

State: Mizoram

Agriculture Contingency Plan for District: Aizawl

1.0 District Agriculture profile*			
1.1	Agro-Climatic/Ecological Zone		
	Agro Ecological Sub Region (ICAR)	Purvachal (Eastern Range) (17.2) Humid Eastern Himalayan Region	
	Agro-Climatic Zone (Planning Commission)	Eastern Himalayan Region	
	Agro Climatic Zone (NARP)	Sub Tropical Hill Zone	
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	-	
	Geographic coordinates of district headquarters	Latitude	Longitude
		24°25'16.04'' and 23°18'17.78'' N	92°37'03.27'' and 93°11'45.69'' E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS		
	Mention the KVK located in the district with full address	KVK, Aizawl, CAU, Selesih, Mizoram.	
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	AMFU, ICAR-RC Mizoram Centre, Kolasib	

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

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):	1633.28	120	1 st week of June	Last week of September
	NE Monsoon(Oct-Dec):	199	20	1 st week of October	2 nd week of December
	Winter (Jan- February)	135	4	1 st Week of January	2 nd week of February
	Summer (March-May)	377.1	9	1 st week of March	4 th week of May
	Annual	2344.38	233		

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)	357.631 thousand ha	20.933 thousand ha	273.158 thousand ha	15.627 thousand ha	1.020 thousand ha	1.023 thousand ha	13.938 thousand ha	1.200 thousand ha	6.169 thousand ha	26.269 thousand ha

1.4	Major Soils (common names like red sandy loam deep soils (etc.,))*	Area (Sq. Km)**	Percent (%) of total geographical area
	1. Very deep, dark brown to yellowish red, clay loam to clay, very strongly acidic, well drained	1520.00	42.50
	2. Deep yellowish frown to brownish yellow clay loam to sandy clay loam, strongly acidic, poorly drained	980.00	27.40
	3. Dark yellowish brown to yellowish	1076.31	30.09

	brown, clay loam, strongly acidic		
	Total	3576.31	

* mention colour, depth and texture (heavy, light, sandy, loamy, clayey etc) and give vernacular name, if any, in brackets (data source: Soil Resource Maps of NBSS & LUP); ** Pl. give the details of the major soils occupying more than 5% of total geographical area. Degree of soil acidity (pH) may also be indicated

1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	20.266	
	Area sown more than once	0.667	103
	Gross cropped area	20.933	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	0.300		
	Gross irrigated area	0.300		
	Rainfed area	19.97		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals			
	Tanks	760		
	Open wells			
	Bore wells			
	Lift irrigation schemes			
	Micro-irrigation			
	Other sources (Farm ponds)	180		
	Total Irrigated Area		0.300	
	Pump sets	200		
	No. of Tractors	4		
	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%

1.6. a.	Fertilizer and Pesticides use	Type	Total quantity (tonnes)			
			2007 – 2008		2008 – 2009	
			Kharif	Rabi	Kharif	Rabi
1	Fertilizers*	Urea	160	200	350	350
		DAP	200	300	300	250
		Potash	140	180	200	150
		SSP	-	-	-	-
		Other straight fertilizers (specify)	-	-	-	-
		Other complex fertilizers (specify)	-	-	-	-
2	Chemical Pesticides**	Insecticides	3636		570	
		Fungicides				
		Weedicides	210			
		Others (specify)				

* Fertilizers – Statistical Abstract, Directorate of Agriculture (Crop Husbandry), Mizoram, Aizawl, 2008 – 09

** Chemical Pesticides – Outbreak of Insect Pests in 2007, Directorate of Agriculture (Crop Husbandry), Mizoram, Aizawl, 2008 – 09

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

1.7	S. No.	Major field crops cultivated	Area ('000 ha)						Summer	Grand total
			<i>Kharif</i>			<i>Rabi</i>				
			Irrigated	Rainfed	Total	Irrigated	Rainfed	Total		
	1	Paddy								
		1) Jhum		6304					6304	
		2) WRC		300					300	
	2	Maize		1794		58			1852	
	3	Pulses								
		1) Rice bean		209						
		2) Arhar								
		3) Field pea				38				
		4) Cowpea		349		106				
		5) French bean				215				
	4	Oilseeds								
		1) Soyabean		246					246	

