Agricultural Contingency Plan of Kolasib District: Mizoram

KRISHI VIGYAN KENDRA (KVK): KOLASIB DISTRICT
KOLASIB: MIZORAM

State: MIZORAM

Agricultural Contingency Plan for District: KOLASIB DISTRICT

1.0 District Agriculture profile*				
1.1	**Agro-Climatic/Ecological Zone**			
	Agro Ecological Sub Region (ICAR)	Eastern Himalayas Warm Per humid Eco-region		
	Agro-Climatic Zone (Planning Commission)	Eastern Himalayan Region (II)		
	Agro Climatic Zone (NARP)	Humid subtropical hill Zone		
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	All District of Mizoram		
	Geographic coordinates of district headquarters	**Latitude**	**Longitude**	**Altitude**
		23° - 5′ to 24° - 35′ N	92° - 3′ to 93° E	36 - 900m msl
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	ICAR Research Complex for NEH Region, Mizoram Centre, Kolasib-796081, Mizoram		
	Mention the KVK located in the district with full address	Krishi Vigyan Kendra, Kolasib District, Kolasib - 796081, Mizoram		
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Automatic Weather Station installed at KVK Kolasib District Complex, Kolasib by ISRO		

***Indicate source of data while furnishing information at different places in the district profile**

Source: Statistical Abstract, Department of Agriculture (Crop Husbandry), Mizoram, 2011-12

Rainfall data (Average of five year 2007-2011)

1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (June- September):	1877.36	78	1st week of June	Last week of September
	NE Monsoon(October- December):	93.83	07	3rdweek of October	2nd week of December
	Winter (January- February)	13.882	03	1st week of Jan	2nd week of Feb
	Summer (March-May)	502.76	27	4thweek of March	2ndweek of May
	Annual	2384.44	115	-	-

Source: Statistical Abstract, Department of Agriculture (Crop Husbandry), Mizoram, 2011-12

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)	138.251	12.788	87.612	11.180	0.200	0.560	2.663	1.100	7.665	10.239

Source: Statistical Abstract, Department of Agriculture (Crop Husbandry), Mizoram, 2012-13; Comprehensive District Agriculture Plan of Kolasib District for RKVY

1. 4	Major Soils (common names like red sandy loam deep soils(etc.,)*	Area ('000 ha)**	Percent (%) of total geographical area
	Alluvial soil	18.622	13.47
	Sandy soil	25.203	18.23
	Laterite soil	66.872	48.37
	Others (specify):	86.393	62.49
1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	12.788	138.6
	Area sown more than once	0.570	
	Gross cropped area	17.728	

Source: Statistical Abstract, Department of Agriculture (Crop Husbandry), Mizoram, 2012-13

1.6	**Irrigation**	Area (‘000 ha)		
	Net irrigated area	4.141		
	Gross irrigated area	4.141		
	Rainfed area	13.578		
	Sources of Irrigation	Number	Area (‘000 ha)	Percentage of total irrigated area
	Canals	-	-	Area may be indicated
	Tanks	86	-	
	Open wells	-	-	
	Bore wells	43	-	
	Lift irrigation schemes	-	-	
	Micro-irrigation	-	-	
	Other sources (please specify) River Perennial stream Springs (Tuikhur) Farm pond	 15 148 212 2350	 1.14	
	Total Irrigated Area			
	Pump sets			
	No. of Tractors			
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	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 (year 2012-13)

1.7	Major field crops cultivated	Area ('000 ha)							
		Kharif			*Rabi*				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Paddy	4.141WRC	2.020	6.161	-	-	-	-	6.161
	Maize	-	0.766	0.766	-	0.119	0.119	-	0.885
	Tapioca	-	0.026	0.026	-	-	-	-	0.026
	Rice bean	-	0.052	0.052	-	-	-	-	0.052
	Field Pea	-	-	-	-	0.084	0.084	-	0.084
	Cow pea	-	0.124	0.124	-	0.035	0.035	-	0.159
	French bean	-	-	-	-	0.157	0.157	-	0.157
	Soyabean	-	0.130	0.130	-	-	-	-	0.130
	Sesamum	-	0.083	0.083	-	-	-	-	0.083
	Rapeseed & Mustard	-	-	-	-	0.234	0.234	-	0.234
	Cotton		0.007	0.007	-	-	-	-	0.007
	Tobacco	-	-	-	-	-	-	-	-
	Sugarcane	-	0.171	0.171	-	-	-	-	0.171
	Potato	-	0.115	0.115	-	-	-	-	0.115

	Horticulture crops - Fruits	**Area ('000 ha)**			
		Total		**Irrigated**	**Rainfed**
	Banana	0.133		-	0.133
	Khasi mandarin	0.163		-	0.163
	Hatkora	0.116		-	0.116
	Assam Lemon	0.090		-	0.090
	Pineapple	0.0647		-	0.0647
	Mango	0.165		-	0.165
	Others (specify)				
	Horticulture crops - Vegetables	Total		Irrigated	**Rainfed**
	Vegetable *Rabi*	0.037		0.037	-
	Vegetable *Kharif*	0.026		-	0.026
	Medicinal and Aromatic/Spice crops	Total		Irrigated	**Rainfed**
	1. Ginger	0.209		-	**0.209**
	2. Turmeric	0.0116		-	**0.0116**
	3. Garlic	0.002		0.002	**-**
	Plantation crops	Total		Irrigated	**Rainfed**
	Arecanut	0.370		-	0.370
	Jatropha	-		-	-
	Oil palm*	1.039		0.027	1.012
	Other plantation crops (Betel vine, Coconut, Tung etc.)	B			
		NB/NP			
	Fodder crops	**Total**		**Irrigated**	**Rainfed**
	NA	NA		NA	NA

