Peer Reviewed ISSN 0975 - 4121

GEOGRAPHIC

A Journal of Geography Association of Mizoram, Aizawl

Volume No. 12, July 2017

GEOGRAPHIC

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Single Copy	Rs. 100.00	$20
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Edited by Rintluanga Pachuau, Published by the Department of Geography & RM, Mizoram University.

G E O G R A P H I C

ISSN 0975-4121

Peer Reviewed

Vol.12. JULY, 2017

PUBLISHED BY DEPARTMENT OF GEOGRAPHY AND RESOURCE MANAGEMENT,
MIZORAM UNIVERSITY

GEOGRAPHY ASSOCIATION OF MIZORAM
(GAM)

(Regn . No. SR/ MZ - 7 of 1983 – 84)

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Volume 12 **July 2017**

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Articles

Status of Education in Chandel District, Manipur

- *Seiyang Baite*

Abstract : *This paper is an attempt to highlight the trend of education in the Chandel district. Chandel is located in the southern part of Manipur. It is 3313sq.kms in area with 144,182 populations in 2011. It is one of the least literate districts in Manipur. In this paper, an attempt has been made to examine the slow development process of education and the factors responsible for it. The paper also gives some suggestions to improve the present educational condition.*

Introduction :

Education is a systematic process through which a child or an adult acquire knowledge, experience, skill and sound attitude. According to Mahatma Gandhi, by education means *'an all-around drawing out of the best in child and man-body, mind and spirit. Literacy is not the end of education or even the beginning'* (Harizan, 1937). Acknowledging its importance, the Indian constitution has provided necessary provisions in the constitution at appropriate places for the state support of education. Article 45 under the directive principles of state policy indicated that, the state shall endeavour to provide within a period of ten years from the commencement of this constitution for free and compulsory education for all children until they complete the age of fourteen years. This means the state has the obligation to provide free and compulsory elementary education (Tripathi, 2006).

As per 2001 census, the literacy rate of Manipur, Imphal East was leading the literacy with 80.61 per cent whereas the literacy rate of Chandel account to 54.4 per cent only which is the lowest in the state. There may be many factors responsible for this low rate of literacy in the district. Therefore, the paper attempts to analyse the existing pattern of education in the district, find out the possible causes of the low rate of literacy and then provides suitable suggestions for the policy makers and planning bodies which can be helpful in some finding solution for the problem.

With the increase and faster growth of literacy the pace of development also becomes faster. It has been observed that the process of development in the two Imphal Districts Viz. Imphal East and Imphal West are much faster in comparision to other districts including Chandel. These two districts have better infrastructures and other facilities.

As Nelson Mandela puts it

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"Education is the most powerful weapon which you can use to change the world". It is the main factor for any kind of development. The pace of development is to a certain level determined by education. The better in quality in imparting education, the higher in attainment of educational status and the faster growth in developmental aspects (Neihsial, 2016)

Geographical setting and socio-economic background of the study area :

Manipur is situated in the eastern corner of North East India. Geographically, it is located between longitude $92^0$58'E to $94^0$45'E longitude and 23^0 50'N to 25^0 42'N latitude. Chandel district is one of the hill districts of Manipur. The geographical area of the district is 3,313 sq. kms. The district is bounded by Myanmar on the south, Ukhrul district in the east, Churachandpur district on the south and west, and Thoubal district on the north. It is about 64 kms from Imphal, the state capital. The district is inhabited by several communities of about 20 tribes, comprising of Anal, Lamkang, Kuki, Mayon, Monsang, Chothe, Thadou, Paite, Vaiphei, Gangte, Mizo etc. There are also Meitei and other non-tribal communities like Tamil, Bengali, Punjabis and Bihari in small numbers most of whom are mainly concentrated in the south eastern part of the district. As per census of India, 2011, there are 28,801 households with a population of 144,182; out of which 74,579 are male 69,603 are females. It is one of the most thinly populated districts of Manipur with a density of 36 persons per km^2. Schedule Tribe and Scheduled Caste constitute 92 per cent of the total population. The work participation rate in the district is 48 per cent in rural areas and 35 percent in urban areas and over the entire whole district is 46 percent.

Economically, Chandel district is one of the most backward districts in the state. The economic activities of the people revolve around agriculture and allied activities. Shifting cultivation is the most common economic activity in the district. Many depend on the forest for their livelihood. They are like mother and child; forest is the life and soul of the highlander. Forest products like timber, firewood, charcoal, bamboo, cane; green leafy vegetables, roots, fodder, medicinal plants, etc. are important sources of income for the people. Teak, Khangra, leihao and pine are mainly exported as timber to the neighbouring towns and districts. Bamboo forms an indispensible forest produce which is used by every household in their daily life. The bamboo shoots are used for food since time immemorial. Bamboo shoot are fermented to form what is locally called toibung/soibum and sold to the market at very

reasonable price. With this agrarian economy, there is always a desire in every soul, for a sustainable livelihood and education. The thirst for education could not be quenched because of the lack of proper education facilities and the high costs of the few properly run private schools.

Present scenario of education system in the district :

The history of education in Manipur in the post- independence era started with the creation of department of education on 20th January 1950. In 1980, the department was bifurcated into two directorates; viz. Directorate of Education (Schools) and Directorate of Higher Education (University). The bifurcation made a great impetus on the development of education in the state, especially in the hill districts. In 2015 there were 946 schools recognized by Board of Secondary Education, Manipur. Out of this, 36 schools were in Chandel District (BoSEM report, 2015). The schools in the district level are looked after by Autonomous District Council (ADC) Chandel. The executive member for Education is entrusted with the task of looking after the welfare and development of schools within the District. However, there is still discrepancy between the hills and valley districts in terms of infrastructure and facilities. Lack of proper educational facilities within tolerable distance causes lot of setbacks to the development of education in the district.

Table 1, shows the growth of different educational institutions in different districts of Manipur from the year 1989 to 2002. It is also very clear that Chandel district has the least number of educational institutions. The district has only three colleges, viz. United College,Lambung, Chandel, South East Manipur College, Komlathabi and Moreh College, ChikimVeng, Moreh. Of these three colleges, only United College is a full-fledged

Table 1: Educational Institutions in Manipur at different stages

Sl. No	Name of the Districts	Primary schools			Middle schools			High/Hr Sec.		
		1989	1999	2002	1989	1999	2002	1989	1999	2002
1	Senapati	380	377	395	67	90	91	27	51	61
2	Tamenglong	209	216	215	33	43	48	12	22	23
3	Churachandpur	412	266	270	76	78	102	48	78	79
4	Chandel	227	205	207	19	33	52	8	18	23
5	Imphal	772	742	727	119	217	288	156	231	272
6	Bisnupur	236	215	211	32	52	63	38	50	54
7	Thoubal	326	327	226	59	72	88	63	92	105
8	Ukhrul	210	224	223	38	46	64	32	40	42
9	Manipur	2772	2572	2574	443	631	796	387	582	659

Sources: SAM 1992, p.52 & 2001, p.70, (High/Higher Sec) p.72-3 SAM & SAM 2004 p.106

government college, whereas the other two are still under grand-in-aid stage.

Apart from the inadequate infrastructure quality of education in Chandel district is low due to lack of qualified or trained teachers and irregularity of school attendance. All these result in the low rate of literacy.

Table 2, shows district-wise literacy population and literacy rate in Manipur.

Table 2, shows the position of Chandel district in terms of its literacy rate. It ranks one of the lowest in the state. According to 2001 census, only 6 percent of the literate attained the level of graduation and above, 25 per cent passed high school examination, another 23 per cent attained middle school level of education and the rest of the literate population remained under middle school. The Ministry of Minority Affairs, Government of India, in their report in 2001 already raised their concern over the poor literacy and low level of educational attainment. (Chandel District Report, 2001)

Factors of the low literacy rate :

Poor infrastructure :

Schools are supposed to be the temples of learning. It should be maintained with dedication and provided with sufficient infrastructures in order to build a better future of the society. But, as far as the government run schools are concern, the general conditions of the schools in the district are pathetic in terms of infrastructure

Table 2: District Wise Literacy Population and Rate in Manipur, 2011

Districts	Literates Population			Literacy Rate (%)		
	Persons	Males	Females	Total	Male	Females
Senapati	232,149	128,806	103,343	75.00	80.85	68.80
Tamenglong	85,939	47,928	38,011	70.40	76.74	63.76
Churachandpur	199,594	106,026	93,568	84.29	88.34	80.13
Bishnupur	160,740	89,486	71,254	76.35	85.52	67.29
Thoubal	271,035	150,585	120,450	76.66	85.90	67.57
Imphal West	395,731	207,844	187,887	86.70	92.93	80.71
Imphal East	324,535	174,044	150,491	82.81	89.86	75.92
Ukhrul	131,118	70,618	60,500	81.87	86.05	77.47
Chandel	90,355	51,396	38,959	70.85	77.93	63.26
Total	**1,891,196**	**1,026,733**	**864,463**			

Source: http://censusindia.gov.in

and maintenance. Often, the funds allocated for the development of the schools are swindled by the authorities and other anti-social bodies. Neihsial (2016) made a study on the status of elementary education in the Chandel and Senapati Districts Manipur lamented on the unsatisfactory school buildings, pathetic condition of the classrooms, shortage of furniture in schools, lack of library facilities, etc. The study also revealed that accommodation for teachers and students in the form of quarters and hostels were inadequate. The results that revealed in her studies are a common scene in almost all government schools in the district. In the age of stiff competition for education and development, the infrastructure provided in the district could not cope up with the fast changing world.

Attitude of the people :

The attitude of the people regarding education is something that has to be taken into account. It is a common man thinking that government schools especially at the primary levels are meant just for getting job opportunities and not so much to impart quality education. They undermined the important role of the government and government employed teachers in imparting quality education. Therefore, parents are not interested in sending their children to government run schools. Even, among children, students studying in public schools have inferiority complex when they mingle with other children.

High cost of education in private institutions :

Under the Board of Secondary Education, Manipur there were 32 high schools and higher secondary schools. The list does not include the Jawaharlal Nehru Novadya Vidyalaya, Chandel. The educational costs in private schools are much higher than those of the government run schools. However, people flock to the private schools for their education as they are convinced that the quality of education in the private schools is better. The high cost of education makes it imperative for the parents to spend a large sum of money from the primary schools on wards. As a result, many parents can't afford for their higher education.

Conflicts and displacement :

Justino (2010) writing on the impacts of conflicts in education stated that there is negative effect of violent conflict on the human capital of individuals particularly among the children and women, due to their vulnerability. The destruction of infrastructure and resources and collapse of government provision of goods and services affected the monitoring of education process in the area.

Displacement due to conflicts increased this impact. Touthang (2017) studying on the displaced population of the Khuga Dam Multipurpose Projects found that the education of the partially affected village were much better than the fully affected villages. The Kuki-Naga ethnic clash of the 1990's caused large number of displacement among the people living in Chandel district. The displaced people faced numerous difficulties in getting education.

Inadequacy of teachers :

'School less teachers or teacher less schools' is an often quoted phrase by the people in the district in terms of the quality of schools that exist in the district. Many of the schools in the district lack trained and qualified teachers. The Department of Education, Manipur University conducted field survey on 40 samples schools in the all the districts of the state. On the issue of quality of education, the unavailability of specific teachers for each class and for teaching some important subjects like science, mathematics and languages in government run schools was raised. Moreover, engage of unqualified substitute teacher by payment of less salary in the remote school is a common practice by the government teachers in the hilly areas. This negligence of the professional activity is also one of the main causes that hinder the educational development in the district. The norm of National Education Policy (1986) requires a teacher to possess B. Ed or M. Ed degree to be in the teaching profession. However, the norm is being hardly followed in the district.

The way forward :

In the light the above discussions it is important to seek a way out for the present situation that the district is facing. Even if many private institutions come up with their own schools and academies, it is ultimately the government that runs the educational system. The responsibility to improve the educational system lies on the government. The government should take extra care on providing better infrastructure. The administration of the hill areas are primarily in the form of villages in which there is a council/authority headed by the chief/chairman. The village councils/authorities also have great responsibility in improving the infrastructure by way of implementing the funds properly and safeguarding the existing infrastructure and facilities. The proper implementation of the SSA scheme of the Central government alone would make tremendous change in the primary education of the people. Change of attitude of the people can come when the government is able to build confidence in the minds of the

people. When the government schools can function properly, it will run hand in hand with the private institutions; thereby the cost education will decrease. Building a peaceful society is a must for all kinds of development. It is the also true with development of education. Quality education needs qualified teachers who are always updated. It is the reason why the education commission Report 1964-65 popularly known as Kothari Commission report recommended that a sound programmed of a professional education for teacher is essential for the qualitative improvement of education.

Conclusion :

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Distribution of Health Care Facilities in Saiha District of Mizoram

- *Dr. Bobby Beingachhi*

Abstract : *Health geography provides a spatial understanding of people's health, the distribution prevalence and occurrence of diseases of in an area and the environment's effect on health and diseases. This study is considered a sub-discipline of human geography; however, it requires an understanding of other fields like epidemiology and climatology. It is defined as a "multitude of services rendered to individuals, families or communities by the agents of the health services or professions, for the purpose of promoting, maintaining, monitoring or restoring health". In many countries health care is completely or largely a governmental function. The main focus of health care is 'serve' or 'service to others'. Therefore, it is so pathetic to left alone to health practitioner rather it would be concerned of social scientists in general and health geographers in particular. It is important to note that the availability of health care facility is extremely important for every person as the availability and location of heath care facilities is a basic prerequisite for treatment in case of emergency. The distribution of heath care facility especially in rural areas of Saiha District is far from satisfactory particularly in the southern and western part as indicated by the absence of basic health care facilities. The absence of health care facility in the remote and inaccessible areas bordering Myanmar continues to remain one of the greatest challenges faced by the rural inhabitants till today.*

Introduction :

Health geography provide a spatial understanding of people's health, the distribution prevalence and occurrence of diseases in an area and the environment's effect on health and diseases. This study is considered a sub-discipline of human geography; however, it requires an understanding of other fields like epidemiology and climatology. The Geography of Health: *An essay in welfare geography* by John Eyles (1987) examined on the topic of health, care, resources, health and illness in Britain in a systematic manner. His central theme of study was to focus on the welfare of the people. By questioning who gets *what, where and how?* It also regards the spatial basis of policy initiative to tackle problems, geographical perspective is, therefore, a necessary framework of reference for any analysis of health and health care. Although health care is a public good, it is not pure. In other words, it is not equally available to all individuals. In a 'planned' health care system, one should expect the distribution of facilities to reasonably closely match the distribution of demand.

Health is defined by many scholars but the most widely accepted definition is given by World

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Health Organization (1984) in the preamble to its constitution, which is as follows: *"Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity and also includes the ability to lead a socially and economically productive life".* Health care is an expression of concern for fellow human beings. It is defined as a *"multitude of services rendered to individuals, families or communities by the agents of the health services or professions, for the purpose of promoting, maintaining, monitoring or restoring health".* In many countries health care is completely or largely a governmental function. The main focus of health care is 'serve' or 'service to others'. Therefore, it is so pathetic to left alone to health practitioner rather it would be concerned of social scientists in general and health geographers in particular.

The provision of high quality, affordable, economic and social development of the country is closely related with the health care of the people. Development of any country is highly depends on the health care of the people and Saiha District is no exception in this regard. With a total population of 0.56 lakhs, health care of the people in general is still very far from satisfactory. Due to ignorance, religious beliefs and traditional thoughts and thinking especially in the rural and outskirts of the main towns, the health condition of the people on average is fragile and pathetic. Many people especially in urban areas are now aware of their health status and many young citizens are becoming aware of taking good care of their health. Yet there is still a towering requirement of medical attendants such as nurses, doctors and lab-technicians besides the presence of health workers.

Study Area :

The study area Saiha District which comprises of 52 villages is located in the southern corner of Mizoram bordering Myanmar, the location lies within 92°30' – 92°58' East longitude and 21°9' – 22°47' North latitudes. The district is bounded by Lawngtlai District in west and north while the eastern and southern side is bounded by Myanmar; therefore the location has a strategic significance as it share an international boundary with Myanmar. Due to the administrative changes of Mizoram in 1996, the then Chhimtuipui District was bifurcation into Saiha district and Lawngtlai District, the former capital of Chhimtuipui District i.e Saiha continue to be the capital of Saiha District.

Many of the villages in this district is well known for its economic backwardness due to its remoteness, especially those villages in the southern part bordering Myanmar, rural inhabitants are scattered along the international boundary comprising of few houses

ranging from 20-50 with a population of less than 300 people. These villages are connected by seasonal road which are sometimes cut off from the rest of the district during rainy season. It is also true to mentioned that there are no medical facility and even for treatment of minor illness and they have to go the nearest Sub-Centres, in many cases the villagers could not afford to do so and sometimes it results in a very bad and awful situation.

Objectives :

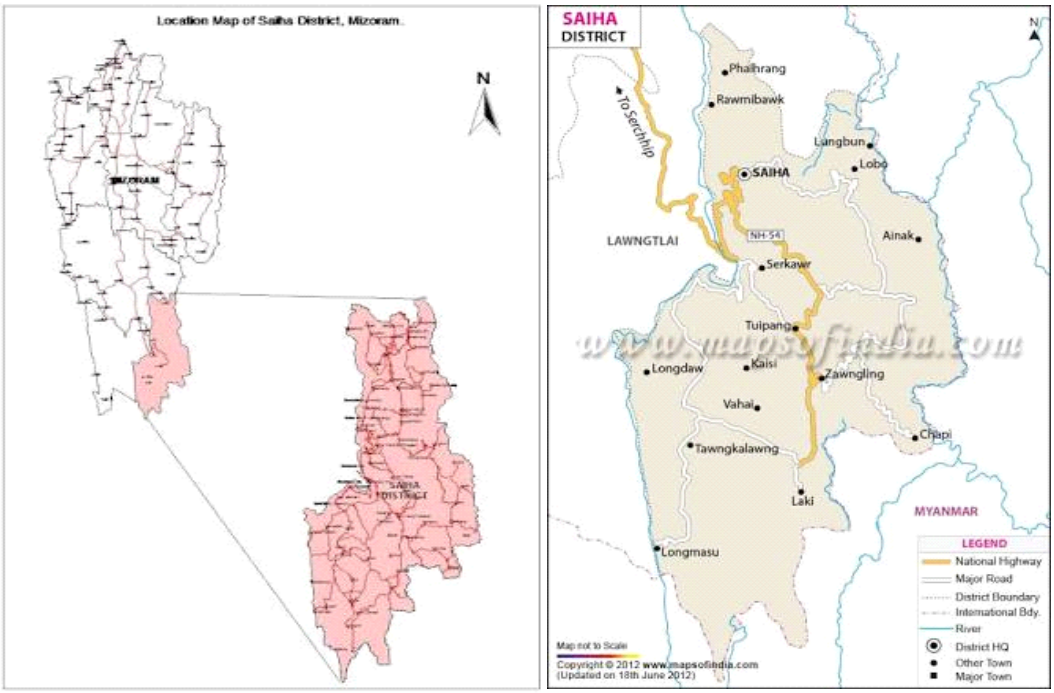
The objectives of the present study are as follows:

1. To examine the distribution of health care facilities in the study area.
2. To analyze the availability and spatial variation of health care facilities and medical staff/ personal.

Methodology :

The main objectives of this study is to investigate the distribution and availability of health care facilities such as hospitals, health sub-centers, dispensaries, community health centers, public health centers etc, the investigation is mainly done on the basis of field observations and relevant and reliable data obtained from both primary and secondary sources. Availability and distribution of health care facilities

STUDY AREA (SAIHA DISTRICT)



such as hospitals, public health centers, community health centers, dispensaries, health sub-centers etc in the rural areas had been examined.

In order to bring out a detail and an in-depth study of the availability and distribution of medical personal/staff in the study area, availability of doctors, pharmacists, nurses and health workers in rural areas had also been examined. In order to assess the spatial variations of health care faculties in the study area, the extent of availability and distribution of health care facilities and medical personal/staff village level data and information was used. At present there are 52 villages and two Rural Development Blocks in the study area.

All the relevant information such as No. of hospitals, health sub-centers, dispensaries, community health centers, public health centers, medical doctors, pharmacists, nurses and health workers in rural areas were based on primary data collected by the investigator. These information and data are extensively used to investigate the availability of healthcare facilities and it form the basis of investigation and analysis of this research paper.

Distribution of Population :

The present study examines the spatial distribution and availability of health care facility in the study area. An important dimension in health care facility in any region refers to its distribution and concentration of population. Therefore it is necessary to examine the distribution of population in the study area. The total population of Saiha District was 56,574 *(Census of India, 2011),* of which male and female were 28,594 and 27,890 respectively. The density of population was 44 person sq/km. Saiha town is the capital and it is the only urban center within the district having a total population of 10,421, while the rural population constitutes 31,464.

There are two rural development blocks namely Saiha R.D. Block and Tuipang R.D. Block, the total number of inhabited villages in the whole district was 52, of which 33 villages falls under Tuipang R.D. Block and the remaining 19 villages falls under Saiha R.D. Block. The above figure shows that about 55% of the total population lives in the rural areas. A micro level examination reveals that the spatial distribution of population and the size of village within the district are highly uneven. The distribution of rural population including male and female are shown in the table given below:

With an average population is 605 person, there are 9 villages in Saiha District where the total population exceeds above 1000, the largest concentration of population is found at Tuipang 'V' village having a total population of 1655, this is

Table 1 : Distribution of Rural Population in Saiha District-2016

Sl. No	Name of Village	House hold	Male	Female	Total
1	Tuisih	196	445	433	878
2	Theiri	131	311	315	626
3	Serkawr	258	500	477	977
4	New serkawr	37	67	77	144
5	New Latawh	123	312	291	603
6	Tuipang L	140	322	330	652
7	Tuipang V	306	849	806	1655
8	Tuipang Diary	238	561	559	1120
9	Siatlai	74	161	174	335
10	Zawngling	302	803	827	1630
11	Chheihlu	101	280	250	530
12	Chakhang	285	651	682	1333
13	Siasi	74	172	172	344
14	Mawhre	98	255	285	540
15	Chapui	205	501	544	1045
16	Khopai	137	296	355	631
17	Ahmypi	42	112	135	247
18	Kaisih	96	245	197	442
19	Maisa	52	130	114	244
20	Lohry	55	132	137	269
21	Lawngban	119	296	311	607
22	Lodaw	60	143	116	259
23	Phura	231	553	515	1068
24	Vahai	148	414	412	826
25	Tongkalong	107	243	235	478
26	Miepu	95	221	202	423
27	Laki	182	508	504	1012
28	Supha	15	28	30	58
29	Lomasu	82	170	159	329
30	Bymari	113	245	210	455
31	Lope	15	29	29	58
32	Lungpuk	223	551	523	1074
33	Khaikhy	36	73	78	151
34	Phalhrang	73	188	189	377
35	Romibawk	103	229	221	450
36	Riasikah	36	72	61	133
37	Tuipuiferry	58	125	111	236
38	Zeropoint	155	399	360	759
39	Maubawk L	122	285	314	599
40	Maubawk Ch	56	135	117	252

Sl. No	Name of Village	House hold	Male	Female	Total
41	Kawlchaw E	239	548	523	1071
42	Lower Theiva	135	290	261	551
43	Lungbun	167	396	403	799
44	Ainak	132	285	274	559
45	Siata	179	438	429	867
46	Tuisumpui	34	98	102	200
47	Old Tuisumpui	69	193	202	395
48	Thingsen	57	174	154	328
49	Niawhtlang-I	151	368	404	772
50	Niawhtlang-II	169	466	443	909
51	Chhuarlung-I	174	430	421	851
52	Chhuarlung-II	56	155	158	313
	Total	**6541**	**15853**	**15631**	**31464**

Source: District Census Handbook 2016

followed by Zawngling (1630), Chakhang (1333) Tuipang Diary (1120) respectively. On the other hand, there are 5 villages where the total population is below 200 and 2 villages namely Supha and Lope recorded the lowest population with 58 only. Apart from this, there are 23 villages having population of above the average and the remaining 29 villages' falls below the average.

It is quite apparent that the size of village population shows a sharp contrast in terms of its absolute number throughout the whole district. This unequal distribution of population within the district may be attributed to different factors such as location, agricultural activities, migration, accessibility, and means of livelihood and so on.

Distribution of Health Care Facility :

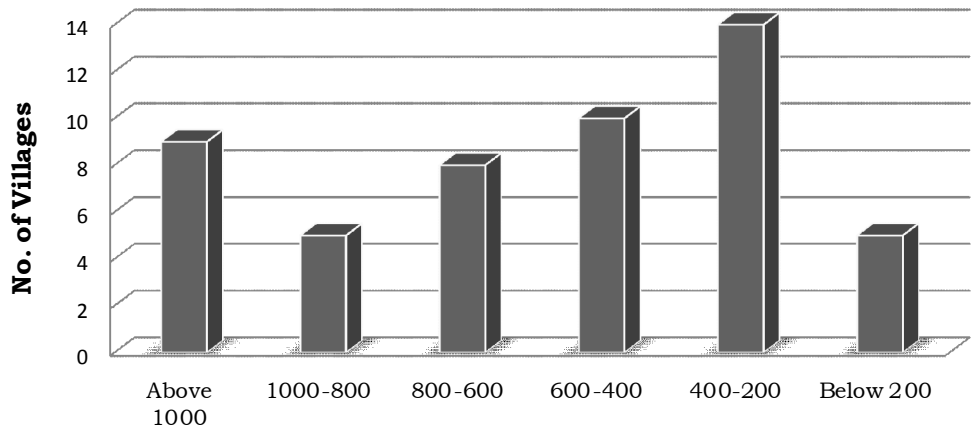
The distribution of health care facility depends on many factors such size of the village, total population, location of the village and policy of the Government towards rural health and so on. The distribution of heath care facility especially in rural areas of Saiha District is far from satisfaction particularly in the southern and western part. The absence of health care facility in the remote and inaccessible areas bordering Myanmar continues to remain one of the greatest challenges faced by the rural inhabitants till today.

It is important to note that the availability of health care facility is extremely important for every person as the availability and location of heath care facilities is a basic prerequisite for treatment in case of emergency. It is also important to examine the number of existing health care facility such as OPD (Out Patient Department), clinic, laboratory, hospital beds, operation theatre etc, besides, the

Size of Population and No. of Villages in Saiha District

Size of population	Above 1000	1000 - 800	800 - 600	600 - 400	400 - 200	Below 200
No. of Villages	9	6	8	10	14	5

Fig 1 : Size of Poplation and No. of Villges in Saiha District-2016



number and availability of existing doctors, nurses, health workers, pharmacists etc which indicates the quality of services and availability of care for the patients in particular and public in general.

Community Health Centres :

Community Health Centres (CHC) which constitute the secondary level of health care were designed to provide referral as well as specialist health care to the rural population. These centres are however, fulfilling the tasks entrusted to them by only to a limited extent. The launching of National Rural Health Mission (NHM) gives the opportunity to have a fresh look at their functioning. In order to provide quality care in these Community Health Centres (CHC) Indian Public Health Standards are being prescribed to provide optimal expert care to the community and achieve and maintain an acceptable standard of quality of care. In general Community Health Centres (CHC) is also one of the agents in providing health care system in the rural areas. Generally, Community Health Centres (CHC) is manned by doctors, nurses, health workers and pharmacists. So far as the availability of health care facility is

concerned there is no Community Health Centres in Saiha District.

