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Status of Food Security among Agricultural Farmers in Mizoram: An Empirical Insights

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Abstract: Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Agricultural production has increased in the state of Mizoram, whereas self-sufficiency in rice is still far from being attained. The present paper is based on a primary study and examined the levels of food security status among agricultural farmers in Mizoram. Primary data were collected from 22 villages comprising 330 households during 2023. Two villages were selected from each of the 11 districts. 30 households from each village were selected for collecting primary information on farmers' status on food security components such as food availability, food accessibility, food utilization and food stability. Indicators were gathered through scheduled. The collected data were analysed by simple arithmetic and Z-score standardised techniques. Maps were prepared by Arc GIS 10.1. The status of Food Security among agricultural farmers in the study area is moderately high. Most farmers have high food security, while a few are very low or very high.

Keywords: *Food Security, Food Availability, Food Accessibility, Food Utilization, Food Stability.*

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I. INTRODUCTION

Food security is a fundamental component of human well-being, sustainable development, and economic progress. The World Food Summit of 1996 defined food security as existing "when all people at all times have access to sufficient, safe, nutritious, food to maintain a healthy and active life". The WHO depicts food security consists of three dimensions viz. "food availability", "food access" and "food use". Remarkably, the Food and Agriculture Organisation of the United Nations (FAO) added a fourth dimension i.e. "the stability of the first three dimensions of food security over time". Therefore, the main prerequisites or dimensions of food security are as follows: *Food availability:* The physical availability of food refers to adequate quantities of food, supplied through native production or imports. It refers to the 'supply side' of food security. *Food Accessibility:* It refers to access by individual to adequate resources (entitlements) for acquiring appropriate food for a nutritious and balance diet. *Food Utilization/use:* Utilization in general understood as the way the body makes the most of various nutrients in the food through balance diet, clean water, hygiene, sanitation and heath care. *Stability:* To be food secure, an individual, household or population must have access to adequate food at all times. Thus food security is multidimensional concept closely associated with poverty, livelihoods, agricultural production, health, nutrition, and social and economic development.

As a fundamental component of sustainable development, it is intricately linked to several SDGs. By understanding these interconnections and implementing targeted strategies, we can work towards achieving zero hunger and ensuring a food-secure world for all. Feeding the future population of 10 billion by 2050 is increasingly challenging due to the complex interplay of social and economic drivers (Hanjra et al. 2017). Significant advancements have been made in India's agricultural output, food distribution, and poverty alleviation. However, vulnerable rural households are nonetheless affected by food insecurity and nutritional deficits. Because of variations in agricultural circumstances, regional features, livelihood prospects, income levels, infrastructure, and access to markets and governmental services, the situation differs significantly between regions.

In Mizoram, a hilly state in Northeast India, where agriculture continues to be a significant source of income for a substantial portion of the rural population, the issue of food security acquires particular significance. The state's

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agricultural output has somewhat grown, but rice self-sufficiency is still a long way off (Vangchhia & Sati, 2017). Agricultural households have unparalled hindrance due to the state's challenging topography, scattered settlements, limited cultivable land, transportation limitations, reliance on rainfall, and comparatively high costs of transporting food products and agricultural inputs. The availability of food for households and production patterns are also influenced by traditional agricultural practices, such as shifting cultivation in some regions. At the same time, household food security is dependent not only on agricultural productivity but also on income and purchasing power as farmers rely more and more on markets for food and other needs. As a result, Mizoram's agricultural farmers have varying degrees of food security.

In addition to making enough money from farming, some farmers might produce enough food for their own consumption, but others might face seasonal shortages, insufficient dietary variety, or trouble affording enough food. A number of variables, including farm size, cropping patterns, household income, availability to agricultural inputs, market accessibility, job possibilities, household size, and involvement in government food and livelihood programs, may have an impact on these disparities. In order to identify vulnerable households and comprehend the socioeconomic issues linked to food insecurity, it is crucial to measure the degree of food security among agricultural farmers.

The assessment of food security should also move beyond food availability and consider the broader dimensions of household access and nutritional well-being. A household may have access to food in terms of quantity but still experience food insecurity because of poor dietary quality or inadequate purchasing power. Similarly, households that are food secure during one period may become vulnerable during periods of crop failure, unemployment, price increases, or other shocks. Examining different levels of food security can therefore provide a more comprehensive picture of the conditions faced by agricultural households in Mizoram.

In light of this, the current study focuses on Mizoram's agricultural farmers' levels of food security. The study aims to determine differences in food security among households and to evaluate the degree to which farming households can obtain sufficient and nourishing food. It also takes into account the agricultural and socioeconomic aspects that could affect farmers' food security.

Understanding these conditions is important for developing appropriate agricultural, livelihood, nutrition, and social protection policies aimed at improving the well-being and resilience of farming communities in Mizoram. The findings may contribute to a better understanding of rural food security and provide useful insights for strengthening sustainable agricultural livelihoods and reducing household-level food insecurity in the state.

The challenges to food security are complex and require renewed analysis and focus on food systems at global, regional and local levels, to sustainably deliver safe and nutritious food to all people at all times (Brown et al. 2012) There is no substantial research done so far in the northeast India, in general and Mizoram, in particular, on food security related issues. This paper is an effort to present local food security status in Mizoram that represents the northeast India. Moreover, it will be a benchmark for further studies in the region or other similar regions. With this background, the main objective of this paper is to examine the status of food security among the agricultural farmers using four dimensions of food security i.e. food availability, accessibility, utilisation and food stability in the state of Mizoram

II. METHODS & MATERIALS

The study is based on an empirical study. The primary data were collected from 22 villages comprising 660 households during 2023. Two villages each were selected from 11 districts. Then, 30 households from each village were selected by the systematic random sampling method. Primary information on farmers' status on food security component indicators was gathered through scheduled. The collected data were analyzed by simple arithmetic and Z-score standardized techniques. Maps were prepared by Arc GIS 10.1 To obtain food security status, 28 food security indicators were analysed under four components of food security viz. food availability, food accessibility, food utilization and food stability. Firstly, all the data were normalized by the Z-score standardisation technique. Descriptive statistics were also calculated to explain the minimum, maximum, average, and Standard deviation of the values. Secondly, after completion of normalisation, the composite indices for the four food security components were calculated and grouped into indices/ levels (five) from very low to very high according to food security status in the study villages. A total 28 indicators were used to measure food availability status among agricultural farmers in Mizoram (Table 1).

