

## Identification of Food Security Region for Balanced Development in Mizoram

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**Abstract :** Man needs adequate food to sustain life. The security in food is necessary for attaining life, growth and healthy life. The present study analyses the level of food security status in the eight districts of Mizoram to identify the food security region for attaining balanced development. The level of food security has been determined by considering the three major components like Food Availability, Food Accessibility and Food Stability including nine minor food security indicators. The Z score standardize technique has been used to analyze of the variables. The study area can be divided into two food security regions like food secure and food insecure region. The two districts like Serchhip and Champhai may be treated as a more or less food secure region at state level whereas the other six districts are food insecure region. The study also identified the food security region as well as the unequal development in terms of food security in the state. So, the study has relevance especially for balanced development.

**Keywords :** Food Security, Food Availability, Food Accessibility, Food Stability, balanced development

### Introduction

The term 'Food Security' was first coined in 1974 by the Food and Agricultural Organization (FAO). The World Bank has defined it as "ensuring food to all people at all times has both physical and economic access to basic food they need" (World Bank, 1990). Mathew (2002) described three main components of food security viz. availability, distribution and access. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food security depends

on availability of food that is nutritionally adequate and safe, especially food that is produced by the new cutting edge from technology (Singh, 2002).

The Food and Agriculture Organization in the fourth (1977) and fifth (1985) World Food Surveys puts the proportion of the third world population living below a minimum survival level of energy consumption at about 15 per cent, where as World Bank (1986) assesses the number of living on diets in less than optimum energy content at between 14 & 15 per cent. Sukhatme (1977) estimates that in India the numbers of people

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whose energy intake are below the lower limit of adaptation comprise 20 per cent of the population, whereas Dandekar and Rath (1971) estimated about twice that proportion to be unable to purchase a minimum adequate diet.

The Food and Agriculture Organization of the United Nations (2013) estimates around 800 million people worldwide to be food insecure and they are not limited to the developing world. Busch and Lacy (1984), FAO (2003) consider measuring food insecurity at the individual/Household level rather than the national level defers from the more traditional approach of identifying food insecurity as the inadequacy of aggregate supply and accessibility to food (Sen, 1981).

Food security is a matter, which has been receiving attention of every one and has resulted in World food Summit five years ago. Kumar (2011) explained that as far as India is concerned we have achieved the food self-sufficiency and have a large buffer stock of almost 60 million tons of food grains. However, at the same time we have about 26 per cent of the population Below Poverty Line. In terms of absolute numbers, this means that almost 260 million persons are below the poverty line in the country. A large proportion of this population lives in rural areas. It is estimated that almost 193 million persons out of the 260 million persons below the poverty line live in rural areas.

Mizoram stood at a very low level in food by taking the food security components as an indicator. The per capita production per annum, per capita per day availability of rice, livestock availability per head, percentage irrigated land etc. is extremely low in the state. At the same time, there is inequality in terms of Public Distribution System (i.e., number of fair price shop) in rural and urban areas. The road density and conditions are also imbalance among the district in general and rural and urban in particular. Thus, the study of disparity in the state is necessary for planning an equal and sustainable development.

### **Objectives**

The main objectives of the study are:

- i) To find out the food security level in Mizoram
- ii) To identify food secure and insecure districts in Mizoram
- iii) To suggest a model for food security in Mizoram

### **The Study Area**

Mizoram is located on the tip of the Northeastern boundary of India lies between 21°56'N -24°31'N latitudes and 92°16'E - 93°26'E longitudes. According to 2011 census, the state has 10, 97,206 Population, among the total population, 91.58 per cent are literate; the number of female per 1000 male is 976. The food production per head per annum in

the year 2013-2014 is only 69.68 (Agriculture Abstract, Mizoram, 2014). As a result of the study the state can be divided into two parts i.e., more or less food secure region and insecure region. The two eastern north districts may be treated as food secure region while the other 6 district are falling under insecure region.

