

**State: BIHAR**  
**Agriculture Contingency Plan for District: East Champaran**

<b>1.0 District Agriculture profile</b>				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	Eastern Plain, Hot Subhumid (moist) Eco-Region (13.1)		
	Agro-Climatic Zone (Planning Commission)	Middle Gangetic Plain Region (IV)		
	Agro Climatic Zone (NARP)	North West Alluvial Plain Zone (BI-1)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Zone – 1 (Saran, Siwan, Goplaganj, Muzaffarpur, E. Champaran, W.Champaran, Sitamarhi, Sheohar, Vaishali, Darbhanga , Madhubani, Samastipur		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		26 <sup>0</sup> 38'N	84 <sup>0</sup> 54 E	62 m
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Regional sugarcane research station, Madhopur , West Champaran		
Mention the KVK located in the district with address	KVK, Piprakothi, East Champaran			
Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	RAU, Pusa.			

<b>1.2</b>	<b>Rainfall</b>	<b>Normal RF(mm)</b>	<b>Normal Rainy days (number)</b>	<b>Normal Onset</b>	<b>Normal Cessation</b>
	SW monsoon (June-Sep)	1018	32	3 <sup>rd</sup> week of June	-
	NE Monsoon(Oct-Dec)	85	5		
	Winter (Jan- Feb)	24	4		
	Summer (Mar-May)	75	3		
	Annual	1202	44		

<b>1.3</b>	<b>Land use pattern of the district</b>	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	398.6	266.2	0.04	83.1	0.8	0.9	19.9	0.02	21.1	6.5

<b>1.4</b>	<b>Major Soils</b>	Area ('000 ha)	Percent (%) of total
	Sandy soils	3.615	1.02
	Coarse sandy loamy soils	32.480	9.22
	Fine sandy loamy soils	178.178	50.56
	Clayey soils	37.405	10.61
	Saline / calcareous soils	100.684	28.57

<b>1.5</b>	<b>Agricultural land use</b>	Area ('000 ha)	Cropping intensity %
	Net sown area	266.2	174
	Area sown more than once	197.3	
	Gross cropped area	463.5	

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)		
	Net irrigated area	121.6		
	Gross irrigated area	176		
	Rainfed area	144.7		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals	4	46.5	26.4
	Tanks			
	Open wells			
	Bore wells	38251	98518	55.9
	Lift irrigation schemes	94	1.0	0.6
	Micro-irrigation	30	0.006	0.003
	Other sources		19.3	10.9
	Total Irrigated Area		176	
	Pump sets			
	No. of Tractors	3693		3693
	<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	27	100%	
	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)							Summer	Grand total
		<i>Kharif</i>			<i>Rabi</i>					
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
	Rice	12	177	177					177	
	Wheat	-	-	-	100	21	121		121	
	Sugarcane	-	-	-					31.5	
	Maize	-	2	-	26		26	12	40	
	Pulses	-	9	-		10		8	27	
	Oil seeds	-			1.5	7.5			9	
	<b>Horticulture crops - Fruits</b>	<b>Area ('000 ha)</b>								
		<b>Total</b>			<b>Irrigated</b>		<b>Rainfed</b>			
	Mango	9.1								
	Guava	1.6								
	Litchi	1.8								
	Lemon	1.6								
	Banana	0.9								
	<b>Horticulture crops - Vegetables</b>	<b>Total</b>			<b>Irrigated</b>		<b>Rainfed</b>			

	Potato	11.4		
	Onion	2.3		
	Tomato	1.8		
	Okra	2.6		
	Cauliflower	2.0		
	Brinjal	1.6		
	<b>Medicinal and Aromatic crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
	<b>Plantation crops</b>	Total	Irrigated	Rainfed
	<b>Fodder crops</b>	Total	Irrigated	Rainfed
	<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)	161.3	127	288.3
	Improved cattle		127	
	Crossbred cattle	1.1	4.6	6.3
	Non descriptive Buffaloes (local low yielding)			
	Descript Buffaloes	16.7	159.1	175.7
	Goat	173.5	355.9	529.4
	Sheep	1.2	1.6	2.7
	Others (Camel, Pig, Yak etc.)			
	Commercial dairy farms (Number)			

<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>
	Commercial	476689	
	Backyard		

<b>1.10</b>	<b>Fisheries (Data source: Chief Planning Officer)</b>			
	<b>A. Capture</b>			
	<b>i) Marine (Data Source: Fisheries)</b>	<b>No. of fishermen</b>	<b>Boats</b>	<b>Nets</b>
				<b>Storage</b>

	Department)		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	<b>facilities (Ice plants etc.)</b>
	ii) Inland (Data Source: Fisheries Department)	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
		341		860		519	
<b>B. Culture</b>							
				<b>Water Spread Area (ha)</b>		<b>Yield (t/ha)</b>	<b>Production ('000 tons)</b>
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)						
	ii) Fresh water (Data Source: Fisheries Department)			4003.5		3.2	5351.1

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

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)							
<b>Major Field crops (Crops identified based on total acreage)</b>										
	Sugarcane							1209.8	38419	
	Maize		3000	109.2	4200	34	2800	143.2	3600	4
	Rice	287.9	1447					287.9	1447	200
	Wheat			242	2000			242	2000	150
	Pulses		900	6	600	3.2	400	9.2	950	24
<b>Major Horticultural crops (Crops identified based on total acreage)</b>										
	Mango							85.6		
	Guava							1.7		
	Litchi							13.2		

	Lemon							11.9		
	Banana							41.2		

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

<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 ( Gandhibug, Stem borer, fruit Borer, Aphids, Rust, wilt, other diseases )	√			

