

**State : Jharkhand**

**Agriculture Contingency Plan for District : Palamau**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Moderately To Gently Sloping ChattisgarhMahanadi Basin, Hot Moist/Dry Subhumid Transitional ESR With Deep Loamy To Clayey Red and Yellow Soils,(11.0)		
	Agro-Climatic Zone (Planning Commission)	EASTERN PLATEAU AND HILLS REGION (VII)		
	Agro Climatic Zone (NARP)	WESTERN PLATEAU ZONE		
	List all the districts or part thereof falling under the NARP Zone	CHATRA, GARWA, GUMAL, LATEHAR, LOHARDAGA, PALAMAU, SIMDEGA		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		23 <sup>0</sup> 5 <sup>0</sup> – 28 <sup>0</sup> -08N	83 <sup>0</sup> .55 <sup>0</sup> 84 <sup>0</sup> 30` E	228.6 m
	Name and address of the concerned ZRS/ ZARS/ RARS/	Zonal Research Station (Z.R.S.), Chianki, medninagar, Palamau, Pin – 822133 (Birsa Agricultural University, Ranchi) Pin – 834006.		
Mention the KVK located in the district	Krishi Vigyan Kendra, Palamau, Medninagar, Pin - 822133			

<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)	1031.9	33	3 <sup>rd</sup> week of June	4 <sup>th</sup> week of September
	NE Monsoon(Oct-Dec)	68.9	10		
	Winter (Jan- March)	35.6	4	-	-

	Summer (Apr-May)	42.5	6	-	-
	Annual	1180	53	-	-

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)	459	107	167	28	18	108	-	136	28	-

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	1. Alfisols	282	53.9
	2. Entisols	113	21.5
	3. Inceptisols	105	20.0

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	107	112
	Area sown more than once	13	
	Gross cropped area	120	

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>		
	Net irrigated area	10.7		
	Gross irrigated area	22.84		
	Rainfed area	96.3		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>Percentage of total irrigated area</b>
	Canals		4	
	Tanks			
	Open wells		0.6	
	Bore wells			
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (please specify)			
	Total Irrigated Area		10.7	
	Pump sets			
	No. of Tractors			
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	<b>No. of blocks/ Tehsils</b>	<b>(%) area</b>	<b>Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)</b>
	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 (as per latest figures, 2008)**

1.7	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>				
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Summer	Grand total
	Rice	4.8	43.2	48	-	-	-	-	48
	Maize	-	24	24	-	-	-	-	24
	Pigeonpea	-	17	17	-	-	-	-	17
	Blackgram	-	10	10	-	-	-	-	10
	Wheat	-	-	-	3	-	3	-	3
	Gram and other pulses	-	-	-		7	7	-	7
	Mustard and other oil seeds	-	-	-	1.5	-	1.5	-	1.5

<b>Horticulture crops - Fruits</b>	<b>Area ('000 ha)</b>		
	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
Mango	0.233	-	-
Guava	0.231	-	-
Banana	0.094	-	-
Lemon	0.533	-	-
	<b>Total : 0.1091</b>	-	-
<b>Horticulture crops - Vegetables</b>		<b>Irrigated</b>	<b>Rainfed</b>
Potato	1.98	-	-
Okra	1.06	-	-
Chili	0.58	-	-
Tomato	0.528	-	-
Brinjal	0.785	-	-
<b>Medicinal and Aromatic crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
<b>Total fodder crop area</b>			

	<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)	-	-	1.3		
	Crossbred cattle	-	-	1.6		
	Non descriptive Buffaloes (local low yielding)	-	-	12.0		
	Graded Buffaloes	-	-			
	Goat	-	-	1.8		
	Sheep	-	-	1.2		
	Camel, Pig, Yak etc.	-	-	-		
	Commercial dairy farms (Number)					
<b>1.9</b>	<b>Poultry</b>	<b>Total No. of birds ('000)</b>	<b>No. of farms</b>			
	Commercial	-	1.8			
	Backyard	-	-			
<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>					
	<b>A. Capture</b>					
	<b>i) Marine (Data Source: Fisheries Department)</b>	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>	
Mechanized			Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines,	

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

### 1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 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 (Crops to be identified based on total acreage)</b>										
	Rice	72	1500	-	-	-	-	72	1500	-
	Maize	33	1400	-	-	-	-	33	1400	-
	Pigeonpea	18.7	1100	-	-	-	-	18.7	1100	-

	Blackgram	7	750	-	-	-	-	7	750	-
	Wheat	-	-	48	1480	-	-	4.8	1480	-
	Gram & other pulses	-	-	4.5	650	-	-	4.5	650	-
	Mustard & other pulses	-	-	12.7	850	-	-	12.7	850	-
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
1										