		2) Sesamum		331					331
		3) Rapeseed and Mustard					185		185
	5	Cotton		36					36
	6	Tobacco		51					51
	7	Sugarcane (in cane)		339					339
	8	Potato		16					16
	S. No.	Horticulture crops - Fruits	Area ('000 ha)						
			Total	Irrigated			Rainfed		
	1	Passion Fruit	4084				4084		
	2	Grape	1172				1172		
	3	Banana	7220				7220		
	4	M. Orange	8275				8275		
	5	Hatkora	1618				1618		
	6	Other Citrus	1192				1192		
		Horticulture crops - Vegetables	Total	Irrigated			Rainfed		
	1	Cabbage	2984				2984		
	2	Cucumber	2749				2749		
	3	Lady's Finger	2550				2550		
	4	Cowpea (green pod)	3474				3474		
	5	French Bean (green pod)	2250				2250		
	6	Chow chow	3200				3200		
	7	Others	2266				2266		
		Medicinal and Aromatic crops	Total	Irrigated			Rainfed		
	1	Stevia	455				455		
	2	Achla	545				545		
	3	Aloevera	50				50		
		Plantation crops	Total	Irrigated			Rainfed		
	1								
	2								
	3								
	4								
	5								

	Others (Specify)	Eg., industrial pulpwood crops etc.			
		Fodder crops	Total	Irrigated	Rainfed
	1	Aecanut	4562		4562
	2	Jatropha	490		490
	3	Other crops	3455		3455
		Total fodder crop area			
		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	341	669	1020
	Improved / Crossbred cattle	868	4187	5055
	Buffaloes (local low yielding)	114	202	316
	Improved Buffaloes			
	Goat	635	1014	1649
	Sheep	17	26	43
	Pig	39963	34377	74340
	Mithun			

	Yak						
	Others (Horse, mule, donkey etc., specify)						
	Commercial dairy farms (Number)						
1.9	Poultry	No. of farms	Total No. of birds ('000)				
	Commercial						
	Backyard						
1.10	Fisheries (Data source: Chief Planning Officer)						
	A. Capture						
	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)	
		846	-	-	-	-	5 MT Capacity- 2 Nos. 3 MT Capacity- 1 No
	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 (Data Source: MPEDA/ Fisheries Department)						
	ii) Fresh water (Data Source: Fisheries Department)		153.4	1.53	234		
	Others						

1.11 Production and Productivity of major crops (Average of last 5 years: 08, 09, 10, 11, 12, specify years)

Kharif													
1.11	Name of crop	2007 – 08		2008 – 09		2009- 10		2010 – 11		2011- 12		2012 – 13	
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)
Major Field crops (Crops to be identified based on total acreage)													
Crop 1	Paddy i) Jhum	72181	1661.36	64420	1572.41	63100	1573.57	13658	329.39	11355	252.63	44942.8	1077.87
Crop 2	ii) W.R.C	36738	2687.88	37548	2681.23	37940	2681.27	12131	13242.70	4146	438.91	25700.6	4346.4
Crop 3	iii) H.Y.V.	5711	2744.35	5692	2693.80	6700	3031.67	-	-	-	-	6034.33	2823.27
Crop 4	Maize	20282	1935.12	19788	1883.67	22703	1933.49	20969	1946.08	729	99.48	16894.2	1559.57
Crop 5	Pulses (Pea, Cowpea, Arhar, Frenchbean, Rice bean	4313	881.64	7971	1182.46	8663	1262.64	5833	1153.91	2632	521.39	5882.4	1000.41
Crop 6	Oil Seed (Rape & Mustard, Sesamum, soyabean , groundnut)	5478	727.30	5321	914.73	5560	947.19	3757	921.51	745	213.77	4172.2	744.9
Crop 7	Sugarcane (In cane)	36174	25968.41	13565	9996.31	45953	3322.04	12187	9094.77	828	937.71	21741.4	9863.85
* Source : Statistical Abstract, Directorate of Agriculture (Crop Husbandry) Mizoram, Aizawl 2008 – 09													
Major Horticultural crops (Crops to be identified based on total acreage)													
	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)				
Crop 1	M. Orange	10.935	2027	11.567	1808	10.757	1299	33259	1657				
Crop 2	Banana	78.600	18494	98.524	15839	66.424	9200	243548	13767				
Crop 3	Passion Fruit	4.979	4489	10.416	5000	13.530	3312	63229	2619				
Crop 4	Grape	4.217	15278	15.960	15500	9.962	8500	24595	11604				
Crop 5	Potato	15.940	9459	83.500	9454	9.870	3399	41770	6655				

