

## State: UTTAR PRADESH

### Agriculture Contingency Plan for District: Kushinagar

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Eastern Plain, Hot Subhumid (moist) Eco-Region (13.10)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain Region (IV)		
	Agro Climatic Zone (NARP)	North Eastern Plain Zone (UP-8)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Bahraich, Basti, Deoria, Faizabad, Gonda, Gorakhpur, Kushi Nagar, Maharajgunj, Sant Kabir Nagar, Shrawasti, Sidharth Nagar		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		26 <sup>0</sup> 30' 16" N	83 <sup>0</sup> 47' 13" E	75m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Institute of Agricultural Sciences, Banaras Hindu University, Varanasi.		
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Vegetable Seed Production Farm, Sarghatia, Post Seroahi, Kushinagar		
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	-			

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June-Sep)	988.2	66	3 <sup>rd</sup> week of June	1 <sup>st</sup> week of October
	NE Monsoon(Oct-Dec)	66.3	3		
	Winter (Jan- March)	40.9	1		
	Summer (Apr-May)	49.7	2		

	Annual	1145.1	72	-	-
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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
	<b>Area ('000 ha)</b>	291.470	224.910	0.817	51.569	0.335	1.786	3.742	4.519	2.613	1.179

1.4	Major Soils (common names like red sandy loam deep soils (etc.))	Area ('000 ha)	Percent (%) of total
	Alluvial	-	-
	Calcareous	-	-
	Clay loam	-	-
	Loam	-	-
	Sandy loam	-	-

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	224.910	153.0
	Area sown more than once	119.213	
	Gross cropped area	344.123	

1.6	Irrigation	Area ('000 ha)	
	Net irrigated area	184.408	
	Gross irrigated area	267.671	
	Rainfed area	40.502	
	Sources of Irrigation	Number	Area ('000 ha)
	Canals		53.9
			Percentage of total irrigated area
			29.25

Tanks		0.1	0.04
Open wells		25	13.55
Bore wells		104	56.81
Lift irrigation schemes			
Micro-irrigation			
Other sources		0.6	0.35
Total Irrigated Area		184	
Pump sets			
No. of Tractors			
<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	<b>No. of blocks – 14</b>	<b>(%) area</b>	<b>Quality of water</b>
Over exploited			No problem of arsenic & fluoride. However, in majority of the area the problems of Calcium & Iron are reported
Critical			
Semi- critical			
Safe	Safe		
Wastewater availability and use			
Ground water quality			

\* Over exploited: ground water utilization > 100%, critical: 90-100%; semi-critical: 70 - 90%; safe: < 70%.

### 1.7 Area under major field crops & horticulture (as per latest figures 2007-08)

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Rice	108.102	14.402	122.504	-	-	-	-	122.504	
Maize	0.397	2.722	3.119	1.405	0.032	1.437	1.565	6.121	
Wheat	-	-	-	112.770	1.490	114.260	-	114.260	
Mustard	-	-	-	3.571	6.009	9.580	-	9.580	
Lentil	-	-	-	1.247	2.372	3.619	-	3.619	

	Sugarcane	-	-	-	-	-	-	69.662	69.662
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S. No	Horticultural Crops - Fruits (2004-05)	Total	Irrigated	Rainfed
	Mango	4.374	-	-
	Banana	0.194	-	-
	Jackfruit	0.083	-	-
	Litchi	0.052	-	-
	Guava	0.017	-	-
	<b>Horticultural Crops Vegetables (2004-05)</b>			
	Potato (2007-08)	1.626	1.190	0.436
	Greenpea	0.290	-	-
	Cauliflower	0.201	-	-
	Okra	0.199	-	-
	Cabbage	0.084	-	-
	Brinjal	0.073	-	-
	Onion (2007-08)	0.062	0.058	0.004
	<b>Medicinal and Aromatic crops</b>	<b>Total ('000 ha)</b>	<b>Irrigated ('000 ha)</b>	<b>Rainfed ('000 ha)</b>
		-	-	-
	<b>Plantation crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
		-	-	-

	<b>Fodder crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
		0.212	0.097	0.115
	<b>Grazing land</b>	-	-	-
	<b>Sericulture etc</b>	-	-	-

<b>1.8</b>	<b>Livestock (2007)</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Male + Female (&gt;3 Yrs) ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	23.740	37.559	55.653	116.952
	Improved cattle	-	-	-	-
	Crossbred cattle	4.084	13.682	12.237	30.003
	Non descriptive Buffaloes (local low yielding)	1.021	102.374	94.917	198.312
	Descript Buffaloes	-	-	-	-
	Goat	-	-	-	277.042
	Sheep	-	-	-	0.0
	Others (Pig)	-	-	-	16.301
	Commercial dairy farms (Number)	-	-	-	0.303

<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>
	Commercial	-	233.677
	Backyard	-	2.946

1.10 Fisheries (Data source: Chief Planning Officer)						
A. Capture						
i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
			0.0 (Govt.) + 241.0(Private)			
B. Culture						
			Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)	
i) Brackish water (Data Source: MPEDA/ Fisheries Department)			-	-	-	
ii) Fresh water (Data Source: Fisheries Department)			0.0(Govt.) + 209.0(Private)		0.0(Govt.)+ 0.3180 (Private) Angulikao-18015000	
Others						

