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1.1. INTRODUCTION

Modernistic developmental strategies under prevailing economic philosophy and accordant system of governance thrive on intensive capital investments. Such investments by their nature and expediency of resource management are made out to be selective in allocation - both financial and spatial. Community resources, in the name of better management, are made out to be beyond the access of the people. Unilateral administrative decisions given legitimacy by a promise of compensation or uncertain welfare measures are designed to limit the uses of conventional resources within their command. The thrust appears to be aimed at promoting dependency of people on a system that despite promising empowerment to the common citizenry thrives on the concept of marginalizing the ever increasing fringe people through appropriation and monopolization of common resources by powerful cartels of politicians, bureaucrats, legal experts and businessmen. Little do the people realize that they are being made subservient under the induced reduction of their rights in decision making processes even in systems of democratic governance? As decision making process is found being undertaken increasingly by the powerful cartels comprising mostly of politicians, bureaucrats, legal experts and commercial enterprises people's confidence in them is eroded. Work culture, therefore, is depilated and associated Community responsibilities adhered through generations is overlooked. The phenomena is found to be resulting either in wastage of human resource at regional and sub-regional levels or concentration of it at artificially

created and already congested centers of opulence dominated in the developing regions by administrative significance of the settlements. More often than not, this is found to have led to under utilization of resources in areas which are perceived to be far from the seats of political and economic power. Little is realized that remoteness of an area/settlement is a construct having its basis in availability and quantum of physical resources. Accessibility made convenient by capital intensive transport and communication facilities is a function of the resource base and resource potentials of a region. Affluent citizens having power to influence planning processes and privy to government decisions are also the people determining the nature, method and quantum of resource utilization in different physical settings. They are also capable of appropriating resources for future investments in apparently remote areas at the cost of local stakeholders who are easily swayed favorably by the promises of shares in the outcome of development processes and which find tangible expressions in well publicized, finely orchestrated and legitimatized political and administrative structure. To the greater dismay they, however, are found to have been leading to exploitation of the common populace who unwittingly are beholden to the people who claim to be the leaders of the general mass but are mostly engaged in manipulation of the system which are suggested to have been evolving to cater to the needs of the people - the raison d' atre of any system of governance.

The problem appears to be grimmer in areas which claim to have a regional identity based only on ethnicity and not on the complex of factors that allow regions to be a viable economic entity to survive on its own and provide a sound basis for its people to have a better living condition. The state of Mizoram is a glaring example of the phenomena that seems to be overtaking the whole country. Born out of dissatisfaction against the political

structure and negligence of its people the state in its post- statehood period (20th Feb., 1987) still depends mostly on central allocation of funds. This is found to have been leading to stratification in traditionally classless society. Expectedly then benefits of adopted development measures go in favor of the a small privy class at the cost of participation in policy and decision making as well as in implementation of plans by the common people who are expected to know and understand their socio-cultural milieu along with the economic bases of a region against universalistic development paradigm.

India is a developing country with the per capita income around US$400. Her immense diversity and huge population are daunting enough problems. However, within this sea of poverty and under-development, there are questions about regional disparities and equalities among the federating states that often lead to political and civil turmoil. This has been particularly true about the northeastern states of India, the land of the seven sisters. From the nineteen sixties, the region has witnessed a variety of popular unrests and agitation due to lack of economic development, economic opportunities, political freedom and the general allegations of step-motherly treatment meted out of these states by the Union Government. Some of these problems are legitimate—many, imaginary.

Mizoram, a tiny state tucked away in the wombs of hills and forests in the far eastern corner that formally became a state only in 1987, after its traumatic insurgent movement that lasted two decades and ended with the famous Laldenga Accord of 1985. Peace was once restored to the restive land. The state has a small population of 888,573, principally the Mizo tribes and uniquely homogenous in its social and cultural structure

Undoubtedly, like the rest of the Region, Mizoram is also economically backward. However, socially it is one of the most developed – it has a near 100 percent literacy,

social coherence and enterprise among the people. It is also disadvantaged due to its difficult access to the rest of the country, poor communication situation and its land located situation. It has little plain or valley areas for agriculture. Inaccessibility makes industries less competitive – thus, little industrialization. Limited local market (small population) for local products to become a profitable enterprise, and a huge unemployment problem.

However, within this tiny state also areas that are even more problematic. The accessible areas that lie close to the national highways are better off – those away in the interiors are cut-off most of the year and lack even the basic amenities of life. The main purpose of this study is to identify the relatively more problem prone areas of the state and to seek out the problem that may help in formulating effective public policies directed to those sectors and areas to help people achieve a reasonable standard of living.

1.2. CONCEPT OF DEVELOPMENT

In recent years development has emerged as a major area of economic analysis both in terms of theoretical and empirical research. The term development is regarded as "a process whereby an economy's real national income increases over a long period of time". The concept of development is neither new nor old. Development is a continuously changing and dynamic concept. The nature of development in the early 1990's differing from that seen early in the 1950's or from that in the 19th century. Development means growth with change and increase in welfare. Development is something more than economy growth. At the very outset of any development studies a distinction must be made and stressed between growth and development for very often they are used

interchangeably. The term growth may be used to denote an increase in output or income whereas development should symbolize the underlying structural, institutional and qualitative changes that bring forth a positive change in a country's capabilities (Hogendron, 1987). Growth therefore is very often people neutral. Development on the other hand, is anthropocentric. Development includes in its ambit economic growth. But growth may be attained without development (Clower et al, 1966). In other words, growth may be affected by inducing selected and sectoral investments in scarce resources and its resultant growing disparities on personal as well as regional levels. Developmental efforts, on the contrary, strive to offer increasing option to the people through which accessibility and exploitability of resources is assured 'unto the last'. Development therefore may be defined as a process that creates conditions leading to reduction if not elimination, of inter personal disparities. It may, however, be affected only if inter regional disparities are minimized (Dutta, 1970).

Economic growth means more output and economic development implies both more output and changes in the technical and institutional management (Kindleberger, 1965). "The proper long term goal of national development policy must be the successive relaxation of the systematic obstacles to the full realization of the human potential of its members. The goal of development are then two folds: to provide the material basis for achieving these objectives and to establish the economic conditions for relaxing the other barriers to self realization" (Adelmen, 1975:67-76). Thus development is no longer considered identical with growth. It is taken to mean growth plus change. There are qualitative dimensions in the developmental process which may be missing in the growth of an economy.

For most economists and policy makers, development has usually been seen as equivalent to growth of which Gross National Product (GNP) served as the main indicator. This was usually expressed in per capita (per person) terms, i.e., the gross, or total, national product was divided by a country's population to give an average figure for a country's level of development. It included only the final output produced and not intermediate production it does not measure the extent to which resources are available in that economy. GNP is an economic measurement and, by definition does not take into account of non- economic criteria and how resources are distributed. It is based on market prices and non-economic transactions are not necessarily covered and cannot reflect the real social value or cost of producing an economic resource. Keeping these aspects in view, the United Nation Development Programme (UNDP) has produced an annual publication called Human Development Index (HDI) as an indicator of development. The Human Development Index encapsulates a concept of development as a process of enlarging people's choices, allowing them the opportunity to live longer and to acquire knowledge. Thus, the narrow focus on economy growth and transformation is widened to embrace a variety of other (economic but also non- economic) factors. As described by Martinussen "Human development was defined as a process of enlarging people's choices. At first, attention was concentrated around the choices in three essential areas: the opportunity to lead a long and healthy life; the opportunity to acquire knowledge; and the opportunity to have access to resources needed for a decent standard of living… To these were later added considerations regarding political freedom and human rights; human development for woman as well as for men; environmental and other aspects of sustainability; and themes regarding citizens' participation and opportunities to affect the

political decisions in society'(Gerard Mc Cann and Stephen Mc Closkay: 2003) Thus economic development implies economic growth along with change- a change for the betterment. This change can come through structural transformation- which is an ingredient of economic development. As the economy grows, changes take place regarding shares of different sectors in employment and GDP, structure of trade, structure of demand, energy consumption and distribution of income etc. "Development must, therefore, be conceived as a multi-dimensional process involving major changes in the social structures, popular attitudes, and national institution, as well as acceleration of economic growth, reduction in inequality, and the eradication of absolute poverty. Development is in essence, must represent the entire gamut of change by which an entire social system, tuned to diverse basic needs and desire of individuals and social groups within that system, moves away from a condition of life widely perceived as unsatisfactory and towards a situation or conditions of life regarded as materially and spiritually better" (Todaro, M.P. 1993) Thus development means structural transformation of an economy that penetrates widely and deeply. It affects social structural and cultural facets of a society. It is taken to a much wider range of variables. It includes especially the whole range of social, economic and political processes expected to lead to a perceptible and cumulative rise in the standard of living and equality of opportunity. Generally, however the word is believed to denote to a set of complex changes induced by human endeavor to seek 'peoples' welfare and about expansion of their capabilities and functioning. Development is both a physical reality and a state of mind in which society has, through some combination of social, economic and institutional processes, secured the means for obtaining a better life. Whatever the specific components of this better life, development

thus, involves, attempt to i). increase the availability and distribution of basic life sustaining goods. ii). Raise levels of caring and education to increase both material welfare and self- esteem, and iii). Expand the range of social and economic choice to both individual and nations, freeing them from servitude and dependence. Such efforts necessarily bring about structural and behavioural changes. Development, therefore, may be defined as value positive process aiming at enhancing the level of the living conditions of mankind in spatio- temporal dimension. It means not only change but also a change for betterment. It is supposed to address to sustainable intragenerational as well as intergenerational equity enabling the people to make best use of their capabilities.

It is in this light that new paradigm in development studies focuses on three attainments of life- income, education and health leading to freedom and dignity to mankind. Such studies, therefore, necessarily involve understanding of the complex interaction of man and nature in regional context. However, the existing models of development planning have been found to put disproportionate emphasis on economic aspects to attain the goal. In the process, resources are appropriated by powerful individual groups to the dismay of weaker sections of the society and against the principles of ecology. In short, leading to lopsided development and a feeling of marginalization by the people dissatisfaction and frustration, thus, generated alienate people from the main stream causing socio- political tensions that go against the very principle of development.

It is, therefore, considered essential to make analysis of developmental processes vis-à-vis spatio temporal organization of the physical environment, the economy and the people and their participation to obtain developmental goals on regional, national and international levels.

1.3. STUDY AREA.

Mizoram is located between 21˚56’ and 24˚31’ N latitudes and 92˚16’ – 93˚26’ E longitudes covering a geographical area of 21,087 sq. km. Geographically, it extends 285 km north to south and 115 km from east to west. It has a long, 123 km inter- state boundary with Assam to the north, 95 km with Manipur to the Northeast and 66 km with Tripura to the west. Besides, it shares 404 km of international border with Burma to the east and south, and 306 km border with Bangladesh to the west. Mizoram became one of the states of Indian Union in February 1987 under the Government of India Act 1935. Before it became a state, it was a Union Territory (1972-1987) and prior to that it had been a part of Assam as the Lushai Hills District.

On the whole, Mizoram has a rugged, mountainous terrain. Most of the ranges trend from north to south direction. The general elevation ranges from 40 metres at Bairabi in the north to 2157 metres at Phawngpui (also known as Blue Mountain) to the south. The eastern half of the state is higher in general relief with an average elevation of 1500 metres, and the slopes are steep. The western part, on the other hand, depicts the characteristic ridges and valleys type of topography with an average elevation of 700 metres.

Geologically, Mizoram consists of primarily, sandstone and shale, which was laid down in deltas or estuaries of large rivers that, discharge from the Himalayas during the tertiary period. The whole hill ranges of central and western part consists of sandstone of Miocene Period. The eastern part consists of shale and siltstone of Oligocene Period. In the Northeast, particularly Darzo Hills and Tuichawng, there are shales and mudstones. Relief and geology had considerably influenced the drainage pattern in the state. Most of

the drainage systems originate in the central part of the state and flow in the north south direction, being controlled by high parallel ranges. Trellis, dendritic and parallel patterns are important characteristic feature of drainage in the state. The rivers follow narrow valleys and form deep gorges, which in most cases are the physiographic expression of faults or other structural patterns. River Tlawng- the longest river in Mizoram (102 km), drains the northern part of the state. It originates in Zopui Hills at a height of about 1395m. The other important river is Tuirial (67 km) that flows to the Barak system in Cachar plains of Assam. Two large rivers, Chhimtuipui and Khawthlang tuipui drain the southern hills. River Chhimtuipui originates near Vamum of Myanmar at an altitude of 2325-m forming the international border with Myanmar. River Khawthlangtuipui originates at Saithah village forming international boundary with Bangladesh.

Mizoram enjoys a moderate climate. It is neither too hot nor too cold throughout the year. The average temperature during summer months varies between 21˚C to 31˚C. In winter months the temperature varies between 10˚C to 23˚C.It may be noted that sometime in March to April, when the low pressure developed over the Indian Sub-continent another 'Low' develops over the northern part of Myanmar. At this time a trough-line that passes through Allahabad- Agartala and Southern Assam becomes the line of attraction for the south westerly winds, during the pre-monsoon and monsoon periods. This brings a heavy downpour of rain and check the rise of the temperature in the summer months. The state receives an average annual rainfall of 2500mm during the summer months of May to October.

Mainly loose sedimentary rocks, such as shale, sandstone and mudstone have developed the soil of Mizoram. The soil has highly acidic. It is poor in potash and

phosphorous. The soil consists of silicate, aluminium oxides, which are reddish and yellow in colour. The soils of Mizoram can be divided into three types namely- (1) Entisols, which occur mainly on steep, eroded slopes and ridges,(2). Inceptisols occur mainly in sub-humid regions and (3) Utisols occur generally on the foothills zones.

The natural vegetation of Mizoram varies along the changes in elevation, rainfall and soil types. Forest covers around 17456.63 Sq.km (about 86.47 %) area of the state. The forests of the state can be classified into three types: Tropical evergreen forests, Tropical semi evergreen forest and Montane sub-tropical pine forest. Tropical evergreen forest is the most important forest in Mizoram. It is largely found in the western part and in the southern part of the state. Tropical semi evergreen forests are generally found in the northern part of the state, central highland and Eastern part of western slope. Montane sub-tropical pine forests are generally occur at higher elevation in the eastern part bordering Myanmar.

The Community Development Scheme that was implemented during the First Five Year Plan brought about tremendous change for improvement of livestock and poultry in the state. Induction of improved breed of pigs and poultry from outside the state was started to disseminate the better quality in Mizoram. Since then various developmental schemes and programmes have been undertaken in the successive five year plans and continue to be implemented by the state government which includes maintenance of 6 Livestock Feed and Fodder Farm, 7 Cattle Farm, 9 Piggery Development Farm, 9 Poultry Demonstration Farm, 1 Rabbit Farm, 1 Buffalo Breeding Farm, 1 Mithun Breeding Farm, 1 Goat Farm, 1 Key Village Centre, 50 Filed Artificial Insemination Centre, 1 Feed Mixing Mill, 1 Animal Feed Plant, and 2 Milk chilling Plant,

To provide animal health care, there are, at present, 5 Veterinary Hospital located at Aizawl, Lunglei, Champhai, Kolasib and Saiha. 31 Veterinary Dispensaries and 106 Rural Animal Health Centre. Besides these institutions, the state government is also maintaining 50 Centres of Artificial Insemination, 9 Animal Disease Surveillance Check Post, 2 Disease Investigation Laboratory and 1 Central Medicine and Vaccine Depot. During 2006 to 2007 1.18 lakh livestock and 1.02 lakh poultry were treated through Hospitals, Dispensary and Health Centres.

Out of the total geographical area of 2108.700 thousand hectares, the total cropped area account for 126.451 thousand hectares. The area cropped more than once account for 5.700 thousand hectares and the net sown area account for 122.000 thousand hectares of land. Land not available for cultivation such as land put to non- agricultural land and Barren land account for 134.030 thousand hectares of land. Other uncultivated land excluding fallow land account for 20.809 thousand hectares. Fallow land account for 238.161 thousand hectares. Net irrigated area account for 11.800 thousand hectares and gross irrigated area account for 16.360 thousand hectares of land. Agriculture provides work for 42.49 percent of the total work force in the state. The cultivators constitute 60.89 percent of the total main workers. Agricultural labourers account for 3.37 percent of the total workers, whereas the household industrial worker constituted only 1.25 percent.

The state of Mizoram ranks one of the lowest populated states of India. During 2001 census the total population of Mizoram was 8,88,573 person with density of 42 person per square kilometer. At the district level, Aizawl district accommodated the largest population with 325676 person followed by Lunglei district with 1,37,223 person, Champhai with 1,08,392 person, Lawngtlai with 73,620 person, Kolasib with 65,960

person, Mamit with 62,785 person Saiha with 61,056 person and Serchhip with 53,861 person. Aizawl district recorded the highest density with 91 person per square kilometre. The lowest density was found in Mamit district with only 21 person per square kilometre. In 2001 census, 52.57 percent of the population in the state has been classified as total workers whereas 40.79 percent as main workers and 11.78 percent as marginal workers. At the district level, the highest percentage of working population is found in Champhai district with 62.9 percent and the lowest is found in the southern corner district of Saiha with only 44.4 percent.

Mizoram is perhaps one of the few states of India that has conspicuous absence of any industries. There are various reason for it, lack of geological surveys and known economic minerals. In a developing economy mineral exploitation often is a starting point of industrial development, but there is little that is available in the recent deposits of Mizoram that can help metallurgical industries. However, the state has rich tradition in household and cottage industries.

1.4. SURVEY OF LITERATURE

The current study intends to analyze various facets of the state in its regional dimensions to identify the relatively poor regions as well as the reasons for their under-development. With the limited objective of the study, two sets of literatures have been pursued: (a) first those key studies referring to the identification of backward areas and, (b) Second, a limited number of geographical studies on Mizoram that have been carried out in recent times. The first study carried out to identify backward districts of India was by former Registrar General of Indian Census, Mitra (1967) in his study of regional

development (Ashok Mitra 1967). In this study he used 35 indicators of development, which were converted to ordinal scale (ranks) and composited to a single index (score) to indicate the relative levels of achievement and failures of each of the districts in India. The 260 districts he studied were classified into four quartile classes- districts featuring in the highest ranks were the least developed. This study inspired a deluge of studies at state, district, Tehsil, blocks or even village level studies using various statistical tools and techniques to identify regions that have performed better or worse. Principal among such studies are those of Dasgupta (1971), Pal (1975), Kundu (1974), Mohapatra (1980) and many others essentially at all India level.

K. Munirathna Naidu (1983) and J. Mishra and Chakradhar Sinha (1985) emphasized on operationalization of regional development planning in India. D. Dewan (1986) tried to evaluate the settlement policies with reference to regional development and attributed the disparities to such policies. L.S. Bhat (2003) attempted to suggest strategy for diffusion of development planning in India. Amivitia Mukherjee (1989) attempted to identify the bases for decentralization of development planning at district level and brought forth the significance of multi level planning in Indian context. M.B. Shankar Rao (1991) focused his attention on rural development and strategies thereof with stress on variables that provide the base for natural economy. Vyas (1991) in his study stressed on the reciprocal relationship that exists between expansion of social amenities and the level of development of a region. He attempted to list some core social amenities expansion of which may lead to better level of development. Thimmaiya (1994) similarly highlighted some of the pertinent issues that need to be taken care of as integral

part of the process of regional planning by the policy makers. Gulati (1996) attempted to suggest indices of development to be considered at district level and method of their integration to arrive at a composite index for regional planning. The study is an improvement over Kundu's two studies in 1974, (A.Kundu 1974) which used mostly economic indicators. Mallikarjun (2002) successfully analysed the intra- regional disparities, their cause and resolution taking into consideration mostly economic parameters in Andhra Pradesh. Rattan Lal Sharma, Jasbir Singh and Sher Singh Dhillion (1985) Carried out studies on Regional disparities in levels of diversification in rural economy in India. They found out that the level of diversification I rural economy is low and very low in major part of India. Pathak(1997) opines that economic backwardness in India is due ti limited dispersion and spread effects of industrial growth which turnout to be the main constraints. Nath (1998) also opines that unequal distribution of industries between states and regions have led to large difference in income, consumption and level of social development.

Studies on regional development of the northeast region of India are limited. One of the first studies was carried out by Munshi and Guha in a paper presented in a national seminar held in 1997, NEHU, Shillong. Mohapatra and Goel (1977) carried out another micro level study on regional development in the state of Meghalaya. This study was on a sub-district level that used principal component analysis for preparation of composite index. Kumar (2003) carried out a study to evaluate the resource bases of Mizoram on block level. He opines that most of the areas have disproportional distribution of resources bringing about a disparity in the level of regional development. Ray (2005) in his paper

presented in a seminar held in 2005, Mizoram University, Aizawl, states that Mizoram mostly depends on central assistance and fails miserably in expanding economic opportunities to the people.

Mizoram being a peripheral tribal area has remained neglected by scholars for a long time. Most of the literatures available are of historical and sociological interest. Further, little literature is available that provides window below the state or the district levels. The first studies on the Mizos were carried out by the Britishers, principally ethnographic accounts and subsequently by the missionaries on languages and culture of the people. Academic interest in the lives and the economy of the people are of recent origin, especially after the independence of the country. Prasad and Aggarwal (1991) attempted to trace the evolution and development of political and economic system in Mizoram. They believe that the process of development is inter-twined with the political development of the state. Singh in his published Doctoral Thesis (1994) has very lucidly discussed the evolution of contemporary socio-economic condition of Mizoram. An over view of the process of economic development and evolution of planning in context of Mizoram was the intent of the two books by Lianzela(1994& 1995). A greater insight in the process of development planning is however, provided by Prasad and Aggarwal(2003) in their edited volume " Modernization of Mizo society". The volume has also put forth certain problem that is faced by an emerging society from its primitivity. Most of the studies, however, address to the causes of underdevelopment and strategies for their resolution to have a balanced development.

1.5. AIMS AND OBJECTIVES

In the context of development, the concept of backward region, its identification and measure of the extent of backwardness needs to be understood carefully. Any strategy for the development of a backward region has to begin with the identification of regional units, mapping it in all possible details like its resource base, prevalent culture and value systems etc. Therefore, in order to achieve the objectives of promoting growth and to reduce regional disparities it is essential to identify regions according to their level of development.

The main objectives of the study are as follows:

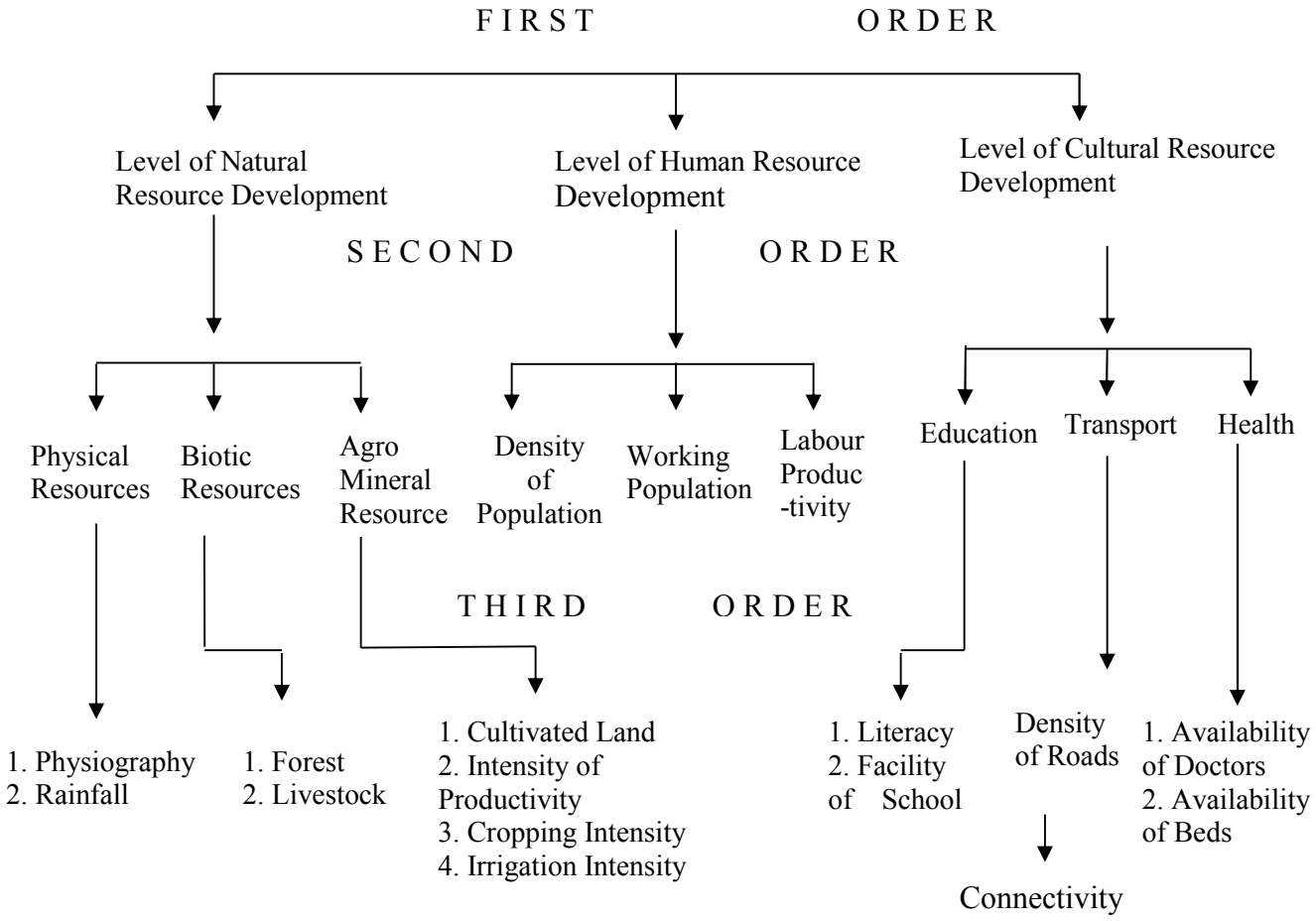
1. To identify the level of development.
2. To explain the causes of regional disparities.
3. To characterize the nature of regional disparities.

1.6. METHODOLOGY

The state of Mizoram is quite small in respect of area having only eight districts. Therefore, study on measurement of regional disparities at districts level may not lead to any meaningful conclusion. In this light, the study has been carried out at Rural Development block level. Development indicators have been assessed through certain representative parameters. An attempt has been made to formulate a composite index of development to facilitate comparison. It is expected to help in the identification of the areas where developmental processes need to be intensified.

In order to arrive at a composite development index, however it has been essential to evaluate the availability and distribution of different components of resource and their elements in the state as well as their useability under the existing socio- econo- political and technological conditions. Therefore, the level of development has been assessed with reference to the three major components and other sub- components of resources. For most part of the study, thus, a systematic approach has been adopted. The study involves work over three orders: before arriving at the first order of the study (levels of development); detailed investigation and analysis of the spatial distribution of major resource groups and the levels of their development (second order) as well as of their critical elements (third order) has been undertaken. The steps under the study (following Kumar. 1981) may, thus, be charted as (shown in chart over leaf).

LEVEL OF DEVELOPMENT



Thus, Natural resources derived from the physical and biotic conditions of the land; human resources derived from the population in the sense of man power and labour productivity and cultural resources derived from attitudes, objectives and technologies of the people (derived through surrogate measures) provides the basis of the present study.

Obviously, the work involves statistical operation in order to bring the resource factors of different character and their levels of development to statistically valid

numerical units. This is realized that in case of intangible aspects of resources measurement poses difficulties. Therefore, some selected surrogate but critical parameters of resources (third order elements) and the levels of their development in their areal distribution has been investigated.

Natural Resources

Natural resources, in any developing society are believed to form the basis of livelihood and sustenance more so in a predominantly agrarian society. Therefore, an attempt has been made to correlate the availability of the components of natural resources(which, for the purpose of the study, has been categorized in three groups- (i) physical, (ii) biotic, and (iii) Agro- Mineral resources and their elements(placed at third order) with R.D. Blocks as areal units.