Primary Health Centres (PHC) :

Primary Health Centres are the corner stone of rural health care. Sometimes it is referred to as public health centre; they are state owned rural health care facilities. They are the most vital and important agent of rural health service-a first port of call to a qualified doctor of the public sector in the rural areas for the sick and those who directly report or referred from the Sub-centres for curative, preventive and promotive health care. The overall objective of Primary Health Centres is to provide health care that is quality oriented and sensitive to the needs of the community. These standards would also help monitor and improve the functioning of the Primary Health Centres and they are a part of the government funded health system. Primary Health Centres and their sub-centres are supposed to meet the health care needs of rural population. A medical officer, Block Extension Educator, one female health assistant and laboratory technicians look after the Primary Health Centres. It is equipped with vehicle and necessary facilities to carry out small surgeries.

As stated above Primary Health Centres are provided to meet the health care needs of the rural areas, therefore; the availability of Public Health Centres is very crucial. So far as the availability of Primary Health Centres is concerned there are four Primary Health Centres in the entire Saiha District, one Primary Health Centres under Saiha R.D. Block, the location of this Primary Health Centres is at Chhuarlung-I village, the remaining three Primary Health Centres under Tuipang R.D. Block are located at Tuipang 'V', Phura and Serkawr. Each of these PHC is manned by one doctor, six nurses, two health supervisors and one pharmacist. This Primary Health Centres caters the health care needs of the rural areas in the district which include 52 villages comprising a total population of 31,464 in 2016.

Health Sub-Centre :

Sub-Centres are mainly peripheral health institutions catering to the health care needs of the rural population. One Sub-Centre caters to the health care needs of 5,000 population in general and 3,000 population in hilly, tribal and backward areas. The Sub-Centres are provided with basic drugs for minor ailments needed for taking care centre of essential health needs of men, women and children. It is the most peripheral contact point between the primary health care system and the community. Generally; sub-centre is manned by two health workers (one male and one female) and one fourth-grade depending upon the availability of medical staff.

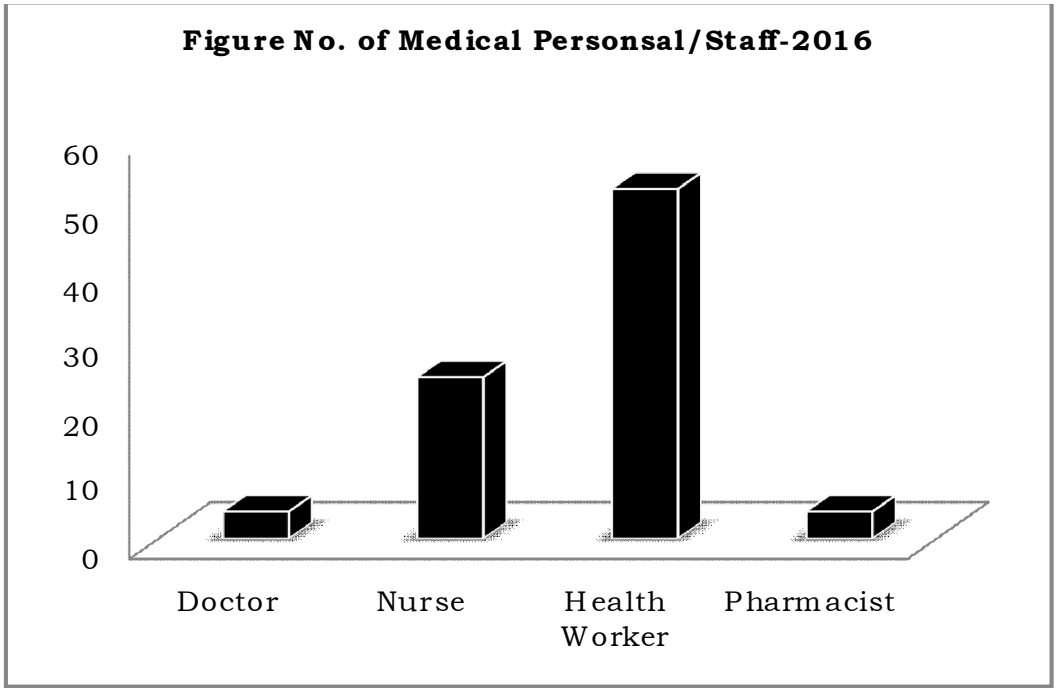
In 2016 as per the information

obtained the concerned office, there are 26 Health Sub-Centres in the Saiha District, 9 Sub-Centres under Saiha R.D. Block and 17 Sub-Centres under Tuipang R.D. Block. The distribution of Health Sub-Centres showed that 52% of the villages in Saiha District had been covered by Health Sub-Centre, 9 villages (47.63%) out of 19 in Saiha R.D. Block and 17 villages (51.51%) out of 33 in Tuipang R.D. Block. The above analysis shows that the spatial coverage of villages by Health Sub-Centres clearly reveals that 26 villages in the whole district had not yet been provided by this basic health amenity.

As stated above Health Sub-Centres in rural areas are generally manned by two health workers one male and one female. Considering the availability of health sub-centre in rural areas of Saiha District as compared from the national scenario; the coverage it quite remarkable. On an average the coverage of rural areas by health sub centre showed that one sub-centre cater the needs of 1210

Existing Strength of Medical personal/Staff-2016

Doctor	Nurse	Health Worker	Pharmacist	Total
4	24	52	4	84



person as against 3000-5000 persons for all India average.

Medical Staffs/Personal :

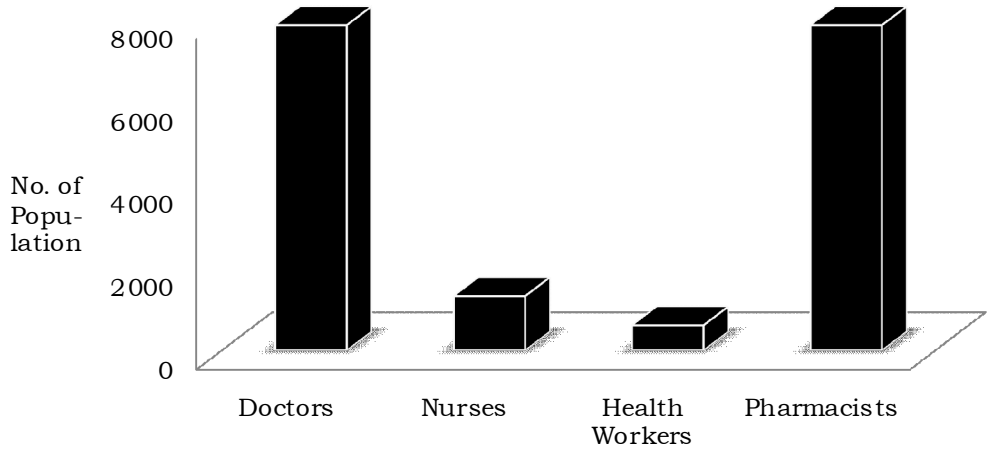
Health care facilities such as Community Health Centres, Primary Health Centres, Health Sub-Centre in rural areas of Saiha District are looked after by State Government, these health care centers are manned by medical staffs such as doctors, nurses; health workers and pharmacists. The total numbers of medical staffs are 84 (4 doctors, 24 nurses, 52 health workers, 4 pharmacists). Out of the total medical staffs; nurse accounted for 28.57% while health workers comprises 61.90%, pharmacists and doctors comprises 4.76% and 4.76% respectively. These 84 medical staffs/personals look after the care of health care needs of the rural population.

The above table clearly suggests that the availability of medical staff such as doctors, nurses; health workers and pharmacists in rural areas of Saiha District are highly uneven. The

Proportion of Rural Population and Medical Stagg/Personals-2016

1	Doctor-Population Ratio	7866
2	Nurse-Population Ratio	1311
3	Health Worker-Population Ratio	605
4	Pharmacist-Population Ratio	7866

Figure 3 : Proportion of Rural Population and Medical Personals-2016



availability of medical staffs/ personals is very important especially medical doctors because in case emergency and serious illness their presence is highly indispensable. Taking the district as whole medical doctors are available only in those villages where Primary Health Centres are located and there are only four Primary Health Centres in the whole district suggesting a heavy dependency of rural population on these medical doctors. On an average in rural areas of Saiha District the ratio of doctor-population was 7866, apart from this the ratio of other medical personal/staff are 7866 pharmacist, 1311nurse and 605 health workers respectively.

Conclusion :

From the ongoing investigation with reference to the availability of health care facility in Saiha District it is quite obvious that there is certain degree of imbalance with regards to distribution of health care facilities, Moreover, with the increasing population and number vulnerable and critical illness is concerned there is an urgent need to strengthen the existing health care facilities. Out of 52 villages with a total population of 31,464, there are 34 health care facilities such as four Primary Health Centres and 26 Sub-Centres distributed in 26 different villages. These health care facilities are looked after by 84 medical personal/staff comprising of 4 doctors, 4 pharmacists, 24 nurses and 52 health works while the remaining 26 villages had no such facilities.

The overall analysis pertaining to health care facility in Saiha District reveals that there are a certain degree of imbalances in the availability of health care facilities despite an increasing population demand and nevertheless the rapid rise in critical and serious illness. It would not be an exaggeration to say that there is hardly any improvement in the health care-population ratio. It is an urgent need to pay serious concern for the concern government to upgrade the current health care facility in the area. It is therefore, an imperative assignment for the government to equip the health care facility in order to cope with the rising needs of the people. It is observed that some villages with a population of nearly 1000 persons yet to be provided with health care facility and medical personal, otherwise emergency and critical situation can happen at any moment. It is also desirable that at least a minimum requirement be provided which will be immensely helpful for the rural health in general and for the local people in particular.

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Impact of Insurgencies in Population Grawoth and Distribution, 1961 - 2011
(A case Study of Major Concentration of Hmar Clan Areas)

- V. Lalnunmawia

Abstract : *Population studies, today occupy an important place in various disciplines of studies and its importance is increasing day by day. A detail knowledge of population scenario is necessary to be a successful politicians, administrators, environmentalists, etc., and in various field like to do a social works, to develop economic fields, to do political works or even different administrative works etc. In addition to this, from the detail study and careful analysis of the population structure of a particular area within a particular time span, one could or might have detected or visualized the impacts of great events, like insurgency, famine, outbreak of war, that had had the area gone through. To what extent this impact is reflected in the population scenario and how it results were recognized from the various measures of population structure. Therefore, the present topic also revolves round the political, social movements or insurgency in the past and its reflect to the population dilemma of North Mizoram, particularly major Hmar clan concentrated areas.*

Introduction :

Mizoram is occupied by various tribal groups of the Mizos. The Lushais, somehow, became to be known as the dominating tribes. Raltes, Hmars, Pawis, Paites are the larges tribal groups. Apart from Mizos, there are certain district tribal groups like Chakmas and Riangs. Some of these tribal groups are scattered and mixed with other but some are still confined to a particular area, such as Pawis and Mara in the southern part, Hmars in north and north east borders, where the Chakmas and Riangs localized in the south western and western part of the state.

The present study area of the North and North East portion of the state, particularly northern part of Aizawl district, northern part of Champhai district and Kolasib district are areas of the state where Hmar clans are concentrated (fig. 1). The area, could be said to suffered from insurgency and armed movement twice since Mizoram was recognized as a separated district of the Mizos. The Mizo National Front (MNF) led insurgency movement of 1966-1986, covered most of the state, were also confined in the area, where people badly suffered from it. Following this, another insurgency led by the HPC and HPC(D) demanded for Autonomous District Council for Hmars, was continued within the area, particularly from 1987. Most of the notable violent actions of the HPCs or the Armed Forces of the Govt. happened within this area. It is also important to note that the

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area is bordered by Assam and Manipur State in its north, where Hmars are one of the major clan in the Mizoram border and near border areas of Assam and Manipur. Therefore, it is somehow important to analyse, to what extent had these insurgency affected the distribution and growth of population as well as settlement.

Study area :

The selected study area covers five (5) Rural Developments Block of Northern Border areas of Mizoram. Viz, Bilkhawthlir and Thingdawl R.D.Blocks of Kolasib district, Darlawn and Phullen R.D. Blocks of Northern parts of Aizawl District and Ngopa R.D. Block of Northern part of Champhai District. These block areas are bounded in the north by Assam and Manipur state of the Indian Union and in the east by Myanmar, where its southern and eastern parts are bounded by the other R.D. Blocks of Mizoram like Champhai, Khawzawl, Thingsulthliah, Tlangnuam, Reiek and Zawlnuam R.D. Blocks. These five Rural Development Blocks combined together covers an area of 3821.91 km2 and falls within 23°47'N – 24°31'N Latitudes and 92°32'E – 93°12'E longitudes.

Objectives :

The main objectives of the present study are –

1. To indicate the impacts of the armed Mizo National Front (MNF) led insurgency 1966-1996 including grouping of villages in the growth and distribution of population and settlement.
2. To indicated the impact of the armed Hmar People Convention (HPC) movement for Autonomous District Council (1987-1994) in the population growth and distribution of the concerned areas.

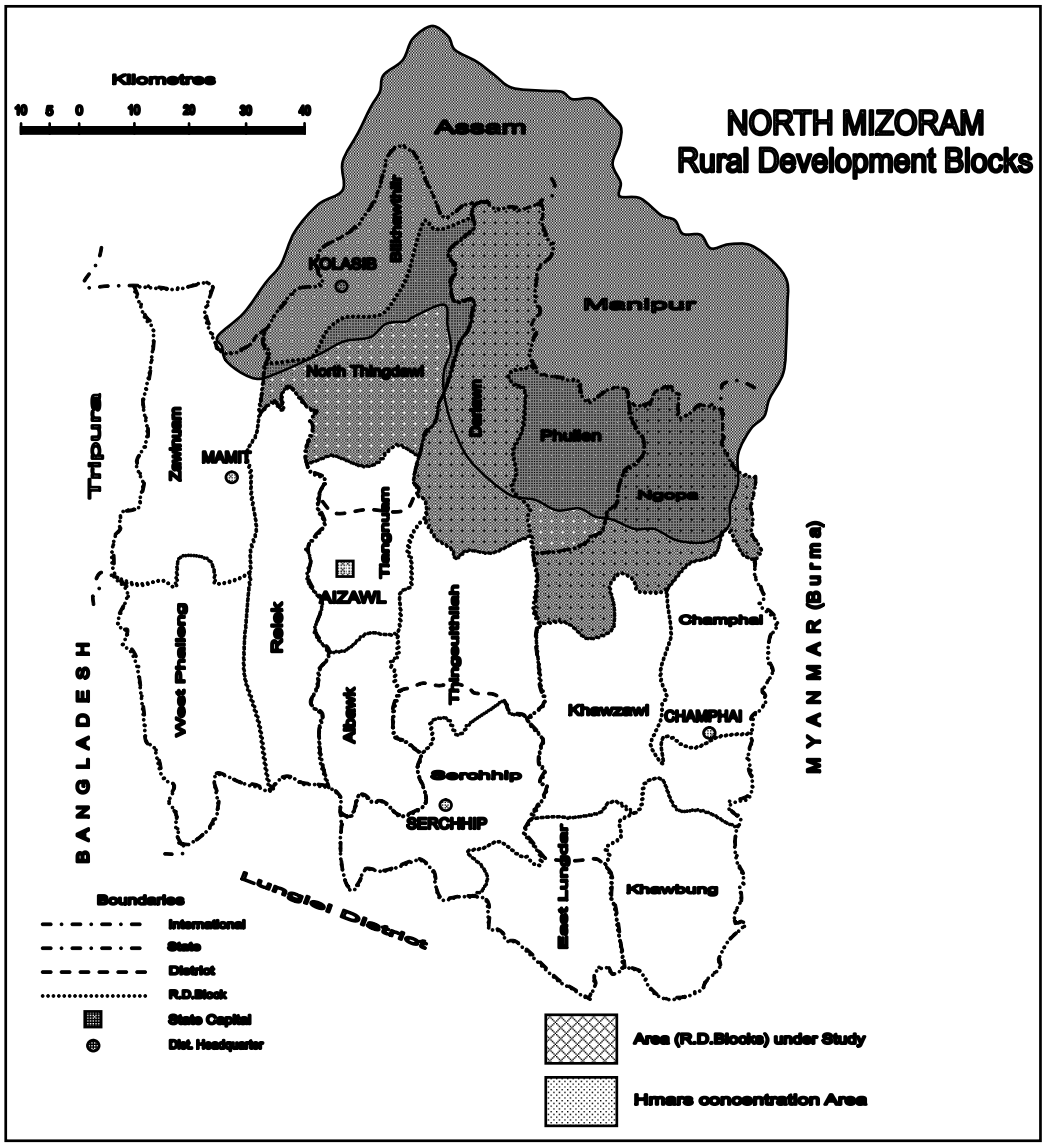
Data Base and Methodology :

The present study is based mostly on the data published by Cencus of India, Statistical Handbook of Mizoram and different sheets of the Survey of India Tapographical Maps.

Since the study period covers 1961-2011, it is important to note that there had not existed any Rural Development Blocks prior to 1974 (or 1981 cencus). But a compilation is made right from 1961 cencus data, where each and every villages were rearranged, basing on the present R.D. Blocks area and boundaries. Therefore, using this compiled data, one could get the actual population of the present Rural Development Blocks area right from 1961 cencus and overcome the problems arising either from re-demarcation of R.D. Blocks boundary or shifting of villages to other block.

For this purpose, i.e., to relocates those deserted and shifted settlement basing on the present Block area. Topographical Map of India. Surveyed 1969 (Sheet Nos.

Figure 1 : Study Area & Hmar clans Concentration Area



83 D/11, D/12, D/15, D/16, A/9, A/13, 83 H/4, E/1 & E/5), consultation of persons of the concerned area and books concerning the areas are made in used. This compilation data clearly reveals the actual changes in population distribution, density, growth, etc. and the changes in the number and location of settlement site.

Impacts of Insurgency on Population Growth, Distribution and Settlement :

A. Mizo National Front (MNF) led insurgency and its impacts:

During 1966 – 1986, there was an insurgency in the state (the then Mizo Hills District Council) of Mizoram due to demand of Independent for Mizos. Large scale disturbances started on 28th February, 1966. Armed Mizo National Front (MNF) Force simultaneously attacked different Government installations in different parts of Mizoram. This was followed by declaration of the district as a disturbed area. Since then, there was a prevalent of darkness, turmoil, famine, burning of houses and barns, firing between the MNF and the Indian Army, grouping of villages, violation of one's right, rape, etc. All these led many people and family moves to urban areas, neighbouring states or country in search of safely as well as food.

As a counter insurgency strategy, regrouping of villages was made, which saw the entire rural population of Mizoram (roughtly 80% of the total population) uprooted from their homes to be located miles away. There were four categories of grouping of villages in Mizoram.

1) Progressive and Protected villages (PPV)
2) New Group Centre (NGC)
3) Voluntary Group Centre (VGC) and
4) Extended Loop Area (ELA)

The first stage of grouping started on 14th January 1967 and the last stage covered up to 1970. This grouping of villages entirely affected the study area.

Apart from grouping of villages, the climax of violent actions of this insurgency, i.e. firing, burning of houses and barns mostly in all mizo villages, violation of civil citizens, killing of innocent civilians, rapes, forced coolie, famine, curfew, etc. mostly took place within 1966-1970 and because of these actions, many families moves to nearby state like Manipur, Assam (particularly Halflong) or to Myanmar (Burma) and Pakistan (now Bangladesh) and some to urban area (Aizawl, many well to do family to Shillong) in expecting safety from various violent actions, unnatural death, famine etc. All these actions along

Table 1 : Decadal Changes in Total Number of Population (1961 - 2011)

Sl. No.	Name of R.D. Blocks	TOTAL POPULATION					
		1961	1971	1981	1991	2001	2011
1	Darlawn	13607	11751	17273	19967	24166	26048
2	Ngopa	7098	6327	9411	11881	16520	18730
3	Phullen	7275	8073	11070	10856	12337	13303
4	Thingdawl	7710	10796	13901	13927	18002	19840
5	Bilkhawthlir	6945	13912	21452	30906	43302	58487
6	**Average**	**8527**	**10172**	**14621**	**17507**	**22865**	**27282**

Table 2 : Growth of population (1961 - 2011)

Sl. No	Name of R.D. Blocks	DECADAL GROWTH OF POPULATION (in %)				
		1961 - 1971	1971 - 1981	1981 - 1991	1991 - 2001	2001 - 2011
1	Darlawn	**-13.64**	46.99	15.6	21.02	7.79
2	Ngopa	**-10.86**	48.74	26.24	51.82	13.38
3	Phullen	10.97	37.12	**-1.93**	13.64	7.83
4	Thingdawl	40.02	28.76	0.19	29.26	10.21
5	Bilkhawthlir	100.32	54.19	44.07	40.1	35.06
6	**AVERAGE**	**19.28**	**43.74**	**19.73**	**30.6**	**19.31**

with grouping of villages reduced or retard the population growth in many areas. Let us analys these impacts from the following table 1 and 2.

From the above table, it can be noted that during 1961-1971 (climax insurgency & grouping period), off the five Rural Development Block Areas under study, two Blocks i.e, Darlawn and Ngopa showed a negative population growth i.e, -13.64 and -10.86. While Phullen Block also showed a very low growth rate i.e, 10.97%. During these period, surprisingly Thingdawl and Bilkhawthlir R.D.Block showed high growth of population. The possible cause for these reason may be (1) movement of people to larger villages (urban/sub-urban) like Kolasib (2358 persons in 1961 – 5990 persons in 1971), Vairengte (451 persons in 1961 – 2458 person in 1971), Kawnpui (1221 person in 1961 – 4052 person in 1971), etc., from surrounding areas. (2) Migration of Brus from Bangladesh and Tripura to western part of the two blocks areas. Apart from total population scenario, Grouping of villages mentioned above, greatly affected the number and location of Settlement within the study area.

From table 3, it can be noted that in 1961 there were 90 villages within the study area (Darlawn, Phullen, Ngopa, Thingdawl and Bilakhawthlir R.D. Blocks) which were grouped into 26 villages where twenty five grouping centres were the then existing villages and one grouping centre was newly created due to grouping. Then 65 villages were deserted. In 1972, those grouped villages were then allowed to reoccupy their home village and a number of families returned and

Table – 3. Changes in Number of Occupied Settlement

R.D. Blocks	Settlement	1961	1971	1981
Darlawn, Phullen, Ngopa, Thingdawl & Bilkhawthlir	Total Occupied Settlement	90	26	97
	Newly Existed Settlement		1	24
	Deserted Settlement		65	17
	Reoccupied Settlement			50

reoccupied their old villages. Buy many families did not return to it and instead moved to urban areas. Beside, those reoccupied settlement were treated as non-permanent village (locally named Bawk) and put under the Villace Councils of grouping centre villages. As recorded in 1981 census, Off 65 villages uprooted, 50 villages reoccupied their old villages 17 villages were abandoned and 24 new settlement sites came into existed. It can be concluded that all these changes happened due to insurgency in the state.

Figure 2 : Number of Population (1961 – 2011)

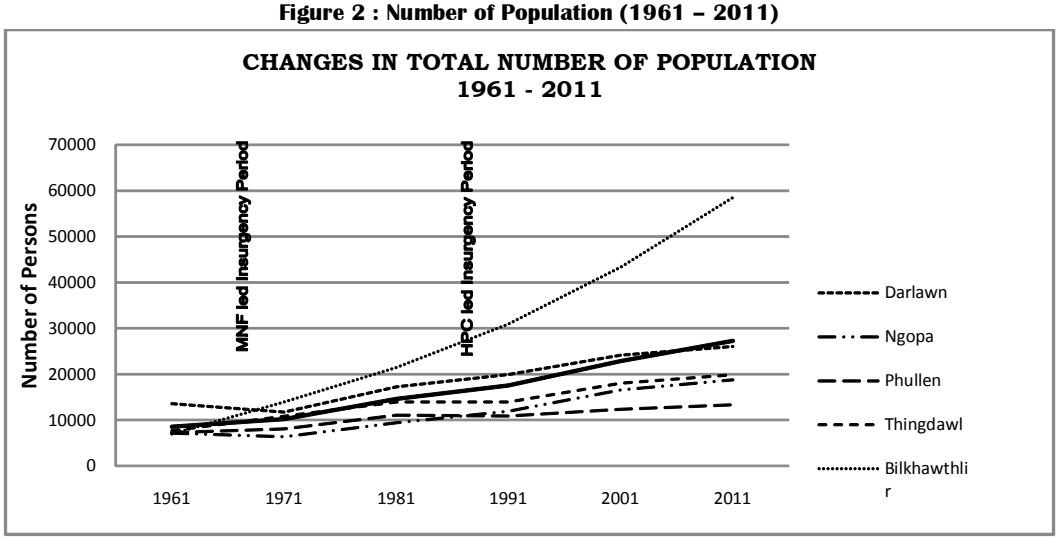
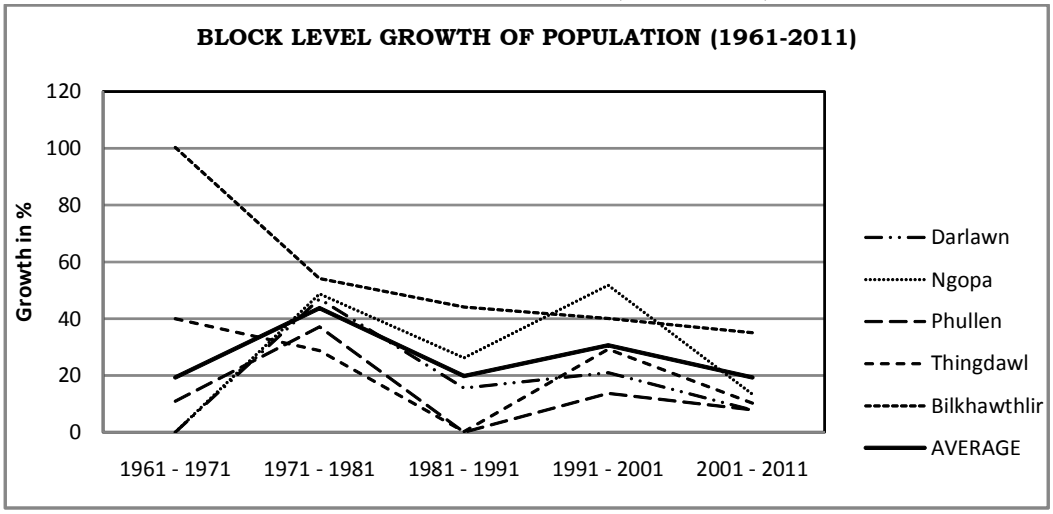


Figure 3 : Growth of Population (1961 – 2011)



B. Hmar People Convention (HPC) led Insurgency and Its Impacts :

In 1987-1988, The HPC submitted Memorandum to the Governor of Mizoram, the Chief Minister of Mizoram and the Prime Minister of India, demanding the creation of Hmar Autonomous District Council in Mizoram comprising all Hmar dominated in the north and northwest, in order to safeguard the rights and privileges of the minorities as envisaged in the Constitution of India.

