

**State: ARUNACHAL PRADESH**

**Agriculture Contingency Plan for District: TIRAP**

<b>1.0 District Agriculture profile*</b>				
<b>1.1</b>	<b>Agro-Climatic/Ecological Zone</b>			
	Agro Ecological Sub Region (ICAR)	17.1 Meghalaya Plateau and Nagaland Hill, warm to hot, moist humid to perhumid eco-subregion (D2A9)		
	Agro-Climatic Zone (Planning Commission)	Eastern Himalayan Zone (II)		
	Agro Climatic Zone (NARP)	Sub – Tropical plain Zone (NEH-4)		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Tirap, Papumpare		
	Geographic coordinates of district headquarters	<b>Latitude</b>	<b>Longitude</b>	<b>Altitude</b>
		26 <sup>o</sup> 38' to 27 <sup>o</sup> 47' N	96 <sup>o</sup> 16' to 95 <sup>o</sup> 40' E	150-1550 m above MSL
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR Complex, Arunachal Pradesh Centre, Basar.		
	Mention the KVK located in the district with full address	KVK, Tirap, PO: Deomali, Tirap , Arunachal Pradesh, PIN- 792129 Ph. 03786-255301 / 9436222149		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	ICAR Research Complex for NEH Region, Arunachal Pradesh Center, Basar, West Siang District- 791101, Arunachal Pradesh.		

**Statistical Hand Book of Tirap, Office of the Deputy Commissioner, Tirap,**

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset ( specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	1589.6	83.11	Last week of May -1 <sup>st</sup> week of June	2nd week of October
	NE Monsoon(Oct-Dec):	148.0	11.66	3rd week of October	2 <sup>nd</sup> week of November
	Winter (Jan- February)	53.6	6.44	-	-
	Summer (March-May)	728.8	38.33	-	-
	Annual	2520.0	139.54	-	-

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)	236.2	64.41	178.3	0.98	3.77	12.08	10.78	0.55	6.18	21.89

2011-12 Stats Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area ('000 ha)**	Percent (%) of total geographical area
	1. Black Soil	NA	--
	2. Alluvial Soil	Exact data not available	<b>Present in the river valley and other pockets of low lying areas.</b>
	3. Sandy Soil	Exact data not available	A considerable portion of soils belong to sandy soil
	4. Acid Soil	Exact data not available	Most soils are acidic in reaction
	5. Red Soil	NA	--

**Detail survey/study report is not available**

<b>1.5</b>	<b>Agricultural land use</b>	Area ('000 ha)	Cropping intensity %
	Net sown area	13.49	114.53 %
	Area sown more than once	1.96	
	Gross cropped area	15.45	
2011-12 Stats Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India			

<b>1.6</b>	<b>Irrigation</b>	Area ('000 ha)		
	Net irrigated area	1.95		
	Gross irrigated area	1.95		
	Rainfed area	11.0		
	<b>Sources of Irrigation</b>	Number	Area ('000 ha)	Percentage of total irrigated area
	Streams	25	0.05	Area may be indicated
	Tanks	0		
	Open wells	0		
	Bore wells	0		
	Lift irrigation schemes	01		
	Micro-irrigation			
	Other sources (Spring water well)	0		
	Total Irrigated Area		1.95	
	Pump sets	12		
	No. of Tractors			
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	NA	NA ( Data not available)	
	Critical	NA	NA	
	Semi- critical	NA	NA	
	Safe	NA	NA	
Wastewater availability and use	NA	NA		
Ground water quality				
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

**Statistical Hand Book of Tirap, Office of the Deputy Commissioner, Tirap District, Arunachal Pradesh**

1.6. a.	Fertilizer and Pesticides use	Type	Total quantity (tonnes)
1	Fertilizers*	Urea DAP Potash SSP Other straight fertilizers (specify) Other complex fertilizers (specify)	NA NA NA NA ( the farmers hardly use chemical fertilizers in field crops)
2	Chemical Pesticides*	Insecticides Fungicides Weedicides Others (specify)	NA NA NA -

\* If break up is not available, indicate total quantity used in the district for any recent year, mention here the year and source of statistic

**Statistical Hand Book of Tirap, Office of the Deputy Commissioner, Tirap District, Arunachal Pradesh**

**1.7 Area under major field crops & horticulture (as per latest figures) (Specify year 2011-12)**

1.7	S.No.	Major field crops cultivated	Area ('000 ha)							
			<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
1	Paddy	NA	NA	NA	NA	NA	NA	NA	5.6	
2	Maize	NA	NA	NA	NA	NA	NA	2.7	2.7	
3	Rapeseed	NA	NA	NA	NA	0.2	NA	NA	0.2	
4	Sesamum	NA	0.05	NA	NA	NA	NA	NA	0.05	
5	Pulses	NA	NA	NA	NA	NA	NA	NA	0.84	
6	Others (Millets)	NA	NA	NA	NA	NA	NA	NA	3.5	

	S.No.	Horticulture crops - Fruits	Area ('000 ha)		
			Total	Irrigated	Rainfed
	1	Orange	0.165	NA	0.165
	2	Pineapple	0.041	NA	0.041
	3	Banana	0.090	NA	0.090
	4	Guava	0.013	NA	0.013
	5	Pear	0.01	NA	0.01
		Others (specify)			
		<b>Horticulture crops -</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>

