

**State: Bihar**

**Agriculture Contingency Plan for District : Sheikhpura**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	Eastern Plain, Hot Subhumid (moist) Eco-Region (13.1)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain Region (IV)		
	Agro Climatic Zone (NARP)	South Bihar Alluvial Plain Zone (BI-3)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Bhojpur, Patna, Nalanda, Nawada, Rohtas, Aurangabad, Gaya, Buxer, Jahanabad, Bhagalpur, Kaimur, Banka, Shekhpura, Munger and Jamui		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		24 <sup>0</sup> 45' and 25 <sup>0</sup> N	85 <sup>0</sup> 45' and 86 <sup>0</sup> 45' E	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agriculture Research Institute, Patna		
	Mention the KVK located in the district with address	KVK Ariari (Shekhpura) Village-Farpur Block, Ariari, Po.-		
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Indian Meterology Department , Airport Complex ,Patna			

<b>1.2</b>	<b>Rainfall</b>	<b>Normal RF(mm)</b>	<b>Normal Rainy days (number)</b>	<b>Normal Onset ( specify week and month)</b>	<b>Normal Cessation (specify week and month)</b>
	SW monsoon (June-Sep)	847.6	62	2 <sup>nd</sup> week of June	2 <sup>nd</sup> week of September
	NE Monsoon(Oct-Dec)	83.60	--	2 <sup>nd</sup> week of October	2 <sup>nd</sup> week of December
	Winter (Jan- Feb)	00.01	05	-	-
	Summer (Mar-May)	70.10	07	-	-
	Annual	1001.31	74	-	-

<b>1.3</b>	<b>Land use pattern of the district (latest statistics)</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>	67.1	57.6	0	5.7	0	0.4	-	0.2	-	0.2

<b>1.4</b>	<b>Major Soils</b>	<b>Area ('000 ha)</b>	<b>Percent (%) of total</b>
	1. Heavy Soils	33.5	50
	2. Sandy Loam Soils	15.0	22
	3. Clayey Soils	18.5	28

<b>1.5</b>	<b>Agricultural land use</b>	<b>Area ('000 ha)</b>	<b>Cropping intensity %</b>
	Net sown area	44.3	143
	Area sown more than once	19.0	
	Gross cropped area	63.5	

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>
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	Net irrigated area	29.8		
	Gross irrigated area	40		
	Rainfed area	14.5		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		7.6	19
	Tanks		0.9	2.4
	Open wells		12.0	30
	Bore wells		10.5	26.3
	Lift irrigation schemes			
	Micro-irrigation			0.007
	Other sources (please specify)			
	Total Irrigated Area		40.030	
	Pump sets	10.232		
	No. of Tractors		0	
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited			
	Critical			
	Semi- critical			
	Safe			
	Wastewater availability and use			
	Ground water quality			
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

### 1.7 Area under major field crops & horticulture

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	22.9		22.9					22.9
	Wheat				14.4		14.4		14.4
	Mustard				4.2		4.2		4.2
	Lentil					10.1	10.1		10.1
	Chickpea					1.5	1.5		1.5
	Maize	3.2		3.2	1.2		1.2		4.4
	<b>Horticulture crops - Fruits</b>	<b>Area ('000 ha)</b>							
		<b>Total</b>			<b>Irrigated</b>			<b>Rainfed</b>	
	Cauliflower	0.2			0.2				
	Cabbage	0.5			0.5				
	Tomato	0.9			0.9				
	Onion	2.7			2.7				
	Brinjal	0.4			0.4				
	Medicinal and Aromatic crops	<b>Total</b>			<b>Irrigated</b>			<b>Rainfed</b>	

	<b>Plantation crops</b>			
	<b>Fodder crops</b>			
	<b>Total fodder crop area</b>	8.3	4.9	3.4
	<b>Grazing land</b>			
	<b>Sericulture etc</b>			