Physical Resources

Physiography especially through its slope parameters is considered to be the most important factor impinging on the agricultural practices in developing regions. Therefore, an attempt has been made to find out different slope categories in different units of study and their suitability for agriculture. Slope categories have been obtained from the Mizoram Remote Sensing Application Center. Keeping in view the terranean attributes of the study area. It is believed that agricultural practices are much influenced by the supply and availability of moisture to the plants and soil. Therefore, rainfall has been considered as critical parameter of moisture supply. Thus, the availability of average rainfall in each block has been considered as a critical parameter.

Biotic Resources

The two elements of biotic resources: Forest and livestock, and their existing level of development has been assessed in relation to the area and the population. In order to bring parity amongst the different animals, it has been converted them into livestock units after Stamp (1960).

Total forest cover area for each block has been obtained in relation to the total land area of the enumeration units by calculating their areal percentage. Simple formula has been adopted:

$$\frac{F \times 100}{T}$$ where,

F = Forest land, and

T = Total land area of a unit

Thus, higher the percentages of forest cover, the higher the forest resources the units are believed to have.

Livestock resources:-

Livestock resource has also been studied in relation to population. As livestock represents a great range of animals in the state they have been converted into livestock units following Stamp (1960):

1. A horse, a cow, a bull, a bullock = 1.0 unit
2. A Calf = 0.5 unit
3. A ewe or ram = 0.14 unit
4. A broad sow = 0.2 unit
5. A fat pig = 0.1 unit
6. 100 Poultry = 1.0 unit

Thus, availability of higher unit per person is reflected in the ranking of blocks in this regard.

Agro- Mineral Resources

Agro- mineral resources have been assessed both in relation to land and population. However, In absence of any significant mineral resources in the state only agriculture in relation to the share of cultivated to cultivable land, per capita availability of cultivable land, intensity of cropping and productivity as well as irrigation intensity and the levels of their development in different blocks have been considered

Five parameters have been evaluated for agricultural resources. Share of cultivated land, intensity of productivity, intensity of cropping and irrigational intensity has been assessed to evaluated agricultural resources by using simple calculation.

For cultivated land, area of each block that has been used for cultivation of different crops has been added and subtracted from the total land area to work out the cultivated land. Blocks with higher cultivated land area have been considered more resourceful and ranked higher.

One of the most important method to measures the utilization of land resources in agriculture sector is through the intensity of cropping which is the ratio of gross cropped area to net sown area expressed in percentage. The higher the extent of area sown more than once the higher will be the index of intensity of cropping. Intensity of cropping has been work out as:

$$\frac{\text{Gross cropped area x 100}}{\text{Net sown area}}$$

This involves the computation of single and double crops. After area has been computed their efficiency has been calculated by multiplying areas under double crops by 100 percent, as they represent 100 percent efficiency over single cropped area.

Intensity of productivity has been calculated for each block by using simple formula. Production of single crop for each block has been divided by the total area of single crop cultivation. After all the crops production has been divided by the crop area. It has been added altogether to work out the intensity of productivity.

$$\frac{\text{Production of single crop}}{\text{Total area of single crop}}$$

Irrigation intensity has been calculated for each block in relation to total agricultural land area. It has been obtained by simple calculation by dividing the irrigated are by the total agricultural area.

$$\frac{\text{Irrigated area}}{\text{Total agricultural area of each block}}$$

Human Resources

Level of Human resource development has been examined with reference to the three major components- total population, working population and labour productivity in relation to land, availability and productive output respectively.

Three parameter has been used to assessed the human resources in the state. Density of population, working population and labour productivity have been evaluated in relation to either total land of each block, total population and total productivity of each block.

Density of population has been calculated in relation to total area of each block as density of population is measured as a number of people per unit area.

$$\frac{\text{Total population}}{\text{Total land area}}$$

Total number of population has been divided by the total land area of each block. The area with higher density of population has been ranked higher. Whereas, the working population has been evaluated in relation to total population of each block. similarly, the area with higher percentage of working population are supposed to have more asset, therefore, they have been ranked higher than those with lower working population.

Labour productivity has been evaluated in relation to total agricultural production of each block. Since other productions in the state are minimal and data for which are not available labour productivity has been calculated as:

$$\frac{\text{Total agricultural production}}{\text{Total main worker for each block}}$$

Cultural Resources

With growing emphasis on education and health, they have been calculated representatives of cultural resources, for, distribution of their intensity is believed to reflect acceptability by the people. Transport facilities, however, much depends on the terranean as well as the economic attributes of an area. Therefore, they are evaluated in terms of their availability per unit areas as well as in respect of persons served by them. Education and Health parameters have been studied in relation to availability of facilities to the relevant population in each unit to find out and compare their levels of development.

Three parameters have been studied to evaluate the cultural resources in the state. It includes a study on education, transport and health resources that have been correlated with their critical factors.

Education

In education, three factors of literacy, availability of school and availability of teacher in the school have been considered in the present study. Literacy percentage has been computed in relation to the total population of the enumeration block as:

$$\frac{\text{Literate population}}{\text{Total population}} \times 100$$

Another index of educational resources is the study of school per 500 students which have been evaluated in relation to the total number of students in each block. For this purpose, all the educational institution as surveyed by the State Education Department 2006 has been considered. The standing of each unit has been calculated as:

$$\frac{\text{No. of educational institution} \times 500}{\text{Total no. of Students}}$$

Thus, more the availability of educational institution per 500, more resourceful the unit has been considered.

Teachers per 500 students have been computed in relation to the number of students. The number of school going children has been gathered from the survey conducted by the Education Department 2006. In this regard, simple arithmetic has been employed as:

$$\frac{\text{Total no. of teachers} \times 500}{\text{Total no. of students}}$$

Higher the ratio, more resourceful and higher the ranking has been considered.

Transport

Transport resources have been evaluated by calculating density of roads and roads in relation to the number of population. Total road length of all types of National highway, State highway, District roads, Village roads and town roads has been assessed in the present study.

Density of roads has been calculated in relation to total land area of each block and divided by 100 square kilometer. The calculation of road density for each block has been computed as:

$$\frac{\text{Total length of road} \times \text{100 square kilometer}}{\text{Total land area}}$$

Another index of transport resources is the roads per one lakh population. For this purpose, the study has been done in relation to the total number of population of each block. The study has been computed as:

$$\frac{\text{Total length of road} \times 100000 \text{ populations}}{\text{Total number of population}}$$

Blocks which have higher density of roads and roads per one lakh population have been ranked higher and are thought to be more resourceful than other blocks.

Health resources

Two parameters have been taken to study the health resources for each block i.e., availability of doctors in the block and availability of hospital beds in the blocks. These two parameters have been evaluated in relation to the total number of population in each block.

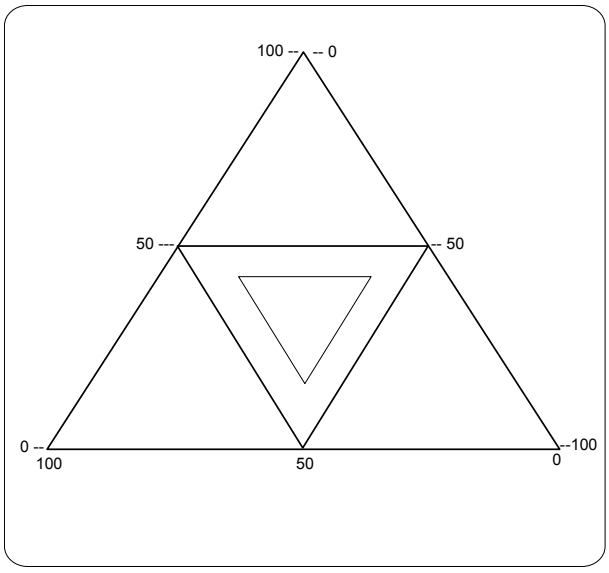
Doctors per 500 population for each block has been computed in relation to the total number of population as:

$$\frac{\text{No. of doctors} \times 500}{\text{Total no. of population}}$$

Similarly, the number of hospital beds per 500 population has also been computed in relation to the total number of population of each block as:

$$\frac{\text{No. of hospital beds} \times 500}{\text{Total no. of population}}$$

The variables of the third order have been integrated using Z- Score to form the second order components of resources. They have been differentiated by the variable rankings at block level and which following Dickinson (1973) may be represented on a triangular graph (a kind of super imposition) to differentiate areas with different levels of development as shown in figure below.



After arriving at the distribution status of different elements of resource an attempt has been made to derive the position of 22 RD blocks in Mizoram in respect of the use and availability of three components of development. As these components are studied with respect to a number of indicators for example, physical resource being evaluated on the basis of 8 indicators, human resources on the basis of 3 indicators and cultural resources on the basis of 7 indicators. They required different measurement units. For example, in case of physical resources, while cultivable area has been measured in hectares, total

annual rainfall is measured in centimeters. Therefore, it has been difficult to compare variables directly to obtain the position of different RD blocks on selected parameters. In order to compare the position of different RD blocks, therefore, it was required to have unit free measurement (or pure number). Hence, Z-Score method has been adopted which assures simplicity in calculation and interpretation.

Z-Score is defined as the deviation of observation from its mean divided by the corresponding standard deviation. Symbolically, it represent:

$$Z = \frac{X - \mu}{\sigma} \qquad (1)$$

Where μ is the mean and σ is the standard deviation. Z-score, by definition, is a pure number, which can be used for the comparison of different variables with different measurement units. After calculating Z-score for two or more variables, one, further, needs composite score to evaluate the overall performance. In this case, it is suggested to add scores on different variables to obtain composite score (Jeromy Anglim's Blog. 2009). In this study, thus the sum of z-score from different variables represent the overall performance of different RD blocks in Mizoram.

In addition to the ranking of different RD blocks according to their performances on the indices, relationship between the major variables or indicators (namely, natural resources, human resources and cultural resources) has been established. The analysis is expected to provide the information on the interdependence of different components of resource in Mizoram. To examine these relationships, Spearman's rank correlation method has been adopted and which may be defined symbolically by

$$r = 1 - \frac{6\sum d_j^2}{n(n^2 - 1)} \qquad (2)$$

Where d_j is the difference between the ranking of two indicators. The statistical significance of the rank correlation has been tested by comparing the calculated value and the table value (Kothari, 2008). If the calculated value is higher than table value, there is significant rank correlation between the two indicators, and insignificant otherwise.

To test if there is any discrepancy on the performances of different blocks with respect to the three major indicators, viz, natural resources, human resources and cultural resources, Kendall's Coefficient of Concordance (Kothari, 2008 Ibid) method has been adopted. Kendall's coefficient of concordance (W) is defined as

$$W = \frac{s}{\frac{1}{12}k^2(N^2 - N)} \qquad (2)$$

Where

$s = \sum (R_j - \overline{R_j})^2$, k = number of sets of rankings, N= number of object ranked.

The statistic being used to test the significance of Kendall Coefficients is defined by

$$\chi^2 = k(N-1)W \qquad (3)$$

which follows chi-square distribution with N-1 degrees of freedom. If the calculated W is not statistically significant it indicates that different RD blocks under study have different performances on the three major indicators, if W is not significant it indicate there is no significant relationship between the three indicators. On the other hand, if W is

significant, we say there is a significant relationship between the performances of different blocks on the selected indicators.

After computation of Z- score, blocks have been ranked on each parameter. Thereafter, percentage of each category in relation to total of that resource has been calculated. For example, if the average rankings for physical, biotic and agro resources in Tlangnuam block are 10, 11 and 14 respectively, a total of these rankings i.e., 35 is assumed to represent 100 percent natural resources in the block. After their percentage values have been calculated, they have been plotted on a triangular graph. Advantage of plotting the three variables on triangular graph lies in the fact that they can proportionately be represented by only one point. The same process has been followed for all the blocks and all the three group of major resources. When plotted on a triangular graph, the standing of different units with regard to different resource categories and also in relation to each other is obtained.

It also reflects the association of different components of resource in each unit under study. After resource association regions of second order has been obtained, a quartile class has been worked out to find out the level of development for each block on the basis of Z- score. Quartile classes have been identified by using mean and standard deviation. Thus, the blocks having above mean + 1SD have been classified as Developed followed by between mean + (1SD) as developing and below mean as underdeveloped.

For final composite resource region, the same process has been repeated to obtain a composite resource region. After final composite resource region has been obtained each block has been evaluated to find out their standing in respect of available resources. In order to find out the level of development of blocks their scores on different variables have

been integrated to obtain a composite score which may reflect their level of development within the state of Mizoram.

1.7. DATA:

The study has been conducted at the block level. A total of 18 indicators have been selected that help in identifying the resources association region as well as the existing level of development for each block. The data as is evident from the nature of the study have been collected from various sources and include both published and unpublished reports, census data, and government publication.

Data regarding the slope of the land for each block has been obtained from Mizoram Remote Sensing Application Center, Government of Mizoram. Data on rainfall for 28 years were collected for most part of the state, from Directorate of Agriculture (Crop Husbandry) Mizoram, Aizawl and from the Directorate of Economic and Statistics, Government of Mizoram. In this regard, rainfall data were collected from 25 Rain gauge stations spread throughout the state. As a matter of fact, all the block headquarters are supposed to have the facilities to record at least rainfall data, but so far no serious attempt has been made in this direction. Data on livestock were collected from Directorate of Animal Husbandry and Veterinary and information on forest cover were collected from Department of Environment and Forest, government of Mizoram.

Similarly, data on components of human resource such as Population and working population have been collected from Village Level Statistics (Rural Development Block) which is published by the Directorate of Economic and Statistic Department government of Mizoram. Similarly, data on educational facilities i.e., number of students

from Primary school to University level; number of teachers and the number of educational institution have been collected from the Directorate of Education, Government of Mizoram. Information about the availability of roads suggesting transport facilities have been gathered from Public Works Department as well as from Economic Survey 2006 published by Planning and Programme Implementation Department, Government of Mizoram. The number of hospital beds and doctors availability has been collected from the Health Directorate, Government of Mizoram.

Collections of data in a state like Mizoram have presented much difficulty, especially at the block level. Most of the Census report and report published by the government are mostly available only at district level. Besides this, the number of blocks and district has increased recently. Therefore, most of the data has been adjusted accordingly to area and population of newly form blocks and districts. Apart from this, most of the data for agriculture in the state have been compiled only at the district level. This has posed difficulty in the collection of data for agriculture. As a result, data on agricultural aspects needed to be collected from the block headquarters. As such, data for agricultural resources that include information about intensity of cropping, intensity of productivity and intensity of irrigation have been collected from the block headquarters.

CHAPTER II

NATURAL RESOURCE EVALUATION

CHAPTER – 2

NATURAL RESOURCE EVALUATION

Natural resources like land, water, and forests, mineral etc. provide a comparative advantage to a region in what people can do- an advantage over other regions in terms of abundance of factors inputs in the process of creating wealth. If a region has abundance of certain natural resources, then their supply make them cheaper as factors inputs and close availability makes the transport cost cheaper vis-à-vis another region that has to import them over long distances. Natural resources is something found by man in his natural environment that is some way is of utility to man. Studies of natural resources have been made largely by the economist and geographers as it deals with man, searching for means to attain given ends (such as the satisfaction of individual wants and the attainment of group or social activities) and nature. So it can be said that those aspects of nature which satisfied and utilized by man in own needs can be termed as natural resources. Natural resources is anything needed by an organism or group of organism (Trivedi, 2004). It includes all materials that are obtained by human beings from the physical and environment of this planet for fulfilling its needs (Khoshoo and Manju Sharma, 1992). In this light, natural resources may be defined as those aspects of man's physical world, which have been influencing the days of his evolution and on what man depended to draw support and maintenance of his life. Zimmermann also observes almost the same thing when he says "those aspect of nature which man can utilize in the satisfaction of his creature wants (without contribution made by man) may be called natural

resources" (Zimmermann, 1946). Broek though gives little wider meaning to natural resources also defined it as "an element or property of the earth that is useful to man" (Broek, 1973: 33). His definitions which point out the 'Property of the earth' clearly suggest that there is a complex interaction between human need and level of his technology. Thus he does not assign any individuality of natural resources.

In this regard it appears very correct when Zimmermann (Zimmermann, op. cit., :8) recognizes two level of man- man on the animal level 'constituting the part of the nature' and MAN on 'Supra- animal' level representing the counterpart of the nature. Man in his primitivity is capable to draw support directly from nature by virtue of his nature i.e., 'his creature wants and his native abilities'. Zimmermann, however, does not seem to give due share to the natural environment in his definition which has been influencing mankind since the earliest time, of course, while discussing the relationship between human culture and natural resources, he admits the influence of nature on culture. But he does not recognize certain aspects of nature as resources. In this regard Dasgupta also defined natural resources as "an assets gifted by the nature and hence assets not produced by man and from the counting point of view they are divided into two categories – non produced economic assets and other non- produced environmental assets. Non produced economic assets include assets over which ownership rights are enforced and which provide economic benefits to their owners, for example, land, land underlying buildings and structures, land under cultivation, recreational land, associated surface water, sub soil assets (coal, oil and natural gas reserves, fossils, etc.) metallic and non metallic mineral reserves, improvement of land, reforestation, forests, oceans, rivers and lakes used for economic purposes, and so on. Other non produced environmental assets include air,

ocean, rivers, lakes, wild species, wild biota, forests, land in wilderness, infertile soil, mountains, and so on, which are not used for economic purposes**"**(Dasgupta, 2005). Dasgupta non produced environmental assets does not apprehended nature as resources. But no doubt "nature sets the limit within which man can develop his arts to satisfy his wants" (Zimmerman, 1946 ibid.,:11-12). But it is little more than that. Man in his primitive stage drew 'aid and support' directly from certain natural phenomenon. Hence as man is recognized on two levels, natural resources should also classified into two categories – mentifacts and artifacts (Hagget.1975:238-239). Those resources which have been influencing man and which even primitive man by virtue of his natural abilities has been able to exploit may be classified as 'mentifact natural resources' as they are more abstract and mental, such as climate, physiography and location. On the other hand, those natural resources which are exposed to natural resistances and which may be exploited by, what Zimmermann calls Man, may be grouped under 'artifact' or 'derived natural resources' such as agriculture and minerals resources.

Climate may be considered as one of the resource because of the fact that, areas which have favourable climate is suitable for human settlement. On the other hand, even in the present world areas with extreme climate were never considered as favourable abode of mankind. But the settlement of Red Indians in the mountain of North America, Bushman of Kalahari and aborigines of Australia are not by their selection. They have been compelled to close themselves against the invading civilized group.

Climate play a dominant role since the evolution of mankind on the earth and more so in the early stage of civilization. Beside the direct effect on climate on man there has been indirect effect of climate. The abundance growth of vegetation on the past which

shows the suitability for agriculture in association with the soil over the parts of the globe has been a direct result of climate. At present, in developed countries, it may be difficult to recognized the importance of climate and soil when man is probably reaching the highest ladder of civilization, but there is no denying the fact that there have been stages, which still prevail in some part of the world, when all environmental factors was probably the final.

Similarly, some early permanent settlements are found in the bank of rivers, it was just only water which draws mans toward them. These settlements were certainly affected by the layout of the land. Agriculture and other developments have been the after effects of those permanent settlements. On the contrary, some hill tribes, in spite of all the physical terrain sticked themselves on the top of the hills for security reason. This is enough to reveal the importance of structure and relief as resource. At the same time this hill tribe had very little to do to derived these resources. As such they are basically forest dwellers and from the pre historic age, they have been found to live as a close component of natural resources particularly to forest ecosystem as forest satisfy a great range of human needs which vary from tangible raw materials to intangible environmental benefits. With the advancement in science and technology man's capacity of appraising his environment has increased enormously. Demand increases and man modify some of the environmental factors and recognized certain alternatives which nature provides. In this case, even in this technological age, the capacity to convert environmental factors is not the same in developing and developed countries. Man, however, has 'emancipated himself from the passive adaptation and natural selection (Zimmermann; 1946.op. cit.,:9) but this is not true in the case of developing countries. Even if they want to emancipate from the

dictate of nature they are unable to do so for want of necessary economic base and aid of cultural heritage. They do not have much of a choice but to be guided by the dictate of the environmental factors or 'mentifacto' natural resources and which knowingly or unknowingly would be useful, thus resource, to them.

'Artifact' natural resources on the other hand, reflect a broadening gap between physical environment factors and man's knowledge and technical skill which he has to utilize in order to extract something useful from nature. In the process he has to overcome 'resistence' put by nature. Such natural resources thus may be utilized but by Man.

Most of the resource geographer while classifying the natural resources have ignored one aspect in particular i.e., abstract natural resources. For example, when Zimmermann classifies natural resources as 'flow' and 'fund' resources (Zimmermann,1946. ibid.,:82), he ignored the abstract resources though he admits their influence on 'MAN' and man's dependence on them. His flow resources are those which either regenerate themselves or may be regenerated provided natural resources are not disturbed. He thus cited example of water power and soil and forest resources which in normal circumstances regenerate and become more or less a permanent assets to mankind. On the other hand, he subgroup fund resources as exhaustible and inexhaustible. Exhaustible fund resources are destroyed after use, as for example, coal. Inexhaustible fund resources are not destroyed and may be reused in one form or the other i.e., iron which may be used again and again in one form or the other, constitute almost a permanent resource to man.

Hagget classifies natural resources into three categories as non- renewable, renewable and others (Hagget:op.cit.1972:194) His non renewable resources are identical

to Zimmermann's fund resources. With regard to renewable resources he again follows Zimmermann and simply elaborates his classification of flow resources. He include one more category of resources as 'others', he assigns resource ship to some abstraction of nature like sceneries. Thus, it appears that Hagget also does not give due importance to the physical environment of man which have been affecting man since the time immemorial. In this regard, however, Joerg's (Joerg's 1935) classification which includes two of Zimmermann classification- flow and fund resources- also take into account the influence of man's physical world in regional context. He thus observes "elements of climate and the nature of terrain including the geological information provide a fairly permanent geographical base to a region and they are either an asset or act as a hindrance for resources regeneration and their use"(Joerg's.1935.Ibid,:177-208). He classifies natural resources, therefore as immutable resources which influence man and his physical environment and flow resources and fund resources.

It appears thus, that though there is no dispute as to the classification of resources as fund and flow there are other aspects of disagreement amongst the resource geographers. One cannot rule out the significance of unmutable resources. Similarly, with the growth of tourism one cannot over look the 'others' natural resources.

This necessitates a new classification of natural resources which may accommodate the classification suggested by Zimmermann(1946), Hagget(1972) and Joerg(1935). Thus four categories of natural resources may be recognized.

1. Immutable Resources
2. Flow Resources
3. Fund Resources and

4. Other Resources

1. Immutable Resources:-

   Immutable resources may be defined as those aspects of nature which are available to mankind as free gift and have been influencing the socio- economic behavior of man. They may thus include climate, topography and geological formations.

2. Flow Resources:-

   These resources which may regenerate and will be available to man for use beyond a doubt of exhaustibility (provided ecological processes are not disturbed)may be classified as flow resources such as water, soil and vegetation.

3. Fund Resources:-

   Fund resources may be recognized as the most specific of natural resources which might be available to man under a specific technology. They are limited in their regional occurrences hence are subject to exhaustion. Of course, some of them may be available for recycling for considerable period of time in different forms.

4. Other Resources:-

   Those aspects of nature which are not really substantial but help man to get respite from hid day to day work and help increase his efficiency. Therefore, scenic beauty, to cite Hagget, physical suitability of a place for health resort, or games and sports like water and ice skiing may be included in this group. Such resources though may form a substantial economic base of a place or a region, are however, difficult to assess as they are out and out abstract.

All the natural resources in their totality similarly are difficult to be evaluated on a regional level, as most often information are not available for smaller units. Therefore, some critical and representative components of natural resources should be selected for appraisal and evaluation. Thus, for the purpose of the present study slopes of the land, hydrography, forest, livestock and agriculture in that order, have been taken as critical parameters for evaluating the natural resources of the state of Mizoram.

The elements of natural resources may, however, be classified in three categories : (a). Physical resources including physiography and rainfall; (b). biotic resources consisting of forest and livestock; and (c). agro- mineral resources representing cultivated land, intensity of productivity, cropping intensity, irrigation intensity and mineral availability in relation to the available area.

PHYSICAL RESOURCES

2.1. PHYSIOGRAPHY

Mizoram has a broadly north- south alignment of tertiary hill ranges in a parallel series. In fact, these parallel ranges are not continuous; rather these are broken into innumerable small hills with sharp and pointed hill tops. The hill ranges are separated by deep narrow gorges and valleys and are characterised by a declining elevation from east to west. The hills are very steep and more so on the western side of the ranges. Sialkal range located on the north east along the border of Manipur and Myannmar has an average height of above 1500 metres. The highest peak of this range is called Lengteng with a height of 2149 metres followed by Nauzuarzo (2141 metres) and Sur (2018 metres).

Sialkal range is seperated from central Mizoram range of Chalfilh (1905 metres) and Tawi (1889 metres) range by Mawmrang range and by narrow and small river valleys of Tuival in the north and Tuipui river in the south. Other notable ranges are Hmuifang range in the central part of the region, and Reiek range in the west of Aizawl. The highest peak of Mizoram Phawngpui tlang (2187 metres) also known as Blue Mountain is located in the southern extension of Chalfilh and Tawi ranges in the district of Chhimtuipui. In general, the hill ranges towards the east are higher than those towards the west. The hills of southern parts are generally smaller and more fragmented by small brook than those in the north.

Further westward, the region depicts ridge and valley type of topography. The relief in this region varies from 40 metres to 1550 metres with an average elevation of 700 metres. Along the border of Tripura and Bangladesh the average elevation stood at below 300 metres from the mean sea level and rises to more than 600 metres towards the east. The hill ranges in the western province is higher in the middle and taper off at both ends in the north and south. Important hill ranges in the western province such as the Mamit and Hachhek ranges merge with the intermontane valleys between the Lushai hills in the east and Chittagong hill tracts in the west.

In Mizoram topography definitely plays a dominant role in all facets of life. Therefore a study of topography, especially with regard to the slope, is of utmost significance. The study of slopes provide information not only about the variety of topographical features but makes available also the evidences needed for interpretation of complex form of landscape. “Slope represents one of the most important elements of land surface. Analysis of slope is a prerequisite for land classification on the basis of land use

capability. Any good use of land needs the knowledge of slope characteristics of the terrain. Slope plays an important role in the evolution of a particular land use pattern thereby representing the direct relationship between slope characteristics and land use components" (Sarmah and A.K.Bora, 1995:13).

The value of slopes in Mizoram can be categories on the basis of its rank as most of the fertile soils occupied the lower slopes. The areal distributions of these categories are largely a functional of the attitudinal and structural characteristics of the area. In general, the inclination of slopes increases from the middle towards north and south. The highest inclination of terrain is associated with high altitude areas. The declivity of slopes on different rocks depends on the rock character and the rate at which the material is denuded. Soft and less resistant rock have generally given rise to depressions, while the highly resistant rocks have formed ridge, crest, spurs and other projections. The resistant rocks with narrow divides present high degree of slopes but areas with wider divides and softer rocks are occupied generally by lower slopes categories.

The whole area of Mizoram is built of tertiary sediments spread up in four distinct series viz; Barial of Oligocene, Surma of Oligo- Miocene with upper to lower Bhuban formation, Surma group of Mio- Pliocene with Bokabil formation and recent Pleistocene of Alluvium formation. The slopes map of Mizoram shows that the Barail series are invariably associated with steep slopes. These are found in the eastern part of the state. The overall relief in the eastern part is higher than the western part. The western part depicts characteristic ridge and valley type of topography and is very low in the western part bordering Tripura and Bangladesh. Out of 2108700 hectares of land 49231.45

hectares are below 15 percent of slope. The rest 2059468.55 hectares of land are not taken into consideration into slope category as it is not suitable for the cultivation.