	Grazing land, reserve areas etc			
	Availability of unconventional feeds/by products eg., breweries waste, food processing, fermented feeds bamboo shoots, fish etc			
	Sericulture etc **Other agro enterprises (mushroom cultivation etc specify)**			
	Others (specify)			

1.8	**Livestock**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Indigenous cattle	-	-	4.473
	Improved / Crossbred cattle	-	-	1.578
	Buffaloes (local low yielding)	-	-	0.102
	Improved Buffaloes	-	-	
	Goat	-	-	2.625
	Sheep	-	-	0.080
	Pig	-	-	25.132
	Mithun	-	-	0.001
	Yak	-	-	-
	Others (Horse, mule, donkey etc., specify) 1. Dog 2. Rabbit	 - -	 - -	 1.936 0.0133
	Commercial dairy farms (Number)			01nos.
1.9	**Poultry**	**No. of farms**	**Total No. of birds ('000)**	
	Commercial	-	21.107	
	Backyard	-	74.820	

1.10	**Fisheries** (Data source: Chief Planning Officer)						
	A. Capture: NA						
	i) Marine (Data Source: Fisheries Department)	**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)	
		NA	**NA**	**NA**	**NA**	**NA**	**NA**
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**	
		2350		-		-	
	B. Culture						
				Water Spread Area (ha)		**Yield (t/ha)**	**Production ('000 tons)**
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)			**NA**		**NA**	**NA**
	ii) **Fresh water** (Data Source: Fisheries Department) + Paddy cum fish culture			1140		0.749	0.854
	Others						

1.11 Production and Productivity of major crops (Average of last 5 years: 2008-09)

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 to be identified based on total acreage)										
	Paddy	9.923	1618.61					9.923	1618.61	
	Maize	0.952	1242.49	0.175	1470.58	-	-	1.127	1273.15	
	Sesame	0.071	855.42					0.071	855.42	
	Cowpea	0.157	1266.12	0.067	1914.28			0.224	1408.80	
	French bean	-	-	0.163	1038.21	-	-	0.163	1038.21	-
Major Horticultural crops (Crops to be identified based on total acreage)										
	Areca nut							1.554	4200.00	
	Turmeric							0.0639	10110.0	
	Khasi mandarin							2.737	16785.57	
	Banana							0.938	7010.00	
	Bird eye chilli	0.050	5000.00					0.050	5000.00	
	Ginger							1.517	7260.00	

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	**Paddy**	**Maize**	**Sesame**	**Cowpea**	**French bean**
	Kharif- Rainfed	2nd week of May – 1st Week of July	April- 4thweek of May	1stWeek of May to 4th Week of June	2nd week of April- 2nd week of May	2nd week of April to1st week June
	Kharif-Irrigated	-do-				
	Rabi- Rainfed		3rd week of September to 2nd Week of October		November	October – November
	Rabi-Irrigated					November