<b>1.8</b>	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	24	19	43
	Improved cattle			
	Crossbred cattle	0.5	2.57	3.07
	Non descriptive Buffaloes (local low yielding)	6	27	33
	Descript Buffaloes			
	Goat			59
	Sheep			0.7
	Others (Camel, Pig, Yak etc.)			0
	Commercial dairy farms (Number)			0.01
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>	
	Commercial		80.8	
	Backyard		0	
<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)			
	<b>A. Capture</b>			
	<b>i) Marine</b> (Data Source: Fisheries)	<b>No. of fishermen</b>	<b>Boats</b>	<b>Nets</b>

Department)		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	facilities (Ice plants etc.)
<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)		30			17.5	
<b>ii) Fresh water</b> (Data Source: Fisheries Department)		200		3.2	338	

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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops identified based on total acreage)</b>										
	Rice	73.542	3200					73.5	3200	
	Wheat			31.6	2200			31.6	2200	
	Mustard			5.1	1200			5.1	1200	
	Lentil			8.1	800			8.1	800	
	Chickpea			1.5	1000			1.5	1000	
	Maize	9.050	2800	3.6	3000			12.6	2900	
<b>Major Horticultural crops (Crops identified based on total acreage)</b>										
	Cauliflower			3.6	18000			3.6	18000	

	Cabbage			10.8	23000			10.8	23000	
	Tomato			6.7	25000			6.7	25000	
	Onion			18.7	20000			18.7	20000	
	Brinjal			9.8	22000			9.8	22000	

<b>1.12</b>	<b>Sowing window for 5 major field crops</b> (start and end of normal sowing period)	<b>Rice</b>	<b>Wheat</b>	<b>Mustard</b>	<b>Lentil</b>	<b>Chickpea</b>
	Kharif- Rainfed	June - July	-	-	-	-
	Kharif-Irrigated	July-August	-	-	-	-
	Rabi- Rainfed	-	1 <sup>st</sup> week of November – 3 <sup>rd</sup> week of November	1 <sup>st</sup> week of October- 2 <sup>nd</sup> week of October	October - November	December
	Rabi-Irrigated	-	November- December	October-December	2 <sup>nd</sup> week of October – 2 <sup>nd</sup> week of November	-

<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	√		

<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: No

	Soil map as Annexure 3	Enclosed: Yes
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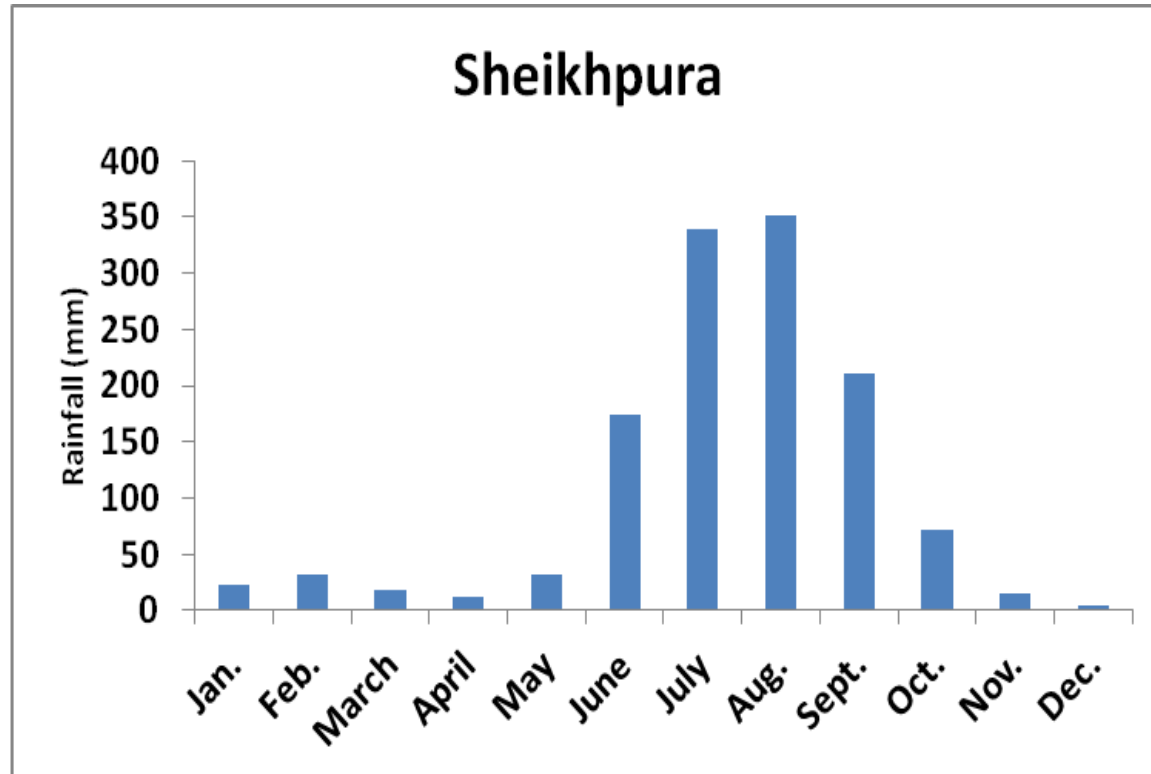
**Annexure-I**  
**Agro climatic Zones of Bihar**