To remind the central and state governments of the neglect that had been shown to them, the HPC organized a 24 hour band on march 28, 1989. Block the movement of vehicles at Sailutar. To counter the band, the State Government declared a firing order and deployed MAP. The HPC then called a 144 hour band on 16th April, 1989. Then militant members of HPC set off bombs, burned offices, bridges and stole guns. Then torturing and arresting, On 16 May 1989 firing between MAP & HPC happens in Cachar District of Mizoram Border. Two HPC and one MAP died. As per official record, a total of 46 persons were killed and 66 injured in the various encounters of the HPC/HVC and MAP. Among those killed were 7 policemen, 22 HPC/HVC militants, and 17 civilians. This was the official record on 31.7.92. This armed confrontation continued till the final signing of the Accord on 27th July, 1994. (Excluding HPCD activities) During this period, many of the citizens of hmars concentrated areas suffered from curfew, burned houses and offices, firing and robbing of Banks, demand of donation from village heads, govt. servants, contractor, merchants, etc., All this led to outmigration of many people from the concerned areas to other hmars settling areas of neigbouring state as well as to other part of the state, particularly urban areas.

Changes in population dilemma within this insurgency period in the study area can be analyzed from Table 1 and 2 as well as figure 2 and 3. During 1981 – 1991, each block of the study area experienced a decline in population growth compared to former decade (1971-1981) or the following decade (1991-2001). Particularly, Phullen R.D.Block showed negative growth (- 1.93) and Thingdawl Block also showed very low growth (0.19). The notable changes from other decades in total and growth of population during the peak insurgency period could be identified from the mentioned table or from figure 2 and 3.

Apart from total population, a village level analysis of change in population and settlement can be summarized a follows. (Table – 4)

From the table No. 4, it can be noted that during 1981 – 1991, i.e., HPC led insurgency period, many villages within the study area

Table 4 : Village Level Growth Analysis and Changes in Number of Settlement.

Sl. No.	Name of R.D. Blocks	No. of Village		Growth of Population (1981-1991)			No. of Villages		
		1981	1991	Very Low (Negative)	Very High (Above 50%)	Others	New	Merged	Deserted
1	Darlawn	29	28	15	5	8	2	0	3
2	Ngopa	14	15	2	2	11	1	0	0
3	Phullen	11	12	6	1	5	1	0	0
4	Thingdawl	20	15	9	6	0	1	1	3
5	Bilkhawthlir	23	20	9	7	4	1	0	6
TOTAL		**97**	**90**	**41**	**21**	**28**	**6**	**1**	**12**

had experienced negative growth of population. Off 91 villages, as much as 41 villages recorded negative growth of population, while another 21 villages then recorded a very high (above 50%) population growth. This fact reveals that apart from outmigration of people, movement from small and isolated village to larger and more peaceful villages was largely practiced. Beside population structure, Changes in number and location of settlement is also noticeable during the same period. The number of settlement recorded in 1981 was 97, then declined to 90 in 1991. During this period, 6 new settlement sites came to exist and one was merged to urban, while 12 settlements were then deserted. All these statements, could be mentioned as the impacts, directly or indirectly, of the said insurgeny, for there is no recoded great fluctuation in the population growth and distribution or settlement unless unnatural moments happened.

Conclusions :

The present study and compilation of the population of Hmars concentrated areas at Rural Development Blocks level clearly shows that there are great changes in population distribution and growth as well as in number and location of settlement during 50 years (1961-2011). From this study, it can be concluded that -

(i) Insurgency, Armed movement, Violation of freedom, Conflicts between small social and ethnic groups, etc could largely affect the distribution, movement, and growth of population and settlements in a particular areas and peoples within it could seriously suffered socially and economically.

(ii) Grouping of Vilages introduced in most part of the state largely affected the distribution and growth of population and settlement and it largely increased migrants from rural to rural, rural to urban areas, across state and international borders, etc.

(iii) The present study clearly reveals the great fluctuation in population growth, large changes

in population distribution and location and growth of settlements within the Hmar Clan concentrated areas. Changes or fluctuation like these could hardly happen in a normal situation and a normal state of life in a particular area. Therefore it is notable that Citizens or Civilians are the ones, who used to suffered from any unnatural or violent movements, whatever the cause of the movement be, right or wrong.

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Rural Urban Disparity in Nutritional Efficiency Attainment and Infant Mortality Rate in District Saiha, Mizoram

- Lalrinpuia Vangchhia
- Vishwambhar Prasad Sati
- Vanlalṭanpuia

Abstract : *The present study examines rural urban disparity on nutritional efficiency attainment in District Saiha, Mizoram which has the distinction of the highest Infant mortality rate (IMR in the state. Nutritional efficiency or deficiency is one of the causal factors effecting Infant death. Therefore it is needed to know the nutritional efficiency attainment and its relationship to IMR. The study was based on primary data collected from 3 local councils represent urban areas and 3 villages for rural areas in the District. 40 per cent household of each villages/Local councils were randomly selected covering 519 household. Nutritive value and efficiency percentage have been calculated on the basis of the value given by Indian Council of Medical Research. By using principal component analysis the nutritional efficiency index and rural urban disparity was measured. Pearlson's rank correlation has been used to know the relationship between nutritional efficiency attainment and IMR. High ranks are concentrated on urban areas while all rural areas are very low. It shows rural urban disparity. There is a high negative correlation between nutritional efficiency attainment and IMR.*

Keyword : *Nutritional attainment, Disparity, Nutritional efficiency, Nutritional deficiency, IMR*

Introduction :

Nutritional attainment is an effective measurement of the levels of the people at all times. Many other diseases are related to the deficiency of nutrients in the body. The problems of the protein-energy malnutrition affect millions of children in the world today. The daily food which we consume always serves many purposes. The failure of food to sub-serve the functions may be brought about in a number of ways: firstly, it may be the result of inadequate intake of essential nutrients due to lack of food. Secondly, it may be developed as a result of failure to absorb normally the essential nutrient supplied by the diet in adequate quantity (Ali, 1977).

Jelliffe (1966) has defined malnutrition as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. Nutrition is a significant factor in determining the health status of youth also. Naidu

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& Parasuraman (1982) discussed the youth's nutritional status is the condition of the body resulting from the food intake, its absorption and utilization over a period of time. Food intake is the critical nutrition input. Poor nutrition of the youth and the general population results from low income, low productivity and low purchasing power.

The problems of hunger and under nutrition in developing countries has rightly attract the attention of scholars (Srinivasan, 1992), The World Bank (1986) estimated that in 1980, 34 per cent of the population of developing countries, or 73 million people did not have sufficient energy intakes through their diets to enable them to live an active working life and that the diets of nearly half of them (340 million) were so deficient in energy that they ran the risk of stunted growth and serious health problems. Another study indicate that Indian children in poor rural communities often suffer from moderate and severe iron deficiency, anaemia 963 per cent of children below three years belonging to poor rural communities were found to suffer from such anaemia (Gopalan, 1992).

Healthy nutrition takes many forms and is understood differently in different countries and cultures. Arora (2009) discussed in general, healthy nutrition should be an integral part of daily life that contributes to the psychological, mental and social well being of individuals. It is the combined effect of the food we consumed, our health status, and the care we take in meeting the health needs of ourselves and others. According to the study conducted by Dandekar & Rath (1971) that the average calorie norms 2,250 per capita per day was recommended as adequate diet in Indian condition. India is a vast and diverse countries, it is concern for nutrition is as old as its civilization. Rasul (2002) explained nutrition and health are not synonymous, but without good nutrition, health cannot be maintained. There is an unequal attainment in nutrition and foods intake due to many reasons.

According to National Health Mission Monthly Report 2016, the Infant Moratality Rate (IMR) in Saiha district was 113. The study tries to examine rural urban disparity in nutritional attainment in Mizoram. The main reason of this is lack of dietary and health care knowledge. Food security, income and education also influence nutritional attainment.

Objectives :

The major objectives of the study are:

1. To find out nutritional efficiency attainment in the study area
2. To examine rural urban disparity in nutritional efficiency attainment
3. To analyze the relationship

between nutritional efficiency attainment and IMR

4. To make suggestions for reduction for rural urban disparity

Methodology :

The study was based on primary data collected during 2014. Data have been collected from the 3 villages from rural and 3 local councils representing urban areas of the district Saiha by random sampling techniques covering 40 per cent family of the total household. Information on foods intake has been collected from all the food items that the people consumed regularly for a year in gram. The food intake was transformed into nutritional value on the basis of the value given by National Institute of Nutrition, Indian Council of Medical Science, Hyderabad (Gopalan, 2011). Per capita per day nutritional value has been calculated by using the following formula

$$PNI = \frac{PFi\ X\ NV}{100}$$

Where,

PNI= Per Capita per Day Nutritional Intake

PFi = per capita per day food intake in gram

NV = Nutritional Value of foods intake

100 = All nutritional value are given in per 100 gram

Nutritional Efficiency has been calculated based on the recommended value given by the same. To measure the levels of nutritional efficiency attainment, Z-score standardized technique has been used for normalization and standardization; Principal Component Analysis has been adopted to find out the composite index of nutritional efficiency attainment. Karl Pearlson's rank Correlation has also been applied to measure the relationship between nutritional efficiency and Infant Mortality Rate. IMR was calculated for every villages/ local council by the following formula:

$$IMR = \frac{\text{No.of Infant death}}{\text{No.of live birth}} \times 1000$$

The 8 Major nutrients such as protein, fat, crude fiber, carbohydrates, energy, calcium, phosphorous and iron were selected to represent the nutritional attainment for the study area.

Analysis :

Statistical Package for Social Science (SPSS) is used as a tool to process different statistics. The nutritional value per capita per day have been first normalized by Z score standardize technique. Descriptive statistics were also formulated to explained minimum, maximum, average and Standard deviation of the value. It prevents undue influence of variables on analysis. After completion of normalization, Principal Component Analysis was run to obtain the

Table 1. Descriptive statistics of the indicators

	N	Minimum	Maximum	Mean	Std. Deviation
Protein (Pr)	6	-40.76	50.93	-5.800	38.5491
Fat	6	-53.36	120.90	5.175	65.7285
Crude Fiber (CF)	6	-91.82	-66.54	-81.271	10.7421
Carbohydrate (CARBS)	6	118.13	234.55	186.583	43.1803
Energy	6	-39.34	-3.12	-19.868	15.2753
Calcium (CA)	6	-88.67	-33.39	-65.273	21.5242
Phosphorous (P)	6	58.61	220.93	134.010	67.5541
Iron	6	-61.18	.36	-31.941	28.2552
Valid N (list wise)	6				

Table 2: Normalized Values of the Indicators

Village/ Local Council	Pr	Fat	CF	CARBS	Energy	CA	P	Iron
College Veng I	0.88	0.56	1.37	0.78	0.96	0.82	0.96	1.14
College Veng II	1.47	1.76	0.84	-0.27	1.10	1.48	1.29	1.11
Council Veng	0.11	-0.36	0.38	1.11	0.51	-0.15	0.26	0.35
Theiri	-0.91	-0.75	-0.98	-0.55	-0.92	-1.09	-0.96	-0.89
Theiva	-0.76	-0.32	-0.79	-1.59	-1.27	-0.95	-1.12	-1.03
Tuipang L	-0.80	-0.89	-0.82	0.52	-0.38	-0.12	-0.42	-0.68

result.

Principal Component Analysis (PCA) requires computation of correlation analysis and test statistics like Kaiser-Meyer-Olkin (KMO) and Bartlett's test Sphericity to assess the appropriateness of using the techniques. The correlation coefficient matrix shows that most of the variables were inter-correlated and there was no extreme multi- colinearity. The value of KMO for the selected data is 0.532 which is acceptable to run PCA. The Barlett's Test of Sphericity also showed a significant level of 0.000 and we can reject hypothesis since the probability is less than 0.5. Then PCA was run in the computer software SPSS to extract communalities and components. Using Kaiser's criterion of taking Eigen values more than 1, two components were extracted which together explained 67.19 percent of the total variation in the data set. It is considered as good enough to process the analysis.

After component loadings were estimated, the individual indicators with the highest component loadings are grouped into intermediate composite indicators. Since we extracted two components, there are also two intermediate composites as shown in table 3. The factor score for every indicator in a component were

shorted by their size of value. Thus, the first component shows nutrition like Fat, Protein, Calcium, Phosphorous, Iron, Crude Fiber and Energy, the only one nutrient i.e. Carbohydrates is under component two.

Running the PCA in SPSS, we have identified the initial Eigen Values (Total) which is more than one. In our present case, it is 6.719 and 1.084. The number of Eigen values above one varies from data to data. The two components explain 67.19 percent variance of the variables includes in the analysis. This shown in the Rotational Component Matrix presented in table 3.

Table 3 : Rotated Component Matrix

Indicators	Components	
	1	2
Fat	.988	-.141
Protein	.976	.209
Calcium	.917	.288
Phosphorous	.901	.428
Iron	.892	.439
Crude Fiber	.854	.431
Energy	.827	.558
Carbohydrates	.139	.988

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

To obtained weight of the indicators, we have multiplied 1st Eigen value (6.719) with 1st extracted component column (0.988, 0.976, 0.917, 0.901, 0.892 and 0.824) and 2nd Eigen Value (1.084) with 2nd column (0.988). We have considered absolute values (irrespective of sign, negative values are treated as positive). Finally, we have summed up the values obtained in case of each variable.

Table 4: Weights of the indicators

Indicators	Weight
Fat	6.79
Protein	6.78
Calcium	6.47
Phosphorous	6.51
Iron	6.47
Crude Fiber	6.2
Energy	6.16
Carbohydrate	2.01

For example, for the first variable (Fat), we have 6.719x 0.988+ 1.084x 0.141 = 6.79

In the same way, the weights of the other variables were calculated. This is produced as

$$I = \sum_{j=1} Xi \left(\sum_{j=1} /Lij/.Ej \right) / \sum_{i} \left(\sum_{j=1} /Lij/.Ej \right)$$

After obtaining weights of every indicators, the index value of all Villages/ Local council have been worked out by the following formula is used to determine the Composite index score.

Where *I* is the index, Xi is the

Local Council	Fat	Pr	CA	P	Iron	CF	Energy	CARBS	Efficiency Index
College Veng I	0.56 x 6.79	0.88x 6.78	0.82x 6.47	0.96x 6.51	1.14x 6.47	1.37x 6.2	0.96x 6.16	0.78x 2.01	44.75/ 47.39 = 0.94

i-th Indicator; Lij is the factor loading of the i-th variable on the j-th factor; E is the Eigen Value of the J-th factor. The following is as an example for College Veng I.

The total weight of the indicators is 47.39. In the same way, the major nutritional efficiency index for the rest of the villages/ local council has been calculated as shown in table 6.

Results and Discussion :

The study find that all the rural areas have deficient in almost all major nutrition while urban areas have attained more or less efficient. Table 6 shows that the nutritional efficiency as per the recommended daily recommended value in percentage. If the nutrition value is negative, it indicates deficiency while the positive degree of value indicates efficiency in percentage. Let's take protein as one example, urban areas like College Veng I and College Veng II have attained 28.24 per cent and 50.93 per cent of efficiency respectively, the other urban area like Council Veng could not attain the recommended efficiency because the value is -1.43 but the deficiency value low, it is nearly close to attained efficient, we can interprete as the deficiency is only 1.43 per cent. On the other hand, all the three rural areas are deficient in Protein. The deficiency percent is also very high like as Theiri (40.76 percent), Theiva (35.17 per cent) and Tuipang L (36.61 per cent) and so on. Thus the rural urban inequality in nutritional attainment is clearly highlighted from the table 5. However both urban and rural does not attained efficiency in all indicators excluding Carbohydrates and Phosphorous. One of the interesting finding is that no village has attained recommended allowance for most important nutrients such as Energy, Crude Fiber and Calcium.

The result shows that rank of efficiency attainment in all indicators, College Veng II obtained the first rank (i.e., 1.24 in Score Composite Index). The main reasons are that the food intake is highest in the areas, the level of income and knowledge are assumed to support better dietary intake. College Veng II is nearly closed by the two urban

Table 5: Nutritional Efficiency Attainment (in percentage)

Village/ Local Council		Pr	Fat	CF	CARBS	Energy	CA	P	Iron
College Veng I	Urban	28.24	41.84	-66.54	220.32	-5.19	-47.55	198.96	0.36
College Veng II	Urban	50.93	120.90	-72.21	174.76	-3.12	-33.39	220.93	-0.48
Council Veng	Urban	-1.43	-18.42	-77.20	234.55	-12.01	-68.42	151.30	-22.03
Theiri	Rural	-40.76	-44.33	-91.82	162.88	-33.87	-88.67	68.90	-57.17
Theiva	Rural	-35.17	-15.58	-89.76	118.13	-39.34	-85.82	58.61	-61.18
Tuipang L	Rural	-36.61	-53.36	-90.10	208.86	-25.68	-67.79	105.36	-51.15

Table 6: Composite Index and Rank in Nutritional Efficiency Attainment

Village/Local Council		Composite Index	Rank
College Veng I	Urban	0.94	2
College Veng II		1.24	1
Council Veng		0.41	3
Theiri	Rural	-0.91	5
Theiva		-0.92	6
Tuipang L		-0.54	4

areas College Veng I (0.94) and Council Veng (0.41) followed by the three rural areas like Tuipang L (-0.54), Theiri (-0.91) and Theiva (-0.54). From here, it is clear that the higher urban while the lower rural in nutritional efficiency attainment.

Nutritional Efficiency Attainment and Infant Mortality :

The study find out that there is high negative correlation between Nutritional efficiency and Infant Mortality Rate. It means that the low efficiency attainments have high IMR and vice versa as shown in Figure 1. It clearly shows that all urban areas under high efficiency index have a low Infant Mortality viz. College Veng I (26.32) College veng II (24.39) and Council Veng (33.33). But at the same time the rural villages like Theiri (636.36), Theiva (272.72) and Tuipang L (200)

~~Figure 1: Relationship between Nutritional Efficiency and IMR~~

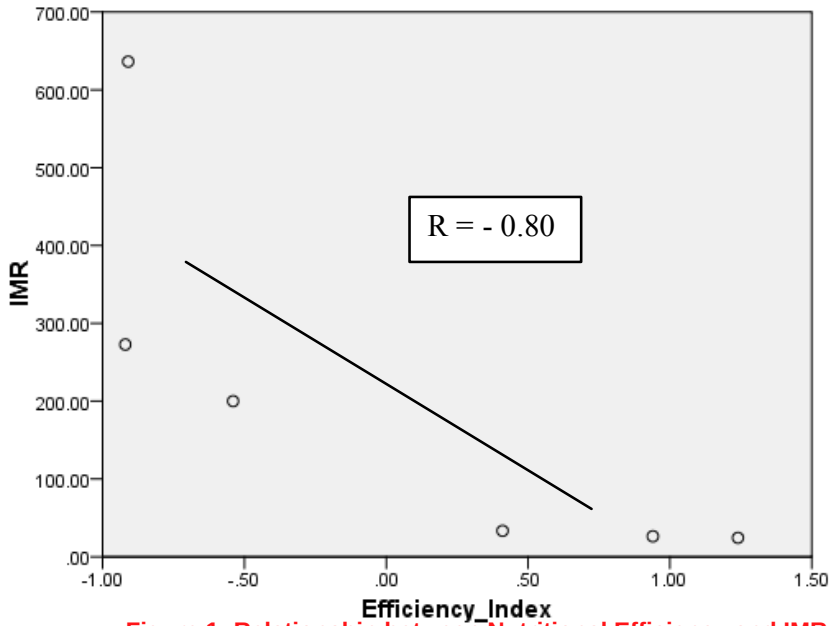

Figure 1: Relationship between Nutritional Efficiency and IMR

have very high Infant death but low nutritional efficiency attainment. Therefore we can say that nutritional efficiency affects Infant Mortality Rate.

Conclusions and Suggestions :

The study explores that nutritional efficiency attainments in all Villages/ Local Council were not good enough in the study area. Deficiencies are found in energy, crude fiber, calcium and iron at almost all Villages/ Local Council. It is supposed to be the factor causing high Infant Mortality in the district because these are mostly needed by the pregnant mother for healthy delivery and lives of babies. Urban areas have generally attained efficient in nutrients while rural areas are deficient as per the recommended value. Thus inequalities between rural and urban areas are found in terms of nutritional efficiency as well as Infant Mortality Rate. The major factors for these are supposed to be unequal income, dietary knowledge, food availability, food accessibility and negligence of healthcare. It is also clear that nutritional attainment effects Infant mortality in rural and urban areas, the relationships between the two are highly negative. It indicates the people who attained more or less nutritional efficiency have low Infant death and vice versa.

From the study, we may suggest that there is a need of improvement in dietary and healthcare. The people especially rural areas should be aware for knowing the importance of diets and healthcare as well as how to achieved that goals. Food habit should be more varied because the rural peoples do not aware to eat different foods; they consumed common foods that are unchanged throughout the years. They have deficiency in one nutrient while exceeded the recommended allowance in other nutrients. For instance, deficiency is found in proteins and energy while phosphorous intake value exceeded the recommended value. For reduction of the disparity between rural and urban areas, connectivity, food and dietary knowledge, income and standard of life in rural area should be uplift. It will check not only the nutritional disparity but also reduce infant mortality. Finally, it will automatically reduce high IMR in the district as well as the state.

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The Two Bengals: Understanding the Development Dilemma in Western Region of West Bengal

- *A.C. Mohapatra*

Abstract : *Perhaps, historically Bengal could be viewed in two ways, the riverine tracts to the east and south (much of which now lies in the sovereign nation of Bangladesh) and the undulating outliers of the Peninsula, adjacent areas bordering Odisha and Jharkhand. While the former was quickly populated with extensive rice culture on the fertile alluvium, the latter contained impenetrable deciduous hardwood forests, largely populated, yet non-farming Gond tribes of various denominations till the arrival of the British. It is search for natural resources, coal in mid-nineteenth century that the British realized the immense natural resources potentials of the latter region. The railways arrived and the sal forest became the immediate fodder of the expanding railways network. The aim of the paper is to provide a historical-geographical narrative of underdevelopment of the western West Bengal which is quite different from the processes and possibilities of development in the riverine Bengal.*

The Two Bengals :

How does one view the great Bengal, Sonar Bangla, where the battle of Palasi[1] was fought in 1755 and Robert Clive snatched away freedom of the Indian sub-continent and its varied people including various tribes (and Adibasis: the original inhabitants). It was also the imperial hub of the British Raj and Kolkata - the Imperial Capital, till it shifted to Delhi in end 1911. The texture of the land is riverine lowlands and flood plains, dotted with villages, mosques and temples on the levees of the serpentine distributaries and backwaters. The color is green- the lush tropical vegetations, the rice paddies and the fisher folks harvesting the bounties of Padma, Jamuna and Meghna. But this was the "new" Bengal, geologically built by recent sediments brought by Ganga and the mighty Brahmaputra, perhaps no more than 2000 years ago. But, immensely fertile, it quickly got populated by peasant rice farmers and the traditional fishers who perhaps were the original inhabitants; those joyfully sang the bhatyali.

The other (older) Bengal was to the west, part of the peninsular plateau bordering the Chotanagpur (now, Jharkhand), to north-central, the Rarh Bengal and the now infamous "Jangal Mahal".[2] This

[1]A field of 'Palas Trees' (Sanskrit: Kinshuka) that abound rural bengal with scarlet red flowers in the summer.

2 Originally included parts of present Odhisa (Mayurbhanj area) and constituted of present post-partition Bengal (Pashchim Bonga) of the districts of Medinipur, Purulia, Bankura, Birbhum and Bardhaman- the latter perhaps more part of the riverine Bengal (with Damodar flowing through) except the western part of the district.

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undulating plateau surface contained rich hardwood forest, particularly of sal (Shorea robusta) and home to the Santals, Mundas, Oraons, Bhumij and myriad of other "hunter-gatherers" central Indian Adibasis. In the early years of the Company Raj, this tract remained undisturbed since there was little prospect of land revenue from hunter-gatherers, the land too was relatively infertile due to the abundance of laterites. On the other hand, the riverine Bengal was quickly populated with rice farmers, rich harvests of crops and became prosperous. These tracts were easy to access through the river channels and thus, became of economic interest to the East India Companyb (EIC). The hunter-gatherers who lived on the fringes of this rich peasantised countryside were little equipped to participate in the rising prosperity of the new Bengal.

However, the beginning of the industrial Revolution in Britain in 1770s had its immediate repercussions on the Indian holdings of EIC. As R.C. Dutta in his classic Economic History of India wrote over a century back, 'IR in Britain and the conquest of Bengal were no mere coincidences - it had far deeper and wider implications' (Dutta,?). Discovery of coal by John Summer in 1774 in Raniganj on the west bank of River Damodar would change the fate of the old Bengal and the entire Chotanagpur and Chatishgarh region, homeland of the myriad Gond tribes, forever. The process further accentuated after the era of the locomotives arrived-just after a decade of the first trains ran in London in 1843, they were brought to India in 1853. This provided a double whammy to the homeland of the hunter-gatherers of the old Bengal and the Chotanagpur region. First, the coal was the future and the mines are to be opened they were profitable. The expansion of railways at first around the most important city of the British India, Kolkata needed vast sums of sal logs to lay the railway tracts. The homeland of the Santals and all the other tribes provided both land was to be acquired from the tribes, which was easy, since their rights were not documented.

Except in the valleys of Damodar and its tributaries where rice culture might have started by the migrant farmers from the east, the rest of the plateau, much forested but remained without any faring culture due to the extensive laterite formations and thus unproductive. The tribes, by mid-nineteenth century were still hunter-gatherers had perhaps a 'homeland' but no private and documented rights.[3] So, after the British annexation and incursion

[3]*During the Moghul rule, wheras, Subah bangal and Sarkar-e-Odisha (coastal Odisha only) were settled with land titles and rights, the Chotanagpur region including the western part of present West Bengal were of little interest to the moghuls as well.*

into the tribal homelands, the tribes became landless, which is also true of all the central Indian territories which ere left to the native rulers (e.g. the Riyashat of Mayurbhanj, which included the Jangal Mahal territories).

By the first quarter of the twentieth century, in some of these areas, based on availability of abundant mineral and coal resources, industrial enterprises emerged both around Kolkata as well as in Chotanagpur (e.g. the Jamshedji Tata steel mill at Tatanagar in 1913-'17). Here too much of the labour were migrants from surrounding regions like Bihar of the riverine Bengal. The tribes had no skills or otherwise unwilling to work as wagers in mills and khadans (mines). On the other hand, they further receded away into still forest tracts. The farmers in the valleys suffered the ferocity of floods of Damodar and had only marginal existence, exploited by the local rulers or Zamindars. Periodic drought, starvation and famines had terrible consequences on the peasantry and the tribes, epitomized by the devastating famine of 1943.

Now, there are the distinctiveness of the Two Bengals, the riverine Bengal and the industrial powerhouse of Kolkata metropolitan centre and the Asonsol-Raniganj belt of coal mining and metallurgical manufactures which made West Bengal the preeminent industrial state of post-Independent India till end of the 1960s and the decimated countryside, particularly the tribal territories was fodder to the industrial economy of Bengal.

Post- Independent Scene:

Despite the terrible suffering of the peasantry in Bengal under the Zamindari system and the subsequent abolition of the system and restoration of land rights to the peasants, inequalities in land holdings continued and particularly, the tenant farming system and the absentee landlordism till the end-seventies when the Left-front government brought about the much needed land reforms in West Bengal.