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Table 1 Explanation of the Indicators

Food Security Components	Indicators
Food Availability	X_1 = No. of households having large enough land for food sufficiency in % X_2 = No. of family self-sufficient in food in % X_3 = No. of families having clean and healthy food in % X_4 = No. of the family affords monthly food expenditure in % X_5 = No. of family sufficient water for domestic use in % X_6 = No. of families having clean and healthy drinking water in % X_7 = No. of households with a good house in %
Food Accessibility	X_1 = No. of HH having enough electricity % X_2 = No. of HH having sufficient LPG supply in % X_3 = No. of HH having proper toilets in % X_4 = No. of HH having a good accessible Road in % X_5 = No. of HH access to good educational institutions in % X_6 = No. of HHs accessing basic medical facilities X_7 = No. of HH access the proper market in %
Food Utilization	X_1 = No. of HH aware of the importance of healthy foods in % X_2 = No. of HH done processing system clean & healthy in % X_3 = No. of HH aware of the importance of cleanliness in % X_4 = No. of HH living in clean enough in % X_5 = No. of HH having a proper stock point of food in % X_6 = No. of HH fairly distributed food to all family members in % X_7 = No. of HH maintaining a balanced diet in %
Food Stability	X_1 = No. of HH crop production supports the family for one year in % X_2 = No. of HH sufficient Income% X_3 = No. of the House safe from natural calamities in % X_4 = No. of HH was well prepared when the market price fluctuated in % X_5 = No. of HH will not have a problem in any pandemic occurrences in % X_6 = No. of HH does not fully depend on Rice Supply from FPS in % X_7 = No. of HH having alternative problem solutions for crop failure in %

➢ *Study Area*

Mizoram lies in the northeastern part of India between 21°58' - 24°35' N and 92°15' - 93°29' E, covering an area of 21,087 km2 and shares 0.64% of the country's area. It is a mountainous state and is also known as the eastern extension of the Himalaya. Myanmar in the east and south and Bangladesh in the west make up its international boundaries. Its national boundary is delimited by Tripura in the west, Assam in the north, and Manipur in the northeast. The total population is 1.09 million, and population distribution is sparse, as only 52 persons live per sq km. The Tropic of Cancer runs through the state nearly in the middle. The landscape of Mizoram is mostly rolling hills with minor valleys. About 76 per cent of the state is covered by forests, 8 per cent is fallow land, 3 per cent is barren and considered uncultivable area, while cultivable and sown area constitutes the rest. Slash-and-burn or jhum cultivation, though discouraged, remains a predominant practice. The present study covers all 11 districts of Mizoram, namely Aizawl, Lunglei, Champhai, Kolasib, Lawngtlai, Mamit, Siaha (Saiha), Serchhip, Khawzawl, Saitual, and Hnahthial. To ensure adequate geographical representation, 22 villages were selected from these districts, with two villages representing each district. The study covers a total of 330 households, providing a broad basis for examining food-security conditions of agricultural farmers across Mizoram.

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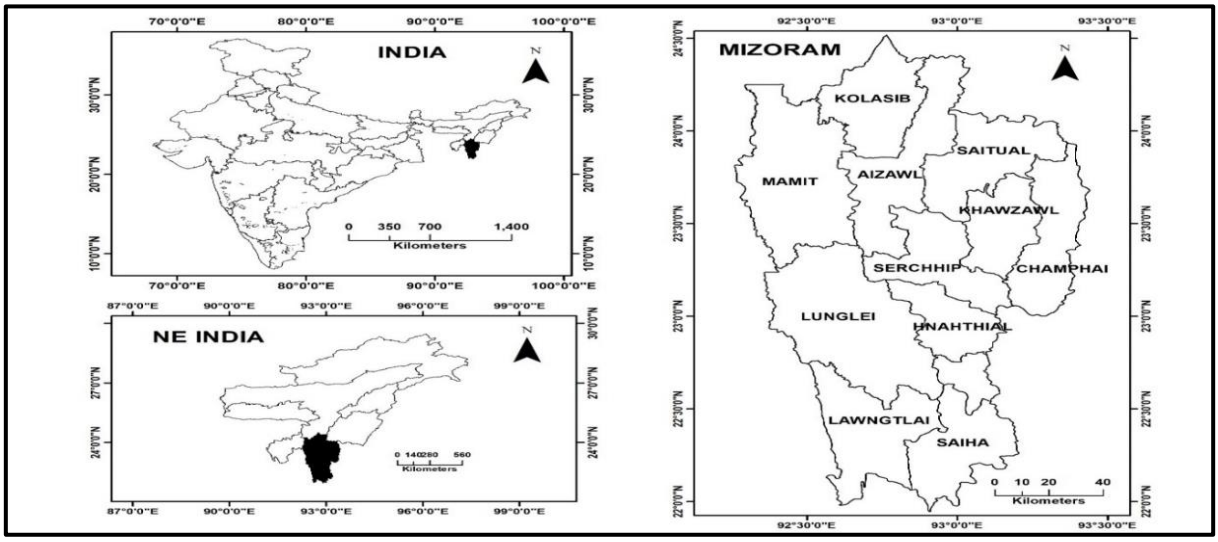


Fig 1 Map Showing Study Area

III. RESULTS AND DISCUSSIONS

➢ *Food Availability*

Food availability is an important dimension of food security and refers to the capacity of households to obtain adequate, sufficient, safe, and nutritious food throughout the year. In the study area, food availability is assessed through land availability, household food sufficiency, access to clean and healthy food, affordability of monthly food requirements, domestic water supply, availability of safe drinking water, and housing conditions. The findings indicate considerable variation among districts. The average proportion of households possessing sufficient land for food self-sufficiency is 73.94 per cent, with Aizawl recording the highest proportion (96.67%) and Lawngtlai the lowest (50%). About 80.91 per cent of households are able to meet their food requirements, with Aizawl and Lunglei reporting the highest levels (96.67% each). Access to clean and healthy food is relatively high, covering 82.12 per cent of households. However, affordability remains a major constraint, as only 56.06 per cent of households can meet their monthly food expenditure requirements. Water availability is comparatively satisfactory, with 86.97 per cent having sufficient domestic water supply and 85.15 per cent having access to clean drinking water. Housing conditions are also relatively favorable, with 72.42 per cent of households living in decent Assam-type, semi-permanent, or RCC houses. Overall, the findings suggest that while basic food and water availability is relatively satisfactory, affordability and housing conditions remain important areas requiring improvement.