<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>Blackgram</b>	<b>Chickpea</b>
	<i>Kharif</i> - Rainfed	June to September	June to July	June to August	June to August	
	<i>Kharif</i> -Irrigated					
	<i>Rabi</i> - Rainfed					October to December
	<i>Rabi</i> -Irrigated					

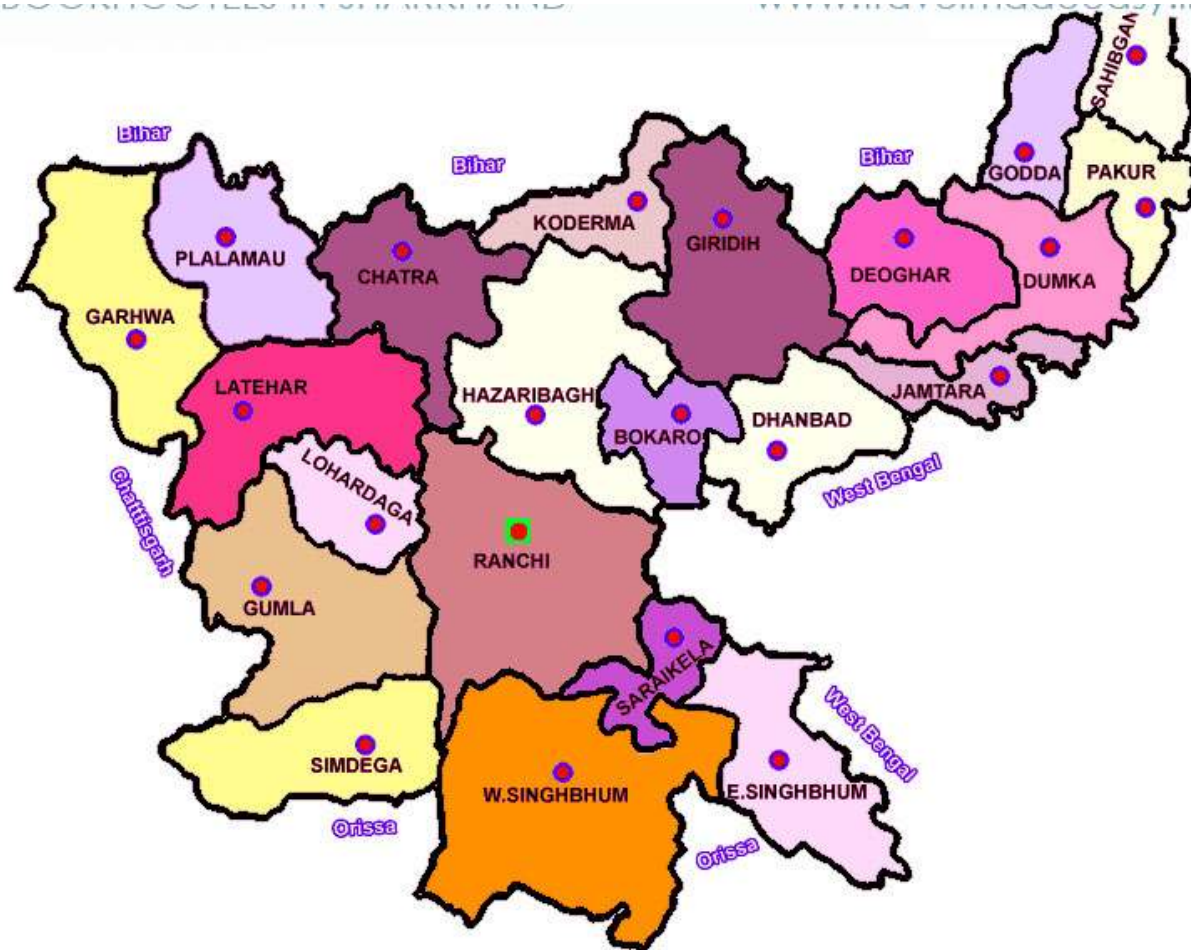
<b>1.13</b>	<b>What is the major contingency the district is prone to? (Tick mark)</b>	<b>Regular</b>	<b>Occasional</b>	<b>None</b>
	Drought	✓		
	Flood			
	Cyclone			
	Hail storm			
	Heat wave	✓		
	Cold wave	✓		