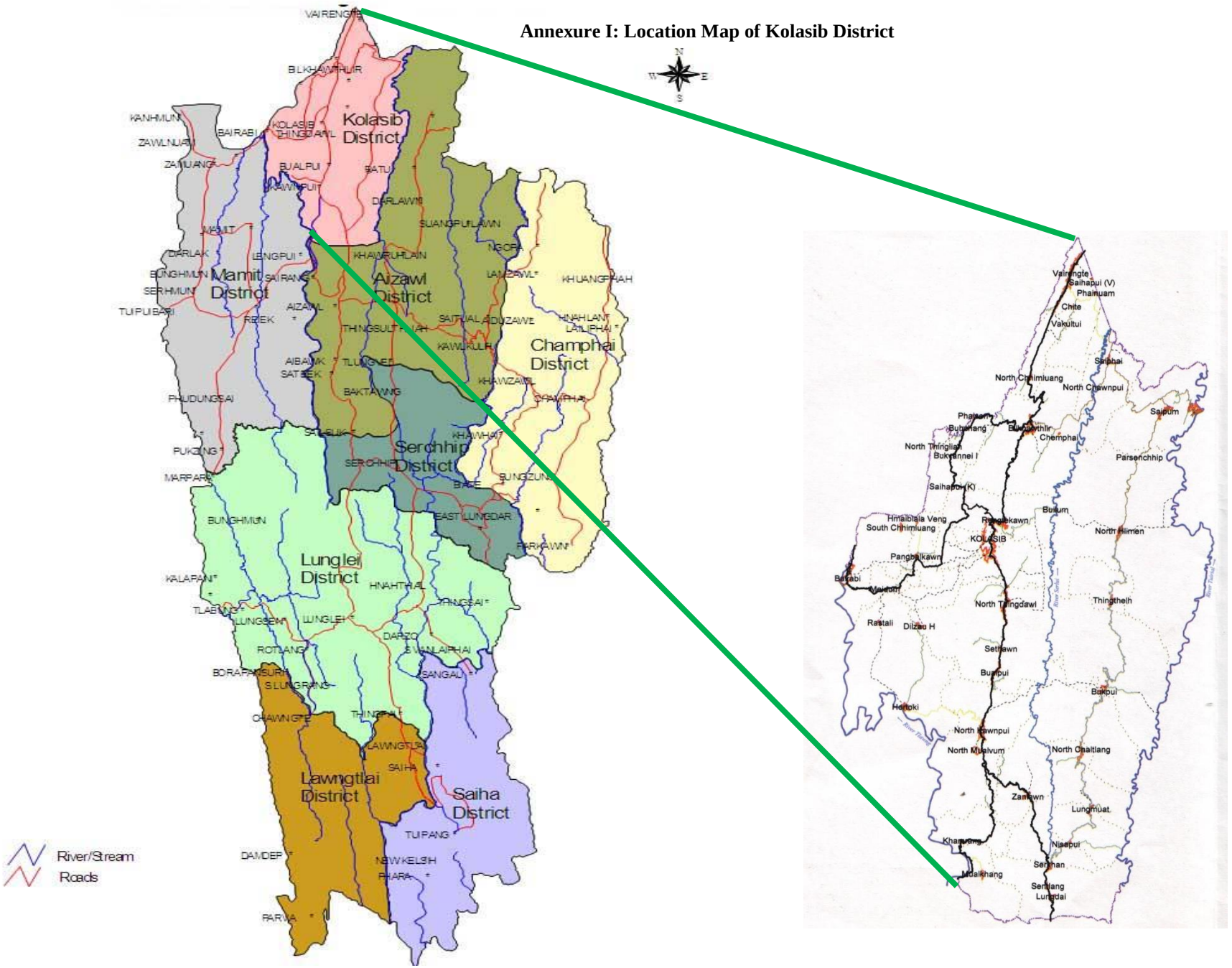
	Summer-irrigated					
	Summer-rainfed					

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular***	**Occasional**	**None**
	Drought		√	
	Flood (Flush)		√	
	Cyclone (Storm)		√	
	Hail storm		√	
	Heat wave			√
	Cold wave			√
	Frost			√
	Sea water intrusion			√
	Snowfall			√
	Pests and disease outbreak (Blast. Leaf folder, Stem borer)		√	
	Landslides		√	

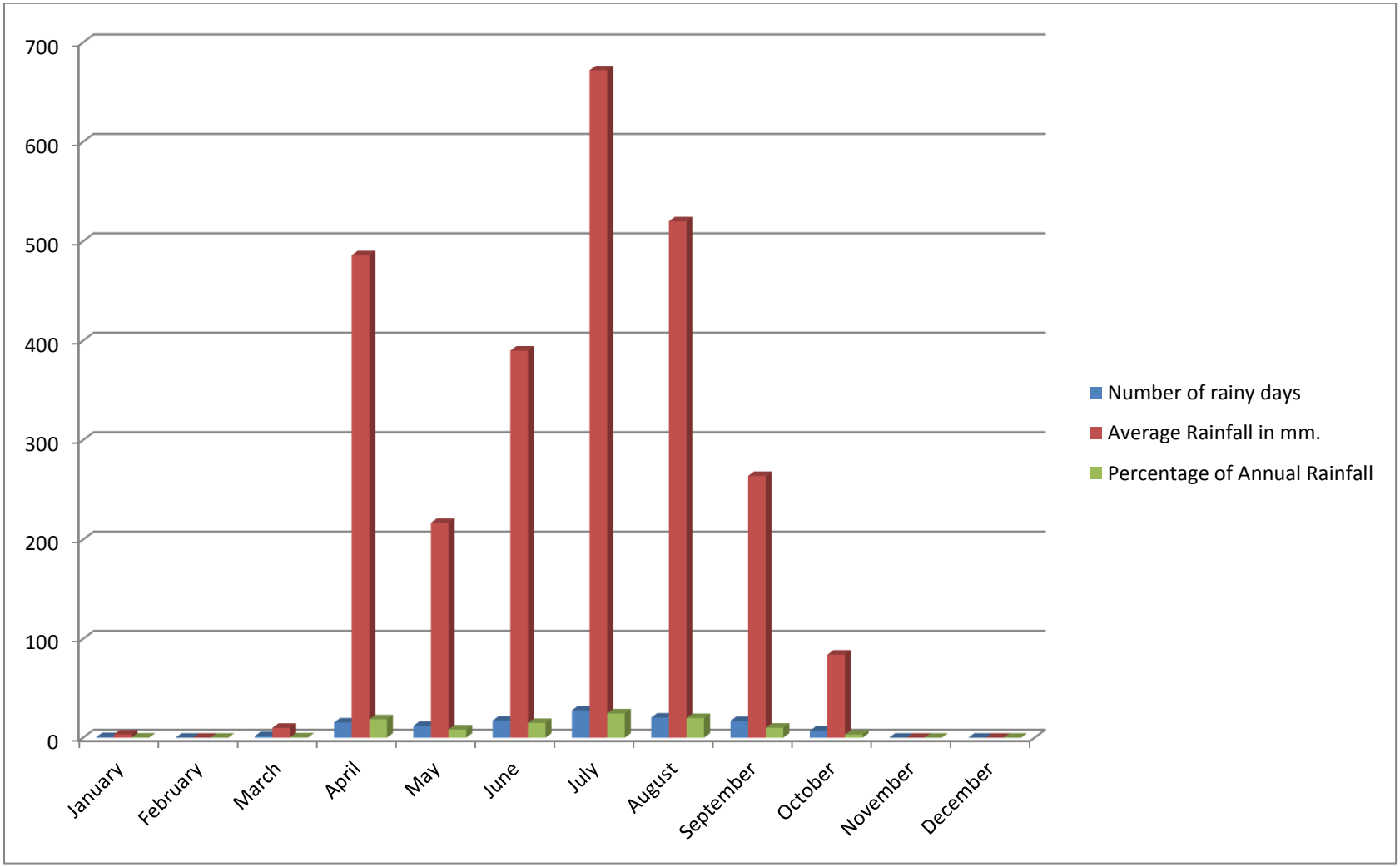
*When contingency occurs in six out of 10 years