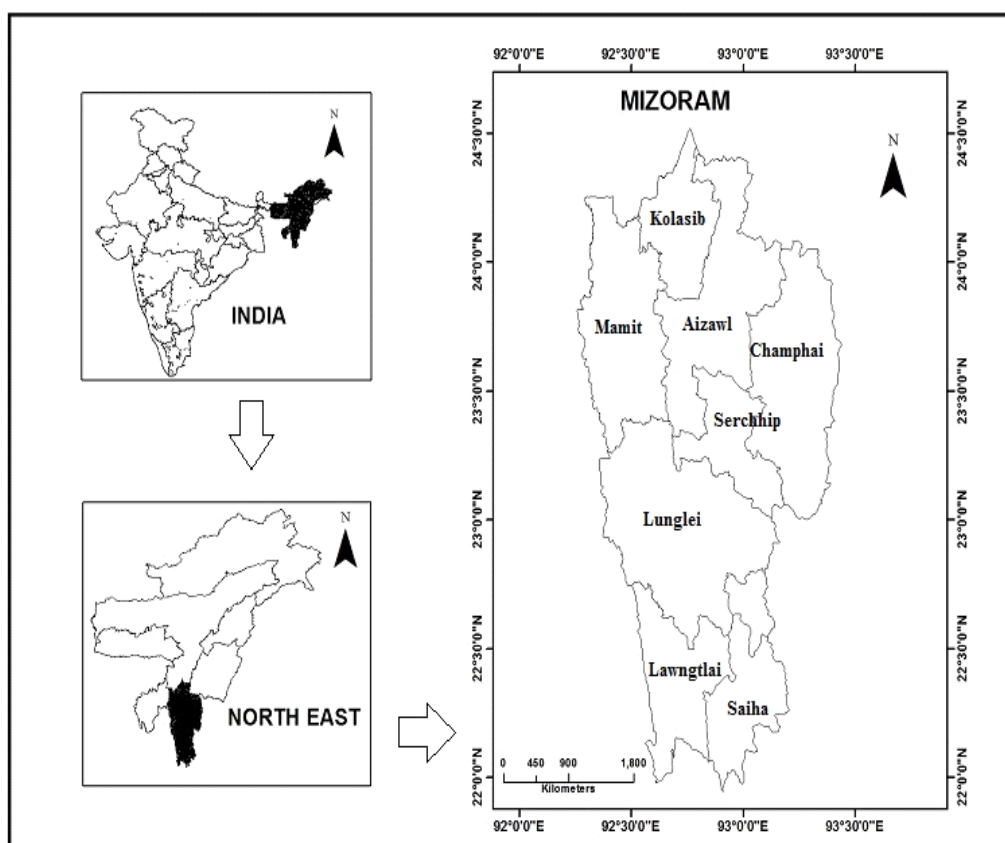
**Data and Methods**

The present study is mainly based on secondary data which is published by the state government.

The data about food production per head per annum, irrigated area in % and yield per hectare are collected from Agriculture Abstract of Mizoram (2013-2014). Statistical Handbook of Mizoram (2014) has been used to find out per capita per day availability of rice, number of livestock per head and number of fair price shop per village or local council. Percentage of main workers and literacy rate were collected from Census of India publication 2011.

The present study attempts to

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**Fig 1: Map of the Study Area**

find out the levels of food security to identify the food secure and insecure region in Mizoram by considering the major three components like food Availability, food accessibility and food stability including the 9 food security indicators (i.e., each components have three indicators). To analyze of these variables Standard Deviation and Z score standardization techniques have been applied. Arc GIS 9.0 has been employed to in cartographic works.

## **Result and Discussion**

### **Food Availability**

Food availability is one of the most important component in food security, since rice is the main food in the state. Food availability is measured by studying the three indicators like rice production per head per annum, per capita per day availability of rice and number of livestock per head (as live stock is the other important source of food that provides meat and milk).

### **Food production per head per annum:**

Since rice as the staple food, production of rice per head in a year is taken as an important component for food security. It refers to the domestic production of rice per head per annum. In 2014, the average rice production per head per annum is 69.68 kilogram per hectare of land. Among the 8 district, Champhai has scored the highest (125.49 g/head) while Aizawl has

produced only 13.16 which is 112.33 lower than Champhai district. Champhai district is followed by Kolasib (121.02), Serchhip (106.72), Lawngtlai (75.80), Mamit (47.00), Lunglei (38.13) and Saiha (30.10).

### **Per capita per day availability of rice:**

The study shows that the per capita per day availability of rice in Mizoram (i.e.193.59 gram) is less than the national average (i.e., 462 grams). The district Champhai has got the highest (348.67 grams) while Aizawl has the lowest position in this indicator (36.67 grams). Among the district, the north and eastern part of the state have a high levels (except district Aizawl as an exceptional case) while the south and western part of the state have a low per capita per day availability of Rice. The study shows that there is no district which is higher than the national average in availability of rice in the study area.