However, in the industrial sphere, West Bengal marched on, particularly during the II Five Year Plan when the Durgapur public steel complex was developed and the Durgapur-Asonsol-Chittaranjan industrial region was developed to act as a 'counter magnet' to the Kolkata metropolitan region. Further, with the Damodar valley Corporation (DVC, 1948) coming up the early fifties with the Durgapur barrage, not only the ferocious Damodar was tamed, but also much needed irrigation water was available, particularly in the Burdwan had plain areas of both the Damodar and Ganga valleys, whereas the western part formed part of the Chotanagpur uplands.

But nothing much changed in

the districts of Medinipur, Bankura and Purulia with agriculture still subject to droughts and the forest communities and the tribes left far behind in the march to development.

Towards the end of 1960s and the early 1970s the industrial scene in Bengal was to undergo significant changes. The two wars (with China in 1962 and Pakistan in 1965) and the passage of Nehru Era, stalled the industrial progress, urban unemployment and industrial unrest all combined into the (in) famous naxalism in the very heart of industrial Bengal, Kolkata. Further, the effects of the (in)famous 'freight equalization policy' of Nehru Era wrought havoc to further industrialization of Bengal, since the state lost any locational advantage in respect of availability of coal and metallurgical minerals. Rather, a process of de-industrialization was ushered in out of which the State is yet to recover. Post-economic deregulation of 1991, studies indicate that in the next decade the state Gross Domestic GDP grew steadily over 8% annually (the highest in the country in which the agricultural performance was reasonably good (over 2%) but the performance of the manufacturing sector was dismal (Guruswamy et al., 2005)[4]. In the next decade (2001-'02 to 2010-'11) the SDP growth fell below the national average (but still around 5% annualized).

The western region of the State (minus the Burdwan district) which is still predominantly rural and agricultural with a considerable tribal population performed even worse. With rural poverty on the rise and acute deprivation staring in the face, Naxalism raised its head again the story of the Jangal Mahal unraveled. The land reforms brought about by the successive Left-Front Government had some initial successes, particularly in the valleys and floodplains, but on the plateau region the results were lackluster. Steady industrial decline compounded with high unemployment became the chief reasons of the unrest.

The Story of the Jangal Mahal :

The current Jangal Mahal region that includes the district of West Medinipur, Bankura and Purulia has a substantial presence of various tribes who have become farmers in recent times only. However, to start with they had no land and therefore, the land reforms of the Left front did little to alleviate their precarious existence. The forests have long gone and therefore, their resource base. Land that they claimed as homeland was usurped during the colonial days itself. Due to the continued forest

[4]*Mohan Guruswamy, Kamal Sharma and Jeevan Prakash Mohanty: Economic growth and development in West Bengal: Reality versus perception, economic and Political Weeeekly, vol.21 (May 21-27, 2005), pp.2151-2157*

policy of the Raj days, the State Forest Departments have become the new Zamindars in the tribal heartlands of central India. The Fifth Scheduled protection of the centrtal Indian tribes could not deliver because though there were Scheduled Tribes in West Bengal (nearly 3 million, principally the Santal), the state was not part of the Scheduled Area provision of the Constitution of 1950. Therefore, the special protections provided to Scheduled Tribes residing in Scheduled Areas (both the fifth and the sixth Schedules under Article 244 (1&2) were not applicable to them. The Forset Rights Act, 2006 (The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006)[5] that land and livelihood rights under Article 3(I) including conversion to personal ownership rights is yet to see the light of the day, particularly in the central Indian tribal areas. This piece of progressive legislation enacted by the Union Government could confer permanent ownership titles to people (the tribes) who were over centuries deprived of their rights on land. Since, land is a state subject, often the state flinch in giving away land to the landless tribes. Second, the state Forest Department fight tooth and nail to hold on to the land which they claim to be theirs, irrespective of the facts whether there is any forest in existence or not. The Peruvian economist Hermando de Soto had argued that one of the principal reasons why in developing countries the rate of economic growth is low can be attribute to the fact that the poor cannot monetize their capital assets including land (e.g. community ownership of land) and thus, are deprived of their participation in capitalism-limitation to choice of participation. Mostly, such assets are non-documented or in joint ownerships and therefore, cannot be collateralized, particularly that obtain in tribal regions of India. Often the usufructuary rights (like, those over minor forest produce) cannot be integrated with the market economy (de Soto, 2000)[6].

Part of the problem lies in the ambivalence of the Indian State, in the past six decades, towards the tribes due to, (i) the pretentious attitudes that somehow or other India would strive to be a 'socialist state' and (ii) somehow or the other, the Indian State must protect the tribes from the deleterious effects of modernity and capitalistic progress and strive to preserve their 'traditional institutions' and customs- very well meaning philosophy but of little practical consequence. With the rise (4 times) in population in the past 6 decades

[5]*Gazetted Second January, 2007.*

[6]*H.de Soto, The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else, Berkshire: Bantam, 2000.*

from 360 million to 1220 million, there is little forest tracts are available to the tribes to practice their traditional way of life. Perhaps their rapid incorporation to the mainstream would have provided them a choice whether to modernize and become part of the rising India or to remain away from it. A good example is perhaps the comparison between the Australian Aborigines who were protected and therefore, obtain a precarious existence, as against the Polynesian Maoris of the New Zealand who were integrated and therefore, have both a sustained traditional life as well as the benefits of modernity.

What is the Blue print? :

Revival of the industrial economy of West Bengal given the policies of the State over the past four decades makes one only pessimistic about the situation. The land questions of Singur and Nandigram still hunt the investors. Closely connected with industrial revival is the unemployment issue in the State, which is the single most important driver of radicalism and radicalisation of rural Bengal, especially the Jangal Mahal region.

In the tribal, rural Jangal Mahal region, the singularly important question is the land question and if, the State Government is pro-active in providing land rights on the tribes who have struggled over, at least three to four decades to become farmers, but without access to land. It may be another question if they would be successful farmers, since most land that may be available for any distribution if any, are the marginal and less fertile lands. Industrial revival could provide some livelihood options on the educated tribal youth, either through direct employment or through self-employment projects.

This situation, none the less, appears grim and the Jangal Mahal reverberates the desperation of the people who have turned strangers in their own homeland.

Population distribution in Aizawl District during 1981 to 2011 : A ~~block wise~~ Block-wise Analysis

C. Nunsiamliani
~~Prof.~~ Rintluanga Pachuau

Abstract : *This paper analyses the population distribution and changes in various blocks of Aizawl district. It focuses on the time of most rapid demographic transformation of Aizawl district from 1981-2011, and the variation in the distribution of population, in various blocks of Aizawl district. The study shows spatial inequality in block-wise distribution of population which is related to economic development.*

Keywords: Population Distribution, Spatial Inequality, Aizawl District, Mizoram

Introduction :

Population distribution implies the way in which people are spread across an area. All over the world, population distribution have a tendency to be uneven. Likewise block-wise distribution of Aizawl district population in Mizoram shows considerable inequality in various censuses. This is because of individuals' occupation and mode of living among various blocks. The patterns of economic condition and population increase in this district conform to the notion that the already densely populated blocks have a greater potential for population increase than the sparsely settled blocks (Nand, 1966). Mizoram is an agricultural state where around 60 per cent of the population relies on agriculture and allied sector (Mizoram Economic Survey, 2013-2014). Shifting cultivation, in spite of being a livelihood of the rural people, has been discouraged due to low surplus, difficulties in marketing and increasing population pressure. Because of this worsening condition, many rural work forces have been migrating to urban centers in search of wage-employment. That is the reason why more than half of the population in Aizawl district lives in town, as more people from village migrate to towns and urban areas looking for open doors for work and better amenities. This resulted in continually changing population of the blocks of Aizawl district during all the census decades.

The Study Area :

Aizawl district is situated in the north of the Tropic of Cancer in the northern part of Mizoram. Geographically, it lies between 92^0 37' 03" E to 93^0 11' 45" E longitudes and 23^0 18' 17" N to 24^0 25' 16" N latitudes. It is the biggest district in Mizoram by population and the second biggest in area with 3,576 km^2. It constitutes 16.96 % of the entire area of Mizoram. The district is sharing borders with Champhai

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district to the east, Kolasib district to the north, Mamit district to the west, Serchhip district to the south. In 2011, the district contains 4 towns, 104 total villages with a density of 112 persons per square kilometer. There were 12 blocks in 1981 and 1991 censuses under Aizawl district. The number was reduced to 5 blocks only in 2001 census due to administrative reorganization and creation of five new districts in the state of Mizoram.

Figure 1 : Map of the Study Area

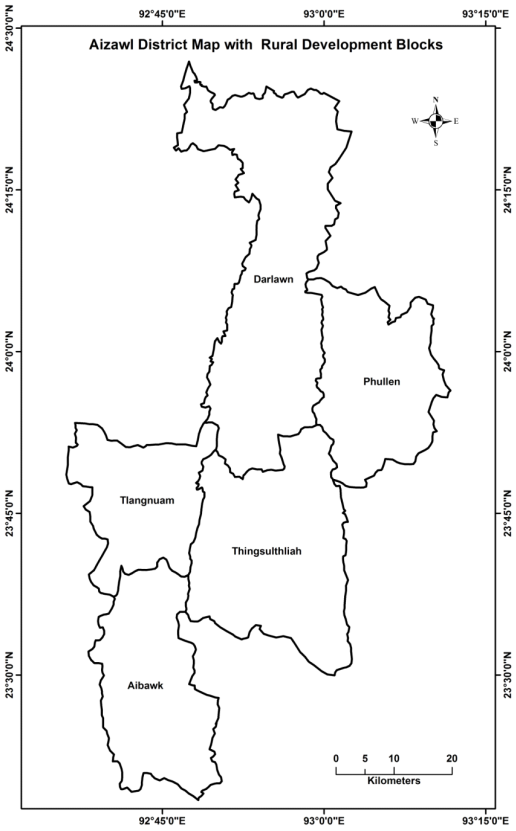

Fig. 1 : Map of the Study Area

Objectives of the study :

1. To assess population change in different community or rural development blocks of Aizawl district during 1981 to 2011.
2. To determine the factors responsible for population change.

Methodology :

The study was carried out with the help of secondary data. Data were mainly obtained from District Census Handbooks, Primary Census Abstracts, and General Population Tables Mizoram, published by the Directorate of Census Operations Mizoram, Statistical Abstract of Mizoram, and Statistical Handbook of Mizoram for various years published by the Directorate of Economics and Statistics, Government of Mizoram.

To determine population change, decadal growth rate is calculated which is given by -

$$DGR=\left(\frac{P_n - P_0}{P_0}\right) \times 100$$

Where,

DGR = decadal growth rate
P_n = present population
P_o = original population
P_n and P_o are ten years apart.

The collected information is also displayed by using cartographic technique like bar graphs and line graphs.

Analysis :

(a) Block-wise Population Distribution in 1981

Since 1981 enumeration, great changes have occurred in the distribution of population, and "the basic forces which were operating" (Thompson 1936:250) in the previous censuses have continued to operate that there is still a definite inclination of the rural population to move to the towns. The existing diverse blocks imbalances of population can be ascribed to various in economic activities, as the largest concentration of population has been recorded in Tlangnuam block due to the proximity to Aizawl city in which living conditions are better at, compared to other 11 blocks in the district. Beside natural increase, migration into the block, mainly in Aizawl town, can be singled out as one of the important factors for such high growth. In fact, 79.44% population lived in the urban areas in this block, and 30 villages with more than 19,000 people are distributed in the 28 inhabited villages. The smallest number of population was found in Reiek block in which populations are distributed in the 28 inhabited villages.

The towns Aizawl (74,493), Champhai (7,487), Kolasib (8,282) and Serchhip (7,329) in Aizawl district are found in 4 blocks. Except Aizawl, all towns were notified for the first in 1981 census. There are 8 blocks which do not have urban population. Tlangnuam block has high urban population, among the 4 blocks in which the 4 towns in the district are located, while East Lungdar has highest number of rural population.

Table 2[1]: Population Distribution of C.D. Blocks in Aizawl District, 1981

Sl. No.	Name of C.D Blocks	Total Population		
		Persons	Rural	Urban
1	Lokicherra	24,444	24,444	-
2	W.Phaileng	16,838	16,838	-
3	Reiek	10,973	10,973	-
4	N.Thingdawl	35,351	27,069	8,282
5	Darlawn	18,066	18,066	-
6	Tlangnuam	93,769	19,276	74,493
7	Aibawk	11,671	11,671	-
8	Serchhip	23,428	16,099	73,329
9	Thingsulthliah	20,638	20,638	-
10	Ngopa	20,956	20,596	-
11	Khawzawl	35,807	28,320	7,487
12	E.Lungdar	28,885	28,885	-
Total		**340,826**	**243,235**	**97,591**

Source: District Census Handbook, Aizawl District ,1981

Figure 2: Villages and Towns of Aizawl District, 1981 Census

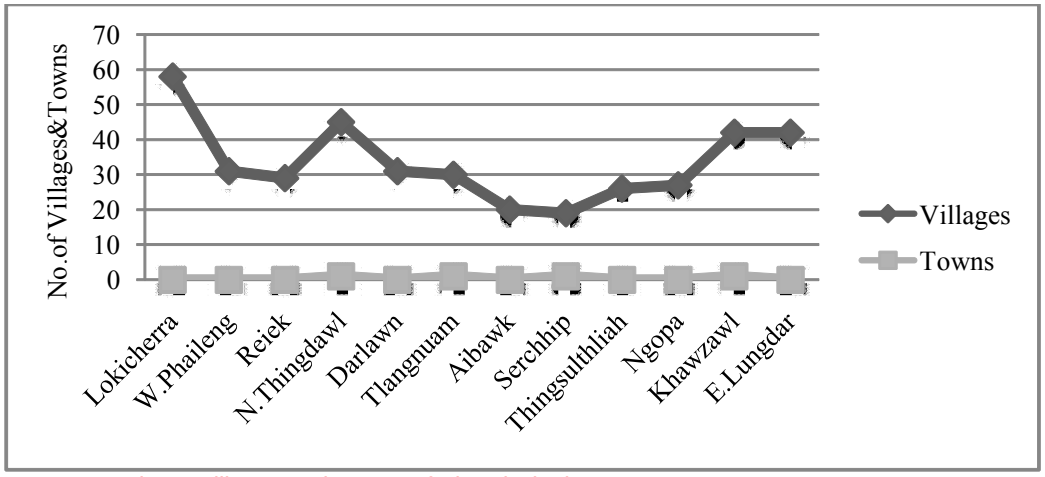

Fig. 2: Villages and Towns of Aizawl District, 1981 Census

district

b) Block-wise Population Distribution in 1991 census

Community Development Block has been renamed as Rural Development Block and the district has 12 Rural Development Blocks as per 1981 census. It is noticed that all the 12 blocks in Aizawl has shows a significant increase in population in 1981-1991. The highest growth rate has been observed in Tlangnuam block with 82.01% followed by Khawzawl block with 40.17% and Thingsulthliah with 31.29% and so on. The total

Table 3: Population of R.D. Blocks of Aizawl District in 1991 Census

Sl. No	Name of R.D. Block	Population Total		
		Persons	Rural	Urban
1	Zawlnuam	30,853	23,852	7,001
2	W.Phaileng	21,591	21,591	-
3	Reiek	12,128	10,320	1,808
4	Tlangnuam	170,667	11,900	158,767
5	N.Thingdawl	44,833	18,033	26,800
6	Darlawn	20,983	17,374	3,609
7	Aibawk	14,439	14,439	-
8	Serchhip	29,993	11,803	18,190
9	Thingsulthliah	27,095	18,693	8,402
10	Ngopa	23,347	23,347	-
11	Khawzawl	50,192	20,177	30,015
12	E.Lungdar	32,344	27,215	5,129
	District Total	**478,465**	**218,744**	**259,721**

Source: District Census Handbook, Aizawl District 1991 Census.

Figure 3: Villages and Towns of Aizawl District, 1991 Census

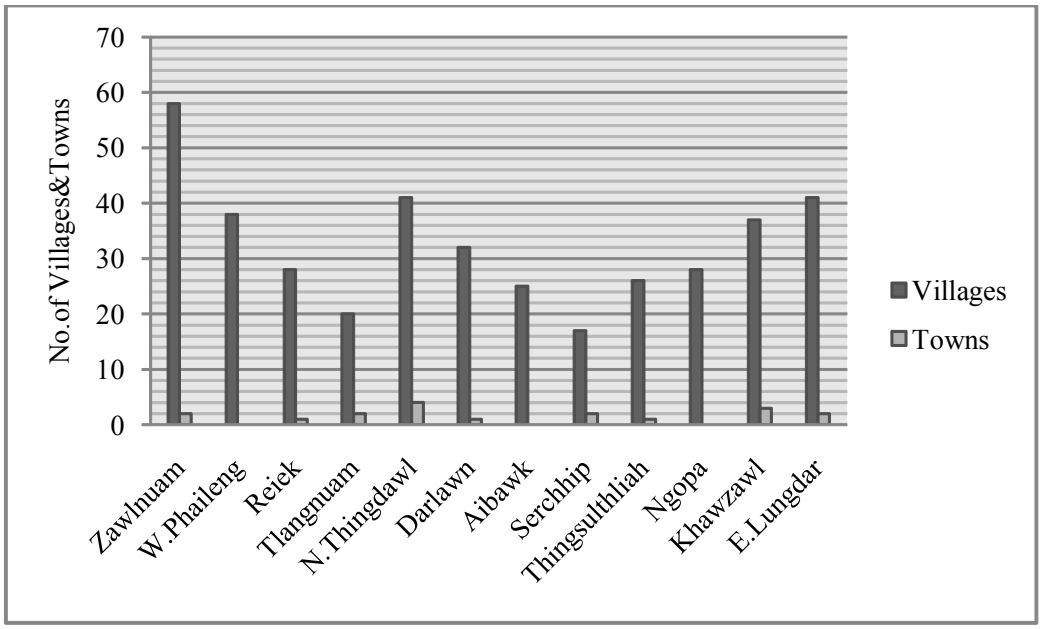

Fig. 3: Villages and Towns of Aizawl District, 1991 Census

added population in all the 12 blocks in ten years amounted to 137,639 persons. The reasons large concentration of population in Tlangnuam block can be credited to migration into Aizawl town and natural increase. Whereas the lowest number of population is found in Reiek block, an increase of only 1,155 populations within a span of 10 years. The percentage decadal variation also records only 10.53% during the two censuses.

Zawlnuam block has the largest number of villages, and furthermore largest number of inhabited villages, where as less number of villages and also scanty inhabited villages are found in Serchhip block. The urban population shows a significant increase while the rural population has declined. Three blocks namely, West Phaileng, Aibawk and Ngopa do not have urban population in this census. The decrease in the rural population in the ten years is due to migration to the town, addition of new towns, and expansion of the existing four towns viz, Aizawl, Champhai, Serchhip and Kolasib in area in this census.

There were four towns in 1981 census, but now it is 18 in the district of Aizawl, and the ratio of urban population to total population amounted to 54.29 %. Aizawl town has the largest urban population where about more than half of the population of the district lives here.

Table 4: Newly Added Towns of 1991 Census in Aizawl District

Sl. No	Name of Towns	Name of R.D. Blocks	No. of Population
1	Zawlnuam	Zawlnuam	3,455
2	Mamit	Zawlnuam	3,546
3	Lengpui	Reiek	1,808
4	Sairang	Tlangnuam	3,527
5	Vairengte	N.Thingdawl	5,607
6	Bairabi	N.Thingdawl	2,421
7	North Kawnpui	N.Thingdawl	5,290
8	Darlawn	Khawzawl	3,609
9	Thenzawl	Serchhip	4,502
10	Saitual	Thingsulthliah	8,402
11	Khawzawl	Khawzawl	7,104
12	Khawhai	Khawzawl	2,102
13	Biate	E.Lungdar	2,325
14	North Vanlaiphai	E.Lungdar	2,804

Source: District Census Handbook, Aizawl District 1991.

No town in the district has been declassified or converged with other towns as is apparent from the following table as per the census of India 1991.

c) Block wise Population Distribution in 2001 census.

The 2001 census was peculiar in the demographic history of Aizawl district. During 1991-2001, the total population of Aizawl district has declined considerably due to reorganization of the district. In the year 1998, 5 new districts had been created in Mizoram, alongside 2 new blocks in this census period, the aggregate number of block became 22 in numbers, and the district likewise progress towards becoming 8 in numbers in the entire state. Therefore, rearrangement occurred among the different blocks, and remarkable changes have occurred in the distribution of population in Aizawl district. The number of blocks in Aizawl district is decreased due to transfer of blocks and a few villages to the recently created 4 districts in the state. For instance, North Thingdawl block and 8 villages of Tlangnuam block has been transferred to newly created Kolasib district and renamed as Tlangnuam (Part) block in Aizawl district and Tlangnuam (Part) block in Kolasib district. Similarly, 6 villages in Thingsulthliah block, Serchhip block, 14 villages of East Lungdar block and 1 town North Vanlaiphai, transferred from Aizawl district to newly formed Serchhip district. The two blocks in Mizoram is renamed as Thingsulthliah (Part) in Aizawl district and Thingsulthliah (Part) in Serchhip district. Once

more, Khawzawl block, 16 villages of Ngopa block, 27 villages of East Lungdar block, and 1 town Biate transferred from Aizawl district to newly shaped Champhai district. Not just this, entire blocks like Zawlnuam, West Phaileng and Reiek from Aizawl district are transferred to the newly shaped Mamit district.

This rearrangement of blocks makes the population in Aizawl district gave an impression of being diminished in numbers, in compared to previous census. Presently, number of blocks in Aizawl district is 5 with the recently added Phullen block which used to be one of the village having a population of 1,939 in 1981 and

Table 5: Block Wise Population Distribution of Aizawl District in 2001 Census

Sl. No	Name of R.D. Block	Total Population		
		Persons	Rural	Urban
1	Darlawn	24,169	20,304	3,865
2	Phullen	12,337	12,337	-
3	Aibawk	15,987	15,987	-
4	Tlangnuam (Part)	242,789	9,475	233,314
5	Thingsulthliah (Part)	30,394	19,428	10,966
	District Total	325,676	77,531	248,145

Source: General Population Tables Mizoram, Census of India 2001

Figure 4: Villages and Towns of Aizawl district, 2001 Census

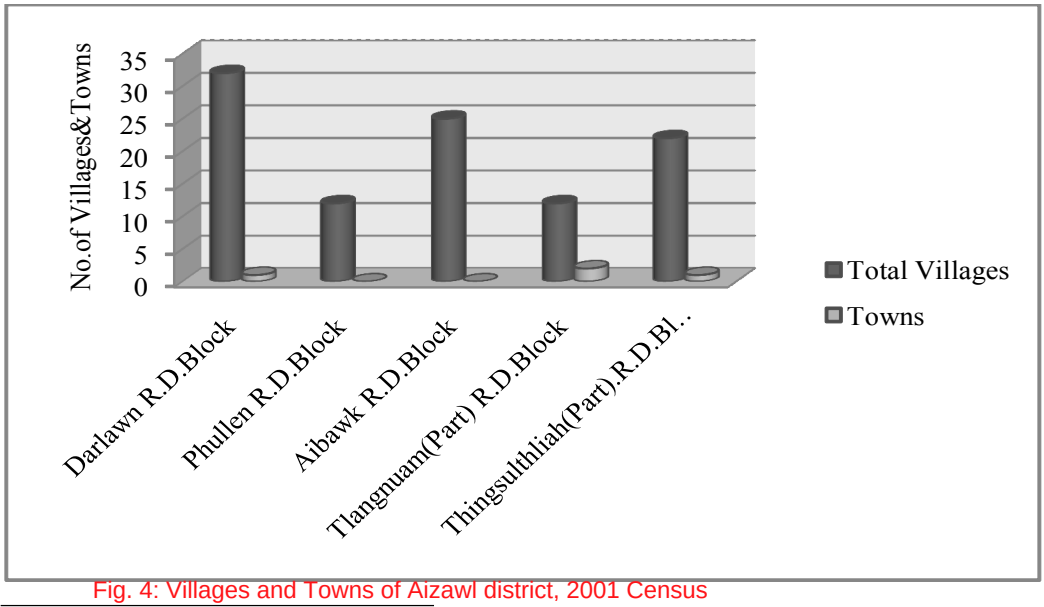

Fig. 4: Villages and Towns of Aizawl district, 2001 Census

1,594 in 1991 census under Ngopa block. This Phullen village carry with it 11 villages from Ngopa block and turn into a completely development block under Aizawl district in 2001.

Despite the fact that numerous villages from Tlangnuam block has been transferred to newly created Kolasib district, largest grouping of population is found in Tlangnuam (Part) block. The most modest number of population is found in the recently created Phullen block. The distinction between the largest and the smallest rural population concentration in the two blocks of Darlawn and Tlangnuam respectively added up to 10,829 persons. Tlangnuam block has largest number of urban population, while Darlawn block has smallest concentration of urban population. Indeed, in 2001 census, out of 5 blocks in the district, Phullen and Aibawk blocks do not have urban population.

There are 7 uninhabited villages in the district, due to merger of small villages with bigger villages. This is the situation in Aizawl district as well as Mizoram in general.

c) Block wise Population Distribution in 2011 census

Tlangnuam (Part) still hold the legacy of highest concentration of population among all the 5 blocks in the district, where as the less concentration of population was found in Phullen. The concentration of population between the most astounding and the least blocks added up to more than 2 lakhs population (298,428). The population in Tlangnuam (Part) block alone added up to 68,942 persons.

The rural population was observed to be high in Darlawn and less in Tlangnuam block, which has more male than female. Yet again, the case is reverse in urban areas where females are more than

Table 6 : Block Wise Population Distribution of Aizawl District, 2011 Census

Sl. No	Name of R.D. Blocks	Total Population		
		Persons	Rural	Urban
1	Darlawn	26,048	22,279	3,769
2	Phullen	13,303	13,303	-
3	Aibawk	17,128	17,128	-
4	Tlangnuam (P)	311,731	12,365	299,366
5	Thingsulthliah (P)	32,099	20,480	11,619
	District Total	400,309	85,555	314,754

Source: Final PCA Mizoram 2011 (Census of India)

males. This may be women are getting more health care facilities, where birth rate is high and death rate is low. Phullen and Aibawk blocks do not have urban population.

Darlawn block has the largest number of villages and in addition to inhabited and uninhabited villages, while Phullen and Tlangnuam (Part) blocks has same number of villages, but Tlangnuam (Part) has 2 uninhabited villages. Among the 4 towns in the district, Darlawn and Thingsulthliah blocks has 1 each, 2 in Tlangnuam (Part) while Phullen and Aibawk blocks have no towns.

Conclusion :

Aizawl district has been experiencing many changes in the lasts decades as per population distribution is concerned. However, this distribution has great inequality as larger concentration was found in few existing towns within the block, whereas growth of population is high in the district, considerably higher than the state growth. The distribution of population in various blocks mirrors diverse economic possibilities. Hence, varied distribution of population can be considered as the difference in economic conditions, as urban population demonstrates faster growth than the rural population. This is due to better economic conditions coupled with better living conditions than the

~~**Figure 5 : Villages & Towns of Aizawl District, 2011 Census**~~

Fig. 5 : Villages & Towns of Aizawl District, 2011 Census

rural areas.

The analysis of decadal change in the distribution of population demonstrates that in 1981 census around 71.37% of the population in the district was living in the rural areas while only 28.63% of the populations are in the urban areas. However, after ten years, the population living in the urban areas has increased to 54.28%, and 45.72% in the rural areas. Urban population shows continuous increase. In 2001 census 76.19% lives in the urban areas, the latest census demonstrated much higher rate of 78.63%, and 21.37% in the rural areas, shows decrease of 8,024 persons than the previous census.