		<b>Vegetables</b>			
	1	Tapioca	0.72	NA	0.72
	2	Colocasia	0.84	NA	0.84
	3	Ginger	0.12	NA	0.12
	4	Pea	0.15	NA	0.15
	5	Chilli	0.12	NA	0.12
	6	Potato	0.145	NA	0.145
	7	Vegetables	2.57	NA	2.57
		<b>Medicinal and Aromatic crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
	1	NA	NA	NA	NA
	Others (specify)				
		<b>Plantation crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
	1	NA	NA	NA	NA
	Others (Specify)	Eg., industrial pulpwood crops etc.			
		<b>Fodder crops</b>	<b>Total</b>	<b>Irrigated</b>	<b>Rainfed</b>
	Others (Specify)				
		<b>Total fodder crop area</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
		<b>Grazing land, reserve areas etc</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

	<b>Availability of unconventional feeds/by products eg., breweries waste, food processing, fermented feeds bamboo shoots, fish etc</b>	NA	NA	NA
	<b>Sericulture etc</b> <b>Other agro enterprises (mushroom cultivation etc specify)</b>	NA	NA	NA
	<b>Others (specify)</b>			

<b>1.8</b>	<b>Livestock (18 th Quinquennial Livestock Census, Dept. of AH &amp; Vety., Nirjuli, A.P.)</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Indigenous cattle	5.836	6.002	11.838
	Improved / Crossbred cattle	0.304	0.587	0.891
	Buffaloes (local low yielding)	0.520	0.482	1.002
	Improved Buffaloes			
	Goat	7.501	8.682	16.183
	Sheep			
	Pig	12.719	9.632	22.351
	Mithun			
	Yak			
	Others (Horse, mule, donkey etc., specify)			
	Commercial dairy farms (Number)			
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>	
	Commercial	--	18.487	
	Backyard	--	80.570	

1.10	<b>Fisheries</b>										
	<b>A. Capture</b>										
	i) Marine	No. of fishermen	Boats				Nets				Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)					
	ii) Inland (Data Source: Fisheries Department)		No. Farmer owned ponds			No. of Reservoirs			No. of village tanks		
		400			-			-			
<b>B. Culture</b>											
					Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)		
i) Brackish water (Data Source: MPEDA/ Fisheries Department)											
ii) Fresh water (Data Source: Fisheries Department , 2006-07)					200		1.70		0.155		
Others (River/Stream)											

**1.11 Production and Productivity of major crops (Average of last 5 years: 2007-08 to 2011-12)**

1.11	Name of crop	Premonsoon		Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops to be identified based on total acreage)</b>												
Crop 1	Paddy	-	-	-		-		-		38.62	388	34.76
Crop 2	Maize	-	-	-		-		-		33.2	1,208	41.25
Crop 3	Millet	-	-	-		-		-		36.35	760	28.5



Crop 4	Pulses	-	-	-	-	-	-	-	10.22	1,002	5.02
Crop 5	Oilseed	-	-	-	-	-	-	-	2.46	892	NA
Others											
<b>Major Horticultural crops (Crops to be identified based on total acreage)</b>											
Crop 1	Vegetable	-	-	-	-	-	-	-	90.3	3507	25.68
Crop 2	Colocasia	-	-	-	-	-	-	-	31.57	3759	25.3
Crop 3	Tapioca	-	-	-	-	-	-	-	37.3	5145	-
Crop 4	Orange	-	-	-	-	-	-	-	2.0	1,212	-
Crop 5	Pea	-	-	-	-	-	-	-	1.38	952	-
Others											

<b>1.12</b>	<b>Sowing window for 5 major field crops</b> (start and end of normal sowing period)	Crop 1: Rice	2: Maize	3: Mustard	4: Millet	5: Pulses (Soybean/Arahar, Black gram)
	Pre-monsoon-Rainfed	2 <sup>nd</sup> week of April- 2 <sup>nd</sup> week of May			1 <sup>st</sup> & 2 <sup>nd</sup> week of March	March
	Pre-monsoon-Irrigated		NA			
	Kharif- Rainfed	July		-	2 <sup>nd</sup> week of June to 2 <sup>nd</sup> week of July	June
	Kharif-Irrigated		NA	-	-	-
	Rabi- Rainfed		Sept-Oct	Oct-Nov		-
	Rabi-Irrigated		NA	-	-	-
	Summer- rainfed	-	Feb-March	-	-	-
Summer- irrigated	-	NA	-	-	-	