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 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

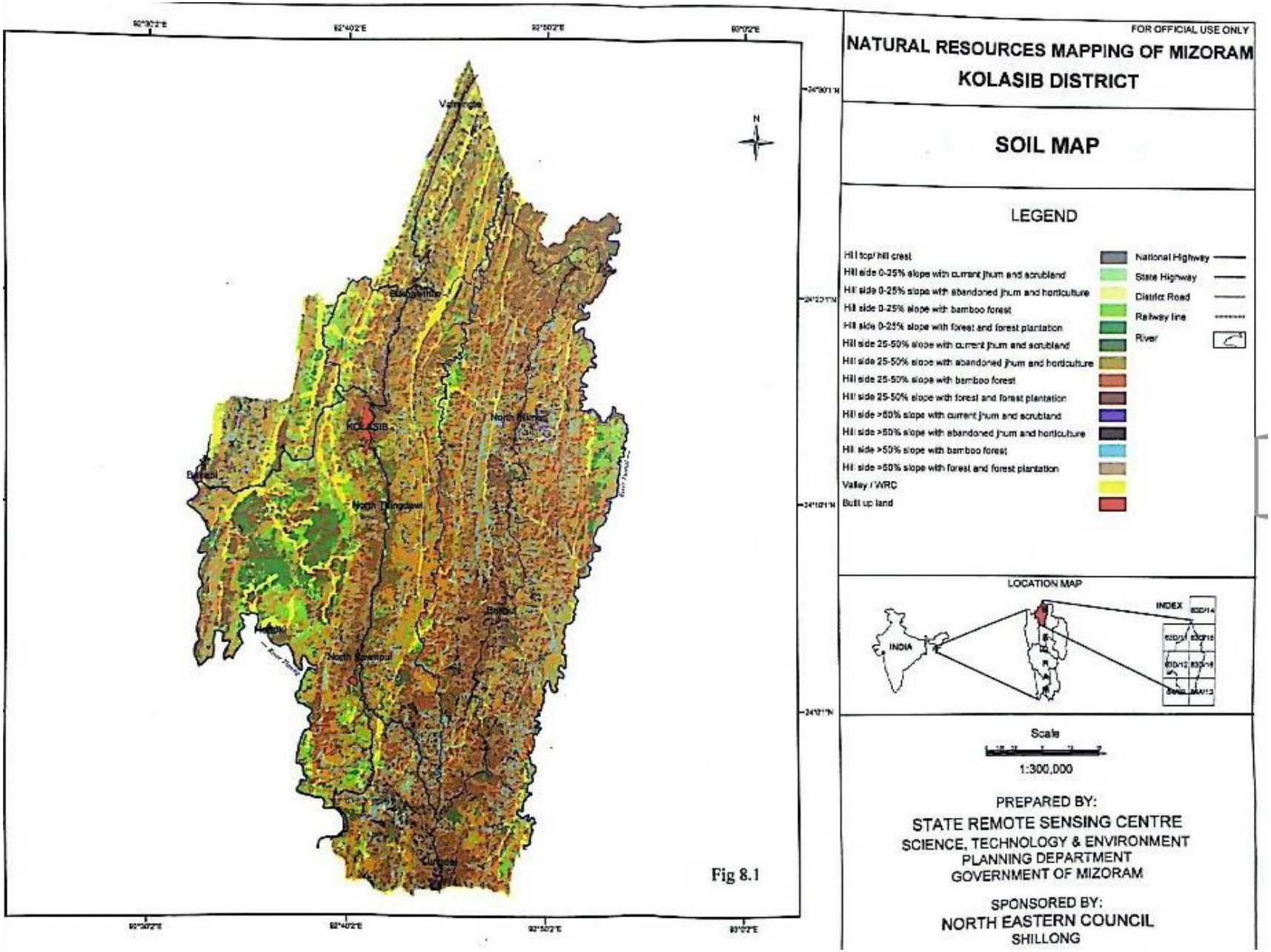
Annexure I: Location Map of Kolasib District



Annexure 2: Average Mean annual rainfall of Kolasib District



Annexure 3: Soil Map of Kolasib District



2.0 Strategies for weather related contingencies

2.1 Drought:

2.1.1 Rainfed situation

2.1.1.1 Premonsoon (Last week of March)

Condition			**Suggested Contingency measures**		
Early season drought (delayed onset)	**Major Farming situation[a]**	**Normal Crop/ Cropping system[b]**	**Change in crop/cropping system[c] including variety**	**Agronomic measures[d]**	**Remarks on Implementation[e]**
Delay by 2 weeks (2nd week of April)	Early rice	Buhsakei, Idaw, Tai (Local)	No change	-	-
Delay by 4 weeks (4th week of April)	Early rice	Buhsakei, Idaw, Tai (Local)	No change	-	-
Delay by 6 weeks (6th week of)	NA				
Delay by 8 weeks (Specify month)	NA				

2.1.1.2 Southwest monsoon (First week of June)

Condition	***Suggested Contingency measures***				
Early season drought (delayed onset of monsoon)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures including soil and water conservation, life saving irrigation, nutrient sprays, etc.**	**Remarks on Implement ation**
Delay by 2 weeks (3rd week of June)	1) Rainfed Upland /Jhum with Rich Alluvial Soil	1) Paddy+ Ginger +Bird's eye Chilli,	No change	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	Supply of seeds through State Dept. ATMAs & KVKs
		2) Ginger (sole crop)	No change	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
		3) Bird's eye chilli (sole crops0	No change	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
		4) Maize (sole crops)	No change	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
		Horticulture crops: Cabbage French Bean Cow pea Brinjal	No change	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	