The most significant change in the distribution of population among different blocks took place in 2001 census, despite this, largest population concentration was found in few towns. In the blocks Tlangnuam witnessed highest growth as well as largest concentration of population due to the inclusion of Aizawl. This high concentration of population resulted in fragmentation of land especially in Aizawl city. This imbalance distribution of population may be deterrent in further development of Aizawl city. Spreading a section of the administrative government workplaces in areas which are less populated may be a solution to reduce population increase to city.

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GIS-based

~~GIS Based~~ Assesment of Ground Water Potential in Tlawng Watershed, Mizoram

- Zoramkhuma

Abstract : *Ground water is often withdrawn for different purpose. It is important source to meet the water requirements of various sectors including irrigation, domestic and industries. Similar to other parts of Mizoram, groundwater is an important source of water for agricultural and domestic uses in Tlawng watershed. Its physical structure narrow, with a small area and a high-population density create another hindrance in ground water management. The elevation of the terrain of basins is great and steep, meaning that most precipitation becomes runoff and drains directly to the main channel very quickly. It result water resources and water demand are unevenly distributed spatially and temporally. Assessment of ground water potential zones is prerequisite in Tlawng watershed. Shortage has recently become an important issue in Tlawng watershed area; due to more than 50 percent (Census, 2011) of the Mizoram populations are settled in Tlawng watershed. Assessment of ground water is needed to regulate the usage of water resources in order to solve the problem of water shortages. In this study Remote Sensing data and GIS and techniques will be deployed for assessment of ground water potential zonation. The present study proved geospatial technology Remote Sensing data and GIS techniques are suitable for assessment of ground water potential in Tlawng watershed. For ground water potential assessment thematic layers like Slope, Relative Relief, Lithology, Geological Structure, Drainage Density, Vegetation Cover, Land Use/Land Cover and Rainfall data are integrated using Weighted Overlay technique (Multi Criteria Decision Making) . The study reveals that uneven distribution of ground water potential zones over the study areas is mainly determined by the lithology, geological structure, slope and rainfall intensity. Vast areas of valley fills, flood plain and low laying areas have more advantages of ground water potential due to the lithology, slope and proximity of surface water helps ground water recharge. Generally the elevated areas and ridges line belongs to poor ground water potential, due to the rapid runoff and limited vegetation cover.*

Keywords : *Remote Sensing, GIS, Assessment of ground water, Ground water potential, Ground water potential zones, Tlawng watershed.*

Introduction :

Groundwater is one of the most valuable natural resources, and supports human health, economic development and ecological diversity (Hutti & Nijagunappa, 2011). No doubt human development is hinge on availability of ground water and surface water resources. Groundwater is a dynamic and replenishing natural resource (Nagarajan & Singh, 1997). Anthropogenic activities affect the infiltration and runoff characteristics of the land surface, which affects ground water

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recharge and quality (Scanlon et al., 2005; Vijay et al., 2011,). Physical factors affect the occurrence and movement of groundwater in a region including topography, lithology, lineament, slope, relief and drainage. All of these factors either directly or indirectly interrelate with ground water resource. A ground water resource is often critical and no single comprehensive technique is yet identified which is capable of estimating accurate ground water assessment. In recent years, integration Remote Sensing data provides spatial and temporal information which is more reliable and conducive for ground water assessment. Progress of Geographic Information System opened a new platform of spatial data integration and reliable tools for natural resource management which is more useful for ground water assessment (Shankar & Mohan, 2006).

The complexities of the processes governing occurrence and movement of ground water make the problem of ground water assessment (GWREM, 2009).The topography and physiographic expression of the Mizoram is imparted by approximately N-S trending steep, mostly anticlinal, parallel to sub-parallel hill ranges and narrow adjoining synclinal valleys with series of parallel hummocks or topographic highs (Geological Survey of India, 2011). The amount of rainfall is comparatively high during monsoon season, shortage of water is often experienced in the post-monsoon season and winter (Dry Season), as most of the water available is lost to surface runoff. The uneven topographic and geological conditions over the space and unequal distribution of rainfall, anthropogenic activity over time and space bring emphasis on assessment of groundwater potential zones in Tlawng watershed of Mizoram. The continuous development of the economy has led to an increase in water consumption, and has consequently resulted in shortages of water resource.

Study Area :

The study area is located between 92°27'28"E to 92°48'E Longitude and 22°49'57"N to 24°14'41"N Latitude. Tlawng watershed occupies the central and western part of Mizoram, parts of Lunglei, Serchhip, Aizawl, Kolasib and Mamit districts are in Tlawng watershed. This is one of the longest and largest rivers in Mizoram. The geographical areas of Tlawng watershed is 2792.6 sq. kms. It holds more than 60 per cent of urban population of Mizoram (Census, 2011). This river originated at an elevation of 1146 m from Mean Sea Level from the southern part of Zobawk, Lunglei district and flows towards north direction and discharges into Barrak river in Cachar district of Assam. The

geology, soil texture, characteristics and climate are typically uniform over the watershed including the distribution pattern. The lithology in the area is developed from tertiary deposits belonging to Surma group highs (GSI, 2011).

The terrain is highly mountainous in the south compared to north. The mean elevation of the northern part of the area is ranging from 50 m to 100 m from sea-level. Southern parts of Tlawng watershed is elevated between 400 m to 550 m from mean-sea level. Similarly, the northern part of the study area is gentle as compared to south. The entire watershed is under the direct influence of monsoon and annual rainfall of the study area is about 259 cm and winter temperature ranges from 8°C to 21°C and in summer it ranges from 20° C to 30°C (Agriculture Statistic, 2015).

Material and Methods :

Indian remote sensing satellite IRS-P6 with 23.5 m resolution and Cartosat-1 having spatial resolution 2.5 m are employed for main data mining. For assessing groundwater potential zones, 7th thematic layers, Slope, Lithology, Geological Structure, Drainage Density, Vegetation Cover, Land Use/Land Cover and Rainfall data integrated with Weighted Overlay technique using GIS platform. Survey of India Topographical map, Geological Survey of India,Google Earth and Mizoram Remote Sensing

~~**Figure 1: Location Map of Tlawng Watershed**~~

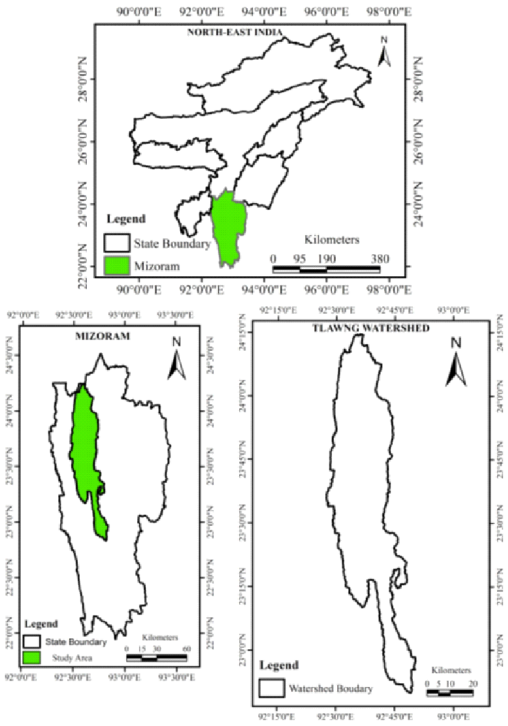

Fig. 1: Location Map of Tlawng Watershed

Application Center data has been referred in this study. Rainfall data are taken from Directorate of Agriculture, Govt. of Mizoram.

Thematic Layers :

The method and number of thematic layers used for assessing groundwater potential by RS and GIS techniques vary considerably from one study to another and their selection is arbitrary. (Machiwal et al., 2011).

Lithology :

Lithology map was prepared with the help of Geology map by Geological Survey of India (1998) map. The topographic expression of

the area often imparts fairly good indication of their lithology (GSI, 2011). Different lithological types behave differently with respect to the occurrence of hydraulic and infiltration process. Depending on their variable mineral composition that determines porosity and aquifer location. The detail knowledge of lithology provides valuable information in assessment of ground water potential (CGWB, 2007; GWREM, 2009). Lithological unit of the study area is shown in table 1 and figure 2.

Table 1 : Lithology Unit of the Study Area

Name	Area (km²)	Per cent
Gravel, Sand and Silt	14.09	0.50
Clayey Sand	61.73	2.21
Sandstone	1799.31	64.43
Siltstone and Shale	895.11	32.05
Limestone	22.38	0.80

Geological Structure :

The most obvious structural features that are important from the ground water point of view are the lineaments (Bhatnagar & Goyal, 2012). One of the most structural features that important for ground water recharge is lineament and fault. Lineament and fracture provide the pathways for groundwater movement and provide potential for ground water recharge (Sankar, 2002). Density of lineament and fault act as a channel for ground water movement which results in increased porosity. Therefore, extension lineament and fault form productive ground water reserve. Figure 3 shown

Figure 2 : Lithology of Tlawng Watershed

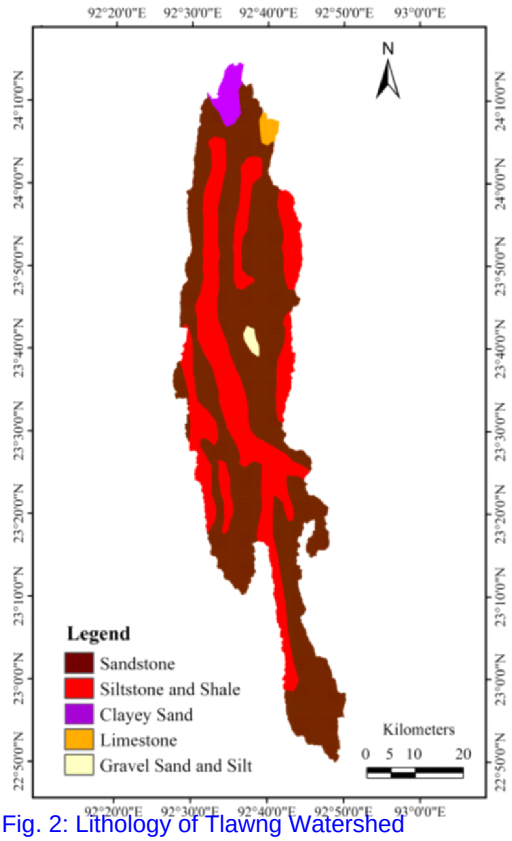

Fig. 2: Lithology of Tlawng Watershed

Lineament/Fault density of the study area.

Slope :

In the gentle slope area, the surface runoff is slow allowing more time for rainwater to percolate, whereas, steep slope area facilitates high runoff allowing less residence time for rainwater to percolate and hence comparatively less infiltration (Patil & Mohite, 2014). The whole watershed is sloping towards south to north direction, meaning drainage lines are running south to

Figure 3: Lineament/Fault Density of Tlawng Watershed

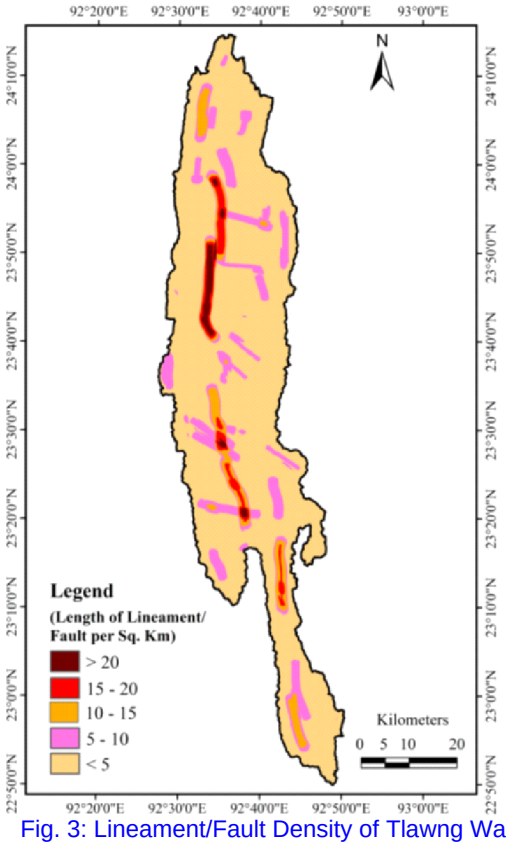

Fig. 3: Lineament/Fault Density of Tlawng Watershed

Table 2: Slope Degree Class of the Study Area

Degree of Slope	Area (km²)	Per cent
>40	114.57	4.10
30-40	455.92	16.33
20-30	890.29	31.88
10-20	910.58	32.61
<10	421.25	15.08

north direction. Slope degree class of the study area is shown in table 2 and figure 4.

Drainage Density :

Drainage density is an inverse function of permeability. Drainage density can indirectly indicate the groundwater potential of an area due to its relation to surface run-off and permeability (Hutti & Nijagunappa, 2011). Similarly, the higher drainage density is runoff is high and less infiltration, the faster the movement of surface flow. Drainage density of the study area is shown in table 2 and figure 5.

Figure 4: Slope Degree Categories of Tlawng Watershed

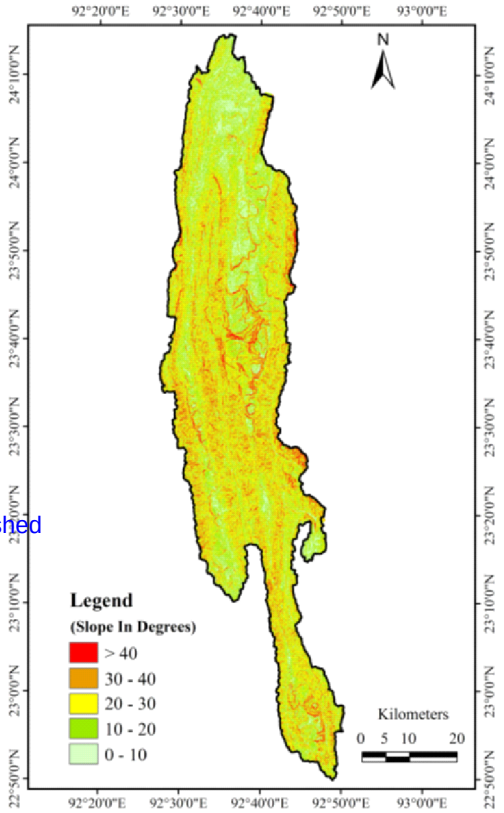

Fig. 4: Slope Degree Categories of Tlawng Watershed

Land Use/Land Cover :

Impacts of LU/LC change on subsurface components of the hydrologic cycle is less well recognized, particularly ground-water recharge. The potential scale of subsurface impacts is large. The

impacts of LU/LC change on spatiotemporal variability in ground water recharge (Scanlon et al., 2005). Increased of settlement and build-up land has direct influenced on runoff capacity and amount. Changes of forest to cultivated and other purpose has direct impact on ground water recharge and ground water hydraulic.LU/LC of the Study Area is shown in table 3 and figure 6.

Table 3 : Land Use/Land Cover Classes of the Study Area

Land Use	Area (km²)	Per cent
Settlement & Built-up Area	33.77	1.21
Mining/Quarrying	29.72	1.06
Agriculture Land	0.84	0.03
Horticulture/Plantation	12.34	0.44
Shifting Cultivation	8.18	0.29
Dense Forest	797.66	28.56
Moderate Forest	1153.68	41.31
Scrub Forest	751.31	26.90
Grass Land	4.16	0.15
Water Body	0.94	0.03

Figure 5 : Drainage Density of Tlawng Watershed

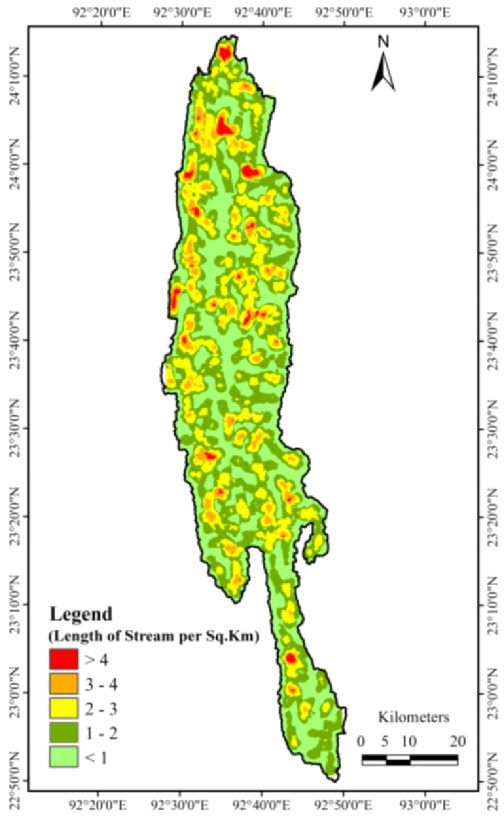

Fig. 5: Drainage Density of Tlawng Watershed

Figure 6 : Land Use/Land Cover of Tlawng Watershed

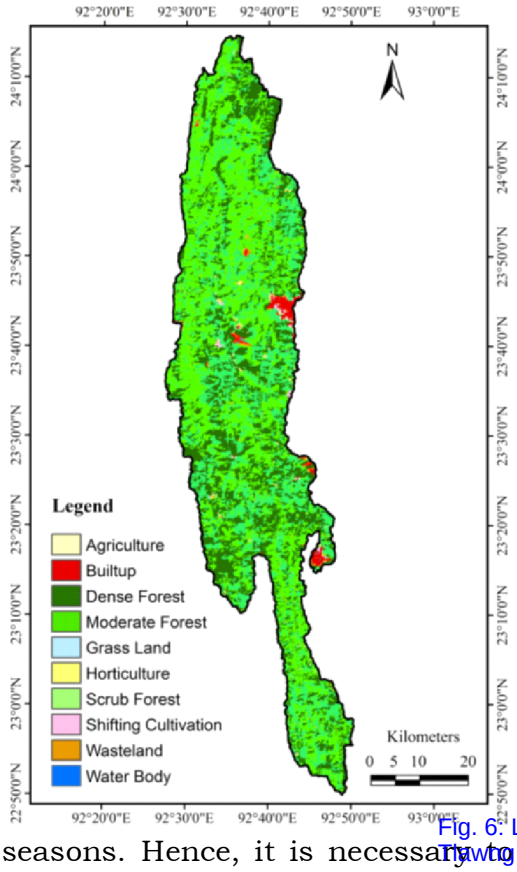

Fig. 6: Land Use/Land Cover of Tlawng Watershed

Rainfall :

The study area has been strong experienced and affected by tropical monsoon climate and rainy seasons. Hence, it is necessary to take rainfall into account as a factor input for ground water potential zonation. Precipitation is a controlling factor of intensity of ground water recharge and ground

water level. The impact of changing rainfall intensities on groundwater recharge in the tropics is unclear (Ower et al., 2009). Substantially, distribution and intensity of precipitation has impact on the amount of ground water recharge over time and space.Average Annual Rainfall of Tlawng Watershed, 2013-14 is shown in figure 7.

Figure 7 : Average Annual Rainfall in Tlawng Watershed, 2013-14

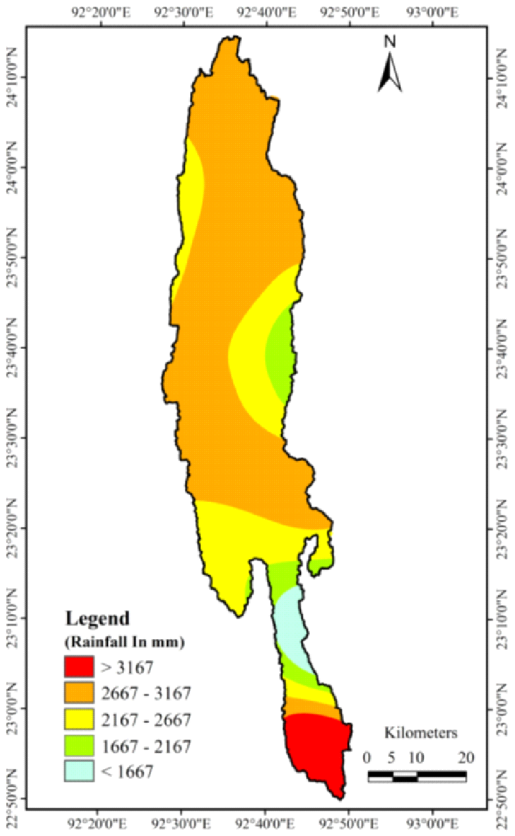

Fig.7 : Average Annual Rainfall in Tlawng Watershed, 2013-14

Vegetation Cover :

Normalized Difference Vegetation Index (NDVI) was calculated to enhance the spectral difference between different objects. Vegetation cover is one of the important determinant factors for ground water recharge in the study area. Vegetation plays key roles in the interactions between groundwater and surface water systems, because of its direct and indirect influence on ground recharge. Changes in vegetation cover and structure, particularly from low vegetation such as grassland to tall vegetation such as a forest can have a significant impact on groundwater recharge. Vegetation Cover of study area is shown in figure 8.

Results and Discussion :

Integrating the determining factors by giving different rank of that thematic map was scaled by the weight of sub-theme. The final map is prepared and categorized into five ground water potential zones; (i) Very good, (ii) Good, (iii) Moderate, (iv) Low and (v) Very Poor potential zones (Fig. 9). Various classes are described as below:

Very Good :

Very Good ground water potential zone occupies 71.31 sq km(2.55 per cent) of the total area (Table 4). This zone is mainly concentrated in northern, southern and eastern part of the study area along the low laying areas with parts of flood plain and valley fills. This zone generally confined in valley fills, flood plain and low laying areas (Fig. 9). Slope condition and

nature of lithology has high degree of retaining water and percolation and maximum pore space between the grains. Lithlogically, most of the areas is covered with sandstone and clayey sand. Besides, distributions of rainfall give rise to more variable ground water recharge and ground water level.

Figure 8 : Vegetation Cover of Tlawng Watershed

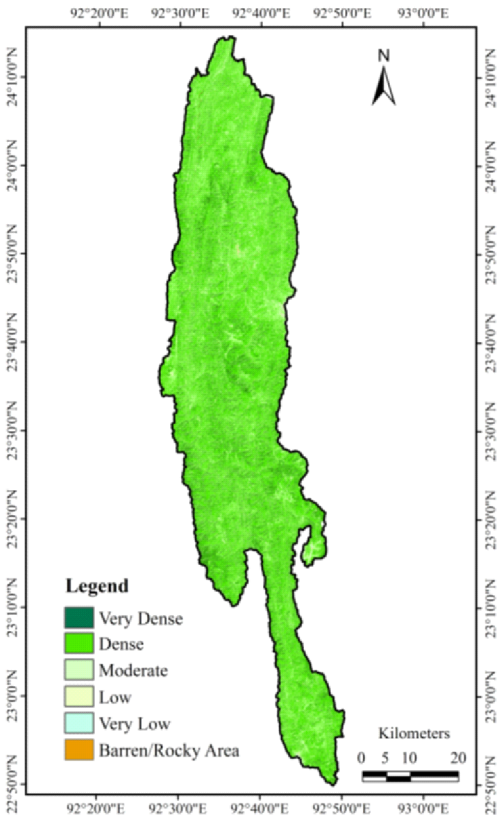

Fig. 8 : Vegetation Cover of Tlawng Watershed

Good Ground :

This zone occupied 439.02 sq km (15.72 per cent) of the study area. The low-lying areas including parts valley plains and valley fills are also included in this zone. Most of the areas are falling 10-15 degree slope and covered with sandstone.Sandstone are generally capable of storing and transmitting water through their interstices and pore spaces present in between the grains, and are considered to be suitable aquifer (Lalbiakmawia, 2015).Although, rainfall intensity and vegetation cover has a significant impact on ground water potential in the study area.

Moderate :

Moderate groundwater potential zones cover an area of 620.59 sq km which is 22.22 percent of the watershed (Table 4). This zone is running a longitudinal direction and mainly western and central part of the watershed. Moderate zone mainly concentrated areas where lithology and slope conditions are neither moderate nor poor condition for ground water yield and ground water recharge. The lithology of this zone is dominated by siltstone and shale with 20-30 degree slope which is lesser favourable for groundwater recharge and the potentiality is minimized by the sloping nature of the topography where runoff is prominent (Fig.9).

Poor Ground :

Mostly this zone is concentrated in the ridge line and high relief, meaning high degree of surface-runoff, which is a poor condition for infiltration beneath the ground surface(Fig.9). The lithology of this zone is occupied by siltstone

and shale which is poor condition infiltration. The undulating topography of the area possess high drainage density is given that rapid runoff and less infiltration process. Most of this area is covered by moderate dense forest. Hence, due to the above mention the ground water yield and ground water recharge is generally assumed as low. This zone occupies about 52 percent (1478.78 sq km) of the study area (Table 4).

Table 4 : Ground Water Potential Zones of the Study Area

Class	Area (km²)	Per cent
Very Good	71.31	2.55
Good	439.02	15.72
Moderate	620.59	22.22
Poor	1478.78	52.95
Very Poor	182.89	6.54

Very Poor Ground :

A very small area covering hill ridge of the eastern and central part of the study area are registered under this category. This area covers about 6.5 per cent (182.89 sq km) of the study area(Table 4). Poor ground water potential zones are characterized by high relief and poor lithological condition for ground water potential. Also, characterized by high degree of slope and surrounded by wasteland and build-up area (Fig. 9).

Conclusion :

Different concepts and assessment techniques may be appropriate for assessment of ground water potential zones. The study proves that remote sensing data provides reliable information for ground water study. GIS technology is useful and efficient for spatial data management and manipulation. The integration and analysis of determining factors are useful for assessment of ground water potential in Tlawng watershed. The study found out that valley fills, flood plain and low laying areas have more advantages of ground water potential due to the

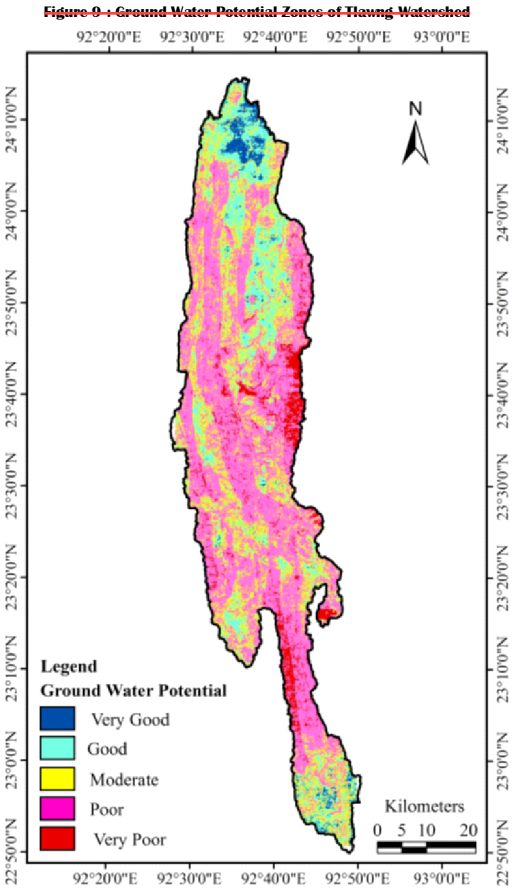

Fig. 9 : Ground Water Potential Zones of Tlawng Watershed

Table 5 : Rank and Weightage of Different Parameters for Delineating Groundwater Potential Zones

Sl. No	Layers	Weights (%)	Classes	Rank
1	Geological Structured (Lineament & Faults Density)	20	>20 per sq km	8
			15-20 per sq km	6
			10-15 per sq km	4
			5-10 per sq km	3
			<5 per sq km	2
2	Lithology	20	Gravel Sand & Silt	5
			Sandstone	8
			Clayey Sand	9
			Siltstone& Shale	2
			Limestone	2
3	Slope	15	>40 Degree	1
			30-40 Degree	3
			20-30 Degree	5
			10-20 Degree	7
			<10 Degree	8
4	Rainfall	10	>3167 mm	9
			2667-3167 mm	7
			2167-2667 mm	6
			1667-2167 mm	3
			< 1667 mm	1
5	Land Use/Land Cover (LULC)	15	Built-up	1
			Wasteland	1
			Agriculture	2
			Horticulture	3
			Shifting Cultivation	2
			Dense Forest	8
			Moderate Forest	7
			Scrub Forest	5
			Grass Land	3
			Water Body	9
6	Drainage Density	10	>4km/sq km	1
			3-4km/sq km	3
			2-3km/sq km	5
			1-2km/sq km	6
			<1km/sq km	8
7	Vegetation Cover	10	Very Dens	8
			Dens	7
			Moderate	6
			Low	4
			Very Low	3
			Barren/Rocky	1

lithology, slope and proximity of surface water helps ground water recharge. The final map prepared through the present study shows detailed idea about groundwater potentiality zones of the area. In such region groundwater needs to be augmented utilization and systematic distribution through suitable watershed management for future demand. This is an important database identifying critical areas for implementing ground development and management programme.

