fine silting soils | **Soybean (***Var.* JS-335**,** Pusa-16, MACS-13**) /** **Blackgram(***Var.* **T-9,** UG-310, TAU-1) | If there is poor germination (Less than 30%) re-sowing<br>Gap filling | *In-situ* moisture conservation.<br>Mulching with locally available biomass and lifesaving irrigation if possible | |
| | | **Maize** *Var. Vijay composite /P. composite-3/HQPM* | i. If there is poor germination (Less than 30%) re-sowing<br>ii. Gap filling | | |
| | | **Ginger var.** *Var.* Nadia | - | Mulching | |
| | | **Turmeric** *Var.* Megha Turmeric | - | | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Normal Crop/cropping system** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementation** |
| **Mid-season drought (Long dry spell consecutive 2 weeks rainless (>2.5 mm period)** | Gently sloping valley plains. Deep fine soils. | **Rice** (Var.RC Maniphou-6 & 7)<br>**Maize** (Var.VL-9)<br>**Pulse (**Red gram var. ICAPL-87, HY-10)<br>**Vegetables (**Okra Var. Arka Anamika, Prabhani Kranti) | Lifesaving irrigation if possible<br><br>Weeding | Foliar spray of 2% Urea in rice Top dressing (or foliar application with 2% Potash)<br><br>Mulching in vegetables.<br><br>Use FYM @ 5 t/ha.<br><br>Intercropping | |
| **Vegetative stage** | Moderately slopping, side slope of hills-deep fine silting soils | **Rice** (Var.RC Maniphou-6 & 7)<br>**Maize** (Var.VL-9)<br>**Pulse (**Red gram var. ICAPL-87, HY-10)<br>**Vegetables (**Okra Var. Arka Anamika, Prabhani Kranti) | Lifesaving irrigation if possible<br><br>Weeding/ intercultural operations etc. | Foliar spray of 2% Urea in rice<br><br>Top dressing (or foliar application with 2% Potash)<br><br>Mulching<br><br>Use FYM @ 5 t/ha. | |
| | | **Ginger** (Var. Nadia, Local) | Weeding and earthing up | Mulching | |
| | | **Turmeric** (Var. Megha turmeric, Lakadong, Local) | | | |

| Condition | | | Suggested Contingency measures | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Normal Crop/cropping system** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementation** |
| **Mid season drought (Long dry spell consecutive 2 weeks rainless long dry )** | Gently sloping valley plains. Deep fine soils. | **Rice** (Var.RC Maniphou-6)<br>**Maize** (Var.VL-9)<br>**Pulse (***Var.* HY-10)<br>**Vegetables (***Var.* Okra Var. Arka Anamika, Prabhani Kranti) | i. Weeding/ intercultural operations etc.<br>ii. Lifesaving irrigation<br>iii. Harvesting physiological mature leafy vegetables | Top dressing (or foliar application with 2% Potash)<br>ii.Mulching in pulse and vegetable<br>i. Deep sowing<br>ii. Use FYM @ 5 t/ha. | |

| | | | | | |
|---|---|---|---|---|---|
| **At flowering / fruiting stage** | | | | | |
| | | **Banana(*Var.* Local)/** | - | i. Mulching & conservation in furrows with dried bio- mass<br>ii.Drip irrigation | |
| | Moderately slopping, side slope of hills-deep fine silting soils | **Rice**(Var.RC Maniphou-6)<br>**Maize**(Var.VL-9)<br>**Pulse(**HY-10)<br>**Vegetables (**Okra Var. Arka Anamika, Prabhani Kranti) | Weeding/ intercultural operations etc.<br><br>Lifesaving irrigation<br><br>Harvesting before flowering | Top dressing of 2% Potash<br><br>Mulching in pulse and vegetable<br><br>Use FYM @ 5 t/ha. | |
| | | **Banana (*Var.* Local)/** | - | Mulching for conservation in furrows with dried bio- mass<br><br>Drip irrigation | |
| | | Ginger (Var. Nadia, Local) | Weeding and earthing up | i. Mulching | |
| | | Turmeric (Var. Megha turmeric, Lakadong, Local) | | | |

| **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** |
| | Gently sloping valley plains. Deep fine soils. | **Ginger** (Var. Nadia, Local) | - | Mulching<br><br>Plan for early rabi with vegetables | |
| | | **Turmeric**(Var. Megha turmeric, Lakadong, Local) | - | | |
| | | **Colocasia**(var. Muktakeshi & Local)**/sweet potato**(var. Gouri & Local)**/tapioca(**var. Shriprakash & Local**)** | - | | |
| | Moderately slopping, side slope of hills-deep fine silting soils | **Ginger** (Var. Nadia, Local) | - | | |
| | | **Turmeric**(Var. Megha turmeric, Lakadong, Local) | - | | |

| | | | | | |
|---|---|---|---|---|---|
| | | **Colocasia**(var. Muktakeshi & Local)/**sweet potato**(var. Gouri & Local)/**tapioca(**var. Shriprakash & Local**)** | - | | |

