

## State: Madhya Pradesh

### Agriculture Contingency Plan for District: Balaghat

1.0 District Agriculture profile				
1.1	Agro-Climatic/Ecological Zone			
	Agro Ecological Sub Region (ICAR)	Central Highlands (Malwa And Bundelkhand), Hot Subhumid (Dry) Eco-sub region (10.4)		
	Agro-Climatic Region (Planning Commission)	Eastern Plateau and Hills Region (VII)		
	Agro Climatic Zone (NARP)	Chattisgarh Plain Zone (MP-1)		
	List all the districts or part thereof falling under the NARP Zone	Balaghat, Dindori, Mnadla, Seoni.		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		21° 19' to 22° 24' N	73° 31' to 81° 30' E	330 MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Zonal Agricultural Research Station , Chhindwara, Regional Agricultural Research Station , Waraseoni		
	Mention the KVK located in the district	Programme Coordinator Vill.- <b>Badgaon</b> , Post- Pala, Teh- Kirnapur, Distt- Balaghat (MP)		
1.2	Rainfall	Normal RF(mm)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1321.1	2 <sup>nd</sup> week of June	1 <sup>st</sup> week of October
	NE Monsoon(Oct-Dec):	72.4	-	-
	Winter (Jan-Feb)	42.9	-	-
	Summer (March-May)	35.2	-	-
	Annual	1471.6	-	-

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)	924.5	302.5	505	47.4	30.9	28	0.7	9.5	13.4	15..9

\* net sown area + current fallows + other fallows

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)	Percent (%) of total
	Deep black soils	577.6	62.6
	Medium sandy clay loam soils	166	18.05
	Shallow sandy soils	177	19.2

Source:- NBSS & LUP, Nagpur

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	273.2	125 %
	Area sown more than once	68.2	
	Gross cropped area	341.4	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	124.7		
	Gross irrigated area	141.5		
	Rainfed area	148.5		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	101	84.1	59.7
	Tanks	2391	29.1	20.6
	Open wells	18995	22.6	16.05
	Bore wells	52	00.2	00.1
	Lift irrigation schemes	NA		
	Micro-irrigation	NA		

	Other sources (reservoir)	33	05.50	03.91
	Total Irrigated Area		141.50	
	Pump sets	14924		
	No. of Tractors	3689		
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils 10	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	-		
	Critical	-		
	Semi- critical	05		
	Safe	05		
	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 etc. (2008-09)

1.7	Major Field Crops Cultivated	Area (000 ha)							
		Kharif			Rabi			Summer	Total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	-	
	Rice			244.9	-	-	-	-	244.9
	Minor millets			12.8					12.8
	Pigeonpea			07.1					7.1
	Maize	-	-	05.6	-			-	5.6
	Linseed	-	-	-		-	19.0	-	19.0
	Wheat	-			-	-	18.4	-	18.4

	Chickpea					10.4		10.4
	Rapeseed/ mustard					07.30		07.30
	<b>Horticulture</b>	<b>Total Area (ha)</b>			<b>Irrigated</b>		<b>Rainfed</b>	
	<b>Fruit crops</b>	1517			880		637	
	<b>Vegetables</b>	<b>Total Area</b>			<b>Irrigated</b>		<b>Rainfed</b>	
		2440			1340		1100	
	<b>Medicinal and Aromatic Crops</b>	<b>Total Area</b>			<b>Irrigated</b>		<b>Rainfed</b>	
		971			473		498	

	<b>Plantation crops</b>	<b>Total area</b>	<b>Irrigated</b>	<b>Rainfed</b>
		-	-	-
	Others such as industrial pulpwood crops etc (specify)	-	-	-
	<b>Fodder crops</b>	<b>Total area (ha)</b>	<b>Irrigated</b>	<b>Rainfed</b>
		989	-	989
	Others (specify)	-		
	<b>Total fodder crop area</b>	989		
	<b>Grazing land</b>	31573	-	-
	<b>Sericulture etc</b>	239	239	-
	<b>Others (Specify)</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)			552.8
	Crossbred cattle			NA
	Non descriptive Buffaloes (local low yielding)			NA
	Graded Buffaloes			194.9
	Goat			202.2
	Sheep			0.0
	Others (Pigs, Horses and others)			22.4
	Commercial dairy farms (Number)			NA
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>	
	Commercial	-	-	
	Backyard	-	437644	

<b>1.10</b>	<b>Fisheries</b> (Data source: Chief Planning Officer)						
	<b>A. Capture</b>						
	<b>i) Marine</b> (Data Source: Fisheries Department)	<b>No. of fishermen</b>	<b>Boats</b>		<b>Nets</b>		<b>Storage facilities (Ice plants etc.)</b>
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	<b>Not applicable</b>						
	<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>		
		976		97	1000		
	<b>B. Culture</b>						

		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) <b>Brackish water</b> (Data Source: MPEDA/ Fisheries Department)	-	-	-
	ii) <b>Fresh water</b> (Data Source: Fisheries Department)	2106	1.22 t/ha	1.00 t/ha approx
	<b>Others</b>			