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

1.11	Name of crop	<i>Kharif</i>		<i>Rabi</i>		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</b>										
	Rice	300.584	2457	-	-	-	-	300.584	2457	
	Maize	3.525	1210	2.969	2181	4.241	2314	10.735	1552	
	Wheat	-	-	299.512	2611	-	-	299.512	2611	

	Mustard	-	-	7.494	776	-	-	7.494	776	
	Lentil	-	-	2.703	713	-	-	2.703	713	
	Sugarcane	-	-	-	-	3645.012	52358	3645.012	52358	
Major Horticultural crops (Crops to be identified based on total acreage)										
Fruit Crop (2004-05)										
	Mango	-	-	-	-	-	-	16.191	370	
	Banana	-	-	-	-	-	-	7.035	3637	
	Jackfruit	-	-	-	-	-	-	2.075	2500	
	Litchi	-	-	-	-	-	-	0.163	314	
	Guava	-	-	-	-	-	-	0.147	865	
Horticultural Crops (2004-05)										
	<b>Vegetable Crops</b>									
	Potato	-	-	-	-	-	-	30.203	19069	
	Greenpea	-	-	-	-	-	-	2.389	824	
	Cauliflower	-	-	-	-	-	-	4.045	2012	
	Okra	-	-	-	-	-	-	1.967	988	
	Cabbage	-	-	-	-	-	-	1.906	2269	
	Brinjal	-	-	-	-	-	-	2.227	3051	
	Onion	-	-	-	-	-	-	0.976	1162	

<b>1.12</b>	<b>Sowing window for 5 major field crops</b>	<b>Rice</b>	<b>Maize</b>	<b>Wheat</b>	<b>Mustard</b>	<b>Lentil</b>	<b>Sugarcane</b>
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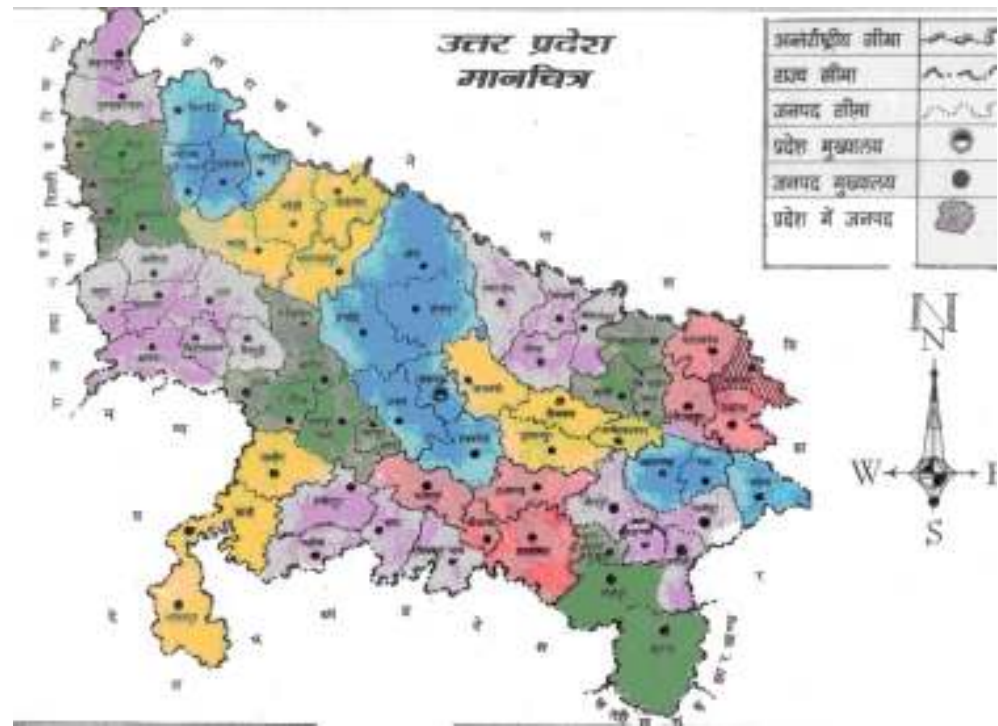
<i>Kharif- Rainfed</i>	4 <sup>th</sup> week of June to 1 <sup>st</sup> week of July	4 <sup>th</sup> week of June to 3 <sup>rd</sup> week of July				
<i>Kharif-Irrigated</i>	1 <sup>st</sup> week of June to 4 <sup>th</sup> week of June (nursery)	-	-		-	-
<i>Rabi- Rainfed</i>	-	2 <sup>nd</sup> week of October to 4 <sup>th</sup> week of October	2 <sup>nd</sup> week of October to 4 <sup>th</sup> week of October	2 <sup>nd</sup> week of October to 4 <sup>th</sup> week of October	2 <sup>nd</sup> week of October to 4 <sup>th</sup> week of October	October-November
<i>Rabi-Irrigated</i>		1 <sup>st</sup> week of November to 2 <sup>nd</sup> week of November	2 <sup>nd</sup> week of November to 4 <sup>th</sup> week of November	1 <sup>st</sup> week of November to 2 <sup>nd</sup> week of November		October-November
Summer irrigated		March/April	-	-	-	February-March

