

**State: RAJASTHAN**  
**Agriculture Contingency Plan for District: JODHPUR**

| 1.0 District Agriculture profile        |  |   |   |                    |                    |
|---|--|---|---|--------------------|--------------------|
| <b>1.1</b>                              | <b>Agro-Climatic/Ecological Zone</b>                               |   |   |                    |                    |
|   | Agro Ecological Sub Region (ICAR)                                  |   | Western Plain, Kachchh And Part Of Kathiawar Peninsula, Hot Arid Eco-Region (2.1) |                    |                    |
|   | Agro-Climatic Zone (Planning Commission)                           |   | Western Dry Region (XIV)  |                    |                    |
|   | Agro Climatic Zone (NARP)  |   | Arid Western Zone (RJ-1)  |                    |                    |
|   | List all the districts or part thereof falling under the NARP Zone |   | Barmer, Jodhpur, Churu, Jaisalmer   |                    |                    |
|   | Geographic coordinates of district headquarters                    |   | Latitude  | Longitude          | Altitude           |
|   |  |   | 26°16'57.11" N  | 73° 1'25.23"E      | 268.67             |
|   | Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS      |   | Zonal Director Research, Agricultural Research Station, Mandor, Jodhpur-342304    |                    |                    |
| Mention the KVK located in the district |  | Krishi Vigyan Kendra, CAZRI (ICAR) Campus, Jodhpur-342003 |   |                    |                    |
| <b>1.2</b>                              | <b>Rainfall</b><br>(2003 – 2008 Mean)                              | Normal RF(mm)   | Normal Rainy days (number)  | Normal Onset       | Normal Cessation   |
|   | SW monsoon (June-Sep):   | 234   | 22  | 1-8 July (week 27) | 3-9 September (36) |
|   | NE Monsoon (Oct-Dec):  | 2   | 1   |                    |                    |
|   | Winter (Jan- Feb)  | 13  | 2   |                    |                    |
|   | Summer (March-May)   | 14  | 2   |                    |                    |
|   | Annual   | 263   | 27  |                    |                    |

| <b>1.3</b> | <b>Land use pattern of the district (latest statistics) (2007-08)</b> | 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 |
|------------|---|-------------------|-----------------|-------------|---------------------------------|--------------------|----------------------|--|------------------------------|-----------------|---------------|
|            | <b>Area ('000 ha)</b>   | 2256.4            | 1861            | 6.996       | 80.1                            | 121.9              | 40.6                 | 0.08                                   | 145.3                        | 283.7           | 322.7         |

| 1.4 | Major Soils (common names like red sandy loam deep soils (etc.,))*  | Area ('000 ha) | Percent (%) of total |
|-----|---|----------------|----------------------|
|     | Medium Light yellowish brown Sandy  | 233.0          | 10.3                 |
|     | Medium Light yellowish brown Loamy  | 674.9          | 29.9                 |
|     | Deep Yellowish brown Sandy  | 930.7          | 41.2                 |
|     | Shallow Pale brown Gravelly loam  | 135.3          | 6.0                  |
|     | <b>Others</b> (Shallow Light yellowish brown Sandy Deep Light yellowish brown Loamy Medium Yellowish brown Sandy) | 287.2          | 12.3                 |
|     | <b>Total</b>  | 2256.4         |                      |

| 1.5 | Agricultural land use (2007-08) | Area ('000 ha) | Cropping intensity % |
|-----|---------------------------------|----------------|----------------------|
|     | Net sown area                   | 1254.6         | 110                  |
|     | Area sown more than once        | 124            |                      |
|     | Gross cropped area              | 1378.6         |                      |

| 1.6 | Irrigation (2007-08)  | Area ('000 ha) |                |                                       |
|-----|---|----------------|----------------|---------------------------------------|
|     | Gross irrigated area  | 304.81         |                |                                       |
|     | Rainfed area  | 1073.87        |                |                                       |
|     | <b>Sources of Irrigation</b>                                | Number         | Area ('000 ha) | Percentage of total irrigated area    |
|     | Canals  | 0              | 0              | 0                                     |
|     | Tanks   | 0.01           | 0              | 0                                     |
|     | Open wells  | 19.4           | 5.0            | 2.4                                   |
|     | Bore wells  | 25.5           | 199.8          | 95.6                                  |
|     | Lift irrigation schemes                                     | -              | -              | -                                     |
|     | Micro-irrigation  | -              | -              | -                                     |
|     | Other sources (please specify)Rehat, Mal (included in well) | 5.2            | 1.5            | 0.5                                   |
|     | <b>Total Irrigated Area</b>                                 |                |                | 10                                    |
|     | Pump sets   | 7.2            | 2.3            | 1.0                                   |
|     | No. of Tractors   |                |                |                                       |
|     | <b>Groundwater availability and use* (Data</b>              | No. of blocks/ | (%) area       | Quality of water (specify the problem |

|  |              |   |   |
|--|--------------|---|---|
| <b>source: State/Central Ground water Department /Board)</b> | Tehsils      |   | such as high levels of arsenic, fluoride, saline etc) |
| Over exploited   | 8            | - | Saline ( 126% GW utilization)                         |
| Critical   | -            | - | -   |
| Semi- critical   | -            | - | -   |
| Safe   | 1            | - | -   |
| Wastewater availability and use                              |              | - | -   |
| Ground water quality   | Saline water |   |   |

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

Source: Rajasthan Agricultural Statistics at a Glance, 2008-09, Commissionerate of Agriculture, Rajasthan, Jaipur

