भारतीय कृषि
ICAR
INDIAN COUNCIL OF
AGRICULTURAL RESEARCH

DISTRICT WISE
CONTINGENCY PLAN
TO DEAL WITH
EL NIÑO

PREPAREDNESS | RESPONSE | RESILIENCE

BUILDING A
DROUGHT RESILIENT
MIZORAM


PADDY


MAIZE


SOYBEAN


GINGER

MIZORAM

EARLY WARNING & MONITORING | WATER MANAGEMENT | SUSTAINABLE AGRICULTURE | COMMUNITY PARTICIPATION

TOGETHER, LET'S BUILD A RESILIENT MIZORAM

PREPARE TODAY • PROTECT TOMORROW • PROSPER TOGETHER

Mizoram

Mizoram is a predominantly hilly state located in the northeastern region of India, where agriculture is the primary source of livelihood for a majority of the rural population. The state is characterized by steep slopes, high rainfall, and rich forest cover. Agriculture is largely rainfed, and traditional shifting cultivation (Jhum) is still practiced in many areas, although settled farming and horticulture are expanding. The diverse agro-climatic conditions support the cultivation of cereals, pulses, oilseeds, spices, fruits, and plantation crops, making agriculture an important contributor to rural livelihoods and food security.

Major Kharif crops include Paddy, maize, soybean, sesame, pigeon pea, black gram, green gram, ginger, turmeric, and vegetables. During the Rabi season, rapeseed-mustard, pulses, vegetables, and potato are cultivated in suitable areas. Horticultural crops such as orange, banana, pineapple, passion fruit, arecanut, and bamboo also contribute significantly to the state's economy. Mizoram receives an average annual rainfall of 2,000–3,000 mm, with nearly 75–80% occurring during the southwest monsoon (June–September). Therefore, agricultural production depends heavily on the timely onset and proper distribution of monsoon rainfall.

Historical Impact of El Niño on Mizoram

Mizoram is vulnerable to El Niño-induced monsoon variability, which often leads to delayed monsoon onset, below-normal rainfall, and prolonged dry spells despite the state's generally high annual rainfall. These conditions reduce soil moisture, affect water availability in rainfed and jhum cultivation systems, and lower crop productivity. Paddy, maize, pulses, oilseeds, spices, and horticultural crops experience moisture stress during critical growth stages. Reduced rainfall also increases the risk of forest fires, affects spring water sources, and negatively impacts rural livelihoods and food security.

Effects on Major Crops

- Paddy: Delayed sowing and transplanting, poor tillering, and reduced grain yield.
- Maize: Poor germination, reduced cob formation, and lower grain filling.
- Soybean: Reduced flowering, poor pod development, and lower yields.
- Sesame: Poor capsule formation and reduced seed filling.
- Pigeon Pea: Flower drop and reduced pod setting due to moisture stress.
- Black Gram & Green Gram: Reduced flowering and lower productivity.
- Ginger: Poor rhizome development under prolonged dry spells.

- Turmeric: Reduced rhizome growth and lower yield.
- Orange: Fruit drop and reduced fruit size.
- Vegetables: Moisture stress causes poor growth and reduced marketable yield.

Contingency Plans for Major Crops Grown in Mizoram

Crop	**El Niño Situation**	**Recommended Contingency Measures**
Paddy	Delayed monsoon	Community nursery, direct-seeded Paddy (DSR), short-duration varieties, moisture conservation
Maize	Delayed sowing	Early-maturing hybrids, ridge sowing, mulching
Soybean	Delayed monsoon	Short-duration varieties, seed treatment, line sowing
Sesame	Rainfall deficit	Use as contingency crop, moisture conservation
Pigeon Pea	Delayed sowing	Short-duration cultivars, intercropping
Black Gram (Urdbean)	Late sowing	Short-duration varieties, foliar nutrition
Green Gram (Moongbean)	Dry spells	Early maturing varieties, foliar spray of 2% urea
Ginger	Moisture stress	Mulching, raised beds, supplemental irrigation
Turmeric	Delayed rainfall	Organic mulching, protective irrigation
Rapeseed-Mustard	Poor residual moisture	Early sowing, protective irrigation