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

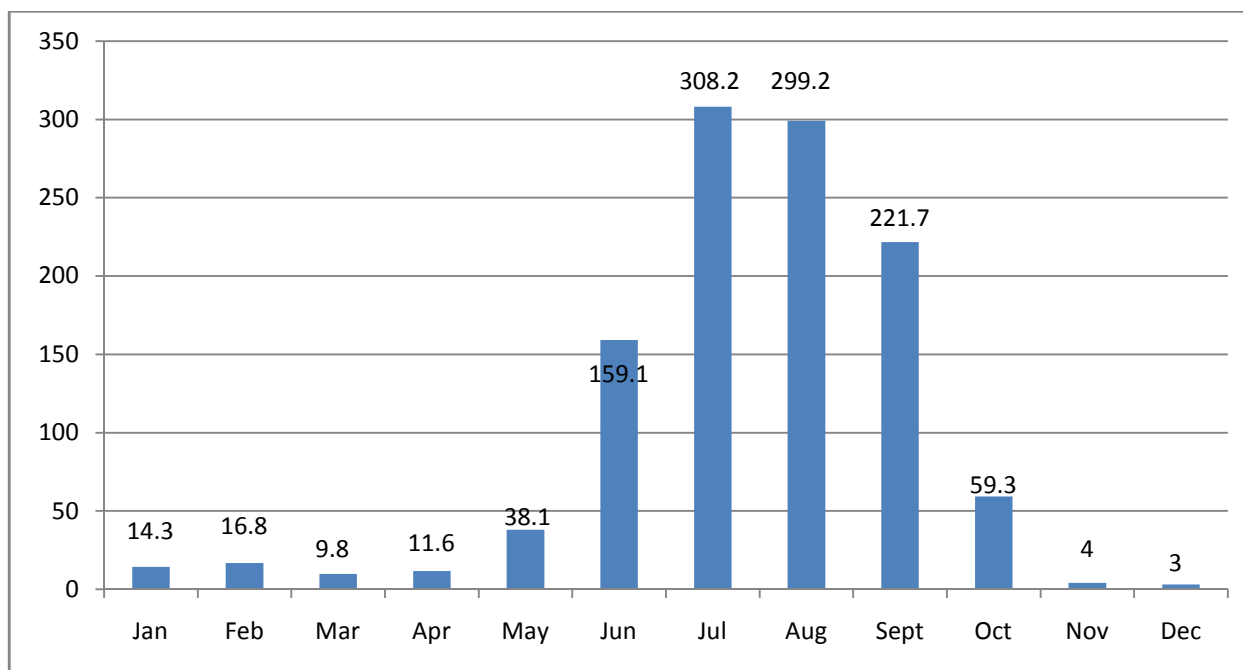
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure- 1	Enclosed: Yes
		Mean annual rainfall as Annexure- II	Enclosed: Yes
		Soil map as Annexure- III	Enclosed: Yes

### Annexure- I

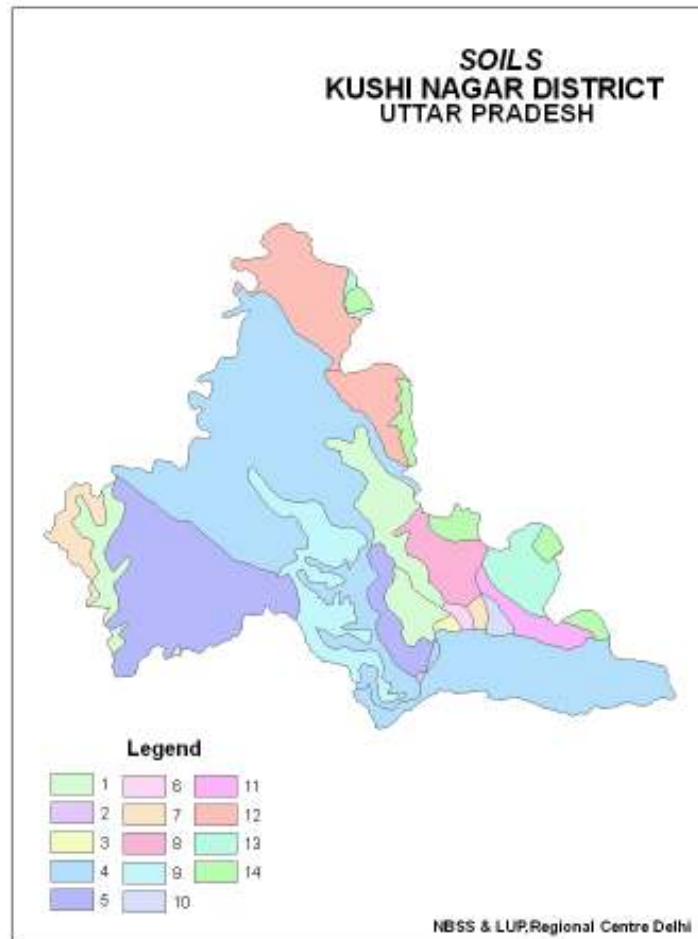




**Annexure - II: Mean Monthly Rainfall(mm)**



Annexure - III



**Alluvial plain (0-1% slope)**

1. Deep, loamy soils and slightly eroded.
2. Deep, loamy soils and slightly eroded associated with silty soils.
3. Deep, fine soils and slightly saline/sodic associated with loamy soils slightly salinity/ sodicity
4. Deep fine soils and slightly eroded associated with loamy soils
5. Deep, silty soils associated with loamy soils slightly eroded.
6. Deep, fine soils slight salinity and sodicity associated with loamy soils with moderate salinity and sodicity.
7. Deep, loamy soils and slight water logging associated with loamy soils slightly eroded.
8. Deep, silty soils and slightly eroded.
9. Deep, silty soils and slightly eroded associated with fine soils.