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: Yes

### Annexure I

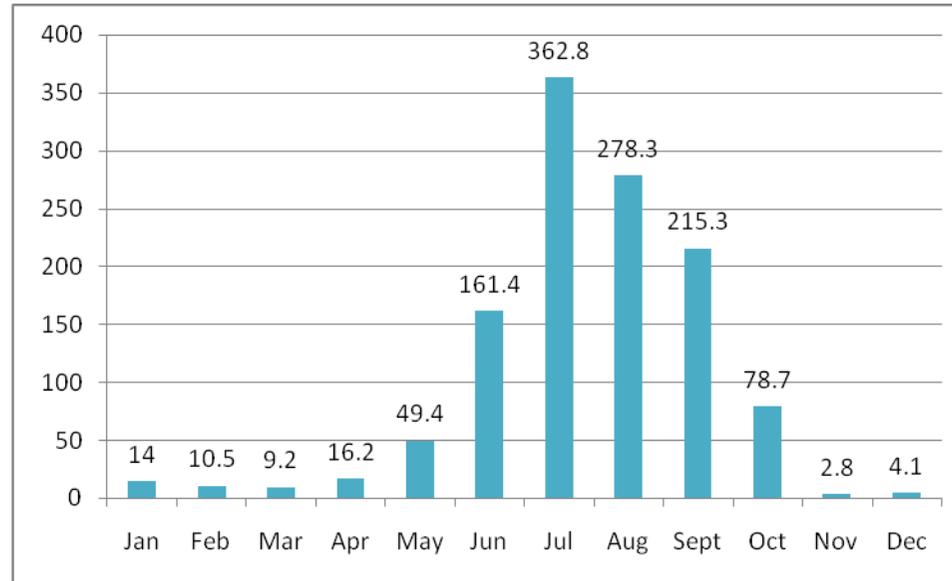
#### Agro climatic Zones of Bihar



Source: krishi.bih.nic.in

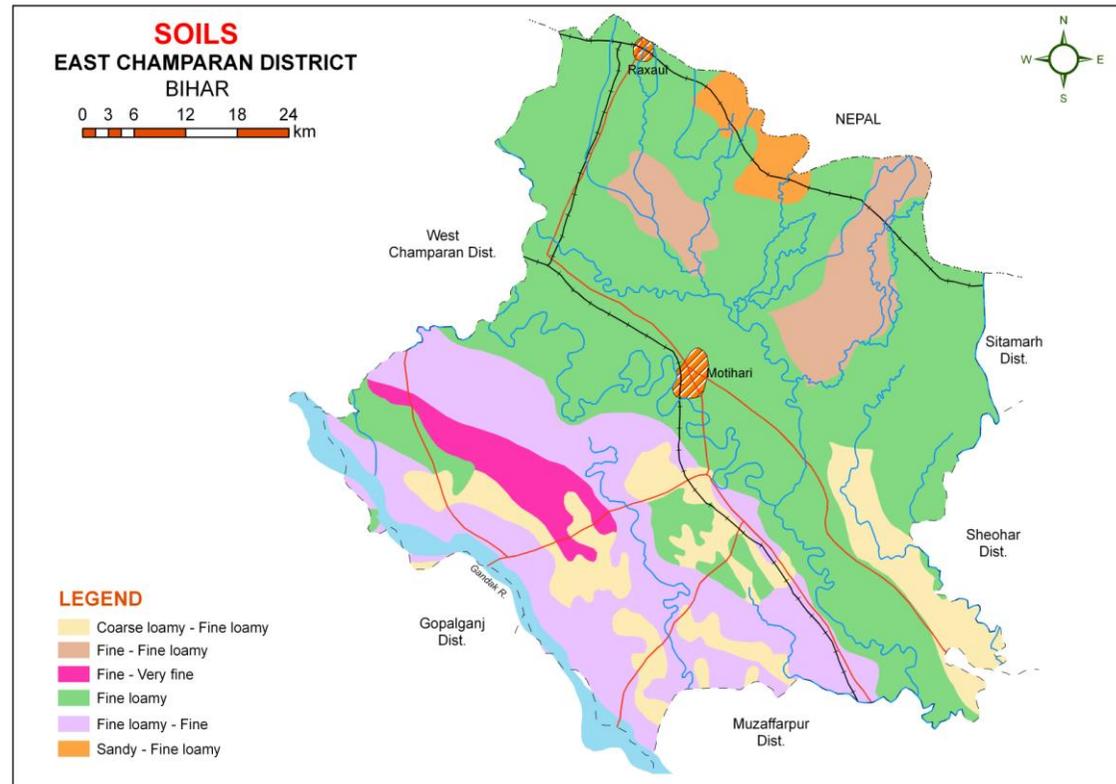
## Annexure II

### Mean annual rainfall (mm)



\*Rainfall was given for chamaparan district erstwhile

### Annexure III



Source : NBSS& LUP, Regional Centre, Kolkata

## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Change in crop / cropping system including variety	Suggested Contingency measures	
				Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)  Delay by 2 weeks  1 <sup>st</sup> week of July	Upland Fine loamy soils	Rice-Wheat Pigeonpea - Greengram	No change	Normal Package of practices	-
	Medium land	Maize-Wheat	No change	<ul style="list-style-type: none"> <li>• Adopt normal package of practices</li> <li>• Direct seeding of drought tolerant varieties in dry soil in June/ July with pre emergence herbicide application under sufficient soil moisture conditions.</li> <li>• Raise staggered community nursery preferably with medium duration varieties in mid and lowlands</li> <li>• Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts.</li> <li>• Interculture for timely weed control in direct seeded rice</li> <li>• Groundwater to be used for life saving irrigation to upland crops and transplanted rice</li> </ul>	
		Rice-Wheat	No change		
	Low land	Rice –Wheat/ Pulses/ Oilseeds/Vegetables/ Potato	Prefer medium duration Rice – Wheat/ Lentil/ Linseed Vegetables/ Mustard/ Potato		