### 1.11 Production and Productivity of major crops

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)							
<b>Major Field crops (Crops to be identified based on total acreage)</b>										
	Rice (Kharif)	309.6	1335	--	--	--	--	309.6	1335	
	Maize	6.58	1429	--	--	--	--	6.5	1429	
	Minor millets	5.2	420	--	--	--	--	5.2	420	
	Pigeonpea	3.2	881	--	--	-	-	3.2	881	
	Wheat	-	-	13.0	818	-	-	13.0	818	
	Linseed	-	-	6.8	396	-	-	6.8	396	
	Chickpea	-	-	6.4	807	-	-	6.4	807	
	Rapeseed/ mustard	-	-	3.2	772	-	-	3.2	772	
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>										
	<b>Horticulture</b>	NA								

crops - Fruits									
<b>Horticulture crops - Vegetable</b>									
	Cabbage	48.2	14000					48.2	14000
	Brinjal	16.5	15200	38.6	15000			55.1	15000
	Tomato	12.6	11200	75.4	14000			88.0	13100
	Chilli	8.3	4300					8.3	4300
	Potato	-	-	40.6	8500			40.6	8500

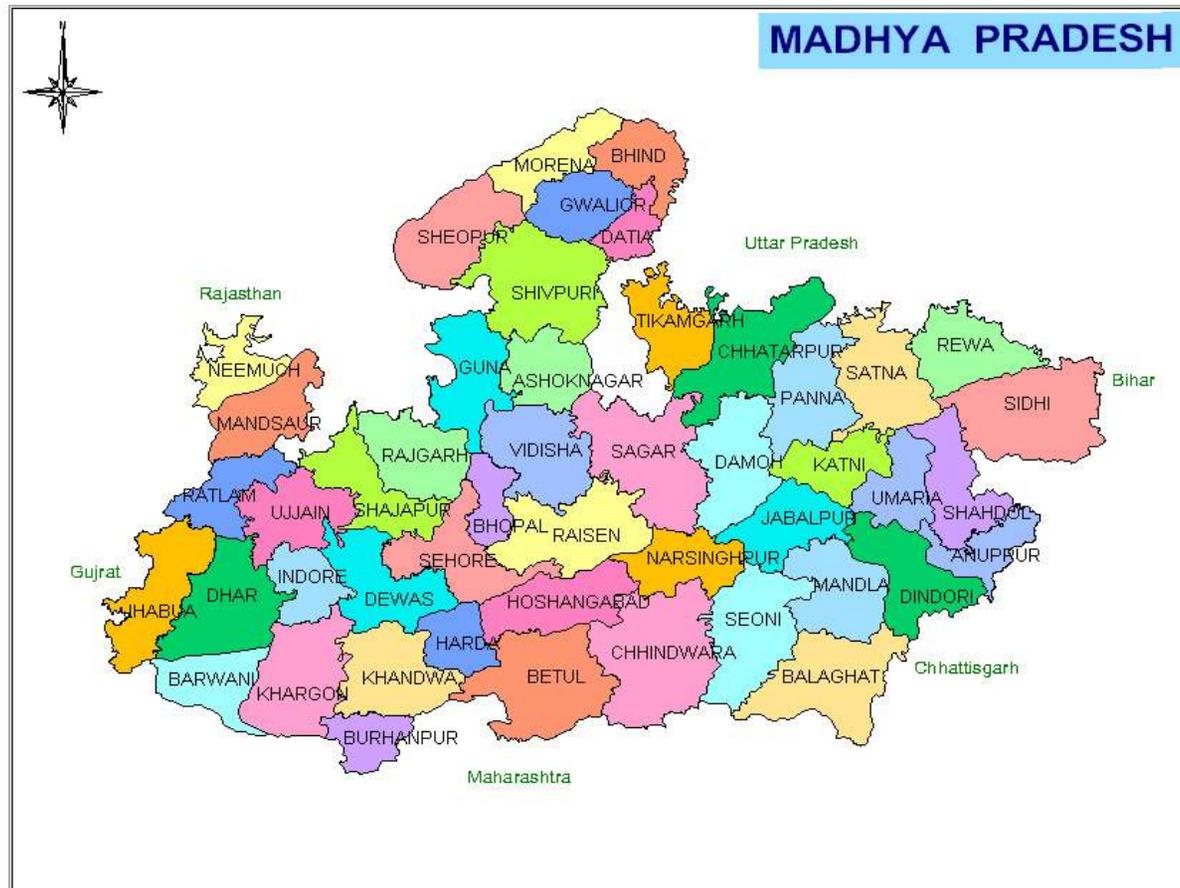
1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Rice	Maize	Pigeonpea	Chickpea	Linseed
	Kharif- Rainfed	2 <sup>nd</sup> week of June-3 <sup>rd</sup> week of July	2 <sup>nd</sup> week of June to 4 <sup>th</sup> week of June	3 <sup>rd</sup> week of June to 2 <sup>nd</sup> week of July	-	-
	Kharif-Irrigated	2 <sup>nd</sup> week of June-2 <sup>nd</sup> week of August	3 <sup>rd</sup> week of June to 2 <sup>nd</sup> week of July	3 <sup>rd</sup> week of June to 2 <sup>nd</sup> week of July		
	Rabi- Rainfed				2 <sup>nd</sup> week of October-1 <sup>st</sup> week of November	2 <sup>nd</sup> week of October – 4 <sup>th</sup> week of October
	Rabi-Irrigated				2 <sup>nd</sup> week of November-1 <sup>st</sup> week of December	1 <sup>st</sup> week of November-2 <sup>nd</sup> week of November