	2)Terrace / mid land with no irrigation facility with rich alluvial soil	1.Rice 2. Maize 3. Soyabean	RCM7, CAUR2, Bhalum 3,4 RCM 75, HQPM5 RCS1-1, RCS1-9, RCS1-10	Normal sowing, Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	Promote optimum water supply system, WHS
		Horticulture crops: Passion Fruit Pineapple Banana M. Orange	No change	Mulching with organic materials, Earthing up, half moon terraces. Bunding, check dams, promote WHS	
	3) Rainfed Low land	Rice	Paddy var. RCM-10, RCM-11, Local, CAU R1,	Deep ploughings (3 times), application of fertilizers & manures, Late sowing	
Delay by 4 weeks (1st week of July)	1) Upland /Jhum Rich Alluvial Soil	Rice based Rice + Maize + Cucumber	Rice : local short duration var. Idaw, tai, Buhsakei, CAU R1 Maize: Local sticky maize, HQPM , RCM- 75, Cucumber: Var. Local, Pusa Sanyog, Pant Khiraa- 1 Local vegs	Late sowing, Sowing by dibbling, Interculture operations, Mulching Earthing up, Log/ bamboo bunding to conserve run –off water & top soil, Spraying of 0.2 % Urea spraying of 0.2 % Potash	
		Ginger	Local var. Thingpui, Thinglaidum, & Thingria,	Mulching with organic materials, Earthing up, Spraying of 0.2 % Urea spraying of 0.2 % Potash	
		Bird's eye chilli	Local variety	Mulching,Spraying of 0.2 % Urea spraying of 0.2 % Potash	
		Horticulture crops Cabbage French Bean Cow pea Brinjal	1. Cabbage var. Ryozeki, Indam 1299, Improved Bahar, Rocky 2. French Bean var. Local, Arka Anoop, Arka Komal, Arka Sharat 3. Cow pea var. Local, Arka Garima Pusa Kumal, PKM-1 4. Brinjal var. Arka Kesav, Arka Neidhi, Arka Anand, Pusa Kranti	Logwood bunding on sloppy land, Sowing can be delayed with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	

	2) Terrace / mid land with no irrigation facility	Rice	Early varieties as above	Late sowing, Application of slaked lime & organic manure, Mulching with available bio-mass, Frequent inter-culture operations, Spraying of 0.2 % Urea spraying of 0.2 % Potash	
		Perennial crops Pineapple, Banan, M. Orange	No change	Mulching, Application of slaked lime & organic manure	
	3) Low land with irrigation facility	Rice	Short duration varieties by system of rice intensification	Deep ploughing Application of organic manure Late sowing	
	4) Low land without irrigation facility	Rice	Short duration varieties by system of rice intensification	Deep ploughing Application of organic manure Late sowing	
		Lowland Paddy	Nursery preparation	Dry & Wet bed method	
Delay by 6 weeks (July 3rd week)		NA	NA	NA	NA
Delay by 8 weeks (August 1st week)		NA	NA	NA	NA

Condition			*Suggested Contingency measures*		
Early season drought (Normal onset)	**Major Farming situation[a]**	**Normal Crop/cropping system**	**Crop management[c]**	**Soil nutrient &moisture conservation measure**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination /crop stand etc.	1) Up land/ Jhum Rich Alluvial soil	1. Rice based 2. Ginger 3. Bird's eye chilli	Weeding Gap filling Plant protection measures Use of drought resistant variety local var	Wood log/ bamboo bunding Mulching Earthing up, Optimum irigation technique	To create awareness on moisture management technique.
	2) Terrace/ Mid land Red Alluvial soil	1. Rice 2. Fruit crops	Intercultural operations Gap filling Plant protection measures	Aplication of organic manure, Mulching with biomass, Earthing up Half moon terracing for M. Orange	
	3) Low land with irrigation facility Clayey loam	Rice	Weeding Gap filling Plant protection measures	SRI	
	4) Low land without irrigation facility Sandy loam	Rice	Weeding Gap filling Plant protection measures	SRI	

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 measures**	**Remarks on Implementation**
At vegetative stage	1) **Farming situation:** Up land/ Jhum Rich Alluvial soil	1. Rice based	Weeding, mulching with locally available organic materials Plant protection measures	Efficient use of store water for life saving irrigation.	Create awareness on soil conservation measures
		2. Ginger	Weeding, mulching with locally available organic materials PP measures	Mulching with locally available organic materials Earthing up	

		3. Bird's eye chilli	Weeding , mulching with locally available organic material Thinning PP Measures	Mulching with bio mass Earthing up	
	2) Terrace/ Mid land Red Alluvial soil	Rice	Weeding PP Measures Dripping & Wetting method	Earthing up up Mulching with locally available organic materials	
		Fruit crops – Pineapple, Banana, M. Orange	Weeding PP Measures Dripping & Wetting method	Earthing up up, Mulching with available biomass, use of cover crops. Half /fullmoon terrace.	
	3) Low land with irrigation facility Clayey loam	Rice	Need based PP measures	Wetting & drying	
	4) Low land without irrigation facility Sandy loam	Rice	PP measures	Wetting & drying	