The slope category of 0- 3 percent cover 1721.68 hectares of land (Appendix- I). In percentage it is only 0.08 percent from the total land area of Mizoram. These slope categories are found in a small patches lying in the midst of hills and narrow valleys. They are intermontane valley plains probably of post Pleistocene lacustrine origin. The largest of these plains is Champhai plain, situated in Khawzawl block on the eastern border of the state. It has a length of 11 kms and at the widest part it is nearly 5 kms. Tuisenhnar is another plain located at the same block in the vicinity of the Khawzawl village itself. The second largest plain is Tuiphai in North Vanlaiphai is located in the south eastern corner of Serchhip block. The plain is 9 km long with 1 km wide. Thenzawl plain located in the same block of Serchhip and Chamdur plains in the south western part of Mizoram in Chawngte block is another important plain. Beside these plains, the whole of western part bordering Bangladesh and Tripura, the northern boundary with Cachar district of Assam have a few flat patches of plain area with a height of 300 metres from the mean sea level. Other small areas of plain are Zawlpui in the Mat river valley, Phaisen and Chhimluang to the west of Bilkhawthlir and Hortoki and Bairabi along the river Tlawng of Thingdawl block. Most of these small flat patches are under wet rice cultivation with the only exception of Chamdur plains which is still thickly forested with a very small population in the region.

The slope category of 3- 10 percent slope cover 9619.15 hectares of land which is 0.46 percent from the total area of Mizoram. The largest area in this category is 2766.52 hectares in Thingdawl block located in the northern part of Mizoram. The slope categories of 10- 15 percent are found in the close vicinity of 3- 10 percent. It covers 1.80 percent from the total land area of the state. The largest area under 10- 15% of slope are found in the block of Darlawn which is located in the north eastern part of Mizoram bordering Myanmar.

Blocks which have large area under cultivable slopes from 0- 15 percent are Thingdawl with an area under cultivable slope percentage of 8.35 percent and ranked first in the index (See Appendix- I) followed second by Reiek block with 5.52 percent, Chawngte block with 4.69 percent, Zawlnuam block 3.73 percent, Lawngtlai and Tlangnuam with 3.7 percent each, W.Phaileng block 2.89 percent, Serchhip block 2.69 percent, Lungsen block 2.17 percent, Khawzawl block 1.78 percent, Aibawk block 1.76 percent, Bunghmun and Ngopa blocks 1.06 percent each, Tuipang block 1 percent, Khawbung block 0.87 percent, E.Lungdar block 0.57 percent, Lunglei block 0.27 percent, Thingsulthliah block 0.22 percent, Phullen block 0.17 percent and Darlawn block with 0.8 percent.

2.2. RAINFALL

Rainfall of the state is a direct reflection of climatic conditions. The streams have a definite bearing on the ruggedness and slope development of the terrain and hence on Mizo life. Moreover, with the development of agriculture, consciousness about the utility of power and the need to harvest fresh water for drinking purposes and develop riverian

fauna, the streams and their morphological characters are assuming new dimensions in the state economy.

The state is endowed by several short lived streams and few perennial streams. The streams rise and fall with the change in season. They are generally developed and controlled by the rugged landscape. The surface run off due to seasonal variation influences much the soil and vegetation cover in the state.

The mountain in the state that runs from north to south direction acts as a water divide and developed deep gorges and valley between the ranges forming 'trellis type' of drainage pattern in the region. As the drainage is controlled by north to south alignment of parallel mountain ranges, the streams of fourth and fifth order shows 'dendretic' as well as 'parallel' drainage pattern in which elongated and parallel running streams join the master stream orthogonically.

One characteristic feature of the stream in the state is that about 13 major stream originated from the central highland. The streams flow either north or south direction following the north to south alignment of the parallel mountain ranges. About 10 streams flow in the northern part of the state and 3 towards the south. River tlawng (also known as Dhaleswari in Cachar district of Assam), Tiau, Tuichawng, Tuirial, Tuichang, Tuipui, Tuivawl, Teirei, Tuirini and Serlui flow toward the north and join Barak river in Cachar district. River Chhimtuipui, Khawthlangtuipui and river Mat flows toward the south.

River Tlawng is the longest river in the state measuring 102 km inside the region. It is originated from Zopui hills in Lunglei district. It is joined by its tributaries river Tut and river Teirei from the western bank. River Tuirial is another important river in Mizoram. It flows toward the north to join Barak River in Assam. It is joined by Tuirini from the

eastern bank after flowing Parallel with Tuirial for about 29 kilometers. River Tuivawl is an important river that drains the north eastern part of the state. It meet its tributary Tuivai river at the state boundary and confluenced with Barak river. Tiau river drains eastern part of the state bordering Mizoram and Myannmar. After confluence with the main tributary, River Tuipui, it meets River Chimtuipui in an opposite direction. The biggest river, Chhimtuipui river, drains the south eastern part of the state. It originates in Myannmar and enters Mizoram near Sebawngte village in the southern eastern part of the state. It flows northward and meet Tuichang river from where it deflect southward. It is confluent by river Mat and flows directly toward the southern part of the state. Another important drainage system is Khawthlangtuipui. It drains the whole south western part of the state and enters Bangladesh through Tlabung village. It has several tributaries such as River Kawrpui, Tuichawng, Phairuang, Kau and De rivers. Khawtlangtuipui and Tlawng rivers are the two important navigable river and serves as a useful transport route in the state. All these rivers and many small streams and rivulets which may be tributaries to them or some other rivers outside the boundary of Mizoram, form a distinct basins.

These rivers received water from the south west monsoon that visited the state during the summer seasons. The rainy season starts from late April till the end of October. The average summer rainfall is 324 cm. The total annual rainfall is 354 cm. The rainfall however is not equally distributed in the state. The highest and the largest amount of rainfall of 65 percent is received when the state falls under the direct influence of maritime tropical air masses which is brought by the South West monsoon. Most of the central highland received rainfall ranging from 300-500cm. The other regions bordering Myanmar, Tripura, Assam and Bangladesh received 100- 300 cms.

The onset of North east monsoon and winter season that extend from November gives a small amount of rainfall to wet the land suitable for winter crops and the land to escape from harsh dry climatic conditions. The average winter rainfall is 14 cm. the largest amount of winter rainfall confined mostly from the central highland towards the western part.

Rainfall in the state is not equally distributed which may be attributed to physiography as well as its location. The highest rainfall is found in Aibawk block located in the central part of the state with average rainfall of 760cm (Appendix- II). The lowest rainfall is found in the block of Bunghmun. This block is located in the eastern part of the state and fall in the rain shadow of Tripura and Bangladesh. Its low altitude then the rest of the region and its location in the rain shadow areas may be attributed to very low rainfall. The southern part of Mizoram received more than 300cm of rainfall. This region covers the block of Tuipang, Lawngtlai, Chawngte, Sangau, Lunglei and Hnahthial block. Blocks receiving more than 400cm of rainfall in the northern part cover the block of Aibawk, Tlangnuam, Thingdawl and Serchhip. These regions are located in the central highland of Mizoram. Another important feature is that blocks located in the eastern part bordering Bangladesh and Tripura such as Zawlnuam, W. Phaileng, Bunghmun and Lungsen have low amount of rainfall. This shows that Physiographic play an important role in the amount of rainfall distribution in Mizoram.

BIOTIC RESOURCES

2.3. FOREST RESOURCES

The state of Mizoram despite indiscriminate felling of trees is still richly endowed with forest cover. Out of the total geographical area of 21,087 Sq.km forest and tree cover 17456.63 Sq.km which account for 82.39 percent. Forest alone covers 18,430 Sq.km which is 87.42 percent. Very dense forest cover 84 Sq.km (0.39%), moderately dense forest cover 7,404 Sq.km (35.12%) and open forest cover 10,942 Sq.km (51.90%). Tree cover only 130 Sq.km which is 0.16 percent of the total geographical area of the state. The total Recorded Forest Area covers 16,717 Sq.km which account for 79.30 percent. Out of the Recorded Forest Area, Reserved Forest covers 7,909 Sq.km, Protected Forest cover 3,568 Sq.km and Unclassed forest cover 5,240 Sq.km.

The high incidence of forest cover in Mizoram may be attributed to three tier management of its forest resources as they are owned and controlled by the state, district councils and village councils at different levels. The forest of Mizoram may be classified into the following three categories.

(i). Tropical Wet Evergreen Forest.

The most important of the forest type in the state, tropical wet evergreen forests largely occur in the south and western side of Mizoram bordering Bangladesh, Tripura and Assam. Important valuable timber species like Dipterocarpus turbinatus (Lawngthing), Artocarpus chaplasha (Tatkawng), Terminalia maryocarpa (Char), Callophyllum pollyanthum (Sentezel), Mesua ferrea (Herhse), Amoora wallichi (Sahatah), Michelia champaca (Ngiau), Dipterocarpus macrocarpus (Thingsen), Terminalia chebula (Reraw),

Daubanga sonneratioides (Zuang), Syzyzium cumini (Lenhmui), Cinnamomumverum (Thakthing) and Cinnamomum (Tejpata) etc are common in these forest.

(ii). Tropical Semi Evergreen and Moist Deciduous Forest.

These forests are found in the central part of the state, north western and northern part covering from Chhimtuipui in the south to Manipur border in the north. Important species in these forest include Michelia champaca (Ngiau), Schima wallichi (Khiang), Gmelina arborea (Thlanvawng), Toona Ciliata (Teipui), Chukrassia tabularizes (Zawngtei), Stercullia villosa (Khaupui), Stercullia colarata (Khaupui), Podocurpus nerifolia (Tufar), Adina cordofolia (Lungkhup) Bombax ceiba (Phunchawng), etc.

In drier part of wet evergreen and semi evergreen forests, deciduous trees predominate and cover the region by species like Juglans regia (Khawkherh), Emblica officinallis (Sunhlu), Castanopsis tribuloides (Thingsia), Sapium baccatum (Thingvawkpui), Albizia procera (Kangtek), etc.

(iii). Montane Sub Tropical Pine Forest.

These forests are found in the eastern part of the state bordering Myannmar. They are common at higher altitude where the climate is relatively cool with decreasing amount of rainfall. Common species in these forests are Pinus keseya (Far), Quercus incana (Phen), Quercus serrata ((Sasawthing), Schima wallichi (Khiang), Prunus cerasoides (Tlaizawng), Myrica (Keifang), Rhododendron (Chhawkhlei), Clerodendron colebrookianum (Phuihnam).etc

It is important to mention that Mizoram has abundant bamboo resources. Bamboo forests cover 12.54 million hectares (57.8% of total area) in the state. It is most abundant in the northern part of the region. Most of the bamboos are found between 400 to 1500

meters. A total of 20 species of bamboo have been recorded in the forest of Mizoram such as Melocanna baccifera (Mautak), Dendrocalamus longispathus (Rawnal), Sephalostachyum capitatum (Rawnal), Oxytenhtara capitatum (Rawthing), Bambusa tulda (Rawthing), Dendrocalamus hamiltoni (Phulrua), Dendrocalamus giganteus (Rawpui), Dendrocalamus hookeris (Lawlak/ Rawkhauh), Dendrocalamus sikkimensis (Rawmi), Dendrocalamus strictus (Tursing), Bambusa vulgaris (Vairua), Arundinaria callosa (Phar), Bambusa arundinacea (Rua), Bambusa oliveriena (Talan), Bambusa Khasiana (Rawte/Chalte), Cephalostachyum fuschianum (Rawngal), Chimonobambusa khasiana (Naka), Melocalamus compactiflorus (Sairil), Neohouzeua dulloa (Rawtha) and Pseudostachyum polymorphum (Chal). Melocanna baccifera is the predominant species and occupies 95 percent of the bamboo-afforested land in the state. At present 30 percent of the forest department income comes from bamboo. They grow as understorey plants in deciduous and evergreen forest, along riverbanks, in and around villages and as dominant secondary vegetation on abandoned jhumlands.

At the block level the largest area of forest cover is found in the block of Thingdawl located in the northern part of Mizoram (Appendix- III). It covers an area of 91.57 percent of the total area of the block. The lowest forest cover is 54.77 percent which is confined in the south western part of the state at Chawngte block. There are nine blocks which have less than the state average of 82.32 percent. These blocks are mostly located in the southern part and western part of the state. It includes the block of Sangau with 68.43 percent, Tuipang 68.42 percent, Lawngtlai 76.21 percent and the lowest forest cover in the state Chawngte block with only 54.77 percent. Serchhip block 75.77 percent, E.Lungdar with 75.75 percent, Khawzawl 81.72 percent, Khawbung 81.74 and Ngopa 81.76 percent.

Blocks which have forest cover more than the state averages are Hnahthial 86.26 percent, Aibawk 88.2 percent, W.Phaileng 87.26 percent, Zawlnuam 87.39 percent, Reiek 87.4 percent, Lungsen 87.8 percent, Lunglei 88.19 percent, Phullen 88.23 percent, Thingsulthliah 88.25 percent, Darlawn 88.31 percent, Bunghmun 89.28 percent, Tlangnuam 88.35 percent and Thingdawl 91.56 percent.

2.4. LIVESTOCK

"Animal husbandry has been found to be closely interwoven with agriculture and played a very important role in the rural economy. Besides being a potential source for stabilizing the farm income, the sector provides useful services and products such as milk, egg, meat, wool, hives and skins, dung, bones, hooves and draught power" (Pandey.1995:263). It is an integral part of crop farming and contributes substantially to household nutritional security and poverty alleviation through increased household income (Kumar and T.Sudarkar, 2004). In an agrarian economy the importance of livestock cannot be denied. Most often it is witnessed that such economies contribute meaningfully only when they are carried out as mixed farming. Animal rearing become complimentary to the main occupation. According to Livestock Census of 2003, the total livestock population in Mizoram was 3.17 lakhs. It was 2.57 lakhs in the earlier Livestock Census of 1997. Thus within a period of five years, livestock population has registered a phenomenal growth of 23.3 percent. Out of the total livestock, the number of pigs constituted the largest group. It was 2.17 lakhs which is 68.45 percent followed by cattle 0.36 which was 11.36 percent. Over the five years period from 1997 to 2003 there has been tremendous growth of cattle and pig population. The number of cattle has increased by 2.26 thousand showing a

percentage increase of 6.78. The total number of pig has also increased by 54 thousand from 1997 to 2003 which accounted for 33.09 percent of growth during this period. As per Livestock Census 2003 population of improved bird has increased by 55.42 percent while desi bird population has decreased by 28.02 percent and this shown a decreased of total poultry population by 14.41 percent over the previous livestock census of 1997.

In the state, the livestock population consists mainly of indigenous species, According to Animal Husbandry and Veterinary Department, Government of Mizoram, the total milk and egg production during 2006 to 2007 was 159.98 lakhs and 348 lakhs. The per capita availability of milk per day worked out to be 49 grams and 39 eggs per year only as against 240 grams of milk recommended by Indian Council of Medical Research and 180 eggs per year for an individual to keep his/her health in good condition. The total production of meat from Cattle, Buffaloes, Mithun, Goats and Pigs during the period 2006 to 2007 was estimated at 8,761 tonnes and total net meat production from Chicken Broiler was 1,492 tonnes. Out of the meat production including Broiler meat Pigs accounted for the highest quantity with 66.42 percent followed by Cattle 17.97 percent Broiler 14.55 percent.

On the basis of Stamp livestock unit conversion, the highest livestock unit is found in Thingdawl block with 15530 units followed by Khawzawl block with 15421 units and Tlangnuam block with 13952 units (Appendix- IV). These three blocks share 40.85 percent of livestock units. The average livestock unit in the state is 4995.86 units. There are sixteen blocks that are found to have lower than the state average. These blocks are Zawlnuam, W.Phaileng, Lungsen, Bunghmun, Chawngte, Reiek, Aibawk, Lawngtlai, Darlawn, Thingsulthliah, Phullen, Khawbung, E.Lungdar, Hnahthial and Sangau block.

All the blocks located in the western part of the state bordering Bangladesh and Tripura have low units of livestock than the state average (Map No.2.4). The lowest concentration of livestock is found in the northern part of the state of Phullen block. There are six blocks that have more than the state average. These blocks are Thingdawl, Tlangnuam, Serchhip, Lunglei, Tuipang and Khawzawl blocks.

AGRO- MINERAL RESOURCES

2.5. CULTIVATED LAND

The economy of the state essentially remains agriculture despite implementation of different developmental scheme. About 66 percent of the total working population is still engage in agriculture and allied activities. Mizoram has a cultivable land of 83239 hectares of land. The share of cultivated land to total land area is only 3.97 percent which is very low. Shifting cultivation still become one of the most important methods of agriculture in Mizoram and remains a way of life for majority of the people despite its negative impact on the land due to short fallow period. About 736 square kilometer (2006) of land is under shifting cultivation accounting for about 88 percent of the cropped area. The remaining 12 percent are under permanent cultivation mostly carried out on the lower slopes of the mountain and in some small plain areas. The paucity posed by the land and inadequate agricultural inputs still compelled most of the farmers to continue the subsistence type of agriculture.

The percentage of cultivated land to total land area of each block in the state is highest in Thingdawl block accounting to 7.38 percent, which show the highest land use

efficiency in the state (Appendix- V). It is followed by Serchhip block located in the central part of the state with 6.59. Most of the southern part of the state have moderate percentage of cultivated land. The lowest percentage of cultivated land is found in Bunghmun block with only 2.56 percent followed by Lungsen block with 2.59 percent. These two blocks are located adjacent to each other. There are fourteen blocks which are found to have cultivated land below the state average of 3.97 percent and eight blocks above the state average (Map No. 2.5).

2.6. INTENSITY OF PRODUCTIVITY

Measurement and evaluation of intensity of agricultural productivity form a basis for planning, evaluating and taking appropriate measures for improving productivity at various levels. Intensity of productivity refers to the total amount of various outputs that has been divided by the number of crop sown in one year which has been put in percentage. The highest intensity of productivity is found in the northern part of the state especially in the central highland. There are eleven blocks which have more than the state average of 26.76 percent. Block that recorded the highest intensity of productivity is Phullen block with 58.39 percent whereas, Serchhip block ranks the lowest in intensity of productivity with only 5.78 percent (Appendix- VI). Blocks that have more than the state average are Phullen block followed by Tlangnuam block with 58.37 percent, Darlawn 58.34 percent, Thingsulthliah 58.33 percent and Aibawk 58.04 percent, Thingdawl 49.97 percent, Khawbung 28.38, Khawzawl 28.1, Ngopa 27.08 percent. Location of these blocks with adequate amount of annual rainfall is the main reason for higher intensity of productivity. There are three blocks which are slightly lower than the state average. These

blocks are Zawlnuam with 26.27 percent, Reiek 26.08 percent and, W.Phaileng 24.18 percent. The rest of the blocks which are located in the southern part and central part of the state have very low intensity of productivity. These blocks are Chawngte 10.65 percent, Lawngtlai 10.65 percent, Lungsen 9.76 percent, Lunglei 9.72 percent, Hnahthial 9.7 percent, Bunghmun 9.49 percent, Sangau 7.83 percent, Tuipang 7.81 percent, E.Lungdar 5.79 percent and, Serchhip with 5.78 percent.

2.7. INTENSITY OF CROPPING

One of the most important method to measures the utilization of land resources in agriculture sector is through the intensity of cropping which is the ratio of gross cropped area to net sown area expressed in percentage. The higher the extent of area sown more than once the higher will be the index of intensity of cropping. The area cropped more than once is regulated by land characteristics such as moisture retentive capacity and productivity of soils, accessibility and attitude of the farmers, size of holding and infrastructural facilities. The intensity of cropping in Mizoram is 130.92 percent which is low as compared to the highest state Punjab (160%) but higher than the dry region of Rajasthan (116%). Owing to its limited plain areas mostly hindered by rugged topography the state is not in a position to adopt modern agricultural input despite ample effort given by the state government. Recently the states have introduced early maturing varieties of seed and plant protection measures such as insecticides, pesticides and seedicides. Slopes have been leveled down for settled agriculture, subsidies has been given on pumping sets and fertilizers have been distributed among the farmers. This has given a tremendous positive impact on the land use efficiency.

The highest intensity of cropping is found in Khawbung block with 184.34 percent followed by Khawzawl with 184.04 percent and Ngopa block with 183.81 percent (Appendix- VII). There are other three blocks that have more than the state average. These blocks are Thingdawl block 158 percent, Chawngte 149.47 percent, Lawngtlai 149.23 percent. The lowest intensity of cropping is found in Tuipang block with only 109.84 percent. Most of the central part of the state, western part of the state bordering Bangladesh and the south eastern part of the state have low intensity of cropping in the state. These block are Lunglei with 128.17, Lungsen 128.06, Bunghmun 128.16 percent, Zawlnuam with 110.86 percent, W.Phaileng 110.8 percent, Reiek 110.85 percent, Aibawk and Tlangnuam 117.03 percent, Darlawn 117.02 percent, Phullen 117.14 percent, Thingsulthliah 117.02 percent, Serchhip 110.47 percent, E.Lungdar 110.4 percent, Sangau 110.22 percent and the lowest intensity of cropping Tuipang 109.84 percent.

2.8. INTENSITY OF IRRIGATION

Irrigation is one of the most important basic operational determinants of agriculture as its availability and efficiency is one of the tools to increase agricultural production. Irrigation is capable of raising yield and stabilizing crop production even without the use of other inputs. Land is irrigated by a variety of ways such as, canal, tanks, resourviour, well and tube well. But the availability of such types depends on the surface configuration, rocks structure, water table, quantity of ground water, proximity and extent of potential catchment areas and soil profile of the land. The region possesses an abundance of water resources from south west monsoon.

However, the water resource has not been harnessed to the maximum extent due to financial constraint as well as the limitation caused by the physical landscape. Most of the irrigation in the state is the diversion of rivers in the lowland areas and construction of small reservoirs at the collection point in the streams or springs. The intensity of irrigation for the whole state is only 0.12 which is very low comparing to other state. The highest intensity of irrigation with 0.994 is found in the southern part of the state in Zawlnuam blocks (Appendix- VIII). The lowest intensity is found in the western part of the state bordering Bangladesh in Bunghmun with only 0.001. There are six blocks which are above the state average. These blocks are Zawlnuam with the highest intensity of 0.994 followed by Lawngtlai with 0.466, Aibawk with 0.253, Lunglei with 0.183, Sangau with 0.131 and, Khawbung with 0.164. There are fourteen blocks which are below the state average. These blocks are Hnahthial with 0.093 and, Phullen with 0.085. Thingdawl with 0.078 Tlangnuam with 0.042, Khawzawl with 0.037, Serchhip with 0.028, Thingsulthliah with 0.022, Reiek with 0.019, Tuipang with 0.018, W.Phaileng with 0.015, Darlawn with 0.014, E.Lungdar with 0.006, Chawngte with 0.01, Bunghmun with 0.001. Lungsen block located in the south western corner bordering Bangladesh and Ngopa block in the north eastern part of the state bordering Manipur do not have irrigational facilities. Its uneven and rugged topography is one of the reason of the absent of irrigation in the block.

2.9. **NATURAL RESOURCE ASSOCIATION REGIONS**

The main objective is to study the level of regional development. In this regard, attempts have been made to study the natural resource region to give the clear picture of each of the blocks the natural resource that it possessed for development. In order to assess the regional significance of the different categories of the natural resource region as they exist, they have been plotted on a triangular graph (Map 2.9) and then natural resource regions have been obtained. In order to obtain integrated natural resource region, various natural resources have been sub grouped into three categories. Thus the elements of the natural resources have been grouped as:

1. Physical resources including physiography and hydrography.
2. Biotic resources including forest and livestock
3. Agro resources comprising cultivated land, intensity of productivity, intensity of cropping and intensity of irrigation.

While assessing on physical resource only available of cultivable land on the slope, rainfall has been taken into consideration. Similarly in the evaluation of biotic resources distribution of forest in each block in percentage and livestock units have been considered. In the evaluation of agricultural resources share of cultivated land to total land area of each block, intensity of productivity, cropping intensity and irrigational facilities has been taken for evaluation.

In order to assess the regional significance of the different categories of the natural resources as they exist, they have been plotted on a triangular graph and then natural resource regions have been obtained.

Region of Equitably Distributed Natural Resources

The composite triangle showing natural resources reflect that there are three blocks where natural resources are evenly distributed. These three blocks are located in the northern part of the state. These blocks are Thingdawl, Zawlnuam and Tlangnuam. Thingdawl, Zawlnuam and Tlangnuam blocks, by virtue of their location near Assam and Tripura plain have fairly large area under cultivable slope. With abundant water supply and other favourable physical resources they also appear to have high percentage of both biotic and agricultural resources. They, therefore, appear to suggest that natural resources may further be developed with comparative ease in these blocks.

Region of Two Evenly (Physical and Agro) Resources dominate one resource

Lawngtlai and Serchhip blocks are dominated by equitably distributed physical and agricultural resources. Lawngtlai block is located in the southern part of the state. The block have large areas of land on cultivable slope with sufficient amount of rainfall. The people in the block have taken advantage of available physical resources and irrigational facilities which facilitates agricultural operations. Thus productivity and intensity of cropping in this block is considerably high to make it agriculturally important. In the meantime, due to large scale cultivation of land, forest resources have been destroyed which is below the state average. Physical and agro resources command more than 45 percent of their resources in this block. Serchhip block, on the other hand, have high percentage of agricultural area. This may be attributed to high pressure of population on the land. As a result forest resources have been depleted much which is below the state

average. The block has more than 6 percent of land for agriculture. And though intensity of cropping and productivity is low in the block. Physical factors combined with irrigation facilities make this block equally significant on these parameters.

Region of Two Evenly (biotic and Agro) Resources dominate one resource

Darlawn block is located generally at higher elevation in the northern part of the state. It has very low percentage of land on cultivable slope. The locations of this block, combined with unfavourable physical factors, have compelled the people to utilize the land to its maximum extent. This block has rugged topography and is thinly populated. As a result, higher elevation and agriculturally unsuitable slopes abound in forest resources. Therefore, with limited land on cultivable slope large area has been used to practice jhum cultivation. Lack of moisture supply through rainfall is compensated by irrigation that is found to increase productivity as well as intensity of cropping in this block.

Region of One Predominant (Physical Resources) and two evenly distributed resources

There is only one block of Aibawk that has marginally predominant physical resources and wherein two resources are found to be evenly distributed. Though biotic resources are significantly low when compared to agricultural resources. The block commands more than 40 percent of physical resources and more than 35 percent of agro resources and a little more than 20 percent of biotic resources. With moderate amount of land on cultivable slope more than 3 percent has been devoted to agriculture. Sufficient rainfall has also helped the development of forest resources. The presence of irrigational

facilities on the lower slopes of the mountain provides more suitable conditions for operation in this block.

Region of One Predominant (Biotic Resources) and two evenly distributed resources

There are four blocks which are found to have predominance of biotic resources over physical and agricultural resources. They are Khawzawl, W.Phaileng, Thingsulthliah and Hnahthial

Khawzawl block located in the eastern part of the state scores a moderate value with regard to physical resources. But moderate rainfall in this blocks helps to keep large area under forest and enable people to domesticate large number of livestock. The presence of plain area and moderate intensity of irrigational facilities in Khawzawl and Champhai are found to help in irrigation of the crops. The two factors combined together may be the cause of high value in the intensity of cropping and productivity in this block.

W.Phaileng on the other hand, due to its continuous terrain with Bangladesh plain obtains very high ranking with regard to the land on cultivable slope which compensates for relatively lower ranking in respect of moisture supply. W.Phaileng though receives only a moderate amount of rainfall, it has high percentage of land under forests. Lesser population pressure on the land in this block has also saved forest from being ruined. The presence of veterinary hospital and dispensary in the block has encouraged livestock rearing considerably.

Thingsulthliah block located to the east of Tlangnuam block has only small percentage of land on cultivable slope. But adequate moisture supply has helped the development of biotic and agro resources in this block. Likewise relatively low pressure of

population on land in Hnahthial block has resulted in lesser destruction of forests. Despite, unfavourable physical factors, adequate moisture supply have also favoured the growth of luxuriant forests on the slope of the hills. These have encouraged the people to have their own herds of livestock. As a result, the blocks are found to have a predominance of biotic resources with significantly low physical and agricultural resources.