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An Economic Analysis of Revenue collected from Land and Settlement in Mizoram – A District-wise Analysis

- *Lalrinkimi Pachuau*

Abstract : *This paper sets out briefly the rationale for taxing land as a source of local government revenue. Taxes on land and property have both fiscal and non-fiscal effects. The revenue that such taxes produce is often an important source of finance for local governments. The extent to which those governments have control over land revenue is thus often an important determinant of the extent to which they are able to make autonomous expenditure decisions. The level, design, and control of land revenue are thus, in many countries, critical elements in effective decentralization policy. The study traced the trend line growth/ decline in revenue collected through land and settlement in Mizoram over the years.*

Keywords: land and Settlement, Revenue, Inter-dstrict analysis, Mizoram

Introduction :

The history of mankind is intimately associated with the use and collection of revenue from land. From times immemorial, the land/ revenue administration centered on collection of taxes which was the main source of revenue. Land and its people define basic frame work of any civilization. The resources, their ownership and accessibility of land are some of the fundamental constituents of any system which is considered an essential aspect of human societies over the centuries.

Generally, agriculture is comparatively less taxed. Tax burden is fairly well distributed among different income groups within non-agricultural sector but not so in agriculture sector in which higher income groups are under taxed. Direct taxes are less progressive in agriculture sector. There is much evasion of Agricultural Income Tax (AIT).

For better utilisation of land, proper taxation of agriculture is necessary. Progressive taxation of agricultural land or agricultural income can be expected to bring down the land values; such taxation could also help mobilize for the exchequer a part of the unearned incomes or capital gains from land. Therefore, case for taxation of agriculture rests not so much on grounds of revenue as on consideration of equity and other economic effects.

Review of Literature :

In India, taxing the agricultural sector properly was a topic of debate during the 1980s that Yojana, the official publication of Ministry of Information and Broadcasting, Government of India set aside two issues to bring out the opinion of different social scientists on the topic. According to Rao (1983) 'there is a strong case of taxing the agricultural sector' since there are

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large number of big farmers whose income exceed the income of non-agriculturists who pay income tax.

There is a disparity between the lower income groups of the agriculture and non agricultural sectors. But the lower expenditure groups in agricultural sector are not under taxed. Angrish (1972) suggests a rationalized scheme of direct agricultural taxes for India. He also is of the opinion that land revenue and Agricultural Income Tax are not progressive and elastic. Middle and high income classes in the agricultural sector possess taxable capacity. Land revenue and Agricultural Income Tax are inequitable and unproductive and there is inter-sectoral and inter class inequity. He also measured the tax burden of land revenue and Agricultural Income Tax on agriculture for the years 1951-52 and 1968-69. Both were declining. He estimated land revenue as per cent of state agricultural income. It was 0.58 in Kerala in 1960-61 when all states average was 1.57. Krishna Raj (1972) wanted to replace outmoded land revenue system with Agricultural Income Tax to cover 'upper class' farmers who are under taxed.

Joshi *et al.* (1968) bring out the importance of land revenue till 1960-61. Land revenue always remained passive and has not sub served the case of development finance. Upper class agricul-turalists could be taxed more. In a case study of Bihar, they found that taxes on agricultural sector played only a very minor role in the state's tax structure. Pattern of rural income, low rates of taxation and large scale evasion were responsible for this. They have analyzed the performance of agricultural taxes of Travancore- Cochin and later Kerala. Most of the Agricultural Income Tax was from plantation crops in the state and this tax plays an important role as a source of revenue.

Objectives of the Study :

(1) To examine the trend of revenue collected by the Government of Mizoram from Land and Settlement.

(2) To study the district wise collection pattern of land revenue and settlement.

Sources of Data :

Data on vehicles for the specific study were taken from the yearly entries of the Mizoram State Transport Department, published in the Statistical Handbook of Mizoram, by the Directorate of Economics & Statistics.

Analysis :

As shown in Figure 1, there is a sharp decline in the revenue collected from land settlement in the year 2010-2011.This sharp fall in the overall collection of revenue is due to the massive drop in the amount of revenue collected during this time period from the district of Aizawl. However, in the year 2013-

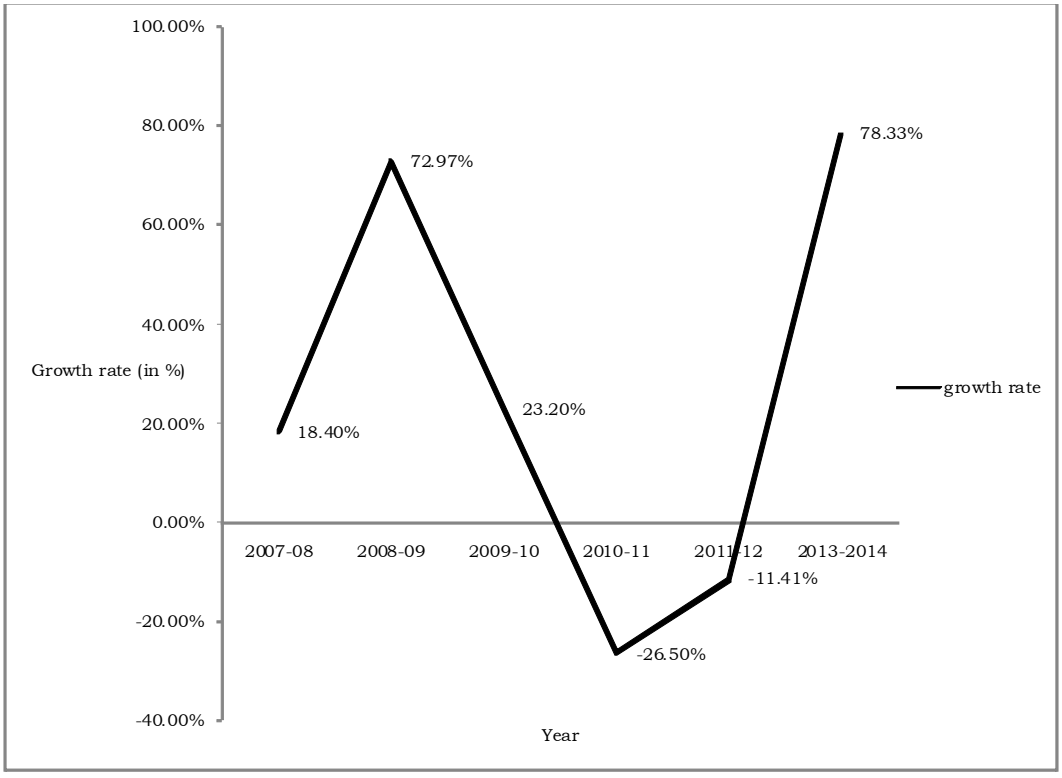
2014, an enormous pull towards positive growth in revenue took place. This again being the influence of revenue collection of the Aizawl district; an increase in revenue that allowed the negatively sloped curve to draw towards a high positive.

Over the years, Aizawl District has collected the maximum amount of land revenues when compared to the other districts. This is mainly due to it being the most populous district and the most number of settlements. The total amount of revenue collected from land and settlement in Mizoram as a whole is very sensitive to changes pertaining to Aizawl District. Lunglei District follows after Aizawl. Overtime, from 2007 to 2014, Aizawl District has grown the most in terms of revenue collected from Land and Settlements, from Rs. 117.38 lakhs in 2007 to Rs. 377.18 lakhs in 2014, followed by Lunglei District and the Kolasib District.

Conclusion :

Land revenue and Settlement has contributed a significant role to the State Governments Revenue. It acts as very important source of revenue for the establishment of

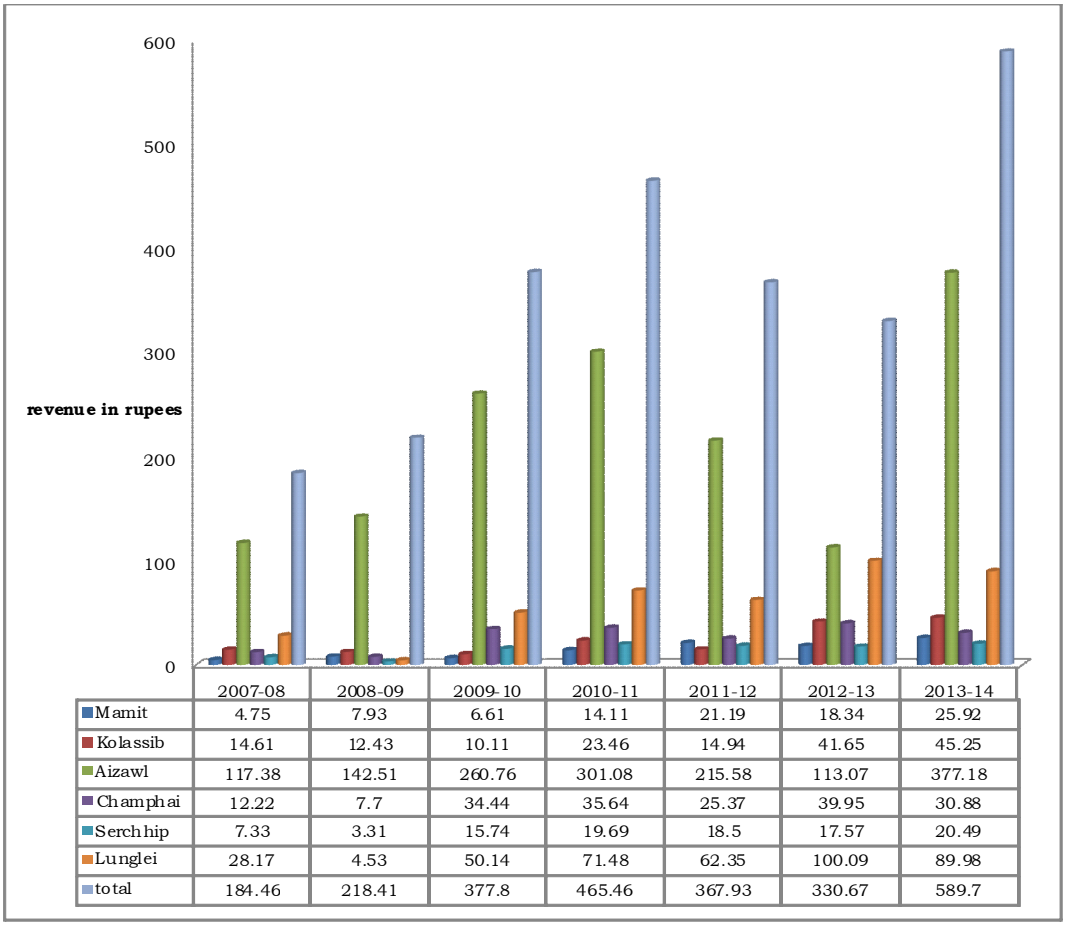
Figure 1 : Growth Rate of Revenue from Land and Settlement during 2007-2014



Source : Mizoram Statistical Handbook

Fig. 1 : Growth Rate of Revenue from Land and Settlement during 2007-2014

Figure 2 : District-wise Growth of Revenue from Land Revenue and Settlement, Mizoram



	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Mamit	4.75	7.93	6.61	14.11	21.19	18.34	25.92
Kolassib	14.61	12.43	10.11	23.46	14.94	41.65	45.25
Aizawl	117.38	142.51	260.76	301.08	215.58	113.07	377.18
Champhai	12.22	7.7	34.44	35.64	25.37	39.95	30.88
Serchhip	7.33	3.31	15.74	19.69	18.5	17.57	20.49
Lunglei	28.17	4.53	50.14	71.48	62.35	100.09	89.98
total	184.46	218.41	377.8	465.46	367.93	330.67	589.7

Fig. 2 : District-wise Growth of Revenue from Land Revenue and Settlement, Mizoram

Source : Mizoram Statistical Handbook 2008-2014

certain regulatory and governing body that specifically help develop the State and its economic functioning. The revenue collected has increased substantially over the years; the district of Aizawl being the greatest contributor so far.

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Disparity in Development Among Towns in Mizoram

- C. Hmingsangzuala
- P. Rinawma

Abstract : *An attempt has been made in the present paper to analyse 34 variables of development among 23 notified towns in Mizoram with the help of Principal Component Analysis (PCA). The study reveals that administrative centres have scored relatively higher level of development whereas the least developed ones are the smallest towns. This paper clearly shows that the number of population in towns directly and indirectly influences the degree of development amongst urban centres in Mizoram.*

Keywords: Development, Towns, Mizoram

Introduction :

Urbanization is one of the developmental aspects of society. The pattern of urban growth across the globe has stark differences in the distribution patterns of inequality. All cities attain a degree of disparity. Inequality is more pronounced in some regions depending on their national and regional contexts. Cities of the developing countries have witnessed increasing socio-spatial inequality. Increasing social inequalities in urban areas can be associated with changes in the structure and composition of urban populations as well as the restructuring of local, national and international economies.

Urban centers are more developed than rural areas. Development imparts discrepancy which is not unusual in the context of developmental studies. The incidence of inequality is, in general, special characteristics found among the developing nations (Neogi, 2010). In the context of Mizoram, the urban centers itself has its own distinct developmental pattern from post-colonial period but a relative disparity amongst the urban centers is a serious threat even rural-urban inequality concerns long-way challenges.

Objectives of the Study :

The main objective of the study is to determine level of development of towns and its relationship with population in Mizoram.

Data Base and Methodology :

The present study is based on the data published by the Census of India, 2011. Principal Component Analysis (PCA) is used to find out spatial inequality of 23 notified towns in Mizoram. PCA is a statistical procedure and special case of factor analysis that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables which can be used to

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summarize the data (Jolliffe, 2002). Mathematically, principal components are linear combinations of variables with weights in terms of their Eigen vectors. These Eigen vectors are derived from the correlation matrix of the variables. Each principal component is a linear combination of X's obtained as

$$Y_1 = e_{11}X_1+e_{12}X_2+\cdots+e_{1p}X_p$$

$$Y2 = e_{21}X_1+e_{22}X_2+\cdots+e_{2p}X_p$$

To calculate PCA, the raw data are transformed into percentage variables, re-grouping into five groups such as Health, Electricity, Education, Banking and Recreation, and then the variables are converting into normalized values with the following formula:

$$NV_{ij} = 1 - \left(\frac{(BestXi - ObservedXij)}{(BestXi - WorstXi)}\right)$$

Where, i = i^{th} observation and
j = j^{th} towns

The Best and Worst values depend upon the nature of particular indicators. In case of a positive indicator, the highest value can be treated as the best value and the lowest will be considered as the Worst value. Similarly, if the indicator is negative in nature, then the lowest value considered as the Best value and the highest, the Worst value.

Once the normalized values are obtained for all the indicators, factor loadings and weights are assigned to these normalized values by using one such software, namely Statistical Package for Social Scientists (SPSS) to identify initial Eigen values which are more than one. The Eigen values are used to obtain weights of the variables.

After weights are assigned to each indicator, the following formula is used to determine the first Index:

$$I = \frac{\Sigma\, Xi\, (\Sigma \mid Lij \mid .Ej)}{\Sigma\, (\Sigma \mid L\, ij \mid .Ej)}$$

Where, I is the Index, X_i is the i^{th} indicator; L_{ij} is the factor loading value of the i^{th} variable on the j^{th} factor; E_j is the Eigen value of the j^{th} factor.

After obtaining an index for the first set of component i.e, Health, other indices are computed for each set of indicators such as Electricity, Banking and Recreation by following the same procedure getting the output in the form of Eigen values and Extracted Component Matrix. Based on the five group of Index, assign rank in an ascending order and, obtained normalized value from the highest index with rank one treated as the Best, and the lowest index with last rank considered as the Worst, compute each sub-group of indicators which are then used to compute composite and final index for the level of development. On the basis of final index, the ranks of all towns are given to classify developmental level into five categories of the urban areas of the state.

After obtaining the final index of all indicators, the relationship between the development and urban population in the 23 towns

of Mizoram was calculated by using Karl Pearson's Coefficient of Correlation. The Pearson correlation coefficient (PCC) also referred to as the Pearson's *r*, is a measure of the linear correlation between two variables *x* and *y*. It has a value between +1 and -1, where 1 is total positive linear correlation, 0 is no linear correlation, and -1 is total negative linear correlation. Positive correlation means that high scores on one are associated with high scores on the other, and that low scores on one are associated with low scores on the other. Negative correlation, on the other hand, means that high scores on the first variable are associated with low scores on the second variables. Negative correlation also means that low scores on the first are associated with high scores on the second. Calculation of Karl Pearson's Correlation Coefficient:–

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][\Sigma y^2 - (\Sigma y)^2]}}$$

Where,

n	= number of pairs of scores
Σxy	= sum of the products of paired scores
Σx	=sum of x scores
Σy	= sum of y scores
Σx^2	= sum of squared x scores
Σy^2	= sum of squared y scores

Indicators :

The following indicators are selected to analyze the level of development:-

i) Health :

a) Number of Hospital Allopathic (HA)
b) Number of Hospital Allopathic Doctors – Total Strength (HD)
c) Number of Hospital Allopathic Para Medical Staff-Total Strength (HP)
d) Number of Dispensary/Health Centre (DS)
e) Number of Dispensary/Health Centre Doctors-Total Strength (DD)
f) Number of Dispensary/Health Centre Para Medical Staff-Total Strength (DP)
g) Number of Family Welfare Centre (FW)
h) Number of Maternity and Child Welfare Centre (MC)
i) Number of Maternity Home (MH)
j) Number of T.B. Hospital/ Clinic (TBH)
k) Number of T.B. Hospital/ Clinic Doctors-Total Strength (TBD)
l) Number of Veterinary Hospital (VH)
m) Number of Veterinary Hospital Doctors-Total Strength (VHD)
n0 Number of Mobile Health Clinic (MH)
o) Number of Mobile Health Clinic Doctors-Total Strength (MD)
p) Number of Non-Government Medicine Shop (NM)
q) Number of Orphanage Home (OH)

ii) Electricity :

a) No of Electricity-Domestic Connection (ED)
b) No of Electricity-Industrial Connection (EI)
c) No of Electricity-Commercial Connection (EC)
d) No of Electricity-Road Lighting

Connection (ER)
e) No of Electricity-Others Connection (EO)

iii) Education :
a) No of Primary School (PS)
b) No of Middle School (MS)
c) No of Secondary School (SS)
d) No of Senior Secondary School (SSS)
e) No of Degree College-Arts, Science, Commerce and Law (DC)

iv) Banking :
a) No of Nationalised Bank (NB)
b) No of Private Commercial Bank (PC)
c) No of Co-operative Bank (CB)

v) Community :
a) Pucca Road Length in Kilometers (PR)
b) No of Auditorium/Community Hall (AC)
c) No of Public Library (PL)
d) No of Public Reading Room (PRR)

Development in Towns of Mizoram :

The diversity of urban structure, its location and underpinning growth center augmented varying quality of life among urban population in Mizoram. The nature of growth centers, industrial development and social developmental activities like infrastructure, health care facilities, educational institution, recreational and amenities boost the wealth of urban people, but, sometime the benefits of urban growth have not been evenly distributed and, high levels of inequality have risen further. It approves disparity amongst diverse urban people in the central and periphery of the study area.

The size of population, suitability of marketing services, regularity of domestic and industrial electricity, street lightning, number of bed in different types of Hospital, availability of medicinal treatment, viability of doctor and Para-medical staff, health care clinic and ample specific medicine for patient, number of educational institution and attainment level, library facilities, child protection and public welfare, recreation, accessibility of investment and saving capital exchange are the characteristics of urbanization which could bestow the status of urban centers in Mizoram. Considering all these characteristics, the development of town in Mizoram was identified through the selected five components such as Health, Education, Electricity, Banking and Recreation. These major indicators are divided into small 34 indicators provide the developmental scenario in the urban areas of the state. The value of final index with its rank, level of development in 23 towns of Mizoram presented in Tables 1 and 2.

The uneven development of urbanization is inevitably determined in the state of Mizoram because of certain features like historical, geographical and political factors along with the system of developmental activities. Table 2

Table 1 : Value of Final Index and Rank of Towns

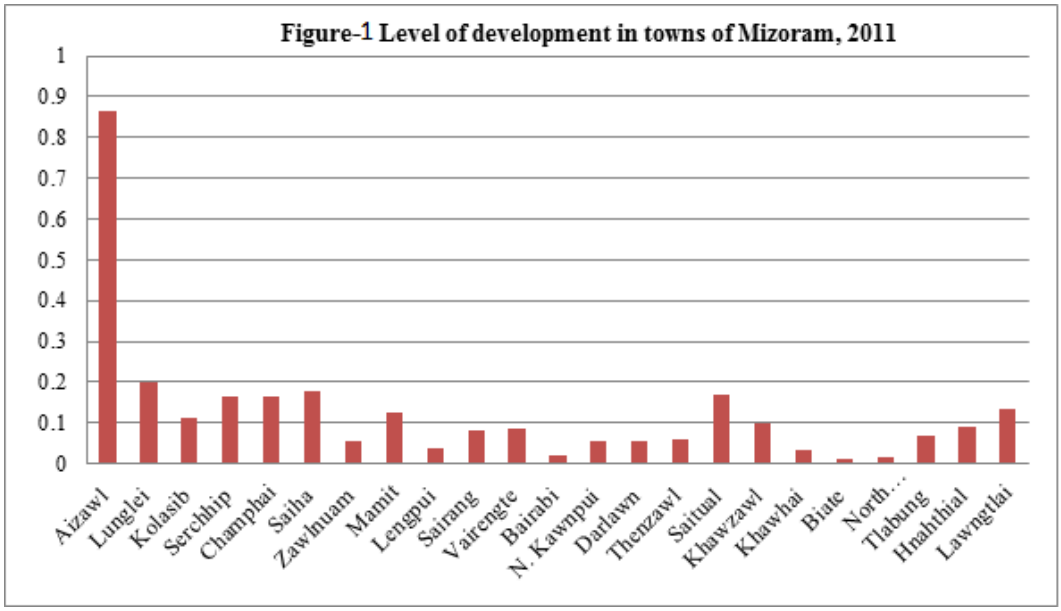
Sl.No.	NT	Index	Rank
1	Zawlnuam	0.0530	18
2	Mamit	0.1235	8
3	Lengpui	0.0378	19
4	N. Kawnpui	0.0538	17
5	Vairengte	0.0863	12
6	Bairabi	0.0193	21
7	Kolasib	0.1131	9
8	Darlawn	0.0571	16
9	Sairang	0.0795	13
10	Aizawl	0.8644	1
11	Saitual	0.1704	4
12	Khawzawl	0.0995	10
13	Khawhai	0.0318	20
14	Champhai	0.1644	6
15	Biate	0.0092	23
16	Serchhip	0.1658	5
17	Thenzawl	0.0601	15
18	N. Vanlaiphai	0.0148	22
19	Tlabung	0.0667	14
20	Lunglei	0.1976	2
21	Hnahthial	0.0916	11
22	Lawngtlai	0.1348	7
23	Saiha	0.1784	3

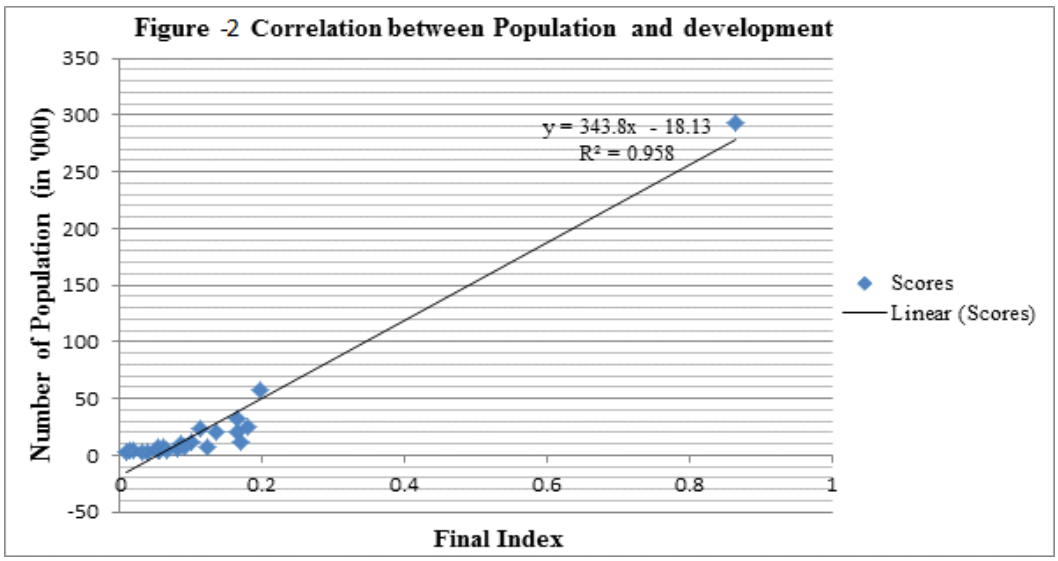
Table 2: Level of Development in Towns of Mizoram

Sl.No	Index	Level	Towns
1	< 0.6	Very High	Aizawl
2	0.1-0.5	High	Lunglei, Saiha, Saitual, Serchhip, Champhai, Lawngtlai, Mamit, Kolasib
3	0.05 - 0.09	Medium	Khawzawl, Hnahthial, Vairengte, Sairang, Tlabung, Thenzawl, Darlawn, N.Kawnpui, Zawlnuam
4	0.001 - 0.04	Low	Lengpui, Khawhai, North Vanlaiphai
5	> 0.001	Very Low	Biate

shows that Aizawl was the most developed urban centers. It is the capital of the state, classified under very high level of development which has the administrative capital, centers of trade and marketing, banking facilities, centers of planning and educational hub in the state, and then now Aizawl Municipal Coorporation is the authority of civic administration of the city. The rest of the district capital categories under high level of development such as Lunglei, Saiha, Serchhip, Champhai, Lawngtlai, Mamit, and Kolasib towns may have the advantage of development as the districts administrative functions credit to all indices. The total share of these towns in the population of the state is relatively high which may also contribute the expansion of trade and marketing centers, recreational and educational facilities. Saitual town have linkages of marketing, higher education and health care facilities with its nearby villages upkeep into a high rank of development.