Agriculture in Mizoram is highly dependent on the southwest monsoon and is therefore vulnerable to El Niño-induced rainfall deficits. Delayed monsoon onset, prolonged dry spells, and reduced soil moisture adversely affect Paddy, maize, pulses, oilseeds, spices, and horticultural crops. Adoption of drought-tolerant varieties, efficient water management, rainwater harvesting, mulching, contour farming, and climate-smart agricultural practices can significantly enhance the resilience and sustainability of Mizoram's agriculture under El Niño conditions.

Districts vulnerable to El Nino

High	Medium	Low
Saiha	Nil	Nil

Actionable Comprehensive Plans for Contingency

State	MIZORAM	District	SAIHA

Rainfall info (mm)

Month/season	Normal rainfall (mm)	Expected deficiency, %	Expected rainfall (mm)
June-Sep	1746.3	More than 19%	Less than 1414.503
June	496		
July	456.9		
August	374		
September	419.4		

Forecast probability for the season (as per IMD): Below Normal

Irrigation info:

Net irrigated area:	797	Gross irrigated area:	906
Net Rainfed area	14650	Gross rainfed area	14550

Source wise irrigation area details (ha)

Source of irrigation	Net	Gross
Canals	797	906
Wells	-	-
Tanks	-	-
Other sources	-	-

Crop Profile (Kharif)

Cereals

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Rice	1146	904	242
2	Jowar	-	-	
3	Maize	404		404
4	Bajra	-		
5	Ragi	-		

Pulses& Oilseeds

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Arhar/ Redgram	-		
2	Groundnut	-		
3	Sesamum	3		3
4	Soyabean	6		6
5	Sunflower	-		
6	Castor	-		

Fibre

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Cotton	-		
2	Jute	-		
3	Mesta	-		
4	Sunhemp	-		

Other crops

S.No	Crop name	Total area (ha)	Irrigated area (ha)	Rainfed area (ha)
1	Sugarcane	5		5
2	Tobacco	-		
3	Guar seed	-		
4	Other Fodder crops	-		

Crop Plan- Beginning of the season

Delay by 4 weeks (1st week of July)	1) Upland /Jhum Rich Alluvial Soil	Rice based Rice + Maize + Cucumber	Rice : local short duration var.Sazukthu,fazai,buhbial) 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	1. Cabbage var. Ryozeki, Indam 1299, Improved Bahar, Rocky	Logwood bunding on sloppy land, Sowing can be delayed up to June with anticipation of rain.	

		Brinjal	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	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, Banana, 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	

Contingency measures- Mid season

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	Mulching with bio mass Earthing up	

			PP Measures		
	2) Terrace/ Mid land Red Alluvial soil	Rice	Weeding PP Measures Dripping & Wetting method	Earthing up Mulching with locally available organic materials	
		Fruit crops – Pineapple, Banana, M. Orange	Weeding PP Measures Dripping & Wetting method	Earthing 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.**	**NA 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	
		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	

Contingency measures- End of the season

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 .	
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	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**	NA	**NA**	**NA**	**NA**
Non release of water in canals under delayed onset of monsoon in catchment	1) Farming situation: Lowland clayey loam	NA	**NA**	**NA**	**NA**

Condition			Suggested Contingency measures		
	Major Farming situation	**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 /delayed onset of monsoon	NA	NA	NA	NA	NA
Insufficiency of surface water for irrigation	1) Farming situation: Lowland clayey loam	NA	NA	NA	NA

Condition			Suggested Contingency measures		
	Major Farming situation[f]	**Normal Crop/cropping system[g]**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation[j]**
Insufficient groundwater recharge due to low rainfall	1) Farming situation: Lowland clayey loam	NA	NA	NA	NA

Resource management technologies

- Jalkund
- Lifesaving irrigation with harvested water of Jalkund
- Paddy straw mulching
- Protected cultivation
- Zero tillage
- In situ moisture conservation