Region of One Predominant (Physical) Natural Resource

The blocks of Reiek, Sangau, Tuipang and Chawngte are distinct for their physical resources. Except Chawngte which lie close to Bangladesh plain, other blocks such as Reiek, Tuipang and Sangau having predominance of physical resources are located in the higher elevations in the state. Chawngte block due to its location has large area under cultivable slope and its location in the south western part is also responsible for higher value in relation to the amount of rainfall. Reiek, despite their location on higher elevations score higher value in respect of cultivable slope as well as with regard to moisture supply through rain. Sangau on the other hand, has little cultivable slope In addition to its location in the south eastern part of the state, this block receives moderate amount of rainfall as compared to other block. Physical resources command more than 50 percent of the natural resources in this block. Despite the fact that biotic resources also are available in substantial quantity in Reiek block. Sangau block located in the south eastern part of the state has more than 80 percent of physical resources while two resources are mostly negligible. In Chawngte block, on the other hand, though agricultural resources command more than 30 percent biotic resources are almost non- existent. Low value obtained in agro and biotic resources reflects that though the people in Reiek, Sangau,

Tuipang and Chawngte blocks use large areas for cultivation due to the constraints posed by the physical factors they are found to score very low in agro resources.

Region of One Predominant (Biotic) Resource

There are three blocks that are dominated by biotic resources. These blocks are Lunglei, Lungsen and Bunghmun. Lungsen block is located in the western part of the state bordering Bangladesh. Suitable physical factors in this block have favoured the luxuriant growth of forests on the slopes of mountains. Relatively low pressure of population on the land on the other hand, has resulted in lesser destruction of forests. Similarly inaccessibility of large area due to dense forests and rugged topography it appears to have proportionately impacted agro resources in this block negatively. Lunglei is located on higher elevation with limited cultivable slope and proportionately low moisture supply. And though the low value of moisture supply is compensated by high intensity of irrigation it hardly is found to reflect in agro resources. On the other hand, availability of veterinary hospital and dispensary might have encouraged livestock rearing in this block making this block proportionately having predominance of biotic resources.

Similarly, Bunghmun block though has high percentage of land on cultivable slope. Being in the foothills, due to their location in the rain shadow areas rainfall in this block is not much. This has also affected proportionately the agricultural resources in this block adversely. On the other hand, a very small concentration of population in this block has kept forest resources relatively unmolested resulting in high proportion of biotic resources in this block.

Region of One Predominant (Agro) Resource

There are four blocks that has been dominated by agro resources. These blocks are Phullen, Ngopa and Khawbung and E.Lungdar. Phullen and Ngopa block are located in the northern part of the state lying adjacent to each other. Due to physical factors though they share very low percentage of land on cultivable slope. People strive to compensate by increasing intensity of cropping, productivity and irrigation. And though the block has relatively high proportion of biotic resources. Agricultural resources are still found to predominate the landscape. Ngopa on the other hand, though has more land on cultivable slope. Irrigational facilities are found to be absent. Low proportions of both the physical and biotic resources make Phullen and Ngopa significant in respect of agro resources.

Khawbung block, on the other hand, is located in the eastern part of the state bordering Myanmar. Despite unfavourable physical resources, the block has high percentage of cultivated land wherein intensity of productivity and intensity of cropping are compensated by the available irrigational facilities. The block of E.Lungdar though is located on higher elevations in the eastern part of the state, agro resources command more than 50 percent of its natural resources. With limited land on cultivable slope due to rugged topography, higher slopes are found to be cultivated to the maximum extent. This has resulted in proportionately high depletion of biotic resources especially the forest cover. Insufficient rainfall in the block is compensated in some areas by irrigational facilities on the lower slope of the hills helping the block to have relatively high proportion of agricultural resources through increased productivity and cropping intensity.

As it is obvious from the analysis that there is no regular pattern of natural resource distribution in the state. This may be attributed due to the physical nature of the state.

Blocks which have all components of the natural resources equitably distributed may be considered to have greater potential for development without depending on supply of resources from other areas. Blocks which have two evenly distributed and blocks that have one predominate natural resources for one reason or the other have a problem with regard to development. In this regard, planner must keep in mind that any development programmes do not bring irrational destruction to one resource or the other.

Table- 2.1

RANKING OF BLOCKS BASED ON DIFFERENT COMPONENTS OF NATURAL RESOURCES

Natural Resource Evaluation							
		Physical		Biotic		Agro	
Sl.No	Blocks	Total	Rank	Total	Rank	Total	Rank
1	Aibawk	2.03	19	-0.15	10.5	1.25	17
2	Darlawn	-1.93	3	-0.05	13	-0.09	11
3	Phullen	-1.95	2	-0.21	8	0.61	14
4	Thingsulthliah	-1.08	9	0.12	17	0.48	13
5	Tlangnuam	1.56	17	2.63	21	0.69	15
6	Bunghmun	-2.12	1	-0.02	14	-2.67	1
7	Hnahthial	-1.41	5	-0.16	9	-2.19	5
8	Lungsen	-0.78	11	0.06	16	-2.64	2
9	Lunglei	-1.26	7	0.79	19	-1.28	8
10	Ngopa	-1.24	8	-0.23	6	1.52	18
11	Khawbung	-1.29	6	-0.15	10.5	2.64	20
12	Khawzawl	-0.94	10	2.22	20	2.56	19
13	E.Lungdar	-1.86	4	-1.22	3	-1.21	9
14	Serchhip	1.49	16	-0.72	5	-0.06	12
15	Sangau	-0.6	13	-1.84	2	-2.28	4
16	Tuipang	0.13	15	-0.22	7	-2.51	3
17	Thingdawl	3.06	22	3.22	22	4.84	22
18	Chawngte	2.11	20	-3.53	1	-0.35	10
19	Lawngtlai	1.88	18	-1	4	1.22	16
20	Reiek	2.53	21	-0.09	12	-2	6
21	W.Phaileng	-0.59	12	0.04	15	-1.93	7
22	Zawlnuam	0.03	14	0.24	18	3.19	21

2.10. LEVEL OF NATURAL RESOURCE DEVELOPMENT

Based on Z-Score the level of natural resource development has been categorized into three divisions such as above Developed above 3.71, developing between -0.12 – 3.71 and Underdeveloped below -0.12. On the basis of the result a composite map has been prepared. On the basis of the given map it may be assumed that there are three blocks which may be identified as having more developed natural resource. There are seven blocks which have been put in the category of developing regions with regard to natural resource development. Similarly, there are twelve blocks which are found to be lagging in natural resource development.

Developed Natural Resource Region.

There are three blocks that are identified as natural resource wise developed. These blocks are Thingdawl, Tlangnuam and Khawzawl.

Thingdawl block located in the northern part of the state scores the highest in the composite index of natural resources with the value of 11.22. The block ranks 1st in all the three components of natural resources. Thingdawl block by virtue of its location near the Assam plain has favourable physical conditions. Large area of land under cultivable slope, adequate moisture supply through rainfall and availability of irrigational facilities in the block has favoured development of agricultural resources in this block. With sufficient amount of rainfall throughout the year about 91.57 percent of the block is covered by forest. This helps in rising of livestock. People have also realised the benefit of domesticating the animals for their own use as well as for commercial purposes. Therefore

livestock units are considerably high in the block. Infact it is highest in the state. Besides this, another patch of flat valley such as Chemphai and Buhchangphai along the river Teirei and Serlui, Phaisen and Chhimluang to the west of Bilkhawthlir, Hortoki and Bairabi along the river Tlawng mostly have been brought under permanent cultivation with increase in irrigation facilities.

Tlangnuam block located to the south of Thingdawl block scores the second highest with 4.88 in the composite index on Z-Score. The block houses the state capital. It has moderate and amount of land on cultivable slope. Abundant rainfall in the block favours the growth of forest resources and development of agricultural resources. Higher demand of meat due to higher concentration of population on the other hand, has favoured domestication of livestock in this block.

The third highest most developed block with regard to natural resource is Khawzawl block. Khawzawl block is located in the eastern part of the state and falls under Champhai district. The block has large area under cultivated land despite moderate value with regard to physical resources. Moderate rainfall and irrigational facilities has helped the block to have higher intensity of productivity and cropping in the plains located in Champhai known as Zote plain and Tuisenhnar in the vicinity of Khawzawl village where permanent cultivation has been carried out. Its nearness to the international boundary, on the other hand, has facilitated domestication of livestock resources in this block.

Developing Natural Resource Region

The overall natural resource evaluation reveals that Zawlnuam, Lawngtlai, Reiek, Serchhip, Khawbung, Ngopa and Aibawk blocks fall under developing region.

Zawlnuam block is located in the western part of the state bordering Assam and Tripura. The block has equal distribution of natural resources. The exclusion of Zawlnuam block from the developed category may be attributed to lower value in biotic resources. It scores 3.46 in the composite index and ranks 4th in the composite index of natural resource. The block has large area of land under cultivable slope. About 4 percent of the land is devoted to agriculture, higher than the state average. This reveals that the people of Zawlnuam practice terrace cultivation on the lower slope of the hills as is evidenced by the availability of irrigational facilities where the block scores the highest value in the intensity of irrigation in the state. The block is endowed with rich forest resources. With adequate cultivable slope and moderate rainfall, the block has an opportunity to increase the agricultural land for crop cultivation as well as increasing the capacity of livestock rearing without destroying the forest resources.

Aibawk ranked 5th with Z-Score at 3.13 in overall natural resource evaluation. It has rich physical resources and even distribution of biotic and agro resources. Sufficient amount of moisture and the presence of irrigational facilities provide more suitable conditions for agriculture. Availability of rich forest resources may also be attributed due to low density of population. Since the block is located close to the state capital, it is important to encourage livestock rearing. Forest resources can also be harnessed without destroying the ecological balance.

Lawngtlai block is located in the southern part of the state. The block scores 2.1 on the composite index and ranks 6th in the overall natural resource evaluation. Large area under cultivated land and sufficient amount of moisture supply through rainfall and irrigational facilities have favoured cultivation of crops in the block. Large scale

deforestation for cultivation on the other hand, has destroyed forest resources. Therefore more land should be brought under permanent cultivation to prevent the depletion of forest resources. Forest resources in this block should be made economically exploitable so that the block may have sound forest base in the future.

Khawbung located in the eastern part of the state scores 1.2 on the composite index and ranks 7th in the overall natural resource evaluation. Despite unfavourable physical factors, the presence of irrigational facilities has helped the block to promote agricultural operations. Unsuitable land for livestock population and large area of land devoted for agriculture is the reason of very low value with regard to biotic resources.

Serchhip ranks 8th in the overall natural resource evaluation and score 0.71 on the composite index. The block is located on the higher elevation of central Mizoram. As a result, it has a moderate percentage of land on cultivable slope. Unfavourable land on the other hand, has forced the people to utilise the land to its maximum extent. Thus, the block has large area of cultivated land which is among the highest in the state. On the other hand, it has a negatively impacted on the forest resources which is below the state average. Sufficient rainfall and the presence of flat plain in North Vanlaiphai village and Thenzawl village have facilitated agricultural operation in this block.

Reiek block that lies adjacent to Tlangnuam block to the west is endowed by rich physical resources. The block scores 0.44 on the composite index and ranks 9th in the overall resource evaluation. The block has large area of land on cultivable slope. Its location in the rain shadow areas has made the block to score very low in respect of both the biotic and agro resources.

Ngopa block ranks 10th and scores 0.05 on the composite index. Inspite of its physical resources, the block scores high value in respect of agricultural resources. Low percentage of forest cover suggests that, the land is cultivated to its maximum extent to make agriculture more important in this block which is supported by moderate rainfall.

Underdeveloped Natural Resource Region

The least developed blocks that fall in underdeveloped categories are Darlawn, Phullen, Thingsulthliah, Lunglei W.Phaileng, Bunghmun, Lungsen, E.Lungdar, Hnahthial, Chawngte, Sangau and Tuipang. Thingsulthliah ranks 11th on the composite index of natural resources, Phullen 12th, Lunglei 13th, Chawngte 14th, Darlawn 15th, W.Phaileng 16th, Tuipang 17th, Lungsen 18th, Hnahthial 19th, E.Lungdar 20th, Sangau 21st and Bunghmun the least developed ranks 22nd.

Blocks such as Phullen, Darlawn, and Thingsulthliah score very low on the overall natural resource evaluation and are under developed blocks. This is due to the fact that, Darlawn, Phullen and Thingsulthliah blocks are located at an elevation of more than 1000 meters from the mean sea level where it has a negative impact on all the natural resources. Dominated by biotic resources and two equitably distributed resources, the block scores only - 0.5 on the composite index. Phullen block score very low in respect of both the physical and biotic resources. This has kept the block in the category of underdeveloped region despite higher value with regard to agricultural resources.

Lunglei block, which is considered to be the second capital in the state falls in the category of underdeveloped region. Unfavourable physical factor have hampered the development of agricultural resources in this block. Chawngte block located in the south

western part of the state despite suitable physical condition, scores very low both in respect of biotic resources and agricultural resources. It may be attributed to large scale destruction of forest for agriculture. But low level of living condition of Chakmas has forced them to produce crops only at a subsistence level.

Darlawn block located in the northern part of the state bordering Assam plain ranks 15th on the composite index. Unsuitable physical factors have hindered the development of both the biotic and agricultural resources in this block. Available irrigational facilities on the other hand, has helped to increased productivity as well as cropping intensity in this block.

W.Phaileng block is located in the western part of the state. The block borders Bangladesh plain. The block is dominated by Riang people who settle there temporarily due to internal tension between the Mizos and the Riangs. Low levels of population pressure appear to have saved forest resources. But temporary settlements on the other hand, have resulted in having lower value in respect of agricultural resources.

Low value of biotic resources and agricultural resources in Tuipang block has kept the block in underdeveloped category. Lungsen block despite, Unfavourable and physical factors, its location in the rain shadow areas has retarded development of agricultural resources in this block.

Hnahthial and E.Lungdar located in the eastern part of the state is found to score very low in respect of physical resources. The presence of high mountain ranges in the central part known as Hmuifang range has resulted in lower percentages of land on cultivable slope. Despite unfavourable physical factors in both Hnahthial and E.Lungdar blocks, adequate moisture has helped the blocks to have rich forest resource than

agricultural resources. With limited land on cultivable slope, higher slope of the mountain has been found to be cultivated to its maximum extent in E.Lungdar which results in higher depletion of their forest cover. Moderate irrigational facilities have enabled the block to have relatively higher proportion of agricultural resources despite its location in the rain shadow areas.

Sangau block located in the eastern part of the state scores very low on natural resources development index. Very low in respect of physical resources has hindered the development of both biotic and agricultural resources in this block. Bunghmun block located in the western part of the state bordering Bangladesh is found to have scores the lowest value on the overall natural resource index. With moderate land on cultivable slope, its location in the rain shadow area has resulted in lower development of agricultural resources. But low pressure of population on the other hand, has kept the forests relatively unmolested resulting in high proportion of biotic resources.

It is obvious from the composite triangle and overall composite development that, blocks that have all the three components of natural resources equitably distributed are more developed than the other blocks. Blocks such as Thingdawl, Tlangnuam, and Zawlnuam have all the natural resources equitably distributed. The exclusion of Zawlnuam block from the developed category may be attributed to low value score of the biotic resources. Khawzawl block which ranks third on overall natural resource development index is dominated by biotic and two other resources equitably distributed. But Thingsulthliah, Darlawn, W.Phaileng and Hnahthial that have been dominated by the same resources have been categorized in underdeveloped blocks as their Z-Score is found to be very low. This shows that some block that have been dominated by one resource lack in

other resources. This suggests that physical resources such as cultivable slope and rainfall play very important in the natural resource development of any region. Because land resource forms the most important wealth of any regions and its potential, proper utilization and management as well as its role in development is a matter of utmost concern to its people.

It is however, believed that promotion of terraced cultivation along the river valleys in different parts of the state will reduce disparities in natural resource endowments. In order to reduce the area of shifting cultivation terracing on cultivable slope will help intensification of cultivation by way of increased productivity, cropping intensity as well as irrigation intensity. This will help to reduce soil erosion as well as it will increase area under forest. Thus, despite, physical constraints, efforts can be made to change the physical setting by way of leveling down the small hills near the river banks and reclamation of forest land destroyed by shifting cultivation on the lower slopes of the mountains. They may be used to promote livestock rearing particularly dairy stocks, which are gaining new economic importance in the state.

In this connection. Government is attempting to bring the jhum land under terrace cultivation by financing the farmers who intend to convert their jhum lands into terraced fields. But so far it has met with little success. What is required at the initial stage of such efforts is convincing the local people of the advantages of terraced cultivation and train them in new technique of cultivation.

Table -2.2

RANKING OF BLOCKS BASED ON Z- SCORE OF NATURAL RESOURCE

Z-Score of natural resource evaluation											
Sl.No	Blocks	X1	X2	X3	X4	X5	X6	X7	X8	Total	Rank
1	Aibawk	-0.28	2.31	0.64	-0.79	-0.34	1.53	-0.54	0.6	3.13	5
2	Darlawn	-0.73	-1.2	0.65	-0.69	-0.61	1.54	-0.54	-0.48	-2.06	15
3	Phullen	-1.03	-0.92	0.64	-0.85	-0.23	1.54	-0.54	-0.16	-1.55	12
4	Thingsulthliah	-1.01	-0.07	0.64	-0.54	-0.07	1.54	-0.54	-0.45	-0.5	11
5	Tlangnuam	0.64	0.92	0.66	1.97	0.04	1.54	-0.54	-0.35	4.88	2
6	Bunghmun	-0.61	-1.51	0.76	-0.78	-1.18	-0.84	-0.11	-0.54	-4.81	22
7	Hnahthial	-1.11	-0.3	0.43	-0.59	-1.14	-0.83	-0.1	-0.12	-3.76	19
8	Lungsen	-0.09	-0.69	0.6	-0.54	-1.15	-0.83	-0.11	-0.55	-3.36	18
9	Lunglei	-0.99	-0.27	0.64	0.15	-0.42	-0.83	-0.11	0.08	-1.75	13
10	Ngopa	-0.61	-0.63	-0.07	-0.16	-0.01	0.02	2.06	-0.55	0.05	10
11	Khawbung	-0.7	-0.59	-0.07	-0.08	0.28	0.08	2.08	0.2	1.2	7
12	Khawzawl	-0.27	-0.67	-0.07	2.29	0.8	0.07	2.07	-0.38	3.84	3
13	E.Lungdar	-0.84	-1.02	-0.73	-0.49	1.13	-1.02	-0.8	-0.52	-4.29	20
14	Serchhip	0.16	1.33	-0.73	0.01	2.18	-1.02	-0.8	-0.42	0.71	8
15	Sangau	-1.11	0.51	-1.54	-0.3	-0.6	-0.92	-0.81	0.05	-4.72	21
16	Tuipang	-0.64	0.77	-1.54	1.32	-0.3	-0.93	-0.82	-0.46	-2.6	17
17	Thingdawl	2.84	0.22	1.01	2.31	2.84	1.13	1.06	-0.19	11.22	1
18	Chawngte	1.11	1	-3.04	-0.49	0.22	-0.79	0.72	-0.5	-1.77	14
19	Lawngtlai	0.64	1.24	-0.68	-0.32	-0.27	-0.79	0.71	1.57	2.1	6
20	Reiek	1.5	1.03	0.55	-0.64	-0.73	-0.03	-0.78	-0.46	0.44	9
21	W.Phaileng	0.26	-0.85	0.54	-0.5	-0.53	-0.13	-0.79	-0.48	-2.48	16
22	Zawlnuam	0.65	-0.62	0.55	-0.31	0.02	-0.02	-0.78	3.97	3.46	4

CHAPTER III

HUMAN RESOURCE EVALUATION

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Human adaptation to their environment and modification of physical systems for their existence are influenced by the geographic context in which human live. The existence and survival depend on their physical environment. They adapt themselves and modify their environment to suit their changing needs. In searching for their requirements, man acquired knowledge and technology to bear on physical systems. Consequently, man has altered the environment and creates resources for his own needs. Man as Zimmermann observes, "is both the most dynamic agent of production and the beneficiary of the entire process of resource development and utilization" (Zimmermann 1951:91). The study of man becomes all the more important as "in the human ecosystem, man assign utility to various elements of his environment and thus confer upon them the role of resources" (Chapman, 1961:31). Hence, Man is not only a dweller in nature, he also transforms it and man is not only the utiliser and processor of resources; he is also the creator of the resources. "There are, however, two facets of human resources. One suggest his direct involvement in resource creation and processing i.e., the interaction between him and his physical world. He is thus a means, by virtue of contributing his labour both mental and physical; even though his cultural advantages are not taken into consideration. The other facet exposes him as the end which all the resources processing and transformations are aimed at. In order to sustain his living and raise his standard of living, man is only the consumer of end product" (Kumar,1981:104). From the very beginning of his existence on the earth, human society has modifying the nature and made all kinds of incursions into it.

In this process enormous amount of human labour has been spent on transforming nature. Humanity converts nature's wealth into the means of the cultural, historical life of society. “the environmental elements that man calls upon to serves as resources and the nature and size of the requirements he place upon them, depends on his numbers, his needs and desires and his values and skills” (Chapman. Opt.cit:31).

Man and nature interact in such a way that, as human progress and society develops, the dependence of man on nature tends to decreases directly while indirectly his dependence grows. While man obtained knowledge more and more about the nature, and on this basis, transforming it, man's power over nature progressively increases, but in the same process, man comes into more and more extensive and profound contact with nature, bringing into the sphere of his activity growing quantities of matter, energy and information. This reveals that man “appears to be most dependable through times for ‘aid and support’ on himself which make him outstandingly the most important resources” (Kumar, 1981. Ibid:104)

In this regard, however, it is ascertained to confer resourceship only to those aspects of the human world which are of ‘aid and support’ to the human population through ages. This may be attributed only to the working population which are certainly indubitable is the ‘most potent’ resource factor. But at the same time the total population on which the working population is obliged to sustain must be given importance, at least on the prevailing standard of living. Zimmermann, therefore opines that “human resources are both the most dynamic and most potent; they are the most precious because they combine the task of production agent with the end object of entire process” (Zimmermann,1951 op.cit.,:91-92). This observation certainly calls for the appraisal of the

total population. This is also necessary to assess the resources efficiency including the human resource in its global as well as regional context. At the same time the total population has to be studied as an incentive factors. A whole range of population factors, thus, comes under the purview of the study of human resources. This has been amply justified as "population plays an important role in modern economic development. It is the most potent resource which can alter the entire face of the country. If utilised prudently. Not only it provides trained and skill man power for economic reconstruction but like other natural resources it can be exported to earn regular income and meet financial crises" (Jauhri, 2005:3) In this connection Fuller states that "Civilised man is simultaneously a consumer of resources, a producer of resources, a manager of the yield and stock of resources, and himself a productive resource" (Fuller, 1969:1). Human resources, thus, provides the pivotal axis to which spokes of other resources are attached.

The study of human resources become very essential as economic development depends on the level of human resources. In general, Human resource is a term used to describe the individuals who make up the workforce of an organization, although it is also applied in labour economics, for example, business sectors or even whole nations. In this connection Kumarasena states that "human resources in collaboration with natural resources help in the process of economic development" (Kumarasena, 2004:132) It is perhaps the most important asset which makes a country or for that matter in any organization great and strong. It is in fact, key to development. All other material resources can be better utilised by motivating human resources (Gautam, 2005:353). From geographical point of view, Human resources can be defined as 'the energies, skills, talent and knowledge of people which potentially can and should be applied to the production of

goods and services. Population studies have been directed to a study of two aspects: 1) Quantity and 2) Quality. Both the aspects are vital to an overall study of population so that the human resources are properly utilized for all round human development. It is currently realized that for all round development of any region, human resource is extremely important. Human resources are considered as an active agent of production that does not destroy nature's bounty but enhances the productive potential of a region. It improves and builds social, economic, cultural and political strengths of the region and ultimately carries forward the national development. Undoubtedly, levels of development in any region would depend largely on the level of development of human resources.

Qualities of man which help general and economic development of a region is considered to part of human resources. A large quality of human resources such as density of population, sex ratio, literacy, urbanization, number of people living in large villages, workers of agriculture and non agricultural workers are considered as constituent of human resources. Data for all these aspect are not available. The following aspect of human resources namely, density of population, total workers, and labour productivity has been taken as an indicator for the identification of human resources.

Mizoram is a case which neither commands much sizeable natural resources nor can be said to have much of a cultural heritage to help its economic development. The only substantial resource which it has is its human resources. The study of these resources in its regional and sub- regional context becomes all the more important as the men depend almost entirely on their labour. Mizoram has a population of 888,573 with male population of 5,49,109 and female population of 4,29,484 in 2001 census. The past trend of overall population in the state has not been consistent. In 1901, the total population in Mizoram

was 82,434. Between 1901- 1911 the state experience a remarkable growth of 10.60 percent with a decadal variation of 8,770 persons. In 1921, the growth rate of population decrease to 7.90 percent. The main reason for the fall in growth rate during this census was that the state has undergone a natural famine called 'Mautam'. Mautam is a natural famine caused by flowering of bamboo which rapidly increased the jungle rats and ate away the crops. This natural famine occurs in Mizoram at approximate intervals of 48 years. The year 1921 is also known as 'demographic divide' in the demographic history of India. The high death rate was the product of large scale abnormal death due to epidemics of influenza, plague, small pox, cholera etc. In 1931, the growth of Mizoram population rapidly rises to 26.42 percent. The sharp rise in the growth rate may be attributed due to bloom in agricultural produce. It has been said that consecutive years from Mautam often experience nature blessing with a thrive in the harvest. In 1941 census, the growth rate drop down to 22.81 percent. 1951 census recorded an increase of 28.42 percent whereas 1961 census show excessive rise in population growth with 35.61 percent.

The census of 1971 again depicts another drop in growth rate of population with only 24.93 percent. Though there have been additions of 66,327 new persons to 1961 figures. During this decade large number of Mizo people joined Mizo Nation Front (MNF) movement. This people were not enumerated in the census counts. In the meantime, many Mizos were killed due to the same movement this are the factors that contributed to the low growth rate of population between 1961- 1971. In 1981, the growth rate of population shows an excessive rise in population of the magnitude of 48.55 percent. From the decade 1981, the growth rate shows a declining trend till 2001 with 39.69 percent in 1991 and 28.82 percent in 2001 census. Low family income and population awareness among the

Mizo people may be one of the reasons that check the rapidly growing population from 1981.

3.1. DENSITY OF POPULATION

The state of Mizoram ranks one of the lowest populated states of India. In 2001 census the total population of Mizoram was 888,573 persons with density of 42 person per square kilometers. At district level, Aizawl district has the highest density with 91 persons per square kilometer followed by Kolasib district located in the northern part with 48 person and Serchhip district located in the central part of the state with 38 persons per square kilometers. The lowest density of 21 persons per square kilometer is found in the north western part of the state in Mamit district.

In 2006 the population of Mizoram reaches 921970 persons with density of 44 persons per square kilometers. The highest density in Mizoram in 2006 is Aizawl district with density of 98 person per square kilometer and the lowest density is again hold by the Mamit district with same density of 21 persons per square kilometer. At the block level in 2006 the highest density is found in Tlangnuam block with 489 persons per square kilometer (Appendix-XIII). This may be attributed to the location of state capital i.e., Aizawl. Socio- economic and cultural factors have played a dominant role in the higher concentration of population. The higher density in this block on the other hand, may also be attributed to its importance as the seat of administration both in the pre and post independence period. Tlangnuam block with its capital location and with its nodal location has all the ingredients of attracting people from different part of the states. The lowest density with 12 persons per square is found in Bunghmun block. This block is located in

the western part of the state bordering Bangladesh. It topography such as major rivers like Khawtlangtuipui, Kau, De, and Tlawng have drained the block which resulted in low relief in the form of valley with hot and humid climate and densely covered by bamboo shrubs. There are four block which have more than the state average. These blocks are Tlangnuam, Serchhip, Lunglei and Chawngte. The high density, which has been found in the western corner of Mizoram with lack of infrastructural facilities, is Chawngte block. Inspite of unsuitable climate with hot and humid, the Chakmas found themselves adaptable to the areas owing to want of habitation thereby keeping the density quite high as much as 48 persons per square kilometer. This can be attributed due to the recent migration of Chakmas from the neighbouring country Bangladesh. On the other hand, blocks having high density are mostly connected by National highway and State highway. Blocks such as Tlangnuam, Serchhip, and Lunglei can be attributed to its township and availability of transportation network and infrastructural facilities. Some of the blocks that have moderate density of population that are away from the national highway and state highways have historical antecedents during the regrouping of village in 1960's as well as migration from rural to urban areas in search of better economic activities.