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 3 <sup>rd</sup> week of July	Upland Fine loamy soils	Rice-Wheat / Rice –Rai/ Potato	Rice-Wheat  Rice- Prefer Medium to short duration varieties like Saroj (100-110d), Birsa Dhan-201 (100-115d)	<ul style="list-style-type: none"> <li>Direct seeding of rice with medium duration drought tolerant varieties with pre emergence herbicide application under sufficient soil moisture conditions followed up with a post-emergence weedicide application 20-25 days later for effective weed management.</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Medium land	Maize-Wheat	Maize-Wheat  Prefer short duration varieties  Maize – Shaktiman-1,2,3 ,4, Suwan, Ganga-11, Deoki, Pusa early hybrid Makka-3	-	
		Rice	Rice-Wheat  Direct sowing / 20d old dapog seedlings with medium to short duration varieties – BR34, Rajendra Dhan-201(130-135d), Rajendra Bhagwati,	<ul style="list-style-type: none"> <li>Where field is moist, direct seeding of medium duration varieties (125 days) can be done during second fortnight of July in midlands. Post-emergence herbicide application use is essential</li> <li>Use mat nursery/ dapog nursery , mat nursery</li> </ul>	
	Low land	Rice –Wheat/ Pulses/ Oilseed/Vegetables/ Potato	Medium duration Rice – Wheat/Lentil/Linseed Vegetables/Mustard Potato  Rice- Direct/ dapog seedlings with		

			Rajshree, Santosh , Sita, Rajendra Suwasni, Rajendra Sweta, Swarna sub-1	<p>(dapog method) can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August in mid and low lands</p> <ul style="list-style-type: none"> <li>• Raise staggered community nursery preferably with short duration varieties in mid and lowlands</li> <li>• Transplant with 30-35 days old seedling may be used with 3-4 seedling per hill with close spacing.</li> <li>• Enhanced dose of nitrogen with full basal dose of NPK at the time of transplanting to boost the early vegetative growth in late plantings under sufficient moisture</li> <li>• Timely interculture for weed control in direct seeded rice</li> <li>• Life saving irrigation</li> </ul>	
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Condition			Suggested Contingency measures		
Early season	Major Farming	Normal Crop/cropping	Change in crop/cropping	Agronomic measures	Remarks on

drought (delayed onset)	situation	system	system		Implementation
Delay by 6 weeks  1 <sup>st</sup> week of August	Upland	Rice –Wheat	Early Rice – Wheat Blackgram/ Finger millet-Wheat Blackgram- T-9, Navin, Pant Blackgram-30 , Pant Blackgram-19 Finger millet- DB-7, BR-5, BR-10, Coimbatore-1  Rice- Prefer short (early matured) varieties like Birsa Dhan 105 (85-90d), Birsa Dhan-106 (90-95d), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi , Richharia(<100d), Saroj (100-110d), Birsa Dhan-201 (100-115d)	<ul style="list-style-type: none"> <li>• Direct seeding of Rice</li> <li>• Dapog seedling can be used</li> <li>• Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected blocks</li> <li>• Life saving irrigation</li> </ul>	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Medium land	Maize-Wheat	Blackgram/ Sesame Sesame - T-9, Navin, Pant Urd-30 , Pant Urd-19 Sesame- Krishna, Pragati	-	
		Rice – Wheat	Rice (Short duration)-Wheat Rice- Prabhat, Dhanlaxmi, Richharia, Turanta Saroj Blackgram/ Finger millet-Wheat  Blackgram- T-9, Navin, Pant urd-30 , 19  Finger millet- DB-7, BR-5, BR-10, Coimbatore-1	<ul style="list-style-type: none"> <li>• Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August</li> <li>• Direct seedling of Rice</li> <li>• Raise staggered community nursery preferably with medium</li> </ul>	
	Low land	Rice –Wheat /Pulses /	Rice (Short Duration)-Wheat		

		Oilseeds/Vegetables/ Potato	Rice- Prabhat, Dhanlaxmi, Richharia, Turanta, Saroj  If dry spell continues, direct seeding of short duration rice varieties (100 days) can be done in midlands by first fortnight of August and extra short duration (70-75 days) up to 25 <sup>th</sup> August	duration varieties in mid and lowlands <ul style="list-style-type: none"> <li>Enhanced basal dose of NPK to boost the early vegetative growth</li> <li>Application of fertilizers especially phosphorous and potash to be ensured under late transplanted conditions in severely affected districts</li> <li>Life saving irrigation</li> </ul>	
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Condition			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 8 weeks  3 <sup>rd</sup> week of August	Upland  Fine loamy soils	Rice-Wheat	Blackgram – Toria /late wheat  Blackgram- T-9, Navin, Pant Urd-30 , Pant Urd-19  Rice- Prefer Early matured varieties like Turanta dhan (75d), Prabhat (90d), Birsa Dhan 105 (85-90d), Birsa Dhan-106 (90-95d), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi, Richharia(<100d), Saroj (100-110d), Birsa Dhan-201 (100-115d)	<ul style="list-style-type: none"> <li>Moisture conservation</li> <li>Inter cultivation</li> </ul> Sowing of <i>rabi</i> crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables  Adopt Soil mulching or Straw mulching	Seeds from BRBN, RAU, Pusa, NSC, TDC
		Rice-Rai/Potato	Sesame- Rai/Potato/ Rabi maize Sesame-Pea-Green gram Sesame- Krishna, Pragati	Mulching for moisture conservation	