**Recent Alluvial Plain (1-3% slope)**

10. Deep, loamy soils with moderate water logging and slight salinity associated with fine soils, slightly water logging.
11. Deep, loamy soils and severely flooding and slight salinity/sodicity.
12. Deep, loamy soils with slight flooding.

**Active Flood Plain (1-3% slope)**

13. Deep, stratified loamy soils with but moderately flooding.
14. Deep, stratified loamy soils, with moderate flooding associated with sandy soils with moderate flooding.

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks 1 <sup>st</sup> week of July	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Rice short duration varieties: NDR 97, NDR 118, Varani Deep, Vandana, Govind, Shushk Samrat, Ashwini  Maize genotypes: Hybrids: Malaviya Makka-2, Ganga 2, Ganga 11, Shaktiman 2, Composites: Naveen, Kanchan, Sweta, Prabhat, gaurav, Pragati Desi: Jaunpuri	Direct sowing with seed cum ferti drills across the slope and re-sowing if no proper germination.	Breeder seed may be obtained from the University(NDUAT)  Seed drills under RKVY  Supply of seeds through NFSM
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Sugarcane + Maize ( <i>Kharif</i> and <i>Rabi</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander ( <i>Rabi</i> )	Sowing of maize in the standing crop of sugarcane during <i>Kharif</i> ; and Maize, Mustard and coriander between two rows of sugarcane during <i>Rabi</i> .	
		Medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Early maturing, semi dwarf and high yielding rice varieties such as NDR 97, NDR 118, Ratna, IR-36, NDR-80, Pant Dhan-12, HUR-105 and Pant Shankar dhan-1	Direct sowing in lines through Seed-cum Ferti drill, Use of seedlings from community nursery for transplanting
	<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> )		Sugarcane + Maize ( <i>Kharif</i> )	Ridge sowing of sugarcane and intercrops	

		Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season			
	Lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Water stagnation up to 1 m: Transplanting with tall rice varieties such as MTU-7029, GR-32, BPT-5204 When water stagnation is more than 1 m: Transplanting with tall rice varieties such as NDR- 8002, Jalmagana, Madhukar, Jal Priya, Jal Nidhi & Bar Avarodhi	Transplanting of rice seedlings should be completed before 15 <sup>th</sup> of July using community nurseries	

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 3 <sup>rd</sup> week of July	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Rice short duration varieties: NDR 97, NDR 118, Varani Deep, Vandana, Govind, Shushk Samrat, Ashwini Maize genotypes: Hybrids- Malaviya Makka-2, Ganga 2, Ganga 11, Shaktiman 2 Composites: Naveen, Kanchan, Sweta, Prabhat, gaurav, Pragati Desi :Jaunpuri	Direct sowing with seed cum ferti drills across the slope and re-sowing if no proper germination. If rainfall is adequate, transplanting of short duration rice varieties may be practiced from community nursery.	Breeder seed may be obtained from the University (NDUAT)  Seed drills under RKVY  Supply of seeds through NFSM
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Sugarcane + Maize Sugarcane + Mustard Sugarcane + Coriander	Sowing of maize in the standing crop of sugarcane during <i>Kharif</i> and Maize, Mustard and coriander between two rows of sugarcane during <i>Rabi</i> .	
	Rainfed medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard	Early maturing, semi dwarf and high yielding rice varieties such as NDR 97, NDR 118,	Direct sowing with seed cum ferti drills and re- sowing if no proper	

		Maize – Lentil	Ratna, IR-36, NDR-80, Pant Dhan-12, HUR-105 and Pant Shankar dhan-1	germination. Weed management through dry land weeder & also through weedicides. Conservation furrow, interculture. Surface water management	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Sugarcane + Maize ( <i>Kharif</i> and <i>Rabi</i> ) Sugarcane + Mustard Sugarcane + Coriander	Sowing of maize in the standing crop of sugarcane during <i>Kharif</i> and Maize, Mustard and coriander between two rows of sugarcane during <i>rabi</i> .	
	Rainfed lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Water stagnation up to 1 m: Transplanting with tall rice varieties such as MTU-7029, GR-32, BPT-5204 When water stagnation is more than 1 m: Transplanting with tall rice varieties such as NDR-8002, Jalmagana, Madhukar, Jal Priya, Jal Nidhi & Bar Avarodhi	Transplanting of rice seedlings should be started with the onset of the monsoon using community nurseries	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 6 weeks 1 <sup>st</sup> week of August	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Early maturing rice varieties: NDR 97, NDR 118, Varani Deep, Vandana, Govind, Shushk Samrat, Ashwini or Rice and Maize may be replaced by pearl millet and sole crop of pigeonpea.	Soil moisture conservation practices such as soil mulching with sugarcane leaves in standing sugarcane fields. Sowing of pigeonpea and pearl millet on	Breeder seed may be obtained from the University (NDUAT)  Seed drills under RKVY  Supply of seeds through NFSM