Crop 6	Turmeric	10.074	19298	57.010	20000	39.862	4141	13343 6	9316	
Crop 7	Ginger	55.432	16179	26.418	15893	34.290	3299	14673 2	8430	
Crop 8	Chow chow	16.769	36723		37000	48.000	15000	91187	20871	

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	1. Paddy	2. Maize	3 Frenchbean,	4. cowpea	5. Sugarcane
	Kharif- Rainfed	1st week of April to 2nd week of May (Jhum paddy)	March to Middle of May	April to June	April-June	March to April
	Kharif-Irrigated	Mid March to 1st week of May (Kharif Paddy – Wetland Rice Cultivation)	Mid March to 1st week of May	Mid March to 1st week of May	Mid March to 1st week of May	
	Rabi- Rainfed	NA	1st week of Sept to 2nd week of Oct.	Last week of Sept to October	Last week of Sept to October	NA
	Rabi-Irrigated	NA	Last week of October to November	Sept – Oct –	Oct to November	
	Summer-irrigated					
	Summer-rainfed					

1.13	What is the major contingency the district is prone to? (Tick mark)	Regular*	Occasional	None
	Drought			√
	Flood			√
	Cyclone		√	
	Hail storm		√	
	Heat wave			√
	Cold wave		√	
	Frost			√

	Sea water intrusion			√
	Snowfall			√
	Landslides		√	
	Earthquake			√
	Pests and disease outbreak (specify)			√
	Others (like fog, cloud bursting etc.)			

*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

2.0 Strategies for weather related contingencies

- **2.1 Drought**
 - 2.1.1 Rainfed situation**
 - 2.1.2 Irrigated situation**
- **2.2 Unusual rains**
- **2.3 Floods**
- **2.4 Extreme events: Heat wave/ Frost/ Hailstorm/ cyclone**
- **2.5 Contingency strategies for livestock, Poultry & fisheries**
 - 2.5.1 Livestock**
 - 2.5.2 Poultry**
 - 2.5.3 Fisheries**

2.1 Drought

2.1.1 Rainfed situation (*maintain separate rows for each cropping system*)

2.1.1.1 Pre monsoon (4th week of March)

<i>Condition</i>	<i>Suggested Contingency measures</i>				
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 Implementation
Delay by 2 weeks (2 nd to of April)	Early rice	Tai, idaw, Buhsakei	No change	--	--
Delay by 4 weeks (4 th week of April)	Early rice	Tai, idaw, Buhsakei	No change	--	--

Delay by 6 weeks (2 nd week of May)	NA
Delay by 8 weeks (4 th week of May)	NA

2.1.1.2 South West Monsoon (1st week of June)

Condition	Major Farming situation ^a	Normal Crop / Cropping system ^b	Suggested Contingency measures		
			Change in crop / cropping system ^c including variety	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset) Delay by 2 weeks (June 3 rd Week)*	1) Jhuming Uneven distribution of rainfall, highly acidic and well drained, soil erosions are prevalent	Paddy+ Ginger +Bird's eye Chilli, (Mixed Cropping)	No change	Logwood bunding on sloppy land, Sowing can be delayed up to May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	To create awareness on water management techniques
		Ginger (sole crop)	No change	Logwood bunding on sloppy land, Sowing can be delayed up to May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
		Bird's eye chilli (sole crops)	No change	Logwood bunding on sloppy land, Sowing can be delayed up to	

				May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
		Maize (sole crops)	No change	Logwood bunding on sloppy land, Sowing can be delayed up to May 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	Half Moon Terrace Adoption of antitransparant Logwood bunding on sloppy land, Sowing can be delayed up to May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	
	2) Terrace (irrigated) Soils are dark, highly leached and poor in bases, rich in iron and have low pH.	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 up to May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.	* Promote optimal water supply system, WHS To create awareness on IPM & INM

		Horticulture crops: Passion Fruit Pineapple Banana M. Orange	No change Intorduction of High Yielding/hybrid	Mulching with organic materials, Earthing up, half moon terraces. Bunding, check dams, promote WHS	
Condition			Suggested Contingency measures		
Early season drought (delayed onset)	Major Farming situation^a	Normal Crop/cropping system^b	Change in crop/cropping system^c	Agronomic measures^d	Remarks on Implementation^e
Delay by 4 weeks (July 2nd Week)	1) Jhumming – The surface soil of hilly terrains are dark, highly leached and poor in bases, rich in iron and have low pH ranging from 4.5 to 5.5 (highly acidic) and well drained.	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. Application of Lime & FYM Contour Farming	To promote optimal irrigation technique and Soil Testing to farmers before sowing of crops. Planting of more Legumes as cover crops
		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	
		Perennial crops Pineapple, Banan, M. Orange	No change	Mulching, Application of slaked lime & organic manure	

