State: BIHAR

Agriculture Contingency Plan for District: Sitamarhi

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| **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) | North West Alluvial Plain Zone (BI-1) | | |
| List all the districts falling under the NARP  Zone\* (\*>50% area falling in the zone) | Zone – 1 (Saran, Siwan, Goplaganj, Muzaffarpur, E. Champaran, W.Champaran, Sitamarhi, Sheohar,  Vaishali, Darbhanga , Madhubani, Samastipur | | |
| Geographic coordinates of district headquarters | **Latitude** | **Longitude** | **Altitude** |
| 250 53’ N & 260 27’ S | 850 40’ E & 850 86’ W | 56 m |
| Name and address of the concerned ZRS/  ZARS/ RARS/ RRS/ RRTTS | RAU, Pusa, Samastipur (Bihar) | | |
| Mention the KVK located in the district with address | PC,Krishi Vigyan Kendra,  VII & P.O- Balha Madhusudan, Via- Janakpur Road, Pupri, Sitamarhi -843320 | | |
| Name and address of the nearest Agromet  Field Unit (AMFU, IMD) for agro-advisories in the Zone | Rajendra Agricultural University, Pusa, Samastipur | | |

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| **1.2** | **Rainfall (Zone-I)** | **Normal RF(mm)** | **Normal Rainy days (number)** | **Normal Onset** | **Normal Cessation** |
| SW monsoon (June-Sep) | 1358.2 | 45 | 3nd week of June | 2nd week of October |
| NE Monsoon(Oct-Dec) | 92.1 | 03 | - |  |
| Winter (Jan- Feb) | 209.4 | 03 |  |  |
| Summer (Mar-May) | 20.5 | 04 |  |  |
| Annual | 1680.2 | 55 |  |  |

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| **1.3** | **Land use pattern of the district** | Geographical area | Cultivable area | Forest area | Land under non-  agricultural use | Permanent pastures | Cultivable wasteland | Land under Misc. tree  crops and groves | Barren and uncultivable land | Current fallows | Other fallows |
| **Area (‘000ha)** | 259.8 | 122.9 | 6.4 | 2.3 | 0.3 | 69.6 | 12.6 | - | 24.9 | 19.6 |

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| **1. 4** | **Major Soils** | **Area (‘000 ha)** | **Percent (%) of total** |
|  | Sandy Soils | 13.887 | 6.67 |
| Fine Sandy Loam Soils | 89.548 | 43.00 |
| Clayey Soils | 51.995 | 24.96 |
| Saline/ Calcareous Soils | 52.835 | 25.37 |

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| **1.5** | **Agricultural land use** | Area (‘000 ha) | Cropping intensity % |
| Net sown area | 122.9 | 110% |
| Area sown more than once | 12.6 |
| Gross cropped area | 135.5 |

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| **1.6** | **Irrigation** | Area (‘000 ha) | | |
| Net irrigated area | 49.1 | | |
| Gross irrigated area | 60.2 | | |
| Rainfed area | 73.8 | | |
| **Sources of Irrigation** | Number | Area (ha) | Percentage of total irrigated area |
| Canals |  |  |  |
| Tanks | 2951 | 2.4 | 3.8 |
| Open wells | 13495 |  |  |
| Bore wells | 500 |  |  |
| Lift irrigation schemes |  |  |  |
| Micro-irrigation |  |  |  |

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|  | Other sources |  |  |  |
| Total Irrigated Area |  | 60.2 |  |
| Pump sets Tuber wells | 26953 |  |  |
| No. of Tractors | 2500 |  |  |
|  | **Groundwater availability and use\* (Data source: State/Central Ground water**  **Department /Board)** | No. of blocks/ Tehsils | (%) area | Quality of water (specify the problem such as high levels of arsenic,  fluoride, saline etc) |
| Over exploited |  |  |  |
| Critical |  |  |  |
| Semi- critical |  |  |  |
| Safe | 17 | 100% | Arsenic- 0-0.4ppm or 0-400 ppb |
| 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 (as per figures of 2008-09)

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| **1.7** | **Major field crops cultivated** | **Area (‘000 ha)** | | | | | | | |
| ***Kharif*** | | | ***Rabi*** | | |  |  |
| **Irrigated** | **Rainfed** | **Total** | **Irrigated** | **Rainfed** | **Total** | **Summer** | **Grand total** |
| Rice | 78.6 | 42.2 | 120.8 |  |  |  |  | 120.8 |
| Wheat |  |  |  | 82.8 | - | 82.8 |  | 82.8 |
| Maize | 3.2 | 9.2 | 12.4 | 18.9 | 0.3 | 19.2 | 0.5 | 32.1 |
| Mustard/Toria |  |  |  | 8.1 | - | 8.1 |  | 8.1 |
| Greengram |  |  |  |  |  |  | 12.1 | 12.1 |
| Lentil |  |  |  | - | 2.8 | 2.8 |  | 2.8 |

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|  | **Horticulture crops -**  **Fruits** | **Area (‘000 ha)** | | |
| **Total** | **Irrigated** | **Rainfed** |
| Mango | 10.2 |  |  |
| Litchi | 0.6 |  |  |
| Guava | 0.5 |  |  |
| Banana | 1 |  |  |
| Papaya | 0.02 |  |  |
| Aonla | 0.17 |  |  |

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|  | **Horticulture crops - Vegetables** | **Total** | **Irrigated** | **Rainfed** |
|  | Potato | 8.4 | 8.4 |  |
| Sponge goBlackgram | 1.4 | 1.4 |  |
| Tomato | 1.1 | 1.1 |  |
| Cauliflower | 2.2 | 2.2 |  |
| Cabbage | 1.8 | 1.8 |  |
| Brinjal | 2.0 | 2.0 |  |
| Okra | 1.5 | 1.5 |  |
|  | **Medicinal and Aromatic crops** | **Total** | **Irrigated** | **Rainfed** |
|  | **Plantation crops** | **Total** | **Irrigated** | **Rainfed** |
|  | **Fodder crops** | **Total** | **Irrigated** | **Rainfed** |