			Pearl millet :WCC 75, Raj 171, Pusa 23 Pigeonpea: Bahar, Narendra Arahari, Malviya Vukas(MA6) & Malviya Chamtkar (MA13)	ridges across the slope and re-sowing if no proper germination.	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Pigeonpea + Pearl millet ( <i>Kharif</i> ) Sugarcane + Maize Sugarcane + Mustard Sugarcane + Coriander	Earthing up in main crop of pigeonpea and sugarcane where as intercrops may be sown in furrows.	
	Medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Rice may be replaced by Pearl millet Pearl millet :WCC 75, Raj 171, Pusa 23	Sowing with seed cum ferti drills across the slope. Weed management through dry land weeder and thinning of population in case of pearl millet, conservation furrow and interculture. Surface water management	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Pigeonpea + Pearl millet ( <i>Kharif</i> ) Sugarcane + Maize Sugarcane + Mustard Sugarcane + Coriander	Earthing up in main crop of pigeonpea and sugarcane. Intercrops may be sown in furrows.	
	Lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Water stagnation up to 1 m: Transplanting with tall rice varieties such as MTU-7029, GR-32, BPT-5204 When water stagnation is more than 1 m: Transplanting with tall rice varieties such as NDR-8002, Jalmagana, Madhukar, Jal Priya, Jal Nidhi & Bar Avarodhi	Transplanting of rice seedlings should be started with the onset of the monsoon using community nurseries	

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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	Agronomic measures	Remarks on Implementation
<b>Delay by 8 weeks</b> 3 <sup>rd</sup> week of August	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Rice may be replaced by Pearl millet or sole crop of pigeonpea Pearl millet :WCC 75, Raj 171, Pusa 23 Pigeonpea (sole crop): Bahar, Narendra Arahar1, Malviya Vakas(MA6) & Malviya Chamtkar (MA13)	Sowing of pigeonpea and pearl millet on ridges across the slope and re-sowing if no proper germination.	Breeder seed may be obtained from the University (NDUAT)  Seed drills under RKVY  Supply of seeds through NFSM
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Intercropping of Pigeonpea + Pearl millet ( <i>Kharif</i> ) Sugarcane + Maize Sugarcane + Mustard Sugarcane + Coriander	Sowing of main crop of pigeonpea on ridges and earthing up of sugarcane crop.	
		Rainfed medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Rice may be replaced by Pearl millet Pearl millet: WCC 75, Raj 171, Pusa 23	
	<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season		Pigeonpea + Pearl millet	Sowing should be done on ridges of main as well as intercrops	



	Rainfed lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Water stagnation up to 1 m: Transplanting with tall rice varieties such as MTU-7029, GR-32, BPT-5204 When water stagnation is more than 1 m: Transplanting with tall rice varieties such as NDR-8002, Jalmagana, Madhukar, Jal Priya, Jal Nidhi & Bar Avarodhi	Transplanting of rice seedlings should be started with the onset of the monsoon using community nurseries	
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Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Early season drought (Normal onset)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Gap filling or re-sowing of crop with drought tolerant varieties of rice like NDR 97, Vandana and Govind Shushk Samrat through direct sowing Use of dust mulch/ straw mulch Intercultivation	Use of additional N @ 10kg/ha  Conservation furrow	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Earthing up in sugarcane and thinning in Maize to maintain proper plant spacing Gap filling and re-sowing of Maize	Conservation tillage Spray of 2% urea as foliar application	

	Medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Gap filling or re-sowing of crops if needed. Use of drought resistant/tolerant rice varieties. Re transplanting of rice seedlings from community nursery Use of dust mulch/straw mulch , Intercultivation	Use of additional N @10kg/ha  Conservation furrow	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Earthing up in main crops and thinning to maintain proper distance between the plants of intercrops (Maize). Gap filling and re-sowing of crops as per need	Conservation tillage Spray of 2% urea as foliar application	
	Lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Gap filling or re-sowing of crop as per need.  Use of dust mulch/ straw mulch  Retransplanting from community nursery as and when rains are received.	Use of additional N @10kg/ha  Conservation furrow	

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
At vegetative stage	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation, if possible Dust/ straw mulch Thinning Intercultivation	Use of additional N @10kg/ha Spray of 2% urea as foliar application Conservation furrow	

		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Earthing up in main crops and thinning to maintain proper distance between the plants of intercrops (Maize). Gap filling and re-sowing of crops as per need	Conservation tillage Spray of 2% urea as foliar application	
	Rainfed medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation if possible Dust/ straw mulch Thinning Intercultivation	Use of additional N @10kg/ha Spray of 2% urea as foliar application Conservation furrow	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Earthing up in main crops and thinning to maintain proper distance between the plants of intercrops (Maize). Gap filling and re-sowing of crops as per need	Conservation tillage Spray of 2% urea as foliar application	
	Rainfed low land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation if possible  Dust/ straw mulch  Thinning Intercultivation	Use of additional N @10kg/ha  Spray of 2% urea as foliar application Conservation furrow	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop Management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell)	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation if possible Harvest maize for fodder purpose	1) Spraying of 2% urea as foliar application. 2) 1% KCl Spray	Linkage for NREGS & CLDP