### 1.7 Area under major field crops & horticulture etc. (2007-08)

| 1.7 | Major Field Crops cultivated (2007-08)  | Area ('000 ha)             |         |       |         |           |         |       |        |             |
|-----|---|----------------------------|---------|-------|---------|-----------|---------|-------|--------|-------------|
|     |   | Kharif                     |         |       | Rabi    |           |         |       | Summer | Grand Total |
|     | Crop                                    | Irrigated                  | Rainfed | Total | Crop    | Irrigated | Rainfed | Total | Summer | Grand Total |
|     | Pearl millet                            | 26.5                       | 564.3   | 590.8 | Mustard | 85.0      | 0.1     | 85.1  | -      | 675.9       |
|     | Cluster bean                            | 5.3                        | 144.6   | 149.9 | Wheat   | 41.7      | 0.04    | 41.8  | -      | 158.9       |
|     | Moth bean                               | 0.4                        | 158.9   | 159.4 | Cumin   | 31.5      | -       | 31.5  | -      | 190.9       |
|     | Green gram                              | 1.0                        | 116.1   | 117.2 | -       | -         | -       | -     | -      | 117.2       |
|     | Sesame                                  | 0.5                        | 29.9    | 30.4  | -       | -         | -       | -     | -      | 30.4        |
|     | <b>Horticulture crops - Fruits</b>      | <b>Total area (000'ha)</b> |         |       |         |           |         |       |        |             |
|     | Ber                                     | 1.1                        |         |       |         |           |         |       |        |             |
|     | Aonla                                   | 0.4                        |         |       |         |           |         |       |        |             |
|     | Lisoda                                  | 0.9                        |         |       |         |           |         |       |        |             |
|     | <b>Horticultural crops - Vegetables</b> | <b>Total area</b>          |         |       |         |           |         |       |        |             |
|     | Onion                                   | 12.3                       |         |       |         |           |         |       |        |             |
|     | Chillies                                | 5.9                        |         |       |         |           |         |       |        |             |
|     | Garlic                                  | 4.5                        |         |       |         |           |         |       |        |             |
|     | Carrot                                  | 1.0                        |         |       |         |           |         |       |        |             |
|     | <b>Medicinal and Aromatic Crops</b>     | <b>Total area</b>          |         |       |         |           |         |       |        |             |
|     | Isabgol                                 | 9.0                        |         |       |         |           |         |       |        |             |

|  |  |                   |
|--|--|-------------------|
|  | <b>Plantation crops</b>                  | <b>Total area</b> |
|  | Mahandi (Hina)                           | 1.7               |
|  | Others such as industrial pulpwood crops | -                 |
|  | <b>Fodder crops</b>                      | <b>Total area</b> |
|  | Sorghum                                  | 17.7              |
|  | Bajra fodder                             | 0.9               |
|  | Guar fodder                              | 1.0               |
|  | Lucerne                                  | 1.9               |
|  | <b>Total fodder crop area</b>            | -                 |
|  | <b>Grazing land</b>                      | -                 |
|  | <b>Sericulture etc</b>                   | -                 |
|  | <b>Others</b> Fiber crop cotton          | 7.2               |

|             |  |                         |                                  |                     |   |
|-------------|--|-------------------------|----------------------------------|---------------------|---|
| <b>1.8</b>  | <b>Livestock – 2003 (P)</b>  | <b>Male ('000)</b>      | <b>Female ('000)</b>             | <b>Total ('000)</b> |   |
|             | Non descriptive Cattle (local low yielding)                                      | -                       | -                                | 519.9               |   |
|             | Crossbred cattle   | -                       | -                                | -                   |   |
|             | Non descriptive Buffaloes (local low yielding)                                   | -                       | -                                | 180.0               |   |
|             | Graded Buffaloes   | -                       | -                                | -                   |   |
|             | Goat   | -                       | -                                | 1036.6              |   |
|             | Sheep  | -                       | -                                | 884.1               |   |
|             | Others (Camel, Pig, Yak etc.)  | -                       | -                                |                     |   |
|             | Commercial dairy farms (Number)  |                         |                                  |                     |   |
| <b>1.9</b>  | <b>Poultry</b>   | <b>No. of farms</b>     | <b>Total No. of birds ('000)</b> |                     |   |
|             | Commercial   | -                       | 36.7                             |                     |   |
|             | Backyard   | -                       | -                                |                     |   |
| <b>1.10</b> | <b>Fisheries (Data source: Chief Planning Officer) Information not available</b> |                         |                                  |                     |   |
|             | <b>A. Capture</b>  |                         |                                  |                     |   |
|             | <b>i) Marine</b> (Data Source: Fisheries Department)                             | <b>No. of fishermen</b> | <b>Boats</b>                     | <b>Nets</b>         | <b>Storage facilities (Ice plants etc.)</b> |

|                   |   |                               |            |                          |                                    |  |   |
|-------------------|---|-------------------------------|------------|--------------------------|------------------------------------|--|---|
|                   |   |                               | Mechanized | Non-mechanized           | Mechanized (Trawl nets, Gill nets) | Non-mechanized (Shore Seines, Stake & trap nets) |   |
|                   |   | -                             | -          | -                        | -                                  | -  | - |
|                   | <b>ii) Inland</b> (Data Source: Fisheries Department)               | <b>No. Farmer owned ponds</b> |            | <b>No. of Reservoirs</b> |                                    | <b>No. of village tanks</b>                      |   |
|                   |   | -                             | -          | -                        | -                                  | -  | - |
| <b>B. Culture</b> |   |                               |            |                          |                                    |  |   |
|                   |   | <b>Water Spread Area (ha)</b> |            | <b>Yield (t/ha)</b>      |                                    | <b>Production ('000 tons)</b>                    |   |
|                   | <b>i) Brackish water</b> (Data Source: MPEDA/ Fisheries Department) | -                             |            | -                        |                                    | -  |   |
|                   | <b>ii) Fresh water</b> (Data Source: Fisheries Department)          | -                             |            | -                        |                                    | -  |   |
|                   | <b>Others</b>   | -                             |            | -                        |                                    | -  |   |

**1.11 Production and Productivity of major crops** (Average of last 5 years: 2003-04, 2004-05, 2005-06, 2006-07 & 2007-08)

| 1.11   | Name of crop | Kharif-2009         |                      | Rabi -2009          |                      | 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) |                                    |
| <b>Major Field crops (Crops to be identified based on total acreage)</b>                   |              |                     |                      |                     |                      |                     |                      |                     |                      |                                    |
|  | Pearl millet | 316.7               | 532                  | -                   | -                    | -                   | -                    | 316.7               | 532                  | -                                  |
|  | Mung         | 27.1                | 290                  | -                   | -                    | -                   | -                    | 27.1                | 290                  | -                                  |
|  | Moth         | 35.8                | 195                  | -                   | -                    | -                   | -                    | 35.8                | 195                  | -                                  |
|  | Guar         | 26.3                | 164                  | -                   | -                    | -                   | -                    | 26.3                | 164                  | -                                  |
|  | Sesame       | 9.4                 | 275                  | -                   | -                    | -                   | -                    | 9.4                 | 275                  | -                                  |
|  | Mustard      | -                   | -                    | 88.4                | 1181                 | -                   | -                    | 88.4                | 1181                 | -                                  |
|  | Wheat        | -                   | -                    | 81.4                | 2182                 | -                   | -                    | 81.4                | 2182                 | -                                  |
|  | Isabgol      | -                   | -                    | 3.0                 | 392                  | -                   | -                    | 3.0                 | 392                  | -                                  |
|  | Cumin        | -                   | -                    | 9.4                 | 389                  | -                   | -                    | 9.4                 | 389                  | -                                  |
|  | Onion        | -                   | -                    | 135.3               | 1195                 | -                   | -                    | 135.3               | 1195                 | -                                  |
| <b>Major Horticultural crops (Crops to be identified based on total acreage Area '000)</b> |              |                     |                      |                     |                      |                     |                      |                     |                      |                                    |
|  | Ber          | 1.1                 | -                    | -                   | -                    | -                   | -                    | 1.1                 | -                    | -                                  |