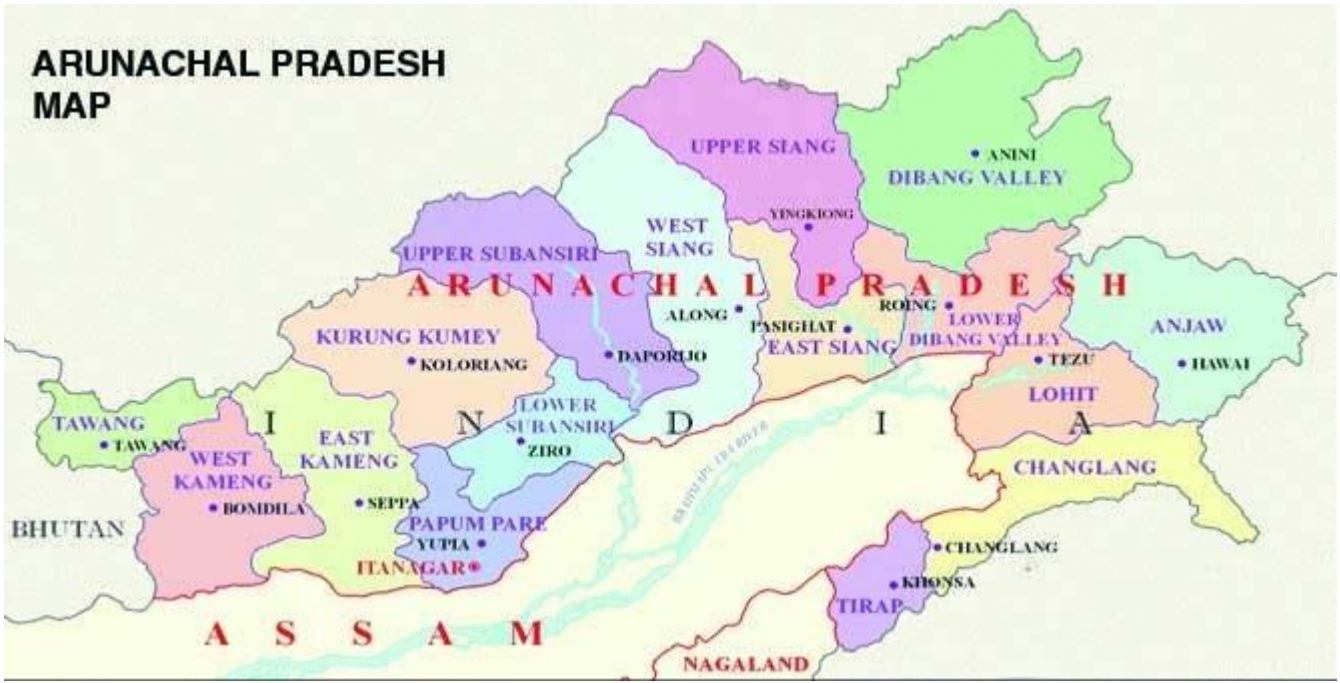
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular*	Occasional	None
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm		√	
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Snowfall			√
	Landslides	√		
	Pests and disease outbreak (specify)**	√		
	Others (like fog, cloud bursting etc.)			√

\*When contingency occurs in six out of 10 years

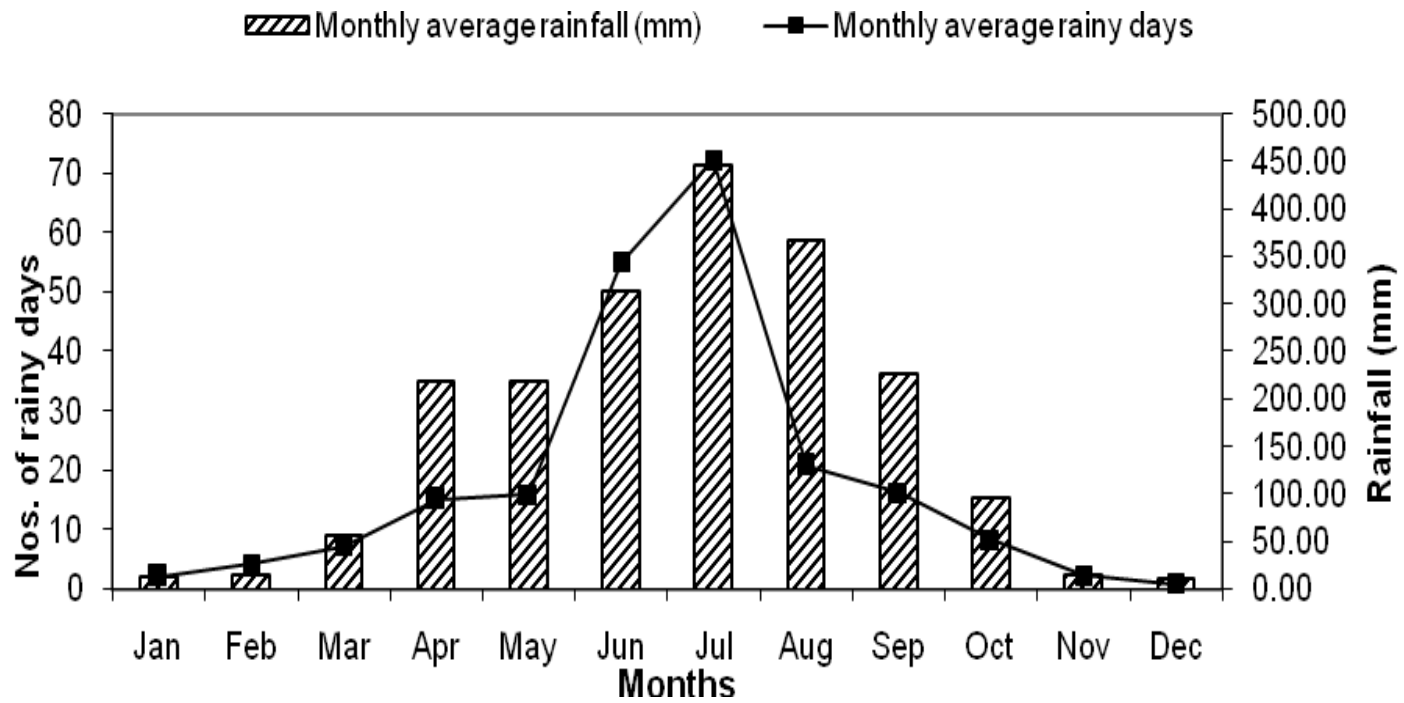
\*\* Pest and disease out break: **Agriculture:** Gub=ndhi bug in upland summer rice, stem borer in Sali rice and maize, trunk borere and stem borer in citrus