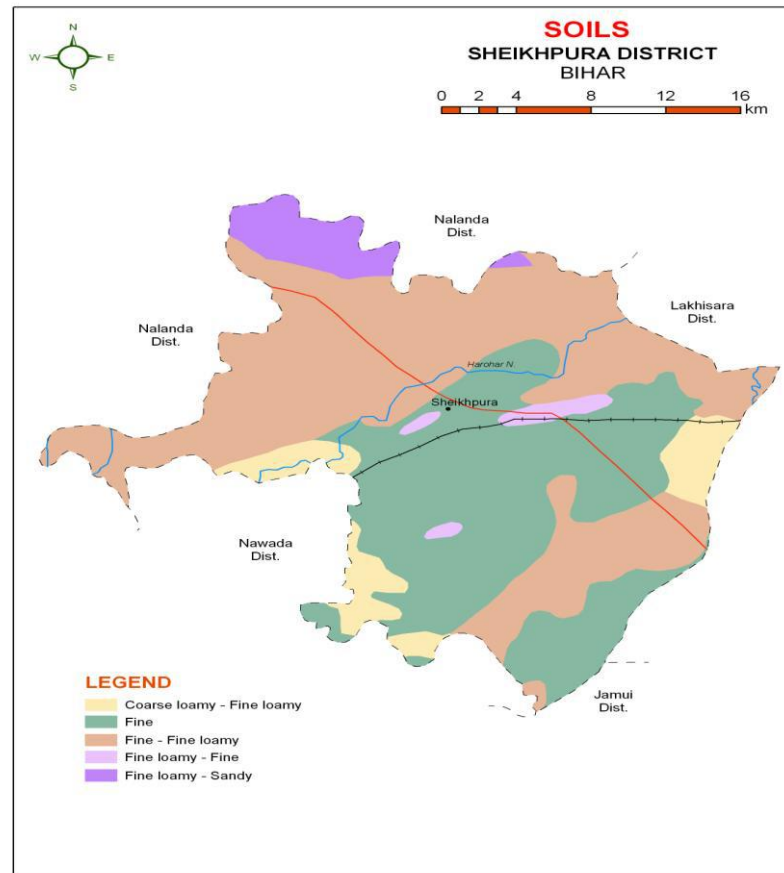
Source: krishi.bih.nic.in



Annexure-II



### Annexure-III



Source: NBSS&LUP, Kolkata

## 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
Early season drought (delayed onset)  Delay by 2 weeks  4 <sup>th</sup> week of June	Up land Medium to low deep sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	Maize-Pigeonpea Maize: Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3	<ul style="list-style-type: none"> <li>• Normal package of Practices</li> <li>• Gap filling</li> </ul>	-
	Mid land	Rice- Wheat Rice- Maize	Rice –Wheat Rice-Maize <b>Rice</b> – Pusa 2-21, Rajendra Suwasni Prabhat , Sita	<ul style="list-style-type: none"> <li>• Adopt normal package of practices</li> <li>• Direct seeding of drought tolerant varieties in dry soil in June/ July with pre emergence herbicide application under sufficient soil moisture conditions.</li> </ul>	
	Low land	Rice- Wheat Rice- Maize- Greengram	Rice- Wheat Rice- Maize- Green gram Medium to long duration  Rice- Rajendra Suwasni, Rajendra Sweta Rajendra Mahsuri -1	<ul style="list-style-type: none"> <li>• Raise staggered community nursery preferably with medium duration varieties in mid and lowlands</li> <li>• Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts.</li> <li>• Interculture for timely weed control in direct seeded rice Groundwater to be used for life saving irrigation to upland crops and transplanted rice</li> </ul>	

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 4 weeks 2 <sup>nd</sup> week of July	Up land  Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	Maize-Pigeonpea  Maize Shaktiman-1,2,3,4 Suwan, Ganga-11, Deoki, Pusa early hybrid Maka-3	<ul style="list-style-type: none"> <li>• Normal package of Practices</li> <li>• Gap filling</li> <li>• Balanced dose of NPK</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Mid land	Rice- Wheat Rice- Maize	Rice –Wheat Rice-Maize  Direct sowing / 20d old dapog seedlings with medium to short duration varieties – BR34, Rajendra Dhan-201(130-135d), Rajendra