It is seen that the topographical factors and economic factors has a great responsibility in the distribution of density of population. Mizoram has become one of the most urbanized states in terms of urban population to state total population.

3.2. TOTAL WORKERS

Total workers are those workers who are engaged in any economic activities. These include marginal workers and main workers. At the district level Aizawl, Lawngtlai and

Saiha district have the percentage of workers below the state average of 55.12 percent. Aizawl district have 47.31 percent of total workers, Lawngtlai with 45.17 percent and, Saiha with 44.12 percent respectively. The low percentage of Aizawl district may be attributed due to its urban nature and modern facilities enjoyed by the most of the people. Another low percentage which is below the state average is Lawngtlai and Saiha district. These two districts are located in the southern part of the state. Their low percentage is due to its remote location with little urban character and lack of infrastructure.

At the block level, the highest percentage of workers is found in Serchhip block with 82.1 percent followed by E.Lungdar with 63.55 and Darlawn block with 63.54 percent. The lowest percentage of total workers is found in the block located in the south eastern corner of the state in Tuipang block with 41.71 percent (Appendix- XIV). There are ten blocks which are found to have than the state average. Blocks which recorded total workers below the state average of 55.12 percent are Thingdawl with 54.28 percent, W.Phaileng 54.05, Reiek 52.89, Sangau 51.46, Phullen 51.06, Chawngte 49.05, Lunglei 46.77, Tlangnuam 43.32, Lawngtlai 42.16 and Tuipang with only 41.71 percent. Five blocks are located in the northern part of the state and another five blocks are found in the southern part of the state. There are twelve blocks that are found to have more than the state average. These blocks are mostly found in the eastern part of the state bordering Myanmar and in the western part of the state bordering Bangladesh and Tripura. One block in the northern part of the state bordering Assam plain and, two in the interior of the state.

3.3. LABOUR PRODUCTIVITY

Labour productivity is the amount of goods and services that a worker produces in a given amount of time. It is one of several types of productivity that economies measure. Labour productivity can be measured for a firm, a process, an industry, or a country. It was originally (and often still is) called labour productivity because it was originally studied only with respect to the work of laborers. Labour productivity can be measured in physical terms or in price terms. The complex and varied relation which exist between the age composition and the active proportion of population in a developed society does not exist in a developing economy. Therefore, as the composition of working force does not bear any semblance with the advanced countries, higher percentage of working population in a backward economy thus, must not be considered at par. On the contrary, apperant efficiency of working force should be considered to rank the relatively developed regions with superiority over others. Regionalization of human resources, thus must kept in view both the quantitative and qualitative parameters of the working force, where quantitative parameter would be represented by the number aspect of the working population. The qualitative aspects might be represented b y its exixting capacity of production or in other words, by labour productivity.

The study of labour productivity thus, become an important index of the regional efficiency of the workers. The difficulty with the assessment of labour productivity in Mizoram is that information are not available for the productivity of labour engaged other than agriculture. Therefore, the productivity of the agriculture in each block in relation to the main workers has been taken as the basis of labour productivity. Moreover,

engagement in other activities is so marginal as compared to agriculture that it will hardly bring any substantial change in the productivity figures of labour as a whole.

In this regard, Darlawn rank the highest in the labour productivity in the state (Appendix- XV). Phullen block rank second in labour productivity. This block is located to the east of Darlawn block. With lower density of population, a good proportion population engaged in agriculture is the main reason of higher labour productivity in this block.

There are thirteen blocks which are below the state average of 0.69. These blocks are Khawbung with 0.66, Lawngtlai 0.63, Sangau 0.52, E.Lungdar 0.51, Tuipang 0.51 Zawlnuam 0.51, Khawzawl 0.48, Chawngte 0.44, Hnahthial 0.39, Lungsen 0.35, Serchhip 0.26, Lunglei 0.2 and Tlangnuam. There are seven blocks in the southern part of the state, two in the central and eastern part of the state and two in the northern part of the state. There are nine blocks which are above the state average. These blocks are Darlawn, the highest with 1.43, Phullen 1.29, Aibawk and Thingdawl with both 1.26, Ngopa 0.95, Thingsulthliah 0.93, Bunghmun 0.88, Reiek 0.79 and W.Phaileng with 0.72. Four blocks are found occupying the northern part of the state bordering Assam and Manipur plain and two blocks are found in the western part bordering Bangladesh.

3.4. HUMAN RESOURCE ASSOCIATION REGIONS

The composite triangle shows that human resources region are unevenly distributed in the state. The study of human resource region in the level of development is important because human and basic natural resources are inextricably linked with the prospects of economic growth and the quality of the environment. Man, besides being an important resource himself is the main user of all other natural resources. Therefore, the study of human resource region such as density of population, total workers and labour productivity and their distribution is the logical starting points for the study of resources that sustain life on earth.

Region of Equitably Distributed Human Resources:

There are two blocks namely Thingsulthliah and Zawlnuam where human resources are evenly distributed. These two blocks can be said to have balanced human resources. Thingsulthliah block due to obtained physical resources has moderate density of population. More over due to relatively developed agriculture, total workers and the agricultural productivity of the labour is quite high. Zawlnuam block, on the other hand, has lesser density of population than Thingsulthliah block. This block has large area of land under cultivable slope with sufficient precipitation and irrigational facilities to impact extended growing period. It may be considered responsible for higher percentage of its population engaged in agricultural activities. Coupled with its topography suitable for permanent terraced cultivation the block is endowed with higher production. It is reflected in higher productivity of agricultural labours. Thus, the total population, working population and labour productivity are proportionate to each other in these blocks.

Region of Two Evenly Resource

Density of population and Total workers

There are three blocks that have equitable distribution of population and working population. These blocks are Serchhip, Hnahthial and Khawzawl block. The reason for higher concentration of population in these blocks are due to location of Serchhip town and Thenzawl town in Serchhip block, Hnahthial town in Hnahthial block and Khawhai town, Champhai town and Khawzawl town in Khawzawl block.

Serchhip block has high density of population. In spite of low percentage of land on cultivable slope, the pressure of population on the land is very high. In order to sustain the population, therefore, a higher percentage of population has to engage itself in one kind of activities or the other. It is reflected in proportionate number of workers in this block. Besides the inclusion of two towns in Serchhip block, there are four villages such as Chhingchhip, Chhiahtlang, Bungtlang, Lungpho and two towns Serchhip and Thenzawl that were selected as grouping centers in 1967 to 1970 to check insurgency. This tremendously increased the population in this block. Similarly, there were four villages such as Pangzawl, Cherhlun, S.Vanlaiphai, Thingsai and one town Hnahthial which were selected as grouping center in 1967, 1969 and 1970. Hnahthial block due to its physical features and small economic base mostly of agriculture experienced a migratory flow from the grouping centers to their original villages after 1971 which is reflected in low density of population in the block. It also reflects in proportionate availability of workforce. Khawzawl block, on the other hand, has high density of population. Khawzawl block also

accommodated six villages such as, Kawlkulh, Chawngtlai, Neihdawn, Zote, Ruallung, Hnahhlan and three towns of Khawhai, Champhai and Khawzawl as grouping centers between 1969 to 1970. The physical resources as well as availability of suitable land for agriculture continued to attach population from the grouped villages. This is the main reason for higher concentration of workforce in this block. However due to seasonal character and mono agricultural practices, labour productivity in these blocks are proportionately low.

Total workers and Labour productivity

There are two blocks which have equitable distribution of total workers and labour productivity. These blocks are Darlawn and Bunghmun blocks. Darlawn block is located in the northern part of the state. In 1970 six villages were selected as grouping centers such as Phaileng, Kepran, Ratu, Vervek, Zohmun, Khawruhlian and one settlement of present town of Darlawn. Owing to their low percentage of physical resources with rugged topography, most of the villagers were forced to leave the grouping centers. On the other hand, the northern part of the state is dominated mostly by Hmar tribes who migrated to the state due to internal clash between various tribes in Manipur. Later, this tribe demanded separate Autonomous District Council in the northern part of the state. As a result, it attracted population from the southern Manipur which resulted in moderate density of population. With Insufficient moisture supply and other physical factors, the people in both the blocks are forced to utilised their land to its maximum extent. As such the percentage of total workers and labour productivity is high in this block in spite of their limited cultivable land**.** Bunghmun block is located in the western part of the state

bordering Bangladesh. Four villages were also chosen as a grouping center in the present block such as, Buarpui, Darngawn 'W', Kawnpui "W' and Puankhai. The block is characterised by low relief and narrow valleys of rivers such as river Khawtlangtuipui, river Kau and river De which drain the block. It is also characterised by hot and humid climate which has given rise to dense bamboo shrubs. Such a condition has forced the people to leave the grouping centers in the block in favour of their original villages. As a result, it has the lowest population in the state. Bunghmun block is mostly dominated by Riangs (Tuikuk) who are generally not well integrated with the sub tribes of the Mizo people. Therefore Inspite of negative climate, and very low standard of living, the people in this block are forced to adjust to their own environment. As a result, the block has equitable distributed but, proportionate working population and labour productivity.

Region of One Predominant and two evenly Resources

Most of the blocks in Mizoram, however, have disproportionate distribution of factors which have been considered for evaluation of human resources in the present study. They reflect either disproportionate concentration of population or workers or their productivity. Such a lopsided distribution of human resource factors may only be explained in the light of obtained environmental conditions and historical process that vary from area to area in Mizoram

Thus, there are certain areas where density of population is found to be disproportionately high as compared to the workforce and their productivity. It suggests a negative balance of human resource factors. On the other hand, some areas are found to

have predominance of workforce suggesting disproportionate participation of people in earning their livelihood due either to difficult natural conditions or their remote locations.

Total workers

There are two blocks that have been dominated by one resource and two equitably distributed of human resources. These blocks are E.Lungdar and Khawbung block. These two blocks lie adjacent to each other and fell under one administrative block as E.Lungdar till 1995. E.Lungdar block is located in the eastern part of the state. The block also experienced grouping of villages at three centers such as in N.Vanlaiphai, Sialhawk and E.Lungdar during 1969- 1970. Similarly like other blocks, smaller section of the population from grouping centers flowed out in search of suitable lands. In 1974, when the block was created, its administrative significance attracted people to sustain their livelihood from the surrounding villages. As such the block has proportionately high percentage of population. In addition, the location of two towns such as Biate and N.vanlaiphai may be attributed to higher concentration of population in the block. Due to formation of Serchhip district in 1997, E.Lungdar gained more importance as block headquarters. As such, with small economic base the block has higher percentage of working population with proportionate labour productivity. Khawbung block is located in the eastern corner of the state. The block though experienced grouping of villages during 1967- 1970 but in post grouping phase out migration of population from erstwhile grouping centers like Bungzung, Vanzau, Vaphai, Farkawn and Khawbung took place. Moreover, the block was carved out of E.Lungdar in 1995 with smaller share of the population. With its peripheral location, and determining physical factors, the environment

has compelled the people to engage in any economic activities. As a result, the block has higher percentage of working population with proportionate labour productivity.

Labour productivity

Thingdawl, Aibawk and Sangau blocks have been dominated by Labour productivity. Thingdawl block is located in the northern part of the state and merged with the Assam plain. The block is mostly dominated by Hmar people. Between 1967- 1970, eight villages were selected for grouping centers as insurgent activities was more prominent in the northern parts of the state. When Kolasib district was carved out from Aizawl district in 1997, Thingdawl block become more important. It covers the whole district of Kolasib. In addition, the location of four towns such as Kolasib, Vairengte, Bairabi and N.Kawnpui is responsible for higher concentration of population apart from migration of hmar people from Manipur and Assam. But the block owing to its location in the northern part of the state adjacent to Cachar plain has favourable land for agriculture. Combined with adequate rainfall and irrigational facilities, the block has marginally higher labour productivity, as compared to the proportionate distribution of population and workers. However, proportion of workers is negatively impacted in relation to the total population caused by the facilities offered by the four urban centers in the block.

Aibawk block is located in the northern part of the state lying adjacent to Tlangnuam block that houses the state capital. The block has low concentration of population which may be attributed to its nearness to the state capital. As such the block has proportionate working population. Its favourable natural resources on the other hand, have resulted in higher percentage of labour productivity.

Sangau block is located in the south eastern part of the state. The block did not experience grouping of villages ever. It falls under Lai Autonomous District council. As such the block has been dominated by Lai people. Since the people have their own administrative unit, the people in this block rarely move out to other areas. This is the reason of moderate concentration of population in this block. The block on the other hand, has small percentage of working population. Endowed with rugged topography but adequate moisture supply through rainfall and irrigational facilities the block to commands proportionately higher labour productivity.

Region of One Predominant Resource Region

Region of High Concentration of Population.

There are five blocks that have been dominated by larger concentration of population. These blocks are, Tlangnuam, Lunglei, Tuipang, Chawngte and Lawngtlai block. Tlangnuam and Lunglei blocks also experienced grouping of villages between 1967- 1970. On the other hand, the settlement pattern in the grouping centers, which followed the process of concentration of members of any particular village in one block or the other, helped in deteriorating village solidarity. Thus, the settlement in the grouping centers upset village solidarity despite retaining village loyalty and identity to their original abode. The villagers in the grouping centers gradually lost village solidarity based on tribal setting. As a result, people started feeling less attached to the villages. This further helped in the consequent migratory flow propelled by perceived better economic opportunities in towns in these blocks. As such, the density of population becomes very

high in both Tlangnuam and Lunglei blocks. The high density of population in Tlangnuam and Lunglei blocks may be attributed to their status as service towns which started attracting people not only from different parts of the state but also from different corners of the country. Fair accessibility of the blocks further made it suitable for enlarged settlement. The engagement in agricultural activities therefore, became much less due to the urban character of these settlements. Therefore, in spite of relative suitability of the block for cultivation agricultural labour productivity does not correspond to the number of the people.

Tuipang, Lawngtlai and Chawngte blocks are located in the southern part of the state. These three blocks have distinct tribal group in a well defined geographical units. Chawngte block has been dominated by the Chakmas, Lawngtlai block by Lais people and Tuipang block by Mara people. These people hardly migrate to other areas as they are generally enscored in their own administrative unit. As a result, they reflect higher concentration of population due to high natural growth rates in these blocks. In addition, illegal migration of Chakmas from Bangladesh to Chawngte and Lawngtlai blocks and from Myanmar to Tuipang is also responsible for higher concentration of population in these blocks.

Region of High Proportion of Workers.

There is only one block of Lungsen that is dominated by higher proportion of workers. This block is located in the western part of the state bordering Bangladesh. This block is also dominated by almost secluded Chakmas that dispersed from Chawngte block. In spite of unfavourable topographical and climatic conditions, the Chakmas found this

block adoptable. Most of the natural conditions being unfavourable in this block the Chakmas could sustain only by infusing larger proportion of their population in economically productive activities though only at a subsistence level. Thus, this block maintains a separate identity where working population is proportionately more than other aspects of human resources.

Region of High Labour Productivity.

There are four blocks that are found to have proportionately higher labour productivity. These blocks are Phullen, Ngopa, Reiek and W.Phaileng. Phullen and Ngopa blocks adjacent to each other are located in the northern part of the state bordering Assam and Manipur. Phullen block was carved out from Ngopa block in 1999. Located on higher elevation settlements in these blocks are dominated by Hmar tribe. The people in search of peace and security have taken shelter in these blocks due to socio- political tension in and around Manipur and Assam. As such Phullen and Ngopa blocks have proportionate population and working population. Higher proportion of labour productivity on the other hand, may be attributed to the influence exerted by the cultivators of Assam and Manipur plains despite their rugged topography. As a result, majority of the population is engaged in productive economic activities. Obtained physical conditions have also forced the people to engage themselves in economic pursuits in order to sustain their life.

Reiek block is located to the west of Tlangnuam block. Low proportion of population in the block may be attributed due to their nearness to the state capital of Aizawl . Connected by fairly good transportational network, the people in this block are also engaged in diversified agro based occupations apart from traditional agricultural

activities. This has contributed to proportionately higher labour productivity in this block. W.Phaileng block, on the other hand, is located in the western part of the state bordering Bangladesh. Social tension between the Mizos and Riangs may be responsible for lower concentration of population in this block. Besides, harsh physical environment, the people of Riang tribe found adapted themselves to this place, wherein a smaller proportion of people in working age group has to sustain a relatively high proportion of population dominated by old aged, female and children by enhancing their productivity.

The above analysis of their human resources endowments clearly suggest that other aspects of the resources are not in proportion to their population. The study of resource region clearly suggest that the region which are deficient in one aspect or the other, need them to be properly harnessed in order to use properly the most important of all the resources in the state, in the best interest of the state in general and the different region in particular. In this regard, the region of evenly distributed human resources appear to pose least problem as they appear to possess the capability to maintain their existing and potential population in much better way than other regions. Thus the blocks of Tlangnuam, Aibawk, and Chawngte may be recognized as the most problematic due to proportionately higher concentration of population productive capacity.

Table- 3.1

RANKING OF BLOCKS BASED ON Z-SCORE FOR DIFFERENT COMPONENTS OH HUMAN RESOURCES

Human resources evaluation							
Sl.no	Blocks	X9	Rank	X10	Rank	X11	Rank
1	Aibawk	-0.24	11	0.77	19	1.54	20.5
2	Darlawn	-0.3	5	0.97	21.5	2	22
3	Phullen	-0.25	9.5	-0.47	6	1.62	21
4	Thingsulthliah	-0.13	16	0.22	15	0.65	17
5	Tlangnuam	4.45	22	-1.36	3	-1.59	1
6	Bunghmun	-0.42	1	0.16	14	0.51	16
7	Hnahthial	-0.26	7.5	0.14	13	-0.81	5
8	Lungsen	-0.25	9.5	0.31	16	-0.92	4
9	Lunglei	0.06	21	-0.96	4	-1.32	2
10	Ngopa	-0.31	4	0.02	12	0.7	18
11	Khawbung	-0.23	12	0.41	18	-0.08	13
12	Khawzawl	-0.09	18	0.35	17	-0.57	7
13	E.Lungdar	-0.18	15	0.97	21.5	-0.49	10.5
14	Serchhip	-0.03	20	3.11	22	-1.16	3
15	Sangau	-0.26	7.5	-0.42	7	-0.46	11
16	Tuipang	-0.2	13.5	-1.54	1	-0.49	10.5
17	Thingdawl	-0.1	17	-0.1	10	1.54	20.5
18	Chawngte	-0.05	19	-0.7	5	-0.68	6
19	Lawngtlai	-0.2	13.5	-1.49	2	-0.16	12
20	Reiek	-0.37	2	-0.26	8	0.27	15
21	W.Phaileng	-0.32	3	-0.12	9	0.08	14
22	Zawlnuam	-0.28	6	0	11	-0.49	10.5

3.5. LEVELS OF HUMAN RESOURCE DEVELOPMENT

The level of human resource development has been categorized into three groups. The blocks having a Z-Score value above 1.37 have been group as developed. Similarly, the blocks with a score between -0.01- 1.37 have been group as developing and below -0.01 as underdeveloped respectively.

Developed Human Resource Region

There are four blocks that are identified as developed blocks. These blocks are Darlawn, Aibawk, Serchhip, and Tlangnuam blocks.

Darlawn block scores the highest value of 2.67 on the overall human resource index. Low concentration of population in this block may be attributed to its rugged topography and inaccessibility of many areas. Moderate physical resources, on the other hand, has encouraged the people in this block to participate in agricultural activities. As a result, the block scores very high in total workers. Higher value in total worker resulted in higher labour productivity in this block.

The second highest on the overall human resources index is Aibawk block. The block score 2.07 on the human composite index. The block has low density of population which is below the state average. Low pressure of population on the land and moderate land on cultivable slope has facilitated the people to engage in agricultural activities. Sufficient amount of rainfall coupled with irrigational facilities on the other hand, has helped the block to scores high with regard to labour productivity in this block.

Serchhip block scores 1.92 and ranks third on the composite index of human resource. The presence of Serchhip and Thenzawl towns is the factor that is responsible for

higher concentration of population in this block. Inspite of unfavourable physical factors, the population in this block in order to sustain has to engage in one kind of activities or the other. As such the block has higher workforce.

Tlangnuam block that houses the state capital score 1.5 and ranks fourth on the human resource evaluation. Despite, low total workers and labour productivity, the block scores the highest in the density of population that may be attributed to the status as service centre which attract people from different part of the state. Lower concentration of total workers may be attributed due to the urban nature in this block. Therefore, inspite of suitable land for cultivation, agricultural labour productivity does not correlate with the number of the people.

Developing Human Resource Region

There are seven blocks that falls under this category. These blocks are Thingdawl, Phullen, Thingsulthliah, Ngopa, E.Lungdar, Bunghmun and Khawbung.

Thingdawl block ranks 5th and scores 1.34 on the human composite index. The block is located in the northern part of the state. The block merges with the Assam plain in the north and Tlangnuam block in the south. The block is endowed with rich natural resources. The location of four towns such as Kolasib, Vairengte, Bairabi and N.Kawnpui is responsible for higher population in this block. Favourable physical factors and irrigational facility has enabled the block to yield higher productivity. Lower proportions of total workers in this block are caused by the facilities offered by the four urban centres.

Phullen block scores 0.9 and ranks 6^{th} on the composite index. The block has low density of population. Lower workforce in the block may be attributed to its rugged

topography. Inspite of unsuitable land for cultivation, moderate precipitation and irrigational facilities has helped the block to have higher productivity. Thingsulthliah block located to the west of Tlangnuam block ranked 7th and scores 0.74 on the composite index. Moderate physical factors, has favoured the block to have proportionate human resources. Ngopa block on the other hand, located adjacent to Phullen block ranked 8th and scores 0.41 on the human composite index. Similarly like Phullen block, the block has also been dominated by rugged topography. Located in the northern part of the state bordering Manipur plain, higher productivity in this block may be attributed to the influence exerted by the cultivators of Manipur plains.

E.Lungdar is another block that falls in the developing region. The block is located in the eastern part of the state. The block scores 0.3 and ranked 9th on the human resource evaluation. The location of the two towns of Biate and N.Vanlaiphai may be responsible for higher concentration of population. Moreover, the block gained more importance due to the formation of Serchhip district in 1997. As such the block has higher total workers with proportionate labour productivity.

Bunghmun block located in the western part of the state bordering Bangladesh ranks 10th and scores 0.25 on the overall human composite index. Low density of population may be attributed to the internal tension between the Mizos and the Riangs besides its unfavourable physical factors. Therefore inspite of negative climate and with low standard of living, the people in this block is compelled to adjust to their environment. As a result, the block scores high value in both the total worker and labour productivity. Khawbung block ranked 11th and scores 0.1 on the composite index of human resources.

Dominated by agro resources, the block has higher percentage of total workers and equitable distribution of both in respect of density of population and labour productivity.

Underdeveloped Human Resource Region

All the southern block of the state, western part of the state and one in the north eastern part of the state falls under this category. These blocks are Khawzawl, Reiek, W.Phaileng, Zawlnuam, Lungsen, Hnahthial, Sangau, Chawngte, Lawngtlai, Lunglei and Tuipang. Khawzawl block ranks 12th, Reiek 13.5th, W.Phaileng 13.5th, Zawlnuam 15th, Lungsen 16th, Hnahthial 17th, Sangau 18th, Chawngte 19th, Lawngtlai 20th, Lunglei 21st and Tuipang 22nd.

Khawzawl block is located in the eastern part of the state bordering Myanmar. The block has high density of population that may be attributed to the presence of four towns of Champhai, Khawzawl and Khawhai. Low human resources in Reiek block may be attributed due to its nearness to the state capital. Available transportational network and favourable physical factors has encouraged the people to engage in agricultural activities which contributed to proportionately higher labour productivity in this block.

W.Phaileng is located in the western part of the state bordering Bangladesh. Social tension between the Mizo and Riangs is responsible for lower concentration of population. Similarly, low level of human resources in Zawlnuam block may be attributed to large illegal migration of Riang from Tripura. Similarly, Lungsen block located in the western part of the state bordering Bangladesh, experience illegal migration of Chakma. Inspite of unfavourable physical factors, the people in this block could sustain only by infusing larger population in economically productive activities though only at a subsistence level.

As such total workers ranked high in this block than Density of population and labour productivity.

Hnahthial and Sangau blocks located to the east of Lunglei block scores very low on the human resource evaluation. Their locations on rugged topography with low levels of cultivated land are responsible for lower human resources in this blocks.

The overall human resource evaluation reveals that blocks located in the southern part of the state such as Tuipang, Lawngtlai and Chawngte score very low in the human resources. These three blocks fall in under developed blocks. These blocks are characterized by ridges and wide valleys with hot and humid climate throughout the year. These blocks are dissected by rivers such as Chhimtuipui river, Kawrpui river and Tuichawng river. Inspite of their topography with lack of transportational network, its peripheral location and harsh environment on the other hand, has hindered the development of human resources in these blocks.

The human resource evaluation map shows that, the southern part of the blocks is dominated by under developed block. The map also shows that, most of the western parts of the state have scores low on human resource evaluation. This may be attributed due to the influx of Riangs and Chakmas refugees that spread and settled in the western part of the state. The other reason may be attributed to inaccessibility of large areas hindered mostly by dense cover of vegetation which have been dissected by rivers with hot and humid climate. The highest or the most developed blocks in human resources are found in the northern part of the state.

Table – 3.2

RANKING OF BLOCKS BASED ON Z- SCORE FOR DIFFERENT COMPONENTS OF HUMAN RESOURCE

Z-Score as an indicator of human Resource Development						
Sl.no	Blocks	X9	X10	X11	Total	Rank
1	Aibawk	-0.24	0.77	1.54	2.07	2
2	Darlawn	-0.3	0.97	2	2.67	1
3	Phullen	-0.25	-0.47	1.62	0.9	6
4	Thingsulthliah	-0.13	0.22	0.65	0.74	7
5	Tlangnuam	4.45	-1.36	-1.59	1.5	4
6	Bunghmun	-0.42	0.16	0.51	0.25	10
7	Hnahthial	-0.26	0.14	-0.81	-0.93	17
8	Lungsen	-0.25	0.31	-0.92	-0.86	16
9	Lunglei	0.06	-0.96	-1.32	-2.22	21
10	Ngopa	-0.31	0.02	0.7	0.41	8
11	Khawbung	-0.23	0.41	-0.08	0.1	11
12	Khawzawl	-0.09	0.35	-0.57	-0.31	12
13	E.Lungdar	-0.18	0.97	-0.49	0.3	9
14	Serchhip	-0.03	3.11	-1.16	1.92	3
15	Sangau	-0.26	-0.42	-0.46	-1.14	18
16	Tuipang	-0.2	-1.54	-0.49	-2.23	22
17	Thingdawl	-0.1	-0.1	1.54	1.34	5
18	Chawngte	-0.05	-0.7	-0.68	-1.43	19
19	Lawngtlai	-0.2	-1.49	-0.16	-1.85	20
20	Reiek	-0.37	-0.26	0.27	-0.36	13.5
21	W.Phaileng	-0.32	-0.12	0.08	-0.36	13.5
22	Zawlnuam	-0.28	0	-0.49	-0.77	15

CHAPTER IV

CULTURAL RESOURCE EVALUATION

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CULTURAL RESOURCE EVALUATION

"Cultural resources stem from the interaction between tow original resource factors, nature and man" (Kumar, 1981:130). Man in order to survive within his natural environment starts exploring his surrounding areas. In the process he modifies his natural environment and builds houses to protect him from severe cold. To protect himself from wild animals he begins to live in a community. In this way man gather knowledge and experience and impart his skill to his descendent. In this way he starts building his culture. "All the accumulated human knowledge and experience and its resultant effects may be considered as cultural resource factors" (Kumar. 1981, Ibid:130). Culture briefly defined, is that what is learned, shared and transmitted in a society. Culture is learned. The members of a culture share certain ideals, which shape their lives. Generations learn to follow these ideals and principles. Culture propagates through generations, which adopt their old customs and traditions as a part of their culture. The ideals they base their lives on is a part of their culture. Cultural values are imparted from one generation to another, thus resulting in a continual of traditions that are a part of culture. The language, the literature and the art forms pass across generations. Culture is learned, understood and adopted by the younger generations of society. No individual is born with a sense of his/her culture. He/she has to learn it. Culture is shared, by which we mean that every culture is shared by a group of people. Depending on the region they live in, the climatic conditions they thrive in and their historical heritage, they form a set of values and beliefs. This set of their principles of life shapes their culture. No culture belongs to an individual.