		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Give life saving irrigation from harvested water. Earthing up in sugarcane and maize crops.	1) Spraying of 2% urea as foliar application. 2) KCl Spray	
	Rainfed medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation to rice – one or two depending upon availability of water in canal	1) Spraying of 2% urea as foliar application. 2) KCl Spray	
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Give life saving irrigation from harvested water. Earthing up in sugarcane and maize crops	1) Spraying of 2% urea as foliar application. 2) KCl Spray	
	Rainfed lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation, if possible  Dust/ straw mulch  Thinning  Intercultivation	Use of additional N @10 kg/ha Spray of 2% urea as foliar application Conservation furrow Use of Azotobacter/ Azospirillum Use of Blue Green Algae @12.5kg/ha after 3-4 days of transplanting of rice seedlings	

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
	Deep alluvial soils, upland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Life saving irrigation, if possible Dust/ straw mulch Intercultivation Defoliate older leaves	Toria (Type-9, Bhavani) /Agati mustard may be sown during last week of September	Linkage for NREGS & CLDP

			Harvesting at physiological maturity.	to middle of October.
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	1) Harvesting at physiological maturity 2) Life saving irrigation	1) Spraying of 2% urea as foliar application. 2) KCl Spray
	Rainfed medium land	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Dust/ straw mulch Intercultivation Defoliate older leaves Harvesting at physiological maturity.	Toria/Agati mustard may be sown during last week of September to middle of October.
		<b>Inter cropping system</b> Sugarcane + Maize ( <i>Kharif</i> ) Sugarcane + Mustard ( <i>Rabi</i> ) Sugarcane + Coriander( <i>Rabi</i> ) Sugarcane sown during summer/ <i>rabi</i> season	Give live saving irrigation from harvested water. Earthing up in sugarcane and maize crops	1) Spraying of 2% urea as foliar application. 2) KCl Spray
	Rainfed lowland	<b>Sequence cropping</b> Rice-Lentil Rice-Mustard Maize – Lentil	Dust/ straw mulch Intercultivation Defoliate older leaves Harvesting at physiological maturity.	Use of Azotobacter/ Azospirillum, Use of Blue Green Algae @12.5kg/ha after 3-4 days of transplanting of rice seedlings. Toria/Agati mustard may be sown during last week of September to middle of October.

## 2.1 Drought

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	Deep to medium alluvial soils, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>rabi</i> )/ Greengram	Rice short duration varieties such as NDR 97, NDR 118, Varani Deep, Vandana, Govind, Shushk Samrat, Ashwini may be transplanted from community nursery	Community nursery, Direct seeding in small beds. Use of micro-irrigation systems <i>viz.</i> sprinkler & sub-surface irrigation.	Breeder seed will be supplied by BHU and NDAUT, Faizabad.  Seed drills RKVY and supply of seeds NFSM
	Deep alluvial soils Lowland, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Tall rice varieties such as Swarna, Cross-116, MTU-7029, GR-32 and BPT-5204	Transplanting of rice seedlings should be completed before 15 <sup>th</sup> of July through community based nursery	
Limited release of water in canals due to low rainfall	Alluvial soils with deep to medium land, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Short duration rice varieties NDR-118, NDR-97, Pant dhan-12, HUR-105, Vandana, Sushk samrat, Ashwini to be grown under aerobic condition	Community nursery, Direct seeding in small beds. Use of micro-irrigation systems <i>viz.</i> sprinkler & sub-surface irrigation.	
	Alluvial soil with deep lowland, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Tall rice varieties such as Swarna, Cross-116, MTU-7029, GR-32 and BPT-5204 may be transplanted with the onset of first shower or with the availability of first irrigation water from the canal	Transplanting of rice seed lings should be completed before 15 <sup>th</sup> of July through community based nursery	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Non release of water in canals under delayed onset of monsoon in catchment	Alluvial soil with deep to medium land, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Early maturing, semi dwarf and high yielding rice varieties such as Saket-4, NDR 97, NDR 118, Govind, Ashwini, HUR-105 and Pant shankar dhan-1 may be direct sown under aerobic conditions with the onset of monsoon.	Direct sowing in lines through Seed-cum Ferti drill, use of dust and straw mulch.	Breeder seed may be obtained from the University (NDUAT)  Seed drills under RKVY  Supply of seeds through NFSM
	Alluvial soil with deep lowland, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Direct sowing of tall rice varieties such as Type-3, Type-23, Mahsoori and Swarna with the onset of monsoon.	After heavy rainfall transplanting may be done with seedlings from community nursery.	