### **Number of Livestock per head:**

Livestock is taken as one of the important indicators of food security because the important food such as meat and all dairy products like milk, butter, ghee etc. are derived and hence the number of livestock per head is taken as an indicator of food security levels measurement. In this case, Champhai district has attained the highest position (2.55) followed by Saiha (2.38), Serchhip (1.74), Mamit

(1.63), Kolasib (1.56), Lunglei (1.40), lawngtlai (1.11) and Aizawl (1.02).

**Levels of Food Availability**

To evaluate the level of food availability, the composite score of the three indicators such as food production per head per annum, per capita availability of food and number of livestock per head for the study area were taken into account. The result shows that the district champhai has the highest score in food availability i.e., 4.5 followed by Kolasib (2.14), Serchhip (1.82), Saiha (-0.51), Mamit (-0.11), Lawngtlai(-0.74), Lunglei (-0.93) and Aizawl (-3.76).

**Food Accessibility**

The accessibility of foods is another important component which determines the food security

in an area (Swaminathan, 2010). Majority of malnourished population cannot produce or afford to buy enough food. They have inadequate access to natural resources, jobs, income or social scores (Chaturvedi, 1997). Road density, number of fair price shop per village and percentage of main workers are the main indicators to examine the food accessibility.

**Road Density** plays an important role for the food accessibility. The good condition and high density of road provide a good accessibility and further result in to food security. In the study area, the road density is very low i.e., 2.68 kilometers per square kilometer. District Mamit has the highest density of road among the eight district 3.9 km per Sq km while the

**Table 1. Food Availability, Mizoram , 2014**

District	*Food production per head per annum (kg)	**Per capita per day availability of Rice (Gram)	**No. of livestock per head	Com posite Score
Aizawl	13.16	36.67	1.02	-3.76
Champhai	125.49	348.67	2.55	4.15
Kolasib	121.02	336.00	1.56	2.14
Lawngtlai	75.80	210.67	1.11	-0.74
Lunglei	38.13	106.00	1.40	-1.93
Mamit	47.00	130.67	1.63	-1.11
Saiha	30.10	83.67	2.38	-0.51
Serchhip	106.72	296.33	1.74	1.82
Mean	69.68	193.59	1.67	
S.D	43.80	121.61	0.55	

Source : \*Agriculture Abstract, Mizoram, 2013-2014  
 \*\*Statistical Handbook, Mizoram, 2014

