

State: SIKKIM

Agriculture Contingency Plan for District: WEST SIKKIM

1.0 District Agriculture profile				
1.1	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)	Temperate humid ESR with shallow to medium deep loamy brown and red hills soils, low to medium AWC and 300 days		
	List all the districts or part thereof falling under the NARP Zone	East Sikkim (Gangtok)		
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude
		27° 06' 18" N-27° 40' 40" N	88° 01' 00" E- 88° 21' 40" E	2800 mt
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR Research Complex for NEH Region, Sikkim Center, Tadong, Gangtok NRC on Orchid, Pakyong ICRI Regional Research Station, Spices board, Tadong CAEPHT, CAU, Ranipool, Gangtok		
Mention the KVK located in the district	Gyaba, Gyalshing, West Sikkim 737111 Email: kvk_gyaba@yahoo.co.in , Phone/Fax: 03595251111			

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)	1963.7		1 st week of June	4 th week of September
	NE Monsoon(Oct-Dec)	199.6		3 rd week of October	1 st week of December
	Winter (Jan- March)	184.17		1 st week of January	4 th week of March
	Summer (Apr-May)	711		2 nd week of April	4 th week of May
	Annual	3058.47			

1.3	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)	116.6	16.6	83.473	0.847				3.392		12.239

1.4	Major Soils	Area ('000 ha)	Percent (%) of total
	Entisols		
	Molissols		
	Ultisols		
	Histosols		

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	16.6	178
	Area sown more than once	-	
	Gross cropped area	29.6	

1.6	Irrigation	Area (*000 ha)		
	Net irrigated area	2.054		
	Gross irrigated area			
	Rainfed area			
	Sources of Irrigation	Number	Area (*000 ha)	% of total irrigated area
	Canals			
	Tanks			
	Open wells			
	Bore wells			
	Lift irrigation schemes			
	Micro-irrigation channel	30		
	Other sources (please specify)			
	Catch water Drain	7		
	Government Channel	68		
	Private channel	75		
	Total Irrigated Area			
	Pump sets			
	No. of Tractors			
	Groundwater availability and use*	No. of blocks/ Tehsils	(%) area	Quality of water
	Over exploited			
Critical				
Semi- critical				
Safe				
Wastewater availability and use				
Ground water quality				
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

1.7 Area under major field crops & horticulture (as per latest figures) (2008-09)

1.7a	Major field crops cultivated	Area ('000 ha)							
		<i>Kharif</i>			<i>Rabi</i>			Summer	Grand total
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
Maize	-	12.88	12.88		-			12.88	
Rice	4.19		4.19					4.19	
Blackgram		1.40	1.40					1.40	
Fingermillet	-	0.78	-		-			0.78	
Buck Wheat					2.16	2.16		2.16	
Rape and Mustard					1.61	1.61		1.61	
Wheat				1.02	-	1.02		1.02	
Barley					0.50	0.50		0.50	
Other Pulses	0.31		0.31		-			0.31	
Source: Food Security and Agriculture Development Department, Government of Sikkim, Annual Report 2008-09									

1.7b	Horticulture crops – Fruits	Area ('000 ha) 2006-07		
		Total	Irrigated	Rainfed
	Orange	2.32		2.32
	Other Fruits	0.9	-	0.9
1.7c	Horticulture crops -	Total area ('000 ha)	Irrigated area	Rainfed area

	Vegetables			
	Rabi vegetables	0.96	0.96	-
	Kharif vegetables	0.91	0.91	-
	Vegetable (off-season)	0.87	0.39	
	Potato	3.26	-	3.26
	Other roots and tubers	0.12	-	0.12

Source: Horticulture and Cash crop Development Department, Government of Sikkim, Annual Report (2006-07)

1.7d	Medicinal and Aromatic crops	Total area ('000 ha)	Irrigated area	Rainfed area
1.7e	Plantation/ Spices crops	-	-	-
	Large Cardamom	2.39	2.39	-
	Ginger	1.98	-	1.98
	Turmeric	0.18	-	0.18
1.7f	Fodder crops	-	-	-
1.7g	Grazing land	-	-	-
1.7h	Sericulture etc	-	-	-

