

## State: JHARKHAND

### Agriculture Contingency Plan for District: DUMKA

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Sub Region (ICAR)	Eastern plateau (chhotanagpur) And Eastern Ghats, Hot Subhumid Eco-Region (12.3)	
	Agro-Climatic Zone (Planning Commission)	Eastern Plateau And Hills Region (VII)	
	Agro Climatic Zone (NARP)	Central And North Eastern Plateau Zone (BI-4)	
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Dumka, Jamtara, Deoghar, Pakur, Sahibganj, Godda, Giridih, Dhanbad, Bokaro	
	Geographic coordinates of district headquarters	Latitude	Longitude
		23 <sup>0</sup> 45' N to 24 <sup>0</sup> 83' N	86 <sup>0</sup> 20' E to 87 <sup>0</sup> 40' E
		Altitude	
		275-460 m	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Research Centre, Dumka (Khuntabandh), (Birsa Agricultural University, Ranchi, Jharkhand.)	
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Khuntabandh, Dumka-814101 (Birsa Agricultural University, Ranchi, Jharkhand.)	
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	ZRS, Dumka	

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep)	1157		2 <sup>nd</sup> week of June	4 <sup>th</sup> week of September
	NE Monsoon(Oct-Dec)	141			
	Winter (Jan- March)	33			
	Summer (Apr-May)	112			
	Annual	1444			

1.3	Land use pattern of the district (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (*000 ha)	612.4	224.2	162.9	56.9	28.4	34.4		33.8	71.6	

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1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total geographical area
	1.Stony and gravelly soils		
	2.Sandy soils		
	3.Loamy soils		
	4.Clay soils		
	5.Sandy loam soils		

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	205	108
	Area sown more than once	48	
	Gross cropped area	224	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area			
	Gross irrigated area	30		
	Rainfed area			
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	1	6.0	
	Tanks	6016		
	Open wells	12654		
	Bore wells	1987		
	Lift irrigation schemes			
	Micro-irrigation			
	Check dam & others			
	Total Irrigated Area			
	Pump sets			
	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			
	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		150						
	Maize		20						
	Pulses		21						
	Oilseeds		7						
	Wheat	7.0							
	Maize	1.0							
	Chick pea		4.0						
	Pea	1.0							
	Mustard								
	Linseed		1.5						
	Finger millet		2						

	Horticulture crops - Fruits	Area ('000 ha)		
		Total	Irrigated	Rainfed
	Fruits	4.7		4.7
	Vegetables	26.4		26.4
	Spices	0.2		0.2

	Flowers	0.001		0.001
	Lemon			
	<b>Horticulture crops - Vegetables</b>			
	<b>Medicinal and Aromatic crops</b>			
	<b>Plantation crops</b>			
	Eg., industrial pulpwood crops etc.			
	<b>Fodder crops</b>			
	<b>Total fodder crop area</b>			
	<b>Grazing land</b>			
	<b>Sericulture etc</b>			

### 1.8 Live stock

	<b>Livestock</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	282	238	520
	Improved cattle			
	Crossbred cattle	2.2	3.5	5.7
	Non descriptive Buffaloes (local low yielding)	21.6	18.1	39.7
	Descript Buffaloes	0.63	0.01	0.64
	Goat	94	182	276
	Sheep	14.6	19	33.6
	Others (Camel, Pig, Yak etc.)	30.2	31.3	61.5
	Commercial dairy farms (Number)			15

<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>
	Commercial	6	10
	Backyard		471

<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)
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<b>A. Capture</b>						
i) <b>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)	
ii) <b>Inland</b> (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
	11591		4		11591	
<b>B. Culture</b>						
			<b>Water Spread Area (ha)</b>	<b>Yield (t/ha)</b>	<b>Production ('000 tons)</b>	
i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)						
ii) <b>Fresh water</b> (Data Source: Fisheries Department)						

### 1.11 Production and Productivity of major crops

1.11	Name of crop	<b>Kharif</b>		<b>Rabi</b>		<b>Summer</b>		<b>Total</b>		<b>Crop residue as fodder ('000 tons)</b>
		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	141.3	2066					141.3	2066	
	Maize	20.8	1300	0.2	1040			21	1170	
	Wheat			4.9	1347			4.9	1347	
	Pigeonpea	2.7	172					2.7	172	
	Mustard	0.6	360					0.6	360	
<b>Major Horticultural crops (Crops identified based on total acreage)</b>										