**Veterinary:** FMD, Swine fever, ranikhet diseases

1.14	Include Digital maps of the district	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rain fall as Annexure II	Enclosed: Yes
		Soil map as Annexure III	Enclosed: No



Location Map of Tirap District



Monthly average Rainfall and nos. of rainy days map of Tirap-District (Av. Of 10 years)

## 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	Agronomic measures	Remarks on Implementation
Delay by 2 weeks ( June 3rd week)	Medium rainfall Sandy loam soil, medium land	Rice	Grow medium duration rice varieties like Satya, Basundhara etc  Prefer drought tolerant varieties of Paddy crop i.e. Luit, Kapilee, Vandana, Anjali etc	<ul style="list-style-type: none"> <li>In-situ rain water conservation, summer ploughing, interculture, tillage practices, weed</li> <li>Timely preparation of nursery bed and transplanting</li> <li>Maintain plant population per unit area of the crop</li> </ul>	Supply of seeds through Dept.of Agri, ATMA
	Medium rainfall, Low land	Rice	Grow medium duration rice varieties like Satya, Basundhara etc  Prefer drought tolerant varieties of Paddy crop i.e. Luit, Kapilee, Vandana, Anjali etc	<ul style="list-style-type: none"> <li>Maintain more plant population for direct seeded rice.</li> <li>In-situ rain water conservation, harvesting of runoff for recycling and ground water recharge by elevating the bunds</li> </ul>	Breeder seed from AAU Jorhat,  Supply of seeds through Dept. of Agril, ATMA etc

Condition	Suggested Contingency Measures				
Early season drought (delayed onset)	Major Farming situation	Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (July 1st week)	Medium rainfall Sandy loam soil, plain lands	Rice	Grow medium duration rice varieties like Satya, Basundhara etc  Prefer drought tolerant varieties of Paddy crop i.e. Luit, Kapilee, Vandana, Anjali etc	<ul style="list-style-type: none"> <li>Apply life saving irrigation to maintain nursery</li> <li>When the mortality of seedlings is less than 50% gap filling should be done</li> <li>.In-situ rain water conservation, practices like summer ploughing, interculture, tillage practices, weed control.</li> </ul>	Supply of seeds through Dept.pf Agri, ATMA

		Sesamum	Use of varieties like Gouri, Vinayak, AST-1683, AST-1	<ul style="list-style-type: none"> <li>• Use of minimum tillage</li> </ul>	
		Soybean	Variety like JS-335, Bragg, moti	<ul style="list-style-type: none"> <li>• Intercropping with maize (Last stage of maize)</li> <li>• Maintain 1:2 row ratio</li> </ul>	
	Medium rainfall, low land	Rice	Prefer drought tolerant varieties of Paddy crop i.e. Luit, Kapilee, Vandana, Anjali etc Sujata, Durga, PDM-11 & 54	<ul style="list-style-type: none"> <li>• Nursery can be raised for transplanting after Use of bulky organic manures with full P,K and 50% N of recommended dose for basal application.</li> <li>• Maintain more plant population</li> <li>• When the mortality of seedlings is less than 50%, gap filling should be done.</li> </ul>	Supply of seeds through Dept.pf Agri, ATMA

<b>Condition</b>					
<b>Early season drought (normal onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Crop management</b>	<b>Soil nutrient &amp; moisture conservation measure</b>	<b>Remarks on Implementation</b>
<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/ crop stand etc.</b>	Medium rainfall Sandy loam soil, plain lands	Rice Maize Mustard Vegetable Pulse	<ul style="list-style-type: none"> <li>• If germination is less or mortality is high go for re-sowing crop</li> <li>• Adjust the plant population by gap filling</li> <li>• More plant population than normal.</li> <li>• Foliar application of chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Organic matter, FYM application.</li> <li>• Proper nutrient management</li> <li>• Complete hoeing weeding and earthing up at 20 DAS for moisture conservation.</li> <li>• Mulching</li> </ul>	<p>Supply of seed drills and intercultural implements through RKVY.</p> <p>Supply seeds from ATMA, RKVY</p>

	Medium rainfall low land	Rice	<ul style="list-style-type: none"> <li>• Gap filling</li> <li>• Foliar application of chemicals</li> <li>• Adoption of proper package and practices</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen the field and contour bunds for in-situ moisture conservation.</li> <li>• Proper nutrient management.</li> <li>• Organic matter, FYM application</li> <li>• Maintain the bund to minimize the run off loss of water.</li> </ul>	<p>Supply of intercultured implements through RKVY.</p> <p>Supply seeds from Dept. of Agriculture</p>
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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	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At vegetative stage	Medium rainfall Sandy loam soil, plain lands	Rice Maize Mustard Vegetable Pulse	<ul style="list-style-type: none"> <li>• Proper weed management</li> <li>• Maintain proper spacing</li> <li>• Foliar application of nutrients 2% Urea or 2% DAP</li> </ul>	<ul style="list-style-type: none"> <li>• Remove weeds</li> <li>• Strengthen the field bunds &amp; close the holes</li> <li>• Provide life saving irrigation.</li> <li>• Application of mulching</li> <li>• Organic mulching with previous crop residues.</li> <li>• Follow ridge and furrow method of planting</li> <li>• Making jalkund</li> <li>• Minimize runoff and percolation loss of water.</li> </ul>	<p>Supply of seed drills and intercultured implements</p> <p>Supply seeds from ATMA, Dept. of Agril.</p>
	Medium rainfall low land	Rice	<ul style="list-style-type: none"> <li>• Foliar application of nutrients 2% Urea or 2% DAP</li> <li>• Gap filling</li> </ul> <p>Foliar application of nutrients 2% Urea or 2% DAP or 1% KNO<sub>3</sub></p>	<ul style="list-style-type: none"> <li>• Remove weeds</li> <li>• Strengthen the field bunds &amp; close the holes</li> <li>• Provide life saving irrigation.</li> </ul>	<p>Supply of seed drills and intercultured implements</p> <p>Supply seeds from ATMA, Dept. of Agril.</p>