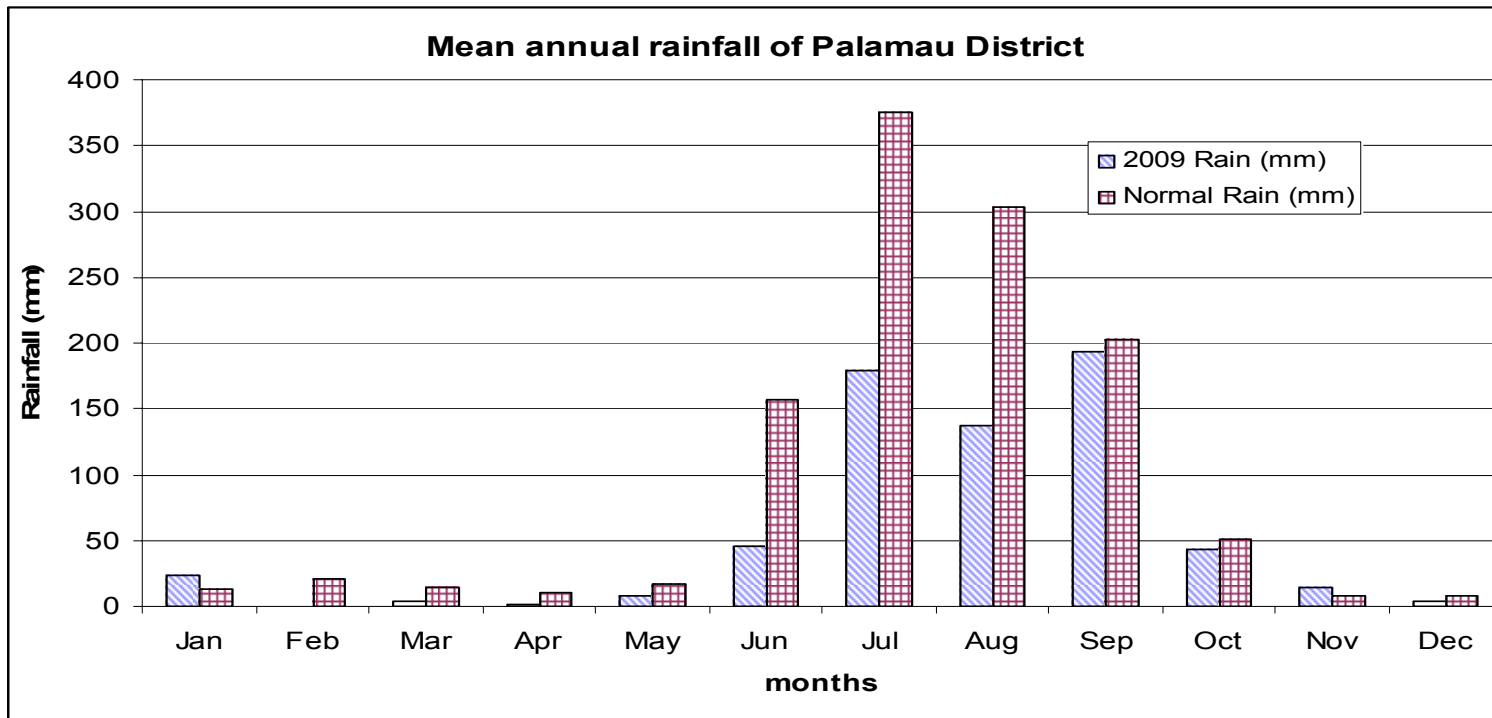
	Frost			
	Sea water intrusion			
	Pests and disease outbreak (specify)			
	Others (specify)			