	<p>2. Terrace – The hill slopes and valleys have the soil order of Ultisols and Entisols respectively while Inceptisols are commonly found both in hills and valleys. They are rich in organic carbon, low in available phosphate and high in available Potash.</p>	<p>Rice & Maize</p>	<ul style="list-style-type: none"> • Early varieties as above • Tolerant/ resistant varieties 	<p>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</p>	<ul style="list-style-type: none"> • . Making of Contour Trench • Mulching Acid-tolerant crops
		<p>Horticulture crops Cabbage French Bean Cow pea Brinjal</p>	<ol style="list-style-type: none"> 1. Broccoli var. KTS-1, Solan Big Head, Palam Samridhi 2. Cabbage var. Ryozekei, Golden Acre, 3. French Bean var. Local, Arka Anoop, Arka Komal, Arka Sharat 4. Cow pea var. Local, Kashi Kanchan, Arka Garima Pusa Kumal, PKM-1 5. Brinjal var. Arka Kesav, Arka Neidhi, Arka Anand, Pusa Kranti 	<p>Logwood bunding on sloppy land, Sowing can be delayed up to May with anticipation of rain. Ridge & Furrow /Raised bed sowing in plain areas and in Terraces. Dibbling instead of broadcasting.</p>	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)					
Delay by 6 weeks (July 3 rd week)	NA		•	•	
	NA			•	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)					
Delay by 8 weeks (August 1 st week)	NA		•		
	NA		•		

Source: Strategic Research and Extension Plan, Aizawl District, Mizoram, 2006

***Matrix for specifying condition of early season drought due to delayed onset of monsoon (2, 4, 6 & 8 weeks) compared to normal onset (2.1.1)**

Normal onset (Month and week)	Month and week for specifying condition of early season drought due to delayed onset of monsoon			
	Delay in onset of monsoon by			
	2 wks	4 wks	6 wks	8 wks
June 1 st wk	June 3 rd wk	July 1 st wk	July 3 rd wk	Aug 1 st wk
June 2 nd wk	June 4 th wk	July 2 nd wk	July 4 th wk	Aug 2 nd wk
June 3 rd wk	July 1 st wk	July 3 rd wk	Aug 1 st wk	Aug 3 rd wk
June 4 th wk	July 2 nd wk	July 4 th wk	Aug 2 nd wk	Aug 4 th wk
July 1 st wk	July 3 rd wk	Aug 1 st wk	Aug 3 rd wk	Sep 1 st wk
July 2 nd wk	July 4 th wk	Aug 2 nd wk	Aug 4 th wk	Sep 2 nd wk

Condition	Suggested Contingency measures				
Early season drought (Normal onset)	Major Farming situation ^a	Normal Crop/cropping system ^b	Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	1. Jhumming	Mix cropping Without proper spacing	<ul style="list-style-type: none"> Resowing of crops. Cultivation of cover crops 	<ul style="list-style-type: none"> Mulching with straw, grasses 	To promote soil & water resources management
		<ol style="list-style-type: none"> Rice based Ginger 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 irrigation technique	
	2. Terrace	Intercropping & Sole Cropping	<ul style="list-style-type: none"> Resowing of crops. Thinning of plant population Protective irrigation Delaying 	<ul style="list-style-type: none"> Mulching Weed control Water harvesting in Situ. 	

			Transplanting of Paddy with the receipt of rains	
		1. Rice 2. Fruit crops	Intercultural operations Gap filling Plant protection measures	Application of organic manure, Mulching with biomass, Earthing up Half moon terracing for M. Orange

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Soil nutrient & moisture conservation measures ^d	Remarks on Implementation ^e
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)					
At vegetative stage	1. Jhumming	Mix cropping	Weeding, mulching with locally available organic materials Plant protection measures	<ul style="list-style-type: none"> • Stone terracing • Mulching • Life saving irrigation 	<ul style="list-style-type: none"> • Provision of Antitranspirants • Stubble mulching • Life Saving irrigation
		1. Rice based	Weeding, mulching with locally available organic materials Plant protection measures	Efficient use of store water for life saving irrigation.	