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| **1.8** | **Livestock** | **Male (‘000)** | **Female (‘000)** | **Total (‘000)** |
| Non descriptive Cattle (local low yielding) | 334.046 | 361.900 | 695.946 |
| Improved cattle | - | - | - |
| Crossbred cattle | 4.500 | 15.000 | 19.500 |
| Non descriptive Buffaloes (local low yielding) |  |  |  |
| Descript Buffaloes | 105.895 | 110.000 | 215.895 |
| Goat | 107.144 | 130.000 | 237.144 |
| Sheep | 10.000 | 67.000 | 77.000 |
| Other (Camel, Pig, Yak etc.) | 334.046 | 361.900 | 695.946 |
| Commercial dairy farms (Number) | - | - | - |

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| **1.9** | **Poultry** | **No. of farms** | **Total No. of birds (‘000)** |
| Commercial |  | 90.7 |
| Backyard |  | 208 |

**Fisheries** (Data source: Chief Planning Officer)

**1.10**

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|  | **A. Capture** | | | | | | | |
| **i) Marine** (Data Source: Fisheries Department) | **No. of fishermen** | **Boats** | | **Nets** | | | **Storage facilities (Ice plants etc.)** |
| Mechanized | Non- mechanized | Mechanized (Trawl nets, Gill nets) | Non-mechanized (Shore Seines, Stake & trap nets) | |
|  |  |  |  |  | |  |
| **ii) Inland** (Data Source: Fisheries Department) | **No. Farmer owned ponds** | | **No. of Reservoirs** | | **No. of village tanks** | | |
| **2000** | | **2500** | | **1800** | | |
|  | **B. Culture** | | | | | | | |
|  |  | | | **Water Spread Area (ha)** | | **Yield (t/ha)** | **Production (‘000 tons)** | |
|  | i) **Brackish water** (Data Source: MPEDA/ Fisheries Department) | | | 3544 | | 3.5 | 10350 | |
|  | ii) **Fresh water** (Data Source: Fisheries Department) | | |

**1.11 Production and Productivity of major crops** (Average of last 5 years: 2004-08)

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| 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 identified based on total acreage)** | | | | | | | | | | |
|  | Rice | 99.4 | 1400 |  |  |  |  | 99.4 | 1400 |  |
| Wheat |  |  | 43.2 | 2100 |  |  | 43.2 | 2100 |  |
| Maize |  |  | 17.6 | 2200 |  |  | 17.6 | 2200 |  |
| Mustard/Toria |  |  | 1.02 | 625 |  |  | 1.02 | 625 |  |
| Greengram |  |  | 0.85 |  | 0.9 | 900 | 1.75 | 900 |  |
|  | Lentil |  |  |  | 0.85 |  |  |  | 0.85 |  |
| **Major Horticultural crops (Crops identified based on total acreage)** | | | | | | | | | | |
|  | Mango |  |  |  |  |  |  | 45.7 |  |  |
| Guava |  |  |  |  |  |  | 5.7 |  |  |
| Banana |  |  |  |  |  |  | 26.5 |  |  |

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|  | Litchi |  |  |  |  |  |  | 15.3 |  |  |
| Lemon |  |  |  |  |  |  | 1.9 |  |  |

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| **1.12** | **Sowing window for 5 major field crops**  (start and end of normal sowing period) | **Rice** | **Wheat** | **Maize** | **Lentil** | **Potato** |
| Kharif- Rainfed 1. Up land   1. Mid Land 2. Lowland | 1 -2nd week of July  2nd-3rd week of June  3rd week of May- 1st week of June | - | - | - | - |
| Kharif-Irrigated | 3rd week of May –  4th week of June | - | - | - | - |
| Rabi- Rainfed | - | - | - | - | - |
| Rabi-Irrigated | - | 2nd week of November - 2nd week of December | 3rd week of October - 2nd week of November | 2nd week of October - 2nd week of November | 3rd week of October - 2nd week of  November |

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| **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 - BPH, L.B., S.B., Aphid | √ |  |  |

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| **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: Yes |