1.8	Livestock*		Male ('000)	Female ('000)	Total ('000)		
	Cattle :				45.339		
	1.Jersey		6.781	13.785			
	2.HF		0.013	0.033			
	3.SIRI		10.491	14.236			
	Buffalo		0.203	0.774	0.977		
	Yak		0.466	0.676	1.142		
	Pigs		8.952	4.334	13.286		
	Goat		20.225	25.007	45.232		
	Sheep:				1.917		
1.Banpala		0.729	1.165				
2.Graded		0.013	0.010				
Commercial dairy farms (Number)				-			
1.9	Poultry		No. of farms	Total No. of birds ('000)			
	Fowl			71.243			
	Poultry			14.588			
1.10	Fisheries						
	A. Capture						
	i) Reverine	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)	
		211					
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	
	B. Culture						
			Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)		
	i) Brackish water						
ii) Fresh water		7.5	3	0.035			
Seed production		3.1		6.5 lakhs fingerlings of carp and trout			

*18th Livestock Census (2007-08), Dept. of AH, LF&VS

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 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)	
Major Field crops (Crops identified based on total acreage)										
	Rice	7.262	1640					7.262	1640	
	Maize	21.76	1645					21.76	1645	
	Finger Millet	1.085	920					1.085	920	
	pulses	1.766	898					1.766	898	
	Wheat			2.296	1316			2.296	1316	
	Barley			0.384	1208			0.384	1208	
	Buckwheat			2.13	986			2.13	986	
	Rape and mustard			0.608	721			0.608	721	
	Soybean	0.476	822					0.476	822	

Major Horticultural crops (Crops identified based on total acreage) (2007-08)										
	Orange							3.43	1414	
	Passion							0.087	174	

fruits									
Other Fruits							1.45	1576	
Vegetables	4.579	4556	4.677	4493			9.246	4524	
Off-season vegetables							5.479	4715	
Potato							14.2428	4325	
Large Cardamom							0.575	230	
Ginger							11.235	5350	
Flowers							5.792		

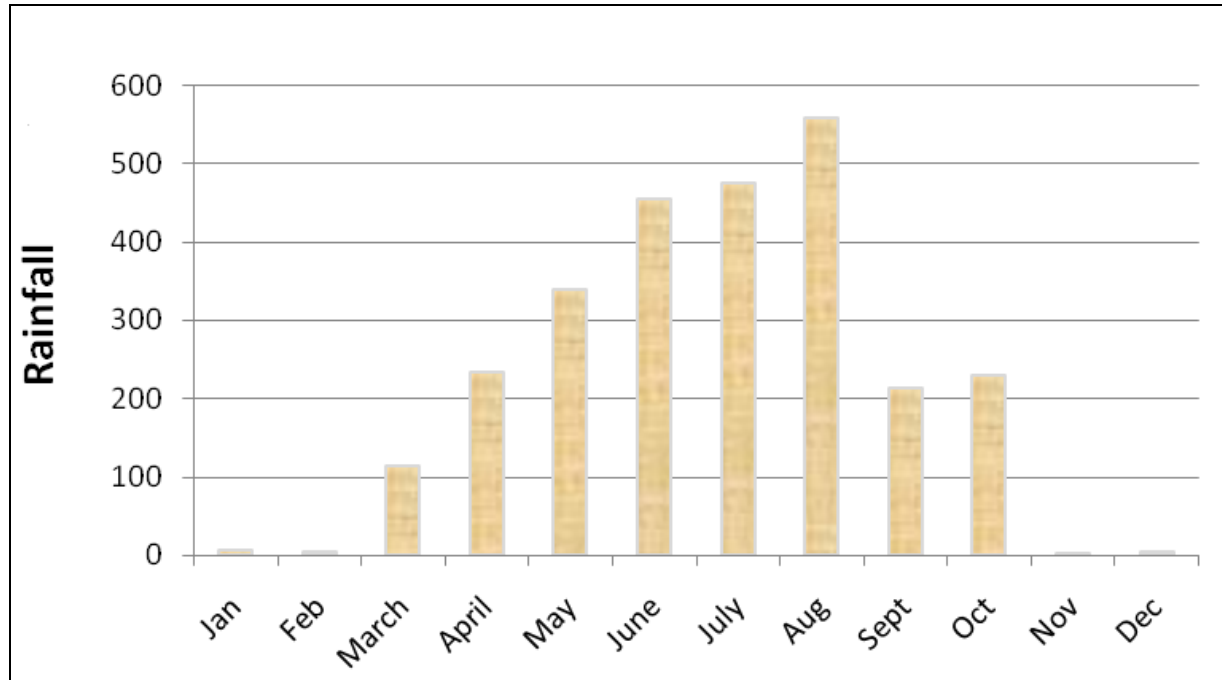
1.12	Sowing window for 5 major field crops	Maize	Rice	Blackgram	Wheat	Rape and Mustard
	Kharif- Rainfed	July to August		3 rd week of June to 1 st week of August		-
	Kharif-Irrigated	-	2 nd week of June to 2 nd week of July	-	-	-
	Rabi- Rainfed	-	-	-	September to October	September to October (dry field)
	Rabi-Irrigated	-	-	-	November to December	3 rd week of November to 2 nd week of December (Paddy field)
	Summer- Rainfed	2 nd week of February to 1 st week of April				