Condition			***Suggested Contingency measures***		
Mid season drought (long dry spell)	**Major Farming situation[a]**	**Normal Crop/cropping system[b]**	**Crop management**	**Soil nutrient and moisture conservation measures.**	**Remarks on Implementation**
At flowering/ fruiting stage	1) Up land/ Jhum Rich Alluvial soil	1. Rice based	Tolerant/ resistant varieties Plant protection measures	Earthing up, mulching with locally available materials	**NA**
		2. Ginger	Weeding PP measures	Mulching with bio mass Earthing up	
		3. Bird's eye chilli	Weeding PP Measures	Mulching with bio mass Earthing up	
	2) Farming situation: Terrace/ Mid land Red Alluvial soil	Rice	PP Measures Dripping & Wetting method	Earthing up Mulching with available biomass	

		Fruit crops – Pineapple, Banana, M. Orange	PP Measures Dripping & Wetting method	Earthing up Mulching with available biomass	
	3) Low land with irrigation facility Clayey loam	Rice	Need based PP measures	Wetting & drying	
	4) Low land without irrigation facility Sandy loam	Rice	PP measures	Wetting & drying	
Condition			**Suggested Contingency measures**		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
	1) **Farming situation:** Up land/ Jhum Rich Alluvial soil	1. Rice based	Plant protection measures	Cole crops, tomato, leafy mustard, French bean, Onion, garlic,	Contour trench formation.
		2. Ginger	Weeding PP measures	NA	
		3. Bird's eye chilli	Weeding PP Measures	NA	
	2) Farming situation: Terrace/ Mid land Red Alluvial soil	Rice	PP Measures Dripping & Wetting method	French bean, soybean, groundnut, maize,	
		Fruit crops – Pineapple, Banana, M. Orange	PP Measures Dripping & Wetting method	NA	
	3) Low land with irrigation facility Clayey loam	Rice	Need based PP measures	NA	
	4) Low land without irrigation facility sandy loam	Rice	PP measures	Cole crops, French bean, soybean, onion, garlic, field pea, brinjal, tomato, okra .	

2.1.2 Drought - Irrigated situation: NA

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Delayed release of water in canals due to low rainfall		Cropping system 1:	**NA**	**NA**	**NA**

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Limited release of water in canals due to low rainfall		Cropping system 1:	**NA**	**NA**	**NA**

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Non release of water in canals under delayed onset of monsoon in catchment		Cropping system 1:	**NA**	**NA**	**NA**
	2) Farming situation:	Cropping system 1:	**NA**	**NA**	**NA**

Condition			**Suggested Contingency measures**		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Lack of inflows into tanks due to insufficient		Cropping system 1:	**NA**	**NA**	**NA**

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
/delayed onset of monsoon					

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system[h]**	**Agronomic measures[i]**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall		Cropping system 1:	**NA**	**NA**	**NA**
Insufficiency of surface water for irrigation					

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

Condition	Suggested contingency measure			
Continuous high rainfall in a short span leading to water logging	**Vegetative stage**	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Paddy	Provision for drainage in case of flooded/submerged situation.	Drain out excess water.	Harvest at physiological maturity	Provision for storage house. Provision for Silpaulin.
Maize	Sowing in bunds/raised bed and provision of drainage to avoid water logging.	Sowing in bunds/raised bed and provision of drainage to avoid water logging.	Drain out excess water, harvest at physiological maturity	Sun drying after harvest. Provision for good storage facilities.

Sesame	Sowing in bunds/raised bed and provision of drainage to avoid water logging.	Sowing in bunds/raised bed and provision of drainage to avoid water logging.	Drain out excess water, harvest at physiological maturity	Sun drying after harvest. Provision for good storage facilities.
Heavy rainfall with high speed winds in a short span[2]				
Paddy	Drainage if waterlogging persists Small seedlings withstand the problem	Drainage if waterlogging persists	Lodged panicles may be harvested at physiological maturity stage	Proper Storage Facilities
Outbreak of pests and diseases due to unseasonal rains				
Paddy	Spray tricyclazole against blast, Chloropyriphos,Regent against stem borer, Malathion against Swarming caterpillar	Spray tricyclazole against blast, Chloropyriphos against stem borer, Malathion against Swarming caterpillar & leaf folder	Malathion spray against Gundhi bug at the time of grain filling stage/milking stage.	Proper winnowing and sun drying of grains. Fumigation/dis infection of storage bin/bags including store house.
Maize	Apply Phorate granules in the whorls & spray of Endosulfan against maize stem borer	Spray Dimethoate against aphid	Wrapping of cobs against bird damage	Store in clean godown, disinfection of gunny bags / storage structure with malathion
Sesamum	Removal of infested	Spraying of	Spray of Ekalux	Store in clean

	tips to manage leaf webber	systemic insecticide against borers	against capsule borer	godown, disinfection of gunny bags / storage structure with malathion
Horticulture				
Solanaceous vegetables	Spraying malathion against beetle, hand collection of egg mass Soil drenching of COC & streptocycline against wilting	Application of Neem oil & Triazophos alternatively against brinjal fruit & shoot borer/ leaf curl virus,	Spraying of Profenophos against fruit borer Metalaxyl against Anthracnose	Segregation of infested fruits & destruction
Cucurbit vegetables	Spraying of Ekalux against Red pumpkin beetle, Collection & destruction of eggs/grubs, Soil drenching of COC & streptocycline against wilting	Spraying Endosulfan against leaf eating caterpillars Metalaxyl against Powdery mildew, Carbendazim against leaf spot & blight	Poison baiting with Malathion & Jaggery against fruit fly	Destruction of overripe & infested fruits

2.3 Floods: NA

Condition	**Suggested contingency measure[o]**			
Transient water logging/ partial inundation[1]	**Seedling / nursery stage**	**Vegetative stage**	**Reproductive stage**	**At harvest**
Continuous submergence for more than 2 days[2]	**NA**	**NA**	**NA**	**NA**
Sea water intrusion[3]	**NA**	**NA**	**NA**	**NA**