Bhagwati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita	<ul style="list-style-type: none"> <li>• Where field is moist, direct seeding of medium duration varieties (125 days) can be done during second fortnight of July in midlands. Post-emergence herbicide application use is essential</li> <li>• Use mat nursery/ dapog nursery , mat nursery (dapog method) can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August in mid and low lands</li> </ul>	
	Low land	Rice- Wheat Rice- Maize- Greengram	Rice- Wheat Rice- Maize- Green gram  Rice- Direct/ dapog seedlings with Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta, Swarna sub-1	<ul style="list-style-type: none"> <li>• Raise staggered community nursery preferably with short duration varieties in mid and lowlands</li> <li>• Transplant with 30-35 days old seedling may be used with 3-4 seedling per hill with close spacing.</li> </ul>	

				<ul style="list-style-type: none"> <li>Enhanced dose of nitrogen with full basal dose of NPK at the time of transplanting to boost the early vegetative growth in late plantings under sufficient moisture</li> <li>Timely interculture for weed control in direct seeded rice</li> <li>Life saving irrigation</li> </ul>	
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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 4 <sup>th</sup> week of July	Up land Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	Finger millet  Finger millet- DB-7, BR-5, BR-10, Coimbatore-1 Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant Urd -30 , Pant Urd-19	<ul style="list-style-type: none"> <li>Normal package of Practices</li> <li>Adequate dose of NPK</li> <li>IPM practices</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Mid land	Rice- Wheat Rice- Maize	Finger millet – Linseed  Finger millet- DB-7, BR-5, BR-10, Coimbatore-1		
	Low land	Rice- Wheat Rice- Maize- Greengram	Rice (Short duration)— Wheat/Lentil/ Chickpea  Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj	<ul style="list-style-type: none"> <li>Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of</li> </ul>	

