

**State: SIKKIM**

**Agriculture Contingency Plan for District: North Sikkim**

<b>1.0 District Agriculture profile</b>					
<b>1.1</b>	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Eastern Himalayas, Warm Perhumid Eco-Region (16.2)			
	Agro-Climatic Zone (Planning Commission)	Eastern Himalayan Region(II)			
	Agro Climatic Zone (NARP)	AZ-36			
	List all the districts or part thereof falling under the NARP Zone	North District			
	Geographic coordinates of district headquarters	<b>Latitude</b>	<b>Longitude</b>	<b>Altitude</b>	
		27 <sup>o</sup> 46' - 28 <sup>o</sup> 48'N	88 <sup>o</sup> 58' - 88 <sup>o</sup> 25'E	4800 -15,000 msl	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR, Sikkim Science Centre, Tadong.			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Mangan, North Sikkim.			
<b>1.2</b>	<b>Rainfall ( Average of last 5 years )</b>	<b>Normal RF(mm)</b>	<b>Normal Rainy days (number)</b>	<b>Normal Onset</b>	<b>Normal Cessation</b>
	SW monsoon (June-Sep)	1464.0		1 <sup>st</sup> week of June	4 <sup>th</sup> week of September.
	NE Monsoon(Oct-Dec)	233.8		3 <sup>rd</sup> week of October	1 <sup>st</sup> week of December.
	Winter (Jan- March)	181.5		1 <sup>st</sup> week of January	4 <sup>th</sup> week of March.
	Summer (Apr-May)	389.5		2 <sup>nd</sup> week of April	4 <sup>th</sup> week of May
	Annual	<b>2268.8</b>			

**Source : State Agriculture department -2009.**

<b>1.3</b>	Land use pattern of the district (latest statistics)	Geographical area ('000 ha)	Cultivable area ('000 ha)	Forest area ('000 ha)	Land under non-agricultural use ('000 ha)	Permanent Pastures ('000 ha)	Cultivable wasteland ('000 ha)	Land under Misc. tree crops and groves ('000 ha)	Barren and uncultivable land ('000 ha)	Current Fallows ('000 ha)	Other fallows ('000 ha)
	Area ('000 ha)	42.260	11.231	22.700	1.523	1.209	-	-	0.00612	5.597	-

Source : Vision 2020 ( Sikkim State)

<b>1.4</b>	<b>Major Soils (common names like red sandy loam deep soils (etc.,))</b>	<b>Area ('000 ha)</b>	<b>Percent (%) of total</b>
	Shallow- medium deep soils		
	Loamy brown soils		
	Red hill soils		
	Others (specify):		

<b>1.5</b>	<b>Agricultural land use</b>	<b>Area ('000 ha)</b>	<b>Cropping intensity %</b>
	Net sown area	11.231	
	Area sown more than once	-	
	Gross cropped area	-	

<b>1.6</b>	<b>Irrigation</b>	<b>Area ('000 ha)</b>		
	Net irrigated area	0.850		
	Gross irrigated area	0.850		
	Rainfed area	10.381		
	<b>Sources of Irrigation</b>	<b>Number</b>	<b>Area ('000 ha)</b>	<b>% of total irrigated area</b>
	Canals		---	---
	Tanks		---	---
	Open wells		---	---
	Bore wells		---	---
	Lift irrigation schemes		---	---
	Micro-irrigation		---	---
	Other sources ----streams		<b>0.850</b>	<b>7.57</b>
	<b>Total Irrigated Area</b>		<b>0.850</b>	
	Pump sets			
	No. of Tractors			
	<b>Groundwater availability and use* (Data source: State/Central Ground water Department /Board)</b>	<b>No. of blocks/ Tehsils</b>	<b>(%) area</b>	<b>Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)</b>
	Over exploited	---	---	---
	Critical	---	-	---
	Semi- critical	---	-	---
	Safe	---	---	---
	Wastewater availability and use	---	---	---
	Ground water quality			
<b>*over-exploited: groundwater utilization &gt; 100%; critical: 90-100%; semi-critical: 70-90%; safe: &lt;70%</b>				

Source : District Agriculture Plan-2009.