		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	Intercropping & Sole Cropping		<ul style="list-style-type: none"> Contour bunding Use of farm ponds Life saving irrigation Bench terracing 	
		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.	
Condition			Suggested Contingency measures		
Mid season drought (long dry spell)	Major Farming situation^a	Normal Crop/cropping system^b	Crop management^c	Soil nutrient & moisture conservation measues^d	Remarks on Implementation^e
At flowering/ fruiting stage	1. Jhumming	Mix cropping	Tolerant/ resistant varieties Plant protection measures	Earthing up, mulching with locally available materials	<ul style="list-style-type: none"> Provision of Antitranspirants Stubble mulching Life Saving irrigation
		1. Rice based	Tolerant/ resistant varieties Plant protection measures	Earthing up, mulching with locally available materials	
		2. Ginger	Weeding PP measures	Mulching with bio mass Earthing up	
		3. Bird's eye chilli	Weeding	Mulching with bio mass	

			PP Measures	Earthing up	
	2. Terrace	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	

Condition	Major Farming situation ^a	Normal Crop/cropping system ^b	Suggested Contingency measures		
			Crop management ^c	Rabi Crop planning ^d	Remarks on Implementation ^e
Terminal drought (Early withdrawal of monsoon)	1. Jhumming	Mix crop	* Early harvesting of vegetables		
		1. Rice based	Plant protection measures	Cole crops, tomato, leafy mustard, French bean, Onion, garlic,	
		2. Ginger	Weeding PP measures	NA	
		3. Bird's eye chilli	Weeding PP Measures	NA	
	2. Terrace	Inter crop	Rabi seeding from early September	Protective irrigation	
		Rice	PP Measures Dripping & Wetting method	French bean, soybean, groundnut, maize,	
		Fruit crops – Pineapple, Banana, M. Orange	PP Measures Dripping & Wetting method	NA	

2.1.2 Drought - Irrigated situation

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Delayed release of water in canals due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; tankfed medium deep black soils	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Limited release of water in canals due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; tankfed medium deep black soils	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			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	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; tankfed medium deep black soils	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; Tube well irrigated medium red soils	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			
Insufficiency of surface water for irrigation			NA		

Condition	Major Farming situation ^f	Normal Crop/cropping system ^g	Suggested Contingency measures		
			Change in crop/cropping system ^h	Agronomic measures ⁱ	Remarks on Implementation ^j
Insufficient groundwater recharge due to low rainfall	1) Farming situation: Mention source of irrigation, topography (upland/lowland) and soil colour & depth Eg; canal irrigated shallow red soils; tankfed medium deep black soils	Cropping system 1:	NA		
		Cropping system 2:			
		Cropping system 3:			
	2) Farming situation:	Cropping system 1:			
		Cropping system 2:			
		Cropping system 3:			
Any other condition (specify)					

Notes:

^f Describe such as uplands, medium and low lands and source of irrigation such as tank fed medium or deep black/loamy/red soils, tube well irrigated red soils, canal irrigated red soils, well irrigated black soils etc.,

^g The normal crop or cropping systems grown in a given irrigated situation

^h Suggested change in the crop, variety or cropping system in view of delay in release of irrigation water, less water availability etc.,

ⁱ All agronomic measures like improved methods of irrigation (skip row etc.), micro irrigation (drip/sprinkler/sub-surface), deficit irrigation, limited area irrigation, mulching etc, that improve water use efficiency and make best use of limited water including methods of ground water recharge and sharing.

^j Comments on source of availability of seed of the alternate crop or variety, any constraints in marketing of alternative crop implications for livestock and dairy sectors and details of state or central schemes like National Rural Employment Guarantee Scheme (NREGS), Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM), National Horticulture Mission (NHM) etc., which facilitate implementation of the agronomic measures suggested.

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				
Paddy	Improve drainage system. Stone terracing to help in conserving soil in hill slope. strip cropping.	Drain out excess water. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Drain out excess water. Lodge panicle may be harvested at physiological maturity state.	Dry and safe well ventilated storage place
Maize	Ridge planting, proper drainage . Improve drainage system. Stone terracing to help in conserving soil in hill slope. strip cropping.	Proper drainage to avoid water logging. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Proper drainage, PP measures	Dry and safe well ventilated storage place
Bird's eye chilli	Ridge planting, Improve drainage system. Stone terracing to help in conserving soil in hill slope. strip cropping.	Proper drainage to avoid water logging. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Proper drainage, PP measures	Sun drying after harvest. Provision for good storage facilities.
Pineapple	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Proper drainage, need based PP measures	Stored in a dry place
Banana	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Proper drainage, need based PP measures	Stored in a dry place
Grapes	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to	Proper drainage, need based PP measures	Stored in a dry place