			<p>Blackgram/ Finger millet-Wheat</p> <p>Blackgram- T-9, Navin, Pant urd-30 , 19</p> <p>Finger millet- DB-7, BR-5, BR-10, Coimbatore-1</p>	<p>medium duration varieties by first fortnight of August</p> <ul style="list-style-type: none"> <li>• Direct seedling of Rice</li> <li>• Raise staggered community nursery preferably with medium duration varieties in mid and lowlands</li> <li>• Enhanced basal dose of NPK to boost the early vegetative growth</li> <li>• Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts</li> <li>• Life saving irrigation</li> </ul>	
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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 8 weeks 2 <sup>nd</sup> week of August	Up land Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	Finger millet Finger millet- DB-7, BR-5, BR-10, Coimbatore-1	<ul style="list-style-type: none"> <li>• Normal package of Practices</li> <li>• Life saving irrigation</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Mid land	Rice- Wheat Rice- Maize	Finger millet – Linseed Finger millet- DB-7, BR-5, BR-10, Coimbatore-1		

			Sesame-Wheat/ Sesame : Krishna, Pragati	
	Low land	Rice- Wheat Rice- Maize- Greengram	Rice short duration (Direct seeded)-Wheat  Rice- Prabhat, Dhanlaxmi, Richharia, Turanta	<ul style="list-style-type: none"> <li>• Double transplanting of rice (karuhan) can be done with 30 + 45 days old seedlings of long duration or photosensitive varieties up to 30<sup>th</sup> August with close planting (40-45 hills per square meter)</li> <li>• Application of organic manure and vermi compost initially for Rice and other crops.</li> <li>• Sowing of <i>rabi</i> crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables can be taken up on time for maximizing productivity from lowlands with support from the government for timely supply of inputs and in a way <i>rabi</i> production would compensate the production loss during <i>kharif</i>.</li> <li>• Fodder varieties of</li> </ul>

				Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts	
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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)					
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.	Up land	Maize- Fallow Pigeonpea- Fallow	<ul style="list-style-type: none"> <li>• Gap filling of existing crop</li> <li>• Life saving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Mulching for moisture conservation</li> <li>• Conservation tillage</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Medium to low deep soil Sandy loam to clay loam soil				
	Mid land	Rice- Wheat Rice- Maize			
	Low land	Rice- Wheat Rice- Maize- Greengram			

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, consecutive 2 weeks rainless (>2.5 mm) period)					



At vegetative stage	Up land Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	<ul style="list-style-type: none"> <li>Life saving irrigation</li> <li>Gap filling of existing crop</li> </ul>	<ul style="list-style-type: none"> <li>Foliar application of 2% MOP</li> <li>Mulching for moisture conservation</li> <li>Conservation tillage</li> <li></li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Mid land	Rice- Wheat Rice- Maize	<ul style="list-style-type: none"> <li>Gap filling of existing crop</li> <li>Postponement of top dressing</li> <li>Life saving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Mulching through weeds,</li> <li>Foliar application of 2% MOP</li> </ul>	
	Low land	Rice- Wheat Rice- Maize- Greengram		Foliar application of 2% MOP	

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Up land Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	<ul style="list-style-type: none"> <li>Gap filling of existing crop</li> <li>Postponement of top dressing</li> <li>Life saving irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Foliar application of 2% MOP</li> <li>Mulching through weeds &amp; residue</li> </ul>	
	Mid land	Rice- Wheat Rice- Maize			
	Low land	Rice- Wheat Rice- Maize- Greengram			

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
Terminal drought (Early withdrawal of			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation

monsoon)					
	Up land Medium to low deep soil Sandy loam to clay loam soil	Maize- Fallow Pigeonpea- Fallow	<ul style="list-style-type: none"> <li>Foliar application of 2% MOP</li> <li>Mulching</li> <li>Clipping of leaves in maize</li> </ul> Life saving irrigation	<ul style="list-style-type: none"> <li>Open the furrow during evening and left furrow open overnight and plank in the next morning before sunrise for growing of early rabi crops like Gram, Lentil, Linseed.</li> <li>Stored water to be used at critical stage of growth of LSI</li> <li>Clean irrigation channel for preventing loss of moisture through seepage</li> <li>Zero tillage sowing of wheat</li> </ul>	Seeds from RAU, Pusa, NSC, TDC , BRBN etc
	Mid land	Rice- Wheat Rice- Maize			
	Low land	Rice- Wheat Rice- Maize- Greengram			