**1.7 Area under major field crops and horticulture**

1.7a	Major field crops cultivated (2009-10) *	Area ('000 ha)							Summer	Grand total
		Kharif			Rabi					
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total			
	Maize		2.92	2.92					2.92	
	Rice		1.00	1.00					1.00	
	Finger millet		0.92	0.92					0.92	
	Buckwheat		0.82	0.82					0.82	
	Soybean		0.40	0.40					0.40	
	Wheat					0.81	0.81		0.81	
	Barley					0.24	0.24		0.24	
	Rapeseed & Mustard					0.22	0.22		0.22	
1.7b	Horticulture crops – Fruits (2007-08) **	Total		Irrigated		Rainfed ('000 ha)				
	Orange	0.067		---		0.067				
	Apple	0.020		---		0.020				
	Passion fruit	0.035		---		0.035				

	Other Fruits (Pears, Peach, Plum, Avacado, Banana, Guava)	0.088	---	0.088
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\*\* Source : Annual Progress Report (2007-08) of State Horticulture Department

\* Annual Progress Report (2009-10) of State Agriculture Department.

1.7c	Horticulture crops - Vegetables	Total area ('000 ha)	Irrigated area ('000 ha)	Rainfed area ('000 ha)
	Kharif	0.486		0.486
	Rabi	0.282		0.282
	Off-season	0.412		0.412
1.7d	Medicinal and Aromatic crops	-	-	-
1.7e	Spices crops	-	-	-
	Large Cardamom	4.090		4.090
	Ginger	0.275		0.275
	Turmeric	0.042		0.042
1.7f	Fodder crops	Total area ('000 ha)	Irrigated area ('000 ha)	Rainfed area ('000 ha)
1.7g	Grazing land	-	-	-
1.7h	Sericulture etc	-	-	-

<b>1.8</b>	<b>Livestock (in number)</b>	<b>Male ('000)</b>	<b>Female ('000)</b>	<b>Total ('000)</b>
	Non descriptive Cattle (local low yielding)	2.934	4.682	7.616
	Crossbred cattle	3.040	5.497	8.537
	Non descriptive Buffaloes (local low yielding)	0.012	0.025	0.037
	Graded Buffaloes	---	---	---
	Goat	5.187	9.831	15.018
	Sheep	2.319	0.111	2.430
	Pig	4.967	1.387	6.354
	Yak	1.547	2.330	3.877
	Commercial dairy farms (Number)			
<b>1.9</b>	<b>Poultry</b>	<b>No. of farms</b>	<b>Total No. of birds ('000)</b>	
	Commercial	30 ( 200 – 500 each)	6 - 15	
	Backyard	---	---	

<b>2.0</b>	<b>A. Capture</b>						
	<b>i) Marine (Data Source: Fisheries Department)</b>	<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)	
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	<b>ii) Inland (Data Source: Fisheries Department)</b>	<b>No. Farmer owned ponds</b>		<b>No. of Reservoirs</b>		<b>No. of village tanks</b>	
<b>100</b>		<b>---</b>		<b>100</b>			
<b>B. Culture</b>							
		<b>Water Spread Area (ha)</b>	<b>Yield (t/ha)</b>		<b>Production ('000 tons)</b>		
	<b>i) Brackish water (Data Source: MPEDA/ Fisheries Department)</b>						
	<b>ii) Fresh water (Data Source: Fisheries Department)</b>	2 ha/ village tank	4 ton/ha		4 ton		
	<b>Others</b>	2 ha- Govt. farm	-		-		

**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)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
<b>Major Field crops (Crops identified based on total acreage)</b>										
	Maize	3.5305	1217.80	-	-	-	-	3.5305	1217.80	
	Rice	0.9479	1040.60	-	-	-	-	0.9479	1040.60	
	Wheat	-	-	0.4684	761.20	--	-	0.4684	761.20	
	Finger Millet	0.4425	697.10	-	-	-	-	0.4425	697.10	
	Buck Wheat	0.0837	509.80	--	-	-	-	0.0837	509.80	
	Barley	-	-	0.0739	625.20	-	-	0.0739	625.20	
1.11	Name of crop	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)	
<b>Major Horticultural crops (Crops to be identified based on total acreage) :</b>										
	Large cardamom	0.867	212	-	-	-	-	0.867	212	