condition	Suggested Contingency Measures				
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Major Farming situation	Crop/cropping system	Crop management	Soil nutrient & moisture conservation measure	Remarks on Implementation
At reproductive stage	Medium rainfall Sandy loam soil, plain lands	Rice Maize Mustard Vegetable Pulse	<ul style="list-style-type: none"> <li>Rice variety: CAU R-1, Ranjit</li> <li>Mustard: TS-38, TS-46</li> <li>Foliar application of 2% urea at pre-flowering and flowering stage to pulses and oilseeds</li> <li>Remove and destroy pest and disease affected plants</li> <li>Spray 2% KCl + 0.1 ppm boron to non paddy crops to overcome drought</li> </ul>	<ul style="list-style-type: none"> <li>Provide irrigation at flowering and grain filling stage.</li> <li>Harvesting and recycling of rain water</li> <li>Provide life saving irrigation.</li> <li>Incase of complete failure of Kharif crop, go for pre-rabi crops/ pulses/vegetable crop cultivation.</li> </ul>	Supply of seed drills and intercultural implements  Supply seeds from ATMA, Dept. of Agril.
	Medium rainfall low land	Rice	<ul style="list-style-type: none"> <li>Foliar application of 2% urea at pre-flowering</li> </ul>	<ul style="list-style-type: none"> <li>Provide irrigation at flowering and grain filling stage.</li> <li>Harvesting and recycling of rain water</li> <li>Provide life saving irrigation.</li> <li>Incase of complete failure of Kharif crop, go for early rabi crop cultivation.</li> </ul>	Supply of seed drills and intercultural implements  Supply seeds from ATMA, Dept. of Agril.
Condition	Suggested Contingency Measures				
Terminal drought	Major Farming situation	Normal Crop/cropping system	Crop management	Rabi Crop planning	Remarks on Implementation
	Medium rainfall Sandy loam soil, plain lands	Rice Maize Mustard Vegetable	Harvesting at physiological maturity stage of the crop not at visual maturity.  Vegetable should be harvested at early than full maturity	<ul style="list-style-type: none"> <li>Construction of Jalkund</li> <li>Utilization of residual moisture for early sowing of rabi crops through mulching, ridge planting</li> </ul>	Construction of Farm ponds through NREGS, RKVY Supply seeds through ATMA, RKVY



		Pulse			
	Medium rainfall low land	Rice	Harvesting at physiological maturity stage of the crop	<ul style="list-style-type: none"> <li>• Construction of Jalkund</li> <li>• Utilization of residual moisture for early sowing of rabi crops</li> </ul>	Construction of Farm ponds through NREGS, RKVY Supply seeds through ATMA, RKVY

### 2.1.2 Drought- Irrigated situation

Condition	Suggested Contingency Measures				
Delayed/ limited release of water in streams due to low rainfall	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	Sandy loam soils, stream / lift irrigation system	Rice-Fallow Rice – Mustard/rabi vegetable	Rice – potato  Rice – Rapeseed  Rice – rabi pulses/ vegetables/ potato	Mulching in rabi season Limited & life saving irrigation, alternate furrow irrigation, drip irrigation, Irrigation in root zone, Proper intercultural operation	Seeds through ATMA, RKVY, Dept. of Agril.  Supply of seed drill and intercultural implements

Condition	Suggested Contingency Measures				
Lack of inflows into streams due to insufficient/ delayed onset of monsoon	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
	NA				

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

Condition	Suggested contingency measure			
	Vegetative stage <sup>k</sup>	Flowering stage <sup>l</sup>	Crop maturity stage <sup>m</sup>	Post harvest <sup>n</sup>
<b>Continuous high rainfall in a short span leading to water logging</b>				
Crop1. Paddy	Not a substantial problem	Provide drainage If possible	Drain out excess water, harvest at physiological maturity	Shifting to a safer place Threshing and drying in sunny weather and stored in well ventilated room
Crop2. Maize	Provide drainage and plant protection measures (Maize stem borer)	Provide drainage and plant protection measures (Maize stem borer)	Drain out excess water, harvest at physiological maturity	Shifting to a safer place Shelling and drying in sunny weather and stored in well ventilated space
Crop 3. Mustard	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shifting to a safer place Drying and threshing in sunny weather and stored in well ventilated space
Crop4. Pulse (Green gram/ Soybean/Arahar)	Provide drainage	Provide drainage	Drain out excess water, harvest at physiological maturity	Shifting to a safer place Dry in shade in a well ventilated space
Crop5. Millet (Proso and foxtail millet)	Provide drainage	Provide drainage If possible	Drain out excess water, harvest at physiological maturity	Threshing and drying in sunny weather and stored in well ventilated room
<b>Horticulture</b>				
Crop1. Orange	Provide drainage Earthing up of plant base/root zone	Provide drainage	Drain out of water Harvesting at physiological maturity stage.	Shift to safer place, grading, marketing and storing in well ventilated space
Crop2. Colocasia	Provide drainage Earthing up of plant base	Provide drainage	Drain out. Harvesting at physiological maturity stage.	Shift to safer place, grading, marketing and storing in well ventilated space
Crop3. Ginger	Provide drainage Earthing up of	Provide drainage, care against rhizome rot	Drain out. Harvesting at physiological maturity stage	Shift to safer place, grading, marketing and storing in well ventilated space
Crop4. Brinjal	Provide drainage Earthing up of plant base/root zone	Provide drainage	Drain out Harvesting at tender stage for vegetable purpose	Shift to safer place