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

Extreme event type	**Suggested contingency measure[r]**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave[p]	**NA**	**NA**	**NA**	**NA**
Crop1	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Crop4	**NA**	**NA**	**NA**	**NA**
Crop 5	**NA**	**NA**	**NA**	**NA**
Horticulture	**NA**	**NA**	**NA**	**NA**
Crop1 (specify)	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Cold wave[q]	**NA**	**NA**	**NA**	**NA**
Crop1	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Crop4	**NA**	**NA**	**NA**	**NA**
Crop 5	**NA**	**NA**	**NA**	**NA**
Horticulture	**NA**	**NA**	**NA**	**NA**

Crop1 (specify)	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Frost	**NA**	**NA**	**NA**	**NA**
Crop1	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Crop4	**NA**	**NA**	**NA**	**NA**
Crop 5	**NA**	**NA**	**NA**	**NA**
Horticulture	**NA**	**NA**	**NA**	**NA**
Crop1 (specify)	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Hailstorm	**NA**	**NA**	**NA**	**NA**
Crop1	**NA**	**NA**	**NA**	**NA**
Crop2	**NA**	**NA**	**NA**	**NA**
Crop3	**NA**	**NA**	**NA**	**NA**
Crop4	**NA**	**NA**	**NA**	**NA**
Crop 5	**NA**	**NA**	**NA**	**NA**

Horticulture	**NA**	**NA**	**NA**	**NA**
Banana, papaya	Modification of planting time to avoid the incidence. Re-planting.	Spraying of selected fungicides and antibiotics for control /prevention of secondary infection on injured parts/open wounds.	Spraying of selected fungicides and antibiotics for control/prevention of secondary infection on injured parts/open wounds.	Harvested at green stage/physiological maturity. Induce ripening under controlled conditions.
Khasi Mandarin	Modification of planting time to avoid the incidence. Re-planting.	Spraying of selected fungicides and antibiotics for control /prevention of secondary infection on injured parts/open wounds.	Spraying of selected fungicides and antibiotics for control/prevention of secondary infection on injured parts/open wounds.	Harvested at green stage/physiological maturity. Post harvest management such as fruit processing etc..
Crop3	**NA**	**NA**	**NA**	**NA**
Cyclone	**NA**	**NA**	**NA**	**NA**
Paddy	Re-sowing of crop. Cultivation of Short duration varieties	-	-	Timely broadcast and telecast and other types of announcement warning regarding cyclone. Harvest crop as much as possible. Store harvest crop at safe place Emphasis should be given on forthcoming rabi crops Supply of seeds and other agro-inputs of *rabi* crops at subsidized rate, provision of bank loan etc
Horticulture				
Banana	Replanting of suckers	NA	Propping of plants to avoid fall	Propping of plants to

	Growing more wind tolerant varieties i.e. dwarf Cavendish to minimize loss. Provision of wind break to reduce wind speed	Provision of wind break to reduce wind speed	down. Harvested at green stage or table purpose.	avoid fall down. Harvested mature bunches and store for ripening in closed godowns for marketing
Citrus	Replanting of seedling/ sapling Provision of wind break to reduce wind speed	Provision of wind break to reduce wind speed	Provision of wind break to reduce wind speed	Harvested mature and ripe fruits Provision of wind break to reduce wind speed
Papaya	Resowing of seeds in nursery. Growing dwarf varieties i.e. Pusa Nanha etc. Replanting of seedling Provision of wind break to reduce wind speed	NA Provision of wind break to reduce wind speed	Propping of plants to avoid fall down. Harvested at green stage or table purpose. Provision of wind break to reduce wind speed	Propping of plants to avoid fall down. Harvested mature bunches and store for ripening in closed go downs for marketing
Sand deposition or heavy siltation				
Specify crop/horticulture/plantation				

2.5 Contingent strategies for Livestock, Poultry & Fisheries:

2.5.1 Livestock

	Suggested contingency measures		
	Before the events	**During the event**	**After the event**
Drought			
Feed and fodder availability	1. Storage of feed ingredients maize, rice polish etc. 2. Storage of rice straw silage making 3. Cultivation of perennial grass, fodder grass etc.	1. Restricted Stall feeding 2. Non-conventional feeds, kitchen waste etc especially for pigs	1. Rain fed cultivation of both perennial and seasonal fodder 2. Utilization of fodder tree leaves.
Drinking water	1. Provision of either shallow tube well or ring well/Storage of water 2. Community water tank if possible	1. Economizing of water use 2. Utilization of shallow tube or ring well 3. Community water tank if possible	1. Community water tank if possible
Health and disease management	1. Vaccination programs 2. Anti-stress management	1. Heat stress management with restricted movement 2. Showering facility	1. Health tonics and Vitamins 2. Disease management
Floods (Flash)			
Feed and fodder availability	a. Storage of feed ingredient (wheat bran, Rice polish) b. Straw, processed fodder above the water level of last major flood.	a. Community shelter b. Restricted stall feeding c. Fodder tree leaves.	a. Cultivation of seasonal and perennial fodder crop b.Utilization of fodder tree leaves subabul etc
Drinking water	a. Overhead storage water tank	Utilization of chemical treated (Chlorinated) water Boiled water	Community tank
Health and disease management	a. Vaccination against FMD, HS, BQ b. De-worming /Biosecurity	a. Community rescue centre b.Quarantine/ Isolation facility c.Vaccination/ Treatment	a. Post flood disease management (Vaccination/Treatment/ Isolation) b. Quarantine/ Isolation of any suspected animal
Cyclone (Storm)			
Feed and fodder availability	1. Storage of feed ingredients maize, rice polish etc. 2. Storage of rice straw silage making	NA	a. disease management (Vaccination/Treatment/ Isolation) b. Quarantine/ Isolation of any suspected animal