			Rice- Prefer Early matured varieties like Turanta dhan (75d), Prabhat (90d), Birsa Dhan 105 (85-90d), Birsa Dhan-106 (90-95d), Rajendra Bhagavathi (early-upland and midland), Dhanlaxmi, Richharia(<100d), Saroj (100-110d), Birsa Dhan-201 (100-115d)	
	Medium land	Maize - Lentil	Sesame –Wheat  Sesame- Krishna, Pragati	Inter cultivation, Mulching, Application of Organic manure and vermi compost initially
		Rice-Wheat	Direct seeded rice (DSR) with short duration (80-90 days) varieties (Turanta dhan, Prabhat, Anjali, Vandana, CR-Dhan-40 etc.) can be taken up in midlands till the end of August subject to availability of at least one assured irrigation  Early Rice-Prabhat, Dhanlaxmi, Richharia, Turanta	<ul style="list-style-type: none"> <li>• Direct seeding of rice</li> <li>• Mat nursery (dapog method)/ Community nursery can be raised for quick availability of young seedlings for transplanting of medium duration varieties by first fortnight of August</li> <li>• Use of 20 days old dapog seedling in rice.</li> <li>• Enhanced basal dose of NPK in rice to boost early vegetative growth</li> <li>• Supply of contingency crop seeds of Toria, Maize (QPM varieties, Swann composite-65-70 days; HM-4 hybrid baby corn), Arhar (Bahar, NDA1, Pusa 9), Urd (Navin and T9), Cowpea and Horsegram</li> </ul>

				<p>need to be ensured for taking up of sowing in September in midlands</p> <ul style="list-style-type: none"> <li>Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts</li> </ul>	
	Low land	Rice-Wheat / Rice- Potato	<p>Rice-Potato Rice-wheat</p> <p>Rice- Rajshree, Santosh, Sita, Rajendra Suwasni Rajendra Sweta</p> <p>Sept. Pigeonpea-Greengram</p> <p>Pigeonpea – Bahar, Pusa-9 Narendra Arhar-I</p>	<ul style="list-style-type: none"> <li>Double transplanting of rice (karuhan) can be done with 30 + 45 days old seedlings of long duration or photosensitive varieties up to 30<sup>th</sup> August with close planting (40-45 hills per square meter)</li> <li>Application of organic manure and vermi compost initially for Rice and other crops.</li> <li>Sowing of <i>rabi</i> crops such as Wheat, Lentil, Chickpea, Pea, Mustard (Pusa Mahak, RAU TS17), Linseed (Garima) and Vegetables can be taken up on time for maximizing productivity from lowlands with support from the government</li> </ul>	

				<p>for timely supply of inputs and in a way <i>rabi</i> production would compensate the production loss during <i>kharif</i>.</p> <ul style="list-style-type: none"> <li>Fodder varieties of Jowar, Maize, Bajra in combination with legumes (cowpea and horsegram) can be taken up wherever feasible to meet the fodder requirements in deficit rainfall districts</li> </ul>	
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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	Rice –Wheat	Gap filling, Weed management	Mulching for moisture conservation , Inter cultivation, Life saving irrigation,	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Fine loamy soils	Rice-Rai-Potato	Gap filling, Weed management		
		Maize-wheat	Gap filling		
	Medium land, Low land	Rice –Wheat	Gap filling Life saving irrigation		

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

<b>spell, consecutive 2 weeks rainless (&gt;2.5 mm) period)</b>					<b>n</b>
At vegetative stage	Upland Medium land Low land	Rice –Wheat	<ul style="list-style-type: none"> <li>• Gap filling of existing crop</li> <li>• Postponement of top dressing</li> </ul>	<ul style="list-style-type: none"> <li>• Inter culturing</li> <li>• Mulching</li> <li>• Conservation tillage</li> <li>• Foliar spray with (1%) MOP</li> <li>• Life saving irrigation</li> </ul>	

<b>Condition</b>	<b>Suggested Contingency measures</b>				
<b>Mid season drought (long dry spell, consecutive 2 weeks rainless (&gt;2.5 mm) period)</b>	<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>
At flowering stage	Upland Medium land Low land	Rice –Wheat	<ul style="list-style-type: none"> <li>• Adopt IPM practices</li> <li>• Foliar application with 2% Urea</li> </ul>	<ul style="list-style-type: none"> <li>• Interculture</li> <li>• Mulching</li> <li>• Foliar application with 2% MOP</li> <li>• Conservation tillage</li> <li>• Life saving irrigation</li> </ul>	

<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, Medium land, Low land	Rice-Chickpea/ Lentil/ Mustard/ Rai/ Linseed	<ul style="list-style-type: none"> <li>• Foliar spray with (1%) Urea or MOP</li> <li>• Adopt IPM practices</li> </ul>	<ul style="list-style-type: none"> <li>• Open the furrow during evening and left furrow open overnight and plank in the next morning before</li> </ul>	

			<ul style="list-style-type: none"> <li>• Mulching</li> <li>• Life saving irrigation</li> </ul>	sunrise for growing of early rabi crops like wheat, Rabi Maize/Pulses /Oilseeds/ Vegetables	
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### 2.1.2 Drought - Irrigated situation

Condition	Major Farming Situation	Crop/Cropping System	Change in Crops/ Cropping system	Agronomic Measures	Remarks on Implementation
Delayed/Limited release of water in canals due to low rainfall	Upland	Rice-Wheat	Rice (Short Duration)-Late sown wheat	Direct sowing with short duration Rice varieties	Seeds from BRBN, RAU, Pusa, NSC, TDC
		Rice-Rai-Potato	Rice (Short Duration)-Wheat Sesame- Rai/Potato/ Maize Sesame-Pea-Greengram		
	Medium land	Rice - Lentil	Rice (short duration) - Lentil	Direct sowing with short duration Rice varieties	
		Sesame-Potato-wheat	Sesame-Potato/Wheat	Life saving irrigation, Inter cultivation, Mulching, Application of Organic manure and vermicompost initially	
	Low land	Rice-Wheat-Green gram	Rice (Short Duration)-Wheat	Nursery raising through Dapog method	