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			

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 II: Mean Annual Rainfall of West Sikkim (2009)



Annexure III : SOIL MAP OF WEST SIKKIM



Source: Department of Agriculture Govt. 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 3 rd week of June	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops –Mandarin orange, other fruits, Cardamom 7. Ginger 8. Turmeric	No change	Wider spacing (60 X 30 cm) for maize Thinning to retain one seedling at 30 cm Transplanting of rice should be completed by mid week of July In case of early withdrawl of rain, short duration varieties should be selected	Supply of seeds through NSC, State agriculture and horticulture department, SAUs

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 4 weeks 1 st week of July	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops –Mandarin orange, other fruits, Cardamom 7. Ginger 8. Turmeric	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL 30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL-206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang-1, DR-92, Pant Dhan 10 Local variety (Attay, Marsi etc.) Soybean: Ahilya-1, PK 327, PK 472, PK-1042, PK-1024, JS-80-21, JS-335, JS 75-46, PK 262, NRC 37, VL Soya 47.	Wider spacing (60 X 30 cm) of maize Thinning to retain one seedling at 30cm Intercultivation (in broadcasting) SRI/ ICM method of paddy cultivation (spacing 20x20 cm) In case of early withdrawl of rain, short duration varieties should be selected	Supply of seeds through NSC, State agriculture and horticulture department, ATMA, SAUs

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 6 weeks 1 st week of August	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL	Wider spacing (60 X 30) cm for maize Thinning to retain one seedling at 30 cm	Supply of seeds through NSC, State agriculture and

		<p>4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable</p> <p>5. Rice - Wheat/Barley/ Mustard/Vegetables</p> <p>6. Perennials crops –Mandarin orange, other fruits, Cardamom</p> <p>7. Ginger</p> <p>8. Turmeric</p>	<p>30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL-206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang-1, DR-92, Pant Dhan 10.</p> <p>Soybean: Ahilya-1, PK 327, PK 472, PK-1042, PK-1024, JS-80-21, JS-335, PK 262, NRC 37, VL Soya 47.</p>	<p>Intercropping of pulses with maize</p> <p>SRI/ ICM method of paddy cultivation (spacing 20x20 cm)</p> <p>Frequent intercultural operation for moisture conservation</p> <p>Crops should be mulched with green leaves</p> <p>Short duration crops (80-90 days) should be selected</p>	<p>horticulture department, ATMA, SAUs</p>
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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.	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops –Mandarin orange/ other fruits, cardamom 7. Ginger 8. Turmeric	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL 30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL-206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang-1, DR-92, Pant Dhan 10.	Furrow application of FYM Mulching with green/dry leaves & grasses Wider spacing (60 X 30cm) for maize Frequent intercultural operation for moisture conservation	Supply of seeds through State agriculture and horticulture department ,NSC, ATMA, SAUs

Condition	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (Long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					

At vegetative stage	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops – Mandarin orange/ other fruits/ cardamom 7. Ginger 8. Turmeric	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL 30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL-206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang-1, DR-92, Pant Dhan 10. Soybean: Ahilya-1, PK 327, PK 472, PK-1042, PK-1024, JS-80-21, JS-335, JS 75-46, PK 262, NRC 37, VL Soya 47.	Furrow application of FYM Mulching with green/dry leaves & grasses Wider spacing (60 X 30) for maize In-situ soil moisture conservation measures Frequent intercultural operation for moisture conservation	Supply of seeds through NSC, ATMA, SAUs
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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
Mid season drought (long dry spell)					