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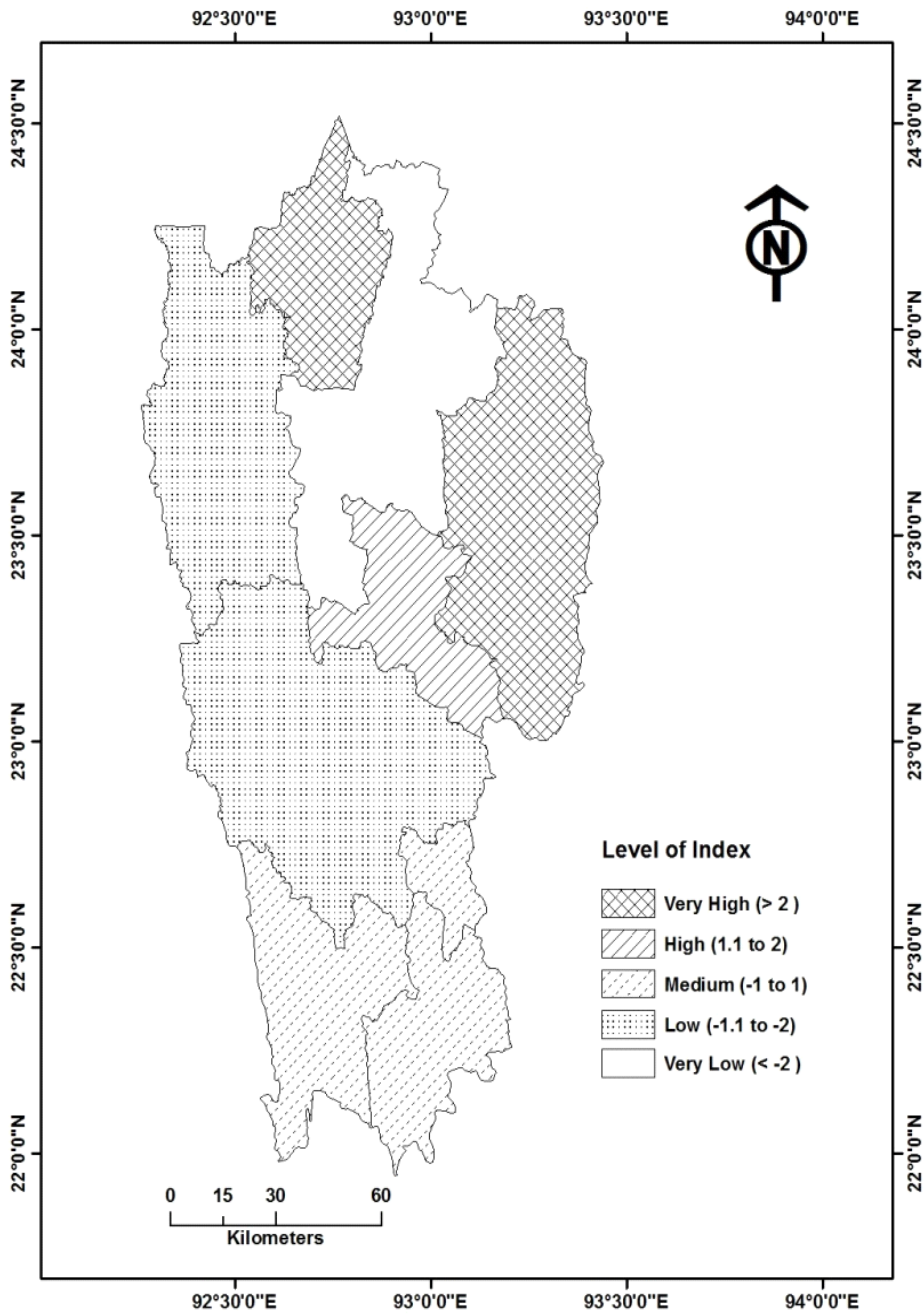


Figure 2. Level of Food Availability, Mizoram, 2014



lowest road density district of Kolasib has 1.8 only. The district Mamit is followed by Lunglei (3.5), Lawngtlai (2.8), Serchhip (2.6), Champhai (2.4), Aizawl (2.3), Saiha (2.1) and Kolasib (1.8). The study shows that south and western part are quite good and have a better accessibility than north and north eastern part of the state.

**Number of Fair Price Shop per village or Local Council** is one of the most important components of food accessibility as to store and distribute food, availability, nearness and regularity of fair price shop are very essential for supporting the poor people. Hence the availability of fair price shop is taken as an important indicator for food accessibility. In the study area, 1.7 fair price shop are available in every Village Council or Local Council in an average. Aizawl district has attained the highest position which has more than 3

numbers of fair price shop per village or Local council. On the other hand district Lawngtlai has a very low availability (i.e. 0.64) which is almost three times lower than Aizawl district and it indicates there is some village or local council do not have fair price shop in the district. The district Aizawl is far highly developed in case of fair price shop availability which is followed by Serchhip (2.30), Champhai (1.78), Kolasib (1.53), Lunglei (1.57), Saiha (1.39), Mamit (1.15) and Lawngtlai (0.65). The result finds that the Public Distribution System (PDS) in the state is suffering from an urban biasness. The most urban have a high number of Fair Price Shop and vice versa.

**Percentage of Main Workers** to the total population is another important component which represents total employment scenario of the area. In the study area 37.50 percent are main

**Table 2. Food Accessibility, Mizoram, 2014**

District	*Road density	**No. of fair price shop per village	***Percentage of main workers	Composite Score
Aizawl	2.3	3.26	37.82	1.3
Champhai	2.4	1.78	42.24	0.46
Kolasib	1.8	1.53	35.37	-1.8
Lawngtlai	2.8	0.64	32.3	-1.99
Lunglei	3.5	1.57	38.42	1.14
Mamit	3.9	1.15	41.9	1.72
Saiha	2.1	1.39	25.97	-3.04
Serchhip	2.6	2.30	45.95	1.99
<b>Mean</b>	<b>2.68</b>	<b>1.70</b>	<b>37.50</b>	
<b>S.D</b>	<b>0.71</b>	<b>0.79</b>	<b>6.31</b>	