Potato			24.7	9695			24.7	9695	
Lady finger							31.5	14000	
Tomato							35.6	20000	
Brinjal							34.4	20000	
Cauliflower							18.3	16000	
Mango							3.2	12000	
Banana							3.8	20000	
Lemon							1.6	10000	

<b>1.12</b>	<b>Sowing window for 5 major field crops (start and end of normal sowing period)</b>	<b>Rice</b>	<b>Maize</b>	<b>Pigeonpea</b>	<b>Mustard</b>	<b>Horsegram</b>
	Kharif- Rainfed	June – July	June – July	June – July		
	Kharif-Irrigated					August
	Rabi- Rainfed				November – December	
	Rabi-Irrigated				November – December	

<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		✓	

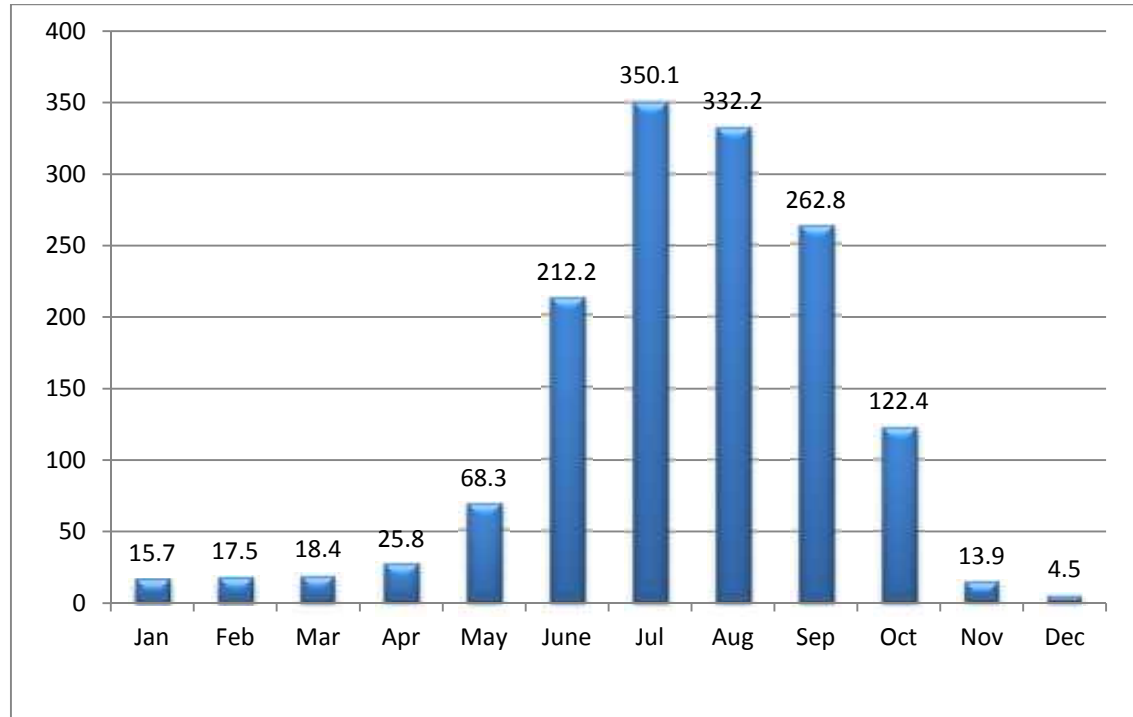
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes

	Soil map as Annexure 3	Enclosed: Yes
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**Annexure I**