Annexure I

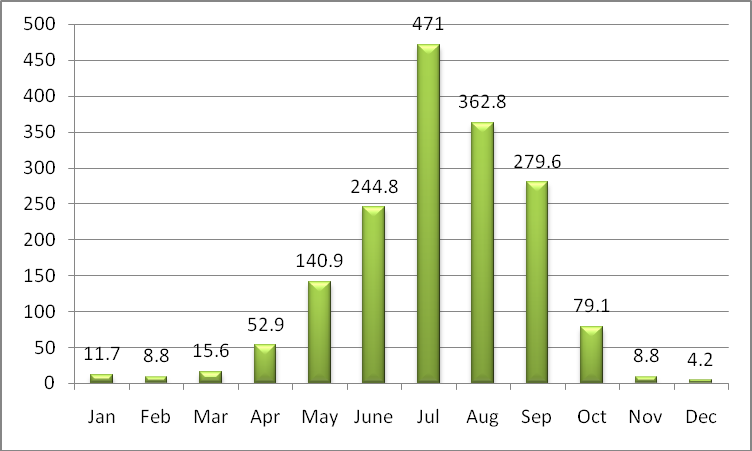
Agro climatic Zones of Bihar



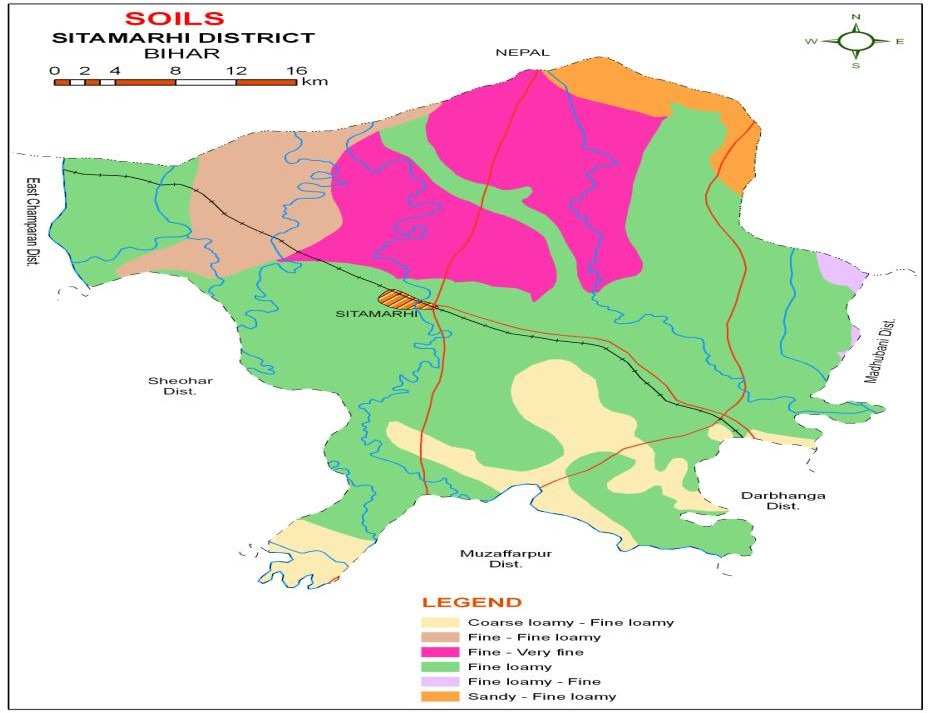
Source: krishi.bih.nic.in

Annexure II

Mean annual rainfall (mm)



Annexure-III



**Source:** NBSS&LUP, Kolkata

**Strategies for weather related contingencies**

* + 1. **Drought**
    2. **Rainfed situation**

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| **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  1st week of July | Upland heavy loamy soils | Rice-Wheat | Rice – Wheat  Rice- Prefer Long to medium duration varieties  Pigeonpea – Bahar, Pusa-9  Narendra Arhar-I | * Adopt normal package of practices * Direct seeding of drought tolerant varieties in dry soil during June/ July with application of pre emergence herbicide under sufficient soil moisture conditions. * Raise staggered community nursery preferably with medium duration varieties in mid and lowlands * Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected area. * Interculture for timely   weed control in direct  seeded rice   * Groundwater to be used   for life saving irrigation  to upland and  transplanted rice | - |
| Medium land | Rice- Wheat | Rice-Wheat  Rice- Prefer Long to medium duration varieties  Rice - Rajendra sweta (135- 140d), Rajendra mahsuri (140- 150 days), Sita (130-140d), Rajendra Bhagwati, Rajendra Neelum (120-125), Rajendra Suwasni (130-135), Rajshree-(140d),  Hybrid-Arize 6444 (130-140), PHB-71 (130-140), P-3667, |
| Lowland | Rice – Wheat | Rice – Wheat  Rice- Prefer Long to medium duration varieties  Rice- Swarna sub-1 (150-155), Swarna (150-155), Rajendra Mansuri (145-150), Rajshree (140d), |
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| **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 4 weeks  3rd week of July | Upland heavy loamy soils | Rice- Wheat | Rice-Wheat  Rice- Prefer Medium to short duration varieties like  Saroj (100-110 days), Rajendra Bhagwati (110-120 days), Prabhat (90-95 days), Sahbhagi (115-120) | * Direct seeding of rice with medium duration drought tolerant varieties with application of pre emergence herbicide under sufficient soil moisture conditions followed up with a post- emergence weedicide application 20-25 days later, for effective weed management. * Enhanced dose of NPK can be used in normal sowing of rice to boost the early vegetative growth in late plantings under sufficient moisture * Interculture operation done for timely weed control in direct seeded rice (DSR) | **-**  Seeds from RPCAU, Pusa, NSC, TDC ,  BRBN etc. |
| Medium land | Rice – Wheat | Rice-Wheat  Direct sowing / 20d old dapog seedlings with medium to short duration varieties – Rajendra Dhan-201(130-135d), Rajendra Bhagwati, Sonam, BPT-5204 | * Where field is moist, direct seeding of medium duration varieties (125 days) can be done during second fortnight of July in midlands. Application of Post- emergence herbicide is essential * Use mat nursery/ dapog nursery, can be raised for quick availability of seedlings for transplanting of |
| Lowland | Rice – Wheat | Rice- Direct/ dapog seedlings  with Rajshree, |
| Makhana (in ponds)  Var. local | Rajendra Suwasni, Rajendra  Sweta, Saryug -52, Sonam |

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|  |  |  | (130-140 days long duration variety should be selected) | medium duration varieties by first fortnight of August in mid and low lands   * Raise staggered community nursery preferably with short duration varieties in uplands * Transplant with 30-35 days old seedling may be used with 3-4 seedling per hill with close spacing. * Enhanced dose of nitrogen with full basal dose of NPK at the time of transplanting to boost the early vegetative growth in late plantings under sufficient moisture * Timely interculture for weed control in direct seeded rice * Life saving irrigation |  |

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| **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**  **Implementat**  **ion** |
| Delay by 6 weeks  1st week of August | Upland soils | Pigeonpea-  Greengram | Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant  Blackgram-30 , Pant Blackgram-19, Shekhar  Kulthi- DB-7, BR-5, BR-10, Coimbatore-1 | * Life saving irrigation | Seeds from  RPCAU, Pusa,  NSC, TDC ,  BRBN etc. |
|  | Upland heavy loamy soils | Rice-Wheat | Rice – Wheat  Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant  Blackgram-30 , Pant Blackgram-19  Kulthi- DB-7, BR-5, BR-10, | * Direct seeding of Rice * Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected |  |

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|  |  |  | Rice- Prefer short (early matured) varieties like Prabhat, Sahbhagi, Turanta (75-90), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi , Richharia(<100d), Saroj (100-110d) | districts   * Life saving irrigation |  |
| Medium land | Rice – Wheat | Rice (Short duration)-Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj |  |
| Rice – Wheat | * Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August * Direct seedling of Rice * Raise staggered community nursery preferably with medium duration varieties in mid and lowlands * Enhanced basal dose of NPK to boost the early vegetative growth * Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts * Life saving irrigation |
| Lowland | Rice-Wheat- Greengram (Greengram) | Rice (Short Duration)-Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj  If dry spell continues, direct seeding of short duration rice varieties (100 days) can be done in midlands by first fortnight of August and extra short duration (70-75 days) up to 25th August |