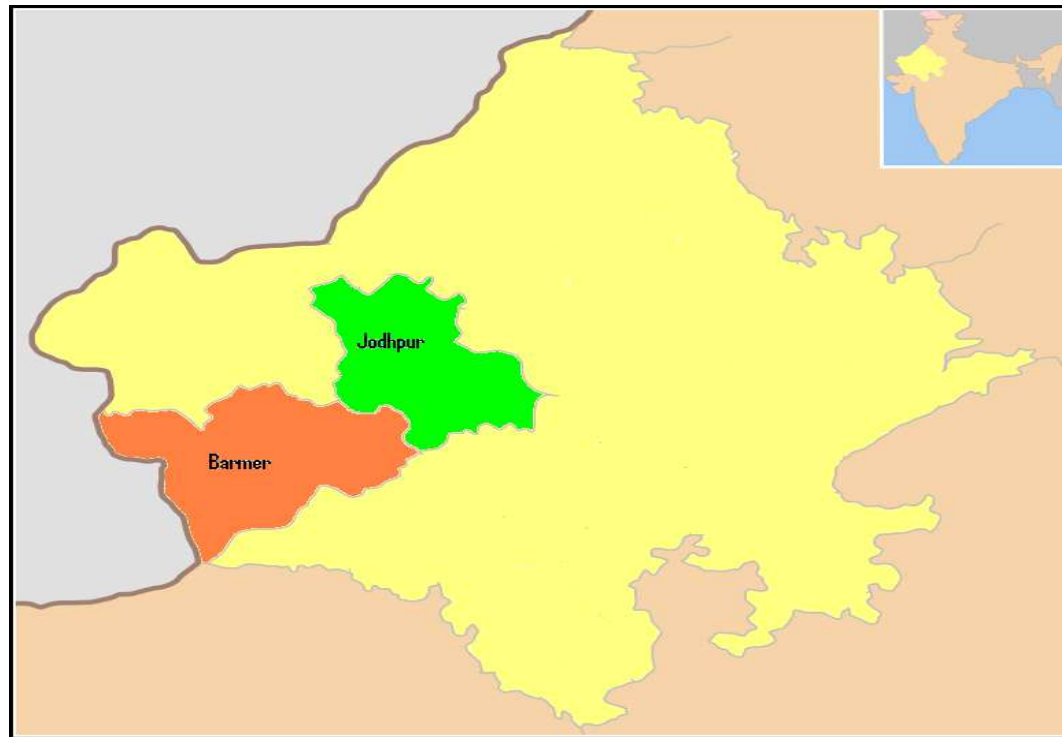
|  |           |     |   |     |   |   |   |     |   |   |
|--|-----------|-----|---|-----|---|---|---|-----|---|---|
|  | Lisoda    | 0.9 | - | -   | - | - | - | 0.9 | - | - |
|  | Aonla     | 0.4 | - | -   | - | - | - | 0.4 | - | - |
|  | Garlic    | -   | - | 4.5 | - | - | - | 4.5 | - | - |
|  | Carrot    | -   | - | 1.0 | - | - | - | 1.0 | - | - |
|  | Col crops | -   | - | 0.8 | - | - | - | 0.8 | - | - |

|             |   |   |   |   |  |   |
|-------------|---|---|---|---|--|---|
| <b>1.12</b> | <b>Sowing window for 5 major field crops</b><br>(start and end of normal sowing period) | Pearl millet  | Moong   | Cluster bean  | Moth   | Sesame  |
|             | Kharif- Rainfed   | 1 <sup>st</sup> July – 30 <sup>th</sup> July            | 1 <sup>st</sup> July-21 July                                      | 1 <sup>st</sup> July- 7 <sup>th</sup> Aug               | 1 <sup>st</sup> July- 7 <sup>th</sup> Aug            | 1 <sup>st</sup> July- 7 <sup>th</sup> Aug         |
|             | Kharif-Irrigated  | 15 <sup>th</sup> June- 30 <sup>th</sup> June            | 1 <sup>st</sup> July -15 <sup>th</sup> July                       | 15 <sup>th</sup> July - 30 <sup>th</sup> July           | 15 <sup>th</sup> July – 30 <sup>th</sup> July        | 15 <sup>th</sup> July – 30 <sup>th</sup> July     |
|             | Rabi- Rainfed   | 30 <sup>th</sup> Sept-15 <sup>th</sup> Oct<br>(Mustard) | 15 <sup>th</sup> Sept – 30 <sup>th</sup> Sept<br>(Sorghum fodder) | -   | -  | -   |
|             | Rabi-Irrigated  | 1 <sup>st</sup> Oct -15 <sup>th</sup> Oct<br>(Mustard)  | 15 <sup>th</sup> Nov - 7 <sup>th</sup> Dec<br>(Wheat)             | 1 <sup>st</sup> Nov – 31 <sup>st</sup> Nov<br>(Isabgol) | 7 <sup>th</sup> Nov- 21 <sup>st</sup> Nov<br>(Cumin) | 15 <sup>th</sup> Dec-15 <sup>th</sup> Jan (Onion) |