		prevent flower drop or promote quick flowering/fruiting		
M. Orange	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruiting	Proper drainage, need based PP measures	Stored in a dry place
Ginger	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Vegetables	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper storage facilities
Heavy rainfall with high speed winds in a short span²				
Paddy	Drain out excess water. Provide wind break.	Drain out excess water.	Drain out excess water.	Dry and safe storage place
Maize	Ridge planting, proper drainage, provide wind break, support with bamboo.	Proper drainage to avoid water logging.	Proper drainage, PP measures	Dry and safe storage place
Bird's eye chilli	Ridge planting, proper drainage, provide wind break, support with bamboo.	Proper drainage to avoid water logging.	Proper drainage, PP measures	Sun drying after harvest. Provision for good storage facilities.
Pineapple	Proper drainage, need based PP measures, provide wind break, support with bamboo.	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Banana	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Grapes	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
M. Orange	Proper drainage, need based PP measures, provide wind break, support with bamboo.	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place

Ginger	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Outbreak of pests and diseases due to unseasonal rains	NA	NA	NA	NA
Paddy	Spray tricyclazole against blast, Chloropyriphos, Regent against stem borer, Monocrotophos against Swarming caterpillar	Spray tricyclazole against blast, Chloropyriphos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Malathionspray against Gundhi bug at the time of grain filling stage/milking stage.	Proper winnowing and sun drying of grains. Fumigation/disinfection of storage bin/bags including store house.
Horticulture				
Pineapple	Need based PP measures	Need based PP measures	Need based PP measures	NA
Banana	Need based PP measures	Need based PP measures	Need based PP measures	
Grapes	Need based PP measures	Need based PP measures	Need based PP measures	
M. Orange	Need based PP measures	Need based PP measures	Need based PP measures	
Ginger	Need based PP measures	Need based PP measures	Need based PP measures	

^k Such as drainage in black soils, indicate taking up need based inter-culture operations, outbreak of pests/diseases along with their management etc.

^l Such as drainage in black soils, application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting and indicate possibility of pest/disease outbreak with need based prophylactic / curative management etc.

^m Such as drainage in black soils, measures for preventing seed germination etc and Indicate possibility of harvesting at physiological maturity immediately and shifting produce to safer place and protection against pest/disease damage in storage etc.

ⁿ Such as shifting of produce to safer place for drying and maintaining the quality of grain/fodder and protection against pest/disease damage in storage etc

2.3 Floods: NA

Condition	Suggested contingency measure ⁰			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation¹				
Crop1 (specify)				
Crop2				
Crop3				
Crop4				
Crop5				
Horticulture /Plantation crops				
Crop1 (specify)				
Crop2				
Crop3				
Crop 4				
Crop 5				
Continuous submergence for more than 2 days²				
Crop1				
Crop2				
Crop3				
Crop4				
Crop5				
Horticulture / Plantation crops				
Crop1 (specify)				
Crop2				
Crop3				
Crop 4				
Crop 5				
Sea water intrusion³				
Crop1				

Crop2				
Crop3				
Crop4				
Crop5				

Notes:

Flood situation could arise during early season (eg. summer season) or in the main season; Accordingly contingency measures could be suggested

¹ Water logging due to heavy rainfall, poor drainage in vertisols, flash floods in streams and rivers due to high rainfall, breach of embankments

² If the water remains in the field due to continuous rains, poor infiltration and push back effect

³ Entry of sea water into cultivated fields in coastal districts due to tidal wave during cyclones or tsunami; intrusion of seawater into groundwater in coastal districts

⁰ Crop/field management depends on nature of material (sand or silt) deposited during floods. In sand deposited crop fields/ fallows indicate ameliorative measures such as early removal of sand for facilitating *rabi* crop or next kharif. In silt deposited indo-gangetic plains, indicate early *rabi* crop plan in current cropped areas and current fallow lands. Indicate drainage of stagnating water and strengthening of field bunds etc. In diara land areas indicate crop plans for receding situations. Usually rice cropped areas are flood prone causing loss of nurseries, delayed transplanting or damage to the already transplanted fields etc. Indicate community nursery raising, scheduling bushenings, re-transplanting in damaged fields and transplanting new areas or direct seeding including seed availability so that the season is not lost. Indicate steps for preventing pre-mature germination of submerged crop at maturity or harvested produce.