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| **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 8 weeks  3rd week of August | Upland shallow to heavy soils | Pigeonpea- Greengram | Blackgram/Finger millet -Sep. Pigeonpea / Late Wheat/Lentil/ Potato/ Rai/ Mustard | * Moisture conservation * Inter cultivation * Sowing of *rabi* crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables | Seeds from RAU, Pusa, NSC, TDC ,  BRBN etc |
| Rice-Wheat | Blackgram/Finger millet -Sep. Pigeonpea / Late Wheat/Lentil/ Potato/ Rai/ Mustard  Rice- Prefer Early matured varieties like Turanta dhan (75d), Prabhat (90d), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi, Richharia(<100d), Saroj (100-110d) |
| Medium land | Pigeonpea – Greengram | September Pigeonpea-Greengram Greengram – Samrat, Pusa Vishal, IPM-02-3  IPM-02-14, PDM-44,  Sept.Pigeonpea–Pusa-9, Sharad  Narendra Arhar-I | * Supply of contingency crop seeds viz. Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), need to be ensured for taking up of sowing in September in midlands |

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|  |  | Rice-Wheat | Direct seeded rice (DSR) with short duration (80-90 days) varieties (Turanta dhan, Prabhat, Anjali, Vandana, CR-Dhan-40 etc.) can be taken up in midlands till the end of August subject to availability of at least one assured irrigation  Early Rice-Prabhat, Dhanlaxmi,  Richharia, Turanta | * Direct seeding of rice * Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August * Use of 20 days old dapog seedling in rice. * Enhanced basal dose of NPK in rice to boost early vegetative growth * Supply of contingency crop seeds of Toria, Maize (QPM varieties, Swann composite- 65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram need to be ensured for taking up of sowing in September in midlands * Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit   rainfall districts |  |
| Lowland | Rice- Potato | Rice-Potato/Wheat  Rice- Rajshree, Sita  Rajendra Suwasni, Rajendra Sweta | * Double transplanting of rice (karuhan) can be done with 30 + 45 days old seedlings of long duration or photosensitive varieties up to 30th August with close planting (40-45 hills per square meter)   Application of organic manure and vermi compost initially for Rice and other crops. |
| Rice-Wheat-Green gram | Sept. Pigeonpea-Greengram  Pigeonpea – Bahar, Pusa-9  Narendra Arhar-I |

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| **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. | Very deep, calcareous fine loamy soils | Rice-Wheat  Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj | * Gap filling * Thinning | * Timely interculture for weed control in direct seeded rice * Mulching * Conservation tillage * Life saving irrigation | Seeds from RAU, Pusa, NSC, TDC ,  BRBN etc |
| Medium land | Maize-wheat  Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 | * Gap filling |
| Pigeonpea-Greengram | * Pre-sowing irrigation * Higher seed rate |

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|  |  | Pigeonpea – Bahar, Pusa-9  Narendra Arhar-I | * Gap filling through Dapog nursery |  |  |
| Lowland | Rice-Wheat-Green gram  Rice- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta | * Gap filling through Dapog nursery |

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| **Condition** |  | | **Suggested Contingency measures** | | |
| **Mid season drought (long dry spell, consecutive 2 weeks rainless**  **(>2.5 mm) period)** | **Major Farming situation** | **Normal Crop/cropping system** | **Crop management** | **Soil nutrient & moisture conservation measures** | **Remarks on Implementa tion** |
| At vegetative stage | Very deep, calcareous fine loamy soils | Rice-Potato Rice –Wheat  Rice- Prabhat, Dhanlaxmi,  Richharia, Turanta, Saroj | * Gap filling of existing crop * Postponement of top dressing * Foliar application with 2% Urea to boost up the   vegetative growth | * Inter culturing * Mulching * Conservation tillage * Foliar spray with (1%) MOP * Life saving irrigation |  |
| Pigeonpea -Greengram Pigeonpea – Bahar, Pusa-9  Narendra Arhar-I | - |
| Medium land | Rice-Wheat-Green gram Rice- - Rajendra Bhagawati,  Rajendra Suwasni Rajshree, Prabhat | * Gap filling of existing crop * Postponement of top dressing |

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| **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 Implementa**  **tion** |
| At flowering/ fruiting stage | Up land | Rice-Wheat Vegetables– Wheat | * Postpone the top dressing * Foliar application with 2% Urea to boost up the vegetative growth | * Interculture * Foliar application with 2% MOP |  |

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|  | Medium land | Maize-wheat | * Postpone the top dressing * Foliar application with 2% Urea or MOP | * Mulching * Conservation tillage * Life saving irrigation |  |
| Pigeonpea –Greengram | - |
| Lowland | Rice-Wheat-Greengram | * Postpone the top dressing * Foliar application with 2% Urea |

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| **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** |
|  | Upland calcareous fine loamy soils | Rice-Wheat  Rice-Prabhat, Dhanlaxmi, Richharia, Turanta , Saroj | * Foliar application with 2% Urea to boost up the vegetative growth * Mulching * Life saving irrigation | * Foliar application with 2% Urea or MOP * 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/Pulses   /Oilseeds/ Vegetables   * Sowing of *rabi* crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables can be taken up on time for maximizing productivity from lowlands with support from the government for timely supply of inputs and in a way *rabi* production would compensate the production loss during   *kharif.* |  |
| Medium land | Maize-Wheat  Maize - Shaktiman-1,2,3,4,  Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3 |
| Pigeonpea  Var. Bahar, Narendra Arhar-1 |
|  |
| Lowland | Rice-Wheat-Greengram  Rice- Rajshree, Santosh, Sita, Rajendra Suwasni, Rajendra Sweta |

**Drought - Irrigated situation**

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| **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  Limited release of  water in canals  due to low rainfall  Non release of  water in canals  under delayed  onset of monsoon  in catchment | Not Applicable | | | | |

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| **Condition** |  |  | **Suggested Contingency measures** | | |
| **Major Farming situation** | **Normal Crop/cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| Lack of inflows into tanks due to insufficient  /delayed onset of monsoon | Upland | Rice-Wheat/Oilseeds/ Pulses/ Rabi maize | Short duration of Rice –Pigeonpea Blackgram /sesame-Wheat  Rice-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj | * Direct seedling of rice * Dapog nursery for rice in midlands and lowlands * Application of organic manure and vermicompost * Mulching * Groundwater to be used for life saving irrigation to upland crops, | Seeds from RPCAU, Pusa, NSC, TDC ,  BRBN etc |
| Medium Land | Rice-Wheat/Oilseeds/ Pulses/ Rabi Maize | **1.**Short duration of Rice- Pigeonpea 2.Blackgram-Wheat  3.Sesame –Wheat  Rice- - Rajendra Bhagawati,  Rajendra Suwasni, Rajshree,  Prabhat |