Drinking water	1. Provision of ground water harvesting/Storage of water	Provide clean drinking water	Provide clean drinking water along with supplements
Health and disease management	1. Vaccination program 2. Biosecurity	1. Community rescue program if possible 2. Community quarantine facility provision	a. disease management (Vaccination/Treatment/ Isolation) b. Quarantine/ Isolation of any suspected animal
Heat wave and cold wave			
Shelter/environment management	Awareness/Provision of comfortable shelter	Provision of fan/heat/blankets / Stress management	Stress management/ disease management/Quarantine
Health and disease management	Biosecurity/Awareness	Nutrient management/ Stress management	Stress management/ disease management/Quarantine of sick animals

[s] based on forewarning wherever available

2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event[a]	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Early storage of feed ingredients	1. Economize feeding 2. Reduction of stock if possible	1. Restricted feeding 2. Reduction of stock if possible	NEDP (New Economic Development Policy)
Drinking water	Provision of water storage	Economize use of water	Economize use of water	
Health and disease management	Vaccination program/Biosecurity	Regular health inspection/Nutrient managemet/Stress management	Stress management/Quarantine of sick animals	
Floods				
Shortage of feed ingredients	Storage of feed ingredients	Reducing the stock	Reducing the stock and restricted feeding	NEDP
Drinking water	Over head water reservoir, Jal kund construction	Use boiled water	Use boiled water.	
Health and disease management	Strategic vaccination of the bird for all possible diseases	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	Preventive doses of antimicrobial drug, biosecurity, electrolyte powder in day to day management	
Cyclone				
Shortage of feed ingredients	Storage of feed ingredients	Restricted feeding and reducing stock if possible	Restricted feeding	NEDP
Drinking water	Provision of ground water/Storage of water	Clean water	Clean water	

Health and disease management	Vaccination program/Biosecurity	Regular health inspection/Nutrient managemet/Stress management	Provision of comfortable shed/Stress management/Quarantine of sick animals	
Heat wave and cold wave				
Shelter/environment management	Provision of comfortable shed/Awareness	Provision of fan/heat/blankets/ Stress management	Provision of comfortable shed/Stress management/Quarantine of sick animals	NEDP
Health and disease management	Vaccination programs/Biosecurity	Regular health inspection /Nutrient Management/Stress management	Provision of comfortable shed/Stress management/Quarantine of sick animals	

[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			
Shallow water in ponds due to insufficient rains/inflow	1. Supplementary water harvest structures like pond and tanks have to be developed. 2. Renovation and maintenance of existing water harvest structures	1. Restrict lifting of water for irrigation purpose of crops 2. Catch the stock, market the produce to reduce the density of population in ponds.	1. Excavate the ponds to increase the depth. 2. Try to release water into the pond if it rains in off-season
Impact of heat in ponds / change in water quality	1. Prepare to release water into the habitat	1. Mixing of water from the water harvest structure like ponds and tanks into the fish habitat.	1. Monitoring the water quality and health of aquatic organisms
2) Floods			
Inundation with flood waters	1. Storage of sand filled bags for emergency use. 2.Repair and maintenance of bunds. 3.Insurance coverage provision for life and property	1. Timely broadcast and telecast and other types of announcement warning about the danger level with respect to water level. 2. Relief operation.	1. Relief operation will continue. 2. Care of health of affected people 3. Settlement of insurance. 4. Financial support to other people.

	4. Provision of net guard around the pond		
Water contamination & change in BOD	Take appropriate measures to check seepage into pond e.g. Raising bunds to prevent entry of water	Check the water quality & take appropriate action	1. Application of lime 2. Application of Alum. 3. Application of KmnO4
Health and diseases management	Stock preventive medicines, vaccines	Prevent influx of diseased fish from outside source, Check through nets Administer medicines through random catch Disinfect water by lime , KMnO4	1. Application of lime and KmnO4. 2. Assessment of the health status of fish and accordingly control measure should be taken. 3. Control on transport of brooders and seeds.
3. Cyclone / Tsunami	**NA**	**NA**	**NA**
A.Capture	**NA**	**NA**	**NA**
Marine	**NA**	**NA**	**NA**
Inland	**NA**	**NA**	**NA**
B. Aquaculture	**NA**	**NA**	**NA**
(i) Overflow / flooding of ponds	**NA**	**NA**	**NA**
(ii) Changes in water quality (fresh water / brackish water ratio)	**NA**	**NA**	**NA**
(iii) Health and diseases	**NA**	**NA**	**NA**
(iv) Loss of stock and inputs (feed, chemicals etc)	**NA**	**NA**	**NA**
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)	**NA**	**NA**	**NA**
(vi) Any other	**NA**	**NA**	**NA**
4. Heat wave and cold wave	**NA**	**NA**	**NA**
A. Capture	**NA**	**NA**	**NA**
Marine	**NA**	**NA**	**NA**
Inland	**NA**	**NA**	**NA**
B. Aquaculture	**NA**	**NA**	**NA**
(i) Changes in pond environment (water quality)	**NA**	**NA**	**NA**
(ii) Health and Disease management	**NA**	**NA**	**NA**
(iii)Any other			

[a] based on forewarning wherever available