### 2.1.2 Drought - 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	Upland Canal irrigated	Rice- Wheat Rice- Potato Rice- Maize	Mustard- Greengram Maize- Potato Maize- Lentil Mustard- 66-197-3, Maize - Shaktiman-1,2,3,4, Suwan, Ganga-11, Deok Pusa early hybrid Macca-3	<ul style="list-style-type: none"> <li>Use of mulches</li> <li>Life saving irrigation</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Limited release of water in canals due to low rainfall	Upland Canal irrigated	Rice- Wheat- Greengram Rice- Potato- Summer vegetables Rice- Maize- Greengram	Rice- Wheat Rice- Potato Rice- Maize Rice- Prabhat, Dhanlaxmi, Richarria, Saroj	<ul style="list-style-type: none"> <li>Foliar application of 2% potash</li> <li>Life saving irrigation</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Low land Canal irrigated	Rice- Wheat- Greengram Rice- Potato Rice- Onion	Rice- Wheat Rice- Lentil/ Linseed Rice- Chickpea Rice- Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya		
Non release of water in canals under delayed onset of monsoon in catchment	Upland Canal irrigated	Rice- Wheat- Greengram Rice- Potato- Summer vegetables Rice- Maize- Greengram	Rice- Wheat Rice- Potato Rice- Maize Rice- Prabhat, Dhanlaxmi, Richarria, Saroj	<ul style="list-style-type: none"> <li>Foliar application of 2% MOP in standing crops</li> <li>Life saving irrigation</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Low land Canal irrigated	Rice- Wheat- Greengram Rice- Potato Rice- Onion	Rice- Wheat Rice- Lentil/ Linseed Rice- Chickpea Rice- Rajendra Bhagawati, Saroj, Rajendra Suwasni, Santosh, R. Kasturi, Sita, Jaya		

Condition		Normal Crop/cropping system	Suggested Contingency measures
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	Major Farming situation		Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Not Applicable				
Insufficient groundwater recharge due to low rainfall					

## 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	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Removal of excess water</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Sowing of subsequently crop, if totally damaged i.e. Toria</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Subsequent crop if totally damaged</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
Maize	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Removal of excess water</li> <li>• Resowing, if completely damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Sowing of alternative maize or other rabi crop if totally damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Subsequent if totally damaged</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
Pigeonpea	<ul style="list-style-type: none"> <li>• September sowing of red gram (var. Sharad), if, previous Pigeonpea crop is completely damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Sowing of alternative rabi maize or other crops like chilli \ tomato\ brinjal if</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place

	<ul style="list-style-type: none"> <li>• Gap filling, if needed</li> <li>• Removal of excess water</li> </ul>	totally damaged		
<b>Horticulture</b>				
Mango	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Replanting of crop if substantially damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Drenching with copper fungicides</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Harvesting at proper time</li> </ul>	Immediate sale of fruits and safe transportation
<b>Heavy rainfall with high speed winds in a short span</b>				
Rice	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Removal of excess water</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Sowing of subsequent crop, if totally damaged i.e. Toria</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Subsequent crop if totally damaged</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
Maize	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Removal of excess water</li> <li>• Resowing, if completely damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Sowing of alternative maize or other rabi crop if totally damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Subsequent if totally damaged</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
Pigeonpea	<ul style="list-style-type: none"> <li>• September sowing of Pigeonpea (var. Sharad), if, previous Pigeonpea crop is completely damaged</li> <li>• Gap filling, if needed</li> <li>• Removal of excess water</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Sowing of alternative rabi maize or other crops like chilli \ tomato\ brinjal if totally damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Subsequent if totally damaged</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
<b>Outbreak of pests and diseases due to un-seasonal rains</b>				
Rice	<ul style="list-style-type: none"> <li>• Removal of excess water</li> <li>❖ Seedling treatment with granular insecticide – Cartap hydrochloride or phorate 10G or carbofuran 3G.</li> <li>❖ Maintain shallow water in nursery beds</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Implementation of IPM practices <ul style="list-style-type: none"> <li>• Use copper fungicides against Bacterial leaf blight.</li> <li>• Split application of N</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Implementation of IPM practices</li> </ul>	Storage at safer place