<b>Condition</b>	<b>Major Farming Situation</b>	<b>Crop/Cropping System</b>	<b>Change in Crops/ Cropping system</b>	<b>Agronomic Measures</b>	<b>Remarks on Implementation</b>
Limited release of water in canals due to low rainfall	Upland	Rice-Wheat	Rice (Short Duration)- Late sown wheat	Direct sowing of short duration Rice	Seeds from BRBN, RAU, Pusa, NSC, TDC
		Rice-Rai-Potato	Rice (Short Duration)-Wheat Sesame- Rai/ Potato/ Maize Sesame-pea-Greengram		
	Medium land	Rice - Lentil	Rice (short duration) - Lentil	Direct sowing with short duration Rice varieties	
		Sesame-Potato-wheat	Sesame-Potato Sesame-wheat	Life saving irrigation, Inter cultivation, Mulching, Application of Organic manure and vermi compost initially	
	Low land	Rice-Wheat-Green gram	Rice (Short Duration)-Wheat	Nursery raising through Dapog method	

<b>Condition</b>	<b>Major Farming Situation</b>	<b>Crop/Cropping System</b>	<b>Change in Crops/ Cropping</b>	<b>Agronomic Measures</b>	<b>Remarks on Implementation</b>
Non Release of water in canals under delayed onset of monsoon in catchments	Upland	Rice-Wheat	Rice (Short Duration)-Late sown wheat	Direct sowing of short duration Rice	Seeds from BRBN, RAU, Pusa, NSC, TDC
		Rice-Rai-Potato	Rice (Short Duration)-Wheat Sesame- Rai/ Potato/ Maize Sesame-Pea-Greengram		
	Medium land	Rice - Lentil	Rice (short duration) - lentil	Direct sowing with short duration Rice varieties	
		Sesame-Potato-Wheat	Sesame-Potato/Wheat	Life saving irrigation, Inter cultivation, Mulching, Application of organic manure and vermicompost initially	
	Low land	Rice-Wheat-Green	Rice (Short Duration)-Wheat	Nursery raising through Dapog	

		gram		method	
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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	Upland	Rice –Wheat	Rice (short duration)- Late wheat	Life saving irrigation,	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Medium land	Rice –Wheat	Sesame-Rabi maize /Wheat	Mulching for moisture conservation,	

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	UP land	Rice –Wheat	Rice (short duration)- Late sown wheat Pigeonpea /Blackgram/ Sesame-wheat	Life saving irrigation,	Seeds from BRBN, RAU, Pusa, NSC, TDC
	Medium land	Rice –Wheat	Sesame-Rabi maize Sesame – Wheat	Life saving irrigation,	
	Low land	Rice –Wheat	Rice-Rabi maize Rice – Wheat	Mulching for moisture conservation	

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
<b>Continuous high rainfall in a short span leading to water logging</b>				
Rice, Maize, Pigeonpea, vegetables	Provide drainage	Provide drainage		
<b>Horticulture</b>	Provide drainage	Provide drainage		

Mango	Provide drainage	Provide drainage	Provide drainage	Safe storage and transportation
Litchi	Provide drainage	Provide drainage	Provide drainage	
Banana	Provide drainage	Provide drainage	Provide drainage	
Guava	Provide drainage	Provide drainage	Provide drainage	
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
Rice	Re planting with Dapog seedling , Gap filling, Kharuhan (double transplanting)			
Maize	Earthing up			
Pigeonpea	Earthing up			
Vegetables	Grow nursery on raised bed and poly tunnel			
<b>Horticulture</b>				
Mango	Re planting			
Litchi	Provide wind break to reduce the wind speed			
Banana	Provide wind break to reduce the wind speed			
Guava				
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Rice	Seedling treatment with granular insecticide – Cartap hydrochloride or phorate 10G , Maintain shallow water in nursery beds Providing good drainage.	❖ Use copper fungicides against Bacterial leaf blight. ❖ Split application of N fertilizer (3-4 times)	❖ Harvest at physiological maturity	Proper drying and safe storage
Maize	❖ Drainage, and yellowing mainly due to nitrogen deficiency apply N	❖ Foliar blight control through Mancozeb @ 2.5g/l Or Zineb/ Maneb @ 2.5-4 g/lit of water	❖ Cob harvesting from standing crop ❖ Harvest at physiological	❖ Storage in safe places like farmer warehouse/tent covering of produce

	<p>split doses</p> <ul style="list-style-type: none"> <li>❖ Application of granular insecticides viz. Thimet 10g, or Carbofuran 3g. in whorl of maize</li> </ul>	(2-4 applications at 8-10 days interval)	maturity	<ul style="list-style-type: none"> <li>❖ Ensure 10-12% moisture in grains before storage</li> <li>❖ Proper drying</li> </ul>
Pigeonpea	<p>Provide drainage,</p> <p>Seed treatment with 1 g carbendizim +2g thiram/kg seed.</p>	Provide drainage	Provide drainage	Proper drying, Storage at safe place and transportation
<b>Horticulture</b>				
Vegetables	<ul style="list-style-type: none"> <li>• Drainage management</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage management</li> </ul>	
Mango	<p>Anthracnose:- The foliar infection can be controlled by spraying of copper oxychloride (0.3%)</p> <p>Use bio control agent viz Streptosporangium pseudovulgare</p> <p>Bacterial canker: Regular inspection of orchards, sanitation and seedling certification are recommended as preventive measures. Mango stones for raising seedlings (root stock) should always be taken from healthy fruits.</p>	<p>Anthracnose:- Apply Carbendazim/ Thiophanate methyl (1g/lit) to control of Anthracnose.</p> <p>Blossom infection can be controlled effectively by spraying of Bavistin (0.1%) at 15 days interval.</p> <p>Mango powdery mildew: Spray wettable sulphur(0.2%) &amp; calixin or karathane (0.1% ) during second week of December</p>	<p>Mango powdery mildew: Prune diseased leaves and malformed panicles harbouring the pathogen to reduce primary inoculum load.</p> <p>Spray wettable sulphur (0.2%) when panicles are 3-4" in size</p> <p>Spray dinocap (0.1%) 15-20 days after first spray. Spray tridemorph (0.1%) 15-20 days after second spray.</p> <p>Spraying at full bloom needs to be avoided. Mango bacterial canker: Three sprays of</p>	<p>Harvest at proper time</p> <p>Anthracnose:- Pre-harvest sprays of hexaconazole (0.01%) or Carbendazim (0.1%) at 15 days interval should be done in such a way that the last spray falls 15 days prior to harvest.</p> <p>Diseased leaves, twigs, and fruits, should be collected and burnt to avoid the spread for next season</p>