Source: \*Internet, \*\*Statistical Handbook (2014), \*\*\*Census (2011)

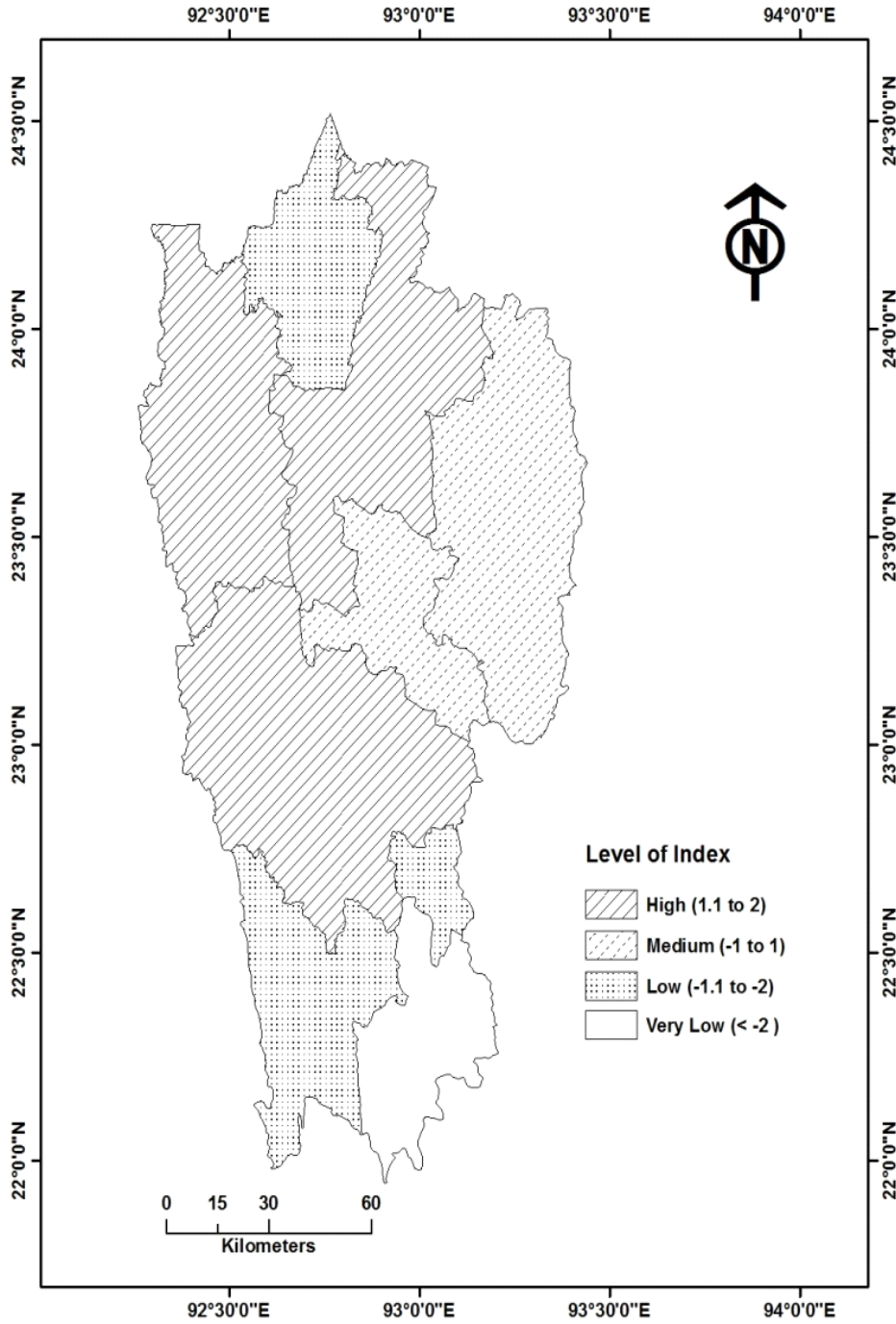


Figure 3. Levels of Food Accessibility, Mizoram, 2014



workers. The district Serchhip has the highest position in that case where 45.95 per cent of the total populations are under main worker followed by Champhai (42.24), Mamit (41.9), Lunglei (38.42), Aizawl (37.82), Kolasib (35.37), lawngtlai (32.3) and Saiha (25.95). It can be shown that the southern parts of the study area has less number of worker as compared to northern part of the state.