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	Alluvial soil with very deep medium & low land, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Early maturing, semi dwarf and high yielding rice varieties such as Saket-4, NDR 97, NDR 118, Govind, Ashwini, HUR-105 and Pant shankar dhan-1 may be direct sown under aerobic conditions with the onset of monsoon. If sowing of rice is not possible then grow fodder crops such as Sorghum and pearl millet Grow pearl millet for grain purpose.	Conservation tillage.	Breeder seed will be supplied by BHU and NDAUT, Faizabad.  Seed drills RKVY and supply of seeds NFSM

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	Alluvial soil with deep medium and lowland, canal irrigated	<b>Sequence cropping</b> Rice-Wheat Rice-Pea Rice-Mustard Maize-Potato Rice-Wheat-Sugarcane (2 years) Rice-Maize ( <i>Rabi</i> ) / Greengram	Shift to Pulses (Blackgram), Oilseeds (Sesame, Groundnut)	Direct seeding in small beds. Use of micro-irrigation systems viz. sprinkler & sub-surface irrigation.	Breeder seed will be supplied by BHU and NDAUT, Faizabad.  Seed drills RKVY and supply of seeds NFSM

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b> Rice	Provide drainage	Proper bunding, drain out excess water	Harvest at physiological maturity	Shift to safer place



Wheat	Provide drainage	Proper bunding, drain out excess water	Harvest at physiological maturity	Shift to safer place
Sugarcane	Provide drainage	Harvesting of crop before flowering	Harvest of crops	Shift to mills
Mustard	Provide drainage	Provide drainage	Harvest at physiological maturity	Shift to safer place
Maize	Provide drainage, Sowing on ridges	Provide drainage, Sowing on ridges	Provide drainage, harvesting of green cobs	Shift to safer place
Lentil	Provide drainage	Drain out excess water	Harvest at physiological maturity	Shift to safer place
<b>Horticulture</b>				
Potato	Ridge an furrow method of sowing, Drain out excess water	Digging of tubers before flowering	Drain out excess water and digging of pre-mature tubers	Shift to safer place
Greenpea	Provide drainage	Provide drainage	Harvest of green pods	Shift to safer place
Cauliflower	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Harvest of mature and pre-mature curds	Shift to market
Okra	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Drain out excess water, Plucking of mature and pre-mature fruits for vegetable purpose.	Shift to market
Cabbage	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Drain out excess water	Shift to market
Brinjal	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Harvest as per need based situation.	Shift to market
Onion	Drain out excess water	Drain out excess water	Drain out excess water	Shift to safer place
<b>Heavy rainfall with high speed Winds in short span</b>				
Rice	Drain out excess water	Drain out excess water and protect from wind speed with vegetable barriers	Drain out excess water and protect from wind speed with vegetable barriers	Keep the grains at safer place
Wheat	Drain out excess water	Drain out excess water and protect from wind speed with	Drain out excess water and protect from wind speed	Keep the grains at safer place

		vegetable barriers	with vegetable barriers	
Sugarcane	Plant should be tied in a group and drain out excess water	Sugarcane is harvested on or before flowering	Plant should be tied in a group and drain out excess water, Harvest the crop	Transport to mills
Mustard	Drain out excess water	Drain out excess water	Drain out excess water. Harvest at physiological maturity	Keep the grains at safer place
Maize	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Harvest of green cobs	Keep the cobs at safer place
Lentil	Drain out excess water	Drain out excess water, Grow dwarf and erect varieties of fieldpea	Drain out excess water, Harvesting of green pods	Keep the grains at safer place
<b>Horticulture</b>				
Potato	Drain out excess water	Drain out excess water	Drain out excess water. Harvesting of pre-mature tubers	Keep the tubers at safer place
Greenpea	Drain out excess water	Drain out excess water, Grow dwarf and erect varieties of fieldpea	Drain out excess water. Harvesting of green pods	Keep the green pods at safer place
Cauliflower	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges, Harvesting of pre-mature flowers	Shift to market
Okra	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges, Harvesting of pre-mature fruits	Shift to market as green vegetables
Cabbage	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges Harvesting of pre-mature buds	Shift to market as green vegetables
Brinjal	Drain out excess water, Sowing on ridges	Drain out excess water, Sowing on ridges	Harvesting as per need based situation.	Shift to market
Onion	Drain out excess water. Protect	Drain out excess water. Protect	Drain out excess water.	Shift to safer

	from high speed of winds	from high speed of winds	Protect from high speed of winds	place
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice	Need based plant protection (integrated pest and disease management)	Need based plant protection (integrated pest and disease management)	Need based plant protection (integrated pest and disease management)	Safe storage against stored grain pest and diseases
Wheat	-do	-do	-do	-do
Sugarcane	-do	-do	-do	-do
Mustard	-do	-do	-do	-do
Maize	-do	-do	-do	-do
Lentil	-do	-do	-do	-do

<b>Horticulture</b>				
Potato	Need based plant protection (integrated pest and disease management)	Need based plant protection (integrated pest and disease management)	Need based plant protection (integrated pest and disease management)	Safe storage against stored grain pest and diseases
Greenpea	-do-	-do-	-do-	-do-
Cauliflower	-do-	-do-	-do-	-do-
Okra	-do-	-do-	-do-	-do-
Cabbage	-do-	-do-	-do-	-do-
Brinjal	-do-	-do-	-do-	-do-
Onion	-do-	-do-	-do-	-do-