Table 2 Food Availability

Districts	No. of households having large enough land for food sufficiency in %	No. of families self-sufficient in food in %	No. of families having clean and healthy food in %	No. of families affording monthly food expenditure in %	No. of families with sufficient water for domestic use in %	No. of families having clean and healthy drinking water in %	No of households with good housing in %
Aizawl	96.67	96.67	100.00	16.67	100.00	100.00	100.00
Lunglei	80.00	96.67	73.33	20.00	93.33	90.00	83.33
Champhai	83.33	90.00	80.00	63.33	90.00	76.67	26.67
Serchhip	66.67	63.33	76.67	56.67	93.33	100.00	100.00
Kolasib	70.00	70.00	80.00	30.00	90.00	93.33	90.00
Mamit	76.67	63.33	63.33	40.00	70.00	53.33	43.33
Lawngtlai	50.00	70.00	40.00	83.33	83.33	40.00	76.67
Siaha	83.33	93.33	96.67	56.67	93.33	90.00	56.67
Khawzawl	93.33	86.67	100.00	66.67	60.00	100.00	100.00
Saitual	60.00	93.33	100.00	100.00	86.67	100.00	90.00
Hnahthial	53.33	66.67	93.33	83.33	96.67	93.33	30.00
Average	**73.94**	**80.91**	**82.12**	**56.06**	**86.97**	**85.15**	**72.42**

Source: Field Survey, 2023

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The total 7 indicators were analyzed by Z Score Standardized techniques to find composite scores for good levels of food availability in Mizoram. Descriptive statistics were also formulated to explain the minimum, maximum, average and standard deviation of the values (Table 3). This prevents the undue influence of variables on the analysis.

Table 3 Descriptive Statistics

Indicators	N	Minimum	Maximum	Mean	Std. Deviation
X_1	11	50.00	96.67	73.9391	15.40695
X_2	11	63.33	96.67	80.9091	14.07132
X_3	11	40.00	100.00	82.1209	18.81373
X_4	11	16.67	100.00	56.0609	27.15353
X_5	11	60.00	100.00	86.9691	11.96780
X_6	11	40.00	100.00	85.1509	20.45948
X_7	11	26.67	100.00	72.4245	28.32663
Valid N (listwise)	11				

X_1= No. of household having large enough land for food sufficiency in %, X_2= No. of family self-sufficient in food in %, X_3= No. of family having clean and healthy food in %, X_4= No. of family afford monthly food expenditure in %, X_5= No. of family sufficient water for domestic use in %, X_6= No. of family having clean and healthy drinking water in %, X_7= No of household with good house in %.

A Z-score standardized technique was used for normalization of the raw data and to find out the composite index. Data collected from primary sources were transformed into variables to be used as indicators. To transform the data matrix into a scale-free matrix, indicators were standardized by subtracting the mean from each variable and dividing by its standard deviation.

Table 4 Normalized Value of the Indicators

Districts	X_1	X_2	X_3	X_4	X_5	X_6	X_7	CI
Aizawl	1.48	1.12	0.95	-1.45	1.09	0.73	0.97	0.70
Lunglei	0.39	1.12	-0.47	-1.33	0.53	0.24	0.38	0.12
Champhai	0.61	0.65	-0.11	0.27	0.25	-0.41	-1.62	-0.05
Serchhip	-0.47	-1.25	-0.29	0.02	0.53	0.73	0.97	0.03
Kolasib	-0.26	-0.78	-0.11	-0.96	0.25	0.40	0.62	-0.12
Mamit	0.18	-1.25	-1.00	-0.59	-1.42	-1.56	-1.03	-0.95
Lawngtlai	-1.55	-0.78	-2.24	1.00	-0.30	-2.21	0.15	-0.85
Siaha	0.61	0.88	0.77	0.02	0.53	0.24	-0.56	0.36
Khawzawl	1.26	0.41	0.95	0.39	-2.25	0.73	0.97	0.35
Saitual	-0.90	0.88	0.95	1.62	-0.02	0.73	0.62	0.55
Hnahthial	-1.34	-1.01	0.60	1.00	0.81	0.40	-1.50	-0.15

Based on the composite scores of all indicators, the levels of farmers' food availability are classified into five categories: very high, high, moderate, low, and very low, as presented in Table 4.5. Farmers in Aizawl and Saitual districts achieved the highest level and are classified as very high, followed by Siaha, Khawzawl, and Lunglei districts, which fall under the high category. Serchhip and Champhai districts are classified as moderate, Kolasib and Hnahthial districts as low, and Lawngtlai and Mamit districts as very low in terms of food availability.

Table 5 Levels of Food Availability among Agri. Farmers in Mizoram, 2023

Index	Class	Districts
Above 0.5	Very high	Aizawl & Saitual
0.1 to 0.5	High	Siaha, Khawzawl & Lunglei
-0.1 to 0.1	Moderate	Serchhip & Champhai
-0.1 to -0.5	Low	Kolasib & Hnahthial
Below -0.5	Very low	Lawngtlai & Mamit