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

Condition	Suggested contingency measure			
	Vegetative stage	Flowering stage	Crop maturity stage	Post-harvest
Continuous high rainfall in a short span leading to water logging				
Paddy	Improve drainage system. Stone terracing to help in conserving soil in hill slope. strip cropping.	Drain out excess water. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruitletting	Drain out excess water. Lodge panicle may be harvested at physiological maturity state.,	Dry and safe well ventilated storage place

Maize	Ridge planting, proper drainage . Improve drainage system. Stone terracing to help in conserving soil in hill slope . strip cropping.	Proper drainage to avoid water logging. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, PP measures	Dry and safe well ventilated storage place
Bird's eye chilli	Ridge planting, Improve drainage system. Stone terracing to help in conserving soil in hill slope. strip cropping.	Proper drainage to avoid water logging. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, PP measures	Sun drying after harvest. Provision for good storage facilities.
Pineapple	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, need based PP measures	Stored in a dry place
Banana	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, need based PP measures	Stored in a dry place
Grapes	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, need based PP measures	Stored in a dry place
M. Orange	Proper drainage, need based PP measures	Proper drainage, need based PP measures. Application of hormones/nutrient sprays to prevent flower drop or promote quick flowering/fruited	Proper drainage, need based PP measures	Stored in a dry place
Ginger	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Vegetables	Proper drainage, need based PP	Proper drainage, need based PP	Proper drainage, need based PP measures	Proper storage facilities

	measures	measures		
Heavy rainfall with high speed winds in a short span²				
Paddy	Drain out excess water. Provide wind break.	Drain out excess water.	Drain out excess water.	Dry and safe storage place
Maize	Ridge planting, proper drainage, provide wind break, support with bamboo.	Proper drainage to avoid water logging.	Proper drainage, PP measures	Dry and safe storage place
Bird's eye chilli	Ridge planting, proper drainage, provide wind break, support with bamboo.	Proper drainage to avoid water logging.	Proper drainage, PP measures	Sun drying after harvest. Provision for good storage facilities.
Pineapple	Proper drainage, need based PP measures, provide wind break, support with bamboo.	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Banana	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Grapes	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
M. Orange	Proper drainage, need based PP measures, provide wind break, support with bamboo.	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Ginger	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Proper drainage, need based PP measures	Stored in a dry place
Outbreak of pests and diseases due to unseasonal rains	NA	NA	NA	NA

Paddy	Spray tricyclazole against blast, Chloropyriphos, Regent against stem borer, Monocrotophos against Swarming caterpillar	Spray tricyclazole against blast, Chloropyriphos against stem borer, Monocrotophos against Swarming caterpillar & leaf folder	Malathionspray against Gundhi bug at the time of grain filling stage/milking stage.	Proper winnowing and sun drying of grains. Fumigation/disinfection of storage bin/bags including store house.
Horticulture				
Pineapple	Need based PP measures	Need based PP measures	Need based PP measures	NA
Banana	Need based PP measures	Need based PP measures	Need based PP measures	
Grapes	Need based PP measures	Need based PP measures	Need based PP measures	
M. Orange	Need based PP measures	Need based PP measures	Need based PP measures	
Ginger	Need based PP measures	Need based PP measures	Need based PP measures	

Notes:

^p In regions where the normal maximum temperature is more than 40°C, if the day temperature exceeds 3°C above normal for 5 days it is defined as heat wave. Similarly, in regions where the normal temperature is less than 40°C, if the day temperature remains 5°C above normal for 5 days, it is defined as heat wave.

^q In regions where normal minimum temperature remains 10°C or above, if the minimum temperature remains 5°C lower than normal continuously for 3 days or more it is considered as cold wave. Similarly in regions with normal minimum temperature is less than 10°C, if the minimum temperature remains 3°C lower than normal it is considered as cold wave

^r Indicate appropriate crop/soil management measures depending upon the crop and its stage for alleviating the specified stress.