	Use of wind-breaks helps in reducing brushing/ wounding and thus reduces the chance of infection.		Streptocycline (200 ppm) at 10 days intervals reduce fruit infection.  In severe infection, spraying of Streptocycline (300 ppm) or copper oxychloride (0.3%) is more effective.	
Litchi	Fruit Fly: Monitor adult fruit flies emergence by using methyl eugenol or sex pheromone traps.	Fruit Fly: First Spray delta menthrin 0.0025% plus molasses 0.1% . after 10-12 days spray fenthion 0.05% + molasses 0.1% followed by dimethoate 0.045% + molasses 0.1% if required	Harvest at proper time	Fruit Fly: Collect all fallen infested fruits and put in a drum covered with fine wire mesh. Harvest fully matured fruits one week earlier to escape egg laying
Banana	Provide drainage	Provide drainage	Harvest at proper time	
Guava	Provide drainage	Provide drainage	Harvest at proper time	

### 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>				
Rice	<ul style="list-style-type: none"> <li>Provide drainage</li> <li>Re transplanting through Dapog nursery</li> <li>Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>Provide drainage</li> <li>Gap filling</li> <li>40-45 days old seedlings may be used</li> <li>Kharuhan (double transplanting) method</li> </ul>	<ul style="list-style-type: none"> <li>Provide drainage</li> <li>Harvest at physiological maturity</li> <li>Lentil as paira crop can be taken</li> </ul>	Storage at safer place
Maize	<ul style="list-style-type: none"> <li>Provide drainage</li> <li>Re sowing</li> <li>Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>Provide drainage</li> <li>Harvest at physiological maturity</li> </ul>	Storage at safer place

Pigeonpea	<ul style="list-style-type: none"> <li>• Provide drainage</li> <li>• Re sowing</li> <li>• Gap filling</li> </ul>	<ul style="list-style-type: none"> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Provide drainage</li> <li>• Harvest at physiological maturity</li> </ul>	Storage at safer place
<b>Horticulture</b>				
Mango	<ul style="list-style-type: none"> <li>• Replanting</li> <li>• Gap filling</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	Judicious harvesting
Litchi	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Replanting</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	Judicious harvest
Banana	<ul style="list-style-type: none"> <li>• Replanting</li> <li>• Gap filling</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	Judicious harvesting
Guava	<ul style="list-style-type: none"> <li>• Replanting</li> <li>• Gap filling</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Drenching with copper fungicides</li> <li>• Provide drainage</li> </ul>	Judicious harvesting
<b>Continuous submergence for more than 2 days<sup>2</sup></b>				
Rice	<ul style="list-style-type: none"> <li>• Gap filling,</li> <li>• Re-sowing</li> </ul>	<ul style="list-style-type: none"> <li>• Replanting through Kharuhan (double transplanting) by 3-4 seedlings per hill</li> <li>• Short duration rice variety</li> </ul>	<ul style="list-style-type: none"> <li>• Toria/Late wheat if completely damaged</li> </ul>	Storage at safer place
Maize	<ul style="list-style-type: none"> <li>• Re-sowing</li> </ul>	<ul style="list-style-type: none"> <li>• Re sowing or gap filling</li> </ul>	<ul style="list-style-type: none"> <li>• Toria/Late wheat if completely damaged</li> </ul>	Storage at safer place
<b>Horticulture</b>				
Mango	<ul style="list-style-type: none"> <li>• Provide drainage</li> </ul>			
Guava	<ul style="list-style-type: none"> <li>• Provide drainage</li> </ul>			
Banana	<ul style="list-style-type: none"> <li>• Provide drainage</li> </ul>			
<b>Sea water intrusion</b>	Not Applicable			

#### 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
Heat Wave				

Maize	Provide irrigation	Provide irrigation	Provide irrigation	
Pigeonpea	Provide irrigation	Provide irrigation	Provide irrigation	
Wheat			Provide irrigation (Terminal heat)	
<b>Horticulture</b>				
Mango	Provide irrigation	Provide irrigation	Provide irrigation	
Litchi	Provide irrigation	Provide irrigation	Provide irrigation	
Papaya	Provide irrigation	Provide irrigation	Provide irrigation	
<b>Cold wave</b>				
Wheat		Provide irrigation , Mulching		
Maize		Provide irrigation , Mulching		
Mustard		Provide irrigation , Mulching		
Potato		Provide irrigation , Mulching		
Pulses		Provide irrigation , Mulching		
<b>Horticulture</b>				
Bhendi		Provide irrigation, Mulching		
Brinjal		Provide irrigation, Mulching		
Chili		Provide irrigation , Mulching		
Tomato		Provide irrigation ,Mulching		
Bottle gourd		Provide irrigation , Mulching		
<b>Frost</b>		Provide irrigation, Mulching		
Wheat		Provide irrigation, Mulching		
Chickpea		Provide irrigation , Mulching		
Pigeonpea		Provide irrigation , Mulching		