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm			√
	Heat wave		√	
	Cold wave		√	
	Frost		√	
	Sea water intrusion			√

	Pests and disease outbreak (specify) <ol style="list-style-type: none"> <li>1. Wilt in pulse crop</li> <li>2. YVM in Blackgram, Greengram,soybean,lentil,okra etc</li> <li>3. Sterility in Arhar</li> <li>4. Pod borer in pulse</li> <li>5. Smut in Sugarcane &amp; Wheat</li> </ol>	Rice Gall midge, Blast, Stem Borer√	√	
	Others (specify)			

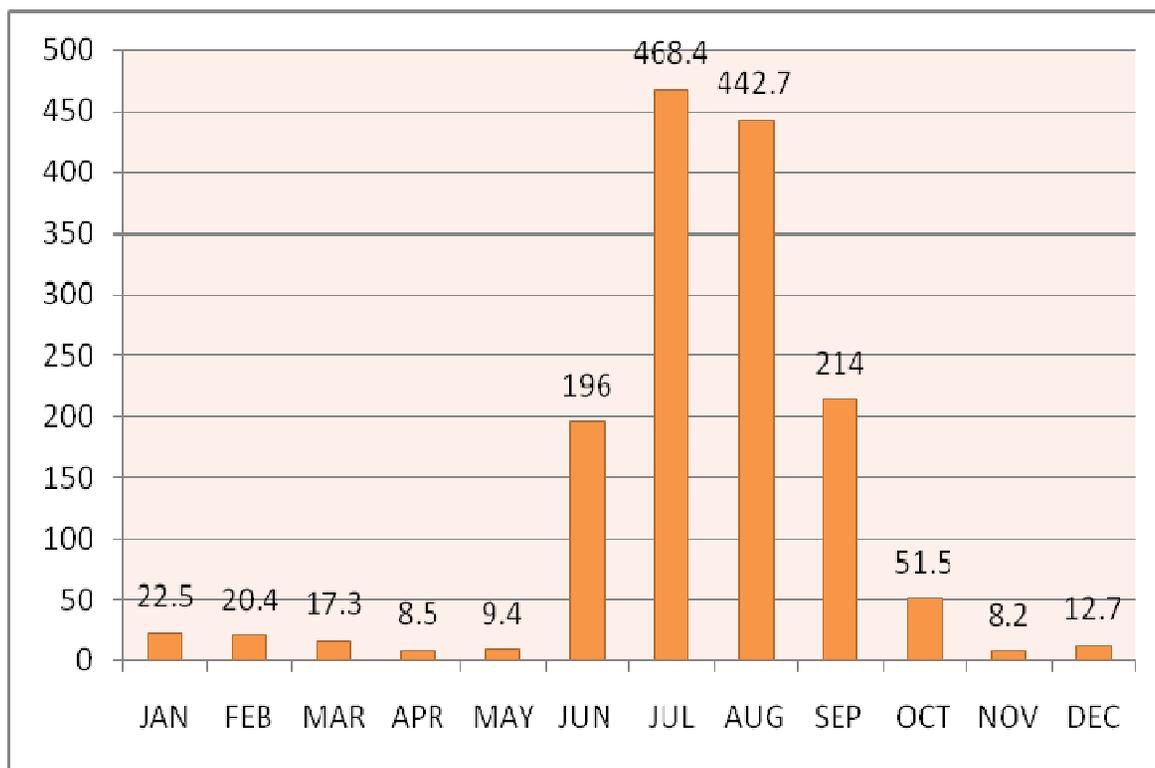
<b>1.14</b>	<b>Include Digital maps of the district for</b>	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