**Food Stability**

Food stability refers to the stability in production, price, marketing, distribution system, access to safe drinking water and environmental hygiene. Food stability for the present study has been examined by considering the three indicators like percentage of irrigated land, yield per hectare and literacy rate.

**Irrigated area of land** in Mizoram is only 1.07 per cent of the total land area. Irrigation is the basic requirement for the continuation of agricultural production in India since India's agriculture is mainly depends upon the rainfall. In the study area, the district Kolasib has the largest irrigated land, 2.77 per cent of the total land area have irrigation system. Beside Kolasib there are only the other two district having irrigated land across 1 per cent of the total land such as Serrchhip (1.79), Champhai (1.24),. The other 5 districts have below 1 per cent irrigated land of the total land area such as Aizawl (0.75), Mamit (0.54), Lawngtlai (0.54), lunglei (0.48) and Saiha (0.44).

**Yield per Hectare** or the agricultural productivity a one of the effective factor determining the

**Table 3. Food Stability, Mizoram, 2014**

District	*Irrigated area In %	*Yield per hectare (kg)	**Literacy rate (%)	Composite Score
Aizawl	0.75	1407.59	98.5	-0.16
Champhai	1.24	1580.21	93.51	1.24
Kolasib	2.77	1672.15	94.54	3.87
Lawngtlai	0.54	1439.66	66.41	-3.26
Lunglei	0.48	1420.07	89.4	-1.25
Mamit	0.54	1293.5	85.96	-2.46
Saiha	0.44	1464.32	88.41	-1.07
Serchhip	1.79	1668.27	98.76	3.07
Mean	1.07	1493.22	91.58	
S.D	0.83	134.43	10.39	