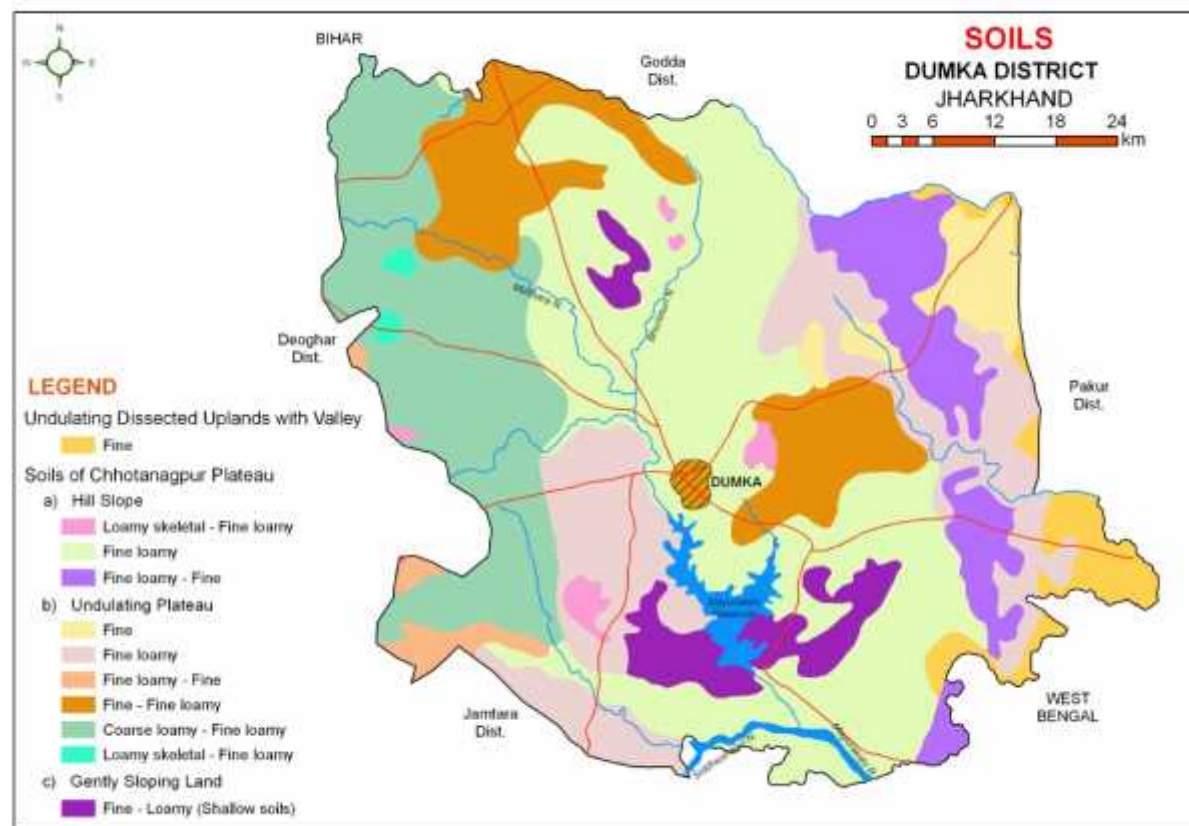


**Annexure II**  
**Mean Annual Rainfall (mm)**





### 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 June 4 <sup>th</sup> week	Upland red sandy loam soils.	Direct sown Rice Maize Pigeonpea Maize + Kudrum Pigeonpea + Kudrum Greengram(K-851) Cowpea	Up to last week of June (for 2 wks delay) all the crops in upland can be taken.  Cultivation of Greengram(SML-668) and blackgram(Birsa Urd-1)	Adopt wider spacing in Pigeonpea	

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 July 2 <sup>nd</sup> week	Upland red sandy loam soils	Direct sown Rice Pigeonpea (Birsa Arhar-1) Maize (Kanchan, Birsa Makai-1) Pigeonpea (Birsa Arhar-1) + Black gram (Birsa urd-1) + Green gram (Pusa Vishal) Cowpea /Dolichos Bean	Continued up to July end Marua (Birsa marua-1), Gundali	1. Sowing on Ridge for proper germination 2. Alternate row irrigation 3. Use micro irrigation system 4. Irrigation at only critical stage of crop	Supply of seed through NFSM & RKVY.

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 July 4 <sup>th</sup> week	Upland rain fed sandy soil	Direct sown rice (Vandana, Birsa Vikas dhan-109) Pigeonpea (Birsa Arhar-1, ICPH2671) Maize (Kanchan, Birsa Makai-1) Maize Pigeonpea (Birsa Arhar-1) + Black gram (T-9/Pant U-19/Birsa urd-1) Black gram (T-9/Pant U-19/Birsa urd-1) + Greengram (Pusa Vishal) Groundnut (Birsa mungfali-2) Cucurbits/Ladyfinger/Cow pea /Dolichos Bean	Continued up to July end  Pigeonpea + Horse Gram Pigeonpea + Sesame French Bean Dolichos Bean Pigeonpea + Maize Pigeonpea (UPAS-120) Horsegram (Birsa Kulthi-1) Sesame (Kanke Safed, Krishna) French Bean (Swarna Priya, Arka Komal) Dolichos Bean (Swarna Utkrista)  Finger millet (A-404, Birsa marua-2), Gundli- Birsa gundali-2	1. Ridge Furrow method should be followed for proper germination 2. Conservation of soil moisture. 3. Mechanical weeding 4. Staking for Dolichos Bean.	1. Supply of seed through NFSM & RKVY. 2. Supply of Grubber & Dutch Hoe.