Annexure I

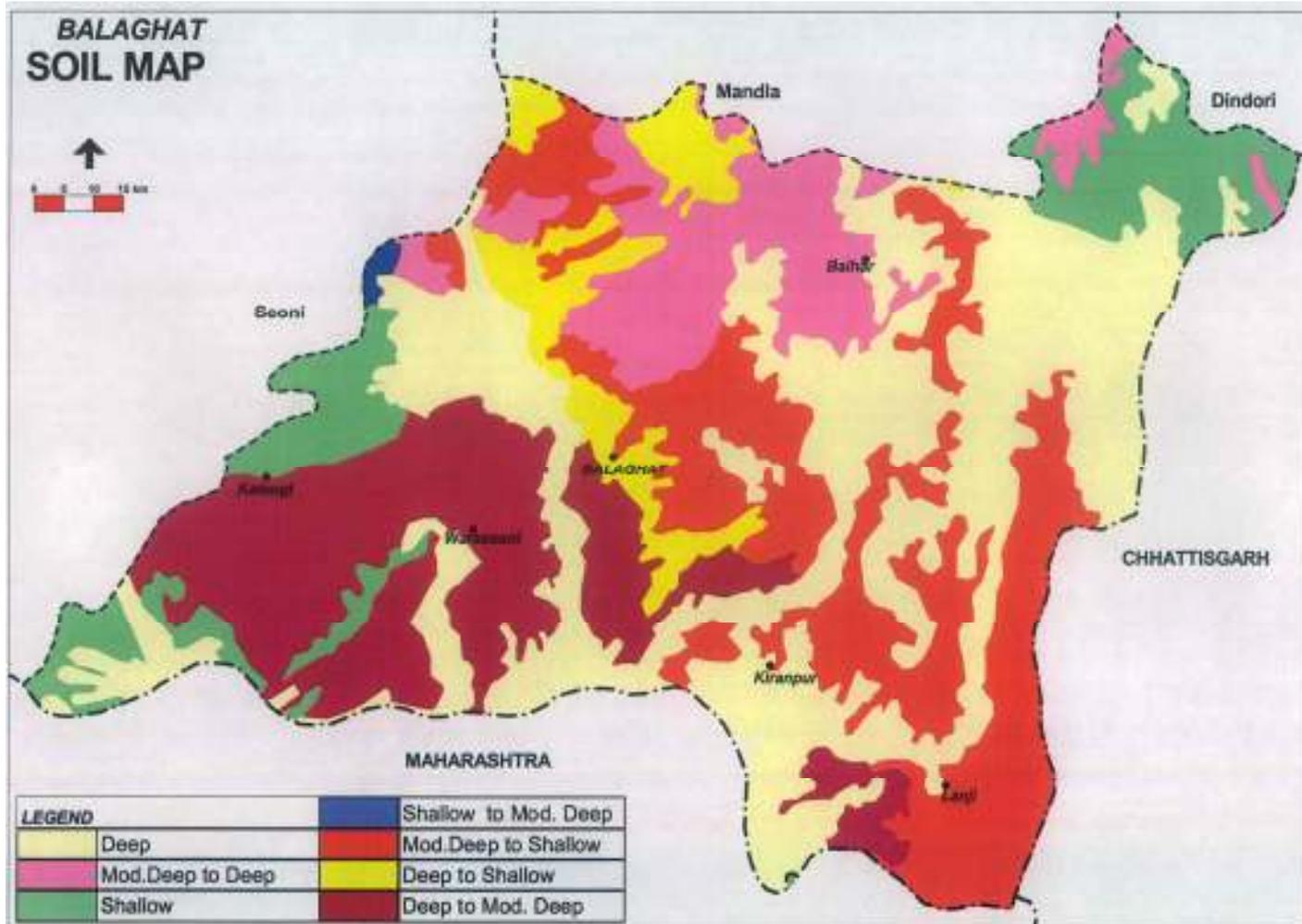




**Annexure-II**  
**Mean annual rainfall (mm)**



Annexure-III



Source: NBSS & LUP, Nagpur

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Delay by 2 weeks  4 <sup>th</sup> week of June	Deep black sandy clay loam soils	Rice-Chickpea /Wheat	<b>Rice-</b> Upland field: JR-201, JR-503, Vandna, Poornima, Ananda, Narendra 97, Govinda and hybrid rice JRH 4, 5 and 8  Lowland field WGL-32100, MR-219, Mahamaya, IR-36, IR-64, MTU-1081, HMT, Swarna, Madhuri, Pusa basmati, Karnal basmati, Pusa sugandha3,4,and 5 and Hybrid rice PRH 10, JRH 4,5 and 8	<ol style="list-style-type: none"> <li>1. Use of blade harrow (Bakhar) for moisture conservation and destroy of weed under late onset of monsoon.</li> <li>2. Selection of having higher production potential varieties.</li> <li>3. Adaptation of moisture conservation practices. Conservation of excess rain water and use as life saving irrigation according to situation.</li> <li>4. Seed treatment with mixture of Thiram (1.5g) + Carbendazim (1.5g) /kg seed followed by treated with biofertilizers</li> <li>5. Use of balanced fertilizer and biofertilizer according to recommendation to crops and application of zinc deficient soil</li> <li>6. Timely weeding and use of weeds as mulch between row of crops for moisture conservation</li> <li>7. Adoption of plant protection as per requirement as rainfall condition</li> <li>8. Transplanting of rice seedlings as per SRI technique</li> </ol>	-
	Medium sandy clay loam soils	Kodo-kutki	<b>No change</b>	Prefer improved varieties	
		Maize		Sowing on ridge and furrow method	
		Pigeonpea		Prefer short duration varieties	
	Shallow soils	Kodo-kutki	<b>No change</b>	Line sowing and improved crop management practices	
		Maize		Sowing on ridge and furrow method	