Lentil		Provide irrigation , Mulching		
<b>Horticulture</b>				
Vegetables		Provide irrigation , Mulching		
Tomato & Potato		Earthing up Provide irrigation , Mulching		Harvest in dry weather
<b>Hailstorm</b>		Not Applicable		

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event <sup>s</sup>	During the event	After the event
<b>Drought</b>			
<b>Floods</b>			
Feed and fodder availability	<ol style="list-style-type: none"> <li>1. Cultivation of fodder tree</li> <li>2. Storage of Improved Quality Fodder</li> <li>3. Conservation &amp; Storage of <ul style="list-style-type: none"> <li>• Feed &amp; Fodder</li> <li>• Hay &amp; Silage: — Preserve the fodder in the form of hay from Berseem &amp; other grasses as well as silage from <ol style="list-style-type: none"> <li>(a) Maize- harvesting at well developed cob.</li> <li>(b) Jowar - at flowering stage.</li> <li>(c) Oat</li> <li>(d) Hybrid Napier – 40-45 day old.</li> <li>(e) Water hycianth mixing with Rice straw in ratio of 4:1 with 70 kg molasses /ton of clean water hycianth.</li> <li>(f) Potato leaves mixing with wheat</li> </ol> </li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Feeding of Complete Feed Block</li> <li>2. Feeding of Urea-Molasses-Mineral-Block &amp; Fodder</li> <li>3. Feeding of stored Hay/Silage/Improved Quality Fodder</li> <li>4. Feeding of Tree leaves some of which are as follows: <ol style="list-style-type: none"> <li>1. Bamboo leaves</li> <li>2. Neem</li> <li>3. Bargad</li> <li>4. Peepal</li> <li>5. Seesam</li> <li>6. Subabul</li> </ol> </li> </ol> <p>Use of unconventional feed stuff:</p> <ol style="list-style-type: none"> <li>(i) Aquatic Plants – water hycianth</li> </ol>	<p>Production of forage crops</p> <ol style="list-style-type: none"> <li>1. Balanced feeding of Animal supported with little higher concentrate mixture</li> <li>2. Cultivation of fodder Rabi maize if water stagnated upto Nov/ December</li> <li>3. Maize in September</li> </ol>

	<p>straw in ratio of 7:1 and should be supplemented with 3% molasses.</p> <p>Hay: –</p> <ul style="list-style-type: none"> <li>• Berseem/Lucerne and other grasses.</li> <li>• Bales of hay and other dry fodder should be stored in dry places at a height of last flood level and covered with asbestos sheet or polythene sheet.</li> </ul> <p>4. Development &amp; storage of: –</p> <p>(a) Complete Feed Block (CFB)</p> <p>(b) Urea-Molasses-Mineral-Block (U.M.M.B)</p> <p>5. Development of Fodder Bank</p>	<p>(i) Lotus</p> <p>(ii) Aquatic weeds</p>	
Drinking water			
Health and disease management	<p>Veterinary Preparedness with Medicines, Vaccines and provision for mobile ambulatory van.</p> <ul style="list-style-type: none"> <li>• Vaccination</li> </ul> <p>During flood stress becomes an incriminating factor for the precipitation of diseases in livestock and poultry.</p> <p>So, necessary vaccination of livestock and poultry should be done against economically important contagious disease.</p> <p>This will be helpful not only to check epidemic in animals, but also to reduce the probability of zoonoses in human beings.</p> <p>Care should be taken for mass vaccination of livestock and poultry with a view to covering 80% of livestock population in</p>	<p>Animal safety, Health camp and Treatment</p> <p>Important Suggestions for animal and Poultry safety</p> <p>During flood, all efforts should be made to rescue most of the livestock and poultry as carefully as possible.</p> <p>The people should be made conscious through announcement with the help of mikes or other means of communication, so that they may escape with their livestock and poultry to safe area.</p> <p>The fisherman or the people who knows swimming should be deputed for the rescue of drowning and floating animals and birds.</p>	<p>Sanitation, deworming, treatment, health camps Culling of Sick animals and disposal of carcass</p> <p>Maintenance of Sanitation: 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. Arrangements should be made accordingly.</p> <p>De-worming after the flood: Immediately after flood, the animals</p>

	<p>order to achieve herd immunity.  Mass vaccination should be conducted by a team of Department staff with proper maintenance of detailed Inoculation Register.  Pro-active steps should be taken to receive and stock the required doses of vaccines against different diseases for their use in face of Flood.</p>	<p>During flood do not leave halter or headstalls on animals.  Do not tie animals together when releasing.  Report the location, identification and disposition of livestock and poultry to authorities handling the disaster.  Health camp and treatment  Water borne diseases are one of the most common phenomena during the flood  Diarrhoeal diseases outbreaks can Report the location, identification and disposition of livestock and poultry to authorities handling the disaster.  Health camp and treatment  Water borne diseases are one of the most common phenomena during the flood  Diarrhoeal diseases outbreaks can occur after drinking contaminated water.  Diseases that can occur during flood should be given special attention and accordingly medicines should be available in the health camp for the following</p>	<p>like cattle, buffalo. Sheep, goat, pig, dog and poultry need to be de-wormed with suitable broad spectrum anthelmintics. This will enable the animals to regain proper health.  In water logged area, snails can be introduced as biological control measures against snails to protect livestock from parasitic disease.  Treatment of sick animals: The Disposal of Carcass: the disposal of dead animals and birds are to be done by Animal Husbandry Department. Accordingly, necessary arrangement should be made for prompt and easy disposal of carcasses during the Flood and Post-Flood period.  Carcasses of animals affected by the disease are the chief source of soil infection. They harbour the germs in large numbers and liberate them from both artificial and natural body openings into the surrounding soil.  Methods of Carcass disposal to be</p>
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		<p>mentioned diseases.</p> <p>Salmonella spp. Escherichia coli Giardiasis Amoebiasis Rotavirus Leptospirosis Scabies Black leg Malignant Edema Foot rot Anthrax Botulism Tetanus Red water Black disease Entertoxemia Liver fluke Amphistomiasis Brooders pneumonia</p> <p>Treatment of Non infectious arrangement should be made for the treatment of drowning and traumatic injuries, aspiration pneumonia, lameness and other surgical cases in the health camp.</p> <p>Disinfection of livestock premises and Poultry shed infection of livestock premises and the temporary sheds should be done with the help of bleaching powder, phenol, carbolic acid etc</p>	<p>adopted</p> <p>Burial</p> <p>Burning</p> <p>Composting</p> <p>Vulturing</p> <p>s. Health Camp after the flood:</p> <p>Protection of livestock from out breaking and communicable diseases be made. Health camps are to be organised in Flood affected areas to restore the normal breeding capability of breedable population as well as to restore the normal health of livestock and poultry.</p>
<b>Cyclone</b>			