<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

## Annexure I

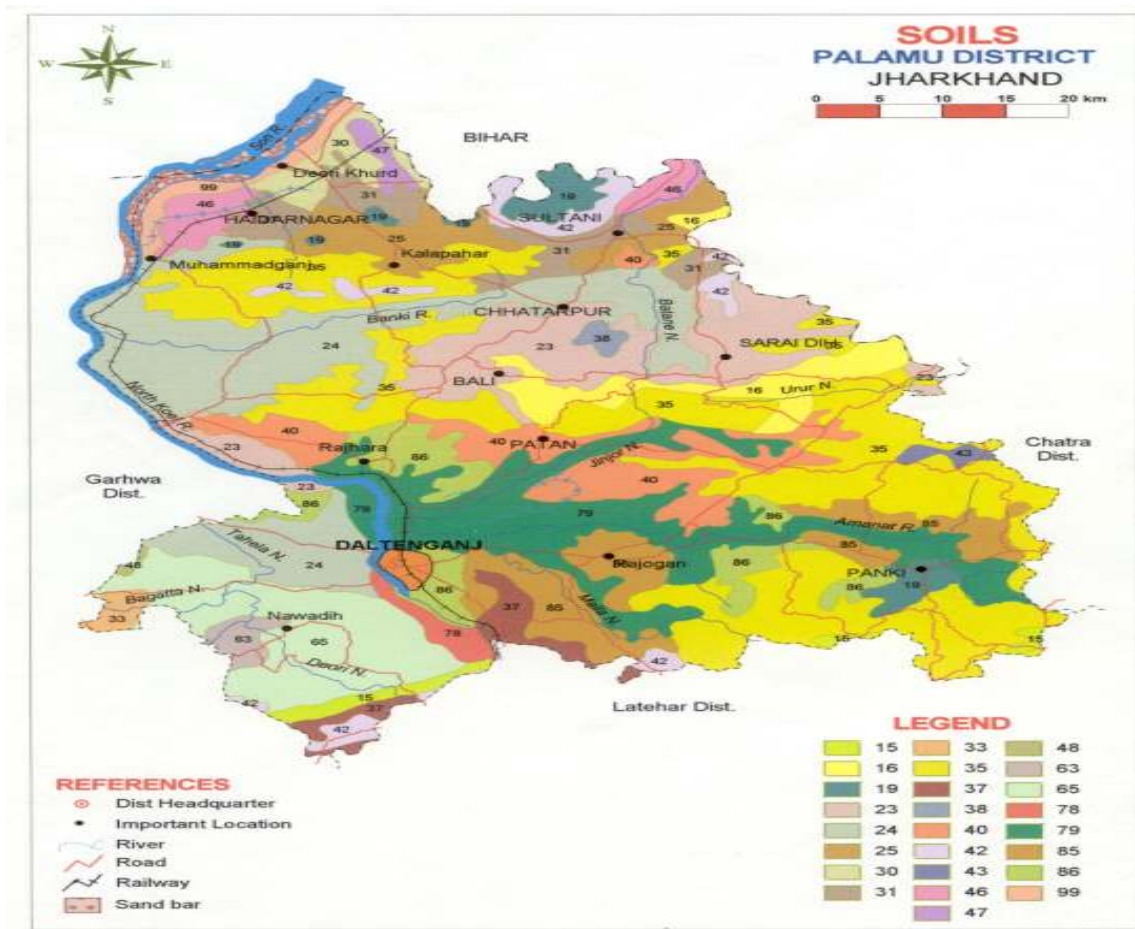


## ANNEXTURE-2: MEAN ANNUAL RAINFALL OF PALAMAU DISTRICT



### ANNEXTURE-3: SOIL MAP OF JHARKHAND

SOURCE: NBSSLUS, BAU



## 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  July 1 <sup>st</sup> week	Upland	Pigeonpea + Maize  Pigeonpea : Birsa Arhar – 1, Bahar, local  Maize: Kanchan , Suwan Composite -1, BVM – 2	Pigeonpea + Okra  Pigeonpea + Sorghum  Okra: Pravani kranti, Arka Anamika A – 4  Sorghum: CSV – 20, 17 CSV – 17, ICPH – 2671	Line sowing  Sowing of Pigeonpea in wider spacing (75 X 25 Cm)  Use of potash fertilizer  Seed treatment	Supply of seeds through D.A.O.  Supply of seeds through N.F.S.M.
	Medium deep sandy loam	Rice : IR -36, IR – 64, Lalat	Rice: Naveen, shabhagi	Integrated pest management	
	Low land deep clay soil.	Rice: Birsamati, Rajendra munsuri – 1, MTU - 7029	Hybrid Rice: PAC – 807, Uday – 111, 27P31, Arize – 6444		

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  July 3 <sup>rd</sup> week.	Upland	Pigeonpea + Maize  Pigeonpea : Birsa Arhar – 1, Bahar, local  Maize: Kanchan , Suwan Composite -1, BVM – 2	Pigeonpea + Okra  Pigeonpea + Sorghum  Okra: Pravani kranti, Arka Anamika A – 4  Sorghum: CSV – 20, 17 CSV – 17, ICPH – 2671	Line sowing  Sowing of Pigeonpea in wider spacing (75 X 25 Cm)  Use of potash fertilizer  Seed treatment	Supply of seeds through D.A.O.  Supply of seeds through N.F.S.M. MNREGS and NWDPRA Schemes
	Medium deep sandy loam	Rice : IR -36, IR – 64, Lalat	Rice: Naveen, shabhagi	Integrated pest management	
	Low land deep clay soil.	Rice: Birsamati, Rajendra munsuri – 1 MTU - 7029	Hybrid Rice: PAC – 807, Uday – 111, 27P31, Arize – 6444		

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  August 1 <sup>st</sup> week.	Upland	Pigeonpea + Maize  Pigeonpea : Birsa Arhar – 1, Bahar, local  Maize: Kanchan , Suwan Composite -1, BVM – 2	Pigeonpea + Okra  Pigeonpea + Sorghum  Okra: Pravani kranti, Arka Anamika A – 4  Sorghum: CSV – 20, 17 CSV – 17, ICPH – 2671	Line sowing  Sowing of Pigeonpea in wider spacing (75 X 25 Cm)  Use of potash fertilizer  Seed treatment	Supply of seeds through D.A.O.  Supply of seeds through N.F.S.M. MNREGS and NWDPRA Schemes
	Medium deep sandy loam	Rice : IR -36, IR – 64, Lalat	Rice: Naveen, shabhagi	Integrated pest management	
	Low land deep clay soil.	Rice: Birsamati, Rajendra munsuri – 1 MTU - 7029	Hybrid Rice: PAC – 807, Uday – 111, 27P31, Arize – 6444		