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	Deep black clay to sandy clay loam soils	Rice-Chickpea / Wheat	<b>Rice:</b> Upland field: JR-503, Vandna, Ananda, Narendra 97, Govinda Low land field -IR-36, IR-64, HMT, JR-503, Poornima  Adopt staggered sown community nursery to ensure adequate supply of correct aged seedlings for transplanting after receipt of rains	<ol style="list-style-type: none"> <li>1. Before onset of monsoon destroy the weeds in fallow land by field operations.</li> <li>2. In late sowing condition increase seed by 25% than normal and sowing of rice by Lehi system</li> <li>3. Use of balance fertilizer</li> <li>4. Under late planting use of biofertilizers and recommended dose potash fertilizer is recommended.</li> </ol>	SAU, Seed Corporation, NSC
	Medium sandy clay loam soils	Kodo-kutki	No change	Line sowing and improved crop management practices	
		Maize	Sesame/ Niger	Sowing on ridge and furrow method	
		Pigeonpea	No change	Prefer short duration varieties	
	Shallow soils	Kodo-kutki	No change	Line sowing and improved crop management practices	
		Maize	Prefer improved varieties	Sowing on ridge and furrow method	

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

<b>Delay by 6 weeks</b> <b>4<sup>th</sup> week of July</b>	Deep black Clay to sandy clay loam soils	Rice-Chickpea/Wheat	Transplanting of <b>Extra early rice varieties</b> Sowing of Sesame and Niger  Adopt staggered sown community nursery to ensure adequate supply of correct aged seedlings for transplanting after receipt of rains	1. Use blade harrow in the fields for moisture conservation and control weeds. 2. Increase in seed rate by 25% 3. Planting of rice in close spacing	SAU, Seed Corporation, NSC
	Medium sandy clay loam soils	Kodo-kutki	<b>No change</b>	Prefer improved varieties	
		Maize	Sowing of Sesame and Niger	Sowing on ridge and furrow method	
		Pigeonpea		Prefer short duration varieties	
	Shallow soils	Kodo-kutki	<b>No change</b>	Line sowing and improved crop management practices	
		Maize	Sowing of Sesame and Niger	Sowing on ridge and furrow method	

<b>Condition</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Suggested Contingency measures</b>		
			<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
<b>Delay by 8 weeks</b>  2 <sup>nd</sup> Week of August	Deep black clay to sandy clay loam soils	Rice-Chickpea /Wheat	Sowing of Niger	1. Use blade harrow in the fields for moisture conservation and destroy of weed in fields. 2. Prepare land of Rabi Crops	SAU, Seed Corporation, NSC
	Medium sandy clay	Kodo-kutki	<b>No change</b>	Prefer improved varieties	

	loam soils	Maize	Sowing of Niger	Sowing on ridge and furrow method
		Pigeonpea	Sowing of Niger	Prefer short duration varieties
	Shallow soils	Kodo-kutki	<b>No change</b>	Line sowing and improved crop management practices
		Maize	Sowing of Niger	Sowing on ridge and furrow method

Condition			Suggested Contingency measures		
Early season drought (Normal onset)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	Deep black clay to sandy clay loam soils	Rice-Chickpea /Wheat	Re sowing & replace early duration variety; Gap filling in case of poor plant population	Interculture Operation & Mulching. spray of 2% urea Sowing on ridge and furrow method	Sources of seed SAU, NSC & SSC For machinery support ongoing schemes like RKVY NREGS etc.,
	Medium sandy clay loam soils	Kodo-kutki	Prefer improved varieties		
		Maize	Sowing on ridge and furrow method		
		Pigeonpea	Prefer short duration varieties		
	Shallow sandy loam soils	Kodo-kutki	Line sowing and improved crop management practices		
		Maize	Sowing on ridge and furrow method		

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Normal Crop/cropping system <sup>b</sup>	Crop management <sup>c</sup>	Soil nutrient & moisture conservation measures <sup>d</sup>	Remarks on Implementation <sup>e</sup>
<b>At vegetative stage</b>	Deep black clay to	Rice-Chickpea /Wheat	Re sowing & replace	Interculture	

	sandy clay loam soils		early duration variety; Gap filling in case of poor plant population	Operation & Mulching. spray of 2% urea	
	Medium sandy clay loam soils	Kodo-kutki	Prefer improved varieties Prefer short duration varieties	Sowing on ridge and furrow method	
		Maize			
		Pigeonpea			
	Shallow sandy loam soils	Kodo-kutki	Line sowing and improved crop management practices	Mulching ; spray of 2% urea ;Sowing on ridge and furrow method	
		Maize			

Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
At flowering/ fruiting stage	Deep black clay to sandy clay loam soils	Rice-Chickpea /Wheat	Life saving by applying supplemental irrigation Weeding and mulching with weeds. Harvesting of crops at physiological maturity.	Intercultivation; Mulching & spray of 2% urea.	For machinery support ongoing schemes like RKVY NREGS etc.,
	Medium sandy clay loam soils	Kodo-kutki	Weeding and mulching with weeds.	Sowing on ridge and furrow method	
		Maize			
		Pigeonpea			
	Shallow sandy loam soils	Kodo-kutki	Line sowing and improved crop management practices	Mulching ; spray of 2% urea	
		Maize		Sowing on ridge and furrow method	

Condition			Suggested Contingency measures		
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
(Early withdrawal of monsoon)	Deep black clay to sandy clay loam soils	Rice-Chickpea /Wheat	Life saving Irrigation; Harvest crop at physiological	Rabi crops like Mustard, Toria & Field pea can be sown after 2 <sup>nd</sup> week of september.	Sources of seed SAU, NSC & SSC For machinery support Ongoing

			Maturity	Sowing of Chickpea & Lentil in october	schemes like RKVY, NREGS etc.,
Medium sandy clay loam soils	Kodo-kutki			Rabi crops like mustard & Chickpea crop should sown after 15 <sup>th</sup> sep to October Mulching ; spray of 2% urea	
	Maize	Sowing on ridge and furrow method			
	Pigeonpea				
Shallow sandy loam soils	Kodo-kutki	Line sowing and improved crop management practices			
	Maize	Sowing on ridge and furrow method			

### 2.1.2 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	Deep black to medium clay loam soils	Rice-Chickpea /Wheat	Choose 100-110 days duration maturing varieties in rice .	Closer spacing & Limited area covered under irrigation. Sowing of pulses in ridge and furrows	Source of seed SAU, NSC & SSC For machinery support Ongoing schemes like RKVY NREGS etc.,
Limited release of water in canals due to low rainfall	Deep black to medium clay loam soils	Rice-Chickpea /Wheat	Reduce the area of rice as per availability of water  Choose short duration varieties (Pulses)	Closer spacing & Limited area covered under irrigation	
Non release of water in canals under delayed onset of monsoon in catchment	Deep black to medium clay loam soils	Rice-Chickpea /Wheat	Blackgram & Greengram	Sowing of blackgram & greengram on ridge & furrows for proper drainage	

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 to insufficient /delayed onset of monsoon	Deep black to medium clay loam soils	Rice-Chickpea /Wheat	Sowing of var. of rice less than 100 days duration through broadcasting or line sowing method.  Sowing of Blackgram & Greengram in close spacing	Blackgram & sesame sown in ridge & furrow with closer spacing	
Condition	Suggested Contingency measures				
Major Farming situation <sup>f</sup>	Normal Crop/cropping system <sup>g</sup>	Change in crop/cropping system <sup>h</sup>	Agronomic measures <sup>i</sup>	Remarks on Implementation <sup>j</sup>	
Insufficient groundwater recharge due to low rainfall	Deep to medium clay loam soils	Rice-Chickpea /Wheat	Early duration var. of rice in limited area  Choose short duration varieties (Pulses)	Irrigation through sprinkler & mulching	Source of seed SAU, NSC & SSC For machinery support Ongoing schemes like RKVY NREGS etc.,

## 2.2 Unusual rains (untimely, unseasonal etc)] (for both rain fed 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	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up gap filling either with available nursery or by splitting the tillers from the surviving hills	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up suitable plant protection Measures in anticipation of pest & disease out breaks	Drain the excess water as early as possible Take up suitable plant protection measures in anticipation of pest & disease out breaks	Drain out water and spread sheaves loosely in field or field bunds where there is no water stagnation Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds

	Take up suitable plant protection Measures in anticipation of pest & disease out breaks			Thresh after drying the sheaves properly Ensure proper grain moisture before storing
Maize	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Take up inter cultivation and at optimum soil moisture condition to loosen and aerate the soil and to control weeds Earthing up the crop for anchorage Spray KNO <sub>3</sub> 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for Pink stem borer, sheath blight and Turcicum leaf blight	Drain the excess water as early as possible Apply 20 kg N + 10 kg K /ha after draining excess water Spray KNO <sub>3</sub> 1 % or water soluble fertilizers like 19-19-19, 20-20-20, 21-21-21 at 1% to support nutrition Take up timely control measures for sheath blight and post flowering stalk rots	Drain the excess water as early as possible Allow the crop to dry completely before harvesting	Harvest the cobs after the they are dried up properly. Dry the grain to optimum moisture condition before storing
Pulses	Provide drainage, care should be taken that rain water does not stagnate in the field.	Care should be taken that rain water does not stagnate in the field.	Care should be taken that rain water does not stagnate in the field. Harvest the crop in clear weather.	Produce should be placed under shade or Protect the produce by covering produce through tarpaulin. Sun drying of produce.
Wheat	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Care should be taken that rain water does not stagnate in the field and not allow to top dressing of nitrogenous fertilizers.	Proper drainage should be provided and adopt all plant protection measures	
Chickpea				
<b>Horticulture</b>	Provide drainage care			
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
<b>Outbreak of pests and diseases due to unseasonal rains</b>				