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  August 2 <sup>nd</sup> week	Upland rain fed sandy soil	Continued up to July end  Pigeonpea + Horsegram Pigeonpea + Sesame French Bean Dolichos Bean Pigeonpea + Maize Pigeonpea (UPAS-120) Horse Gram (Birsa Kulthi-1) Sesame (Kanke Safed, Krishna) French Bean (Swarna Priya, Arka	Pigeonpea + Horsegram Pigeonpea + Sesame Pigeonpea (UPAS-120) Horse Gram (Birsa Kulthi-1) Niger (Birsa Niger-1, 2) Sesame (Kanke Safed, TC- 25)	1. Sowing in Ridge furrow system 2. Irrigation in alternate row. 3. Conserve soil moisture. 4. Mechanical weeding. 5. Micro irrigation system.	1. Supply of seed through NFSM & RKVY. 2. Supply of Grubber & Dutch Hoe.

		Komal) Dolichos Bean (Swarna Utkrista)			
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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 <sup>c</sup> including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks June 4 <sup>th</sup> week	Medium land rainfed loamy soils.	Rice (Lalat, IR-64, IR-36, Arize-6444)	Rice (IR-64, IR-36, Lalat, Naveen, Sahbhagi, Arize-6444, Birsamati))	Rice cultivation through SRI method or plastic drum seeder. 2. Bunding for water retention. 3. Use of cono weeder for weeding.	

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 4 weeks July 2 <sup>nd</sup> week	Medium land rainfed loamy soils.	Rice (IR-36, IR-64, Lalat, Birsamati, Naveen, Arise-6444, Sahbhagi)	Continued up to July end.	1. Sowing through plastic drum seeder & transplanting by SRI method. 2. Bunding for water retention. 3. Use of cono weeder for weeding.	Supply of plastic drum seeder, cono weeder & SRI marker by NFSM & RKVY.

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 6 weeks July 4 <sup>th</sup> week	Medium land rainfed loamy soils	<b>Rice</b> – IR-36, IR-64, Lalat, Naveen, Birsamati, Arise 6444, Sahbhagi	Continued up to July end.	1. Sowing through plastic drum seeder and transplanting through SRI method. 2. Bunding for water retention. 3. Use of cono weeder for weeding.	Plastic drum seeder & for SRI method cono weeder marker can be supplied by NFSM & RKVY scheme.
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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 August 2 <sup>nd</sup> week	Medium land rainfed loamy soils.	Rice – (IR-64, IR-36, Naveen, Lalat) or field left fallow. Maize – HQPM-1, Swarna Composite-1 Pigeonpea – Bahar, Birsa Arhar-1 Urd – T-9, Pant U-19, Birsa Urd-1 Moong – K-85, Pusa Vishal Kulthi – Birsa Kulthi-1 Brinjal French Bean Tomato Rice Bean Sweet Potato Radish Cauliflower Chilies	Direct sowing of rice – Anjali, Vandana, Birsa Dhan-108, Sahabhagi. Maize – HQPM-1, Suwan Composite-1, Pigeonpea – Birsa Arhar-1 /UPAS-120. Black gram – T-9, Pant U-19 Green gram – K-85, Pusa Vishal Horse gram – Birsa Kulthi-1 Brinjal – Swarna Pratibha, Swarna Abhilamb, Swarna Ajay, Swarna Sobha, Swarna Nilima. French Bean – Swarna Priya, Arka Komal, Swarna Lata) Tomato – Arka Abha, Swarna Sampada, Swarna Vijay. Rice Bean – RBL-1. Sweet Potato – Kalmegh. Radish – Japanese White. Cauliflower – Early Kunwari, Hajipur extra early.	1. Sowing with fertilizer cum seeddrill. 2. Sowing in Ridges 3. Proper drainage channel 4. Bunding of field in Rice fields. 5. Sowing of rice across the slope. 6. Sowing of pulses along the slope.	Seed cum fertilizer drill supplied by NFSM & RKVY scheme.

			Chilies – Pusa Jwala, Capsicum Bharat, Indra.		
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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 June 4 <sup>th</sup> week	Low land rainfed clay soils.	Rice (MTU-7029, Sita, BPT-5204)	Rice (Rajshree, Arise-6444, MTU-7029)	1. Direct sowing of rice. 2. Sowing through drum seeder. 3. Proper bunding for water retention. 4. Spreading of a layer of organic materials like straw, seedless grass, dry leaves etc in the field to check evaporation of water.	