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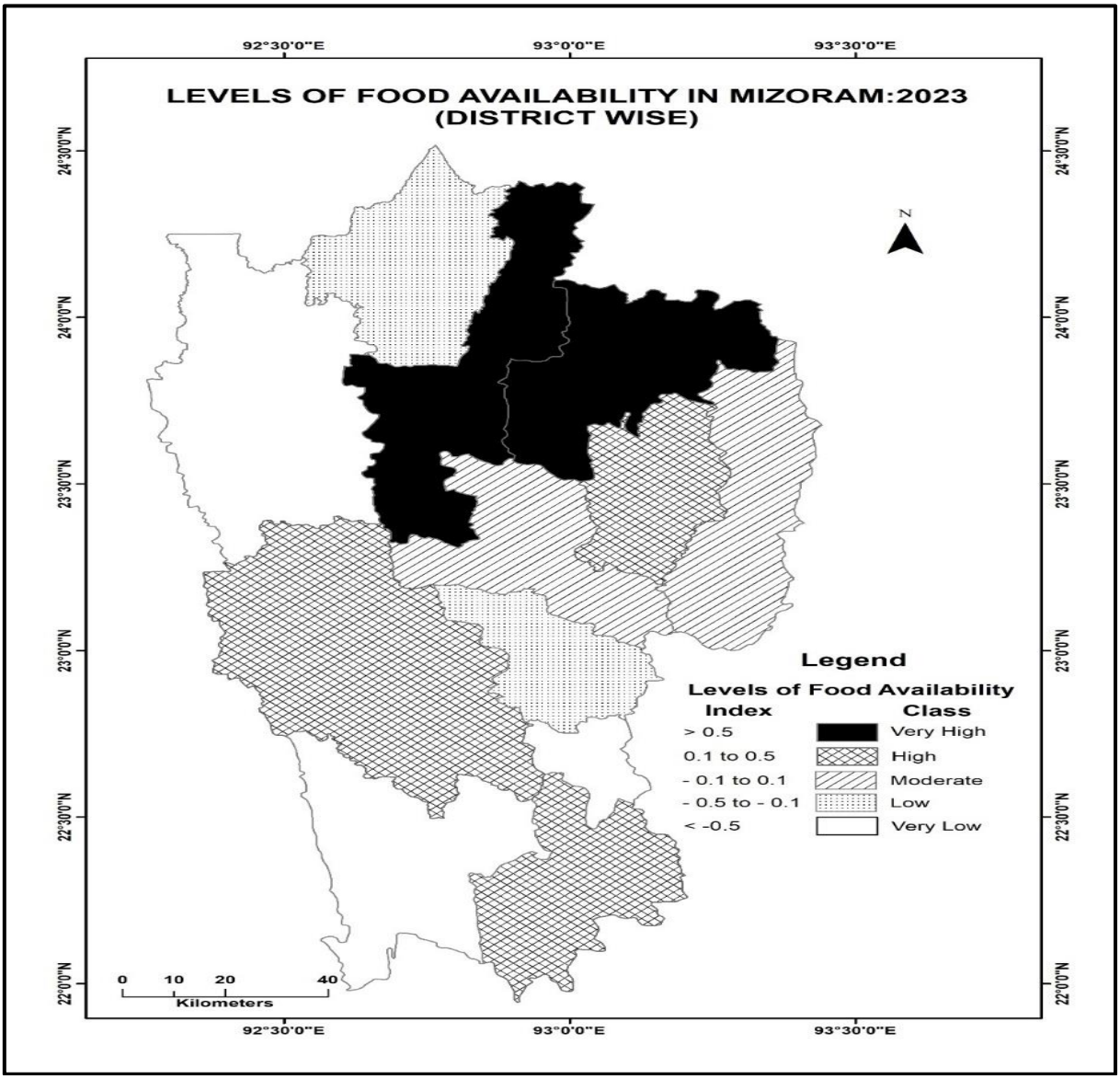


Fig 2 Levels of Food Availability in Mizoram:2023 (District Wise)

Similarly, food accessibility, food utilization and food stability were calculated as under.

➢ *Food Accessibility*

Food accessibility is an essential dimension of food security because it determines whether households can physically and economically obtain adequate food. Limited access to employment, income, natural resources, and essential services can increase the risk of food insecurity and malnutrition (Swaminathan, 2010; Chaturvedi, 1997). In the present study, food accessibility was assessed using seven indicators: household access to electricity, LPG, toilets, motorable roads, educational institutions, medical facilities, and markets, as shown in Table 2. The findings reveal considerable variation among districts. Household electricity access averaged 71.52 per cent, with Serchhip, Kolasib, and Saitual achieving 100 per cent. LPG accessibility averaged 75.76 per cent, while sanitation facilities recorded the highest accessibility at 96.67 per cent. Road connectivity was comparatively low, averaging only 58.48 per cent, with Khawzawl recording the highest accessibility (96.67%) and Lawngtlai the lowest (6.67%). Educational accessibility averaged 74.55 per cent, while medical facility accessibility stood at 71.21 per cent. Market accessibility was relatively low at 61.21 per cent, although Khawzawl and Saitual achieved 100 per cent. Overall, sanitation, LPG, electricity, education, and medical facilities show relatively better accessibility, whereas road and market connectivity remain major constraints. Improving transportation infrastructure, market linkages, and essential services is therefore important for strengthening food accessibility and ensuring sustainable food security in the study area.

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Table 6 Food Accessibility

Districts	No. of HH having enough electricity %	No. of HH having sufficient LPG supply in %	No. of HH having proper toilets in %	No. of HH having good accessible Road in %	No. of HH access good educational Institution in %	No. of HH access to basic medical facilities	No. of HH having access proper market in %
Aizawl	86.67	100.00	100.00	53.33	96.67	90.00	43.33
Lunglei	90.00	80.00	93.33	86.67	46.67	10.00	96.67
Champhai	53.33	50.00	96.67	16.67	20.00	16.67	46.67
Serchhip	100.00	100.00	100.00	30.00	86.67	96.67	50.00
Kolasib	100.00	86.67	86.67	66.67	73.33	83.33	56.67
Mamit	56.67	70.00	56.67	56.67	83.33	56.67	63.33
Lawngtlai	10.00	26.67	90.00	6.67	10.00	13.33	16.67
Siaha	23.33	0.00	100.00	50.00	100.00	100.00	6.67
Khawzawl	53.33	100.00	100.00	96.67	100.00	100.00	100.00
Saitual	100.00	96.67	100.00	46.67	93.33	76.67	100.00
Hnahthial	70.00	93.33	96.67	93.33	93.33	96.67	56.67
Average	**71.52**	**75.76**	**96.67**	**58.48**	**74.55**	**71.21**	**61.21**

Source: Field Survey, 2023

Based on the composite scores of all indicators, the levels of farmers' food accessibility are classified into five categories: very high, high, moderate, low, and very low, as presented in the figure 3. Farmers in Khawzawl, Saitual & Hnahthial districts achieved the highest level and are classified as very high, followed by Serchhip, Kolasib & Aizawl districts, which fall under the high category. Lunglei district is classified as moderate, Mamit & Siaha districts as low, and Champhai & Lawngtlai districts as very low in terms of food accessibility.