**2.1.2 Drought - Irrigated situation-- not applicable**

| **Condition** | | | **Suggested Contingency measures** | | |
|---|---|---|---|---|---|
| | **Major Farming situation** | **Normal Crop/cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| **Delayed release of water in canals due to low rainfall** | Not applicable | | | | |
| **Limited release of water in canals due to low rainfall** | | | | | |
| **Non release of water in canals under delayed onset of monsoon in catchment** | | | | | |
| **Lack of inflows into tanks due to insufficient /delayed onset of monsoon** | | | | | |
| **Insufficient groundwater recharge due to low rainfall** | | | | | |
| **Insufficient flow of water in streams** | | | | | |

**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** | **Post-harvest** |
| Rice | 1. If the crop is submerged 5-7 days the plant will die so, the flood water should be drained out | 1. The flowering is very critical stage for the crop production if the crop is submerged up to flower part, the pollen grains will | 1. Drain out the excess water<br>2. Harvest the rice where 75% panicles are matured. Water should be drained out 10-15 | 1. Harvest and dry by making bundles to increase grain filling.<br>2. Dry the seed on a concrete |

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| | and maintain 5-8 cm | be washed away and it will lead to chaffy grains, so all the excess water caused by unusual rain should be drained out and maintain the same depth 5-8 cm<br>2. An RC Maniphou variety is preferable. Frequent irrigation should be given to maintain water temperature and enhances vegetative growth. | days before harvesting.<br>3. Drain out water 10 days before harvesting.<br>4. If the temperature is raised, disease and pest population is increased so plant protection measures should be taken up. | floor or frequently turn over the seed until the seeds are dried.<br>3. Harvest when panicle is turned yellow 75-80% matured. Moisture level should be 10-12% and store properly for enhancing germination. Gunny bag storage is preferred and for seed purpose. Store in RC-bin. Can be used for 2 years |
| Soybean | 1. Weeding at 40 days should be done<br>2. Excess water should be drained out since it is moisture sensitive plant | 1. Weeding at 60 days after sowing followed by earthing up | 1. Mulching in between rows for moisture conservation<br>2. Timely harvest when pods turn yellow | 1. Dry the seed 3-4 days with plants and sun dried 2-3 days about 10-12% moisture content<br>2. Threshing the plant and screening the seeds and remove<br>3. Other unwanted debris and sundry. |
| Groundnut | 1. Earthing up in groundnut should be done before flowering<br>2. Proper drainage should be made in and around the field<br>3. Make the field clean by weeding | 1. Drain out the excess water to avoid water logging | 1. All the matured seed should be harvested timely to prevent from germination<br>2. Disease free pods should be harvested | 1. Harvest the crop, spread and sundry for 2-3 days<br>2. Pods should be dried after harvesting dry to 10% moisture. |
| Blackgram | 1. Proper bed should be prepared | 1. Weedicide should not be applied in the black gram at any stage<br>2. Hand weeding is preferred if possible | 1. All the matured seed should be harvested timely to prevent from germination<br>2. Harvesting should be done when crop is 75% mature<br>3. Pods should not be allowed to over mature to avoid shattering | 1. Pods should be harvested, dried and spread in the shed<br>2. Dry the seed on a concrete floor and frequently turn over the seed until the seed are dry<br>3. Pods should be dried after harvesting so that moisture is |

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| | | | | reduced to 10%. |
| Mustard | 1. Thinning should be done<br>2. Apply recommended dose of manure & fertilizers to give higher yield | 1. Apply irrigation at flowering and pod filling stages | 1. Harvested as soon as it mature to avoid over ripening and prevent seed shattering | 1. Proper drying should be done<br>2. After proper drying, seed are stored in dry and cold place |
| Outbreak of pests and diseases due to unseasonal rains | - | | | |