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event ^s	During the event	After the event
Drought			
Feed and fodder availability	<p>Construction of Feed Storage Hay/Silage making Increase production of animal feed blocks Establishment of Cold Storage Cultivation of short duration fodder crops in summer/pre monsoon rains like Maize, jowar, oats, bajra, etc.</p>	<p>Feeding of house hold grain and grain byproducts Feeding of banana leave Feeding of dry fodders Feeding of Molasses & Grains Feeding of Kitchen wastes/ left over feeds.</p>	<p>Application of Manure, fertilizers, etc. to increase soil fertility and enhance fodder production Cultivation of short duration rabi fodder crops like maize, jowar, oats, bajra, etc.</p>
Drinking water	<p>1) Making of Rain Water Harvesting dams 2) Water storage Tank 3) Construction of Ponds.</p>	<p>1) Provision for drinking adequate amount of wholesome drinking water.</p>	<p>1) Construction of water storage Tank 2) Feeding of adequate amount of drinking water. 3) Cleaning of storage tanks</p>
Health and disease management	<p>1)Regular Supplementation of livestock with Vitamins and Minerals 2)Vaccination and Deworming should be done regularly. 3)Feeding of balanced diet 4)Restriction of the entry into the farm premises. 5)Isolation of diseased or suspected animals.</p>	<p>1)Proper disposal of Manure 2)Regular cleaning of sheds. 3)Disinfection of sheds. 4)Restriction of entry into the farm premises 5)Proper disposal of dead animals.</p>	<p>1)Disinfection and sanitation of all the shed 2)Movement other than the attendant into the farm premises should be restricted. 3)Proper disposal of dead animals.</p>
Floods			
Feed and fodder availability			
Drinking water			
Health and disease management			
Cyclone			
Feed and fodder availability			
Drinking water			
Health and disease management			

Heat wave and cold wave	Planting of trees around shed Provision of well ventilation in the shed	In severe cases water spraying Supplementation of minerals and vitamins	Routine practices can be followed
Shelter/environment management			
Health and disease management			
Snowfall			
Earthquake			
Landslides			

^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	1) Storage of household grains and by-products	2) Feeding of broken rice mixed with concentrate feed in the ration of 1:1 3) Feeding of garbage, kitchen waste. 4) Feeding of green leaves and stems of <i>Spilanthus Bidens pilosa, Conyza auriculata.</i> 5) Provision of	1) Routine management practices	

		wholesome drinking water		
		6) Feeding of Vitamins & Minerals.		
Drinking water	<ul style="list-style-type: none"> • Making of Rain Water Harvesting dams • Water storage Tank • Construction of Ponds 	<ul style="list-style-type: none"> • Provision for drinking adequate amount of wholesome drinking water. 	<ul style="list-style-type: none"> • Construction of water storage Tank • Feeding of adequate amount of drinking water. • Cleaning of storage tanks 	
Health and disease management				
Floods				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Cyclone				
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management				
Health and disease management				
Snowfall				
Earthquake, Landslides etc				

^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			
Marine			
Inland			
(i) Shallow water depth due to insufficient rains/inflow	Construction of dam/barrage for storage of water during drought period	Fishes has to be congregate in deeper water zone, if needed can make arrangement of net fencing to protect fish from escaping	Fishes may be released to their natural habitat after needful prophylactic measures
(ii) Changes in water quality	Regular monitoring of water so that it could maintain in optimum cultivable limit as per limit	If possible try to maintain the stocking density as per water depth	If and when required treatment of water within limits
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Renovation an reclamation of all cultivable ponds have to be done and maintain the water level little high from normal culture level	Rather maintaining several ponds, better maintain few ponds by pump out water from ponds	It is suggested to provide prophylactic treatment to the pond water as well as fish biomass as and when required
(ii) Impact of salt load build up in ponds / change in water quality			
(iii) Any other			
2) Floods			
A. Capture			
Marine			
Inland			
(i) Loss of stock			
(ii) Changes in water quality			
(iii) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	Fishes from flood prone ponds have to be evacuate to safer place	Restriction of flood water to fish pond and regular	Whenever necessary repairing or renovation of pond is suggested

	or flood effected ponds should be fenced by desired size mesh net	monitoring of fenced net	
(ii) Water contamination and changes in water quality	Continuous monitoring of culture water	Fishes have to transfer from heavy turbid pond to clear water pond	Have to monitor the water quality and if any adverse condition found immediate treatment is necessary
(iii) Health and diseases	Maintain the water quality parameters in optimum level. Disease effected fish, if notice have to be removed from the pond	Try to maintain disease free environment by adopting prophylactic measures	Mass treatment of pond water
(iv) Loss of stock and inputs (feed, chemicals etc)	Required quantity fish culture critical inputs stored in well advanced	Stored fish culture inputs have to protect from attack of moulds etc.	As and when required stored feeds have to sun dried before use
(v) Infrastructure damage (pumps, aerators, huts etc)	Shifting of pumps, aerators in safer place. Huts have to be repaired and should construct in flood free area	If not necessary better not to use pumps etc.	Damage infrastructure should repair immediately
(vi) Any other			
3. Cyclone / Tsunami			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			

B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			

^a based on forewarning wherever available