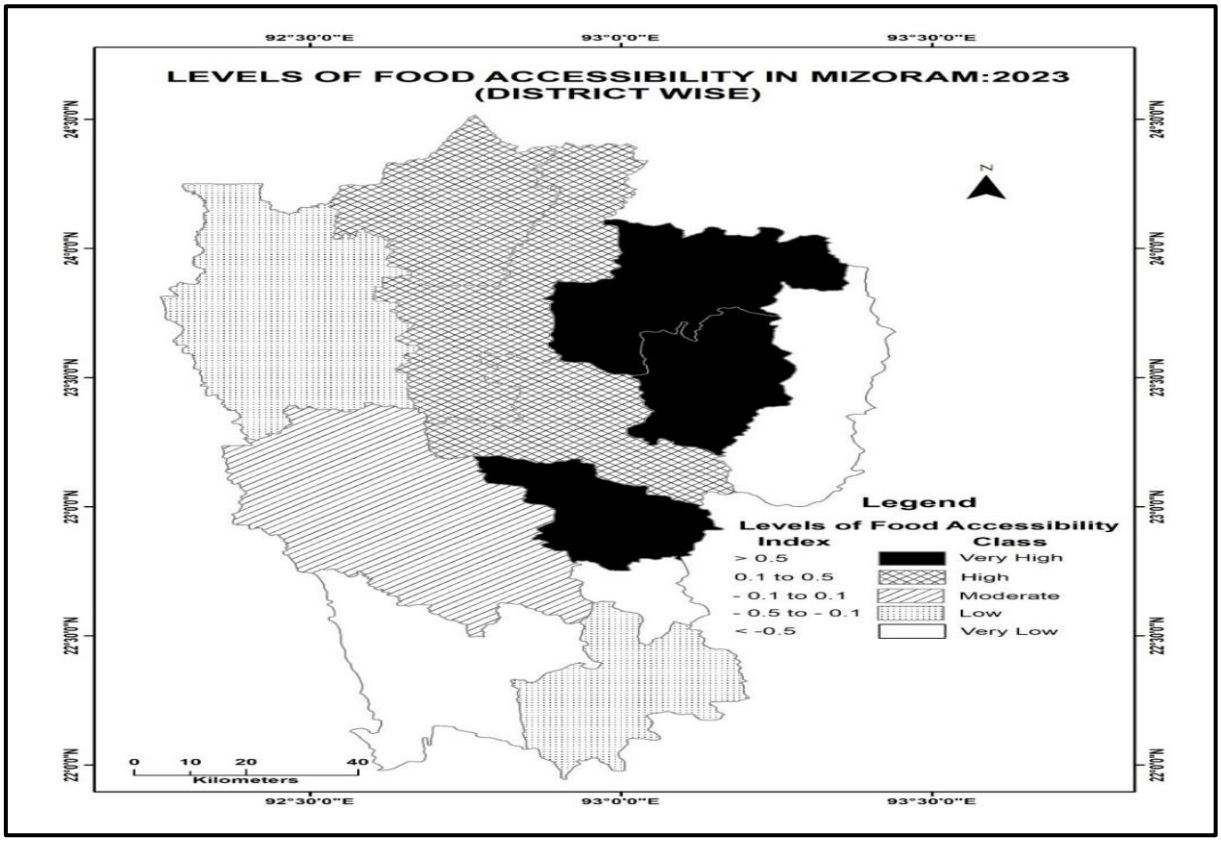


Fig 3 Levels of Food Accessibility Among Agricultural Farmers in Mizoram 2023

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➢ *Food Utilization*

Food utilization is a fundamental component of food security, referring to the proper use of food to meet the nutritional needs of individuals (FAO, 2001). It depends on dietary quality, hygiene, food storage, cleanliness, and awareness of healthy eating practices. In the study area, food utilization was assessed using seven indicators, as presented in Table 7. The findings indicate that 83.03 per cent of farmers were aware of the importance of healthy food, while 75.15 per cent maintained a clean and healthy household system. Awareness of cleanliness was relatively high at 83.94 per cent, and 90.30 per cent of farmers reported clean living conditions. Proper food storage facilities were available to 60.91 per cent of households. Food distribution within families was comparatively satisfactory, with 93.64 per cent reporting fair distribution among family members. However, maintenance of a balanced diet was relatively poor, with only 40.30 per cent of farmers following a balanced diet. Considerable district-level variations were observed. Aizawl, Khawzawl, and Saitual generally performed well across several indicators, whereas some districts recorded lower levels of food utilization. Balanced-diet practices were particularly low in Lunglei, Serchhip, and Siaha, at only 3.33 per cent each. Overall, the findings suggest that although awareness, cleanliness, and food distribution are satisfactory, balanced dietary practices and proper food storage remain major challenges. Nutrition education, dietary diversification, and improved food-storage practices are therefore necessary to enhance food utilization and nutritional security in the study area.