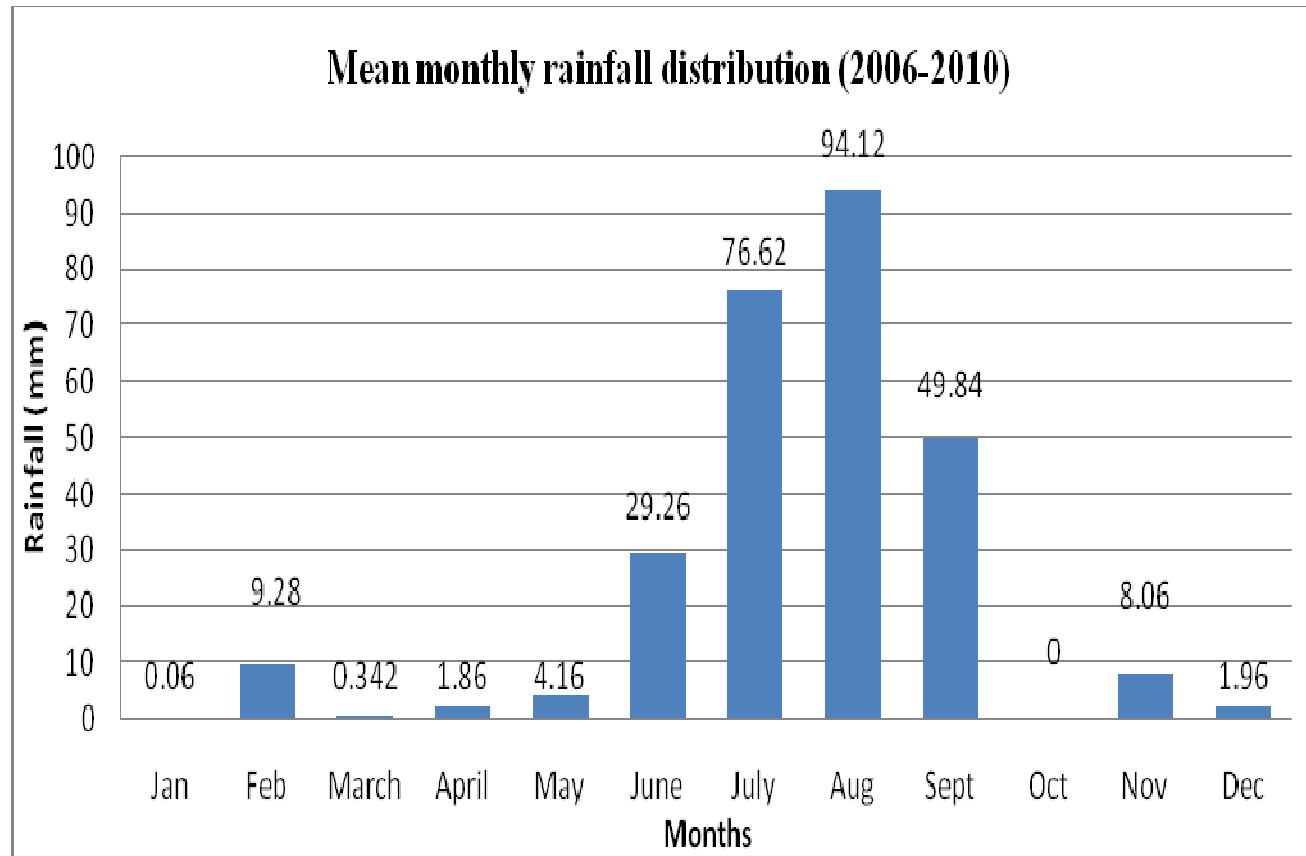
|                  |  |                            |                                |                                |
|------------------|--|----------------------------|--------------------------------|--------------------------------|
| <b>1.13</b>      | <b>What is the major contingency the district is prone to? (Tick mark)</b> | Regular                    | Occasional                     | None                           |
|                  | Drought  | √                          | -                              | -                              |
|                  | Flood  | -                          | -                              | √                              |
|                  | Cyclone  | -                          | -                              | √                              |
|                  | Hail storm   | -                          | -                              | √                              |
|                  | Heat wave  | √                          | -                              | -                              |
|                  | Cold wave  | -                          | √                              | -                              |
|                  | Frost  | -                          | √                              | -                              |
|                  | Sea water intrusion  | -                          | -                              | √                              |
|                  | Pests and disease outbreak (specify)                                       | Pearl millet: Downy mildew | Moong & Moth: Leaf curl mosaic | Sesame: Macrophomina, phyllody |
| Others (specify) | -  | -                          | -                              |                                |

|      |  |   |               |
|------|--|---|---------------|
| 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**  
**Location map of Jodhpur district**