	Vegetables	1.942	3996	1.232	4369	-	-	3.174	4182.50	
	Off-Season Vegetables	1.876	4553	-	-	-	-	1.876	4553	
	Potato	1.305	3907	0.419	4190	-	-	1.724	4048.50	
	Ginger	1.460	5309	-	-	-	-	1.460	5309	
Others	Turmeric	0.138	3286	-	-	-	-	0.138	3286	

Source : Annual Progress Report of State Horticulture and Agriculture Department (2007-08)

1.12	Sowing window for 5 major field crops	Maize	Paddy	Wheat	Finger Millet	Buck Wheat
	Kharif- Rainfed	Feb- March			May - July	Feb – March July - August
	Kharif-Irrigated		April - July			
	Rabi- Rainfed			Sept - Nov		
	Rabi-Irrigated					

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)			

Others (specify)			
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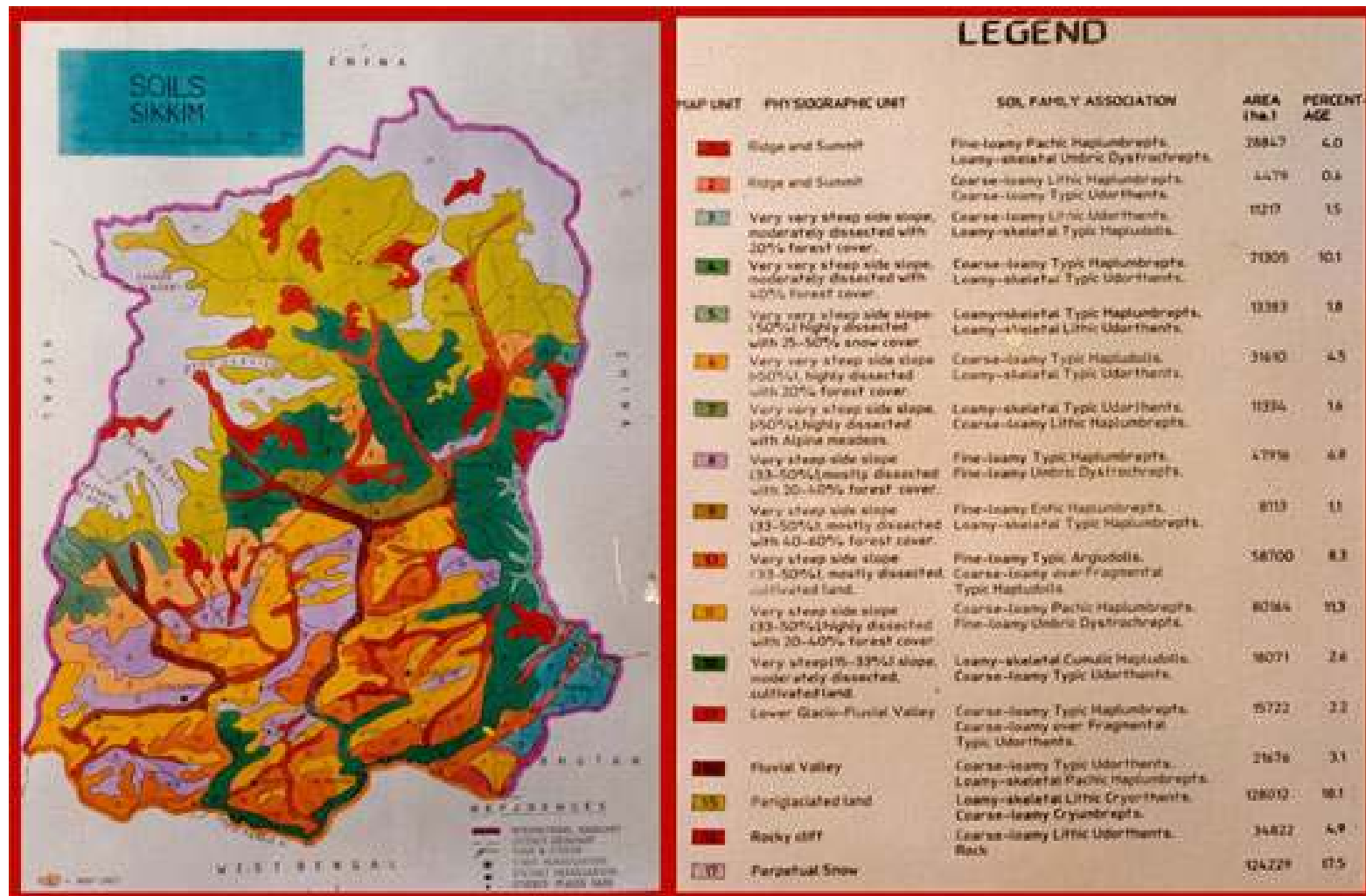
6 out of 10 years = Regular