**3 Floods:**

| **Condition** | **Suggested contingency measure** | | | |
|---|---|---|---|---|
| Transient water logging/ partial inundation | **Seedling /nursery stage** | **Vegetative stage** | **Reproductive stage** | **At harvest** |

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| Early Rice | 1. Seed treatment with fungicide before sowing<br>2. Usually all the stagnant water should be drained out and maintain 2-3 cm depth during the seedling stage. | 1. During the vegetative or tillering stage all the stagnant water caused by uncertain floods should be drained out<br>2. The flood water should not be allowed to submerge rice plants more than 5 – 6 days, it may lead to crop damage in flood prone areas | 1. Variety China-1,HYV RC-Maniphou-4 and RC Maniphou-5 may be recommended<br>2. During this stage water should not allow the flower part of rice to be submerged otherwise all the pollen grain will be washed away and it will lead to chaffy grain. | 1. Some local variety China 1 and HYV like RC Maniphou 4, RC Maniphou 5 may be grown in the low laying areas/flood prone areas. These varieties are generally sown as a direct seeded or transplanted in the month of March/April and harvested in the month of July.<br>2. In July flood water submerge the plant up to 52 cm level, the matured panicle should be harvested and leave the rice straw by cutting and by using local boats. |
| **Kharif Rice** | 1. If the nursery sown in the month of June is damaged by flood, it may re-sown in the months of July | 1. During the vegetative or tillering stage all the stagnant water caused by uncertain floods should be drained out.<br>2. The flood water should not be allowed to submerge rice plant 5 – 6 days, so it may lead to crop damage in flood prone areas. | 1. The floating rice/deep water rice variety KD14-7-9 may be grown in the flood prone area<br>2. Variety China-1,HYV RC-Maniphou-4 and RC Maniphou-5 is recommended | 1. The harvested rice should be made into bundles and dried in the protected place and thresh manually as soon as possible before germination.<br>2. Drying under direct sun with frequent over turning to bring down seed moisture level up to 10%. |
| **Cucurbits** | 1. Shift immediately to a safer place, pro-tray nursery is suggested.<br>2. Avoid raising in open nursery field pro-tray is | 1. Bunds or drainage facility is made before rainy season.<br>2. Low cost poly house is preferred, time of transplanting is changed either before or after flood by using low tunnel system | 1. Rain shelter and bunds are helpful.<br>2. Sufficient drainage system should be provided, rain shelter facility is also suggested | 1. Mature ones and low quality crops should be harvested<br>2. Separate ripe and unripe fruit, drying in well ventilated room and zero energy cool chamber for a week for marketing |

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| | suggested for nursery raising | | | |
| **Solanaceae** | 1. Plant in raised beds | 1. Drainage is a must, caterpillar is active in this stage, powdery mildew is increased.<br>2. Prophylactic plant protection measures is taken up | 1. Give staking<br>2. Harvest the crop even if the fruits are not fully mature in case of tomato.<br>3. Harvest the crop even though the tubers are not fully developed. | 1. Mature ones are harvested for sale |
| **Leguminosae** | 1. Cannot germinate in such condition | 1. If plant reaches up to 6 nodes they cannot thrive for about a week, therefore use any means to drain out water from the field | 1. Mature pods are harvested and immature ones are still in the plants.<br>2. Necessary measures should be taken up for draining out water from the areas. | 1. Mature ones are harvested for sale .No pods can be harvested for seed |

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

| **Extreme event type** | **Suggested contingency measure** | | | |
|---|---|---|---|---|
| **Heat wave/ Cold wave/ Frost / Hailstorm / Cyclone** | **Seedling /nursery stage** | **Vegetative stage** | **Reproductive stage** | **At harvest** |
| Early kharif Rice | Usually nurseries are raised in Feb. - March.<br>During this month, soil temperature is low.<br>Apply FYM @ 1 ton in 700 $m^2$ and add sufficient plant residues to increase soil temperature for proper germination and seedling growth, water level should be maintained 2-3 cm | - | - | - |