It is rather shared among many people of a certain part of the world. It belongs to a single community and not to any single human being. Culture as Spencer and Thomas put it, "is the distillate of total human experience" (Spencer and William, 1973:3). These human experiences, however, are bound to be variable in different set of physical environment followed by different set of chain reaction. In this regard, O.P Singh state that "a culture refers to a distinctive way of life—a specific set of learned, shared, transmitted ideas and behaviors" (Singh, 1983:232). Whatever may be the way of life, it is bound to be different as man is never free from the influence exerted by nature especially in existing circumstances. Most obviously, it is the body of cultural traditions that distinguish specific society. When people speak of different language they are referring to the shared language, traditions, and beliefs that set each of these peoples apart from others. In most cases, those who share other culture do so because they acquired it as they were raised by parents and other family members who have it. Political boundaries, ethnic differences and social distance can also caused barriers but interaction among them while maintaining those barriers, share and transmitted their own culture. "The difference in culture is reflected through its contents which include religious belief, social organizations, technological and material possessions" (Taylor,1924:1). The behavior of man, however, varies from one set of physical environment to the other and so changes his cumulative knowledge and experience. These are manifest in art and artifact which persist through tradition and from generation to generation. This is reflected in the social and economic infrastructure he builds to take maximum advantages from nature. The concept of maximum advantage is however, is subject to the level of cultural attainment and

technology on its command, of a particular cultural group. Moreover, in no cases the expansion of those advantages ceases.

An analysis of cultural development shows that man in order to survive has acted upon his environment his main aim is to attain betterman for himself and for his society. The net result is the creation of culture. Therefore, Zimmermann defines culture as "The sum total of all the devices produces by man with the aid, advice and consent of nature to assist him in the attainment of his objectives" (Zimmermann,1951:115). There may be difference of opinion regarding the definition of culture as scholar of different disciplines have attempted from different angles. But they all agree over one point that culture, unlike the natural and human resources, is not an original factor rather it is derivative from the chain reaction between the two, which starts right from the beginning of the human civilization. Also they agree that after creation of culture up to a certain level man is able to modify if not alter the influence of nature and 'emancipates' himself from 'passive adaptation' to an active energy. The culture also opens new vistas and man is able at times to compensate or even replace the rare natural resources with the aid of culture. On the other hand, culture varies in origin, form and function according to the natural environment. In this regard occidental machine civilization certainly has an advantage over the oriental vegetal civilization. In the former, increasing use of inanimate energy has relieved manpower, as well as has ensured maximum utilization of natural resources. With the development of tertiary and quarternary activities man has learn how to live on meager and exhaustible resources nature has provide. That too with the increased height of living standard and better living condition. On the other hand, in vegetable civilization, human power and economy is still very low and most of the economy is essentially subsistence

oriented with marginal or no capital formation. More over industrial revolution which have been beniffited by the west have yet to be realised. As such prosessing and transformation in the industries is very limited. Western impact however, has been inmmense and certainly some advantages of the west have been transmitted to the east, particularly in the economic sphere. At least people are becoming increasingly conscious of efficient resource use and better living conditions.

Man has a natural bent for economy and other cultural elements are certainly affected by the nature of the economy a cultural group possesses or it allows to diffused with. In accordance with the economic leaving a particular group developed its techniques and societal arts which are aimed at further betterment of the society. In this context, the cultural elements which help develop the economy may well be recognized as additional resource to the mankind besides the natural and human resources.

The study of culture is important because of the fact that it is cumulative experience and knowledge of the human world, its innovative capacity which enables him to find out the difference uses of the natural substances and their processing and transformation. This suggests the study of tangible aspect of culture, no doubt, but study of some intangible aspect is as important, as they have some apparent influence on the social, economic and institutional structure of the group. In the present study, though, the intangible aspect has been discussed; emphasis has been given to some representative tangible aspect of culture. It is important to understand the ethnology, religion and social structure of a cultural group as they influence the other tangible aspects of culture. Educational, health and transport resources have the reflection of such intangible aspect of culture therefore; these three parameter has been taken as an indicator of cultural development.

EDUCATIONAL RESOURCES

4.1. LITERACY

Literacy is considered as one of the key indicators of human resource development. Literacy could be considered as both cause and effect of development (Rahi,1996:593). Various dimensions of social- cultural change in any society can be understood in the light of the level of literacy and education. Education is the signal most determinant of long term economic growth of a nation (Coleman, 1965). Rural development is seen with the level of literacy because it is an active agent and alters every aspect of life of the people by extracting, accumulating, transforming all types of resources and after all the development the personality of an area and by making people with available essential resources for their basic needs.

For all round development, knowledge, know- how, and efficiency with managerial qualities that are the utmost need for any meaningful development. These developmental resources are possible to acquire only when people in any region are able to read and write. Hence the level of literacy opens new prospect for development. In these respect, it is observed that the stare of Mizoram is in an advantageous position in the field of education. The literacy rate for male during the same census was 90.7 percent and for females was 86.7 percent. At the district level the highest literacy rate was observed in Aizawl district with 96.5 percent. The lowest literacy rate was found in the district of Lawngtlai with only 64.7 percent.The highest literacy percentage is observed in the block of Tlangnuam with 97.35 percent followed by Aibawk block with 96.8 percent. The lowest

percentage is found in the block located in the western part of the state of Lungsen block with only 57.35 percent (Appendix XX). There are thirteen blocks which have the literacy percentage above the state average of 88.88 percent and nine blocks below the state average (Map No. 4.1). Blocks with low literacy below the state average are found in the western part of the state bordering Bangladesh and Tripura. These blocks are mostly occupied by Chakmas and Riangs who are considered as minor groups in the state with low level of living.

4.2. SCHOOL PER 500 STUDENTS

Educational institutions which are supposed to be the first places of learning and knowledge definitely represent an important aspect of the modern society. Moreover, the spread of educational institutions certainly affects the composition of the working population particularly in a economy where otherwise children of school going ages would have been included in the active list (Beanjeu-Garnier,1976). In this regard Scott Moreland state that "it is only education that can create the necessary skill to achieve sustainable economic growth and to increase the quality of life" (Moreland,1993:256-261). Thus, Education plays a vital role in the building up of knowledge and the diffusion of innovation. New techniques and mode of production require a minimum level of awareness which can obtain by education (Vishwakarma,2003). As regard the spread of educational institution in the state. The first lower primary school was opened in Mizoram in 1901and the first middle school in 1906and Mizo high school was established in 1944. There after the number of school increases rapidly run through by private. College level education in the state came still later with the establishment of Aizawl college in 1958

which later came to be known as Pachhunga University college. The number of school in 2006 was 3387 with 257623 numbers of students. As a whole school in relation to the students in Mizoram is 7.92. In this connection, it is noteworthy that distribution of schools does not correspond with the requirement of the people in different part of the state. Therefore more thinly populated blocks such as Bunghmun (10.83) have the highest concentration of school per students (Appendix-XXI). This block contributes 1.78 percent of population in the state. The other blocks which have more than the state average are Lungsen 9.38, Sangau 9.74, and Reiek 9.49. The lowest concentration of school in relation to students is found in the block of Tlangnuam, the location of the state capital, which houses 28.23 percent of the state population have only 5.60 of school per students. Moreover, the distinct tribal groups in well defined geographical units also influence the decision of the government as well as the voluntary organizations in the establishment of educational institution Such as Lawngtlai 8.25, Sangau 9.74, Chawngte 6.13 and Tuipang block with 5.88. The reason of low school per 500 students in the block of Tuipang and Chawngte may be attributed due to its peripheral location. These two blocks are located in the south eastern and south western corner of the state. This has resulted in the uneven distribution of school in the state. As a matter of fact nine blocks have lower schooling facilities than the state average. The rest thirteen blocks have higher facilities than the state average.

4.3. TEACHER PER 500 STUDENTS

The state has an average of 40.52 teachers' in relation to 500 students. The highest ratio is found in the block of Sangau with 53.84 followed by Reiek block with 52.92 and

Lunglei block with 51.33 (Appendix- XXII). Two blocks of Sangau and Reiek also scores the highest ratio in school per students. The lowest teacher student ratio is found in Chawngte block located in the western corner of the state. It is followed by Tlangnuam block with 29.82. The low ratio in Tlangnuam block may be attributed to better educational facilities that attract school going children from different part of the state. There are ten blocks which have educational facilities below the state average. These blocks are Lungsen, Chawngte, Thingdawl, Tlangnuam, Aibawk, Serchhip, Khawzawl, Khawbung, Tuipang and W.Phaileng. Twelve blocks such as Zawlnuam, Bunghmun, Lawngtlai, Hnahthial, E.Lungdar, Thingsulthliah, Darlawn, Phullen, Ngopa, Reiek, Lunglei and Sangau have educational facilities above the state average.

TRANSPORT RESOURCES

4.4. ROAD DENSITY PER 100 SQ.KM

Among the constituents of infrastructure, transport plays one of the most important roles in the economic development of any region. “Transport is a key stone of civilization. The spread of production, trade and ideas and the economic ascendancy of mankind all depend upon movement” (Stubbs, Tyson and Dahi,1980:1). Thus, transport systems are closely related to socio- economic changes. The mobility of people and freight and level of territorial accessibility are at the core of the relationship. Economic opportunities are likely to arise where transportation infrastructures are able to answer mobility needs and ensure access to market and resources (Rodrigue,Claude Comtois and Brain slack, 2006). In Mizoram the only mode of transportation is roads. This is due to the rugged topography of

the state where construction of roads becomes very difficult. Attempts have been made to connect different part of the state by road which is the only possible and economic mode of transport within the state. Due to north- south alignment of mountain ranges it is difficult to construct road in east- west direction as it is costly where roads have to pass deep gorge and valley. There is only one rail head at Bairabi which is located in the northern part of the state near the boundary of Assam and connect these two states by rail with the rest of the country. It is the cheapest mode of transport. But the role in the intra state economy is insignificant as the rail road falls only 1.26 kilometer in Mizoram. The other mode of transport which is mainly concerned with the movement of passenger is the airway. Moreover, the uneven landscape does not promise the growth of air borne traffic. This, leaves only the roadways as an important means for internal and external movement of people as well as of goods

The total length of roads in Mizoram is about 6054.21 kilometers of which 4313.11 kilometers or 71 percent is surfaced roads and 1741.10 kilometers or 29 percent is unsurface road. The state is connected only with one national highway known as National Highway No. 54 from Silchar (Assam) to Tuipang in the north. It has a length of 884.78 kilometers. Besides the national highway, there are quit a sizeable length of the roads which connect all the district and block headquarters such as state highway, district, village roads, town and city roads which account for 5169.43 kilometers.

To access the transport in the state, density per 100 square kilometer has been taken to explain the inaccessibility and accessibility of the area. The average density of roads in the state is 30.24. In this regard it appears that Tlangnuam block has the highest density with 97.46 per 100 square kilometers which is more accessible than any other part of the

blocks (Appendix- XXIII). The block has benefitted due to the location of the state capital. It is connected by roads from different part of the state as it is the central administrative block.

The second highest density is found in Thingdawl block with 36.53 per 100 square kilometers. Owing to its location in the northern part of the state with low relief features bordering Assam plain. The block is connected by national highway. Since the state has rugged topography most of the roads follow the alignment of mountain ranges from north to south. As a result blocks which are located far from the national highway and state highway have low densities that have been mostly connected by district as well as village road. This is true in the case of Chawngte block with only 19.42 per 100 square kilometers which is the lowest in the state. The other reason may be attributed to small size with dispersed type of settlement. But there are blocks located away from the national highway and state highway that have high density of roads. This may be attributed due to the effort given by the state government to enhance livelihood security in rural areas under National Rural Employment Guarantee Scheme. Under such scheme roads has been constructed to connect their neighboring areas as well as their farm land to play a vital role in accelerating the development in rural areas linking them with the administrative and marketing centres and providing facilities for social mobility. Blocks such as Thingdawl, Darlawn, Phullen and Khawzawl located in the northern and eastern part have density above the state average. These regions have strategic as well as developmental value as it borders Assam, Manipur and Myanmar for long distance. This suggests that beside the uneven topography, strategic as well as other cultural aspects of settlement have influenced considerably the density of roads in different part of the state.

4.5. DENSITY PER ONE LAKH POPULATON

In the word of Youngson, “the more closely one examines the impact of transport improvement, the more clearly one realizes how pervasive this impact is, in what a multitude ways the transport system helps to determine the scope and direction of economic development and how important are transport improvements in creating new opportunities and new incentives” (Youngson,1967:83). This suggests that transport is very essential to move people or goods from where they are to where they would prefer to be. Availability of transport is of utmost important as accessibility to any region impart knowledge and skill to the people thereby developing human resources which ultimately leads to economic growth.

The average availability of roads in relation to the population in the state is 904.10. This is certainly very high with 904.10 kilometers of roads for every one lakh persons. The evaluation of density in relation to roads becomes very essential as roads broaden the market for goods and thereby making possible large scale production. Development of roads network makes possible to develop fully the agriculture where other mode of transportation is not much available due to uneven topography. In such region roads facilities are required by agriculture normally to market

its product. Availability of roads support new ideas as it help in the diffusion of knowledge from developed areas to undeveloped areas and also help in mobility of labour from one occupation to other occupation. It open up remote regions which are inaccessible and thereby linking them with the markets and enables the regions to produce what it can be at the cheapest cost. In hilly region like Mizoram, availability of roads network is very important as it is the only available mode of transport for passenger and goods. The

highest density per one lakh population of road is found in Bunghmun block which is located in the western part of the state (Appendix- XXIV). This region score among the lowest in density per 100 square kilometer of roads. The highest score in this category may be attributed due to low concentration of population which is only 1.78 percent from the total population. The density per one lakh population in this block is 1647.73 which mean 1647.73 kilometer of road is available for every one lakh persons. The second highest is found in Darlawn block with 1529.34 kilometers followed by Phullen block located adjacent to Darlawn block with 1258.09 kilometers.

The lowest availability of roads in relation to population is found in Tlangnuam block, the block that houses the state capital. The reason for low value may be attributed to high concentration of population in this block. This block contributes 28.23 percent from the total population in the state. This is also in the case of Lunglei block where it contributes 7.11 percent of its population. These blocks have low value with 405.03 kilometers. The second lowest is Chawngte block in the south western corner of the state. There are thirteen blocks that are below the state average. These blocks are Thingdawl, Tlangnuam, Thingsulthliah, Serchhip, Khawzawl, E.Lungdar, Lungsen, Lunglei, Hnahthial, Chawngte, Lawngtlai and Tuipang, Blocks such as Zawlnuam, W.Phaileng, Bunghmun, Aibawk, Darlawn, Phullen, Ngopa and Khawbung recorded above the state average.

HEALTH RESOURCES

4.6. NUMBER OF DOCTORS PER 500 POPULATION

Health is an important element of well being. The health facilities available to a person indicate his level of living. Enjoyment of health facilities has taken place among 'human rights' (Dash,2007:159). Not only is that health is connected with the human rights, provision of adequate health care facilities also accelerate economic development in a country. A healthy population is a prerequisite for economic growth. In order to evaluate the medical resources, attempts have been made to study it in relation to the population of each block. Hence availability of doctors has been studied in relation to 500 people. But this gives wrong impression that in some areas the areas with greater doctors are medically more resourceful. On the other hand, this is true in the case of the capital with large population where medical facilities are available. In such case medical facilities may be good in the capital but since the population is very large the availability in terms of population may be small as compared to other blocks. Health being one of the prime concerns of mankind medical facilities has to be evaluated in relation to population and not the number. Hence, Tlangnuam block score the highest with 0.51 of doctors per 500 population. This means 0.51 doctors are available for every 500 persons in Tlangnuam block. The availability of doctors in this block may be attributed to the location of the state capital. Khawzawl block located in the eastern part score the second highest in terms of doctor and population. The average doctors and population ratio in the state is 0.13. Beside Tlangnuam and Khawzawl block, blocks that score more than the state averages are Lunglei, Serchhip, Tuipang, and Thingdawl. In terms of population, these blocks have the

highest concentration of population. This reveals that blocks with higher concentration of population have score very high. On the other hand, blocks that has moderate population such as Lawngtlai, Chawngte, Lungsen and Thingsulthliah score below the state average. This may be attributed to their peripheral location. The lowest score is found in the block of Lungsen with only 0.02. There are fifteen block that are below the state average and seven blocks above the state average of 0.13.

4.7. NUMBER OF BEDS PER 500 POPULATION

It is again obvious from the table that the availability of hospital beds is by no means proportionate to the number of the people. This like the distribution of educational institutions may be attributed to the government policies of making medical facilities available in all the blocks irrespective of the number of the people. This has resulted in the unbalanced distribution of medical facilities in the state. As such, 15 blocks out of 22 blocks have score below the state average of 1.16 of beds per 500 population. The highest score is again found in the block of Tlangnuam with 3.17 of beds per 500 population (Appendix- XXVI). This may be high as compared to other blocks. But as compared to the population of this block with 28.23 percent from the total population, the availability of beds is very low. It is only 3.17 beds for every 500 population. The second highest is found in the block of Zawlnuam located in the north western part of the state. This block scores the third in the availability of doctors per 500 population. Lunglei block score again the third highest in this category. The lowest score is found in the block of Lungsen. The same block also holds the lowest in doctors per 500 population. Other blocks such as Lawngtlai, Aibawk, Thingsulthliah, Bunghmun, Khawbung, Sangau, Tuipang, Chawngte,

Lawngtlai, Reiek and W.Phaileng block also score very low. Some of the blocks in the state have very low facilities with only Primary health Centre and Community health Centre that accommodate only 30 to 40 beds. Most of the blocks that score high in this category are the blocks that have high concentration of population.

4.8. CULTURAL RESOURCE ASSOCIATION REGIONS

On the basis of the above analysis four cultural resource regions may be recognized:

1. Region of Equitably Distributed Cultural Resources,
2. Region of Two Cultural Resources Equitably Distributed,
3. Region of One Predominant and Two Equitably Distributed Cultural Resources and,
4. Region of One Predominant Cultural Resource

Region of Equitably Distributed Cultural Resources

The cultural resource associations regions show that there are two blocks where cultural resources are equitably distributed. These blocks are Thingsulthliah and Ngopa. Thingsulthliah block owing to its nearness to the state capital has been one of the focal points of development that is found to have helped in the development of education in this block. Situated between the route to southern part of the state and the capital the block is having one of the best transport facilities in the state. Ngopa block, on the other hand, is located in the northern part of the state bordering Manipur state. It is also situated between the state capital and Manipur. Since development programme has been directed toward this route in order to make trade arrangement with Manipur, effort has been given to develop transport facilities in this block. In this regard, Ngopa block has benefited from the developmental programme that has helped it to have good transport and educational facilities.

Region of Two Evenly Resource:

a). Education and Health.

There are two blocks which are found to be dominated by Education and Health resources. These blocks are Lunglei and E.Lungdar. Lunglei and E.Lungdar have almost equitable facilities of education and health resources. The lower incidence of transport resource may be attributed to their interior location and rugged topography with precipitous slope. This has hindered the development of roads in these blocks which also do not reflect much potential for their development in absence of much of the human resource. Lunglei is located in the southern part of the state. It had been one of the most important administrative centers during the British regime. It retained its importance as administrative center as it is located between the cross road of the northern part of the state and apparently economically underdeveloped southernmost part of the state. Comparably, however, the block has better educational and health facilities. This may be attributed to common general policy of the government on education and health. E.Lungdar, on the other hand, has benefited from its nearness to the Serchhip town. In addition, the block fell under one administrative block with Khawbung block till 1995 with its headquarters at E.Lungdar. After the block was divided into two, majority of educational institutions and health facilities fell under E.Lungdar block. The block, thus, has higher proportion of educational and health facilities as compared to transport facilities.

b). Health and Transport.

There are two blocks which have been dominated by the association of health and transport facilities. These blocks are Tlangnuam and Thingdawl. The dominance of health and transport facilities in Tlangnuam block may be attributed to the location of the state capital. The block act as a nodal point where almost all the roads are constructed to connect districts and blocks headquarters as well as villages located in its peripheral area. In regard to health, medical facilities are also available. Since it is the administrative centre, educational institutions appear to be much better equipped than other blocks. It attracts school going children from different parts of the state, as a result schooling facilities do not appear to be corresponding with the number of students. Thingdawl block, on the other hand, is located in the northern part of the state. The location of the block bordering the Assam plain and its low relief features is responsible for proportionate concentration of transport facilities in this block. Moreover, its nearness to the state capital appears to have led to the growth of health resources than transport. They also seem to have influenced by the rapid growth of four urban centres of Kolasib, Kawnpui, Bairabi and Vairengte.

c). Education and Transport.

Education and transport resources dominate in four blocks of Aibawk, Darlawn, Phullen and Lungsen block. Three of them are located in the northern part and one in the south western part of the state. In case of education, the government of Mizoram under universalisation of education and under Sarva Shisa Abhayan(SSA) and Rastriya Madhyamik Shiksha Abhiyan (RMSA) programmes has established educational institution

in different parts of the village. As such Aibawk, Darlawn, Phullen and Lungsen blocks are also among the beneficiary of this programme. In case of transport facilities, two blocks namely, Darlawn and Phullen, owing to their location in the northern part bordering Assam and Manipur plains have proportionate transportational network. Proportionately higher transport facilities in Aibawk block may be attributed to its nearness to the state capital. In addition, construction of new World Bank road from Aizawl to the southern part of the state through Aibawk block is another factor for higher incidence of its transport facilities. On the other hand, low concentration of population in Lungsen block and location of Tlabung town in it acts as a trade center between Mizoram and Bangladesh is another factor leading to relatively better transport facilities in Lungsen block.

Region of One Predominant and Two Equitably Resources

a). Health

There are two blocks that are predominated by Health resource and wherein two resources are found to be equitably distributed. These blocks are Khawzawl and Zawlnuam. Khawzawl and Zawlnuam blocks due to their strategic location bordering Myanmar and Bangladesh seem to have much more medical facilities in relation to transport and education. It may be attributed to universalisation of health programme undertaken by the government of Mizoram. These blocks, however, appear to have considerable transport and educational resources though in no way they are comparable with health resources in these blocks.

b). Education.

Lawngtlai and Reiek are the two blocks where Educational facilities are predominant. But they also appear to have two resources equitably distributed though at a disproportionately low magnitude. Reiek block is located in the north western part of the state. The block lies adjacent to Tlangnuam block that houses the state capital. Its nearness to the state capital appears to have helped sufficient educational resources. As a result, the block also seems to have good literate population. Similarly transport facilities may also be said to be in proportion, but the medical facilities seems to be little insignificant as compared to the transport facilities. Lawngtlai block, on the other hand, is located in the southern part of the state. The block is dominated by the Lai people. Higher proportion of educational facilities in this block may be attributed to the influence exerted by the tribal group in the decision of the government as well as by voluntary organizations, in the establishment of educational institution.

c). Transport

There is only one block that has been dominated by transport facilities. Khawbung block is located in the eastern part of the state. The block lies adjacent to E.Lungdar block. Khawbung block was carved out from E.Lungdar block only in 1995. Being newly formed most of the educational and health facilities have fallen in E.Lungdar block. As a result, the block though is found to have proportionate percentage of education and health facilities though of low magnitude. On the other hand, higher percentage of transport may be attributed to lower concentration of population in this block.

Region of One Predominant Resource Region

a). Region of Predominant Educational Resource.

There are two blocks that are found to have predominance of educational resources. These blocks are Hnahthial and Sangau blocks. These two blocks are lying adjacent to each other. Hnahthial block is located to the north of Sangau block. Higher concentration of educational resources in this block may be attributed to proportionately low levels of both transport and health facilities which appear to have been negatively impacted by its nearness to Lunglei town. Sangau block, located to the south of Hnahthial block falls under Lawngtlai district is dominated by Lai people. As a result, it is administered by Lai autonomous district council. Higher percentage of educational resource in this block may, therefore, be attributed to the influence exerted by the people to the government in the establishment of educational institutions in most of the villages in this block. As a result, the block possess most favourable ratio of school and teacher in relation to the number of stakeholders in school going age group.

b). Region of Predominant Transport Resource.

Bunghmun and W.Phaileng are the two blocks dominated by transport facilities. These blocks are both located in the western part of the state bordering Bangladesh. The reason for the dominance of transport facilities in these blocks may be attributed to very low level of population concentration in widely distributed but well connected settlements. And despite the fact that the block has sufficient number of educational institutions, teacher taught ratio is not found to be proportional. Similarly, health facilities, due to the

lack of threshold population in many settlements, are disproportionately lacking in the blocks. Therefore, it appears to be predominated by transport resources.

c). Region of Predominant Health Resource

Health facilities predominate in three blocks of Serchhip, Tuipang and Chawngte. Serchhip block located in the interior of the state with uneven topography is the reason of lower development of Education and transport facilities. On the other hand, the block has higher concentration of population that led to higher demand for health resources. This is also true in the case of Chawngte under Chakma Autonomous District Council and Tuipang under Mara Autonomous District Council. Both the tribal groups are well enclosed in their areas of abode as they are not easily integrated in mainstream of Mizo society. Moreover a substantial number of Chakmas are believed to be illegal residents and keep moving in between Bangladesh and Mizoram with their kith and kins. In additions, they are forced to lead a desperately subsistence based life in which small children are also expected to participate. As a result, educational and transport resources have not been developing proportionately. On the other hand, health facilities mostly because of the areas susceptibility to malaria as a basic amenity have been widely provided by the government.

On the other hand, nearness of Lunglei town to Tuipang block appears to have significantly negative impact on the development of educational resources in the block. However, its location has forced the state government and district as well as village administration to develop transport facilities significantly. However, health facilities still predominate in the block as they have to be retained for the good of the people.

The regional analysis of the available cultural resources thus suggest that the different critical variables of cultural resources are not proportionately distributed in the

state and attempt should be made to harness them in the interest of the well being of the state.

In this regard it may be observed that many problems of education and health resource development in the state arises out of relative inaccessibility of different regions. Therefore, it may be suggested that transport resources be developed in the state. This may be expected to accelerate the implementation of government policy of dispersal of different resources. Even the voluntary organization may be attracted towards the present inaccessible areas to provide education and medical facilities. Development of roads is also essential keeping in view the strategic importance of the state and harnessing of economic potentials of different areas. This may also enhance the possibility of developing educational and health resources.

Table- 4.1

RANKING OF BLOCKS BASED ON Z-SCORE FOR DIFFERENT COMPONENTS OF CULTURAL RESOURCES

Cultural Resource Evaluation							
		Education		Transport		Health	
Sl.No	BLOCK	Total	Rank	Total	Rank	Total	Rank
1	Aibawk	1.36	17	1.23	17	-1.53	2
2	Darlawn	1.15	16	2.03	21	-0.86	8
3	Phullen	1.6	19	1.3	19	-0.89	7
4	Thingsulthliah	0.92	13	0.37	15	-0.78	10
5	Tlangnuam	-2.2	3	2.2	22	6.07	22
6	Bunghmun	1.1	15	1.36	20	-1.44	3
7	Hnahthial	1.43	18	-1.16	3	-0.6	12
8	Lungsen	-2.04	4	-1.21	4	-2.44	1
9	Lunglei	2.34	20	-1.75	2	2.33	20
10	Ngopa	1.03	14	1.29	18	-0.12	14
11	Khawbung	-0.95	7	0.26	14	-0.7	11
12	Khawzawl	-0.46	10	-0.24	10.5	1.45	19
13	E. Lungdar	0.63	12	-0.99	5	0.33	17
14	Serchhip	-0.86	8	-0.85	7	0.44	18
15	Sangau	2.7	21	-0.67	8	-0.8	9
16	Tuipang	-1.95	5	-0.61	9	0.06	16
17	Thingdawl	-1.71	6	0.24	13	0.01	15
18	Chawngte	-5.08	1	-2.03	1	-1.36	5
19	Lawngtlai	-0.49	9	-0.97	6	-1.03	6
20	Reiek	3.43	22	0.39	16	-0.41	13
21	W. Phaileng	-2.51	2	-0.24	10.5	-1.4	4
22	Zawlnuam	0.54	11	0.04	12	2.79	21

4.9. LEVEL OF CULTURAL RESOURCE DEVELOPMENT

The levels of cultural resource development has been categorized into three divisions such as Developed above 3.25 based on Z-Score, Developing between -0.04 - 3.25 and underdeveloped below -0.04. Tlangnuam block score the highest on the overall cultural resource index followed by Reiek, Lunglei and Bunghmun block. The lowest value is found in Chawngte followed by Lungsen block.