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 – 1: LOCATION MAP OF NORTH DISTRICT IN SIKKIM**



### Annexure – III : SOIL MAP OF SIKKIM



## 2.0 Strategies for weather related contingencies

### 2.1 Drought

#### 2.1.1 Rainfed situation

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Change in crop / cropping system including variety	Agronomic measures	Remarks on Implementation
Early season drought (delayed onset)					
Delay by 2 weeks  June 3 <sup>rd</sup> week	Moderately deep dark brown to dark reddish loamy soil.	<b>Maize + Wheat system:</b> a. Maize + Rice Bean - Wheat b. Maize + Soyabean - Mustard/Toria c. Maize-Cole Crops <b>Maize :</b> Mostly Local along with C-1415, C-1837. <b>Soybean :</b> Local	<b>Maize :</b> C-1415, C-1837, Hishell, Narendra M-909. <b>Toria :</b> Yellow Sarson <b>Rice bean :</b> local <b>Cole crops :</b> Serrano, Pragati, Rareball, Kenzan-60, Everest. <b>Soybean :</b> PK-1042 <b>Paddy :</b> PD-10, ULD-61, Sugandha 2,3. <b>Finger millet :</b> Maize based cropping	Application of recommended dose of organic manures and appropriate Bio-fertilizers.  Line sowing of Maize, Wheat & Mustard in recommended spacing.	1. Modification of Seed drills, Iron plough as per the requirement of hill agriculture and their uses to be encouraged and distributed under RKVY. 2. Supply of quality seeds through FSADD/NSC. 3. Supply of
		<b>Paddy- Wheat</b> <b>Finger millet-Wheat</b> <b>Paddy :</b> Local (Attey, Lama) <b>Wheat :</b> Sonalika <b>Finger millet :</b> Local			

		<b>Maize-Ginger</b> <b>Ginger</b> : Bhaisey, Gorubathaney.	system is continued till 1 <sup>st</sup> week of August.	Thinning and gap filling.  Conservation furrow.  Inter-cropping	ICAR approved organic fertilizers & Bio-fertilizers.
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<b>Condition :</b>					
<b>Suggested Contingency measures</b>					
<b>Early season drought (delayed onset)</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Change in crop/cropping system</b>	<b>Agronomic measures</b>	<b>Remarks on Implementation</b>
Delay by 4 weeks  July 1st week	Moderately deep dark brown to dark reddish loamy soil.	<b>Maize - Wheat system:</b> a. Maize + Rice Bean - Wheat b. Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize</b> : Mostly Local along with C-1415, C-1837. <b>Soybean</b> : Local	Maize based cropping system is continued till 3 <sup>rd</sup> week of August. <b>Maize</b> : C-1415, C-1837 <b>Cole Crops</b> : Serrano, Pragati,	<b>In Maize :</b> 1. Conservation furrow.  2. Splitting nutrient application.  3. Harvest of crop at physiological	Modification of Seed drills, Iron plough as per the requirement of hill agriculture and their uses to be encouraged and distributed under RKVY..  2. Assured supply of quality seeds through

		<b>Paddy - Wheat</b> <b>Finger millet- Wheat</b> <b>Paddy :</b> Local (Attey, Lama) <b>Wheat :</b> Sonalika <b>Finger millet :</b> Local	Everest.	maturity.	FSADD/NSC.
		<b>Maize- Ginger</b> <b>Ginger :</b> Bhaisey, Gorubathaney.		<b>In Paddy :</b> 1. SRI to be encouraged. 2. Medium to long duration varieties needs to be sown. <b>In Finger millet :</b> Nursery planting of mid to long duration varieties. <b>In Ginger :</b> Adequate mulching with leaf litter or locally available materials.	3. Supply of ICAR approved organic fertilizers & Bio-fertilizers.