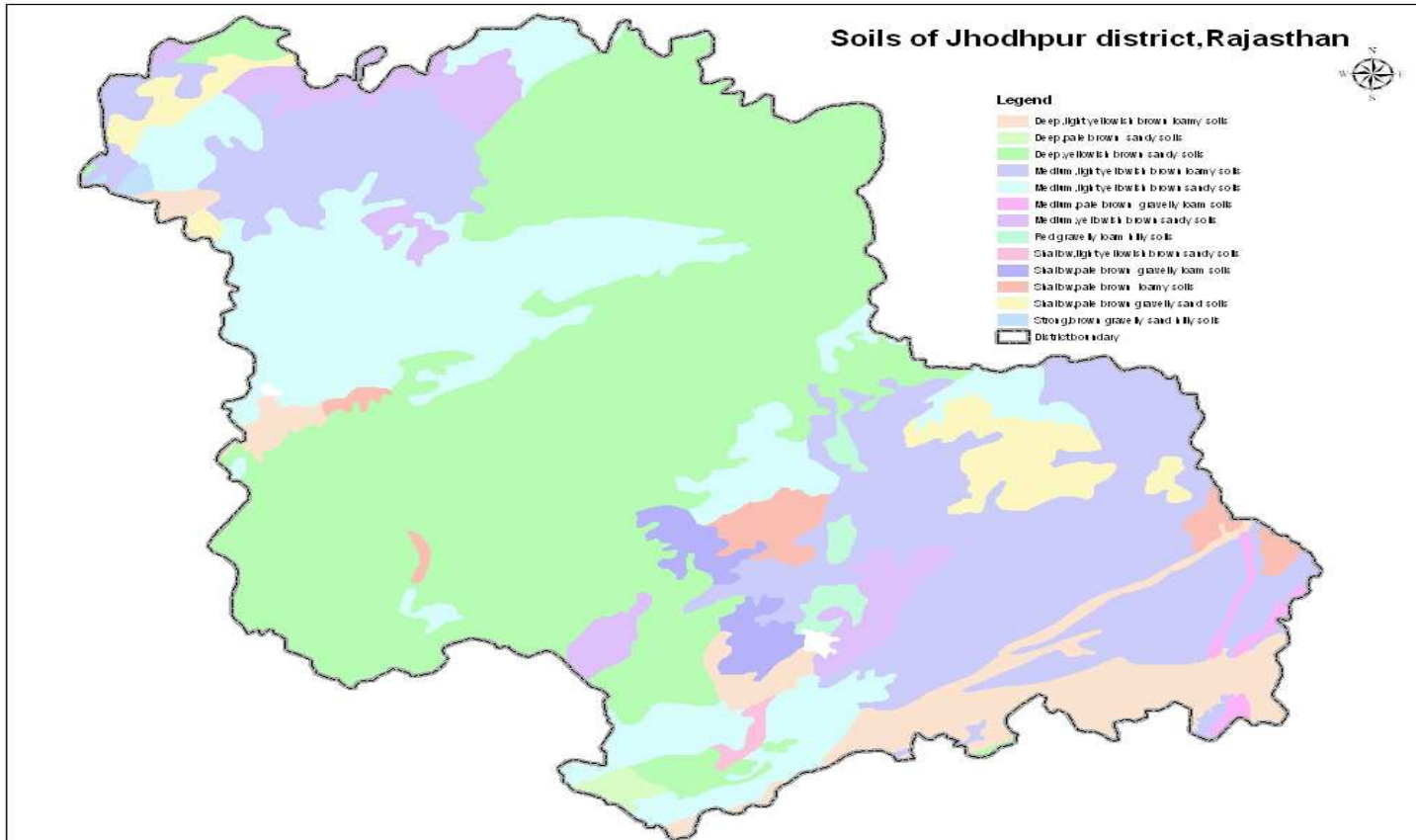


Annexure –II  
Mean monthly rainfall graph





Annexure –III  
Soil map



Source: NBSS&LUP, Regional Centre, Udaipur

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

| Condition                                    |   |                               | Suggested Contingency measures                     |  |  |
|--|---|-------------------------------|--|--|--|
| Early season drought (delayed onset)         | Major Farming situation   | Normal Crop / Cropping system | Change in crop / cropping system including variety | Agronomic measures   | Remarks on Implementation  |
| Delay by 2 weeks (3 <sup>rd</sup> week July) | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                  | No change  | <ul style="list-style-type: none"> <li>Use press wheel behind tine to secure good germination.</li> <li>Seed soaking with thiourea (0.05%) for four hours</li> </ul> | <ul style="list-style-type: none"> <li>Use certified seed from NSC, RSSC, SAU</li> <li>Provide subsidy by Ag. Dept. under RKVY for press wheel device</li> </ul> |
|  |   | Sesame                        | No change  | -  |  |
|  |   | Mothbean                      | No change  | Seed soaking with thiourea (0.05%) for four hours.   |  |
|  |   | Greengram                     | No change  | Seed soaking with thiourea (0.05%) for four hours.   |  |
|  |   | Cluster bean                  | No change  | Seed soaking with thiourea (0.05%) for four hours.   |  |

| Condition   |   |                             | Suggested Contingency measures                                     |  |  |
|---|---|-----------------------------|--|--|--|
| Early season drought (delayed onset)              | Major Farming situation   | Normal Crop/cropping system | Change in crop/cropping system                                     | Agronomic measures   | Remarks on Implementation  |
| Delay by 4 weeks (1 <sup>st</sup> week of August) | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                | No change<br>Use extra early hybrids viz. HHB 67, ICMH 356 GHB 358 | <ul style="list-style-type: none"> <li>Reduce <u>25% acreage</u> Sowing at 60 cm &amp; use press wheel</li> <li>Mix cropping with moth &amp; guar</li> </ul> | <ul style="list-style-type: none"> <li>Use certified seed from NSC, RSSC, SAU</li> <li>Provide subsidy by Ag. Dept. under RKVY for press wheel device</li> </ul> |
|   |   | Sesame                      | No change<br>Use RT 127 & RT 346                                   | -  |  |
|   |   | Mothbean                    | No change<br>Use RMO 40, RMO 257                                   | <ul style="list-style-type: none"> <li>Seed priming with 0.05% thiourea</li> <li>Increase seed rate of by 10-15%</li> </ul>                                  |  |
|   |   | Greengram                   | moth and guar  | <ul style="list-style-type: none"> <li>Seed priming with 0.05% thiourea</li> </ul>   |  |

|  |  |              |  |   |  |
|--|--|--------------|--|---|--|
|  |  |              |  | <ul style="list-style-type: none"> <li>• Increase seed rate of by 10-15%</li> </ul>   |  |
|  |  | Cluster bean | No change<br>Use RGC 936, RGC 1003 & RGM 112 | <ul style="list-style-type: none"> <li>• Seed priming with 0.05% thiourea</li> <li>• Increase seed rate of by 10-15%</li> </ul> |  |

| Early season drought (delayed onset)               | Major Farming situation   | Normal Crop/cropping system | Change in crop/cropping system      | Agronomic measures  | Remarks on Implementation  |
|--|---|-----------------------------|-------------------------------------|---|--|
| Delay by 6 weeks<br>2 <sup>nd</sup> week of August | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                | Guar, moth and Sorghum fodder crops | <ul style="list-style-type: none"> <li>• Seed priming with 0.05% thiourea in moth and guar</li> <li>• Increase seed rate by 15-20 %.</li> </ul> | Use certified seed from NSC, RSSC, SAU<br>Provide subsidy for thiourea |
|  |   | Sesame                      | moth and guar                       | Increase seed rate by 15-20 %.  |  |
|  |   | Mothbean                    | No change<br>Use RMO 40             | <ul style="list-style-type: none"> <li>• Seed priming with 0.05% thiourea</li> <li>• Increase seed rate of by 15-20 %.</li> </ul>               |  |
|  |   | Greengram                   | moth & guar                         | Increase seed rate by 15-20 %.  |  |
|  |   | Cluster bean                | No change<br>Use RGC 936            | <ul style="list-style-type: none"> <li>• Seed priming with 0.05% thiourea</li> <li>• Increase seed rate of by 15-20 %.</li> </ul>               |  |