Table 7 Food Utilization Among Agricultural Farmers

Districts	**No. of HH aware importance of healthy foods in %**	**No. of HH done processing system clean & healthy in %**	**No. of HH aware importance of cleanliness in %**	**No. of HH living in clean enough in %**	**No. of HH having proper stock point of foods in %**	**No. of HH fairly distributed food to all family members in %**	**No. of HH maintaining Balance Diet in %**
Aizawl	100.00	100.00	100.00	100.00	93.33	100.00	60.00
Lunglei	40.00	63.33	50.00	86.67	66.67	100.00	3.33
Champhai	96.67	80.00	96.67	96.67	93.33	96.67	16.67
Serchhip	83.33	70.00	76.67	83.33	53.33	100.00	3.33
Kolasib	86.67	90.00	93.33	100.00	70.00	96.67	70.00
Mamit	43.33	60.00	63.33	56.67	70.00	73.33	63.33
Lawngtlai	86.67	10.00	83.33	90.00	3.33	100.00	13.33
Siaha	90.00	93.33	90.00	96.67	23.33	100.00	3.33
Khawzawl	100.00	100.00	100.00	100.00	46.67	100.00	93.33
Saitual	100.00	100.00	100.00	100.00	80.00	100.00	93.33
Hnahthial	86.67	60.00	70.00	83.33	70.00	63.33	23.33
Average	**83.03**	**75.15**	**83.94**	**90.30**	**60.91**	**93.64**	**40.30**

Source: Field Survey, 2023

Based on the composite scores of all indicators, the levels of farmers' food utilization are classified into five categories: very high, high, moderate, low, and very low, as presented in the figure 4. Farmers in Saitual, Aizawl & Khawzawl districts achieved the highest level and are classified as very high, followed by Kolasib & Champhai districts, which fall under the high category. Siaha district is classified as moderate, Serchhip district as low, and Hnahthial, Lawngtlai, Lunglei & Mamit districts as very low in terms of food utilization.

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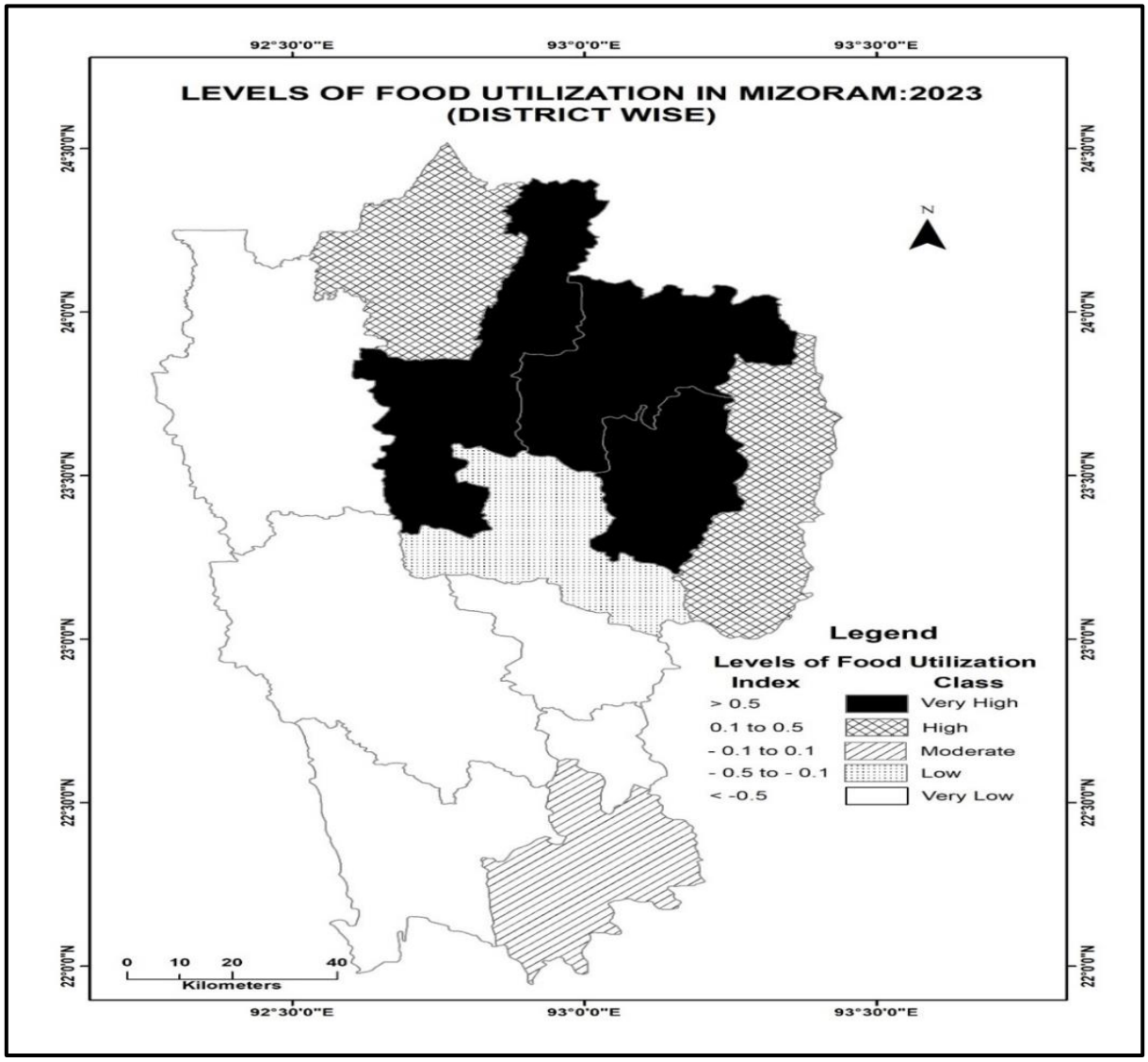


Fig 4 Levels of Food Utilization Among Agricultural Farmers in Mizoram 2023

➢ *Food Stability*

Food stability is an important dimension of food security, reflecting the ability of households to maintain adequate food access despite economic, environmental, and social shocks. In the study area, food stability was assessed using seven indicators: family crop production, income sufficiency, safety of houses from natural calamities, preparedness for market price fluctuations and pandemics, independence from Fair Price Shop (FPS) supplies, and alternatives during crop failure. The findings show that 63.64 per cent of farmers could meet their basic food requirements through their own crop production, while only 50.91 per cent reported sufficient family income. Housing safety against natural calamities was considerably low, with only 19.39 per cent of households meeting the criterion. Similarly, preparedness for market price fluctuations was only 11.82 per cent, while pandemic preparedness stood at 10.30 per cent. Only 16.97 per cent of farmers were independent of FPS rice supplies, indicating substantial dependence on public food distribution. Furthermore, merely 8.18 per cent had alternative options in the event of crop failure. Significant district-level variations were observed. Aizawl and Lunglei recorded high levels of family crop production, while Mamit showed the highest income sufficiency. Khawzawl performed best in household safety, Kolasib in market and pandemic preparedness, and Hnahthial in alternatives during crop failure. Overall, food stability remains relatively weak, particularly regarding disaster preparedness, market risks, and crop-failure alternatives. Strengthening livelihood diversification, agricultural insurance, disaster resilience, and alternative income and food sources is essential for improving food stability in the study area.