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| **Condition** |  |  | **Suggested Contingency measures** | | |
| **Major Farming situation** | **Normal Crop/cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| Lowland | Rice-Wheat/Oilseeds/ Pulses/ Rabi maize | Short duration Rice-Wheat/ Lentil-Mustard/Linseed  Rice- Rajshree, Rajendra Neelam, MTU-1001, MTU-1010, Rajendra Suwasni, Rajendra Sweta | vegetables and transplanted rice |  |

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| **Condition** |  |  | **Suggested Contingency measures** | | |
| **Major Farming situation** | **Normal Crop/cropping system** | **Change in crop/cropping system** | **Agronomic measures** | **Remarks on Implementation** |
| Insufficient groundwater recharge due to low rainfall | Upland | Rice-Wheat/Oilseeds/ Pulses/ Rabi maize | Short duration of Rice- Wheat Pigeonpea/Blackgram/ Sesame- Wheat  Rice-Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj | * Dapog nursery for rice * Direct seedling of rice * Mulching * Application of organic manure and vermicompost * Groundwater to be used for life saving irrigation to upland crops, vegetables and transplanted rice | Seeds from RAU, Pusa, NSC, TDC ,  BRBN etc |
| Medium Land | Rice-Wheat/Oilseeds/ Pulses/ Rabi maize | Short duration of Rice- Wheat Pigeonpea/Blackgram/ Sesame- Wheat  Rice- - Rajendra Bhagawati, Rajendra Suwasni, Rajshree, Prabhat, R. Neelam, MTU-1010, MTU1001 |
| Lowland | Short duration of Rice- Wheat Pigeonpea/Blackgram/ Sesame- Wheat | Short duration Rice- wheat/lentil/mustard/linseed  Rice- Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta, R. Neelam, MTU-1010, MTU1001 |

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

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| **Condition** | **Suggested contingency measure** | | | |
| **Continuous high rainfall in a short span leading to** | **Vegetative stage** | **Flowering stage** | **Crop maturity stage** | **Post harvest** |
| **water logging** |  |  |  |  |
| Rice | * Drainage management * Re-transplanting through Dapog nursery if needed * Gap filling * Resowing with drum seeder | * Drainage management * Subsequently crop if totally damaged i.e. Toria | * Drainage management * Subsequent crop if totally damaged * Harvest at physiological maturity | Storage at safer place |
| Maize | * Drainage management * Gap filling * Resowing, if completely damaged | * Drainage management * Alternative maize or other rabi crop if totally damaged | * Drainage management * Subsequent if totally damaged * Harvest at physiological maturity | Storage at safer place |
| Pigeonpea | * Drainage management * September sowing if Khrif Arhar is completely damaged * Gap filling if needed | * Drainage management * Alternative maize or other rabi crop if totally damaged | * Drainage management * Subsequent if totally damaged * Harvest at physiological maturity | Storage at safer place |
| Vegetables | * Resowing , if required * Replanting | * Drainage management | * Drainage management | Storage at safer place |
| **Horticulture** |  |  |  |  |
| Mango | * Drainage management * Replanting if completely damaged * Gap filling | * Drainage management | * Drenching with copper fungicides * Drainage management * Harvesting at proper maturity |  |
| Litchi | * Drainage management * Replanting, if completely damaged | * Drainage management | * Drainage management * Spray and pasting of trunk with suitable fungicide * Drenching with copper   fungicide |  |
| Banana | * Drainage management * Replanting, if completely damaged | * Drainage management | * Drainage management * Spray and pasting of trunk with suitable fungicide |  |
| Papaya | * Drainage management * Replanting, if completely | * Drainage management | * Drainage management * Spray and pasting of | * Safe storage and   transportation |

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|  | damaged |  | trunk with suitable fungicide |  |
| **Heavy rainfall with high speed winds in a short span2** |  |  |  |  |
| Rice | * Drainage management * Replanting if completely damaged * Gap filling if needed | * Drainage management * Subsequent crop if totally damaged i.e. Toria | * Drainage management * Subsequent crop if totally damaged | Storage at safer place |
| Maize | * Resowing If completely damaged * Gap filling if needed * Drainage management | * Drainage management * Alternative maize or other crop if totally damaged | * Drainage management * Subsequent crop if totally damaged | Storage at safer place |
| Pigeonpea | * Resowing If completely damaged * Gap filling if needed * Drainage management | * Drainage management * Alternative crop if totally damaged | * Drainage management * Alternative crop if totally damaged | Storage at safer place |
| vegetables | * Drainage management * Gap filling | * Drainage management | * Drainage management * Drenching with copper fungicide |  |
| **Horticulture** |  |  |  |  |
| Mango | * Drainage management * Replanting if substantially damaged | * Drainage management * Drenching with copper fungicides | * Drainage management * Harvest at proper time |  |
| Litchi, | * Drainage management * Gap filling | Drainage management | * Drainage management * Drenching with copper fungicide |  |
| Banana, Guava | * Drainage management * Replanting if substantially damaged | * Drainage management * Staking | * Drainage management * Harvest at proper time |  |
| **Outbreak of pests and diseases due to unseasonal rains** | | | | |

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| Rice | * Seedling treatment with granular insecticide – Cartap hydrochloride or Phorate 10G or Carbofuran 3G.   + Maintain shallow water in nursery beds   + Providing good drainage. | * Use copper fungicides against Bacterial leaf blight. * Split application of N fertilizer (3-4 times) | * Harvest at   physiological maturity | Proper drying and safe storage |
| Maize | * Drainage, and yellowing mainly due to nitrogen   deficiency apply N split doses   * Application of granular insecticides viz. Carbofuran 3G. in whorl of maize | * Foliar blight control through Mancozeb @ 2.5g/l of water (2-4 applications at 8-10 days interval) | * Cob harvesting from standing crop * Harvest at   physiological maturity | * Storage in safe places like farmer   warehouse/tent covering of produce   * Ensure 10-12% moisture in grains before storage * Proper dying |
| Pigeonpea | * Provide drainage * Seed treatment with 1 g Carbendazim +2g Thiram/kg seed. | Provide drainage | Provide drainage | * Proper dying * Storage at safe place and transportation |
| **Horticulture** |  |  |  |  |
| Vegetables | * Drainage management | * Drainage management | * Drainage management |  |
| Mango | **Anthracnose:-**  The foliar infection can be controlled by spraying of copper oxychloride (0.3%)  Use bio control agent viz *Streptosporangium pseudovulgare*  **Bacterial canker:**  Regular inspection of orchards, sanitation and seedling certification are  recommended as preventive measures. | **Anthracnose:-**  Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.  **Mango powdery mildew:** Spray wettable sulphur(0.2%) & calixin or karathane (0.1% ) during second week of December | **Mango powdery mildew:**  Prune diseased leaves and malformed panicles harbouring the pathogen to reduce primary inoculum load.  Spray wettable sulphur (0.2%) when panicles are 3-4” in size  Spray dinocap (0.1%) 15-  20 days after first spray. Spray tridemorph (0.1%) | Harvest at proper time  **Anthracnose:-**  Pre-harvest sprays of Hexaconazole (0.01%)  or Carbendazim (0.1%) at 15 days interval should be done in such a way that the last spray falls 15 days prior to harvest.  Diseased leaves, twigs, and fruits, should be |