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

Delay by <b>6 weeks</b>  July 3 <sup>rd</sup> week	Moderately deep dark brown to dark reddish loamy soil.	<b>Maize - Wheat system:</b> a.Maize + Rice Bean -Wheat b.Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize :</b> Mostly Local along with C-1415, C-1837. <b>Soybean :</b> Local	<b>Cole Crops :</b> Serrano, Pragati, Everest.  <b>Mustard :</b> B-9  <b>Wheat :</b> Sonalika   Sowing at wider spacing than the recommended one.	<b>In Paddy :</b> 1. SRI to be encouraged. 2. Mid to long duration varieties needs to be sown.  <b>In Finger millet :</b> Nursery planting of mid to long duration varieties.  Thinning.  <b>In Ginger :</b> Adequate mulching with leaf litter or locally available organic materials.	Modification of Seed drills, Iron plough as per the requirement of hill agriculture and their uses to be encouraged and distributed under RKVY. 2. Assured supply of quality seeds through FSADD/NSC. 3. Supply of ICAR approved organic fertilizers & Bio-fertilizers.
		<b>Paddy- Wheat</b> <b>Finger millet - Wheat</b>  <b>Paddy :</b> Local (Attey, Lama) <b>Wheat :</b> Sonalika <b>Finger millet :</b> Local			
		<b>Maize - Ginger</b> <b>Ginger :</b> Bhaisey, Gorubathaney.			

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  August 1 <sup>st</sup> week	Moderately deep dark brown to dark reddish loamy soil.	<b>Maize + Wheat system:</b> a. Maize + Rice Bean - <b>Wheat</b> b. Maize + Soyabean - <b>Mustard/Toria</b> c. Maize + Cole Crops <b>Maize</b> : Mostly Local along with C-1415, C-1837. <b>Soybean</b> : Local	<b>Cole Crops</b> : Serrano, Pragati, Everest.  <b>Mustard</b> : B-9  <b>Wheat</b> : Sonalika  <b>Buckwheat</b> : Local to be included in the cropping system.  Sowing at wider spacing than the recommended one.	<b>In Paddy</b> : 1. SRI to be encouraged. 2. Mid to long duration varieties needs to be sown.  <b>In Finger millet</b> : Nursery planting of mid to long duration varieties.  Thinning.	Modification of Seed drills, Iron plough as per the requirement of hill agriculture and their uses to be encouraged and distributed under RKVY. 2. Assured supply of quality seeds through FSADD/NSC. 3. Supply of ICAR approved organic fertilizers & Bio-fertilizers.
		<b>Paddy - Wheat</b> <b>Finger millet -Wheat</b> <b>Paddy</b> : Local (Attey, Lama) <b>Wheat</b> : Sonalika <b>Finger millet</b> : Local			
		<b>Maize - Ginger</b> <b>Ginger</b> : Bhaisey, Gorubathaney.			

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



<b>Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.</b>	<b>Moderately deep dark brown to dark reddish loamy soil</b>	<b>Maize + Wheat system:</b> a. Maize - Rice Bean - Wheat b. Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize :</b> Mostly Local along with C-1415, C-1837. <b>Soybean :</b> Local	1. Thinning and gap filling the existing crop. 2. Re sowing. <b>Maize :</b> C-1415, C-1837 <b>Soyabean :</b> PK-1042 <b>Cole crops :</b> Kenzan – 60, Rare Ball. <b>Paddy :</b> PD-10, ULD-61 <b>Toria :</b> Yellow Sarson	Intercultivation  Conservation Furrow  Thinning  <b>In Ginger :</b> Adequate mulching with leaf litter or locally available organic materials	Modification of Seed drills, Iron plough as per the requirement of hill agriculture and their uses to be encouraged and distributed under RKVY. 2. Assured supply of quality seeds through FSADD/NSC. 3. Supply of ICAR approved organic fertilizers & Bio-fertilizers.
		<b>Paddy - Wheat</b>			
		<b>Finger millet - Wheat</b> <b>Paddy :</b> Local (Attey, Lama) <b>Finger millet :</b> Local			
		<b>Maize - Ginger</b> <b>Ginger :</b> Bhaisey, Gorubathaney.			