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 3 <sup>rd</sup> week	Upland	Finger Millet  Finger Millet- Kulthi – Birsa Kulthi – 1, Madhu	Toria  Toria – Bhawani, Panchali, Pant Toria – 303, Lotni (Local)	In Finger millet : 1. Seed hardening- (18 hrs. soaking in water followed by 24 hrs. shade drying)  2. Thinning to retain one seedling at 30 cm	Supply of seeds through D.A.O.  Supply of seeds through N.F.S.M.

				3. Inter cultivation 4. Conservation furrow Thinning	
		Niger Niger: N- 5, Birsa Niger – 2 and 3	Pigeonpea Pigeonpea: ICPH - 2671		

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	Pigeonpea + Maize  Pigeonpea: Birsa Arhar – 1, Bahar, local  Maize: Kanchan , Suwan Composit -1, BVM – 2	1. Thinning and gap filling of existing crop.  2. Re sowing of crop	Soil mulching  Gapfilling  Re Sowing  Conservation Furrow	Supply of seeds through D.A.O.  Supply of seeds through N.F.S.M.
	Medium deep soil	Rice  Rice : IR -36, IR – 64, Lalat	1. Life saving irrigation through Pumps and sprinkler.		



	Low deep clay soil	Rice Rice : Birsamati, Rajendra munsuri – 1	Life saving irrigation through Pumps		

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	Uplands	Maize + Pigeonpea / Blackgram  Pigeon Pea + Sesame Maize + Groundnut/Cowpea/ Fingermillet	1. Supply of life saving irrigation. 2. Weeding cum – hoeing to break capillarity. 3. Finger millet has better drought tolerance capacity (Area extension) 4. weeding and weed mulching of the field	1. Application of compost to enhance the water holding capacity of soil. 2. Judicious land of for better penetration of root system 3. Weeding and weed mulching of the field.	Supply of Pumps (Sprinkler) sets under RKVY
	Medium land	Rice Rice: IR – 36, IR – 64	1. Life saving irrigation through Pumps and sprinkler.	Pre sowing application of compost and Judicious application of P&K	

				for better water holding and root growth.	
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<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Mid season drought (long dry spell)</b>	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Crop management<sup>c</sup></b>	<b>Soil nutrient &amp; moisture conservation measues<sup>d</sup></b>	<b>Remarks on Implementation<sup>e</sup></b>
At flowering/ fruiting stage	Upland	Maize + Pigeonpea/ Maize + Blackgram / Pigeonpea + Sesame/ Maize + Groundnut / Pigeonpea + Groundnut	Life saving irrigation through sprinkler system weed – cum – hoeing and weed mulching	Intercultivation (soil mulching )  Conservation Furrow	Supply of seeds trough D.A.O.  Supply seeds trough N.F.S.M.
	Medium deep sandy loam	Rice : IR – 36 , IR - 64	Life irrigation by lifting the water from ponds/ wells		Supply of irrigation devices under RKVY.
	Low land deep clay soil.	Rice : Sonam, Rupali, Arize – 6444, PHB – 71	Life saving irrigation through Pumps/Ponds/wells.		

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Terminal drought (Early withdrawal of monsoon)</b>	<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>

	Upland shallow red soils	Maize + Pigeonpea / Blackgram/ Groundnut/Cowpea  Pigeonpea + Sesame/ Fingermillet	Life saving irrigation Harvesting of pods of Cowpea and Blackgram for vegetable purpose and fodder.	Niger/ Rai/ Chickpea/ Linseed.	Supply of Pumps (Sprinkler) sets under RKVY
	Medium land	Rice	Supply of life saving irrigation through lifting the water from ponds wells.	Rai + Wheat,  Linseed + Horsegram, Niger, Toria, Chickpea, Vegetable like – tomato, Vegetable pea, Potato.  Wheat + Mustard Lentil.	Seeds and planting materials supply under RKVY.
	Low land	Long duration rice varieties and hybrids.	Life saving irrigation Crop protection measures		Ponds/wells under MNREGS and RKVY.

### 2.1.2 Drought - Irrigated situation

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		Rice (Rainfed condition)	Maize	Effective use of irrigation (Sprinkler)	Supply of seeds through D.A.O.  Supply of seeds

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
					through N.F.S.M.