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|  | Mango stones for raising seedlings (root stock) should always be taken from healthy fruits.  Use of wind-breaks helps in reducing brushing/ wounding and thus reduces the chance of infection. |  | 15-20 days after second spray.  Spraying at full bloom needs to be avoided. **Mango bacterial canker:** Three sprays of Streptocycline (200 ppm) at 10 days intervals reduce fruit  infection.  In severe infection, spraying of Streptocycline (300 ppm) or copper oxychloride  (0.3%) is more effective. | collected  and burnt to avoid the spread for next season |
| Litchi | Fruit Fly:  Monitor adult fruit flies  emergence by using methyl  eugenol or sex pheromone traps. | Fruit Fly:  First Spray deltamenthrin  0.0025% plus molasses  0.1% after 10-12 days  spray fenthion 0.05% +  molasses 0.1% followed by  profenofos 0.045% +  molasses 0.1% if required | Harvest at proper time | Fruit Fly:  Collect all fallen  infested fruits and put in  a drum covered with  fine wire mesh.  Harvest fully matured  fruits one week earlier  to escape egg laying |
| Banana | Provide drainage | Provide drainage | Harvest at proper time |  |
| Guava | Provide drainage | Provide drainage | Harvest at proper time |  |

* 1. **Floods**

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| **Condition** | **Suggested contingency measures** | | | |
| **Transient water logging/ partial inundation1** | **Seedling / nursery stage** | **Vegetative stage** | **Reproductive stage** | **At harvest** |
| Rice | * Provide drainage * Re transplanting through dapog nursery seedlings * Gap filling | * Provide drainage * Gap filling * 40-45 days old seedlings may be used * Kharuhan (double transplanting) mehod | * Provide drainage * Harvest at physiological maturity * Lentil as paira crop can be taken | Storage at safer place |
| Maize | * Provide drainage | * Provide drainage | * Provide drainage | Storage at safer place |

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|  | * Re sowing Gap filling |  | * Harvest at physiological maturity |  |
| Pigeonpea | * Provide drainage * Re sowing * Gap filling if needed | * Provide drainage | * Provide drainage * Harvest at physiological maturity | Storage at safer place |
| **Horticulture** |  |  |  |  |
| Mango | * Re planting * Gap filling * Provide drainage | * Drenching with copper fungicides * Provide drainage | * Drenching with copper fungicides * Provide drainage |  |
| Litchi | * Gap filling * Replanting * Provide drainage | * Drenching with copper fungicides * Provide drainage | * Drenching with copper fungicides * Provide drainage |  |
| Banana | * Replanting * Gap filling * Provide drainage | * Drenching with copper fungicides * Provide drainage | * Drenching with copper fungicides * Provide drainage |  |
| Guava | * Replanting * Gap filling * Provide drainage | * Drenching with copper fungicides * Provide drainage | * Drenching with copper fungicides * Provide drainage |  |
| **Continuous submergence for more than 2 days** |  |  |  |  |
| Rice | * Gap filling, * Re sowing | * Replanting through Kharuhan (double transplanting) method by 3-4 seedlings per hill * Short duration rice variety | * Toria/Late wheat if completely damaged | Storage at safer place |
| Maize | * Re sowing | * Re sowing or gap filling | * Toria/Late wheat if completely damaged | Storage at safer place |
| **Horticulture** |  |  |  |  |
| Mango | * Provide drainage |  |  |  |
| Guava | * Provide drainage |  |  |  |
| Banana | * Provide drainage |  |  |  |
| **Sea water intrusion3** | Not Applicable | | | |

* 1. **Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone**

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| **Extreme event type** | **Suggested contingency measurer** | | | |
| **Heat Wavep** |  |  |  |  |
| Maize, | Provide irrigation | Provide irrigation | Provide irrigation |  |
| Pigeonpea | Provide irrigation | Provide irrigation | Provide irrigation |  |
| Wheat | Provide irrigation | Provide irrigation | Provide irrigation (Terminal heat) |  |

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| **Horticulture** |  |  |  |  |
| Mango | Provide irrigation | Provide irrigation | Provide irrigation |  |
| Litchi | Provide irrigation | Provide irrigation | Provide irrigation |  |
| Papaya | Provide irrigation | Provide irrigation | Provide irrigation |  |
| **Cold waveq** |  |  |  |  |
| Wheat | - | Provide irrigation , Mulching |  |  |
| Maize | - | Provide irrigation , Mulching |  |  |
| Mustard | - | Provide irrigation , Mulching |  |  |
| Potato | - | Provide irrigation , Mulching |  |  |
| Pulses | - | Provide irrigation , Mulching |  |  |
| **Horticulture** |  |  |  |  |
| Vegetables |  | Provide irrigation, Mulching |  |  |
| **Frost** |  |  |  |  |
| Wheat |  | Provide irrigation, Mulching |  |  |
| Chickpea |  | Provide irrigation , Mulching |  |  |
| Pigeonpea |  | Provide irrigation , Mulching |  |  |
| Lentil |  | Provide irrigation , Mulching |  |  |
| **Horticulture** |  |  |  |  |
| Vegetables |  | Provide irrigation , Mulching |  |  |
| Tomato & Potato |  | Earthing up  Provide irrigation , Mulching |  | Harvest in dry  Weather |
| **Hailstorm** | Not Applicable | | | |