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 July 2 <sup>nd</sup> week	Low land rainfed clay soils.	Rice (MTU-7029, Arise-6444, Rajshree)	Rice (Arise-6444, Rajshree)	1. Direct sowing of rice. 2. Sowing through drum seeder. 3. Proper bunding for water retention. 4. Spreading of a layer of organic materials like straw, seedless grass, dry leaves etc in the field to check evaporation of water.	1. SRI marker and cono weeder under NFSM & RKVY.
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<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
Delay by 6 weeks July 4 <sup>th</sup> week	Low land rainfed clay soils.	<b>Rice</b> (Arise-6444, Rajshree)	<b>Rice</b> (Lalat, Naveen, Birsamati, IR-64, IR-36)	1. Direct sowing of rice. 2. Sowing through drum seeder. 3. Proper bunding for water retention. 4. Spreading of a layer of organic materials like straw, seedless grass, dry leaves etc in the field to check evaporation of water.	Supply of SRI marker, cono weeder and drum kit through NFSM & RKVY.

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>

Delay by 8 weeks August 2 <sup>nd</sup> week.	Low land rainfed clay soils.	Rice (Lalat, Naveen, Birsamati, IR-64, IR-36)	Rice (Anjali, Birsa Dhan-201, Birsa Dhan-202, Vandana, Sahbhagi).	<ol style="list-style-type: none"> <li>1. Direct sowing of rice.</li> <li>2. Sowing through drum seeder.</li> <li>3. Proper bunding for water retention.</li> <li>4. Spreading of a layer of organic materials like straw, seedless grass, dry leaves etc in the field to check evaporation of water.</li> <li>5. Life saving irrigation.</li> </ol>	Supply of seed & drum seeder through NFSM & RKVY.
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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.	Upland rainfed sandy soils.	Direct sown rice (Gora) Pigeonpea (Bahar) Pigeonpea + Maize Maize (Kanchan) Maize + Ladyfinger Pigeonpea +Black gram / Green gram Blackgram Greengram Groundnut (AK12-24) Cucurbits/Ladyfinger	<ol style="list-style-type: none"> <li>1. Thinning and gap filling the existing crop.</li> <li>2. Re sowing.</li> <li>3. Inter culturing to check evaporation.</li> <li>4. Strip cropping if re sown crops,</li> <li>5. Life saving irrigation</li> <li>6. Trench (1 – 1 ½ ft) making across the slope after 10 – 12 feet intervals.</li> </ol>	<ol style="list-style-type: none"> <li>1. Intercultivation</li> <li>2. Conservation furrow</li> <li>3. Thinning</li> <li>4. Spray of anti transpirant.</li> </ol>	<ol style="list-style-type: none"> <li>1. Supply of inter cultural implements through RKVY.</li> <li>2. Seeds supplied through NFSM &amp; RKVY.</li> </ol>

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation	Remarks on Implementation
Mid season drought (long dry spell,					



<b>consecutive 2 weeks rainless (&gt;2.5 mm) period)</b>				<b>measures</b>	
At vegetative stage	Upland rainfed sandy soils.	Direct sown rice (Gora) Pigeonpea (Bahar) Pigeonpea + Maize Maize (Kanchan) Maize + Ladyfinger Pigeonpea +Blackgram /Green gram Blackgram Greengram Groundnut (AK12-24) Cucurbits/ladyfinger	1. Thinning 2. Weeding. 3. Grazing leaf tips. 4. Postponement of top dressing 5. Life saving irrigation 6. Earthing up in groundnut. Maize & Pigeonpea.	1. Intercultivation (soil mulching) 2. Conservation furrow  3. Spray of anti transpirants.	

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Mid season drought (long dry spell)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measues</b>	<b>Remarks on Implementation</b>
At flowering/ fruiting stage	Upland rainfed sandy soils.	Direct sown rice (Gora) Pigeonpea (Bahar) Pigeonpea + Maize Maize (Kanchan) Maize + Ladyfinger Pigeonpea +Black gram /Green gram Blackgram Greengram Groundnut (AK12-24) Cucurbits/Ladyfinger	Life saving irrigation  Weed mulching  Postponement of top dressing.	Spray of anti transpirants.	Farm ponds through NREGA.