<b>Heat wave and cold wave</b>	
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<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>				
Shortage of feed ingredients				
Drinking water				
Health and disease management	<p><b>Vaccines to be used for different animals and Poultry</b></p> <p><b>Cattle and Buffalo</b>  Hemorrhagic Septicemia Vaccine  Black Quarter Vaccine  FMD Vaccine  Anthrax Vaccine as per endemicity.</p> <p><b>Sheep and Goat</b>  Hemorrhagic Septicemia Vaccine  PPR Vaccine  FMD Vaccine  Goat pox Vaccine  Enterotoxemia Vaccine  Anthrax Vaccine as per endemicity</p> <p><b>Pigs</b>  Hemorrhagic Septicemia Vaccine  PPR Vaccine  FMD Vaccine</p>			

	<p>Goat pox Vaccine  Enterotoxemia Vaccine  Anthrax Vaccine as per endemicity.</p> <p style="text-align: center;"><b>Dogs</b></p> <p>Rabies Vaccine</p> <p style="text-align: center;"><b>Poultry</b></p> <p>Mareks disease vaccine  RDV (F<sub>1</sub> &amp; R<sub>2</sub>B),  FPV,  IBRV &amp;  IBDV  ( <b>Annexure-1</b>)</p> <ul style="list-style-type: none"> <li>• <b>Medicines</b></li> </ul> <p>All Districts should be earmarked for flood.</p> <p>An inventory of required medicines to treat the affected livestock in case of eventualities should be made.</p> <p>The Govt. should take steps to procure sufficient quantity of essential life saving medicines.</p> <p><b>List of life saving Medicines</b></p> <p>Corticosteroids  Nikethamide  Antibloat  Adrenaline  Antihistaminic  Antidotes for common poisoning  Antisnake venom  Broad spectrum antibiotics  Anti-inflammatory  Antipyretic and Analgesics  Fluids and Electrolytes</p> <ul style="list-style-type: none"> <li>• <b>Mobile Veterinary Clinics</b></li> </ul>			
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	<p>Mobile Veterinary Clinics should be kept ready at Veterinary Hospital or Veterinary Camps so that immediate treatment of injured and affected animals may be done.</p> <p>For this MVC must have adequate drugs like antibiotic, analgesic, dewormer, ointment, antsnake venom and emergency health care facilities along with trained personnel.</p> <p>A good no. of mobile clinic teams should be planned consisting dedicated and experienced technical workers with allotment of area of operation.</p> <p>The teams should be kept in readiness <b>having required stock of medicines and equipment</b> to work in any adverse situation.</p> <p>A telephone directory should be maintained at the District level by collecting the telephone nos. of Vets, Para-Vets, NGOs / youth clubs / societies, volunteers etc. to collect feedback and plan the activities during the emergency.</p> <p>An emergency kit for poultry should be made ready well in advance. The Poultry kit should have Cage, mask, mash, pellet feed trough, waterers, detergents, poultry vaccines, Veterinary drugs, workers protection uniform etc.</p>			
<b>Cyclone</b>				
<b>Heat wave and cold wave</b>				

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

## 2.5.3

## 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	(i) Partial harvesting (ii) Addition of water (iii) Stocking of air breathing fishes	(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) Arrangement of aeration (iii) Addition of water from external resource	(i) Arrangement of aeration. (ii) Addition of water a. Monitoring of water quality b. Reduction of manuring according to water level.	
<b>2) Floods</b>			
<b>A. Capture</b>			
<b>B. Aquaculture</b>			
(i) Inundation with flood water	(i) Elevation/ Renovation of pond dyke. (ii) Sale of Table/marketable size fishes (iii) construction of earthen nursery ponds in upland areas	Collection of naturally bred seeds (Spawn /fry /fingerling) from flooded water Stocking in nursery ponds for rearing	-Retain the water in pond immediately after flood through repairing of damaged dyke etc. -Netting of pond -Removal of unwanted, predatory/weed fishes -Sell of large size fishes
(ii) Water contamination and changes	Arrangement of regular water quality monitoring		

in water quality			
(iii) Health and diseases	(a) Use lime/ potassium permanganate (b) Arrangement of CIFAX and medicines & chemical stock		-Sampling of fishes and water for disease analysis - Liming, use of drugs/ medicine if required in consultancy of fisheries experts
(iv) Loss of stock and inputs (feed, chemicals etc)	Raising the height of dyke by fencing with net and bamboo poles to prevent loss of stock	Arrangement of advance size fingerling/ yearlings for stocking	Stocking of large size fingerlings carp Fertilization of pond and regular feeding of fish Harvesting and sale of fish
(v) Infrastructure damage (pumps, aerators, huts etc)	Repairing/ arrangement of alternate safe place to keep pumps aerators etc.	A regular water on the flood and infrastructure facilities.	Re establishment of the infra structural facility.
<b>3. Cyclone / Tsunami</b>			
<b>4. Heat wave and cold wave</b>			

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