## 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation</b>				
Rice	Re sowing with short duration varieties	Provide drainage	Prevent premature seed germination	Harvesting at physiological maturity Shift to safer place
<b>Continuous submergence for more than 2 days</b>				
Rice	Varieties having submergence tolerance should be grown viz. Swarana sub-1, IR-64 sub-1 Community nursery	Re transplanting after cessation of flood from community nursery.	Prevent premature seed germination	Harvesting at physiological maturity
<b>Sea water intrusion</b>	Not Applicable			

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave</b>				
<b>Rice</b>	-	-	Provide Light irrigation to reduce temperature	Harvesting at physiological maturity
<b>Pigeonpea</b>	-	-	Provide Light irrigation	Harvesting at physiological maturity
<b>Wheat</b>	Provide irrigation	Provide Light irrigation	Provide Light irrigation	
<b>Lentil</b>	Pre irrigation before sowing	Provide Light irrigation	Provide Light irrigation to reduce temperature	
<b>Pea</b>	Pre irrigation before sowing	Provide Light irrigation	Provide Light irrigation	
<b>Horticulture</b>				
Potato	Provide Light irrigation	Provide Light irrigation	Provide Light irrigation	
Vegetable pea	Provide Light irrigation	Provide Light irrigation	Provide Light irrigation	

Cauliflower	Provide Light irrigation	Provide Light irrigation	Provide Light irrigation	
Tomato	Provide Light irrigation	Provide Light irrigation	Provide Light irrigation	
Chilli	Provide Light irrigation	Provide Light irrigation	Provide Light irrigation	
<b>Cold wave</b>				
Wheat	-	Provide irrigation to provide relief from cold wave		-
Lentil	-	Provide irrigation to provide relief from cold wave		-
Pigeonpea	-	Provide irrigation to provide relief from cold wave		-
<b>Horticulture</b>				
Mango	-	-	Smoking by burning waste material to increase temperature	-
<b>Frost</b>				
Wheat	-	-	Provide Light irrigation	
Pulse crops	-	-	Provide light irrigation	
<b>Horticulture</b>				
Mango	-	Provide light irrigation	Smoking in orchards to increase temperature by burning waste material	
<b>Hailstorm</b>	Not Applicable			
<b>Cyclone</b>	Not Applicable			

Sugarcane	Not experienced	Not experienced	Crop is harvested before the incidence of frost	Harvesting at physiological maturity
Mustard	Not experienced	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Not experienced
Lentil	Not experienced	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Harvesting of green pods
<b>Horticulture</b>				
Potato	Not experienced	Not experienced	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Digging of tubers as pre-mature stage
Green pea	Not experienced	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Harvesting of green pods
Cauliflower	Not experienced	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Keep the surroundings warm (burning the waste materials) and growing frost tolerant varieties	Harvesting at pre-mature stage
<b>Hailstorm</b>	Not applicable			
<b>Cyclone</b>	Not applicable			

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the events	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	Insurance Encourage perennial fodder on bunds and wasteland on community basis Establishing fodder banks, encouraging fodder crops in irrigated area	Utilizing fodder from perennial trees and Fodder bank reserves. Utilizing fodder stored in silage. Transporting excess fodder from adjoining districts Use of feed mixtures.	Availing Insurance

	Silage – using excess fodder for silage	Allow the cattle for grazing at barren lands.	
Drinking water	Preserving water in the tank for drinking purpose. Excavation of Bore wells	Using preserved water in the tanks for drinking. Wherever ground water resources are available priority for drinking purpose.	
Health and disease management	Veterinary preparedness with medicines and vaccines	Conducting mass animal Health Camps and treating the affected ones in Campaign	
<b>Floods</b>			
Feed and fodder availability	Grow the fodder crops at safer places (non- flood prone area)	Utilizing fodder from perennial trees and Fodder bank reserves. Utilizing fodder stored in silage. Transporting excess fodder from adjoining districts Use of feed mixtures. Shift the live stocks at safer place.	Availing insurance
Drinking water		Shift the live stocks at safer place where drinking water is available.	
Health and disease management	Veterinary preparedness with medicines and vaccines	Conducting mass animal Health Camps and treating the affected ones in Campaign	
<b>Cyclone</b>			
Feed and fodder availability			
Drinking water			
Health and disease management			
<b>Heat wave and cold wave</b>			
Shelter/environment management			
Health and disease management			

### 2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
<b>Drought</b>	Insurance & Integration Establishing feed reserve Bank	Utilizing from feed reserve banks	Availing insurance Strengthening feed	

			Reserve Banks	
Shortage of feed ingredients				
Drinking water				
Health and disease management	Emergency Veterinary preparedness with medicines vaccination to birds	Campaign and Mass Vaccination	Culling affected birds	
<b>Heat wave and cold wave</b>				
Shelter/environment management				
Health and disease management				

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
A. Capture			
B. Aquaculture			
<b>2) Floods</b>			
A. Capture			
B. Aquaculture			
<b>3. Cyclone / Tsunami</b>			
A. Capture			
B. Aquaculture			
<b>4. Heat wave and cold wave</b>			
A. Capture			
B. Aquaculture			