There are nine towns under the medium category of development, the rural development blocks like Khawzawl, Hnahthial, Zawlnuam and Darlawn comprises the blocks activities in their respective zone bringing bridge to form better development with the help of small services to their vicinity. The other medium level developments of town are Thenzawl, N. Kawnpui, Tlabung, Varengte and Sairang. Thenzawl town is located near the district capital of Serchhip taking imperative center for traditional Mizo handloom industry; set up the educational institution, owned and managed by the central government may bring town services. Tlabung and Sairang towns are located in the river banks of Tlawng and Chhimtuipui provides an idyllic abode for explorer during the British Era. The pioneer of Christian missionaries had begun





their ministry of spiritual and social enlightenment in these notified towns during the colonial period imprints the renovation and reformation of social and educational development in the state of Mizoram till the post-colonial period. Core-periphery influences may enhance the expansion and development of Sairang town. Biate was the lowest developed town but recently declared the as cleanest town amongst all the towns and city in

Mizoram followed by the three least developed towns such as North Vanlaiphai, Khawhai and Lengpui. The four least developed towns were also the fourth bottom in terms of population of town in Mizoram.

Population and Development :

The rate at which the population of an urban area increases may be called urban growth. It may lead to an increase in economic development of a country or the developmental activities attract the growth of population in an urban area. The figure-3 indicates the relationship between urban population and level of development in the towns of Mizoram.

The above scattered plot shows that highly positive correlation of 0.958 which indicates a very strong or high linear relationship between the variables. It means that the large number of population in the urban centers has a high level of development and, the less number of urban populations scores the low level of development. On the other hand, the high developed urban area has a large number of populations and, the least developed towns have the less number of populations.

Conclusion :

The pace of urbanization is very fast in Mizoram yet it was not translated on the ground to minimize the existing gap of disparity in the towns of the country. The present paper clearly reveals that there is a positive correlation of demographic structure and developmental works for growth and balance development of city and towns in the study area. Unequal development prevails in the 23 towns of the state which disproportionally generate urban growth on the basis of administrative function, education, health care services and its location, espouse push and full factors of migration. The developmental activities in the urban centers attract many people who have had migration towards the better opportunity. The present study suggests that intervention of government in regard to form growth center to curb harmonizing the developmental disparities of towns and cities in the state.

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Appendix A

Values of Health Indicators in Mizoram, 2011 (in Percentage)																	
NT	HA	HD	HP	DS	DD	DC	DM	FW	MC	MH	TBH	TBD	VH	VHD	MH	MD	NM	CH
Zawlnuam	4.76	1.41	0.00	1.30	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	6.25	0.00	0.00	0.41	0.00
Mamit	33.33	7.04	7.95	0.00	0.00	0.00	0.00	0.00	5.26	0.00	10.0	16.67	0.00	0.00	12.5	0.00	0.00	0.00
Lengpui	0.00	0.00	0.00	6.49	0.00	30.7	25.93	0.00	0.00	0.00	10.0	0.00	9.09	0.00	0.00	0.00	0.10	0.00
N. Kawnpui	4.76	1.41	11.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	6.25	0.00	0.00	0.00	0.00
Vaivengte	4.76	4.23	11.92	0.00	0.00	0.00	0.00	8.33	42.11	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.61	0.00
Bairabi	4.76	2.82	5.96	0.00	0.00	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00
Kolasib	4.76	15.49	10.6	1.30	0.00	0.00	0.00	0.00	0.00	0.00	10.0	0.00	9.09	25.0	0.00	0.00	4.39	12.0
Darlawn	0.00	0.00	0.00	1.30	8.55	7.69	0.00	8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sairang	0.00	0.00	0.00	1.30	0.85	7.69	0.00	0.00	5.26	0.00	0.00	0.00	0.00	0.00	12.5	40.0	0.71	0.00
Aizawl	4.76	15.49	0.00	53.25	35.04	0.00	0.00	8.33	5.26	14.29	10.0	50.0	9.09	18.75	12.5	20.0	82.76	48.0
Saitual	4.76	1.41	17.22	3.90	2.56	0.00	0.00	33.33	21.05	57.14	10.0	0.00	0.00	0.00	0.00	0.00	0.00	8.00
Khawzawl	4.76	4.23	0.00	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Khawhai	0.00	0.00	0.00	1.30	6.84	7.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Champhai	4.76	12.68	20.53	10.39	0.00	0.00	25.93	0.00	0.00	0.00	10.0	16.67	9.09	0.00	12.5	0.00	5.71	12.0
Biate	0.00	0.00	0.00	1.30	28.21	30.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00
Serchhip	4.76	12.68	7.28	3.90	0.00	0.00	0.00	0.00	0.00	0.00	10.0	16.67	0.00	0.00	12.5	20.0	0.00	4.00
Thenzawl	4.76	4.23	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	6.25	0.00	0.00	0.71	4.00
N. Vanlaiphai	0.00	0.00	0.00	1.30	8.55	15.3	9.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00
Tlabung	0.00	0.00	0.00	2.60	8.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00
Lunglei	4.76	0.00	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	12.5	0.00	0.10	4.00
Hnahthial	0.00	0.00	0.00	1.30	0.00	0.00	3.70	8.33	5.26	14.29	10.0	0.00	9.09	6.25	0.00	0.00	0.71	0.00
Lawngtlai	4.76	1.41	0.00	3.90	0.00	0.00	29.63	25.0	15.79	14.29	10.0	0.00	0.00	0.00	12.5	0.00	0.10	4.00
Saiha	4.76	15.49	4.64	0.00	0.00	0.00	0.00	8.33	0.00	0.00	10.0	0.00	9.09	31.25	12.5	20.0	1.53	4.00

Appendix - B

Values of Development Indicators of Mizoram, 2011 (in Percentage)

	Electricity					Education					Recreation			Banking	
NT	HD	H	EC	ER	EO	PS	MS	SS	SSS	DC	AC	PL	PR	PRR	NB	PB	CB
Zawlnuam	0.83	0.00	0.74	0.40	0.00	1.65	1.64	0.37	1.19	2.27	4.00	0.79	0.00	5.42	3.33	0.00	0.00
Mamit	1.73	0.00	0.00	0.00	0.44	2.02	2.34	0.74	2.38	4.55	5.33	0.00	0.00	3.39	3.33	5.56	11.11
Lengpui	0.79	0.20	0.19	0.15	0.00	0.74	0.94	0.37	1.19	0.00	1.33	0.20	0.00	1.33	3.33	0.00	0.00
N. Kawnpui	1.84	1.38	1.97	1.32	0.22	2.21	2.11	0.37	1.19	0.00	0.00	0.00	0.00	1.64	0.00	5.56	0.00
Vairengte	1.75	3.14	0.52	0.83	0.00	0.74	1.41	1.47	2.38	0.00	1.33	0.20	0.00	4.00	3.33	5.56	0.00
Bairabi	0.67	0.39	0.32	0.67	0.00	1.47	0.94	0.37	1.19	0.00	1.33	0.20	0.00	3.55	0.00	0.00	0.00
Kolasib	4.32	0.59	5.59	7.16	1.62	4.6	5.15	2.57	4.76	4.55	4.00	0.39	0.00	2.52	3.33	0.00	11.11
Darlawn	0.80	0.00	0.84	0.92	0.00	1.10	1.41	1.47	2.38	0.00	1.33	0.59	0.00	3.67	3.33	5.56	0.00
Sairang	0.53	0.39	0.00	0.61	0.00	1.47	0.7	0.00	0.00	0.00	4.00	0.39	0.00	0.7	6.67	5.56	0.00
Aizawl	54.58	59.14	51.50	62.74	0.18	41.54	44.5	46.69	53.57	40.91	8.00	89.59	97.64	5.55	26.67	5.56	11.11
Saitual	2.18	0.00	1.84	5.65	4.91	1.29	2.58	12.87	2.38	4.55	6.67	0.39	0.00	2.58	3.33	11.11	0.00
Khawzawl	1.71	0.00	2.16	2.33	0.00	3.68	2.34	2.57	1.19	4.55	6.67	1.57	0.43	4.61	6.67	5.56	0.00
Khawhai	0.54	0.00	0.00	0.00	0.00	1.10	0.94	0.37	1.19	0.00	1.33	0.20	0.21	3.73	0.00	5.56	0.00
Champhai	4.39	8.60	5.95	0.63	1.88	3.13	0.47	6.25	2.38	6.82	5.33	0.20	0.21	4.09	3.33	5.56	11.11
Biate	0.51	0.00	0.00	0.00	0.00	1.47	0.94	0.74	1.19	0.00	4.00	0.20	0.21	5.55	0.00	0.00	11.11
Serchhip	3.67	0.00	5.59	2.43	0.83	4.60	4.92	3.31	1.19	4.55	6.67	0.00	0.00	3.39	10.0	5.56	11.11
Thenzawl	1.17	0.59	0.00	0.47	0.04	1.47	1.17	1.47	1.19	0.00	1.33	0.00	0.00	2.67	3.33	5.56	0.00
North Vanlaiphai	0.77	0.79	1.29	0.00	0.00	0.55	0.94	0.37	1.19	0.00	1.33	0.20	0.21	5.12	3.33	0.00	0.00
Tlabung	0.70	2.36	0.39	0.15	0.00	1.65	1.64	0.74	1.19	2.27	2.67	0.39	0.43	8.27	3.33	5.56	0.00
Lunglei	8.66	22.20	10.05	11.55	0.79	14.71	12.65	11.03	8.33	6.82	18.67	3.14	0.00	5.3	3.33	5.56	11.11
Hnahthial	1.45	0.20	1.97	1.01	5.30	2.21	1.64	0.74	1.19	6.82	1.33	0.79	0.21	5.21	3.33	5.56	0.00
Lawngtlai	1.63	0.00	3.42	0.20	4.99	3.13	3.98	4.41	2.38	6.82	6.67	0.39	0.21	7.79	3.33	5.56	11.11
Saiha	4.78	0.00	5.65	0.78	78.80	3.49	4.68	0.74	4.76	6.82	6.67	0.2	0.21	9.94	3.33	5.56	11.11

Growth Of Urban Centres in Mizoram

- *C.Hmingsangzuala*
- *P. Rinawma*

Abstract : *The growth of urban centers depends not only on birth and death rates and migration but also on political, religious, historical and economic factors. The present paper examines the spatio-temporal growth of towns in Mizoram using data from 1951-2011, Census of India. The four distinct phases have been divided on the basis of population distribution and number of towns in Mizoram. The present paper clearly ascertains that the growth of towns bequest by historical, geographical and political factors. The urban functions begin in the colonial period but the foundation of urban structure imposed by the post- colonial people. The colonial administration and regrouping of villages by armed forces during insurgency plays a vivacious role in the growth of urban centers. The demographic arrangement has also contributed a major factor of urban growth in the state of Mizoram.*

Keywords: Urban Centres, Growth, Mizoram

Introduction :

Spatio-temporal process of socio-economic development brings about more people start living and working in urban areas. The gradual increase in the proportion of population concentrated in urban centers and the ways in which each society adapts to that change formed the process of urbanization. The process of society's transformation from predominantly rural to a predominantly urban population is known as 'urbanization' (Khular, 2005). Urbanization is not merely a modern phenomenon; it is a transformation process of social roots on a global scale, whereby predominantly rural culture is being rapidly replaced by changing urban culture.

The origin of urban centers or towns has been traced to about 5000 B.C when the growth and development of several valley civilizations in the world led to the origin of towns at favorable locations as permanent human settlements (Mandal, 1999). In India, urban modernism truly began with the advent of the British rule (Verma, 2014), but the accelerated growth of urban centers started after the Independence due to the country's adoption of mixed economy, which gave rise to a large number of mining, commercial, administrative and industrial towns.

Mizoram, however, has distinct urban characteristics with much growing faster rate of urban centre during the colonial period. The rapid growth of urban population has been explained as a

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result of British established some geographically favorable sites like Aizawl and Lunglei as administrative centre-cum-military outposts (Saitluanga, 2010), grouping of several smaller villages with larger villages on grounds of location and convenience from the security point of view during the nationalist movement of Mizo National Front (MNF), expansion of areas of existing towns (Pachuau, 2009), high rural-urban migration as well as increasing census towns from 1951. In 2001, Mizoram became the most urbanized state of India with 49.65per cent of the total population living in urban areas. According to 2011 Census, more than half (51.51 per cent) of the population living in urban areas.It may be noted that the urban developmental trend have sound prospect even inequality still exist in this infantile stage. However, the most serious implication of this trend is a scramble for living space which is becoming more scarce, more distant and more expensive (Rolianthanga, 1999), and may set forth relative disparity amongst the town of Mizoram.

Urban centers of the state thus evolved as the 'growth poles' (Manzoor, 1972) due to location advantages, and play a significant role in the evolution and growth of system. The transformation may be visualized with regard to the morphology of settlements, socio-economic value system, way of life, degree of interaction (Berry & Horton, 1970), in proportion to the function and their linkages both at the centre and its hinterland, however, is inversely proportional to distance (Kumar, 1999).

An urban centre with less than one lakh population is called a town while that with more than one lakh is called a city (Khular, 2005). A town can be specializing in more than one activity and to varying degree. It possesses a unique binomial status of acting as a bridge between villages and cities (Verma, 2014). Kumar (1998) stated that the townstherefore attempt to expand their external function not only in the complementary regions but also encroach in the area of influence of the townships. It may be achieved either by providing specialized services or by making products more competitive by producing goods in large quantity at lower prices through improved transport facilities within the city region and beyond. The size and number of urban centers seem to have grown consequent upon the expansion of non-basic activities set in motion in and around the nuclei of administration which provide services as the base for high density. They are characterized not only by the accelerated concentration of population but also have emerged as centers of agglomeration economy and basic activities in their favour. The variability of urban functions rapidly

emerged as linkages of peripheral region with lower magnitude in the study area. The present paper analyzes the spatio-temporal growth of urban centers in Mizoram.

Data Base and Methodology :

The present study is based on the secondary data published by the Census of India, 1951 -2011. To calculate the growth of urban population and number of towns, both decadal growth rates were employed. Growth rate simply refers to the percentage change of a specific variable within a specific period of time.

Decadal growth rate is given as -

$$DGR = \left(\frac{Pn - Po}{Po}\right) x\ 100$$

Where, DGR = Decadal Growth Rate
P_n = Present population
P_o = Initial Population

Spatio-temporal growth of Town in Mizoram :

Defining urban area is not an easy task but a must to discuss the trend of urban growth. The census of India has used various criteria and definition, changes from one census year to another. The number of towns was firstly enumerated according to the definition of 1901 census, towns included municipality, all civil lines not included within the municipal limits, cantonment and inhabited collection of towns by not less than 5,000 persons may decide to treat as a town for census purposes. At the 1911 census, the capitals of the princely state of India, irrespective of being urban or not, were adopted. The 1961 census adopted a strict definition which has been applied more rigorously and uniformly in the consequent census years of 1971, 1981 and 1991. In 2001 census, clear and detail definition was given by census of India which was adopted in the last enumeration is as follows:

i) All places with a municipality, corporation, cantonment board or notified town area committee, etc.
ii) All other places which satisfy the following criteria;
   a) a minimum population of 5,000
   b) at least 75 per cent of male working population engaged in non-agricultural pursuit; and
   c) a density of population of at least 400 persons per sq km

Populations of towns were small during the pre-colonial period, they settled usually in a single collection of houses, situated on the hill tops with a view to secure defense organization (Pachuau, 2009). The advent of British introduced a new pattern of rural settlement. Opening various institutions and military outpost in certain area attracts a few populations. The size of population and number of towns is also growing after colonial period due to administrative and political functions. The four distinct phases have been marked even the study

period encase a short six decades as presented in Table 2. The population distribution, size and year of town in Mizoram given in Table-1:-

Initial Period (1951-1961) : During this period, there was only one urban centre in the state i.e, the capital Aijal with a population of 14,257. The town contained only

Table 1:

Table – 1 : Population size of Towns and year of appearance, Mizoram, 1951 -2011

Notified Town	Year of appearance	PopulationCensus Year						
		1951	1961	1971	1981	1991	2001	2011
Aizawl	1951	6956	14257	31740	74493	155,240	228,280	293,416
Lunglei	1971			6019	17205	35,599	47,137	57,011
Kolasib	1981				8282	13,482	19,008	24,272
Serchhip	1981				7329	13,688	17,096	21,158
Champhai	1981				7487	20,809	26,465	32,734
Saiha	1981				7018	13,669	19,826	25,110
Zawlnuam	1991					3,455	3,120	3,733
Mamit	1991					3,546	5,110	7,884
Lengpui	1991					1,808	2,423	3,282
Sairang	1991					3,527	5,034	5,950
Vairengte	1991					5,607	7,715	10,554
Bairabi	1991					2,421	3,304	4,320
NKawnpui	1991					...	6,472	7,732
Darlawn	1991					3,609	3,865	3,769
Thenzawl	1991					4,502	5,507	7,259
Saitual	1991					8,402	10,966	11,619
Khawzawl	1991					7,104	10,954	11,022
Khawhai	1991					2,102	2,403	2,496
Biate	1991					2,325	2,227	2,277
NVanlaiphai	1991					...	3,275	3,602
Tlabung	1991					3,409	3,681	4,554
Hnahthial	1991					...	7,138	7,187
Lawngtlai	2011					...	14,600	20,830

Source: Census of India 1951- 2011

Table 2:

Table – 2 : Growth of Urban Population and Towns in Mizoram, 1951-2011

Census Year	Population	Decadal Growth of population (%)	% to the total population	No of Towns	Decadal Growth of Towns (%)	Stage of Growth	Inter - Censal Year
1951	6956	-	-	1	-		-
1961	14257	104.95	3.54	1	0	Initial Period	1951 - 1961
1971	37759	164.85	5.34	2	100	Slow Growth	1961- 1971
1981	121814	222.61	11.36	6	200	Rapid Growth	1971 - 1981
1991	304304	149.81	24.67	22	266.67		1981 - 1991
2001	455606	49.72	46.20	22	0	Declining Growth	1991-2001
2011	571771	38.17	51.51	23	4.55		2001 - 2011

3.54 per cent of the state's population in 1961. This period is embarked on a stage of initial function of towns. Administrative and market related maneuver could not be served in the region. The period is also a transitional period of political matter in Mizoram, the chieftainship society transform into a democratic form of government. The capital, Aijal has attracted native people in this new settlement. After India attained independence the region continued to remain as one of the district of Assam, known as Lushai Hills District, which later changed into Mizo district in 1954. The name Aijal have changed into Aizawl and consolidated its primacy through intensification of administrative functions.

Slow Growth (1961-1971) : The state experienced a socio-political setback during 1961-1986, followed by the great famine which commonly known as 'Mautam' or 'Bamboo Flowering' of 1959 consequently a heavy loss to human property and crops. Numbers of voluntary welfare organizations tried to help the starving villagers in their level best to meet the basic requirement. The Mizo particularly disgruntled the Assam government on their unsatisfactory response of Mautam famine and, it has led to growing discontent among the Mizo. The Mizo National Famine Front, a body formed for the famine relief in 1959, which later on became as a new political organization, the Mizo National Front (MNF) in 1961 dig up aggression to secure its goal of establishing a sovereign land to uplift the socio-economic development and empowerment of the region. This political uprising in the state has led to face encounter with Indian Military, which again led to re-grouping the villages in 1967, forms a pattern of rural urban migration in the state which affect the spatial distribution of population.

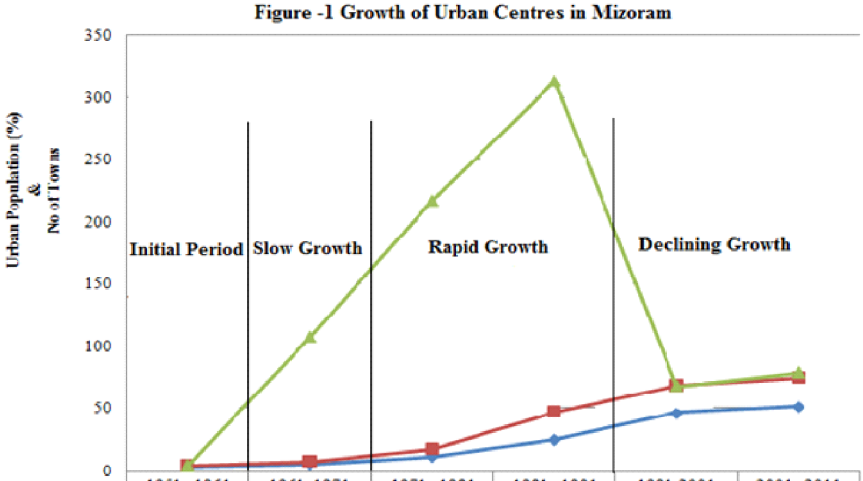
During this decade, a new urban centre was developed in the southern region of the state, named Lunglei, which was once a colonial administration in the erstwhile British Empire. Due to the continuous conflict between the military force and insurgency, many of the neighboring villages have re-grouping to Lunglei and, shifted in search of safety. Consequently the size of the urban population in the state has increased from 3.34 per cent to 5.34 per cent. The decadal growth rate of urban population was increased from 104.95 per cent in 1951-1961 to 164.85 per cent in 1961-1971. During the twenty years of insurgency, 1966-1986, many people were migrated to the neighboring state and abroad to escape from the internal disturbances in search of better opportunity, where has lead the slow process of urbanization in Mizoram.

Rapid Growth (1971–1991) : The state witnessed an unprecedented growth of urban population and number of towns during the two decades of 1971-1991.Assam state was split, re-organized into multiple political regions, Lushai hills area was declared as Mizoram and, it has given the status of Union Territory in 1972. The upgradation of District Council to Union Territory was highly significant in the progress of urbanization (Saitluanga & Pachuau, 2015), number of urban population increased rapidly from 5.34 to 11.36 per cent and the decadal growth rate increased with 222.61percent from the preceding decade of 1971-1981.

By the year 1981, there were six towns in the region; two towns of them are already existed in the preceding census whereas the other four new towns like Kolasib, Champhai, Serchhip and Saiha were added by the new administrative function of territory and, attracted immigrants in the peripheral areas. The evocative phases of urban structure begun to a large extent in Mizoram after it achieved the statehood on 30th June 1986, the peace accord was signed between the MNF and the Union Government. After the statehood, the decentralization of power, administrative function at the district and block level increased manifold and opening scope of employment and marketing facilities which change the rural economy towards the attainment of secondary sectors. The infrastructural development also provide affordably of social well-being, rural-urban service center has a potential, conceived as points of attraction for further development to its own population as well as its surroundings region, creating a balance development of an area pertains an urban structure in various part of the state. By 1991, the number of towns in Mizoram remarkably increased from 6 to 22. The eleven added new towns (table -1) share 24.67 per cent of the state total population. The decadal growth rate of urban population was 266.67 per cent during 1981-1991. This peaceful and stable governmental structure endorses the growth of urbanization in Mizoram.

Declining Growth (1991-2011) : The rate of urbanization was neither uniform across the states nor stable over the preceding decades. The decadal growth rate of population in the state has decreased dramatically, i.e., it was recorded as 49.72 per cent and 38.17 per cent during1991-2001 and 2001-2011 respectively. No town was added during 1991-2001, and only one notified town named Lawngtlai, was added during the decade of 2001-2011. The growth of urban infrastructure, availability of capital investment and capacity building, skill development exert pull on a

Figure -1 Growth of Urban Centres in Mizoram



	1951 - 1961	1961-1971	1971 - 1981	1981 - 1991	1991-2001	2001 - 2011
Decadal Growth of Towns (%)	0	100	200	266.67	0	4.55
No of Town	1	2	6	22	22	23
%to the total population	3.54	5.34	11.36	24.67	46.2	51.51

large volume of inflow of migrants to the urban centers from rural; which hamper the development of new towns. The state has recorded an increase in total urban population from 46.20 per cent and 51.51 per cent during 2001 to 2011. The negative and positive tendency like depletion of fertile land, primitive and unproductive method of cultivation, lack of sufficient transportation facilities, better educational institution, trading services give support to rural urban migration. The high growth of population, unequal growth of urban services with decreasing rural infrastructure creates a high tendency of rural-urban disparity and urban inequality in Mizoram.

Conclusion :

The pace of urbanization start from the post-colonial period but the foundation of urban function was imposed by the colonial people. The colonial administration and regrouping of villages by armed forces during insurgency plays a vital role which viaduct the stride of primitive to modernity in the state. The political development and uncertainty of social life set forth more or less sense of relative progress of urban structure in various parts of the state. The present paper clearly ascertains that the demographic structure has also played a major factor of urban growth; the growth of towns may also bequest by historical, geographical and political factors.

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Impact of Mizoram University on the Occupational Change of Tanhril Locality

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Abstract : *The study shows that Mizoram University, though fruitful for the occupational change and marketing for the people of Tanhril locality, has also negative impact on the occupational structure of the villager. It seeks to correlate servicing sector provided by Mizoram University and also studies how land compensation has impact on their economy on Tanhril Village.*

Keywords: University, Occupational Change, Mizoram

Introduction :

The role of university as a source of development is a matter of national discussion and worldwide as well because of job opportunities open in the institution. The establishment of university is not only a source economic development but also affected to political behaviour of a region. Therefore, it is also a source of idea and information which need attention and interest in the role of university for development. (Mosha, 1986)

Mizoram University (MZU) was established on July 2, 2001 under the University Grants Commission, Government of India, and, by the Mizoram University Act (2000) of the Parliament of India. It is located in Tanhril, Aizawl covering a plot of land measuring 978.1988 acres (3,958,630 m2) with lush greenery and scenic hills which was leased by the Government of Mizoram.

Mizoram University provides employment opportunities like teacher, security personnel, cleaner, gardener (Grass Cutter), non-teaching staffs in offices, vegetable seller, canteen workers etc. The selling of horticultural crops, vegetables and fruits near the main entrance of campus supply quarter-dwellers and hostellers their food. They are partly dependent on it. The employment generated by the campus can be classified broadly into Daily Workers, Company Workers, teaching and non- teaching staff in various offices. It is therefore interesting to study how the occupational structure of the Tanhril people has been changed by the establishment of Mizoram University.

Literature Review :

Love & McNicoll (1990) in their paper the economic impact of university funding cuts examines some of the economic consequences of government policy on Scottish universities. The basic premise of the study is that, in addition to their obvious functions as institutions of higher education, universities are large economically active

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organisations, so that any change in their income and expenditure will have spin-off effects throughout the local economy.