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)					
Terminal drought	Upland rainfed sandy soils.	Direct sown Rice (Gora) Pigeonpea (Bahar) Pigeonpea + Maize Maize (Kanchan) Maize + Ladyfinger Pigeonpea +Black gram /Green gram Blackgram Greengram Groundnut (AK12-24) Cucurbits/Ladyfinger	Life saving irrigation Pigeonpea harvested for vegetable purpose Harvest at physiological maturity stage.	Cow pea/ French Bean  <b>Irrigated vegetables-</b> Potato, Cole crops, root crops etc. if irrigation source is available.	1. Farm pond through NREGA. 2. Threshing implements through RKVY. 3. Groundnut digger and plucker through RKVY.

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.	Medium land rainfed loamy soils	Rice (Lalat, IR-64, IR-36, Arise-6444)	1. Re sowing or re-transplanting through plastic drum seeder. 2. Life saving irrigation may be given if possible. 3. Replacement of crop with short duration leguminous crop like Green gram, Black gram, Horse gram, Sesame & Niger.  Greengram (Pusa Vishal) Blackgram (Pant U-19, Birsa Urd-1) Horsegram (Birsa Kulthi-1) Sesame (Kanche Safed, TC-25) Niger (Birsa Niger-1,2)	1. Weeding 2. Postponement of top dressing 3. To check evaporation from field spread dried leaves (Mulching). 4. Proper bunding 5. Strip cropping of re sown crops 6. Spray of anti transpirants.	Supply of SRI marker and cono weeder from NFSM of RKVY scheme.

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	Medium land rainfed loamy soils.	Rice (Lalat, IR-64, IR-36, Arize-6444)	<ol style="list-style-type: none"> <li>1. Re sowing or re-transplanting through plastic drum seeder.</li> <li>2. Life saving irrigation may be given if possible.</li> <li>3. Replacement of crop with short duration leguminous crop like Greengram, Blackgram, Horse gram, Sesame &amp; Niger.</li> </ol> <p> <b>Green gram</b> (Pusa Vishal)  <b>Black gram</b> (Pant U-19, Birsa Urd-1)  <b>Horse gram</b> (Birsa Kulthi-1)  <b>Sesame</b> (Kanke Safed, TC-25)  <b>Niger</b> (Birsa Niger-1,2) </p>	<ol style="list-style-type: none"> <li>1. Weeding</li> <li>2. Postponement of top dressing</li> <li>3. To check evaporation from field spread dried leaves (Mulching).</li> <li>4. Proper bunding</li> <li>5. Strip cropping of re sown crops</li> <li>6. Spray of anti transpirants.</li> </ol>	Supply of SRI marker and cono weeder from NFSM of RKVY scheme.

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)					

<b>At flowering/ fruiting stage</b>	Medium land rainfed loamy soils.	<b>Rice</b> (Lalat, IR-64, IR-36, Arise-6444)	1. life saving irrigation if available. 2. Sowing of early Rabi crops like Mustard/Linseed/ Lentil/Pea. 3. Postpone of top dressing.  <b>Mustard</b> (Shivani) <b>Linseed</b> (T-397, Sweta) <b>Lentil</b> (PL-406, 639) <b>Pea</b> (Swarna Rekha)	Spray of anti transpirants.	Supply of anti transpirants through NFSM and RKVY.
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<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Terminal drought</b> (Early withdrawal of monsoon)	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Rabi Crop planning</b>	<b>Remarks on Implementation</b>
Terminal drought	Medium land with loamy soils.	<b>Rice</b> – Naveen, IR-36, IR-64, Lalat, Birsamati.	1. Harvest at physiological maturity stage. 2. Life saving irrigation.	<b>Chick pea</b> – (Pant G-114, Radhey, BG-256, KPG-59). <b>Pea</b> – (Swarna Rekha/Arkel) <b>Linseed</b> – Sweta/T-397) <b>Lentil</b> – (PL-406, PL-639). <b>Mustard</b> – (Shivani)	Supply of anti transpirants through NFSM and RKVY.