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		Not Applicable			

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		Not Applicable			

Condition			Suggested Contingency measures		
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due					

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
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
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 <sup>n</sup>
Continuous high rainfall in a short span leading to water logging				
Pigeonpea + Maize	Provided drainage	Provided drainage	Rain water harvesting	Safe storage against storage pest and disease
Pigeonpea + sorghum	Provided drainage	Provided drainage	Harvest for vegetable Purpose	Safe storage against storage pest and disease

Pigeonpea + Okra	Provided drainage	Provided drainage		Safe storage against storage pest and disease
<b>Heavy rainfall with high speed winds in a short span</b>	-	-	-	-
<b>Outbreak of pests and diseases due to unseasonal rains</b>	-	-	-	-

### 2.3 Floods

Condition	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
<b>Continuous submergence for more than 2 days</b>				
<b>Sea water intrusion</b>				

### 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</b>				
<b>Cold wave</b>				
Pigeonpea	-	Spray of fungicide and IPM	Before initiation of flower use of IPM Which include fungicide + insecticide	
Chickpea		Spray of fungicide and IPM	Watering of plant	
Mustard		Spray of fungicide	Smoking at 3 to 4 am in the morning	

		and IPM	
<b>Frost</b>			
<b>Hailstorm</b>			
<b>Cyclone</b>			

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Feed and Fodder availability	<p><b>1. Reserve feed/ fodder bank at community level</b></p> <p>Each district should have reserves (feeding 5000 ACU maintenance ration for about 1-3 weeks period) of the following at any point of the year for mobilization to the needy areas. Checking of feed availability may be made at 3 months interval, particularly before onset of summer.</p> <p>Rice/ wheat straw: 250 t</p> <p>Urea molasses mineral bricks (UMMB): and complete feed</p>	<p>Harvest and use all the failed crop (Maize, Rice, Wheat, Horse gram etc) material as fodder.</p> <p>Harvest the top fodder (Neem, Subabul, Acasia, Pipol, Gular, Sessame, Sal, Jamun, Mango, Jackfruit, Bamboo etc) and unconventional feeds resources like banana plants, babool pods, Mahua seed cake etc for use as feed/ fodder for livestock (LS). Fallen leaves from forest may also be used as fodder.</p> <p>Aquatic plants like lotus, water hyacinth, duckweed may be fed to livestock mixing with straw.</p> <p>During drought, sorghum may accumulate HCN, which is toxic to livestock. Care may be taken in feeding of stunted grown Sorghum fodder.</p> <p>Available feed and fodder should be collected</p>	<p>Short duration fodder crops of Sorghum / Bajra / Maize (UP Chari, Pusa Chari, HC-136, HD-2/Rajkoo, Gaint Bajra, L-74, K-6677, Ananand / African tall, Kissan composite, Moti, Manjari, BI-7) and cowpea should be sown in unsown and crop failed areas. Cultivation of Jowar/Cowpea/ Maize in September-October.</p> <p>Rapeseed, mustard, Chinese cabbage etc and maize may be</p>