Source: \*Agriculture Abstract, Mizoram, 2013-2014), \*\*Census of India, 2011

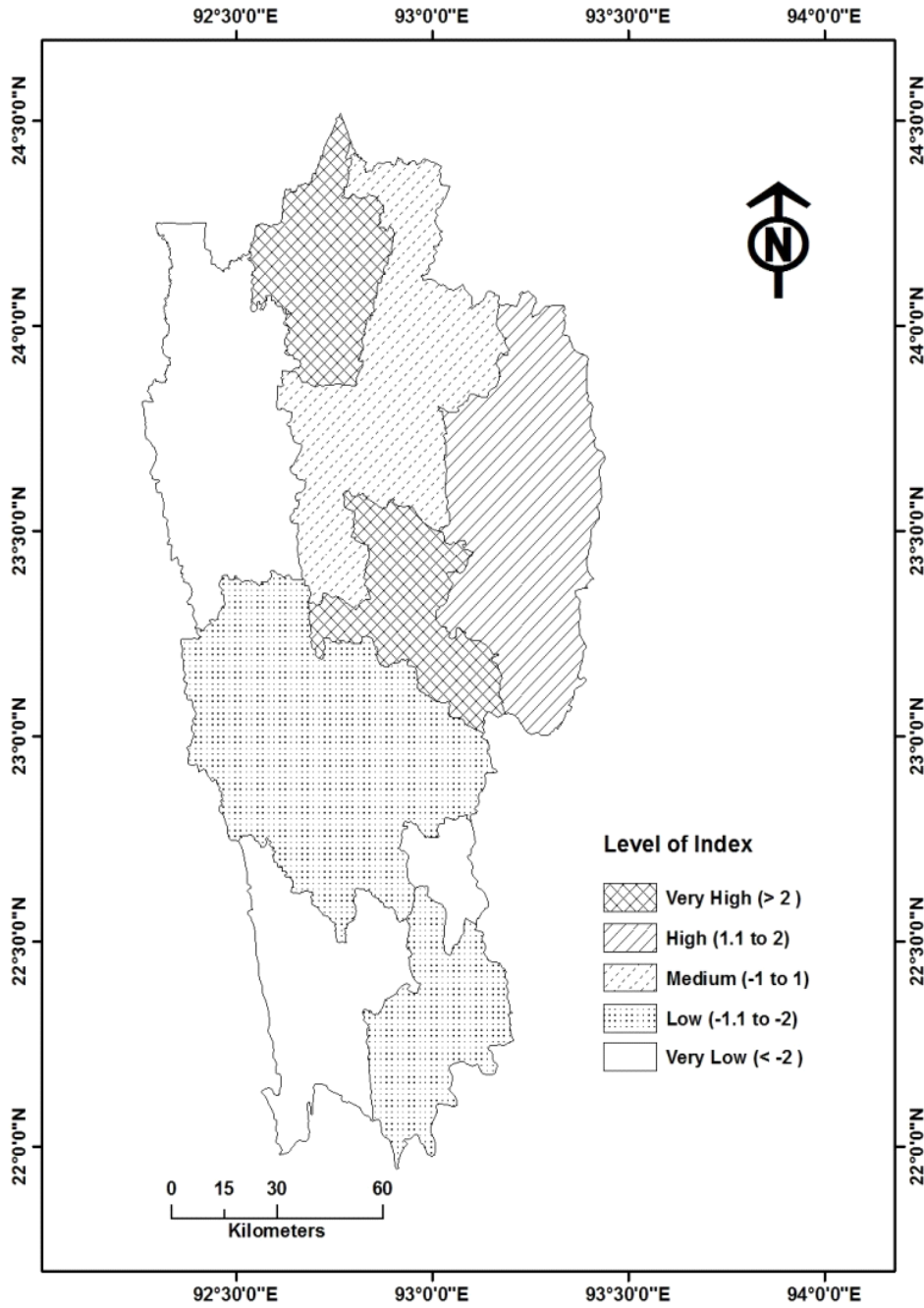


Figure 4. Levels of Food Stability, Mizoram, 2014

stability of foods. It refers to production of rice in kilogram per hectare of land. The high productivity region might attain the food stability and security whereas the low productivity region is on the other side could not attained stability and security of food. The average yield per hectare in the study area is 1493.22 kilogram per 1 hectare of land. Among the 8 districts, Kolasib has attained the highest agricultural productivity i.e. 1672.15 kg/hectare which is followed by Serchhip (1668), Champhai (1580.21), Saiha (1464.32), Lawngtlai (1439.66), Lunglei (1420.07), Aizawl (1407.59) and Mamit (1293.5).

**Literacy rate** is the important factor for management of food and food stock. The food stability of a family is largely depends on the educational level and knowledge. Thus literacy rate is taken as one of the indicators affecting the stability of food in the study area.

The average literacy rate in the study area is 91.58 (census 2011), it is higher than the national average (74.04 percent). Serchhip District has the highest literacy rate which is 98.76 per cent whereas Lawngtlai District has attained 66.41 per cent only. The other district has also a good status in educational levels such as Aizawl (98.5), Kolasib (94.51), Champhai (93.51), Lunglei (89.4), Saiha (88.41) and Mamit (85.96).

**Food Security Region in Mizoram**

To identify the food security region of the state, Z score of the every 9 indicators have been calculated in each district. Further all the concerned indicators have been added at district level and average is obtained to find out the Z score of food security level. The standard deviation techniques has been applied to divide the study region in to five levels of food security such as very high, high, medium, low and very low.

**Table 4. Index of Food security in Mizoram, 2014**

District	Food Availability	Food Accessibility	Food Stability	Composite Score
Aizawl	-3.76	1.3	-0.16	-2.62
Champhai	4.15	0.46	1.24	5.85
Kolasib	2.14	-1.8	3.87	4.21
lawngtlai	-0.74	-1.99	-3.26	-5.99
Lunglei	-1.93	1.14	-1.25	-2.04
mamit	-1.11	1.72	-2.46	-1.85
Saiha	-0.51	-3.04	-1.07	-4.62
Serchhip	1.82	1.99	3.07	6.88