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Table 8 Food Stability of Agricultural Farmers

Districts	No. of HH crop production support family for one year in %	No. of HH with sufficient Income %	No. of HH safe from natural calamities in %	No. of HH well prepared when market price fluctuated in %	No. of HH will not have a problem in any pandemic occurrences in %	No. of HH not fully depend on Rice Supply from Fair Price Shop in %	No. of HH having alternative problems solution for crop failure in %
Aizawl	93.33	96.67	3.33	3.33	6.67	33.33	0.00
Lunglei	93.33	76.67	3.33	6.67	3.33	3.33	3.33
Champhai	80.00	16.67	13.33	20.00	20.00	23.33	3.33
Serchhip	63.33	26.67	0.00	0.00	0.00	20.00	0.00
Kolasib	66.67	53.33	26.67	30.00	23.33	36.67	3.33
Mamit	56.67	100.00	3.33	3.33	6.67	3.33	3.33
Lawngtlai	40.00	10.00	3.33	16.67	6.67	43.33	10.00
Siaha	66.67	16.67	0.00	20.00	23.33	10.00	3.33
Khawzawl	56.67	66.67	93.33	6.67	6.67	0.00	0.00
Saitual	26.67	43.33	6.67	6.67	3.33	6.67	10.00
Hnahthial	56.67	53.33	60.00	16.67	13.33	6.67	53.33
Average	**63.64**	**50.91**	**19.39**	**11.82**	**10.30**	**16.97**	**8.18**

Source: Field Survey, 2023

Based on the composite scores of all indicators, the levels of farmers' food stability are classified into five categories: very high, high, moderate, low, and very low, as shown in the figure 5. Farmers in Kolasib and Hnahthial districts achieved the highest level and are classified as very high. This is followed by Champhai and Aizawl districts, which fall under the high category. Siaha and Khawzawl districts are classified as moderate, Lawngtlai and Mamit districts as low, and Serchhip and Saitual districts as very low in terms of food stability.

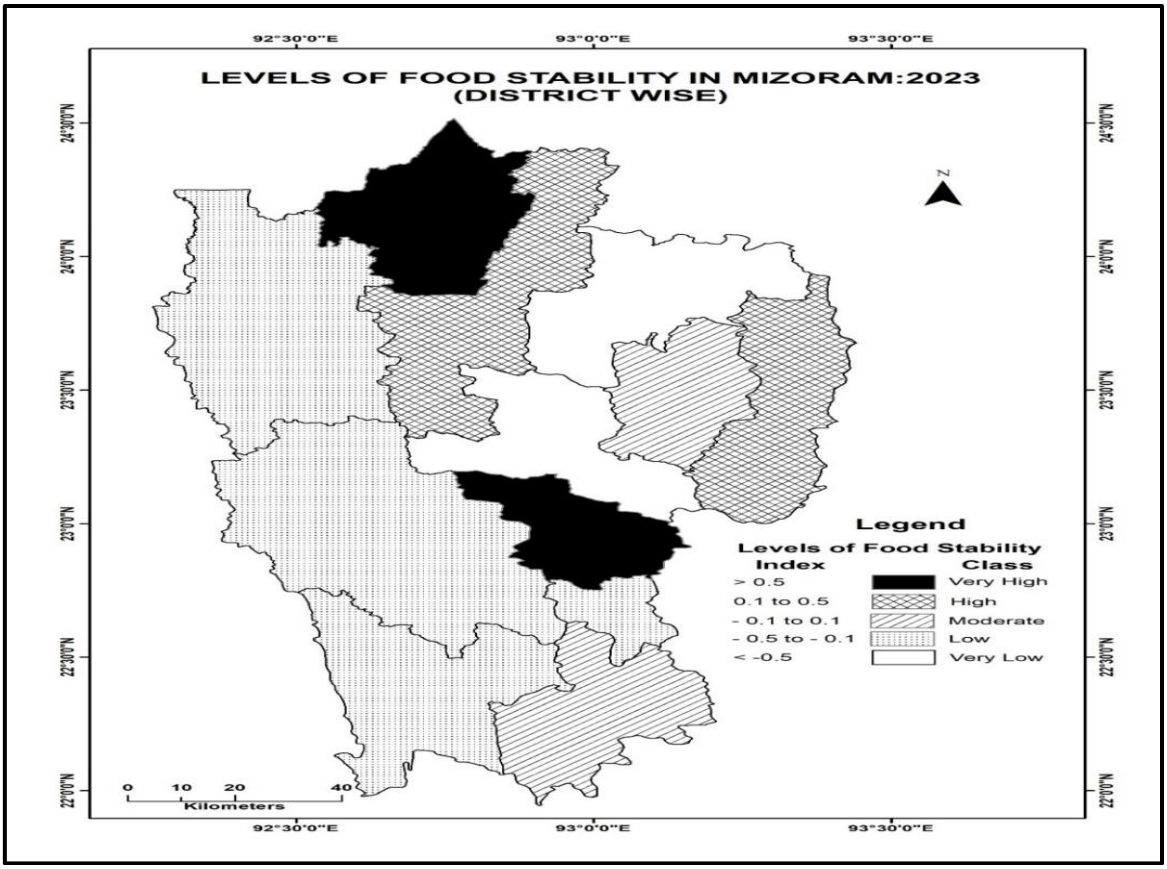


Fig 5 Levels of Food Stability Among Agricultural Farmers in Mizoram 2023

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➢ *Levels of Food Security of Agricultural Farmers in Mizoram 2023*

After calculating all indicators from the four food security components, such as food availability, food accessibility, food utilization, and food stability. The agricultural farmers of Mizoram were classified based on their composite scores. All districts were categorized into five levels of food security status: very high (above 0.5), high (0.1 to 0.5), moderate (-0.1 to 0.1), low (-0.1 to -0.5), and very low (below -0.5). As shown in the figure 6, farmers in Aizawl district achieved the highest level and are classified as very high. Khawzawl, Saitual, and Kolasib districts are classified as high, while Hnahthial, Siaha, and Champhai districts fall under the moderate category. Lunglei is also classified as moderate, and Mamit and Lawngtlai districts are classified as very low in overall food security status.