Rice	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Spraying of Monocrotophos 36 EC 14 ml or Cypermethrin 10 EC 6 ml per 10 liter of water against stem borer	Removal and destruction of infected panicles due to Loose smut	
Maize	Plant protection measures for stem borer, army worm. Control stem borer.  For control of leaf blight spray Mancozeb @ 2.5g/l.	Plant protection measures for Rust, TLB. Control cob worm and rust  PP measures for Stalk rot/rust//TLB by spraying Hexaconazole @ 0.1 %	Plant protection measures for Rust / TLB/Leaf spot in Maize	-
Pulses	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	Carry out critical survey of fields for insect and disease attack in crops	
Wheat	Spray 0.2 % Dithane M-45 WP against wheat rust.	Spray 0.2 % Dithane M-45 WP against wheat rust.	Carry out critical survey of fields for disease attack in crops	-
Chickpea	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. “T” shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC or methyl parathion 50 EC @ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Quinalphos 1.5 WP 20-25 per hectare with duster.	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. “T” shaped pegs placed in late sown chickpea field for biological control of pod borer and for chemical control spraying of Quinalphos 25 EC or Chlorpyriphos 20 EC or methyl parathion 50 EC@ 600 ml dissolve in 500 L of water should be used. Dusting of Fenvalerate 0.4% or Quinalphos 1.5 WP 20-25 per hectare with duster.	Spray triazophos 40 % EC @ 1-1.5 l/ha in chickpea against pest incidence. Carry out critical survey of fields for insect and disease attack in crops	-
<b>Horticulture</b>	-	-	-	-

### 2.3 Floods- Not applicable

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>				
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</b>				
Rice	Light and repeated irrigation at the appearance of hair line cracks in soil surface, Correct iron deficiency with 0.5% iron sulphate spray.	Repeated irrigation at the appearance of hair line cracks in soil surface, pounding of water for 15 days after transplanting to check Fe deficiency and for crop establishment.	Repeated irrigation at the appearance of hairline cracks in soil surface	Harvest crop at physiological maturity
Maize, Pigeonpea,	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation
<b>Horticulture</b>				
Mango , Guava	Protect the crop with the help of light irrigation, wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
<b>Cold wave</b>				
Chick pea Wheat	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Light irrigation Smoke generation at night time to rise temperature	Harvest at physiological maturity

<b>Frost</b>				
Chickpea, Lentil, Pigeonpea	Give f light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation; Smoke generation at night time to rise temperature  wind breaks are necessary where cold and heat wave in regular	Protect the crop with the help of light irrigation, Smoke generation at night time to rise temperature wind breaks are necessary where cold and heat wave in regular	Harvest at physiological maturity
<b>Hailstorm</b>	Not applicable			
<b>Cyclone</b>	Not applicable			

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	<b>Suggested contingency measures</b>		
	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>Drought</b>			
Feed and fodder availability	<p>As the district is occasionally prone to drought the following practices may be implemented to prevent fodder shortage problem</p> <p>Sowing of cereals (fodder varieties of Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during North-East monsoon under dry land system for fodder production.</p> <p>Collection of soybean, gram and chick pea stover for use as feed supplement during drought</p> <p>Preserving the green maize fodder as silage</p> <p>Encourage fodder production with Bajra – stylo-Bajra on rotation basis and also to cultivate short-term fodder crops like sunhemp</p>	<p>Harvest and use biomass of dried up crops (Rice, wheat, Maize, Soybean, Black gram, Green gram, chick pea etc., ) material as fodder</p> <p>Harvest all the top fodder available (Subabul, Glyricidia, Pipol, Prosopis etc) and feed the LS during drought</p> <p>Concentrate ingredients such as Grains, brans, chunnies &amp; oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during</p>	<p>Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize with input subsidy</p> <p>Supply of quality stem cuttings of Hybrid napier (CO1), paragrass, guinea grass etc., well before monsoon</p> <p>Encourage growing fodder crops like Berseem in winter and Juar in summer season</p> <p>Flushing the stock to recoup</p> <p>Replenish the feed and fodder banks</p>

		<p>drought</p> <p>Promotion of Horse gram as contingent crop and harvesting it at vegetative stage as fodder</p> <p>Continuous supplementation of minerals and vitamin to prevent infertility.</p> <p>Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals</p>	
Drinking water	<p>Adopt various water conservation methods at village level to improve the ground water level for adequate water supply.</p> <p>Identification of water resources</p> <p>De-silting of ponds</p> <p>Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals)</p> <p>Construction of drinking water tanks in herding places/village junctions/relief camp locations</p> <p>Community drinking water trough can be arranged in sandies /community grazing areas</p>	<p>Adequate supply of drinking water.</p> <p>Restrict wallowing of animals in water bodies/resources; Add alum in stagnated water bodies</p>	<p>Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources</p> <p>Provide clean drinking water</p>
Health and diseases management	<p>Procure and stock emergency medicines and vaccines for important endemic diseases of the area</p> <p>All the stock must be immunized for endemic diseases of the area</p> <p>Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district</p> <p>Adequate refreshment training on draught</p>	<p>Carryout deworming to all animals entering into relief camps</p> <p>Identification and quarantine of sick animals</p> <p>Constitution of Rapid Action Veterinary Force</p> <p>Performing ring vaccination (8 km radius) in case of any outbreak</p> <p>Restricting movement of livestock in case of any epidemic</p> <p>Tick control measures be undertaken to</p>	<p>Keep close surveillance on disease outbreak.</p> <p>Undertake the vaccination depending on need</p> <p>Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with</p>