| Condition                            |   |                             | Suggested Contingency measures |   |   |
|--------------------------------------|---|-----------------------------|--------------------------------|---|---|
| Early season drought (delayed onset) | Major Farming situation   | Normal Crop/cropping system | Change in crop/cropping system | Agronomic measures  | Remarks on Implementation   |
| Delay by 8 weeks<br>End of August    | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                | Keep fallow                    | Conserve soil moisture by <i>Bhakhar</i> & planking and utilize residual soil moisture for rabi crops like taramira (RTM 314), & fodder sorghum (Raj Chari 2) | <ul style="list-style-type: none"> <li>• Use certified seed from NSC, RSSC, SAU</li> <li>• Provide subsidy for farm implements</li> </ul> |
|                                      |   | Sesame                      | -do-                           |   |   |
|                                      |   | Mothbean                    | -do-                           |   |   |
|                                      |   | Greengram                   | -do-                           |   |   |
|                                      |   | Cluster bean                | -do-                           |   |   |

| 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                                     |
| <b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b> | Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                | Timely weed control by wheel hand hoe | Vegetative and dust mulching                   | Link RKVY for CIAE wheel hand hoe for inter-culture operation |
|   |  | Sesame                      | -do-                                  | -do-   |   |
|   |  | Mothbean                    | -do-                                  | -do-   |   |
|   |  | Greengram                   | -do-                                  | -do-   |   |
|   |  | Clusterbean                 | -do-                                  | -do-   |   |

| 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 Implementation  |
| <b>At vegetative stage</b>   | Low rain fall, Sand Dunes with undulating inter-dunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet                | Remove 25% within row<br>Timely weed control by wheel hand hoe | Dust and vegetative mulch<br>• Delay top dressing urea<br>• Provide life saving irrigation if available.<br>• Spray of thiourea at 500 ppm | Water harvesting structures be constructed with larger catchment area under MGNREGA, NHM, RKVY, NFSM, ISOPOM etc<br>Provide subsidy for thiourea |
|  |  | Sesame                      | Timely weed control  | • Spray of Urea (2%), Provide life saving irrigation.<br>• Weeding, using dust & vegetative mulch  |  |
|  |  | Mothbean                    | Timely weed control by hoe-                                    | • Spray of thiourea at 500 ppm at vegetative.<br>• Weeding, using dust & vegetative mulch  |  |
|  |  | Greengram                   | Timely weed control by hoe                                     | • Spray of thiourea at 500 ppm at vegetative<br>• Weeding, using dust & vegetative   |  |

|                           |   |              |                            |  |  |
|---------------------------|---|--------------|----------------------------|--|--|
|                           |   |              |                            | mulch  |  |
|                           |   | Cluster bean | Timely weed control by hoe | <ul style="list-style-type: none"> <li>• Spray of thiourea at 500 ppm at vegetative</li> <li>• Weeding, using dust &amp; vegetative mulch</li> </ul> |  |
| <b>Reproductive phase</b> | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils (Rainfed) | Pearl millet | Timely weed control by hoe | Spray of thiourea at 500 ppm<br>Provide life saving irrigation   |  |
|                           |   | Sesame       | Timely weed control by hoe | Spray of urea (2%),<br>Provide life saving irrigation  |  |
|                           |   | Moth         | Timely weed control by hoe | Spray of thiourea at 500 ppm at reproductive stage.<br>Life saving irrigation  |  |
|                           |   | Mothbean     | Timely weed control by hoe | Spray of thiourea at 500 ppm at reproductive stage.<br>Life saving irrigation  |  |
|                           |   | Greengram    | Timely weed control by hoe | Spray of thiourea at 500 ppm at reproductive stage.<br>Life saving irrigation  |  |

| Condition                     | Major Farming situation   | Normal Crop/cropping system | Suggested Contingency measures   |   |  |
|-------------------------------|---|-----------------------------|--|---|--|
|                               |   |                             | Crop management  | Rabi Crop planning measues                              | Remarks on Implementation                              |
| (Early withdrawal of monsoon) | Low rain fall, Sand Dunes with undulating interdunal spaces/ Deep sandy plain/ Coarse to fine textured hard pan soils | Pearl millet                | Life saving irrigation if feasible<br>If damage will be severe, harvest for fodder | Sowing of Barley using poor quality water in Luni basin | Link watersheds, NREGS for water harvesting technology |
|                               |   | Sesame                      | Life saving irrigation if feasible<br>If damage will be severe, harvest for fodder | -   |  |

|  |           |              |      |   |  |
|--|-----------|--------------|------|---|--|
|  | (Rainfed) | Moth         | -do- | - |  |
|  |           | Moong        | -do- | - |  |
|  |           | Cluster bean | -do- | - |  |

### 2.1.2 Irrigated situation

| Condition  | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures |                    |                           |
|--|-------------------------|-----------------------------|--------------------------------|--------------------|---------------------------|
|  |                         |                             | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Delayed release of water in canals due to low rainfall |                         |                             | Not applicable                 |                    |                           |

| Condition  | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures |                                 |                           |
|--|-------------------------|-----------------------------|--------------------------------|---------------------------------|---------------------------|
|  |                         |                             | Change in crop/cropping system | Agronomic measures <sup>1</sup> | Remarks on Implementation |
| Limited release of water in canals due to low rainfall |                         |                             | Not applicable                 |                                 |                           |

| Condition  | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures |                    |                           |
|--|-------------------------|-----------------------------|--------------------------------|--------------------|---------------------------|
|  |                         |                             | Change in crop/cropping system | Agronomic measures | Remarks on Implementation |
| Non release of water in canals under delayed onset of monsoon in catchment |                         |                             | Not applicable                 |                    |                           |

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

| Condition   | Major Farming situation | Normal Crop/cropping system | Suggested Contingency measures  |   |  |
|---|-------------------------|-----------------------------|---|---|--|
|   |                         |                             | Change in crop/cropping system  | Agronomic measures  | Remarks on Implementation  |
| Insufficient groundwater recharge due to low rainfall | Irrigated conditions    | Groundnut                   | Reduce area under Groundnut<br>Cotton castor,   | Use low water requiring cultivars<br>Use sprinkler or drip irrigation system, | <ul style="list-style-type: none"> <li>• Use certified seed of from NSC, RSSC, SAU</li> <li>• Provide subsidy for MIS</li> </ul> |
|   |                         | castor                      | Castor  | -do-  |  |
|   |                         | cotton                      | cotton  | -do-  |  |
|   |                         | chilli                      | Chilli/Taramira   | -do-  |  |
|   |                         | Wheat                       | Sowing of early maturing and drought tolerant varieties of  | -do-  |  |
|   |                         | Mustard                     | Sowing of early maturing and drought tolerant varieties of Mustard (Bio 902),   | -do-  |  |
|   |                         | Cumin                       | Cumin RZ 209 or Taramira (RTM 314) with limited irrigation can be grown if conserved moisture is available because of late season rain fall | -do-  |  |
|   |                         | Isabgol                     | Isabgol (RI 1)  | -do-  |  |