* 1. **Contingent strategies for Livestock, Poultry & Fisheries**
     1. **Livestock**

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|  | **Suggested contingency measures** | | |
| **Before the event** | **During the event** | **After the event** |
| **Drought** | Not Applicable | | |

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| **Cyclone** | Harvest all the possible wetted grain (rice/ wheat/maize etc) and use as animal feed after drying.  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.  Don’t allow the animals for grazing in case of early fore warning (EFW)  Incase of EFW, shift the animals to safer places.  Identification of animals may be done. | Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.  Diarrhea out break may happen, arrangement should be made to mitigate the problem  Protect the animals from heavy rains and thunder storms In severe cases un-tether **or** let loose the animals  Arrange transportation of highly productive animals to safer place  Spraying of fly repellants in animal sheds | Repair of animal shed  Deworm the animals through mass camps  Vaccinate against possible out breaks  Proper disposable of the dead animals / carcasses by burning / burying with lime/ bleaching powder in pit  Bleach / chlorinate (0.1%) drinking water or water resources  Collect drowned crop material, dry it and store for future use |
|  | Keep animals untied in the shed in case of EFW. |  | Sowing of above mention short duration fodder crops in unsown and water logged areas  Application of urea (20-25kg/ha) in the CPR’s to enhance the bio mass production. |
| **Floods** | **1. Reserve feed/ fodder bank at community level**  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. Complete feed block or urea molasses mineral bricks may be stored. Checking of feed availability may be made at 3 months interval, particularly before onset of monsoon.  Silage:20-50 t  Urea molasses mineral bricks (UMMB): and complete feed block | **1. Immediate measures**  Transportation of animals to elevated areas.  Temporary shelter arrangement.  Stall feeding of animals with stored hay and concentrates.  Proper hygienic and sanitation of the animal shed/ temporary shelter. Application of lime/ bleaching powder or ash may be applied around shed.  In severe floods, un-tether or let loose the animals  Emergency outlet establishment for required medicines or feeds in each village.  Checking of animals for injury and illness.  Spraying of fly repellants in animal sheds. Smoke may be | Repair of animal shed.  Bring back the animals to the shed.  Cleaning and disinfection of the shed with bleaching powder/ lime or ash.  Bleach (0.1%) drinking water / water sources  Deworming with brood spectrum dewormers.  Vaccination against possible out breaks  Proper disposable of the dead animals / carcasses by burning / |

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|  | (CFB) 50-100 t Hay:100-250 t  Concentrates: 20-50 t  Minerals and vitamin supplements mixture:1-5 t  **2. Preparation and storage of silage and hay and crop by-products at household level. The feed storage may be established in high land where shelter may be taken during flood.**  Preserve the fodder in the form of hay from Berseem, cowpea, oat & other grasses as well as silage from  (a Maize- harvesting at dough stage.   1. Jowar - at flowering stage. 2. Oat 3. Hybrid Napier – 40-45 day old. 4. Water hycianth mixing with Rice straw in ratio of 4:1 with 70 kg molasses /ton of clean water hyacinth.   Bales of hay and other dry fodder should be stored and covered with asbestos sheet or polythene sheet.  Preserve crop by-products like broken rice/ wheat/ maize, bran, chunies etc and dried plant of masoor, Greengram, etc in *bhuskar.* The height of *bhuska*r may be high (above the water level of last flood).  **3, Creation of permanent fodder seed banks in all flood prone areas.**  **4. General precautions**  In case of EFW, harvest all the crops (Sorghum, Maize, Rice, Wheat, Horse gram, | generated at night inside the shed to prevent animals from  mosquito bite.  Govt. may supply feed block or urea molasses minerals bricks or concentrate as flood relief. Bleaching powder and lime may also be supplied.  If stored feed are not available, feeding of animals may be done with top feeds (tree leaves,, aquatic plants, sugarcane tops) etc. as mentioned in drought.  Fungal infected straw/ feed should not be fed.  Bleach (0.1%) drinking water / water sources. If bleaching  powder is not available, treat with lime powder.  Produce smoke with mosquito replants in the shed during  night. | burying with lime and bleaching  powder in pit. . Subsidy may be  given for proper disposal of dead animals.  Proper drying the harvested crop material and proper storage.  Wet feed/ straw may be dried for animal feeding. Care should be taken not to feed fungal infected  feed. Wet straw may be treated with |
| urea (1%) to prevent fungal growth  and enrichment.  Govt. may supply cattle feed at  frequent interval or at sufficient  quantity to feed the animals.  If available feed is insufficient  quantity, concentrate mixture may  only be fed to milch and pregnant  animals.  Feed wastage may be reduced by  offering feed in small quantity feed  in several times (4 times a day)  Aquatic plants like duck weed,  water hyacinth and banana plants  may be fed to dry and unproductive  animals along with wheat straw. |

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|  | etc) that can be useful as fodder in future (store properly)  Don’t allow the animals for grazing  Arrange for storing minimum required quantity of hay (25-50kg) and concentrates (25kgs) per animals in farmer / LS keepers house / shed for feeding animals during floods  Arrangement for transportation of animals from low lying area and also for rescue animal health workers.  Keep animals untied in the shed.  Permanent marking/ identification of animals.   1. **Strengthening of co-operative sectors in flood prone areas for milk marketing and inputs of medicine, seed , feed and veterinary care. One person in each village may be trained with primary veterinary health care and emergency rescue operation.** 2. **Emergency kit preparation** Emergency medicine Temporary shelter   Torch Rope |  | Sugarcane tops, bamboo leaves and mango leaves may be fed to milching, pregnant and small ruminants. When local grass will be available, may be fed to all animals.  Newly grown grasses may contain high amount of nitrate. Care may be taken to feeding grasses after flood water is receded.  There may be leaching of essential minerals due to waterlogging. So, mineral mixture may be fed to all animals. Mineral mixture may be supplied by the Govt. at subsidized rate.  Timely treatment of animals may be done by increasing of number of veterinary dispensary and mobile veterinary clinics. Medicine may be supplied at free of cost. Flood prone zones are susceptible to liver fluke, so, drug may be given to control fluke infestation.  Smoke may be generated at night inside the shed to prevent animals from mosquito bite. |