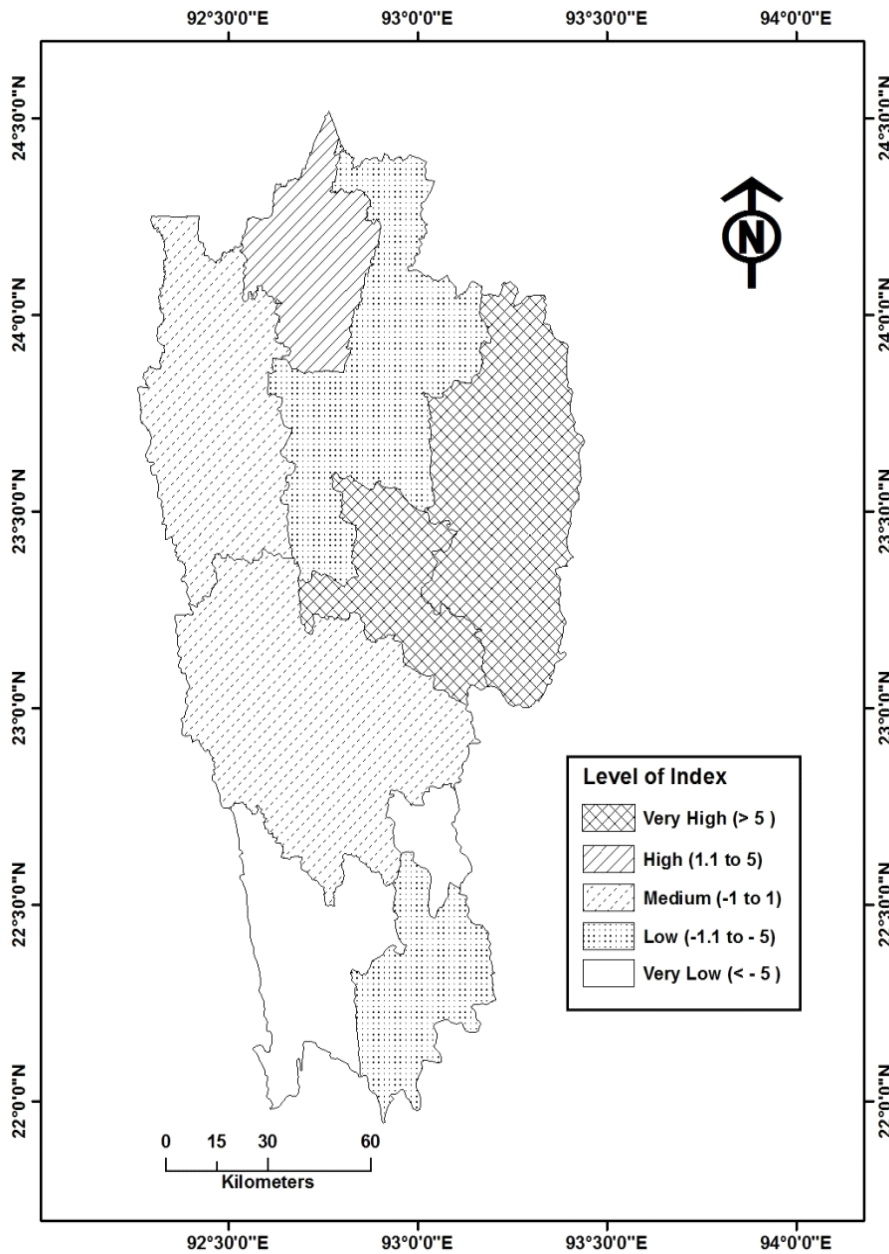


Figure 5. Food Security Region in Mizoram, 2014

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The district Serchhip and Champhai are categorized as a food secure region. The two districts have score 6.88 and 5.85 in the Z score value. On the other hand the other districts were identified as a food insecure region. The results also indicated that there is unequal development in Mizoram due to major factors like food availability, food accessibility and food stability deference among the district.

### **Conclusion and Suggestion**

As a result of the study, Mizoram can be divided into two regions i.e., food secure and food insecure region. The only 2 districts such as Serchhip and Champhai may be treated as a food secure region in the state whereas the other 6 district are food insecure region. There is an unequal development between higher score secure region and lower score insecure region. For instance: Disparity between Serchhip and Lawngtlai is 12.7 in composite score is severely high. The imbalance between the score of Secure and insecure region is 34.02. The study also find out that the highest literacy district has highest food security levels and vice versa. However, the whole state does not attain food security as per recommended energy requirement (i.e., 669.82 Kcal per capita/day) on the basis of per capita availability of rice (i.e., 193.59 g).

Mizoram in general and the southern and western part in particular should be uplifted in case of: Education, Public Distribution System must cross at least 1 at Z score, irrigational facilities, agricultural production and productivity including Livestock (it must be increase at least by 10 per cent) to attain stability of foods. At the same time it is important to diversify agriculture, improving infrastructure, providing market linkage and food processing and storage etc. Road connection should be developed by at least 30 per cent for accessibility of foods in every district. The waste land also must be developed permanent scientific cultivation. In doing so, the severity and deficiency of food can be minimized and only after that the balanced development at district level in foods and others factors could be attained in the state.

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