At flowering/ fruiting stage	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops –Mandarin orange/ other fruits/ cardamom 7. Ginger 8. Turmeric	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL 30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL-206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang- 1, DR-92, Pant Dhan 10. Soybean: Ahilya-1, PK 327, PK 472, PK- 1042, PK-1024, JS-80-21, JS-335, JS 75- 46, PK 262, NRC 37, VL Soya 47	Furrow application of FYM Mulching with green/dry leaves & grasses Wider spacing (60 X 30 cm) for maize In-situ soil moisture conservation measures Frequent intercultural operation for moisture conservation	Supply of seeds through NSC, ATMA, SAUs
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Condition (Terminal drought)	Major Farming situation	Normal Crop / Cropping system	Suggested Contingency measures		
			Crop management	Rabi Crop planning	Remarks on Implementation
(Early withdrawal of monsoon)	Rainfed	Maize based cropping system : 1. Maize - rice/soybean - potato/vegetables/ wheat/mustard 2. Maize - Maize + French Beans (Local)/vegetables 3. Ginger + Maize 4. Maize - Finger Millet/ Rice Bean (Relay) + vegetable 5. Rice - Wheat/Barley/ Mustard/Vegetables 6. Perennials crops –Mandarin orange/ other fruits/ cardamom 7. Ginger 8. Turmeric	Maize: HQPM-I, RCM 1- 1, RCM 1-2, RCM 1-3, Madhuri, Vivek Maize Hybrid 15, Vivek Hybrid 9, Vivek Maize Hybrid 23, Vivek Sankul Makka 11. Rice: Bali, Joli, Kalinga-3, Aditya, Heera, Jawahar, BG 367-7, Diwani, VL 4930, VL 30218, PD-10, VL Dhan 61, VL-62, VL Dhan 65, VL Dhan 86, VL Dhan 209, VL- 206, KRH-2, Krishnabhog, Satyaranjan, Shah Sarang-1, DR-92, Pant Dhan 10. Soybean: Ahilya-1, PK 327, PK 472, PK- 1042, PK-1024, JS-80-21, JS-335, JS 75-46, PK 262, NRC 37, VL Soya 47.	In-situ soil moisture conservation measures Furrow application of FYM Mulching with green/dry leaves & grasses Wider spacing (60 X 30 cm) for maize Frequent intercultural operation for moisture conservation	Supply of seeds through NSC, ATMA, SAUs

2.1.2 Drought - Irrigated situation

Condition	Suggested Contingency measures			
	Major Farming situation	Normal Crop/cropping system	Change in crop/cropping system	Agronomic measures
Delayed release of water in canals due to low rainfall	Not Applicable			
Limited release of water in canals due to low rainfall	Not Applicable			

Non release of water in canals under delayed onset of monsoon in catchment	Not Applicable			
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	Not Applicable			
Insufficient groundwater recharge due to low rainfall	Not Applicable			

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
Continuous high rainfall in a short span leading to water logging				
Field crops				
Maize	Ridge planting, Provide drainage	Provide drainage	Drain out excessive water, Harvesting at physiological maturity stage	Dry and store in air tight condition
Rice	Drain out excessive water	Drain out excessive water		
Wheat				
Finger-Millet				
Blackgram	Ridge planting, Provide drainage	Provide drainage		
Rapeseed & Mustard				
Soybean				
Horticultural crops				
Mandarin	Provide drainage	Application of PGRs, (Auxin) and boron to enhance fruit set	Drain out excessive water and harvest the crop at maturity.	
Other fruits				
<i>Rabi</i> vegetables	Ridge planting, Provide drainage	Provide drainage	Drain out excessive water and harvest the crop at optimum stage.	Store at optimum temperature and packed properly
<i>Khariif</i> vegetables				
Off season vegetables				
Cardamom	Provide drainage	Optimize population of pollinator	Drain out excessive water and harvest the crop at physiological maturity stage.	Dry and store in air tight condition
Ginger	Ridge planting, Provide drainage	Provide drainage		Store at optimum temperature and packed properly
Turmeric				
Other spices				

Heavy rainfall with high speed winds in a short	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
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span				
Field crops				
Maize	Ridge planting, Provide drainage	Provide drainage	Drain out excessive water, Harvesting at physiological maturity stage	Dry and store in air tight condition
Rice	Drain out excessive water	Drain out excessive water		
Wheat				
Finger millet				
Blackgram	Ridge planting, Provide drainage	Provide drainage	Drain out excessive water, Harvesting at physiological maturity stage	Dry and store in air tight condition
Rapeseed & Mustard				
Soybean				
Horticultural crops				
Mandarin	Provide drainage	Application of PGRs, (Auxin) and boron to enhance fruit set	Drain out excess water and harvest the crop at maturity.	
Other fruits				
Rabi vegetables	Ridge planting, Provide drainage	Provide drainage	Drain out excess water and harvest the crop at optimum stage.	Store at optimum temperature and packed properly
Kharif vegetables				
Off season vegetables				
Cardamom	Provide drainage	Optimize population of pollinator	Drain out excess water and harvest the crop at physiological maturity stage.	Dry and store in air tight condition
Ginger	Ridge planting, Provide drainage	Provide drainage		
Turmeric				
Other spices				
				Store at optimum temperature and packed properly

Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Field crops				
Maize	Disease resistant varieties, Need based plant protection IPDM	Need based plant protection IPDM		Safe storage against storage pest and diseases
Rice				
Wheat				
Fingermillet				