### 2.1. Un-timely (unseasonal) rains

| Condition   | Suggested contingency measure   |  |   |  |
|---|---|--|---|--|
|   | Vegetative stage  | Flowering stage  | Crop maturity stage   | Post Harvest   |
| Continuous high rainfall in a short span leading to water logging |   |  |   |  |
| Pearlmillet   | <ul style="list-style-type: none"> <li>• Drain excess water as early as possible</li> <li>• Inter cultivation with hoe</li> <li>• Apply 20 kg additional N /</li> </ul> | <ul style="list-style-type: none"> <li>• Drain excess water as early as possible</li> <li>• Inter cultivation with hoe</li> <li>• Apply 20 kg additional N / ha</li> </ul> | <ul style="list-style-type: none"> <li>• Drain excess water as early as possible</li> <li>• Harvest at physiological</li> </ul> | Dry the grain to optimum moisture content before storage |

|  |  |                                |          |  |
|--|--|--------------------------------|----------|--|
|  | ha after<br>• draining of excess water | after draining of excess water | maturity |  |
|--|--|--------------------------------|----------|--|

| <b>Horticulture</b>  |  |  |  |   |
|--|--|--|--|---|
| <b>Condition</b>   | <b>Suggested contingency measure</b>   |  |  |   |
| <b>Heavy rainfall with high speed winds in a short span</b>    | <b>Vegetative stage</b>  | <b>Flowering stage</b>   | <b>Crop maturity stage</b>   | <b>Post Harvest</b>   |
| Mustard  | Drain excess water with proper drainage mechanism<br>Use 10-15kg N/ha to regain lost vigor<br>Improve aeration of soil with hoe  | Drain excess water with proper drainage mechanism<br>Use 10-15kg N/ha to regain lost vigor<br>Improve aeration of soil with Bhakhar<br>Use multi nutrient spray or planofix to promote flowering | Drain excess water<br>Spraying of 0.2 % <i>Trichoderma hamatum</i> + <i>T.Viride</i> for control of stem rot     | Drying of the produce immediately after stoppage of rain                    |
| Wheat  | Drain excess water with proper drainage<br>Interculture to loosen the soil, control weeds and to improve aeration at optimum moisture content<br>Top dress 10-15kg N/ha to regain lost vigor | Drain excess water<br>Spray 2% urea<br><br>Hormonal spray is advised to induce flowering   | Stop irrigation in lodged crop<br>Drain excess water as early as possible<br>Harvest the crop on clear sunny day | Drying of the produce immediately after stoppage of rain                    |
| <b>Horticulture</b>  |  |  |  |   |
| Ber  | N.A.   | Foliar spray of NAA 50 ppm   | -  | Dispose of the dropped fruits or prepare value added products               |
| <b>Outbreak of pests and diseases due to un-seasonal rains</b> |  |  |  |   |
| Cumin  |  | Blight   | Spraying 0.2% Mancozeb/<br>carbendazim<br>Spray of wettable sulphur/<br>sulphur dusting                          | Dry the produce before storage to prevent storage pest and fungal infection |
| Mustard  | Useoxydemeton,methyl25EC or Dimethotata 30 EC @625,850 and 1000ml dissolved in 625,850,1000lit of  | Mechanical control. And spray the crop with malathion 50EC at 1000ml in 500liters of water/ha  | To prevent stem rot disease spray 0.2% Carbendizim   | -do-  |



|  |   |                                   |  |  |
|--|---|-----------------------------------|--|--|
|  | water/harespectively and 3 sprays at 15 days interval to control aphids | to control Bihar hairy caterpilla |  |  |
|--|---|-----------------------------------|--|--|

### 2.3 Floods Not Applicable

| Condition                                   | Suggested contingency measure |                  |                    |            |
|---|-------------------------------|------------------|--------------------|------------|
|   | Seedling / nursery stage      | Vegetative stage | Reproductive stage | At harvest |
| Transient water logging/ partial inundation |                               |                  |                    |            |
| Crop1                                       | N.A.                          | N.A.             | N.A.               | N.A.       |
| Continuous submergence for more than 2 days | N.A.                          | N.A.             | N.A.               | N.A.       |
| Sea water inundation                        | N.A.                          | N.A.             | N.A.               | N.A.       |

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

| Extreme event type  | Suggested contingency measure |                  |   |            |
|---------------------|-------------------------------|------------------|---|------------|
|                     | Seedling / nursery stage      | Vegetative stage | Reproductive stage  | At harvest |
| <b>Heat Wave</b>    |                               |                  |   |            |
| Wheat               | N.A.                          | N.A.             | Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage                                | -          |
| Mustard             | -                             | -                | Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage                                | -          |
| Chickpea            | N.A.                          | N.A.             | Apply surface irrigation, spray 1000 ppm thiourea at grain filling stage                                | -          |
| Cotton              | N.A.                          | -                | Spray with 2% KNO <sub>3</sub>  | N.A.       |
| <b>Horticulture</b> |                               |                  |   |            |
| Kinnow              | N.A.                          | N.A.             | N.A.  | N.A.       |
| <b>Cold wave</b>    |                               |                  |   |            |
| Mustard             | N.A.                          | N.A.             | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , apply light surface irrigation or spray 500 ppm thiourea | N.A.       |
| Chickpea            | N.A.                          | N.A.             | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , apply light surface irrigation or                        | N.A.       |

|                     |             |  |   |             |
|---------------------|-------------|--|---|-------------|
|                     |             |  | spray 500 ppm thiourea  |             |
| Castor              | N.A.        | N.A.   | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , apply light irrigation or spray 500 ppm thiourea | N.A.        |
| <b>Horticulture</b> |             |  |   |             |
| Aonla               | N.A.        | N.A.   | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> or spray 500 ppm thiourea                          | -           |
| <b>Frost</b>        |             |  |   |             |
| Mustard             | N.A.        | N.A.   | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , smoking at night, apply light irrigation         | N.A.        |
| Chickpea            | N.A.        | Apply surface irrigation, Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , or spray 500 ppm thiourea | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , smoking at night, apply light surface irrigation | N.A.        |
| Castor              | N.A.        | N.A.   | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , smoking at night, apply light surface irrigation | N.A.        |
| <b>Horticulture</b> |             |  |   |             |
| Aonla               | N.A.        | N.A.   | Spray of 0.1% H <sub>2</sub> SO <sub>4</sub> , or spray 500 ppm thiourea                        | -           |
| <b>Hailstorm</b>    |             |  |   |             |
| Wheat               | N.A.        | N.A.   | -   | -           |
| Mustard             | N.A.        | N.A.   | -   | -           |
| Chickpea            | N.A.        | N.A.   | -   | -           |
| <b>Horticulture</b> |             |  |   |             |
| Kinnow              | N.A.        | N.A.   | -   | -           |
| <b>Cyclone</b>      | <b>N.A.</b> | <b>N.A.</b>  | <b>N.A.</b>   | <b>N.A.</b> |