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

**2.5.2 Livestock**

| | Suggested contingency measures | | |
|---|---|---|---|
| | **Before the event[s]** | **During the event** | **After the event** |
| **Drought/ Lean period (Oct-March)** | | | |
| Feed and fodder availability | Encourage perennial fodder on bunds and waste land on community basis<br>Establishing fodder banks, encouraging hedge row species for fodder crops<br>Preparation of Hay | Utilizing fodder from perennial trees and Fodder bank reserves<br>Transporting excess fodder from adjoining districts<br>Use of non conventional fodders.<br>Use of commercial feed mixtures and feed blocks. Culling unproductive livestock | Use of non conventional fodders.<br>Use of commercial feed mixtures and feed blocks<br>Availing Insurance |
| Drinking water | Roof top water harvesting , Preserving water in the tank for drinking purpose.<br>Collection of water from streams<br>Deworming | Judicious use of water, Using preserved water in the tanks for drinking purpose, recycling of household used water. | Maintenance/cleaning of community reservoirs/ village ponds .<br>Deworming |
| Health and disease management | Insurance, Veterinary preparedness with medicines and vaccines, organizing vaccination camps and commercial feed supplements. | Conducting mass animal Health Camps and treating the affected one, commercial feed supplements. | Culling sick animals and commercial feed supplements |
| **Floods** | Not applicable | | |
| Feed and fodder availability | | | |
| Drinking water | | | |
| Health and disease management | | | |
| **Cyclone** | Not applicable | | |
| Feed and fodder availability | | | |
| Drinking water | | | |
| Health and disease management | | | |
| **Heat wave and cold wave** | Not applicable | | |
| Shelter/environment management | | | |
| Health and disease | | | |

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| management | | | |

**2.5.2 Poultry**

| | Suggested contingency measures | | | Convergence/linkages with ongoing programs, if any |
|---|---|---|---|---|
| | **Before the event** | **During the event** | **After the event** | |
| **Drought** | - | - | - | - |
| Shortage of feed ingredients | Procurement and storage of feed ingredients, Establishing feed reserve Bank | Utilizing from feed reserve banks, nutritional supplements to poultry | Nutritional supplements to poultry | |
| Drinking water | Arrangement for drinking water, Roof top water harvesting , Preserving water in the tank for drinking purpose | Judicious use of water, providing B-complex and Vit.C in water | | |
| Health and disease management | Insurance and Emergency Veterinary preparedness with medicines and vaccination to birds | Sanitation and Hygiene | Culling affected birds, Mass vaccination. Segregation of sick birds. | |
| **Floods** | Not applicable | | | |
| **Cyclone** | Not applicable | | | |
| **Heat wave and cold wave** | Not applicable | | | |

**2.5.3 Fisheries/ Aquaculture**

| **2.5.3 Fisheries** | **Suggested contingency measures** | | |
|---|---|---|---|
| | Before the event | During the event | After the event |
| **2. Floods** | | | |
| **B. Aquaculture** | 1. Construction of ring bund/embankment of fish farm. The height of the bund should have 0.5 – 1.0 m higher than the highest flood level (data should be taken 10 yrs.)<br>2. Provide proper drainage system in order to prevent inflow and outflow of pond water | Encircle the pond /farm areas with proper nylon nets in order to prevent escape of fish from ponds/ farms during flood. | 1. Aquatic weed should be cleaned and controlled by using suitable methods<br>2. Liming should be done to get pond water near neutrality($P^H$ 6.5-7.5) |

| | | | |
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| | 3. Health check and any incidence diseases should be done and isolate the pond, fish is transferred to the quarantine pond | | 3. Change pond water to fresh water |
| (i) Inundation with flood water | -do- | -do- | -do- |
| (ii) Water continuation and changes in water quality | Provide proper drainage system in order to prevent inflow and outflow of pond water. | Checking the quality of water and maintain at the optimum level of required physical, chemical & biological water quality parameters. | - |
| (iii) Health and diseases | i. To ensure enough fresh water<br>Preparedness with medicines and proper sanitation programme | To ensure enough fresh water | Liming @ 200-300 kg/ha. |
| (iv) Loss of stock and inputs (feed, chemicals etc) | i. Arrangement of feed and feed ingredients & chemicals<br>ii. Establishment of feed reserve bank<br>iii. Precaution for the upcoming event by providing standby infrastructure and space | Utilization of the stock reserve<br><br>Proper utilization of standby infrastructure and space | Maintain stock for self sufficiency<br><br>Arrangement for repayment of the received input from the banks |
| v) infrastructure damage (pumps, aerators, huts, etc) | iv. To shift the machineries to safer sides. The huts should be properly guarded the natural calamities | To arrange shifting of the item to a safer place | Repairing of item whenever needed by skilled labors |