Blackgram				
Rapeseed & Mustard				
Soybean				
Horticultural crops				
Mandarin	Need based plant protection IPDM	Need based plant protection IPDM		Safe storage against storage pest and diseases
Other fruits				
<i>Rabi</i> vegetables	<ul style="list-style-type: none"> • Disease resistant varieties, • Need based plant protection IPDM, • Crop rotation 	<ul style="list-style-type: none"> • Bio control agents, • Need based plant protection IPDM 	Harvest the crops at maturity stage	Safe storage against storage pest and diseases
<i>Kharif</i> vegetables				
Off season vegetables				
Cardamom				
Ginger				
Turmeric				
Other spices				

2.3 Floods:

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

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

Extreme event type	Suggested contingency measure			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave				
Horticulture				

Orange	Shade net			
Cold wave				
Mustard	Nursery should be raised inside well covered structure and about 50 percent more seedlings should be raised.	<ul style="list-style-type: none"> Planting of trees around field to act as wind break and replanting of damaged plants Application of K to enhance tenacity in plants Staking of plants 	Planting of trees around field to act as wind break	Early harvest the crops
Maize				
wheat				
Rice				
Rapeseed				
Soybean				
Horticulture	Nursery should be raised inside well covered structure and about 50 percent more seedlings should be raised.	<ul style="list-style-type: none"> Planting of trees around field to act as wind break and replanting of damaged plants, Application of K to enhance tenacity in plants, Staking of plants 	Planting of trees around field to act as wind break	Early harvest the crops
Cardamom				
Orange				
Potato				
Vegetables				
Frost				
Mustard	Provide irrigation, grow frost resistant variety	Provide irrigation		
Pea	Provide irrigation, grow frost resistant variety	Provide irrigation		
wheat	Provide irrigation, grow frost resistant variety	Provide irrigation		
Horticulture				
Cardamom	Protected by shade net and Provide irrigation	Provide drainage		
Orange	Protected by shade net and Provide irrigation	Irrigation, smoke around the orchard	Smoke around the orchard	
Potato	Sprinkler irrigation	Provide drainage		

Vegetables	Protected in poly tunnel or poly house or shade house	Provide drainage		
Hailstorm	Not Applicable			
Horticulture				
vegetable	Use Hailstrom net			
orange	Use hailstorm net in nursery			
Cardamom	Use hailstorm net in nursery			
Cyclone	Not Applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	Insurance Encourage perennial fodder on bunds and waste land Silage – using excess fodder for silage	Utilizing fodder from perennial trees Utilizing fodder stored in silos Transporting excess fodder from adjoining districts Use of feed mixtures	Availing Insurance
Drinking water	Preserving water in the tank for drinking purpose Water harvesting in Jalkund Structure	Using preserved water in the tanks for drinking wherever ground water resources are available priority for drinking purpose	
Health and disease management	Veterinary preparedness with medicines and vaccines	Conducting mass animal Health Camps and treating the affected once in Campaign	Culling sick animals

Floods	Not Applicable		
Cyclone	Not Applicable		
Heat wave and cold wave			
Shelter/environment management	Awareness to the farmers about the management during the cold wave	Animal reared in open to the shifted to the shelter and the shelter are to be made warm by preventing the cold waves for eg. Using gunny bags etc.	
Health and disease management	Awareness to the farmers about the management during the cold wave		

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought	Insurance	Utilizing from feed serve banks	Availing insurance Strengthening feed Reserve Banks	
Shortage of feed ingredients				
Drinking water	Emergency Veterinary preparedness with medicines vaccination to birds	Campaign and Mass Vaccination	Culling affected birds	
Health and disease management				

Floods	Not Applicable			
Cyclone	Not Applicable			
Heat wave and cold wave				
Shelter/environment management	Heat insulation in shelter/ housing management			
Health and disease management				

^a based on forewarning wherever available

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event ^a	During the event	After the event
1) Drought			
A. Capture			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Arrange for additional source of water Early harvest of the fish Insurance	Harvesting of the fish Digging the trenches in the mud tank Aeration	Avail insurance Seeding of fresh lot of fingerlings
(ii) Impact of salt load build up in ponds / change in water quality			
2) Floods	Not Applicable		
3. Cyclone / Tsunami	Not Applicable		
4. Heat wave and cold wave			
A. Capture			

B. Aquaculture			
(i) Changes in pond environment (water quality)	Arrangement of the plastic protection over the pond Water of the pond with fresh water Insurance	Plastic cover over the fish pond	Avail insurance
(ii) Health and Disease management		Salt Bath	

^a based on forewarning wherever available