	management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	mid summer
<b>Floods</b>	NA		
<b>Cyclone</b>	NA		
<b>Heat wave and cold wave</b>			
<b>Heat wave</b>	<ul style="list-style-type: none"> <li>i) Plantation around the shed</li> <li>ii) H<sub>2</sub>O sprinklers / foggers in the shed</li> <li>iii) Application of white reflector paint on the roof</li> <li>iv) Thatched sheds should be provided as a shelter to animal to minimize heat stress</li> </ul>	<p>Allow the animals early in the morning or late in the evening for grazing during heat waves</p> <p>Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves</p> <p>Put on the foggers / sprinklers /fans during heat waves in case of high yielders (Jersey/HF crosses)</p> <p>In severe cases, vitamin 'C' and electrolytes should be added in H<sub>2</sub>O during heat waves.</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</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>Allow for grazing between 10AM to 3PM during cold waves</p> <p>Add 25-50 ml of edible oil in concentrates and fed to the animal during cold waves</p> <p>Apply / sprinkle lime powder in the animal shed during cold waves to neutralize ammonia accumulation</p>	<p>Feed the animals as per routine schedule</p> <p>Allow the animals for grazing (normal timings)</p>
<b>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</p>

			animals
--	--	--	---------

### 2.5.2 Poultry

	Suggested contingency measures		
	Before the event	During the event	After the event
<b>Drought</b>			
Shortage of feed ingredients	Storing of house hold grain like maize, broken rice etc, in to use as feed in case of severe drought	Supplementation only for productive birds with house hold grain Supplementation of shell grit (calcium) for laying birds Culling of weak birds	Supplementation to all survived birds
Drinking water		Use water sanitizers or offer cool hygienic drinking water	
Health and disease management	Culling of sick birds. De-worming and vaccination against RD and IBD	Mixing of Vit. A,D,E, K and B-complex including vit C in drinking water (5ml in one litre water)	Hygienic and sanitation of poultry house Disposal of dead birds by burning / burying with lime powder in pit
<b>Floods</b>	NA		
<b>Cyclone</b>	NA		
<b>Heat wave and cold wave</b>			
<b>Shelter/environment management</b>	<b>Heat wave:</b> Provision of proper shelter with good ventilation	In severe cases, foggers/water sprinklers/wetting of hanged gunny bags should be arranged Don't allow for scavenging during mid day	Routine practices are followed
	<b>Cold wave:</b> Provision of proper shelter Arrangement for brooding Assure supply of continuous electricity	Close all openings with polythene sheets In severe cases, arrange heaters Don't allow for scavenging during early morning and late evening	Routine practices are followed

<b>Health and disease management</b>	De-worming and vaccination against RD and fowl poxs	Supplementation of house hold grain Provide cool and clean drinking water with electrolytes and vit. C  In hot summer, add anti-stress probiotics in drinking water or feed	Routine practices are followed
--------------------------------------	---	--	--------------------------------

### 2.5.3 Fisheries/ Aquaculture

	<b>Suggested contingency measures</b>		
	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>
<b>Drought</b>			
Shallow water in ponds due to insufficient rains/inflow	<ol style="list-style-type: none"> <li>1. Restricted release of water from reservoir.</li> <li>2. Supplementary water harvest structures like pond and tanks have to be developed.</li> <li>3. Renovation and maintenance of existing water harvest structures</li> </ol>	<ol style="list-style-type: none"> <li>1. Restrict lifting of water for irrigation purpose of crops</li> <li>2. Catch the stock, market the produce to reduce the density of population in ponds.</li> </ol>	<ol style="list-style-type: none"> <li>1. Excavate the ponds to increase the depth.</li> <li>2. Try to release water into the pond if it rains in off-season</li> </ol>
Impact of heat & salt load build up in ponds / change in water quality	<ol style="list-style-type: none"> <li>1. Prepare to release water into the habitat</li> </ol>	<ol style="list-style-type: none"> <li>1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitoring the water quality and health of aquatic organisms</li> </ol>
<b>Floods</b>	NA		
<b>Cyclone</b>	NA		
<b>Heat wave and cold wave</b>			
Management of pond environment	Good water quality to be maintained, Water depth to be maintained	Recirculation of water and pruning	Water treatment with lime
Health and diseases management	Prophylactic measures to be taken	Maintain good quality water in ponds	Treatment of pond water with lime and medicines