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|  |  |  | Farmers may be given soft loan for purchase of new animals.  Cooperative society may be extended to this area which will help in following   1. Society will provide loan through bank. In a month, price of 3 weeks milk will be given to the farmers and 1 week price will be given to bank for repay of loan. 2. Farmers will get medicine at wholesale rate. 3. Concentrate feed will be provided by co-operative at subsidized rate. 4. Timely treatment of animals will be done. 5. Marketing channel for milk will be steady.   Subsidy may be given for construction of temporary animals shed (Bamboo based).  Animals should come under insurance coverage.  Small-scale income generating activities like backyard poultry, duckery, goatery may be started. For this purpose, farms may be developed in non-flood prone zones where these animals will be raised up to certain age and will be distributed to the affected farmers for immediate income generation. |

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|  |  |  | Fodder cultivation may be encouraged with supply of fodder seed. |
| Heat & Cold wave | Arrangement for protection from **heat wave**   1. Plantation around the shed 2. Water sprinklers / foggers in the shed ot frequent washing of animals. 3. Application of white reflector paint on the roof or putting rice straw on the roof of the shed.   **Cold wave :** Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time) | Allow the animals early in the morning or late in the evening for grazing during heat waves  Allow for grazing between 10AM to 3PM during cold waves  Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves  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.  Put on the foggers / sprinkerlers and frequent washing of animals during heat weaves and heaters during cold waves  In severe cases, vitamin ‘C’ and electrolytes should be added in H2O during heat waves.  Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation | Feed the animals as per routine schedule  Allow the animals for grazing (normal timings) |
| Health and  Disease  managem ent | 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 | 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 de wormed with suitable anti-parasitic drug and be checked and treated for ecto-parasites, if any. De worming will improve fodder and feed absorption. | Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps.  Conducting fertility camps.  Disposal of carcass by above means.  regnancy toxemia may occur due to longed 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 |

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|  | establishment  Provision for mobile ambulatory van. | 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, respiratory infection, fever, injury, leg gangrene and snake bite may be high. Precaution may be taken to treat the affected animals. | animals rehabilitated in sheds.  During flood cases of malaria, diarrhea, respiratory infection, fever, injury, leg gangrene, water born diseases and snake bite may be high. Precaution may be taken to treat the affected animals  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.  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  Brooders pneumonia Malaria  Snake bite. |

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| Insu rance | 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)

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| **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:

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| **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 |

* + 1. **Poultry**

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|  | **Suggested contingency measures** | | |
| **Before the eventa** | **During the event** | **After the event** |
| **Drought** | Not Applicable | | |
| **Floods** |  |  |  |
| Shortage of feed ingredients | In case of EFW, shift the birds to safer place  Storing of house hold grain like maize, broken rice, wheat etc,  Culling of weak birds | Use stored feed as supplement Don’t allow for scavenging | Routine practices are followed |

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| 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 with bleaching powder/ lime etc.  Treatment of affected birds  Prevent water logging surrounding the sheds  Assure supply of electricity  Sprinkle lime powder to prevent ammonia accumulation due to dampness | Disposal of dead birds by burning / burying with line powder in pit  Disposal of poultry manure to prevent protozoal problem  Supplementation of coccidiostats in feed Vaccination against RD |
| **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 accumulation due to dampness | Disposal of dead birds by burning / burying with line powder in pit  Disposal of poultry manure to prevent protozoal problem  Supplementation of coccidiostats in feed Vaccination against RD |
| **Heat wave** | | | |

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| 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 | De worming 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 |

* + 1. **Fisheries/ Aquaculture**

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|  | **Suggested contingency measures** | | |
| **Before the eventa** | **During the event** | **After the event** |
| **1) Drought** |  |  |  |
| A. Capture |  |  |  |
| (i) Shallow water in ponds due to insufficient rains/inflow | 1. Thinning of population 2. Arrangement of water supply from external resource 3. Deepening of ponds for more | 1. Partial harvesting 2. Addition of water 3. Stocking of air breathing fishes (Singhi, Magur or | 1. Maintenances of remaining stock till favorable condition achieved 2. If not feasible, total harvesting |

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|  | storage of water | Murrel) | or transfer of fishes may be done.  (iii) Preparation of the pond for next crop. |
| (ii) Impact of salt load build up in ponds / change in water quality | 1. Regular monitoring of water quality parameter. 2. Arrangement of aeration (del) 3. Addition of water from external resource | 1. Arrangement of aeration. 2. Addition of water 3. Monitoring of water quality 4. Reduction of manuring according to water level. | (i) 10 to 15% exchange of water |
| **2) Floods** |  |  |  |
| A. Capture |  |  |  |
| B. Aquaculture |  |  |  |
| (i) Inundation with flood water | 1. Elevation/ Renovation of pond dyke. 2. Sale of table size /marketable size (del) fishes 3. construction of earthen nursery ponds in upland areas | 1. Collection of naturally bred seeds (Spawn /fry   /fingerling) from flooded water   1. Stocking in nursery ponds for rearing 2. Enhancement of dykes by sand bags | i Retain the water in pond immediately after flood through repairing of damaged dyke etc.  Ii Netting of pond for removal of unwanted / predatory fishes  Iv Sale of large size fishes |
| (ii) Water contamination and changes  in water quality | Arrangement of regular water quality  monitoring |  | Use of Kmno4 as prophylactics |
| (iii) Health and diseases | (iv) (a) Use lime @ 200 kg/ ha  / Potassium permanganate @ 2%  (a) Arrangement of CIFAX and medicines & chemical stock | Use of Potassium permanganate as prophylactics | -Sampling of fishes and water for disease analysis  - Liming, use of drugs/ medicine if required |
| (iv) Loss of stock and inputs (feed, chemicals etc) | Raising the height of dyke by fencing with net and bamboo poles to prevent loss of stock  Removal of culture inputs from the site | Arrangement of advance size fingerling/ yearlings for stocking | Stocking of large size fingerlings of carps  Restoration of fertilization of pond and regular feeding of fish  Harvesting and sale of fish |
| (v) Infrastructure damage (pumps, aerators, huts etc) | Repairing/ arrangement of alternate safe place to keep pumps aerators etc. | A regular water on the flood and infrastructure facilities. | Re-establishment of the infra structural facility. |
| **3. Cyclone / Tsunami** |  |  |  |
| **4. Heat wave and cold wave** |  |  |  |