<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<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Crop management<sup>c</sup></b>	<b>Soil nutrient &amp; moisture conservation measues<sup>d</sup></b>	<b>Remarks on Implementation<sup>e</sup></b>

<b>At vegetative stage</b>	<b>Moderately deep dark brown to dark reddish loamy soil.</b>	<b>Maize - Wheat system:</b> a.Maize + Rice Bean - Wheat b.Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize :</b> Mostly Local along with C-1415, C-1837. <b>Soybean :</b> Local	Thinning to maintain optimum plant population.  Life saving irrigation by using water of Dug-out ponds and rain water harvesting structure.  Weeding and weed mulching.	Intercultivation.  Conservation furrow.  Mulching.	Construction of Dug-out ponds and rain water harvesting structure under RKVY.  Popularization of drought tolerant varieties.
		<b>Paddy - Wheat</b> <b>Finger millet -Wheat</b>  <b>Paddy :</b> Local (Attey, Lama) <b>Wheat :</b> Sonalika <b>Finger millet :</b> Local			
		<b>Maize - Ginger:</b> Bhaisey, Gorubathaney.			

<b>Condition</b>			<b>Suggested Contingency measures</b>		
<b>Mid season drought (long dry spell)</b>	<b>Major Farming situation<sup>a</sup></b>	<b>Normal Crop/cropping system<sup>b</sup></b>	<b>Crop management<sup>c</sup></b>	<b>Soil nutrient &amp; moisture conservation measrues<sup>d</sup></b>	<b>Remarks on Implementation<sup>e</sup></b>

<b>At flowering/ fruiting stage</b>	<b>Moderately deep dark brown to dark reddish loamy soil.</b>	<b>Maize - Wheat system:</b> a. Maize + Rice Bean - Wheat b. Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize</b> : Mostly Local along with C-1415, C-1837. <b>Soybean</b> : Local	Thinning to maintain optimum plant population.  Life saving irrigation by using water of Dug-out ponds and rain water harvesting structure.	Intercultivation.  Conservation furrow.  Mulching.  Band placement of Organic fertilizers.	Construction of Dug-out ponds and rain water harvesting structure under RKVY.  Popularization of drought tolerant varieties
		<b>Paddy - Wheat</b> <b>Finger millet - Wheat</b> <b>Paddy</b> : Local (Attey, Lama) <b>Wheat</b> : Sonalika <b>Finger millet</b> : Local	Weeding and weed mulching.		
		<b>Maize – Ginger</b> Bhaisey, Gorubathaney			

<b>Condition</b>	<b>Major Farming situation</b>	<b>Normal Crop/cropping system</b>	<b>Suggested Contingency measures</b>		
			<b>Crop management</b>	<b>Rabi Crop planning</b>	<b>Remarks on Implementation</b>
<b>Terminal drought (Early withdrawal of monsoon)</b>	<b>Moderately deep dark brown to dark reddish loamy soil.</b>	<b>Maize - Wheat system:</b> a. Maize + Rice Bean - Wheat b. Maize + Soyabean - Mustard/Toria c. Maize + Cole Crops <b>Maize</b> : Mostly Local along with C-1415, C-1837. <b>Soybean</b> : Local	Life saving irrigation by using water of Dug-out ponds and rain water harvesting structure.	Mustard var. B-9 (drought tolerant).  Long duration Wheat variety.  Incorporation of French Bean and	Construction of Dug-out ponds and rain water harvesting structure under RKVY.  Popularization of

		<b>Paddy - Wheat</b> <b>Finger millet - Wheat</b> <b>Paddy :</b> Local (Attey, Lama) <b>Wheat :</b> Sonalika <b>Finger millet :</b> Local		Rajma which can be harvested at physiological maturity if needed.	drought tolerant varieties.  Beans and indeterminate Rajma varieties needs to be emphasized.
		<b>Maize - GingerGinger :</b> Bhaisey, Gorubathaney			