Crop5. Tapioca	Provide drainage Earthing up of plant base/root zone	Provide drainage	Drain out Harvesting at tender stage for vegetable purpose	Safe storage against store grain pest and disease
<b>Heavy rainfall with high speed winds in a short span<sup>2</sup></b>				
<b>Horticulture</b>				
Crop1. Orange	Providing wind breaks and drain out excess water	Providing wind breaks and drain out excess water.	Drain out excess water. Harvesting at physiological maturity stage.	Shift to safer place, grading, marketing and storing in well ventilated space
Crop2. Colocasia	Providing wind breaks and drain out excess water	Providing wind breaks and rain out excess water	Drain out excess water Harvesting at physiological maturity stage.	Shift to safer place, grading, marketing and storing in well ventilated space
Crop3. Ginger	Providing wind breaks and drain out excess water	Providing wind breaks and drain out excess water	Drain out excess water Harvesting at physiological maturity stage and Harvest for vegetable purpose	Shift to safer place, grading, marketing and storing in well ventilated space
Crop4. Brinjal	Providing wind breaks and drain out excess water	Providing wind breaks and drain out excess water	Drain out excess water Harvesting at tender stage for vegetable purpose	Shift to safer place, grading, marketing and storing in well ventilated space
Crop5. Tapioca	Providing wind breaks and drain out excess water	Providing wind breaks and drain out excess water	Drain out excess water Harvesting at tender stage for vegetable purpose	Shift to safer place, grading, marketing and storing in well ventilated space
<b>Outbreak of pests and diseases due to unseasonal rains</b>				
Crop1. Paddy	Spray tricyclazole against blast, Chloropyriphos, Regent against stem borer, Monocrotophos against Swarming caterpillar	Spray tricyclazole against blast, Chloropyriphos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Malathion spray against Gundhi bug	Sun drying / disinfection of gunny bags with malathion in godown or heat treatment to manage stored grain pests
Crop3. Maize	Removal of infested tips to manage leaf webber, Spraying of systemic insecticide like Chloropyriphos @ 3 ml/lit against stem borers	Spraying of systemic insecticide like Chloropyriphos @ 3 ml/lit against stem borers	Wrapping of cobs against bird damage	Sun drying, Store in clean godown, disinfection of gunny bags / storage structure with malathion

Crop3. Mustard	Application of monocrotophos against mustard saw fly and Spray Dimethoate against aphid	Application of monocrotophos against mustard saw fly and Spray Dimethoate against aphid	-	Store in clean godown,
<b>Horticulture</b>				
Crop1. Orange	Spraying malathion against beetle, hand collection of egg mass Soil drenching of COC	Application of Triazophos alternatively against fruit borer/ leaf curl virus,	Spraying of Profenophos against fruit borers Metalaxyl against Anthracnose	Segregation of infested fruits & destruction
Crop2. Colocasia				
Crop3. Ginger	Spraying malathion against beetle, hand collection of egg mass Soil drenching of COC & streptomycin against wilting	Application of Neem oil & Triazophos alternatively against brinjal fruit & shoot borer/ leaf curl virus,	Spraying of Profenophos against fruit borers Metalaxyl against Anthracnose	
Crop4. Brinjal				
Crop5. Tapioca				

### 2.3 Floods : Not happen till date in the district

Condition	Suggested contingency measure <sup>o</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Transient water logging/ partial inundation<sup>1</sup></b>				
Crop1. Paddy	Use Submergence tolerant varieties like Jalashree, Jalkanwari, Drainage of the Nursery bed, If not possible go for re-sowing, Dapog method of nursery, SRI method of cultivation	Drainage of excess water. Apply 50% N + 50% K <sub>2</sub> O as top dressing during the tillering stage.  In partially damaged field. gap filling may be done by redistributing the tillers.  Wet seeding of sprouted seeds (@75-80 kg/ha) of medium	Drainage of excess water. If flood comes during reproductive stage, emphasis should be given on forthcoming rabi crops.  Growing of vegetables after receding flood water and adoption of integrated farming system to obtain more income and to	Drainage of excess water. If flood comes during reproductive stage, , emphasis should be given on forthcoming rabi crops  Supply of seeds and other agro-inputs of <i>rabi</i> crops at subsidized rate, provision of bank loan etc. Wet seeding of short duration varieties

		duration varieties like Luit Kapilee Management of pests & diseases	compensate the loss during kharif.	Utilization of residual soil moisture and use of recharged soil profile for growing pulses
Crop2. Pulses	Provide drainage, if heavy mortality resow the crop	Ensure drainage, Make ridge & furrows	Ensure drainage, Make ridge & furrows	Harvest the matured crop
<b>Horticulture /Plantation crops</b>				
Crop1. Orange	Early planting	1. Drain out of stagnating water and making field bunds. 2. Re- planting 3.Earthing up of plant base/root zone	Drain out of stagnating water and making field bunds	Shift to safer place.
Crop2. Colocasia	Early seedling			
Crop3. Ginger	Early seedling			
Crop4. Brinjal	Early seedling			
Crop5. Tapioca	Early planting			
<b>Continuous submergence for more than 2 days</b>				
<b>Horticulture / Plantation crops</b>				
Crop1. Orange	1. Drain out of stagnating water and making field bunds. 2. Re- planting or re-sowing in new areas.	1. Drain out of stagnating water. 2. Re- planting or re-sowing including seed availability. 3. Earthing up of plant base/root zone	2. Drain out of stagnating water. 2. Re- planting or re-sowing including seed availability.	Shift to safer place.
Crop2. Colocasia				
Crop3. Ginger				
Crop4. Brinjal				
Crop5. Tapioca				
<b>Sea water intrusion<sup>3</sup></b>				
NA				