Developed Cultural Resource Region

There are three blocks that are identified as developed blocks in cultural resource evaluation. These blocks are Tlangnuam, Reiek and Zawlnuam block. Tlangnuam block score the highest value with 6.07 on the composite index. Low value scored in education may be responsible for large number of school going children to avail better educational facilities from different part of the state. Higher value score in transport and health facilities may be attributed to its location of the state capital.

Reiek block is located to the west of Tlangnuam block. The block ranks 2nd and scores 3.41 on the composite index of cultural resources. Its nearness to the state capital has helped the block to have sufficient educational facilities. Located between the state capital and the western most part of the block, Reiek block has also benefitted to have proportionate transport facilities. Zawlnuam is other block that falls in this category. The block ranks 3rd and scores 3.37 on the composite index. Moderate value score in transport facilities and high value score in respect of health facilities may be attributed to its strategic location bordering Bangladesh. Moreover, settlement of Riangs with low standard of living may be responsible for higher health facilities in this block.

Developing Cultural Resource Region

There are nine blocks that fall in developing region. These blocks are Lunglei, Darlawn, Ngopa, Phullen, Sangau, Aibawk, Bunghmun, Khawzawl, and Thingsulthliah.

Lunglei block located in the southern part of the state ranked 4th and scores 2.92 on the composite index of cultural resources. Located in between the southernmost part of the state and the northern part of the state, the block became one of the most important administrative centres. As a result, the block has better educational and health facilities in the state. But low level of transport facilities may be attributed to its rugged topography that hindered the development of roads in this block. Darlawn, Phullen and Ngopa located in the northern part of the state ranked 5th, 6th and 7th in the overall composite index of cultural resources. These three blocks are lying adjacent to each other in the north bordering Assam and Manipur. Higher value of educational facilities may be attributed to the universalisation of education in the state. Constructions of roads to connect Manipur and Assam have benefitted these blocks to have abundant transportational network inspite of its rugged topography.

Sangau block located in the south eastern part of the state ranks 8th and scores 1.23 on the composite index. Higher value of educational facilities in this block may be attributed to the influence exerted by the people to the government in the establishment of school in most of the village in this block. On the other hand, its location in the eastern part on a rugged topography is responsible for lower transport facilities as well as health facilities.

Aibawk block is located to the south of Tlangnuam block. The block ranks 9th and scores 1.08 on the composite index. It nearness to the state capital has benefitted the block to have higher educational facilities. On the other hand, health facilities appear to be insignificant. Construction of new roads through this block to connect the southern part of the state has also benefitted the block to have higher value with regard to transport facilities. Bunghmun block is located in the western part of the state bordering Bangladesh. The block ranks 10th and scores1.02 on the composite index. Higher value of transport facilities and educational facilities in the block may be attributed to very low level of population concentration in widely distributed but well connected settlements. On the other hand, Construction of road cum Fencing along indo Bangladesh Border (IBB) in Mizoram Sector which is the project of Govt. of India, Ministry of Home Affairs and Engineering Projects (India) Ltd has enable the block to have sufficient transport facilities in this block. Similarly lack of threshold population in this block has hindered the health facilities in this block.

Khawzawl is another block that fall in developing region. The block ranks 11th and scores 0.75 on the composite index. The block is located in the eastern part of the state bordering Myanmar. High density of population in this block enables the block to have higher heath facilities apart from universalisation of health programme undertaken by the government of Mizoram. The block has moderate education and transport facilities but they are not comparable with regard to health facilities in this block.

Thingsulthliah block located adjacent to Tlangnuam block ranks 12th and scores 0.51 on the cultural resource evaluation. Its nearness to the state capital has helped the

block to develop in respect of educational facilities. On the other hand, location between the state capital and the southern part of the state has enabled the block to have best transport facilities.

Underdeveloped Cultural Resource Region

There are eleven blocks that fall under this category. These blocks are E.Lungdar that ranks 13th on the cultural composite index, Hnahthial 14th, Serchhip 15th, Khawbung 16th, Thingdawl 17th, Lawngtlai 18th, Tuipang 19th, W.Phaileng 20th, Lungsen 21st, and Chawngte 22nd.

E.Lungdar block that lies adjacent with Serchhip block ranks 13th and scores -0.03 on the composite index. The block on the other hand, has benefitted its nearness to Serchhip town. Its location on uneven topography is responsible for lower transport facilities in this block. Moreover, school going children's to avail better educational facilities in this block is another factor for lower educational facilities.

Hnahthial block is located in the south eastern part of the state. Higher concentration of educational facilities in this block may be attributed to low level of both transport and health facilities. On the other hand, its nearness to Lunglei town has led the growth in respect of both the transport and health facilities. Serchhip block is located in the central part of the state. The presence of two towns of Serchhip and Thenzawl has helped the block to have sufficient health facilities. Its interior location and physical factors has hindered the development of transport in this block. Large number of school going children and insufficient educational institution has negatively impacted school per student ratio and teacher per student ratio in this block.

Khawbung block is located in the eastern part of the state. The block has been carved out from E.Lungdar block. After the block was divided into two blocks, most of the education and health facilities have fallen in E.Lungdar block. As a result, Khawbung block have low level of education and health facilities. Higher value of Transport may be attributed to low level of population in this block. Thingdawl block on the other hand, is located in the northern part of the state. Higher health facilities in this block may be attributed to its nearness to the state capital as well as to the rapid growth of four urban centers. Low relief features is also responsible for the block to have moderate value with regard to transport facilities. On the other hand, large number of school going children is another factor for lower educational facilities in this block.

Located in the southern part of the state where transportational network are not much available, Lawngtlai, Tuipang and Chawngte block score very low in the overall cultural resources. Low value of cultural facilities in these blocks may be attributed to their peripheral location. Tuipang block on the other hand score moderate value in respect to health facilities. This may also be attributed due to available transport facilities as compared to Chawngte and Lawngtlai block. Moreover, health facilities mostly because of the areas susceptibility to malaria as a basic amenity have been widely provided by the government.

W.Phaileng and Lungsen blocks located in the western part of the state bordering Bangladesh score very low value on the composite index. Low value of cultural resources in these blocks may also be attributed to their peripheral location. Moreover, both the blocks experience illegal migration of Chakma and Riang from Bangladesh as well as from Tripura. On the other hand, Construction of road cum Fencing along Indo

Bangladesh Border in Mizoram Sector by the Central government has enabled the block to have moderate transport facilities in this block.

The map also reveals that the southern part of the state score very low in the cultural resources. This may be attributed due to physical features that hindered the development process. Apart from the southern blocks, blocks located in the interior part also score low value in the cultural resources such as Serchhip, Khawbung and, Hnahthial. Most of the developed blocks are found in the northern part of the state.

Table- 4.2

RANKING OF BLOCKS BASED ON Z- SCORE FOR DIFFERRENT COMPONENTS OF CULTURAL RESOURCE

Z- Score as an indicator of Cultural Resource Evaluation										
Sl.No	BLOCK	x12	X 13	X 14	X 15	X 16	X 17	X 18	total	Rank
1	Aibawk	0.88	0.5	-0.02	0.34	0.89	-0.7	-0.81	1.08	9
2	Darlawn	0.54	0.27	0.34	0.33	1.7	-0.7	-0.16	2.32	5
3	Phullen	0.66	0.33	0.61	0.34	0.96	-0.7	-0.19	2.01	7
4	Thingsulthliah	0.71	-0.41	0.62	0.34	0.03	-0.4	-0.38	0.51	12
5	Tlangnuam	0.92	-1.74	-1.38	4.11	-1.91	3.8	2.27	6.07	1
6	Bunghmun	-1.36	2.19	0.27	-0.66	2.02	-0.7	-0.74	1.02	10
7	Hnahthial	0.59	0.2	0.64	-0.66	-0.5	-0.4	-0.2	-0.33	14
8	Lungsen	-2.03	1.1	-1.11	-0.66	-0.55	-1.1	-1.34	-5.69	21
9	Lunglei	0.85	0.1	1.39	-0.4	-1.35	0.6	1.73	2.92	4
10	Ngopa	0.25	0.42	0.36	-0.01	1.3	-0.3	0.18	2.20	6
11	Khawbung	0.36	0.12	-1.43	-0.01	0.27	-0.4	-0.3	-1.39	16
12	Khawzawl	0.50	-0.14	-0.82	0.18	-0.42	0.8	0.65	0.75	11
13	E. Lungdar	0.67	-0.12	0.08	-0.4	-0.59	-0.1	0.43	-0.03	13
14	Serchhip	0.79	-1.22	-0.43	-0.03	-0.82	0.3	0.14	-1.27	15
15	Sangau	-0.38	1.37	1.71	-0.49	-0.18	-0.3	-0.5	1.23	8
16	Tuipang	-0.15	-1.53	-0.27	-0.28	-0.33	0.4	-0.34	-2.50	19
17	Thingdawl	0.47	-1.35	-0.83	0.39	-0.15	0.2	-0.19	-1.46	17
18	Chawngte	-1.85	-1.35	-1.88	-0.67	-1.36	-0.7	-0.66	-8.47	22
19	Lawngtlai	-1.23	0.25	0.49	-0.44	-0.53	-0.1	-0.93	-2.49	18
20	Reiek	0.65	1.18	1.6	-0.54	0.93	-0.1	-0.31	3.41	2
21	W. Phaileng	-1.95	0.26	-0.82	-0.54	0.3	-0.6	-0.8	-4.15	20
22	Zawlnuam	0.11	-0.48	0.91	-0.27	0.31	0.7	2.09	3.37	3

CHAPTER V

CHAPTER V

5.1. RESOURCE ASSOCIATION REGIONS OF MIZORAM

Mizoram though, a small state with an area of 21087 square kilometer, has great range of diversity in the distribution of different types of resources. However an attempt has been made in this part of the study to integrate all the three categories of resources which reveal the uneven pattern of resource associations that exist in the state. On the basis of integration of resource components three major associations are obtained. This is expected to help in the identification of potentials of development in each resource association region. Broadly three major resource association regions may be identified in the state as follows

1. Region equitably distributed resources
2. Regions of two types of resources equitably distributed
3. Regions of one predominant resources

Region of Equitably Distributed Resources:

There are four blocks in the state where resources are found to be equitably associated though with marginal variability of different components. These blocks are Tlangnuam, Aibawk, Ngopa and Phullen. The block of Tlangnuam with the location of the state capital and another town of Sairang reflects the suitability of natural condition in the block for the growth and diversification of economy. Proportionately, however, the block is still endowed with more than sufficient natural resources when compared to human

resources. It may suggest that the block may still accommodate additional population to some extent. On the other hand, cultural resource in the block is found to be relatively more when compared to its human resources. It may be attributed to the concentration of institutions and population near the seat of administration and political power, a very common feature in developing region.

Aibawk block located to the south of Tlangnuam block has marginally higher proportion of human resource than its natural resources. Endowment of favourable natural resources to sustain higher population in this block is responsible for higher human resources. Cultural resources, on the other hand, are found to be relatively low as compared to natural and human resources. Higher concentration of cultural facilities in the nearby state capital may be responsible for lower proportion of cultural resources in the block.

Phullen and Ngopa blocks are both located in the northern part of the state bordering Manipur plain. As a matter of fact, Ngopa block has been carved out from Phullen block in 1999 only. These two blocks lie adjacent to each other. Inspite of lower natural resources, both the blocks, have relatively higher concentration of human and cultural resources. The factor that makes them prominent on human resource map may be attributed to the fact that the blocks are dominated by Hmar tribe and who are found to provide shelter to the people of the same ethnic group who are forced to migrate from neighbouring state of Manipur due to internal tensions. Phullen block, however, has marginally higher proportion of human resources than Ngopa block. It may be attributed to its relatively earlier existence as an administrative unit. Moreover, their geographical location in between Manipur and the state capital explains a lot about higher availability of

cultural resources in these blocks. Ngopa block has marginally higher percentage of cultural resources than Phullen block for obvious reason of having a relatively lower proportion of human resources. However, higher proportion of cultural resources in both the blocks may be attributed to their strategic location where the state government has given much attention to diversify their economy as they lie near the border of Manipur- an area of perpetual tension.

Regions of two Resources Equitably Distributed

After the evaluation of availability of different components of resources. It is found that, there are six blocks which have predominance of two components of resource and lack substantially in one component. They, on the basis of the predominance of components, may be categorized as:

a). Region of Natural and Human Resource Associations

b). Region of Human and Cultural Resource Associations and

c). Region of Natural and Cultural Resource Associations.

Region of Natural and Human Resource Associations:

There are three blocks which have two components of natural and human resources equitably distributed. These blocks are Lungsen, Serchhip and Thingdawl. Thingdawl block adjacent to Assam plain in north and by Tlangnuam block in south has a favourable location. Its location in the north having low relief features enables the block to possess rich natural resources. Migration from the neighbouring Assam and Manipur state due to inter tribe turmoil has makes this block to have proportionate human resource. Human

resource is also impacted positively by the facilities offered by the four urban centers in the block. This shows that the block may still accommodate additional population. Cultural resource development, however, has not kept pace with the growth of human resource in the block propelled by accommodation of illegal migration from the neighbouring states. In addition, the block is also found suitable for the development of biotic and agricultural resources.

Serchhip block, on the other hand, is located in the central part of the state. In 1997, it also became the seat of district administration of newly formed Serchhip district. The block is well endowed with physical and agricultural resources. These also have been a spurt in the growth of human resource to man the district administration in the wake of the formation of the district. Development of cultural resources, however, has not kept pace with the growth of human resources as it takes longer time to develop accordant and proportionate cultural facilities.

Lungsen block on the other hand, is located in the western part of the state bordering Bangladesh. Physically the block is part of the rolling western Mizo hills. And despite the fact that agricultural and biotic resources are very low, human resource in the block is found only proportional to the natural resource. Equitable distribution of natural and human resources is found to have been caused by availability of suitable slope in the area and higher proportion of workforce required to sustain the population in the area. Moreover, the area is also exposed to illegal migration from Bangladesh. Naturally therefore, cultural components in the block have not developed proportionately and are found to be lacking.

Region of Human and Cultural Resource Associations:

There are two blocks that are dominated by human and cultural resources. These blocks are Darlawn and Bunghmun blocks. Both the blocks have similar characteristics in regards to their population. Darlawn located in the northern part of the state is dominated by Hmar tribe while Bunghmun block located in the western part is dominated by Riang tribe. Both the blocks have been experiencing illegal migration from the surrounding areas. But with regards to natural resources, both the blocks are different from each other. Owing to its location, Darlawn block has rugged topography while Bunghmun block has land on moderate cultivable slope. But unfavourable physical factors in both the blocks have failed to bring the blocks on the natural resource map of the state. In regards to human resource, both the blocks are dominated by the number of workers and their productivity. In spite of unfavorable climatic conditions and rugged topography the people in both the blocks are compelled to utilise their land to its maximum extent. As a result, both the blocks have proportionate working population and labour productivity. Similarly, the cultural resource elements are moderately distributed over the blocks which are much a result of the voluntary organizations and government efforts to make educational and transport facilities available to the remotest part of the state.

Region of Natural and Cultural Resource Association:

There is only one block that has the two resource component- natural and cultural equitably distributed. This block is Zawlnuam block. The block is located in the western part of the state. Owing to its location the block mingles with Tripura and Assam plain

which enables the block to have sufficient land on cultivable slope. Its location bordering Tripura and Bangladesh on the other hand, has led the state government to establish medical institution and transport facilities as it accommodates Riangs who appear to be a minor tribe in the block. Moreover, an attempt to diversify economy due to its nearness to Assam and Tripura has led the block to have sufficient transport facilities. As such, the block is dominated by Natural and cultural resources.

Region of One Predominant and two evenly Resources

Natural Resource.

There are two blocks may be identified as being dominated by one resource but having two resource components. These blocks are Khawbung and Khawzawl. These blocks lie adjacent to each other. Khawzawl block is located to the north of Khawbung block. Despite its location on higher elevation, the block has rich natural resources. Large area under cultivable slope and the presence of Zote plain in Champhai and Tuisenhnar plain in the vicinity of Khawzawl has enabled the block to have adequate natural resources. Its strategic location in the eastern part and the presence of three towns of Khawhai, Khawzawl and Champhai attract people from within the state as well as from across the state boundary. This is also reflected in the cultural resources. But availability of natural resources in higher proportion in the block suggests that the block may further accommodate additional population.

Khawbung block, despite its unfavourable physical factors, has predominance of agricultural resource that is found to make the block having a predominance of natural resource. On the other hand, human and cultural resources are found to have lower

magnitude of distribution though almost within the range of equitable distribution. However, the block appears to have significantly higher developed proportion of human resource than the development of cultural resource. It may be attributed to the fact that the block is highly agrarian with a little advanced primitive practice and more than half of its working population depends on family based agricultural activities. It is reflected in proportionate distribution of population and labour productivity though they are much below the state average.

Human Resource

There is only one block of Thingsulthliah where human resource is found to be dominating with two components of resource- natural and cultural, almost evenly distributed. Thingsulthliah block in the vicinity of Tlangnuam and the state capital- Aizawl (about 40km away) and large part of it being connected with it by National Highway 54 is found to have facilitated relatively more concentration of human resource. Within the reach of the state capital a substantial number of workers find employment there despite having their permanent residence and family in the block. Again a substantial number of people are engaged in business facilitated by its location at the cross roads between Aizawl and Champhai/Saitual as well as between Aizawl and Serchhip. Intermediate location of the block has given it relatively higher vibrancy of economy hence its human resource.

On the other hand, in respect of natural and cultural resource components the block though appears to have equitable distribution. They are found to be of much lower magnitude. This suggests that the available endowments in the block may not be able to sustain its human resource for long. This is also true that though the elements of cultural

resource may be developed on demand and governments intervention. There is least likelihood that natural resource in existing condition may any further be improved except for agricultural resource with the infusion of suitable technology. However, that may only be possible at environmental cost.

Cultural Resource.

There are two blocks dominated by cultural resource while two resource components natural and human are almost evenly distributed. These blocks are Hnahthial and Reiek. Hnahthial owing to its interior location in southern part of the state has unfavourable physical conditions reflected in availability of land on cultivable slope. But moderate rainfall on the other hand, has encouraged the people in this block to base their economic activities on agricultural to sustain their living in a rough terrain where mobility is naturally limited. As such the block has marginally higher human resources than its natural resources. Its nearness to Lunglei town on the other hand, has impacted the cultural resource. The block may claim to have a very favourable educational facility and relatively good medical facilities which appear to have pulled the block up on cultural resource map of the state despite the fact that transport facilities are marginal.

Reiek block on the other hand, is located adjacent to Tlangnuam block toward the west. The block has large cultivable slope with small percentage of cultivated area. Fairly good transportational network and its nearness to Tlangnuam block and the state capital has resulted in low proportion of human resources. Reiek block on the other hand, has benefitted from its nearness to both Tlangnuam and Zawlnuam block that have adequate

cultural facilities. As such the block has the best educational facilities in the state and relatively good distribution of transport and health facilities.

Region of One Predominant Resource Region

Other blocks of the state either have predominance of one or the other resource. Obviously they substantially lack in two resources. It is reflected in the capacity of the region to accommodate ever increasing population.

Natural Resource Region.

There are three blocks which broadly correspond to the southern part of the state and appear to be profusely endowed with natural resources. These three blocks have well defined geographical distribution of ethnic groups.

Tuipang block located in the south eastern corner of the state have predominance of physical resources. Adequate rainfall with small land on cultivated slope has encouraged the people to domesticate livestock in this block apart from small agricultural base. Low level of human as well as cultural resources in this block has kept the block high in respect of natural resource. Lawngtlai and Chawngte block on the other hand, have large area of land on cultivable slope. With adequate moisture supply, majority of the population are engaged in agricultural activities. As a result, these blocks are found to have relatively better natural resource. Their struggle for survival in their existing environment accentuated by remoteness and dependence on agriculture resource makes the three blocks being dominated by natural resource. People being predominantly agriculturalists under primitive dispensations are however, found to be destructing their forest resources. Thus,

developing one component of natural resource at the cost of the other. This raises question about the sustainability of the natural resource in the region.

These blocks, on the other hand, appear to be lacking in human and cultural resource endowments. This may be attributed to the fact that all of these three blocks are also inhabitated by the people of specific ethnic composition- Chawngte by the Chakmas, Lawngtlai by the Lais and Tuipang by the Maras. These ethnic groups by and large, continue to be enclosed in their respective areas as they have still to find a general acceptability with the main stream Mizo tribes. As such they are mostly governed by their respective Autonomous District Council which largely depend on devolution of financial resources through the state government. As is the case with most developing regions all over the world availability of infrastructural facilities in these blocks away from the seat of state power, are barely minimum. This also reflects itself in low level of development of their human resource.

Human Resource Region.

There are two blocks that are found to have predominance of human resource. These blocks are E.Lungdar and W.Phaileng. W.Phaileng block located in the western part of the state bordering Bangladesh. Though, social tension between the Mizos and Riangs is responsible for relatively lower concentration. People in the block, by and large, have to sustain themselves by utilizing whatever human resource is available to them. It is reflected in more than half of the people being involved in one kind of economic activity or the other. Also the hardship owing to proportionate low occurance of natural resource is found to be compensated by the productivity which is higher than the state average. Again

owing to the obtained hostile conditions the block is found to be substantially lagging in elements representing the cultural resource

E.Lungdar on the other hand, is located in the eastern part of the state in a rugged topography. As such the block has very low occurrence of natural resources. With small economic base, it has higher percentage of working population and proportionate labour productivity that makes the block part of the predominantly human resource region. Its nearness to Serchhip town though has benefitted the block to some extent, to have a sizeable cultural resources due to rugged topography, whatever facilities it has, is certainly not at par with the vast requirement of its population. Thus, even the cultural resources do not appear to match its human resources.

Cultural Resource Region.

Besides the above mentioned blocks, there are two blocks which distinguish themselves as predominantly cultural resource region. These blocks are Lunglei and Sangau. It may be noted that the distribution of cultural resource in the state takes into account mostly the settlements and not the population particularly with regard to basic schooling facilities and health care. Lunglei block located in the southern part of the state with limited cultivable slope and moisture supply is the reason of its backwardness in natural resources. Located at the cross road between the southern districts and the northern part of the state, the block is one of the most important administrative centers of the state. As a result, the block has relatively a large concentration of population. People's unwillingness to participate actively in the agrarian activities due to urban nature of the block makes it having one of the lowest percentages of working population. On the other

hand, higher literacy percentage influenced the spread of educational and medical facilities. Consequent upon its urban character make Lunglei as having predominantly cultural resource. Though, the block is not very poor in its natural resource endowments particularly with reference to its biotic resources.

Similarly, Sangau block located to the south east of Lunglei block has unfavourable natural resources. With regard to human resource, the block is dominated by Lai people and fall under Lawngtlai district. As such the block has moderate population. Despite rugged topography the block has proportionately higher labour productivity due to adequate rainfall and irrigational facilities. But being in the neighborhood of one of the most advanced block in regard to cultural resource, Sangau block has certainly harvested the fruit of the cultural development of its neighbour. As a result, the block has one of the highest educational facilities in the state. This combined with other cultural factors, the two blocks of Lunglei and Sangau emerge as a cultural resource region in the state.

The present analysis of the spatial distribution of resources, however, stresses one point that in Mizoram physical environment still play a dominant role in its socio-economic development. Even the other resources in their regional context depend to large extent on the physical environment. This dependency on one aspect of resource appears to dominate whole of the state as long as the economy depends only on agriculture. Though the areas well within the sphere of towns so far have failed to provide any sound alternative economic base other than services which, in most cases, have outgrown their requirement. Moreover, they cannot be considered a reproductive economy whereas in a state like Mizoram having certain sociological problems some productive economic activities are needed to be expanded. As a matter of fact, the state requires some

supplementary economy besides agriculture. Of course, steps have been initiated in this direction and the bamboo industries at Sairang (Tlangnuam block) and Bairabi (Thingdawl block), Mizoram Industrial Food Corporation at Chhingchhip (Serchhip block) are efforts in this direction. Though they are expected to bring substantial change in the resource pattern of their adjoining areas, they are just not enough for the entire state with as much of physical diversity as its tribal populace. These efforts also reflect the urban centricity in prevailing system of governance.

In this connection, it would appear that except for the region of equitably distributed resources there are problems in resource development and exploitation in the state. As the region of evenly distributed resources have all the resource factors almost evenly or proportionately distributed, with proper planning of resource exploitation, they may be developed with comparative ease. But the problem lies with the areas having two resources evenly distributed or having one predominant resource. In such areas, thus, attempt should be made towards achieving equitable distribution of resources.

Even the regions with much natural and cultural resource appear to be least problematic. They may be considered to possess much potentiality for development as they have resources on credit side of resource utilizations. Thus the problem arises mostly with human resource region.

In this regard, it appears that if intra regional migration of population is encouraged the state may benefit doubly. Firstly, demand on natural and cultural resources will be reduced in human resource region; Secondly, migrating population will introduce new techniques for resource exploitation in relatively more backward areas particularly in the western blocks of the state. This presupposes migration of population from human

resource region to natural or cultural resource regions. Such a migration may be encouraged by propagating the economic and cultural benefits of adopting new areas. On the other hand, natural resource regions have much more potentiality to adjust immigrating population.

Moreover such migrations are believed to lead to more harmonious relation amongst the different tribal groups. With the development of transport facilities and a little modification in land ownership regulations which are usually controlled in present circumstances by village administration, such migration is possible in the state, if not in short period in long period. Mutual dependency of regions will certainly be a healthy sign towards the economic well being of the state and may contribute to the nation's developmental schemes (G.Kumar.1982).

Table- 5.1

RANKING OF BLOCKS BASED ON Z-SCORE FOR DIFFERENT COMPONENTS OF RESOURCE ASSOCIATION REGIONS OF MIZORAM

Sl.No	BLOCK	Natural	Rank	Human	Rank	Cultural	Rank
1	Aibawk	3.13	18	2.07	21	1.08	14
2	Darlawn	-2.06	8	2.67	22	2.32	18
3	Phullen	-1.55	11	0.9	17	2.01	16
4	Thingsulthliah	-0.5	12	0.74	16	0.51	11
5	Tlangnuam	4.88	21	1.5	19	6.07	22
6	Bunghmun	-4.81	1	0.25	13	1.02	13
7	Hnahthial	-3.76	4	-0.93	6	-0.33	9
8	Lungsen	-3.36	5	-0.86	7	-5.69	2
9	Lunglei	-1.75	10	-2.22	2	2.92	19
10	Ngopa	0.05	13	0.41	15	2.2	17
11	Khawbung	1.2	16	0.1	12	-1.39	7
12	Khawzawl	3.84	20	-0.31	11	0.75	12
13	E. Lungdar	-4.29	3	0.3	14	-0.03	10
14	Serchhip	0.71	15	1.92	20	-1.27	8
15	Sangau	-4.72	2	-1.14	5	1.23	15
16	Tuipang	-2.6	6	-2.23	1	-2.5	4
17	Thingdawl	11.22	22	1.34	18	-1.46	6
18	Chawngte	-1.77	9	-1.43	4	-8.47	1
19	Lawngtlai	2.1	17	-1.85	3	-2.49	5
20	Reiek	0.44	14	-0.36	9.5	3.41	21
21	W. Phaileng	-2.48	7	-0.36	9.5	-4.15	3
22	Zawlnuam	3.46	19	-0.77	8	3.37	20

5.2. LEVELS OF DEVELOPMENT IN MIZORAM

Level of development within the state of Mizoram has been arrived at in the present study on the basis of value free scores derived from the calculation of Z-Score for different components of resource discussed in foregoing chapters and paragraphs. The scale thus arrived at is reflective only of intra- state level of development that has been assessed at block level.