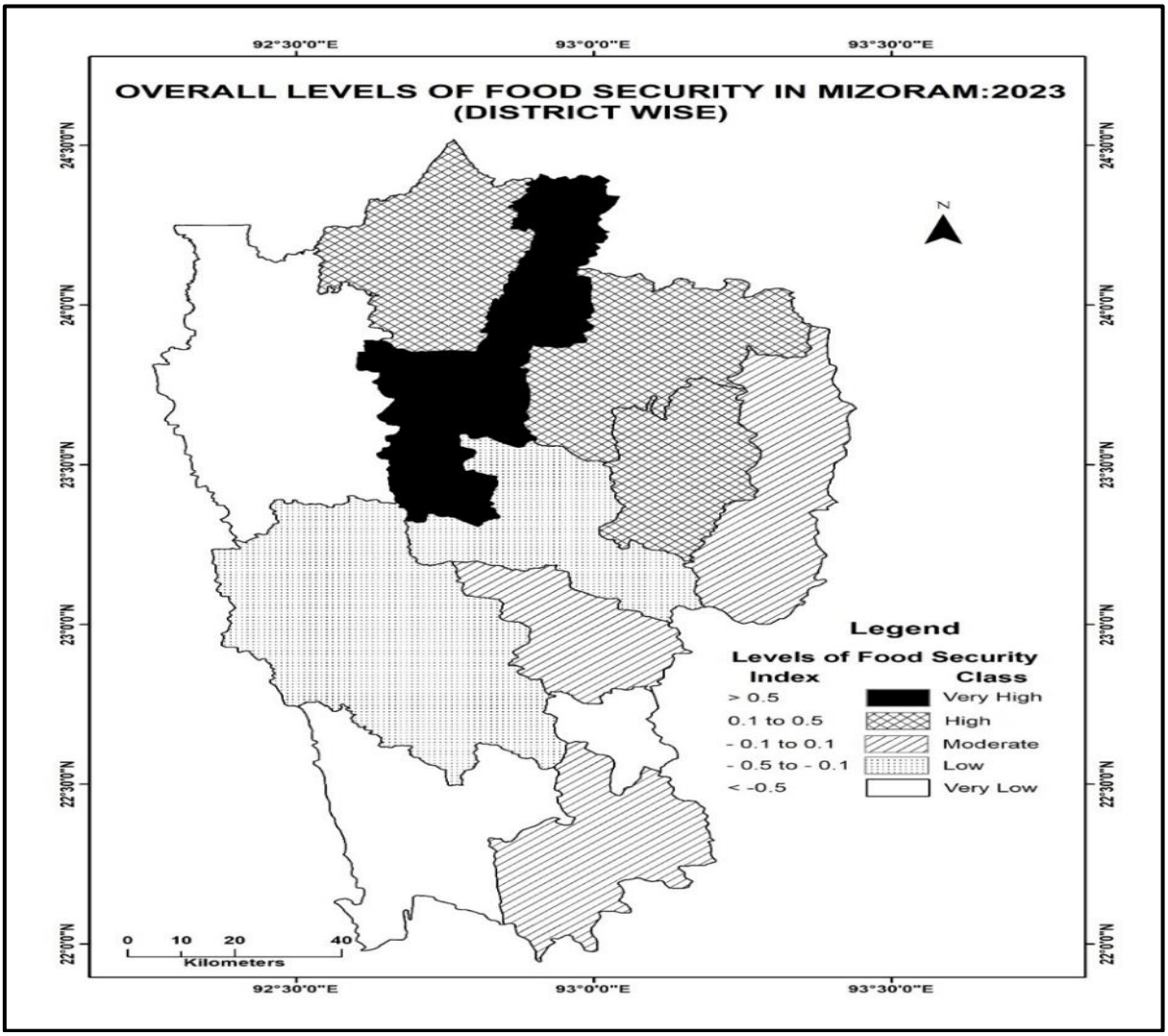


Fig 6 Levels of Food Security Among Agricultural Farmers in Mizoram 2023

IV. CONCLUSIONS AND SUGGESTIONS

The study concludes that food security among agricultural farmers in Mizoram presents considerable spatial variation across its four major dimensions: food availability, accessibility, utilization, and stability. Food availability is relatively satisfactory, particularly in terms of water supply, clean food, and household food sufficiency, although affordability and housing conditions require further improvement. Food accessibility is better for sanitation, LPG, electricity, education, and medical facilities, while poor road and market connectivity remain significant constraints. Food utilization shows satisfactory levels of awareness, cleanliness, and food distribution, but balanced dietary practices and food storage require greater attention. Food stability is the weakest dimension, with limited preparedness for natural calamities, market fluctuations, pandemics, and crop failures. Overall, Aizawl records very high food security, while Khawzawl, Saitual, and Kolasib show high levels; Mamit and Lawngtlai remain very low.

The findings highlight the need for improved infrastructure, livelihood diversification, nutrition education, disaster preparedness, and stronger agricultural support systems to achieve sustainable food security in Mizoram. The study suggests strengthening agricultural production through improved irrigation, modern farming technologies, quality inputs, and better storage facilities. Road connectivity and market infrastructure should be improved to enhance farmers' access to food and agricultural markets. Nutrition education

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and awareness programmes should promote balanced diets, dietary diversification, hygiene, and proper food storage. Household income can be strengthened through livelihood diversification, employment opportunities, and better access to agricultural credit and government schemes. Greater emphasis should be placed on crop insurance, disaster preparedness, and alternative livelihood options to improve food stability. Strengthening public distribution systems and essential services, particularly in vulnerable districts such as Mamit and Lawngtlai, is also necessary. District-specific planning and targeted interventions should be adopted to reduce regional disparities and achieve sustainable food security in Mizoram.

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