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

Extreme event type	Suggested contingency measure <sup>r</sup>			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
<b>Heat Wave<sup>p</sup></b>	NA			
<b>Cold wave<sup>q</sup></b>	NA			
<b>Frost</b>	NA			
<b>Hailstorm</b> Crop1 (Paddy, Maize, Mustard)	Re-sowing the crop if heavy damage, Gap filling to maintain optimum population	Stacking where possible, provision for wind break	Stacking where possible, provision for wind break	Harvest at physiological maturity of the crops
<b>Horticulture</b>				
Crop1 Orange Crop2. Pineapple	Providing thatch grass roof. Re-planting	Re-planting Direct seeding including seed availability		Shift to safer place
<b>Cyclone</b> <b>(all cultivated crops)</b>	Re-sowing the crop if heavy damage, Gap filling to maintain optimum population	Stacking where possible, provision for wind break.	Stacking where possible, provision for wind break	Harvest at physiological maturity of the crops
<b>Sand deposition or heavy siltation</b>	NA			
Specify crop/horticulture/plantation	NA			

## 2.5 Contingent strategies for Livestock, Poultry & Fisheries

### 2.5.1 Livestock

	Suggested contingency measures		
	Before the event <sup>s</sup>	During the event	After the event
<b>Drought</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>Encourage the villagers/farmers to cultivate perennial fodder on low laying/irrigated areas on community basis. Also encourage to people to grow trees or shrubs like subabul, sesbania etc.</li> <li>Establishing fodder and feed banks at village level</li> <li>Making of silage/hay from extra fodder</li> <li>Stocking of concentrate feed ingredients in sufficient quantities</li> <li>Awareness programme on fodder cultivation and nutritional management of livestock during drought</li> </ul>	<ul style="list-style-type: none"> <li>Utilizing fodder and feed from perennial trees and Fodder and feed bank of village from silos</li> <li>Transporting excess fodder from nearby district</li> <li>Supply of concentrate feed to the livestock keepers in sufficient quantities</li> </ul>	<ul style="list-style-type: none"> <li>Availing crop insurance</li> <li>Fodder regeneration programme</li> <li>Plan for round the year production of fodder</li> <li>Culling unproductive livestock</li> </ul>
Drinking water	<ul style="list-style-type: none"> <li>Construction of community pond and other water harvesting tank in the village for conservation of excess water during monsoon period</li> <li>Excavation of Bore wells</li> <li>Proper maintenance of use of all the common water resources hygienically</li> </ul>	<ul style="list-style-type: none"> <li>Using water from reserved tanks for only drinking purpose</li> <li>Necessary arrangement of drinking water at grazing land</li> </ul>	<ul style="list-style-type: none"> <li>Using water from reserved tanks for only drinking purpose</li> <li>Preserve drinking water for future</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Awareness to all the Veterinary sub centers, Dispensary to prepare for the event with medicines and vaccines</li> <li>Conduction of vaccination and Health camp</li> <li>Training and awareness programme among extension personals and villagers</li> </ul>	<ul style="list-style-type: none"> <li>Regular conducting Health Camp and treatment to sick animals at village level</li> <li>Dead animals should be disposed scientifically either burning or burring in deep pit</li> </ul>	<ul style="list-style-type: none"> <li>Regularly conducting vaccination and health camp</li> <li>Culling unproductive and sick livestock</li> <li>Proper disposal of dead animals</li> </ul>

<b>Floods</b>			
Feed and fodder availability	<ul style="list-style-type: none"> <li>Encourage the villagers/farmers to cultivate perennial fodder on low laying/irrigated areas on community basis. Also encourage to people to grow trees or shrubs like subabul, sesbania etc.</li> <li>Establishing fodder and feed banks at village level</li> <li>Making of silage/hay from extra fodder</li> <li>Stocking of concentrate feed ingredients in sufficient quantities</li> <li>Awareness programme on fodder cultivation and nutritional management of livestock during drought</li> </ul>	<ul style="list-style-type: none"> <li>Utilizing fodder and feed from perennial trees and Fodder and feed bank of village from silos</li> <li>Transporting excess fodder from nearby district</li> <li>Supply of concentrate feed to the livestock keepers in sufficient quantities</li> </ul>	<ul style="list-style-type: none"> <li>Used hay, paddy straw from storage</li> <li>Use tree fodders.</li> <li>Use agricultural by product as conc. feed.</li> <li>Supply concentrated feed to the villagers.</li> </ul>
Drinking water	Preserve drinking water in tank	Supply of clean and treated drinking water	<ul style="list-style-type: none"> <li>Supply of clean and treated drinking water</li> <li>Do not allow the animals to drink flood water.</li> <li>Use water from preserve tanks</li> </ul>
Health and disease management	<ul style="list-style-type: none"> <li>Awareness to all the Veterinary sub centers, Dispensary to prepare for the event with medicines and vaccines</li> <li>Conduction of vaccination and Health camp</li> <li>Training and awareness programme among extension personals and villagers</li> </ul>	<ul style="list-style-type: none"> <li>Make awareness programme for Mass Vaccination at least three months before flood against FMD, Swine Fever.</li> <li>Mobile veterinary services at flood affected areas</li> <li>Prepare Veterinary DPPT with Medicines and Stuff</li> </ul>	<ul style="list-style-type: none"> <li>Organized Veterinary Health Camp at village level.</li> </ul>
<b>Cyclone</b>	<b>Cyclone</b>		
Feed and fodder availability	Preserve feed and fodder at village level	<ul style="list-style-type: none"> <li>Do not allow the animals for free grazing.</li> <li>Use storage feed and fodder.</li> <li>Supply of concentrated feed</li> </ul>	Fodder regeneration programme should be taken