### 2.1.2 Drought - Irrigated situation -

Condition	Suggested Contingency measures				
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Not Applicable				

### 2.2 Unusual rains (untimely, unseasonal etc) (for both Rainfed and Irrigated situations)

Condition	Suggested contingency measure			
Continuous high rainfall	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest

<b>in a short span leading to water logging</b>				
<b>Maize + Soybean</b>	Provide drainage	Provide drainage. Timely earthing – up.	Drain out the excess water. Harvesting at physiological maturity stage.	Shift to safer place and dry in shade and turn frequently.
<b>Paddy</b>	Provide drainage by opening the bunds.	Provide drainage	Drain out the excess water.	Shift to safe place; dry in shade and turn frequently. Safe storage against storage pests.
<b>Finger millet</b>	Provide drainage	Provide drainage	Drain out the excess water.	Dry in shade and turn frequently. Safe storage against storage pest and disease .
<b>Wheat</b>	Provide drainage	Provide drainage	Drain out the excess water.	Shift to safe place ; dry in shade and turn frequently. Safe storage against storage pests and diseases
<b>Mustard</b>	Provide drainage	Provide drainage	Drain out the excess water.	Shift to safe place ; dry in shade and turn frequently. Safe storage against storage pests and diseases
<b>Horticulture</b>				
<b>Ginger</b>	Timely Earthing up to provide drainage.	Provide drainage	Drain out the excess water.	Shift to safe place ; dry in shade and turn frequently. Safe storage against storage pests and diseases.

<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>				
<b>Maize + Rice bean - Wheat</b>	Need based IPM measures.	Need based IPM measures.		Safe storage against storage pests and diseases.
<b>Maize + Soybean - Mustard</b>				
<b>Paddy - Wheat</b>				
<b>Finger millet</b>				

### 2.3 Floods:

<b>Condition</b>	<b>Suggested contingency measure</b>			
	<b>Seedling / nursery stage</b>	<b>Vegetative stage</b>	<b>Reproductive stage</b>	<b>At harvest</b>
<b>Transient water logging/partial inundation<sup>1</sup></b>				
<b>Continuous submergence for more than 2 days<sup>2</sup></b>	Not Applicable			
<b>Sea water intrusion<sup>3</sup></b>				

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

<b>Extreme event type</b>	<b>Suggested contingency measure<sup>r</sup></b>			
	<b>Seedling / nursery stage</b>	<b>Vegetative stage</b>	<b>Reproductive stage</b>	<b>At harvest</b>
<b>Heat Wave<sup>p</sup></b>				

<b>Cold wave<sup>q</sup></b>				
Maize	Nursery should be raised inside the well covered structure and about 50 percent more seedlings should be raised.	<ul style="list-style-type: none"> <li>• Planting of trees around field to act as wind break and replanting of damaged plants</li> <li>• Application of K to enhance tenacity in plants</li> <li>• Staking of plants</li> </ul>	Planting of trees around field to act as wind break.	Early harvest of the crops at Physiological maturity.
Barley				
Wheat				
Rajma				
<b>Horticulture :</b>				
Apple	Nursery should be raised inside the well covered structure and about 50 percent more seedlings should be raised.	<ul style="list-style-type: none"> <li>• Planting of trees around field to act as wind break and replanting of damaged plants</li> <li>• Application of K to enhance</li> </ul>	Planting of trees around field to act as wind break.	Early harvest of the crops at Physiological maturity.
Vegetables				
Large Cardamom				

		tenacity in plants • Staking of plants		
<b>Frost</b>				
Maize	<ul style="list-style-type: none"> <li>• Frost resistant varieties,</li> <li>• Nursery should be raised inside the well covered structure and about 50 percent more seedlings should be raised.</li> </ul>			
Rice				
Wheat				
Finger-Millet				
Soybean				
Rapeseed & Mustard				
<b>Horticulture :</b>				
Large Cardamom	Partial Shedding with Agro- net. Fumigation.	Partial Shedding with Agro- net. Light irrigation.		
Sikkim Mandarin	Raising of seedlings in low cost poly house.			
Vegetables	<ul style="list-style-type: none"> <li>• Frost resistant varieties,</li> <li>• Nursery should be raised inside well covered structure and about 50 percent more seedlings should be raised.</li> </ul>	<ul style="list-style-type: none"> <li>• Planting of trees around field to act as wind break and replanting of damaged plants,</li> </ul>	Planting of trees around field to act as wind break	Early harvest of the crops at Physiological maturity.