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Early season drought</b> (Normal onset)	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measures</b>	<b>Remarks on Implementation</b>

Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Low land rainfed clay soils.	<b>Rice</b> (MTU-7029, Sita, BPT-5204, Arise-6444)	<ol style="list-style-type: none"> <li>1. Life saving irrigation may be applied if any water resource is available.</li> <li>2. Gap filling should be done.</li> <li>3. Re sowing or re transplanting through plastic drum seeder or SRI method respectively if heavy damage is occurs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Weeding mulching.</li> <li>2. Spreading a layer of dried leaves to check evaporation loss.</li> <li>3. Proper bunding for water retention.</li> </ol>	Supply of seeds, SRI marker & cono weeder and drum seeder through NFSM & RKVY.
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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
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	Low land rainfed clay soils.	<b>Rice</b> (MTU-7029, Sita, BPT-5204, Arise-6444)	<ol style="list-style-type: none"> <li>1. Life saving irrigation.</li> <li>2. Re sowing or re transplanting through drum seeder or SRI methods respectively.</li> </ol>	<ol style="list-style-type: none"> <li>1. Weeding mulching</li> <li>2. Spraying a layer of dried leaves to check evaporation.</li> <li>3. Postponement of top dressing.</li> <li>4. Proper bunding of field.</li> </ol>	Supply of SRI marker & cono weeder, plastic drum seeder through NFSM & RKVY.

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)					
At flowering/ fruiting stage	Low land rainfed clay soils.	<b>Rice</b> (MTU-7029, Sita, BPT-5204, Arise-6444)	<ol style="list-style-type: none"> <li>1. Life saving irrigation.</li> <li>2. Sowing of early Rabi crops.</li> </ol>	<ol style="list-style-type: none"> <li>1. Spraying of anti transpirants.</li> <li>2. Postponement of top dressing.</li> </ol>	Supply of anti transpirant through NFSM & RKVY.

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
Terminal drought (Early withdrawal of monsoon)	Low land rainfed clay soils.	Rice (MTU-7029, Sita, BPT-5204, Arise-6444)	1. Life saving irrigation. 2. Harvesting at physiological maturity stage.	Chick pea (Pant G-114) Linseed (T-397) Wheat (C-306, K-8962, DL-788-2) Barley (Ratna)	1. Farm pond through NREGA. 2. Threshing implements through RKVY.

### 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					
Limited release of water in canals due to low rainfall					
Non release of water in canals under delayed onset of monsoon in catchment					
Lack of inflows into tanks due to insufficient /delayed onset of monsoon					

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation

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	Rainfed upland sandy soils.	Upland rice, Maize, Pigeonpea, Black gram, Green gram, Groundnut, Cucurbits, Ladyfinger.	Aerobic rice, short duration pulses, oilseeds and vegetables (Green gram, Black gram, Sesame, Horse gram and Cucurbits)	1. Strip cropping. 2. Limited irrigation. 3. Alternate furrow irrigation. 4. Drip irrigation. 5. Micro tube irrigation. 6. Polythene mulching in vegetables.	1. Seed, irrigation system and polythene sheets through NFSM, NHM and RKVY.
	Rainfed medium land loamy soils.	<b>Rice</b> (Lalat, IR-64, IR-36, Arise-6444)	Short duration aerobic rice (Vandana, Anjali, BVD-110,109)	1. Limited irrigation. 2. Sowing across the slope. 3. Trench (1-1 ½ ft.) across the slope. 4. Contour bunding.	
	Rainfed low land clay soils.	<b>Rice</b> (MTU-7029, BPT-5204, Rajshree, Sita)	Medium duration Rice varieties (Lalat, IR-64, IR-36, Arize-6444)	1. Life saving irrigation. 2. Spray of anti transpirant.	

## 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>				
Direct sown Rice (Gora) Pigeonpea (Bahar) Maize (Kanchan) Maize + Ladyfinger Pigeonpea +Blackgram/Greengram Blackgram/ Greengram	Provide drainage	Provide drainage	Drain out excess water, Harvesting at physiological maturity stage Harvest of Pigeonpea, Cow pea, French Bean for vegetable purpose.	Shift to safe place. Dry in shade & turn frequently. Safe storage against storage pest & disease.

Groundnut (AK12-24) Cucurbits/Ladyfinger				
<b>Rice</b> (Lalat, IR-64, IR-36, Arize-6444)	Drain out excess water.	Drain out excess water.	Drain out excess water.	Shift to safe place. Safe storage against storage pest & disease.