	❖ Providing good drainage.	fertilizer (3-4 times)		
Maize	<ul style="list-style-type: none"> <li>• Soil application of granular insecticides viz. Phorate 10 g/Carbofuran 3g in whorl of maize</li> <li>• Implementation of IPM practices</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Implementation of IPM practices</li> </ul> <p>Foliar blight control through Mancozeb @ 2.5g/l Or Zineb/ Maneb @ 2.5-4 g/lit of water (2-4 applications at 8-10 days interval)</p>	<ul style="list-style-type: none"> <li>• Cob harvesting from standing crop</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
Pigeonpea	<ul style="list-style-type: none"> <li>• Provide drainage</li> <li>• Seed treatment with 1 g carbendizim +2g thiram/kg seed.</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> <li>• Implementation of IPM practices</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthening of Drainage system</li> </ul>	Storage at safer place
<b>Horticulture</b>				
Mango	<p><b>Anthracnose:-</b> The foliar infection can be controlled by spraying of copper oxychloride (0.3%)</p> <p>Use bio control agent viz <i>Streptosporangium pseudovulgare</i></p> <p><b>Bacterial canker:</b> Regular inspection of orchards, sanitation and seedling certification are recommended as preventive measures. Mango stones for raising seedlings (root stock) should always be taken from healthy fruits. Use of wind-breaks helps in</p>	<p><b>Anthracnose:-</b> Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose. Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.</p> <p><b>Mango powdery mildew:</b> Spray wettable sulphur(0.2%) &amp; calixin or karathane (0.1% ) during second week of December</p>	<p><b>Mango powdery mildew:</b> Prune diseased leaves and malformed panicles harbouring the pathogen to reduce primary inoculum load.</p> <p>Spray wettable sulphur (0.2%) when panicles are 3-4" in size</p> <p>Spray dinocap (0.1%) 15-20 days after first spray. Spray tridemorph (0.1%) 15-20 days after second spray.</p> <p>Spraying at full bloom needs to be avoided.</p> <p><b>Mango bacterial canker:</b> Three sprays of Streptocycline (200 ppm) at 10 days intervals reduce fruit infection.</p>	<p>Harvest at proper time</p> <p><b>Anthracnose:-</b> Pre-harvest sprays of hexaconazole (0.01%) or Carbendazim (0.1%) at 15 days interval should be done in such a way that the last spray falls 15 days prior to harvest.</p> <p>Diseased leaves, twigs, and fruits, should be collected and burnt to avoid the spread for next season</p>

	reducing brushing/ wounding and thus reduces the chance of infection.		In severe infection, spraying of Streptocycline (300 ppm) or copper oxychloride (0.3%) is more effective.	
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### 2.3 Floods

Condition	Suggested contingency measure <sup>o</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation <sup>1</sup>				
Continuous submergence for more than 2 days <sup>2</sup>	Not Applicable			
Sea water intrusion <sup>3</sup>				

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

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave<sup>p</sup></b>				
Maize	• Life saving irrigation	• Life saving irrigation	• Life saving irrigation	
Pigeonpea	• Life saving irrigation	• Life saving irrigation	• Life saving irrigation	
Wheat	• Life saving irrigation	• Life saving irrigation	• Life saving irrigation	
<b>Horticulture</b>				
Mango	• Life saving irrigation	• Life saving irrigation	• Life saving irrigation	
<b>Cold wave<sup>q</sup></b>				
Wheat, Maize, Mustard, Potato, Pulses		• Light irrigation • Mulching by crop residue \ weed		
<b>Horticulture</b>				
Brinjal, Chilli,		• Light irrigation		