Drinking water	Preserve drinking water in tank	Supply of clean and treated drinking water	<ul style="list-style-type: none"> <li>• Supply of clean and treated drinking water</li> <li>• Do not allow the animals to drink flood water.</li> <li>• Use water from preserve tanks</li> </ul>
Health and disease management	Health and disease management	Awareness to the Veterinary sub center/ Dispensary to prepare with medicine	Veterinary health camp
<b>Heat wave and cold wave</b>	NA	NA	NA
Shelter/environment management			
Health and disease management			
<b>Snowfall</b>	NA	NA	NA
<b>Earthquake</b>	NA	NA	NA
<b>Landslides</b>	NA	NA	NA

<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>				
Shortage of feed ingredients	Procure feed ingredients from unaffected area and storage for use at village	Use feed ingredients from storage	Disposal of bird at proper age	State vety deptt,

	level.			
Drinking water	Preserve drinking water in tanks	Use water from preserve tanks.	Supply of clean and treated water	State vety depts
Health and disease management	Prepare Veterinary sub center/ dispensary with medicine and vaccines	Health camp Free treatment	Organized health camp at least one month	State vety depts
<b>Floods</b>				State vety depts
Shortage of feed ingredients	Prepare feed storage room at high land or Chang Ghar. Make one common feed storage room at high land where flood cannot affect (in village wise)	Use the feed ingredient after sun drying	Use good condition feed ingredients and discharge damp one	State vety depts
Drinking water	Preserve drinking water in tanks	Use preserve water from tanks. Treatment to drinking water before use	Treatment to drinking water after at least 30 days	State vety depts
Health and disease management	Prepare Vaccine and medicine for flood in all Veterinary sub dispensary	Health camp Free treatment	Organized health camp at least one month	State vety depts,
<b>Cyclone</b>	NA			
Shortage of feed ingredients	Preserve feed ingredient at village level	Do not allow the bird to move pout side Use stored feed ingredients	Feed regeneration programme	State vety depts,
Drinking water	Preserve drinking water in tanks	Supply of clean drinking water	Supply of clean and treated water	State vety depts,
Health and disease management	Prepare Veterinary sub center/ dispensary with	Health camp Free treatment	Organized health camp at least one month	State vety depts

	medicine and vaccines			
<b>Heat wave and cold wave</b>				
Shelter/environment management	Prepare shelter shed with all precautionary measure at village level	Shift the birds to shelter shed	Prepared scientific poultry house with locally available materials	State vety deptt
Health and disease management	Prepare medicine and vaccines etc. at village. Veterinary sub center/ dispensary.	Organized health camp	Organized health camp	State vety deptt
Snowfall	NA			
Earthquake, Landslides etc				

<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>			
Marine			
Inland	NA	NA	NA
(i) Shallow water depth due to insufficient rains/inflow			
(ii) Changes in water quality			
(iii) Any other			
<b>B. Aquaculture</b>			
(i) Shallow water in ponds due to insufficient rains/inflow	Secondary water source like river/deep tube well/well/ rain water	Fill up water from the secondary source and apply fertilizer to	Stop intake of water from the secondary source

	harvest tank to be developed	maintain water productivity.	
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other	Training and awareness to the Govt. official and farmer		
<b>2) Floods</b>			
<b>A. Capture</b>			
Marine			
Inland	NA	NA	NA
(i) Loss of stock			
(ii) Changes in water quality			
(iii) Health and diseases			
<b>B. Aquaculture</b>			
(i) Inundation with flood water	Try to sell out the stock	Make the stock empty	Again fill the new stock
(ii) Water contamination and changes in water quality	Water quality should be maintain	Take proper water quality management	Drain out the water partially if possible and fill up from secondary water resource.
(iii) Health and diseases	Maintain the water quality	Use medicine if required	Take suggestion from expert and then apply medicine
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)	-	-	Contact the concerned Dept. For any kind of compression and loan
(vi) Any other	Training and awareness to the farmers and FEO, Field staff	-	-
<b>3. Cyclone / Tsunami</b>	NA	NA	NA
<b>A. Capture</b>			
Marine			
Inland			

B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
<b>4. Heat wave and cold wave</b>			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)	Management of water quality to be done and arrangement of secondary source of water should be done	Exchange water upto 2/3 and apply fertilizer	Exchange water upto 2/3 and take suggestion from expert.
(ii) Health and Disease management	Provide proper sanitation	Use lime, bleaching, Alum	If required use medicine.
(iii) Any other	Awareness to FEO, Field staff, villagers for the event	-	-

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