	<p>block (CFB) 50-100 t</p> <p>Dried grass collected from forest: 20-25 t</p> <p>Concentrates: 20-50 t</p> <p>Minerals and vitamin supplements mixture: 1-5 t</p> <p><b>2. Preparation and storage of straw and dried grass/ grass hay/ fallen leaves at household level</b></p> <p>Preserve the fodder in the form of hay from Berseem, cowpea, oat &amp; other grasses.</p> <p>Large farmers may prepare silage from</p> <p>(a) Maize- harvesting at dough stage.</p> <p>(b) Jowar - at flowering stage.</p> <p>(c) Oat</p> <p>(d) Hybrid Napier – 40-45 day old.</p> <p>(e) Water hyacinth mixing with Paddy straw in ratio of 4:1 with 70 kg molasses /ton of clean water hyacinth.</p> <p>Bales of hay and other dry fodder should be stored and covered with asbestos sheet or polythene sheet.</p> <p><b>3. Creation of permanent fodder seed banks in all drought prone areas.</b></p>	<p>from CPRs/ forest and stall fed in order to reduce the energy requirements of the animals</p> <p><b>Mild drought :</b> Hay/straw should be transported to the needy areas</p> <p><b>Moderate drought:</b> Hay/ straw and vitamin &amp; minerals mixture should be transported to the needy areas</p> <p><b>Severe drought:</b> UMMB, hay, concentrates and vitamin &amp; mineral mixture should be transported to the needy areas. All the hay should be enriched with 2% Urea molasses solution or 1% common salt solution and fed to LS. In acute drought affected areas, animal camp may be organized along nearby canals or water sources. Farmers along with canal may be persuaded to cultivate fodder crops (where canal exists).</p> <p>Herd should be split and supplementation should be given only to the highly productive and breeding animals (pregnant and lactating animals). Due to prolonged under-feeding, there is a chance of abortion in pregnant animals and lactating cows may show the symptoms of hypoglycemia. Comparatively good quality feed may be offered to milch and pregnant animals. Dry and non-productive animals may be reared on dry roughages sprayed with 10% molasses or crude jaggery solution and 2% urea for maintenance of animals.</p> <p>Available kitchen waste should be mixed with dry</p>	<p>grown as fodder where feasible. These crops will be harvested in November to facilitate the sowing of wheat, pulses etc. Under irrigated conditions sowing of barseem with Chinese cabbage in last week of September may be taken up for early availability of green fodder. Oats may be grown in October as multi cut fodder to ensure the fodder availability for longer period.</p> <p>Concentrates supplementation should be provided to all lactating indigenous, crossbred and buffaloes</p> <p>In highly affected areas, where animals have died, soft loan or subsidy may be given for purchase of dairy animals. Backyard poultry, pig, goat may be distributed among resource poor farmers for immediate income generation.</p>
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	<p><b>2. Establishment of silvi-pastoral system and cultivation of fodder tress</b></p> <p>Establishment of silvi-pastoral system in CPRs with <i>Stylosanthus hamata</i> and <i>Cenchrus ciliaris</i> as grass with <i>Leucaena leucocephala</i> as tree component. Fodder trees may be planted around the house, wasteland etc. Recently, Chaya tree (<i>Cnidoacolus aconitifolius</i>) has been introduced in IGFRI, Jhansi which has high protein value, may be introduced in drought prone regions.</p> <p><b>3. Management of CPRs</b></p> <p>Top dressing of N in 2-3 split doses @ 20-25 kg N/ha in CPRs with the monsoon pattern for higher biomass production</p> <p><b>4. Short duration and low water requiring fodder cultivation</b></p> <p>Increase area under short duration fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677,</p>	<p>fodder while feeding.</p> <p>Livestock should be kept in shelter or under shed during daytime. In case of hot weather condition, grazing may be done in morning and afternoon. Livestock should not be traveled long distance for grazing to save energy and drinking water intake. Animals should not be watered immediately after return from grazing.</p> <p>Washing of animals may be done at least twice a day.</p> <p>40-50 g of salt and 30-40 g mineral mixture per adult animal and 10-20 g for small ruminants and calves to be provided daily through feed to reduce the imbalances of minerals.</p> <p>Livestock may be provided with drinking water from wells, hand pumps or from pond. In case of bad water quality, bleaching powder or chlorine or lime may be applied to water.</p> <p>Arrangements should be made for mobilization of small ruminants across the districts where no drought exits</p> <p>Unproductive livestock should to be culled during severe drought</p> <p>Create transportation and marketing facilities for the culled and unproductive animals (10000-20000 animals)</p> <p>Subsidized loans (5-10 crores) should be provided to the livestock keepers.</p>	
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	<p>Ananad/African Tall, Kisan composite, Moti) and cowpea.</p> <p><b>5. Feeding management</b></p> <p>Chopping of fodder should be made as mandatory in every village through supply and establishment of good quality crop cutters.</p> <p>Establishment of backyard production of Azolla for feeding dairy animals.</p> <p>Establishment of back yard cultivation of para grass/ hybrid Napier with drain water from bath room/washing area</p> <p>Avoid feed wastage by offering chaffed fodder and less quantity feed for 4 times a day.</p> <p>Avoid wastage of maize stover.</p> <p>Harvesting and collection of perennial vegetation particularly grasses which grow during monsoon. If excess grasses are collected, dried grass may be stored.</p> <p>Proper drying, bailing and densification of harvested grass.</p>		
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<p><b>Cyclone</b></p>	<p>Harvest all the possible wetted grain (rice/ wheat/maize etc) and use as animal feed after drying.</p> <p>Arrange for storing minimum required quantity of hay (25-50 kg) and concentrates (10-25 kg) per animal in farmer's / LS keepers house/ shed for feeding during cyclone.</p> <p>Don't allow the animals for grazing in case of early fore warning (EFW)</p> <p>In case of EFW, shift the animals to safer places.</p> <p>Identification of animals may be done.</p> <p>Keep animals untied in the shed in case of EFW.</p>	<p>Treatment of the sick, injured and affected animals through arrangement of mobile emergency veterinary hospitals / rescue animal health workers.</p> <p>Diarrhea out break may happen, arrangement should be made to mitigate the problem</p> <p>Protect the animals from heavy rains and thunder storms</p> <p>In severe cases un-tether <b>or</b> let loose the animals</p> <p>Arrange transportation of highly productive animals to safer place</p> <p>Spraying of fly repellants in animal sheds</p>	<p>Repair of animal shed</p> <p>Deworm the animals through mass camps</p> <p>Vaccinate against possible out breaks</p> <p>Proper disposal of the dead animals / carcasses by burning / burying with lime/ bleaching powder in pit</p> <p>Bleach / chlorinate (0.1%) drinking water or water resources</p> <p>Collect drowned crop material, dry it and store for future use</p> <p>Sowing of above mention short duration fodder crops in unsown and water logged areas</p> <p>Application of urea (20-25kg/ha) in the CPR's to enhance the bio mass production.</p> <p>After cyclone, for livelihood improvement of highly affected areas, backyard poultry, pig, goat etc may be distributed for immediate income generation.</p>
<p><b>Floods</b></p>	<p>Not applicable</p>	<p>Not applicable</p>	<p>Not applicable</p>