### 2.3 Floods

Condition	Suggested contingency measure			
	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			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Hailstorm</b>	Not applicable			
<b>Heat Wave</b>				
Wheat	Life saving irrigation	Life saving irrigation	Life saving irrigation	
<b>Cold wave</b>				
Wheat	Light irrigation, Balanced fertilizer application, Foliar spray of nutrients	Light irrigation, Mulching with crop residue \ weeds, Fertilizer application	Light irrigation,fertilizer application	
Vegetables	Raising of seedling in Poly house, re sowing if damaged	Light irrigation Mulching with crop residue \ weeds Disease and pest control, care for	Quick harvesting	Grading, quick disposal for marketing



		chilling injury or replanting		
Pigeonpea		Light irrigation Mulching with crop residue \ weeds		
<b>Frost</b>				
Wheat		Light irrigation Mulching with crop residue \ weeds		
Pigeonpea	Exposure of crop to smoke by burning waste material during night time	Exposure of crop to smoke by burning waste material during night time Light sprinkler irrigation	Exposure of crop to smoke by burning waste material during night time Light sprinkler irrigation	Exposure of crop to smoke by burning waste material during night time
Tomato & Potato		Earth up to 15cm ht. Irrigation Intercultivation, Mulching with weeds		Harvest in dry weather
Horticultural crops (fruit crops)	Light frequent irrigation may be practiced wherever irrigation facilities are available, mulching, thatching and creating smoke screens and lighting of fire is also practiced where irrigation facilities are not available			
<b>Cyclone</b>	Not applicable			

## 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	Preservation of surplus fodder, encourage fodder cultivation and tree plantation and also encourage supply of molasses to cattle feed plants.	Arrangement of feeds and fodder from adjoining areas, exploitation of non conventional feed resources, use of urea treated straw and feed blocks.	Promotion of fodder seed production, cultivation and storage, establishment of fodder block making machines in fodder surplus areas.
Drinking water	Repairs of tube wells, clear off the sludge in the canals and local water catchments and clean the water tanks,	Harnessing water through the existing reservoirs and exploitation of groundwater.	To strengthen reservoirs by promoting recharging of water and rain water harvesting during rainy season.

	large ponds and lakes		
Health and disease management	Mass vaccination and de worming	Provide shades to animals and water as much as possible. Treatment of diseased animals and proper disposal of carcasses.	Treatment of diseased animals and provide vitamin and mineral supplement to regain strength and vigour.

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

### 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>				
Shortage of feed ingredients	Storage of feed	Provide non conventional feed, supplement anti oxidant and anti stress		
Drinking water	Storage of water in tanks	Add vit-C and other anti stress ingredients with water		
Health and disease management	Regular vaccination	Vaccination and treatment of diseased one	Disposal of dead birds	

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

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1. Drought</b>			
Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Plough the pond and apply lime @ 250kg/ha	Reduce the stocking density from 25000 fry (1 inches size) to 10000-15000/ha	Remove the fishes of bigger size(0.5 kg)
(ii) Impact of salt load build up in ponds / change in water quality		Apply lime @ 50 kg on every 15-30 days. Aerate the water as per need	Apply lime as per need @ 50 kg/ha
<b>2. Heat wave and cold wave</b>			
Aquaculture			

(i) Changes in pond environment (water quality)	Reduce application of organic manure and supplementary feeds	Reduce/stop application of feed	Harvest the bigger fishes, reduce/stop application of supplementary feed. Apply lime @ 50 kg/ha and potassium permanganate in perforated plastic ball 5-10g in each ball
(ii) Health and Disease management	Apply lime	Apply lime/salt as per need	Apply lime/salt as per need.

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

### 2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Preparing infrastructures for Pen Culture & Cage Culture in reservoirs.	Stocking of spawn & raising fingerlings there from in Pen.	Stocking of fingerlings in Cage.
(ii) Changes in water quality	Application of lime & Potassium Permangnet in vicinating areas of Pen Culture & Cage Culture in reservoirs.	Application of lime & Potassium Permangnet in vicinating areas of Pen Culture & Cage Culture in reservoirs.	Application of lime & Potassium Permangnet in vicinating areas of Pen Culture & Cage Culture in reservoirs.
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	Preparation of water bodies for fry/fingerlings production. Overstocking of bottom dwelling fishes like Mrigal & Common Carp.	Stocking of spawn & raising fry/fingerlings therefrom. Partial Harvesting time to time of bottom dwelling fishes like Mrigal & Common Carp.	Early harvesting of bottom dwelling fishes like Mrigal & CommonCarp. Supply of fry to the area of requirement & Stocking of fingerlings in reservoirs of the dist.
(ii) Impact of salt load build up in ponds / change in water quality	Use of Lime & Cowdung	Sprinkling of Potassium Permangnet, Linkage of village drains to water bodies.	Sprinkling of Potassium Permangnet, Linkage of village drains to water bodies.
<b>2) Floods</b>	Not Applicable		

(source: District Fisheries Department)