Tomato, Bhindi		• Mulching by crop residue \ weed		
<b>Frost</b>				
Wheat, Maize, Mustard, Potato, Pulses		• Light irrigation • Mulching by crop residue \ weed		
<b>Horticulture</b>				
Brinjal, Chilli,  Tomato, Bhindi		• Light irrigation • Mulching by crop residue \ weed		
<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 event <sup>s</sup>	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	<ol style="list-style-type: none"> <li>Cultivation of fodder tree Storage of Improved Quality Fodder</li> <li>Conservation &amp; Storage of <ul style="list-style-type: none"> <li>Feed &amp; Fodder</li> <li>Hay &amp; Silage: — Preserve the fodder in the form of hay from Berseem &amp; other grasses as well as silage from (a) Maize- harvesting at well developed cob.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>Feeding of stored Hay/Silage/Improved Quality Fodder</li> <li>Feeding of Tree leaves some of which are as follows: <ol style="list-style-type: none"> <li>Bamboo leaves</li> <li>Bargad</li> <li>Peepal</li> <li>Seesam</li> <li>Subabul</li> <li>Gooler</li> </ol> </li> </ol>	Production of forage crops <ol style="list-style-type: none"> <li>Balanced feeding of Animal supported with little higher concentrate mixture</li> <li>Cultivation of fodder- Berseem, cow pea, maize, oat,</li> </ol>



	<p>(b) Hybrid Napier – 40-45 day old.  (c) Potato leaves mixing with wheat straw in ratio of 7:1 and should be supplemented with 3% molasses.</p> <p>3. Development of Fodder Bank</p>		
Drinking water			
Health and disease management	<p>Veterinary Preparedness with Medicines, Vaccines and provision for mobile ambulatory van.</p> <ul style="list-style-type: none"> <li>• Vaccination  Necessary vaccination of livestock and poultry should be done against economically important contagious disease.  This will be helpful not only to check epidemic in animals, but also to reduce the probability of zoonoses in human beings.  Care should be taken for mass vaccination of livestock and poultry with a view to covering 80% of livestock population in order to achieve herd immunity.  Mass vaccination should be conducted by a team of Department staff with proper maintenance of detailed Inoculation Register.  Pro-active steps should be taken to receive and stock the required doses of vaccines against different diseases.</li> </ul>	<p>Animal safety</p> <ul style="list-style-type: none"> <li>• Prevention from heat</li> <li>• Frequent drinking water availability to the animal</li> <li>• Fresh and green fodder availability</li> <li>• Proper deworming at definite interval</li> <li>• Proper vaccination at definite interval</li> <li>• Disinfection of livestock premises and Poultry shed regularly</li> </ul>	<ul style="list-style-type: none"> <li>• Sanitation,</li> <li>• De worming,</li> <li>• Treatment,</li> <li>• Health camps</li> <li>• Culling of Sick animals and</li> <li>• Disposal of carcass</li> </ul>

### 2.5.2 Poultry

	Suggested contingency measures			Convergence/ linkages with ongoing programs, if any
	Before the event <sup>a</sup>	During the event	After the event	
<b>Drought</b>				
Health and disease management	Vaccines to be used for Poultry Mareks disease vaccine RDV (F <sub>1</sub> & R <sub>2</sub> B), FPV, IBRV & IBDV			
<b>Cyclone</b>	Not Applicable			
<b>Heat wave and cold wave</b>				

<sup>a</sup> based on forewarning wherever available

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures			Convergence/ linkages with ongoing programs, if any
	Before the event <sup>a</sup>	During the event	After the event	
<b>Drought</b>	Not Applicable			
<b>Floods</b>				
<b>Cyclone/ Tsunami</b>				
<b>Heat wave&amp; Cold Wave</b>				

<sup>a</sup> based on forewarning wherever available