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

|                              | Suggested contingency measures  |  |  |
|------------------------------|---|--|--|
|                              | Before the event  | During the event   | After the event  |
| <b>Drought</b>               |   |  |  |
| Feed and Fodder availability | <p>As the district frequently prone to drought, it should have some feed and fodder reserves at any point of the year for mobilization to the drought affected villages, Hence the under mentioned feed reserves should be created at district head quarter</p> <p>Urea molasses mineral bricks (UMMB):50-100 t<br/>Hay:100-250 t<br/>Concentrates: 20-50 t<br/>Minerals and vitamin supplements mixture:5-10 t</p> <p>Available crop residues especially Bajra Karabi, Wheat/barley straw/ Chopped sewan/Dhaman/Bharut/ Dry leaves of Jharberi/ Groundnut bhusa should be stored properly in the farm of hay at individual farmer level.</p> <p>Harvest the top fodder (Khejari, Neem, Subabul, Acasia, Pipol etc) and create fodder banks at village level</p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component</p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production</p> <p>Increase area under short duration fodder crops of</p> | <p>Harvest and use all the failed crop (Sorghum, Mothbean, Clusterbean, Greengram Wheat, Groundnut etc..) material as fodder and feed the Livestock.</p> <p>Use judiciously the karabi, Preserved sewan /Dhaman /Bharut, Wheat straw, Lopped Khejari</p> <p>High productive animals should be Supplemented with tree fodder</p> <p>Available feed and fodder should be cut from CPRs and stall fed in order to reduce the energy requirements of the animals</p> <p><b>In case of Severe drought:</b> UMMB, hay, concentrates and vitamin &amp; mineral mixture should be transported to the drought affected villages</p> <p>All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals</p> <p>Provision of emergency grazing/feeding (Cow-calf camps or other special arrangements to protect high productive &amp; breeding stock)</p> <p>Available kitchen waste should be mixed with dry fodder while feeding</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans should be provided to the livestock</p> | <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p> |

|                                      |   |  |  |
|--------------------------------------|---|--|--|
|                                      | <p>sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAIN T BAJRA, L-74, K-677, Ananad/African Tall, Kisan composite, Moti, Manjari, B1-7 etc.) on farmers fields with some input subsidy</p> <p>Avoid burning of wheat straw</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon</p> <p>Proper drying, bailing and densification of harvested grass</p> <p>Capacity building and preparedness of the stakeholders and official staff for the extreme events</p>          | keepers for procurement of feed  |  |
| <b>Heat &amp; Cold wave</b>          | <p>Arrangement for protection from <b>heat wave</b></p> <ol style="list-style-type: none"> <li>i) Provision shed with bamboo/thatched material</li> <li>ii) Plantation around the shed</li> <li>iii) H<sub>2</sub>O sprinklers / foggers in the shed</li> <li>iv) Application of white reflector paint on the roof</li> </ol> <p><b>Cold wave :</b> 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)</p> | <p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Put on the foggers / sprinklers during heat waves and heaters during cold waves</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H<sub>2</sub>O during severe heat waves.</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p> | <p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>  |
| <b>Health and Disease management</b> | <p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p>  | <p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of</p>  | <p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and</p> |

|                  |   |  |  |
|------------------|---|--|--|
|                  | <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health &amp; management measures.</p> <p>Procure and stock multivitamins &amp; area specific mineral mixture</p>  | <p>any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Rescue of sick and injured animals and their treatment</p> <p>Organize with community, daily lifting of dung from relief camps</p> | <p>spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer</p> |
| <b>Insurance</b> | Encouraging insurance of livestock  | Listing out the details of the dead animals  | <p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>   |
| Drinking water   | <p>Identification of water resources</p> <p>Desilting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in shandies /community grazing areas</p> | <p>Restrict wallowing of animals in water bodies/resources</p> <p>Provide clean drinking water</p>   | <p>Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>  |

### 2.5.2 Poultry

|                              | Suggested contingency measures  |  |                                  |
|------------------------------|---|--|----------------------------------|
|                              | Before the event <sup>a</sup>   | During the event   | After the event                  |
| <b>Drought</b>               |   |  |                                  |
| Shortage of feed ingredients | <p>Storing of house hold grain like wheat, sorghum, bajra etc,</p> <p>Culling of weak birds</p> | <p>Supplementation only for productive birds with house hold grain</p> <p>Supplementation of shell grit (calcium) for laying birds</p> | Supplementation to all           |
| Drinking water               | Rain water harvesting   | Sanitation of drinking water   | Give sufficient water as per the |

|                                |  |  |   |
|--------------------------------|--|--|---|
|                                |  |  | bird's requirement  |
| Health and disease management  | Culling of sick birds.<br>Deworming and vaccination against RD and IBD                             | Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water  | Hygienic and sanitation of poultry house<br>Disposal of dead birds by burning / burying with lime powder in pit |
| <b>Heat wave</b>               |  |  |   |
| Shelter/environment management | Provision of proper shelter with good ventilation  | In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged<br>Don't allow for scavenging during mid day   | Routine practices are followed  |
| Health and disease management  | Deworming and vaccination against RD and IBD   | Supplementation of house hold grain<br>Provide cool and clean drinking water with electrolytes and vit. C<br>In hot summer, add anti-stress probiotics in drinking water or feed | Routine practices are followed  |
| <b>Cold wave</b>               |  |  |   |
| Shelter/environment management | Provision of proper shelter<br>Arrangement for brooding<br>Assure supply of continuous electricity | Close all openings with polythene sheets<br>In severe cases, arrange heaters<br>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<br>Antibiotics in drinking water to protect birds from pneumonia   | Routine practices are followed  |

### 2.5.3 Fisheries: Not Applicable.