		<ul style="list-style-type: none"> <li>• Application of K to enhance tenacity in plants,</li> <li>• Staking of plants</li> </ul>		
<b>Hailstorm</b>				
<b>Agriculture :</b>				
Maize	Introduction of short duration late sowing varieties. Resowing may be advocated . Crop/weather insurance.	Crop can be used as fodder. Availing Insurance.	Crop can be used as fodder.	
Soybean			Availing Insurance.	Availing Insurance.
<b>Horticulture :</b>				
Ginger	Adequate mulching. Crop/weather insurance.	Availing Insurance.	Availing Insurance.	Availing Insurance.
Vegetables	Introduction of short duration late sowing varieties. Resowing may be advocated . Crop/weather insurance	Availing Insurance.	Availing Insurance.	Availing Insurance.
Large Cardamom				
<b>Cyclone</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>			
Feed and fodder availability	Insurance. Encourage perennial fodder on bunds and waste land on community basis. Establishment of fodder banks. Silage – using excess fodder for silage.	Utilizing fodder from perennial trees and Fodder bank reserves. Utilizing fodder stored in silos . Transporting excess fodder from adjoining districts / State. Use of feed mixtures.	Availing Insurance.  Culling unproductive livestock .
Drinking water	Construction of Rain water harvesting structures and dug out sunken ponds.	Use of preserved water of the tanks and ponds for drinking purpose.	
Health and disease management	Veterinary preparedness with medicines and vaccines.	Conducting mass animal Health Camps and treating the affected animals during the Campaign.	Culling sick animals.
<b>Floods</b>	-NA-		
Feed and fodder availability			
Drinking water			
Health and disease			

management			
<b>Cyclone</b>			
Feed and fodder availability			
Drinking water			
Health and disease management			
<b>Heat wave and cold wave</b>			
Shelter/environment management	Plantation of Fodder trees and perennial fodder grasses on community basis. Permanent sheds at specific locations on community basis. Establishment of fodder banks.	Use of permanent sheds. Use of fodder of fodder banks and community pasture land. Strengthening of fodder banks.	Availing Insurance.
Health and disease management	Veterinary preparedness with medicines and vaccines.	Conducting mass animal Health Camps and treating the affected animals during the Campaign	Culling sick animals.

Based on forewarning wherever available.

### 2.5.2 Poultry :

	<b>Suggested contingency measures</b>	<b>Convergence/linkages with ongoing programs, if any</b>
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	<b>Before the event</b>	<b>During the event</b>	<b>After the event</b>	
<b>Drought</b>				
Shortage of feed ingredients	Insurance of birds. Establishment of feed reserve Bank.	Utilizing feeds from reserve banks.	Availing insurance. Strengthening feed Reserve Banks.	State poultry mission.
Drinking water	Emergency Veterinary preparedness with medicines ; vaccination to birds.	Heat Insulation of walls and proper ventilation, Campaign and Mass Vaccination.	Culling of affected birds.	State poultry mission.
Health and disease management	Emergency Veterinary preparedness with medicines ; vaccination to birds.	Campaign and Mass Vaccination.	Culling of affected birds. Availing insurance.	State poultry mission.
<b>Floods</b>				
Shortage of feed ingredients				
<b>Cyclone</b>	-NA-			
Shortage of feed ingredients				
<b>Heat wave and cold wave</b>				
Shelter/environment	Construction of permanent			

management	sheds.			
Health and disease management	Emergency Veterinary preparedness with medicines ; vaccination to birds.	Campaign and Mass Vaccination	Culling of affected birds. Availing insurance.	State poultry mission.

<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>	Not Applicable		
<b>2) Floods</b>	Not Applicable		
<b>3. Cyclone / Tsunami</b>	Not Applicable		
<b>4. Heat wave and cold wave</b>	Not Applicable		

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