<p><b>Heat &amp; Cold wave</b></p>	<p>Arrangement for protection from <b>heat wave</b></p> <ul style="list-style-type: none"> <li>i) Plantation around the shed</li> <li>ii) Water sprinklers / foggers in the shed or frequent washing of animals.</li> <li>iii) Application of white reflector paint on the roof or putting rice straw on the roof of the shed.</li> </ul> <p><b>Cold wave :</b> Covering all the wire meshed walls / open area with gunny bags/ polyethylene sheets (with a mechanism for lifting during the day time and putting down during night time)</p>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves. Molasses may be added in the concentrate feed during heat waves.</p> <p>Put on the foggers / sprinklers and frequent washing of animals during heat waves and heaters during cold waves</p> <p>In severe cases, vitamin ‘C’ and electrolytes should be added in H<sub>2</sub>O during heat waves.</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
<p><b>Health and Disease management</b></p>	<p>Specify the endemic diseases (species wise) in that region.</p> <p>Identification of veterinary staff and animal health workers.</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Storage of emergency medicines and</p>	<p>Rescue of sick and injured animals and their treatment</p> <p>Conducting mass animal health camps</p> <p>Animals may be checked for any external injury and illness, Pregnant animals may be checked for any discomfort and uneasiness.</p>	<p>Conducting psahu sibir, mass animal health camps, fertility camps and deworming camps.</p> <p>Conducting fertility camps.</p> <p>Disposal of carcass by above means.</p> <p>Pregnancy toxemia may occur</p>

	<p>medical kits</p> <p>Timely vaccination (as per enclosed vaccination schedule) against all endemic diseases</p> <p>Surveillance and disease monitoring network establishment</p> <p>Provision for mobile ambulatory van.</p>	<p>Animals may be dewormed with suitable anti-parasitic drug and be checked and treated for ecto-parasites, if any. Deworming will improve fodder and feed absorption.</p> <p>During flood do not leave halter or headstalls on animals.</p> <p>Do not tie animals together when releasing.</p> <p>Report the location, identification and disposition of livestock and poultry to authorities handling the disaster.</p>	<p>Due to prolonged under-feeding. Hypoglycemia is also observed. Treatment may be provided to affected animals.</p> <p>Adequate attention is to be paid to disinfect the premises of temporary sheds with the help of bleaching powder, phenol, carbolic acid etc. In no case the carcass/ cadaver should come in contact with healthy animals rehabilitated in sheds.</p>
<b>Insurance</b>	Encouraging insurance of livestock	Listing out the details of the dead animals	<p>Submission for insurance claim and availing insurance benefit</p> <p>Purchase of new productive animals</p>
Drinking water	<p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Identification of water resources</p>	Restrict allowing of animals in water bodies/resources	Specify the options (place and area) for establishment of drinking water reserves.

<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 <sup>a</sup>	During the event	After the event	
<b>Drought</b>				
<b>Floods</b>				
<b>Cyclone</b>				
<b>Heat wave and cold wave</b>				

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

### .5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event <sup>a</sup>	During the event	After the event
<b>1) Drought</b>			
<b>A. Capture</b>			
<b>B. Aquaculture</b>			

(i) Shallow water in ponds due to insufficient rains/inflow	(i) Thinning of population  (ii) Arrangement of water supply from external resource  (iii) Deepening of ponds for more storage of water	(i) Partial harvesting (ii) Addition of water (iii) Stocking of air breathing fishes (Singhi, Magur or Murrel)	(i) Maintenances of remaining stock till favorable condition achieved (ii) If not feasible, total harvesting or transfer of fishes may be done. (iii) Preparation of the pond for next crop.
(ii) Impact of salt load build up in ponds / change in water quality	(i) Regular monitoring of water quality parameter. (ii) Addition of water from external resource	(i) Addition of water (ii) Arrangement of aeration. (iii) Monitoring of water quality (iv) Reduction of manuring according to water level.	
(iii) Any other	Polythene lining in ponds having more water seepage		
<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			
	<b>Suggested contingency measures</b>		

	<b>Before the event<sup>a</sup></b>	<b>During the event</b>	<b>After the event</b>
<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			

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