Ogur (1973) consider the economic influence of institutions of higher learning on local rental housing markets. The hypothesis is that the presence of a college or university in a rental housing market area causes the price of housing services to be higher, cet. par., than it otherwise would be. In order to test these postulated relationships, data were collected for the 62 New York State counties (9) from the 1960 U.S. Censuses of Population and Housing. Additional data were collected from the 1960Census for 24 New York State urban places and from the 1950 Census for the 43 New York State counties outside of Standard Metropolitan Areas. The result, according to him thus far, have been uniformly consistent with the original hypothesis that the presence of colleges and universities causes rents to be higher than otherwise

Study Area :

Tanhril is located on top of hill on the western part of Aizawl. The area is lying between 92°40'44" East – 92° 40' 50" East longitude and 23° 44'50''North – 23° 44'09'' North latitude. It is a part of Municipal area of Aizawl and is placed under Tlangnuam block of Aizawl District. The Village was believed to establish as a result of disintegration of Dungtlang Village in eastern Mizoram which was still rules by several chiefs. Tanhril-a and his people, who was also believed to be one of the chief in Dungtlang had also migrated westward occupying the present location in early 17th Century AD. Then, the village was named after him 'Tanhril'. Within this village he had his own chieftainship. According to 2011 census there are 539 families in which Mizoram University campus 978.1988 acres of land became in the village council area in 2000.

Methodology :

For the present study, Cluster sampling method is adopted to collect information from 286 households in Tanhril. Primary data is also obtained from the employees Mizoram University. Secondary data like Census data 2011 and data of Employee of 2010-11 academic sessions from Mizoram University have also been used.

Objectives :

The objectives of the study are-

1) To identify the economy that is related with Mizoram University.
2) To find out the impact of income of the family.
3) To explore changes made by Mizoram University campus on their economy
4) To discover gender participation of Tanhril villagers in the Campus

Results & Discussion :

a) Daily Workers :

Daily-wages/workers mean a worker who are hired and paid per day. This category includes vegetable seller and manual labour. Based on survey conducted in 2011, daily workers constitute 55.53% of the total workers from Tanhril village in and nearby Mizoram University (MZU). Out of this, 58.49% are vegetable sellers while 35.89% are canteen workers and 5.64% are manual labour. The study also reveals that as much as 13% of the primary workers in Tanhril village are directly or indirectly engaged with Mizoram University. The most interesting result is that number of female working population is higher than male except in manual labouring.

Table 1: Daily Workers in MZU from Tanhril

Name of incumbent	Male	Female	Total	% of worker
Vegetable seller	2	29	31	58.49
Labour	3	-	3	5.64
Canteen Worker	7	12	19	35.89
Total	**10**	**45**	**53**	**100**

Table 2 shows the percentage of income of daily wagers from Tanhril. From the total income percentage of daily workers income, Vegetable seller contributed 67.60%, followed by canteen worker (23.67%), labour (8.73%) respectively.

Table 2 : Income of Daily Workers from Tanhril in MZU

Workers	Monthly (Rs.)	Annual (Rs.)	% of contribution (income)
Vegetable seller	97,650	1,171,800	67.60
Labour	12,600	151,200	8.73
Canteen Worker	34,200	410,400	23.67
Total	**144,450**	**1,733,400**	**100**

b) Security Personnel and Cleaners :

Mizoram University has two working security companies in 2011. They were Northern Security Service and Mizoram Premier Agency. Mizoram Premier Agency initiated their service in 2010 and the Northern Security Services started in 2011. North Eastern Security Service employed 63 personnel in the company out of which 24 are from Tanhril village. It means that 38.9% are from the local village.

Mizoram Premier Agency has 24 cleaners and 3 Gardener. Out of 24, 11 cleaners and 3 Gardener are from Tanhril. The total workers from Tanhril, then, are 38 in number. While total number of Security and gardener are the addition of male the total number cleaner is the addition of female alone. Company employee contributed 7.08% from all the income of Tanhril village in a year. It is evident from the table that 100 % from the total cleaners are female while 100 % of Gardener and Security from their own total incumbent are male. The table demonstrates that there is gender space in security, cleaner and gardener.

Table 3 : Number of Person Security personnel and Cleaners from Tanhril

Workers	Male	Female	Total
Security	24	-	24
Cleaner	-	11	11
Gardener	3	-	3
Total	**27**	**11**	**38**

All of these workers were paid Rs. 4,500 per month each. As per annually 24 securities earning Rs. 4,500 a month contributed Rs.108,000, 11 cleaner became Rs.4,9500 and 3 gardener earned 13,500 toward the economy of Tanhril.

Table 4 : Income of employee under company

Name of Incumbent	Pay	No of person	Monthly	Annual
Security	4,500	24	108,000	1,296,000
Cleaner	4,500	11	49,500	594,000
Gardener	4,500	3	13,500	162,000
Total	13,000	38	171,000	2,052,000

Source: Based on field survey conducted during February - March 2011

c) Office staffs :

There are different staffs under Mizoram University. They are found to be engaged as teacher, laboratory assistants, clerks and peons. The staffs, altogether, are 8 where 7 are males and 1 is female. The following table shows the distribution of person in different level of staff.

Table 5 : Number of person working as staff in Mizoram University from Tanhril

Name of Post	Male	Female	Total
Assistant Professor	1	-	1
Laboratory Assistant	1	-	1
Lower Division Clerk (LDC)	1	1	2
Peon	4	-	4
Total	**7**	**1**	**8**

The contribution made by different staffs come Rs. 15,00,000 in a year. The only lecturer getting Rs. 80,000 per month generated Rs. 9,60,000 yearly; Laboratory assistance, earning Rs. 15,000 made Rs.1,80,000 in a year; 2 Lower Division Clerk, working as a muster role, contributed Rs. 1,20,000 in 1 year; 1 peon which is registered as temporary appointment contributed Rs. 2,40,000 in a year. The addition of all staffs contribution becomes 5.17% of the total income of Tanhril locality.

Table 6 : Name of Incumbent & Levels of Income from Tanhril

Name of Post	Pay	No of Person	Monthly Salary (Rs.)	Annual Salary (Rs.)
Assistant Professor	80,000	1	80,000	960,000
Laboratory Assistant	15,000	1	15,000	18,0000
Lower Division Clerk (LDC)	5,000	2	10,000	120,000
Peon	5,000	4	20,000	240,000
Total	**105000**	**8**	**125,000**	**1,500,000**

Land Compensation :

Mizoram University Campus which occupies 978.1988 acres of land which belong to the people of Tanhril locality and other outsiders before its establishment. When the land was occupied, University gave a payment to compensate the people of the village. 96 families took land compensation from university. The total amount paid for the land was Rs. 19,65,00,000. The average compensation given to the family is Rs. 20,46,875. From 95 families 65 are from Tanhril. The total average compensation given to Tanhril is Rs. 13, 304, 6875.

According to the study, the funds received from land compensation were spent for Construction of Houses and water tank, purchasing vehicles and opening business. 20 % houses are constructed from the land compensation along with water tank and 40% of vehicles like Two Wheeler, Car, LMV and HMV are

bought from the compensation taken where some of them are a valuable goods carrier which generates regular and reliable income. The purchase of Public Vehicles like Taxi and Bus generated a good income and it is their major source of income. Besides, one of the major changes brought land compensation fund was that 5 families utilised the compensation for opening shops like variety stores, medical store and garment shops where two families have shops in millennium centre.

Discussion and Conclusion :

The establishment of the campus not only causes the transformation of economy but also the level of income of workers in Tanhril through employment and Compensation. The establishment of University, on the other hand, has also remarkable drawback. More than 65 families have a plot of land at the erstwhile Tanhril Village Council land which was purchased by the University. About 32% of families used their land for agricultural purposes, and rest of them used their land for quarrying, lumbering, burning char coal and collecting fuel-wood purposes. The occupation of 978.1988 acres of land of the village has been totally under university campus land use. As a result the economy depend on these factors are affected. More than 47 families have had suffered the consequences of the establishment of the University. There are still 22 families who are still having plots of land beneath the University Campus. Previously, they could find path which in now in the campus area. But the fencing of campus obstructed where affected families have to take longer path. This led to the wastage of time and energy to reach their agricultural field.

To conclude, the establishment of Mizoram University, though there is drawback, has become a change on the occupational structure because 1.68% of the number of workers has related economy with Mizoram University. Thus, 1.68% of Mizoram University Workers which is 99 persons out of 586 workers in Tanhril contributed 18.25% of the whole economy of Tanhril. The 99 workers of Mizoram University engaged in different level. These are teaching staff, non-teaching staff, daily workers like vegetable sellers, canteen workers, labours and company workers which in aggregate contributed Rs. 5,285,400 in a year. Furthermore, it also provides nearer markets for the primary workers. The workers have to take shorter head loading because of availability of road transportation till University gate It also help to supply their products to market. It generates regular incomes that contribute 67.60% from all the total income of daily workers in University.

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Gender and Use of Natural Resources in Mizoram, India : An Emerging Nexus

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prasad

Abstract : *Literally speaking, our immediate physical environmental and space are changing at a pace faster than ever. Its impacts are different on genders which determine how we adapt and also can act as an agent of change. The nexus between gender and the use of natural resources in Mizoram is and will be an important agenda in determining just and equal distribution of rights apart from bringing about sustainable development both economically and environmentally in light of the spatial variation in the use of natural resources by women and to assess the contribution of women's use of natural resources on the socio-economic development of the region. Taking into consideration the limited hold over properties both private and public has no doubt limited their economic activities. But emerging market, better and new techniques of cultivation and emerging varieties of items for sale has provided an ample source of subsistence for survival especially in rural areas. But the basic understanding of the study reflects that work which involves mechanized or more rewarding values are more masculine in nature and those that involves unpaid domestic chores and labour at one's own land which are no doubt very valuable are more feminine in nature but at the end of the day distinction between gender roles at the present are not as sharp as compared to other parts of the country when it comes to natural resource use.*

Keywords : *space, gender, natural resources, sustainable development*

Introduction :

"By virtue of being a woman, she'll do all the work. She'll get up at the crack of dawn, before anyone else in the house, finish all the cooking and then send the kids to school. Later, she'll work in the fields, only to come home and wash everyone's clothes. She'll also have to make time for cleaning and other household chores. In the short span of a breathless rant, Ramvati has perfectly summarized not just her own typical day, but the archtype of the woman farmer. In a landscape where the plight of farmers is only deteriorating, with the entire nation on the brink of, or in the midst of, one of the most agrarian crises it has faced, the story of women farmers is that of double jeopardy- being a woman and a farmer-both lives of unparalled forbearance and unmitigated thanklessness".[1]

Much economic growth in recent decades has been driven by the rapid expansion of natural

[1] *As cited on the e-magazine of The Wire.in*

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resource use, especially in developing and emerging economies, and by the processing and consumption of fossil fuels. This has led to a concentration of environmental pressures in some parts of the world (UNEP 2016). Many environmental problems have been compounded by the risks and impacts of extreme weather and climate events, which disproportionately affect the worlds' poorest populations (UNEP 2016, IPCC 2014)

The drivers of environmental change are also differentiated by gender. Whether environmental changes are acute or slow and chronic, it has specific differentiated impacts on women and girls or on men and boys. Moreover, austerity measures and public spending cuts in recent years have exacerbated gender inequalities and increasingly shifted the burden of ensuring the survival of individuals and households onto the shoulders of women and girls (including through their use of natural resources), adding to their unpaid domestic and care work and time poverty (UN Women 2014).

The livelihoods of the vast majority of population in developing world depend on natural resources. Their revitalized management is often of basic importance to economic recovery and development in conflict affected settings. Addressing gender and other inequalities related to environmental sustainability and access to natural resources, including in participation and decision-making, can further efforts to achieve lasting peace and sustainable development (UN Women 2014). Moreover, assessment of availability of natural resources and the ways that resources are exploited for human purposes is an important key to the understanding of sustenance patterns, institutional arrangements and policies in any society.

Women contribution and access to natural resources have long been an issue of discussion in geography and development studies. Women workforce in contemporary world is asserting its presence as never before. Recognition of the gender nexus despite age long limitations, as an economic viable contributor to the families in particular and the society in general, has been bringing the female component on the forefront of economic and political discourses. The attitude is further reinforced under contemporary conditions of globalisation, induced migration, changes in policies and patterns of compensation to the women and accordant benefits and organizational structure to name a few. Women, here, are no longer waiting for a paradigm shift. The paradigm has long shifted, workforce composition is different now and getting stronger.

Bina Agarwal notes that, "In many developing countries, women are often burdened with a

significant responsibility for family subsistence and are important, often the primary, and in many female-headed households the sole economic providers. However, their ability to fulfill this responsibility is significantly constrained by the limited (and declining) resources and means at their command-a constraint that stems not merely from their class position but also from gender. These gender inequities in access to resources take varying forms: intra-family differences in the distribution of basic necessities; women's systematically disadvantaged position in the labour market; their little access to the crucial means of production-land, and associated production technology; and the growing deterioration and privatisation of the country's common property resources on which the poor in general and women in particular, depend in substantial degree for sustenance" (Agarwal,1989).

Contemporary international gender studies explore what all members of a household contribute to the household economy. The women-in-development literature of the 1970s and the 1990s stressed the overlooked and under-valued role of women in rural development globally, almost to the exclusion of age dimensions and males. A broader approach to agricultural labor recognizes that everyone in the household contributes to family sustenance, but that economic roles differ by one's gender and stage in life (Eckman et al., 2016). Despite some advances, women continue to face significant obstacles in entering the labour market and progressing in their careers. Barriers to occupation, persistent occupational and sectoral segregation and a disproportionate share of unpaid household and care work prevent them from enjoying equal access to opportunities, and to opportunities that are in line with their significant progress in educational achievement over the past decades. This limits their economic choices, weighs on their social status and ultimately curbs growth and social development. In a recent McKinsley study, 15 gender equality indicators were tracked for 95 countries. The study found that, if women participated in the economy at a level identical to that of men, it would add up to 28 trillion US Dollars or 26 per cent of annual global gross domestic product (GDP) in 2025, assuming a business-as-usual scenario. This impact is roughly equivalent to the size of the combined United States and Chinese economies today (Mc Kinsey Global Institute, 2015 in Women at Work Trends, 2016)

The above story of Ramvati is not very different from the lives of women who reside in the small Himalayan state of Mizoram in North East India. Mizoram is a tiny state at the north eastern part of India where about 70 % of the people are dependent on agriculture

and related activities amongst which Jhum or Swidden cultivation is the most dominant one. While men are the main force to cut thick forests in Jhum cultivation, womenfolk are also not spared, especially widows as circumstances compel them.

The study, therefore, attempts to appraise gender nexus in the use of natural resources by specifically highlighting their contributions and knowledge in the use of agriculture, water and livestock resources. It would be influential in examining how natural resource is instrumental in securing livelihoods, as well as how resources are used and controlled in certain socio-economic and political contexts. It is argued here that gender has a different set of roles in different households in the agriculturally dependent economy of Mizoram.

Objectives :

1. To study the spatial variation in the use of natural resources by women.
2. To assess the contribution of women's use of natural resources on the socio-economic development of the region.

Methodology :

The study is based on an intensive survey of 32 villages in Mizoram. One rural development (RD) block was first selected from each district. Selection of sample RD blocks was done in the way that the 28 RD blocks were arranged into ascending order on the basis of household size. Based on this arrangement the data are distributed into median and eventually quartiles were calculated so as to ensure even and unbiased arrangement of the area to be sampled.

The quartiles helps in dividing the data into four equal parts and from these four categories of evenly divided blocks the sampled area were chosen. After selection of RD blocks, four villages each were selected from each RD block. From each sample villages, sample size was determined by basing the size of the village population. Finally selection of households was done with the help of random sampling method. Respondents were drawn from households engaged in agriculture and allied activities background only. Both qualitative method and quantitative methods were used for data collection.

Scheduled questionnaires were prepared to cover of household survey cover the household demography. Only working women who were either the heads or the wives of the heads of the households were interviewed. Various statistical tools were employed to come to a concrete analysis and discussions.

Role of women in Jhum cultivation :

In Mizoram, woman must take charge in her "natural" role as care-giver. Added domestic responsibilities, however, do not take away

from her role in the fields where she is mostly assigned what are referred to as "donkey's jobs"- the hard labour of sowing, seeding, threshing, harvesting and ploughing. Unfortunately, the skills that are involved in each of these tasks are not talked about often, or often enough.

(a) Sowing of crops :

Men and women are equally involved in the sowing of seeds for the crops. The duration of time taken for sowing is mostly 1-2 hours per day especially in the districts of Mamit and Serchhip where mostly local vegetables are grown and plantation crop have largely taken over the Jhum areas and hence not many hours here are taken for sowing, except at the start of the initiative

Districts like Lunglei, Lawngtlai, Siaha and Kolasib, Aizawl are found to be engaged in cross cultivation of all horticulture, plantation and vegetables both local and common varieties. With the help of government initiatives and financial institutions various schemes are started and therefore the duration of sowing is mostly similar varying from 3 hours to 4 hours per day which indicates that the duration is not only for a particular crop but a collective time given but they could not indicate distinctly how much time they give to a particular crop.

Areas where sowing requires maximum number of hours are found in Lunglei and Champhai District where paddy cultivation are practiced in large number including local varieties and sticky rice. Champhai records the highest percentages of joint venture in sowing and indicates that there are no particular work divisions for men or women but mostly work in collaboration. In almost all districts works hours dedicated to work jointly are more than that of hours spent on the basis of gender. Women largely share shoulder to shoulder in terms of preparing the bed of cultivation.

Table 1 : Total time Taken for Sowing of Crops

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	56.50	16.18	2.12	3.71	0.00	0.00	16.98	4.51
Male		59.66	14.85	2.24	3.92	0.00	0.00	15.13	4.20
Joint		28.48	7.89	7.22	6.68	0.00	34.76	10.43	4.55
Female	Above 3	0.00	10.07	19.60	16.67	25.82	2.29	16.12	9.43
Male		0.00	10.61	19.24	16.37	25.36	2.25	16.73	9.44
Joint		0.00	15.52	25.86	22.10	0.00	0.00	23.67	12.85
Female	> 5	0.00	43.40	0.00	0.00	0.00	55.32	1.28	0.00
Male		0.00	43.40	0.00	0.00	0.00	55.32	1.28	0.00
Joint		0.00	39.24	0.54	0.90	50.99	4.52	3.07	0.72

(b) Ploughing :

Being a hilly terrain, modern implements are not common in the state except a few plains and valleys and in few pockets of Kolasib, Champhai and Aizawl District. It is a tedious job in a hill state like Mizoram where one requires digging into the soil and breaking the soil and rock as is common with the physiographic sedimentary nature of the state. The time dedicated jointly outnumber the hours spent individually again except for Champhai District, which can be attributed to the wet rice cultivation in the plains adjoining Myanmar borders where mechanized farming could be practiced and mechanized farming are intrinsically male bastion in this part of the world.

(c) Irrigation activities :

Irrigation is possible on areas which are nearer the capital like Lunglei, wet paddy cultivation in the plains of Champhai and fractions of Kolasib which lies in and around the longest river of Mizoram 'Tlawng River' and near the borders of Cachar Plains and hence the maximum duration of hours are spent in these areas. In most cases irrigation refers to channelizing water from any source available which includes small drains to major rivers. Recently there had been an upsurge in channelizing water from major rivers in nearby river beds which enable farmers to cultivate even during odd seasons of crops like tomatoes, potatoes, beans, cabbages etc. which were earlier relied only from those imported from neighbouring states. These enable both gender to have work and source of livelihood even during off seasons. Income generation have reaching effect towards family in general and children in particular both in terms of nutrition and education.

Districts like Lawngtlai, Saiha and Aizawl and to some extent Serchhip are areas who spends minimal hours ranging from hardly 1 to 2 hours for irrigational purpose which pictures for irrigation is not

Table 2 : Total time Taken for Ploughing

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	12.79	8.82	13.15	11.46	16.93	17.11	12.91	6.84
Male		12.46	9.54	12.99	11.47	16.50	16.68	13.46	6.90
Joint		14.21	10.34	14.61	12.74	18.81	6.54	15.01	7.74
Female	Above 3	0.00	37.21	6.98	11.63	0.00	0.00	34.88	9.30
Male		0.00	40.00	0.00	0.00	0.00	0.00	50.00	10.00
Joint		0.00	12.80	2.40	4.00	0.00	65.60	12.00	3.20
Female	> 5	0.00	97.14	0.00	0.00	0.00	0.00	2.86	0.00
Male		0.00	97.14	0.00	0.00	0.00	0.00	2.86	0.00
Joint		0.00	64.76	0.00	0.00	0.00	33.33	1.90	0.00

Table 3 : Total time Taken for Irrigating

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	1.21	14.85	22.12	19.29	1.92	7.37	21.72	11.52
Male		1.16	14.99	21.18	18.47	3.00	8.22	21.76	11.22
Joint		1.25	17.79	23.10	20.40	0.00	0.00	24.97	12.49
Female	Above 3	11.97	10.26	1.28	2.14	32.05	29.06	10.68	2.56
Male		15.64	0.00	0.00	0.00	40.22	44.13	0.00	0.00
Joint		100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	> 5	24.20	28.53	0.00	0.00	26.29	20.14	0.84	0.00
Male		23.83	30.30	0.41	0.69	24.66	16.67	2.89	0.55
Joint		13.95	22.59	0.00	0.00	31.23	31.56	0.66	0.00

gaining momentum as of now but it does not mean that there are no scope for its expansion as many people who had been interviewed during the course of the present study had empathized for the need of irrigation and how it would have boosted their production if given proper support and expertise. The work hours for both men and women are almost similar and most work is done jointly in terms of time spent on irrigation. Lunglei, Kolasib, Champhai and Mamit are districts where irrigation are practiced and used to really benefit their crop as these areas have ample amount of land especially in their borders with other state with flat arable lands and intersecting rivers. They spare a good amount of time on irrigation purpose for a hilly terrain state like this which can range to more than 5 hours by males and females alike.

(d) Weeding and Harvesting :

In the past, parents were helped inn weeding operations by their daughters. While explaining the multifarious role played by a Mizo girl, L.D Baveja in (Eckman et al., 2016) also explained: She...works on the Jhum land together with the other members of the family. Sometimes, boys and girls worked together in different Jhums in rotation and ate together in the Jhum huts. This is a means of helping out each other in the cultivation process and is known as 'Inlawm'. A boy is called 'Lawmpa' and a girl is called 'Lawmnu'. This often led to courtship in the subsequent days even to the extent of marriage. This practice is still alive among the boys and girls in the countryside. After the morning meal, boys and girls go together to the jhum for weeding and back home in the evening after toiling the whole day with only a short break at noon for mid-day meal. After coming back home from her jhum work, a girl's task again begins in the evenings when she has to help the family cook and roll innumerable Mizo Cigarettes for the visitors

(Eckman et al., 2016).

Harvesting of crops is mainly done in the month of November and December. The paddy is carried home in two or more stages by storing in successive temporary huts called 'Chhekin'. On occasions when the location of the Jhums is too far from the village, a subsidiary Jhum called 'Leipui' is located near the village, where the principal subsidiary food crops like maize, arum, sweet potato and other vegetables of daily necessity are grown. The rice grains collected from the plot are heaped up in one place, from which the grains are transported with a larger bamboo basket called 'Tlam' by the stronger men-folk to the Jhum hut for threshing (Eckman et al., 2016).

(d) Marketing and obtaining credit :

Marketing seems to be clearly woman deliverance at places and times outdoing their counterparts when it comes to marketing as can be seen from various markets seen in and around Mizoram. Outside activities are usually considered male domains but in Mizoram men and women walk juxtaposing each other when it comes to work especially marketing and obtaining credits/loans. The gendered nexus between the use of natural resource along with the ways to array the produce had clearly blurred since history in Mizoram but it is only in recent times that their worth and inputs are measured and treasured.

Districts that are comparatively closer to the state capital may experience easier ways to market and obtain credits like Aizawl, Serchhip District and districts which comes under the Autonomous Councils like Siaha and Lawngtlai whereby more impetus are given to the ethnic communities and hence more funds which gives them

Taking into consideration the limited hold over properties both private and public has no doubt limited their economic activities. But

Table 4 : Total time Taken for Harvesting

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	0.00	32.22	19.49	17.21	0.00	0.00	20.72	10.36
Male		0.00	32.35	19.15	16.91	0.00	0.00	21.22	10.35
Joint		0.00	31.97	18.93	16.71	1.19	0.00	20.97	10.23
Female	Above3	0.00	10.67	0.00	0.00	24.00	49.33	13.33	2.67
Male		0.00	0.00	0.00	0.00	74.07	25.93	0.00	0.00
Joint		0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00
Female	> 5	29.38	0.00	0.00	0.00	36.41	34.21	0.00	0.00
Male		28.29	0.00	0.00	0.00	34.79	36.92	0.00	0.00
Joint		29.38	0.00	0.00	0.00	31.45	39.17	0.00	0.00

emerging market, better and new techniques of cultivation and emerging varieties of items for sale has provided an ample source of subsistence for survival especially in rural areas. The life of women and men almost revolves around their plot of land and natural resources, nevertheless the household chores and livestock management also do consist and important source of survival. But the basic understanding of the study reflects that work which involves mechanized or more rewarding values are more masculine in nature and those that involves unpaid domestic chores and labour at one's own land which are no doubt very valuable are more feminine in nature but at the end of the day there are not a sharp distinction between gender roles at the present when it comes to natural resource use except for its returns.

Conclusion :

The study clearly shows that women and men do work in unison when it comes to natural resource use and more so in joint or together. Gender dynamics do not call for big time demarcation of work roles in this part of the area. The study revealed that though there exist a thin line between these gender roles irrespective of the spatial spread of the state. Much of the labour irrespective of gender is found to

Table 5 : Total time Taken for Marketing

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	0.00	31.70	18.77	16.57	2.03	0.00	20.79	10.14
Male		0.00	32.00	19.35	17.00	0.61	0.17	20.58	10.29
Joint		0.00	31.78	19.66	17.15	0.00	0.99	20.20	10.23
Female	<2-5>	0.00	0.00	0.00	0.00	44.17	55.83	0.00	0.00
Male		0.00	5.19	0.00	0.65	38.96	47.40	6.49	1.30
Joint		0.00	12.70	0.00	0.00	0.00	68.25	15.87	3.17
Female	> 5	33.49	0.00	0.00	0.00	32.23	34.28	0.00	0.00
Male		31.19	0.00	0.00	0.00	31.48	30.75	0.00	0.00
Joint		27.95	1.71	0.39	0.66	37.01	30.31	1.44	0.52

Table 6 : Total time Taken for Obtaining Credit

Gender	Hours	Mamit	Lunglei	Lawngtlai	Siaha	Kolasib	Champhai	Aizawl	Serchhip
Female	1 to 2	0.00	29.09	17.22	15.21	4.81	5.28	19.08	9.31
Male		0.00	30.13	18.23	16.09	3.28	3.20	19.38	9.69
Joint		0.00	29.38	18.17	15.85	4.32	3.98	18.76	9.54
Female	< 3	3.00	0.00	0.00	0.00	45.00	52.00	0.00	0.00
Male		3.40	0.00	0.00	0.00	48.06	48.54	0.00	0.00
Joint		0.00	5.19	0.00	0.00	44.81	43.51	5.84	0.65
Female	> 5	46.00	0.00	0.00	0.00	28.89	25.11	0.00	0.00
Male		40.00	1.55	0.00	0.00	27.77	28.35	1.94	0.39
Joint		36.72	2.24	0.52	0.86	27.76	29.31	1.90	0.69

be from lowly educated and unskilled and therefore suited only for petty jobs and self-employment. Women largely work from home and are allowed to participate in almost all aspects of work related to natural resources use and at the same time to not fare away from the stereotypical roles assigned to them. Whether this enhanced participation translates into decision making process and equal division of labour both at work and home is still a question to reckon with further studies.

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