Final composite or overall development score refers to aggregate development of blocks in respect of natural, human and cultural resources. In chapter 2 Thingdawl, Tlangnuam and Khawzawl have been identified as developed blocks and Zawlnuam, Lawngtlai, Reiek, Serchhip, Khawbung, Ngopa, and Aibawk as developing blocks in respect of natural resources and twelve blocks on the other hand, are found to be underdeveloped blocks. In Chapter 3 on the basis of obtained Z- Score Darlawn, Aibawk, Serchhip and Tlangnuam appear to be as developed blocks whereas Thingdawl, Phullen, Thingsulthliah, Ngopa, E.Lungdar, Bunghmun and Khawbung may be considered to be as developing blocks. Remaining eleven blocks are categorized as underdeveloped in respect of human resources. In Chapter 4 dealing with cultural resource, again on the basis of Z-Score Tlangnuam, Reiek and Zawlnuam are found to be developed blocks. Lunglei, Darlawn, Ngopa, Phullen, Aibawk, Bunghmun, Khawzawl, Thingsulthliah and E.Lungdar are classified as developing blocks whereas remaining ten blocks may be said to be underdeveloped. On the basis of overall composite score dealt in chapter 5 three blocks emerge as developed, nine blocks as developing and remaining ten blocks as underdeveloped.

Z-Score values reveal that blocks that score high value in respect one resource does not necessarily score high in respect of the other resources. But the block of Tlangnuam is an exception. Tlangnuam appears to be benefitted by the location of the state capital. The level of development in Mizoram has been categorized as developed above 6.09, developing between -0.17- 6.09 and underdeveloped below -0.17.

Developed Region

There are three blocks that fall in the category of developed blocks. These blocks are Tlangnuam, Thingdawl and Aibawk as all of them are found to have scored above 6.09 on Z-Score reflecting the level of development.

Tlangnuam block scores the highest with 12.45 on Z-Score. It ranks 1st on the overall development composite index. Available physical resource has enabled the block to have rich biotic and agricultural resources. Location of the state capital has enabled the block to have proportionately high human and cultural resources in the area.

Thingdawl block scores the second highest value 11.1 on the development index. Located in the northern part of the state bordering Assam plain, the block is endowed with rich physical resources. Favourable land and sufficient moisture supply has enabled the block to have one of the best biotic and agricultural resources in the state. Rapid growth of four urban centers of Vairengte, Bairabi, N.Kawnpui and Kolasib and its nearness to the state capital has attracted people not only from within the state but also from across the neighbouring states of Assam and Manipur. In 1997 Kolasib district was carved out from Aizawl district. The newly formed district covers the whole block of Thingdawl.

However, cultural facilities in the block does not appear to have kept pace with its human resources.

Aibawk block scores the third highest on Z-Score. The block lies to the south of Tlangnuam block in close proximity. Favourable physical conditions have enabled the block to have rich agricultural resources. This is also reflected in human resource where the block scores the second highest. Its nearness to the state capital seems to have benefitted the block to have moderate concentration of cultural facilities.

Developing Region

Zawlnuam block ranks 4th and scores 6.06 on overall composite index. It is below the average of suggested scale of developed regions. The block is located in the north western part of the state. Owing to its location, the land merged with Assam and Tripura plain. With low relief features coupled with moderate rainfall and adequate irrigational facilities the block is found to have rich agricultural resources. Its location on the other hand, bordering Tripura in the west and Assam on the north has enabled the block to have moderate transport facilities. Dominated mostly by the Riangs who are minor tribe with low level of living has forced the government to establish medical institution in this block. This combined with natural resources makes the block to score high on the overall composite index.

Khawzawl block located in the eastern part of the state score the 5th highest in the overall development index. The block scores 7.57 on the overall composite index. Despite its location in the eastern part of the state, the block has large area of land on cultivable slope. With sufficient amount of moisture supply and permanent cultivation in the vicinity

of Khawzawl and Champhai towns has enabled the block to have rich natural resources. Its location in the eastern part bordering Myanmar, on the other hand, has facilitated the block to have moderate human and cultural resources.

Reiek block is located adjacent to Tlangnuam block in the west. It ranks 6th and scores 3.49 on the composite index. Its location between the state capital and Zawlnuam block has helped the block to have adequate cultural facilities. Inspite of its moderate natural resources, its nearness to the state capital has resulted in low proportion of human resources which is reflected in the composite score for development in terms of the state.

There are three blocks in the northern part of the state that fall in developing category. These blocks are Darlawn, Ngopa and Phullen. These three blocks have rugged topography which is found to be unsuitable for agricultural operations. But agriculture being still one of the most important occupations in the state, these three blocks are proportionately endowed with human and cultural resources. This may be attributed to the fact, that inspite of their rugged topography the blocks experience illegal migration from Assam and Manipur. This has compelled the people in these blocks to participate more vigorously in agricultural activities. As a result, the block has higher proportion of working population and labour productivity. Availability of cultural facilities, on the other hand, is the result of Government policies as well as voluntary organization who makes settlement as basis of provision of selected facilities.

Serchhip block located in the central part of the state scores 1.36 on the final composite index. Large area under cultivated land and adequate moisture has facilitated agricultural operation in the block. This is also the reason of the development of human

resources in this block besides the services offered by the two towns of Serchhip and Thenzawl particularly after Serchhip block was made to house district headquarters.

Thingsulthliah block ranks 11th on the composite index. The block has harvested the fruits of its nearness to the advanced blocks of Tlangnuam, Aibawk and Serchhip. Its interior location at the cross road of Champhai and Saitual has helped the block to have relatively higher human resources than its natural and cultural resources. Its location between the state capital and the southern as well as eastern part of the state has enabled the block to have moderate transport facilities. Adequate rainfall on the other hand, has favoured the growth of forest resources in the block. This has enabled the block to have marginally higher natural resource endowments than its cultural endowments.

Khawbung is another block that falls in the developing category. The block is located in the eastern part of the state. It ranks 12th on the composite index. Despite its unfavourable physical factors, availability of irrigational facilities has helped the block to have higher agricultural resources. This makes the block predominant in respect of natural resource. Its peripheral location on the other hand, has hampered the development of cultural resource.

Underdeveloped Region

There are ten blocks in the state that have been identified as underdeveloped. These blocks are Lunglei, Lawngtlai, Bunghmun, E.Lungdar, Sangau, Hnahthial, W.Phaileng, Tuipang, Lungsen and Chawngte.

Lunglei block housing one of the largest towns in the state is found to ranks 13th on overall composite index. This may be attributed due to its rugged topography. Limited

cultivable slope has hindered the development of agricultural resources in this block. But adequate rainfall on the other hand has favoured the growth of forest which makes the block to have moderate natural resources. This is also reflected in the proportion of working population as well as in productivity in which the block scores among the lowest in the state. Its significance as the house of district administration on the other hand, has facilitated the block to score high with regard to availability of cultural resources.

There are three blocks located adjacent to each other in the southern part of the state. Theses blocks are Lawngtlai, Tuipang and Chawngte. Lawngtlai block ranks 14th, Tuipang ranks 20th and Chawngte ranks 22nd on the composite index. These blocks appear to have relatively better proportion of natural resource than human and cultural. It may be attributed due to their peripheral location.

Bunghmun block located in the western part of the state ranks 15th on the overall composite index. Unfavourable physical factors have hampered the development of agriculture in this block. As such the block has the lowest concentration of population. But inspite of its unsuitable physical conditions, the block has proportionate distribution of working population and labour productivity. With regard to cultural resources, the block has good transport and educational facilities which are the result of government policy as well as the efforts of voluntary organizations.

E.Lungdar block ranks 16th on the composite index. The block is located in the eastern part of the state adjacent to Serchhip block. Owing to its location, the block has unfavourable physical factors. Its nearness to Serchhip town, however, has enabled the block to have moderate cultural facilities. The presence of two service towns Biate and N.Vanlaiphai on the other hand, has enabled the block to have higher proportion of

working population that reflects itself in availability of proportionately better human resource.

There are two blocks located in the south eastern part of the state that fall under underdeveloped region. These blocks are Hnahthial and Sangau block. Hnahthial block ranks 18th and Sangau block ranks 17th on the composite index. Both the blocks lie adjacent to each other. Their location on higher elevation with rugged topography is responsible for both the blocks to score low value in the composite index for almost all components of resource.

W.Phaileng and Lungsen blocks located in the western part of the state bordering Bangladesh are other blocks that fall under this category. W.Phaileng ranks 19th and Lungsen ranks 21st on the overall composite index. Human resources is found only proportional to natural resources. Cultural resource, on the other hand, is found to be lacking due to their interior locations with respect to the state capital.

The development map for the state reveals that the underdeveloped blocks are found to occupy the western and southern part of the state bordering Tripura and Bangladesh from W.Phaileng in the north to Chawngte block in the south. This region is inhabitated by Chakmas from the south spreading towards the north up to Bunghmun block and by the Riangs from Zawlnuam to W.Phaileng in the north. These two tribes are found to have very low level of social life. As a result, most of these people are engaged in Primitive practices of agriculture. The region is covered by dense vegetation and dissected by many rivers like Kawrpui, Tuichawng, Phairuang, Khawthlangtuipui, De, river Tut and River Langkain. The rivers flow either toward the north or south following north- south trending ridges and valleys with humid climate.

Another section of underdeveloped blocks are found to be occupying the south eastern part of the state extending from E.Lungdar block to Tuipang block. These blocks are E.Lungdar, Hnahthial, Sangau and Tuipang. Lunglei in the southern part of the state form the part of the contiguous underdeveloped region. This belt is dominated by the high mountains in the state. The hills are characterized by a declining trend of elevation from east to west. However, the topography is much rugged in the region. The slopes are very steep and the elevation between ridges and valleys varies between 200- 600 meters. Due to scanty growth of vegetation on the steep slopes, loose and delicate soil structure, and wide spread soft clay on precipitous slopes due to absence of old rocks landslide are frequent and cause serious impediments on trade and agricultural enterprises. It also affects adversely the maintenance of transport and communication network in this region.

Table- 5.2

RANKING OF BLOCKS BASED ON COMPOSITE Z-SCORE FOR LEVELS OF DEVELOPMENT IN MIZORAM

Composite Z-Score for level of Development						
Sl.No	BLOCK	Natural	Human	Cultural	Total	Rank
1	Aibawk	3.13	2.07	1.08	6.28	3
2	Darlawn	-2.06	2.67	2.32	2.93	7
3	Phullen	-1.55	0.9	2.01	1.36	9.5
4	Thingsulthliah	-0.5	0.74	0.51	0.75	11
5	Tlangnuam	4.88	1.5	6.07	12.45	1
6	Bunghmun	-4.81	0.25	1.02	-3.54	15
7	Hnahthial	-3.76	-0.93	-0.33	-5.02	18
8	Lungsen	-3.36	-0.86	-5.69	-9.91	21
9	Lunglei	-1.75	-2.22	2.92	-1.05	13
10	Ngopa	0.05	0.41	2.2	2.66	8
11	Khawbung	1.2	0.1	-1.39	-0.09	12
12	Khawzawl	3.84	-0.31	0.75	4.28	5
13	E. Lungdar	-4.29	0.3	-0.03	-4.02	16
14	Serchhip	0.71	1.92	-1.27	1.36	9.5
15	Sangau	-4.72	-1.14	1.23	-4.63	17
16	Tuipang	-2.6	-2.23	-2.5	-7.33	20
17	Thingdawl	11.22	1.34	-1.46	11.1	2
18	Chawngte	-1.77	-1.43	-8.47	-11.67	22
19	Lawngtlai	2.1	-1.85	-2.49	-2.24	14
20	Reiek	0.44	-0.36	3.41	3.49	6
21	W. Phaileng	-2.48	-0.36	-4.15	-6.99	19
22	Zawlnuam	3.46	-0.77	3.37	6.06	4

CHAPTER VI

SUMMARY AND

FINDING

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The process of economic growth involves change in the economic activities as well as change in the structure of economy which ultimately generates large volume of goods and services and distribute the same to enable people at large to lead a better quality of life. Inequality in economic endowments leads to regional disparities that reflect itself in economic, social and cultural problems. This result in unutilisation or under utilization of resources both natural and human. It is obvious that, developed regions have more advantages as they are capable of attracting more resources and accordant activities. This is found to lead to unequal growth. It tends to perpetuate itself due to economies of concentration. It may, however, be observed that regions develop initially due to their natural advantages or historical factors. It is found that developing regions are characterised by large and growing regional disparities due to unequal distribution of resources and their capacity to use them. It is perpetuated due to lag in capital formation and which is generally capital intensive. In developing countries, it is believed that reduction of regional inequalities is crucial in order to accelerate the economic growth. Regional inequalities are found even to persist in small regions within a country. This is also true in the case of small state like Mizoram which is located in the north eastern corner of India.

Mizoram is a small state with a small population of about ten lakh. It is tucked away in the far north eastern corner of India. It is cut off from the other states of the north east with only a limited access through south Assam corridor. The state has little mineral

resource and, extremely limited flat lands and valleys. Perched on the highly folded recent deposits belonging to Himalayan orogeny. The area has some forests dominated mostly by bamboo and hardwoods supported by heavy rainfall. But most important- the state has a highly literate and sturdy population. Yet, the state as a whole is found to be underdeveloped. Mizoram is perhaps one of the few states of India that has conspicuous absence of any industries. However the state has rich tradition of household and cottage industries based on available resources in the area.

Due to rugged topography and difficulty of mobility, Mizoram has been divided into eight administrative districts, i.e., Aizawl, Kolasib, Lunglei, Champhai, Mamit, Saiha, Lawngtlai and Serchhip. Aizawl district covers 3576.31 square kilometers, Kolasib district covers 1382.51 Sq.km, Lunglei cover 4538 Sq.km, Champhai cover 3185.83 Sq.km, Mamit cover 3025.75 Sq.km, Saiha cover 1965.81 Sq.km, Lawngtlai cover 1991.19 Sq.km and Serchhip cover 1421.60 Sq.km. For smooth functioning of development programmes and their implementation the state is again divided into 22 development blocks.

In a sense of searching for development, or conversely regional backwardness within a state that is backward itself rather undeveloped, is an anachronism in itself. But, by logic of Myrdal and Hirschman, 'the more backward (economically) is the region, regional disparities within, will be even more'. There is justification enough to assess the situation under such conditions. In this light, it is important to assess the process of regional disparity in the state and to evaluate the manner and extent of development programmes of nearly half a century that has fructified on the regional scale within the state.

The state has several impediments on the path of development as discussed in foregoing chapters. However, within the state the main factor responsible for regional underdevelopment has been accessibility and allied factors, like the process of urbanisation and development of markets that has been spurred by road connectivity, especially the National Highway that is found to form the life line of the state.

In Chapter I, brief outline of the state has been given. This chapter also deals with the concept of development and characteristics of the study area. Review of literature has also been with reference to the development paradigms and processes, aims and objectives of the study and methodology applied to the study with a detail discussion on composite indices that has been used for analysis.

In Chapter II entitled, "Natural Resource Evaluation" deals with the resource associations and their impact on level of natural resource development. The chapter has been divided into three sections that include Physical resources, biotic resources and agro resources. Physical resources include the study of percentage of area under cultivable slopes that may be used for cultivation, and the study of distribution of rainfall in the state. Evaluation of Biotic resources includes the study of forest resources and livestock units. Agro resources deal with the study of cultivated area that is being used for cultivating different crops. It also reflects in intensity of productivity, intensity of cropping and intensity of irrigation. Natural resource evaluation has been done to assess inter block disparities. In the process a brief description of each indicator relating to the state of natural resources has been given. The three sections of natural resources has been combined to find out the natural resource association regions within the state. Similarly, by

using the composite value the level of natural resources development within the state has been workedout.

In Chapter III entitled, “Human Resource Evaluation” deals with the density of population, total workers and labour productivity. This chapter tries to find out how human resources play an important role in the development of state economy. By using the Z-Score, human resources region for the three sections has been workedout as well as the level of human resource development in the state.

In Chapter IV entitled, “Cultural Resource Evaluation”. The chapter has been divided into three sections that includes educational facilities, health facilities and transport facilities. The three sections has been further sub- divided into literacy percentage of the state, the number of institution per 500 students, the number of teachers per 500 students, density of roads per 100 square kilometers, roads per 1,00,000 population, number of doctors per 500 population and number of hospital beds per 500 populations. In this chapter cultural resource association regions has been workedout as well as their level of development in the state.

In chapter V entitled, “Composite Resource Evaluation” deals with the final composite of all the three resources that includes natural resources evaluation, human resource evaluation and cultural resource evaluation. First resource association regions has been workedout to find out the distribution and concentration of resources in the state by plotting its value in the composite triangle and then the level of development in the state has been workedout.

The main points of this chapter are the following:

1). Natural resource evaluation in the state of Mizoram by and large, reflects the pattern of development for the same sector of the hilly areas in the entire country of India. Available natural resources contribute much in the development of any region. Eight variables were chosen for the study as outlined below that have been subjected to statistical methodologies of analysis. The indicators are as follows.

Natural resources have been divided into three parts as:

a) Physical resources: Physical resources have been further sub- divided into Area under cultivable slopes(X1) and rainfall(X2).
b) Biotic resources: Biotic resources have been further sub- divided into forest(X3) and livestock units(X4).
c) Agro resources : Agro resources has been further sub- divided into cultivated land(X5), intensity of productivity(X6), intensity of cropping(X7), and intensity of irrigation(X8).

On the basis of preceding study at least four natural resource regions are recognised: (i). Region of evenly distributed natural resources, (ii). Region of two natural evenly distributed (iii). Region of one dominant and two evenly distributed natural resources, and (iv). Region of one predominant natural resource.

Region of two even natural resources have further been subdivided into two groups; (i). Physical and agro resource region, (ii). Biotic and Agro resource region. Similarly, regions of one predominant and two equitably distributed resources have been grouped as (i). Physical resource dominated and two biotic and agro equitably distributed (ii). Biotic resource dominated and two physical and agro equitably distributed, and region of one

predominate natural resource have been grouped as (i) Physical resource region, (ii) Biotic resource region and, (iii). Agro resource region.

Thingdawl, Zawlnuam and Tlangnuam blocks have equal distribution of natural resources. There are eleven blocks that has been dominated by single natural resources and three blocks by two natural resources. The other five blocks has predominated by one resource and two evenly distributed natural resources.

Block showing the highest level of development in the natural resource evaluation is Thingdawl block. Thingdawl block scores 11.22 on the natural composite index. It is followed by Tlangnuam and Khawzawl block with 4.88 and 3.84 on the composite index. These three blocks fall under developed category in natural resource evaluation. There are seven blocks that fall in under developing category and the rest twelve blocks are recognised as underdeveloped blocks. The least developed block with regard to natural resource evaluation is Bunghmun located in the western part of the state

Thingdawl, Tlangnuam and Khawzawl blocks which have all the natural resources equitably distributed have the economic potential for the regions to take off for rapid development as all the three aspects of natural resources are available proportionately and locally. On the other hand, other blocks which have two equitable resource distributions and one predominant resource, attempt should be made to develop any of the existing resources. But any attempt to develop the resources must not deteriorate its environmental quality.

2). In human resources, urban centre constitute demographically the most developed areas in the state. Urban centres are the areas of intense human activities in the state and they are acting as the most powerful pull factors both for the people and the opportunities.

Urban centres stand for higher proportion of literate population as well as better living condition. In human resources four regions are recognised: (i). Regions of equitably distributed human resources, (ii). Region of two human resources equitably distributed (iii). Region of one human resource dominant and two equitably distributed, and (iv) Region of one predominant human resource.

Region of two even human resources have further been sub grouped as (i) Region of density of population and Total workers and (ii) Region of total workers and labour productivity. Similarly, regions of one predominant and two equitably distributed human resource have been classified as (i) Region of Total workers and two resource density and labour productivity equitably distributed, (ii) Region of Labour productivity and two resource density and total workers equitably distributed and regions of one predominate human resource have been classified as (i) Region of high concentration of population, (ii) Region of high proportion of workers and (iii)Region of high labour productivity.

Human resources have been divided into three parts as:

a). Density of population(X9)

b). Total workers and(X10)

c). Labour productivity(X11)

Thingsulthliah and Zawlnuam blocks have equal distribution of human resources. There are three blocks that have been dominated by density of population and total workers. Total workers and labour productivity have predominated two blocks. Total workers dominated and two resource equitably distributed have dominated two blocks and Labour productivity dominated and two resource equitably distributed have dominated

three blocks. Density of population alone dominated five blocks. Total workers dominated only one block whereas Labour productivity dominated four blocks.

In the levels of human resource development the most developed block in the state is Darlawn block. The block is dominated by total workers and labour productivity. It scores 2.69 on the composite index. There are four blocks that are identified as developed region. These blocks are Darlawn, Aibawk, Serchhip, and Tlangnuam. Seven blocks fall under developing region and the rest eleven blocks are identified as underdeveloped blocks. The least developed block with regard to human resource evaluation is Tuipang block located in the southern part of the state.

The two blocks that have equal human resource distribution pose least problem in human resource planning and development due to equitable distribution. On the other hand, region that have one or two resource, attempt should be made to harness scare human resource as human resources in collaboration with natural resources helps in the process of economic development.

3). The most significant thing about the cultural resources in the state is the physical accessibility of these to the general public in terms of spatial distance. It is well established fact that the level of social differentiation in the tribal society like the Mizo is relatively low and practically majority of the people are in a position to avail these facilities once they are made available with the reach from the point of view of spatial accessibility.

Four cultural resource regions have been classified on the basis of earlier study. These include: (i) Region of equitably distributed cultural resources, (ii) Region of two

cultural resources equitably distributed, (iii) Region of one predominant and two equitably distributed cultural resource and (iv) Region of one predominant cultural resource.

Regions of two cultural resources equitably distributed has further classified as: (i) Region of Education and Health, (ii) Region of Health and Transport, and (iii) Region of Education and Transport. Region of one predominant and two equitably distributed cultural resource has been grouped as: (i) Health, (ii) Education and, (iii) Transport. Similarly, region of one predominant cultural resource has been grouped as (i) Region of predominant educational resource, (ii) Region of predominant transport resource and, (iii) Region of predominant health resource.

Cultural resources have been divided into three parts as:

a). Education facilities: Education have been further sub- divided into Literacy percentage(X12), school per 500 students(X13) and Teacher per 500 students(X14).

b). Transport facilities: Transport facilities have been further sub- divided into road density per 100 square kilometer(X15), road density per 1,00,000 population(X16).

c). Health facilities: Health facilities have been further sub- divided into number of doctors per 500 population(X17) and number of beds per 500 population(X18).

There are two blocks of Thingsulthliah and Ngopa that have equitable distribution of cultural resource distribution in the state. Education and health dominated two blocks. Health and transport dominated two blocks. Education and transport predominated four blocks. There are five blocks that have been dominated by one cultural resource and two resource equitably distributed. Similarly, there are two blocks that has been dominated by education alone. Two blocks by Transport and three blocks by Health facilities.

The most developed block in cultural resource evaluation is Tlangnuam. The block scores 6.07 on the composite index. There are three blocks that are identified as developed blocks. These blocks are Tlangnuam, Reiek and Zawlnuam. There are ten blocks that fall under developing region and eleven blocks under underdeveloped blocks. The least developed block in cultural resource evaluation is Chawngte block located in the south western part of the state.

Thingsulthliah and Ngopa that have all the elements of cultural resources evenly distributed pose least problem in cultural resource planning. All the three resources may be developed and exploited to bring an overall development of cultural resources without discouraging the development of one or the other resources. On the other hand, in regions of two cultural resources and one predominant, effort have to be made to developed the lacking resources.

4). Four resource association regions of Mizoram have been recognised: (i) Region of equitably distributed resources, (ii) Region of two types of resources equitably distributed and (iii) Region of one predominant and two evenly distributed and, (iv) Region of one predominant resources.

Region of two resources equitably distributed have further been subgroup as: (i) Natural and human resource association regions, (ii) Human and cultural resource association regions and, (iii) Natural and cultural resource association regions. Region of one predominant and two evenly distributed resource association regions have been grouped as: (i) Natural resource (ii) Human resource and (ii) cultural resource. Similarly region of one predominant resource region have been grouped as (i) Natural resource region (ii) Human resource region and (iii) Cultural resource region.

Tlangnuam, Aibawk, Ngopa and Phullen blocks have all the resources equally distributed. There are three blocks dominated by natural and human resources. Two blocks by human and cultural and, one block by natural and cultural. There are five blocks predominated by one resource and two evenly distributed resources. Three blocks have been predominated by natural resource alone. Two blocks by human and three blocks by cultural resources.

Block showing the highest level of development is Tlangnuam block. The block scores 12.45 on the final composite index. There are three blocks that fall in the category of developed blocks. These blocks are Tlangnuam, Thingdawl and Aibawk. Nine blocks fall under developing blocks. Remaining ten blocks are categorized as underdeveloped blocks.

Finally, studies of the process of economic growth in different countries show that development does not appear everywhere at the same time. When the process starts, some areas are favoured while others are neglected. Regions differ in regard to resource endowment. Generally, favourable geographical conditions like proximity to minerals or sources of power or to agricultural land for specialized crops or to markets have matter a good deals in giving some areas an initial advantage over others (O.P.Mahajan.1982 pp-3). It is conceivable that neglected region may have good economic potential for the region to take off. But the rich resource endowments may not be exploited due to technological or insufficient transportational network. In this regard, the state of Mizoram with small area and not too big a population may be said to have sufficient resources at its command. The only difficulty with the spatial distribution of resources is that they are not proportionally distributed throughout the state. But the unequal distribution is not always the result of

availability of one resource or the other rather it is due to extra sufficiency of other resource or resources. This necessitates efforts on the part of the people and the government to affect equitable distribution of resources for overall development of the state.

Looking at the final composite index, there emerges a great variation in disparities at inter block level. Out of 22 blocks, three blocks namely, Tlangnuam, Thingdawl and Aibawk are found to have recorded high value on the composite index. This shows that economic development in Mizoram follows a pattern. A higher percentage of urban blocks are found to have better facilities than the others. Thus influence index score positively. On the other hand, existing nodal points of both rural and urban centres do not provide an optimal linkage due to inaccessible conditions. It is observed that the transportational facilities have contributed in enhancing the functional gaps at intra and inter spatial level.

Newly emerging small urban centres lying mostly along the main highway are incapable of generating sufficient growth impulses to the surrounding areas. The large settlements are few and hardly show any evidence of nodality around them. This may be the reason of low value for some of the blocks which score low value in human and cultural resources while they may score high in respect of natural resources. While the level of literacy and the number of schools are high the cases of medical and transport facilities are different. It is expected that higher literacy make people more health conscious and the importance of transport network and increase in demand for more facilities. But low correlation may be assigned to greater emphasis given to education by government as well as the non- governmental organization in the state. Moreover, to

develop health and transport facilities in the state like Mizoram, it is likely to take longer period than activities like education.

Overall, three factors appear central to the problem of regional development (or disparity) at the micro level in Mizoram. These are (a) urbanisation and infrastructure development, particularly, accessibility (b) health and education and (c) agriculture. Development policies if directed towards infrastructure development especially in respect of accessibility to speed up cultural development and agriculture to bring about natural resource development, in the peripheral blocks, to a great extent the internal disparities of the state may be addressed. Due to obvious limitation, industralisation is not in the offing in the state in immediate future and therefore, it will not be a factor either in enhancing or reducing regional disparities as in large states of the country.

Framework for short term plan for rapid development

1. A basic drawback, which has not received proper attention, is the absence of proper theoretical framework designed to adopt and implement a strategy conducive to the development of backward regions. In this regard, resource regions serve as basic spatial unit. Planning for such regions should incorporate both local needs and resources. To meet such objectives, resource are to be managed which means their development is planned in such a manner that their sustained supply can be maintained for longer time to larger section of the society with least deterioration of the ecosystem.
2. The problem of imbalances among the blocks has to be tackled under any economic system. In this case, the state of Mizoram has little option; as such development of agriculture should be given top priority. Though agriculture may not initiate

industrial development, its progress will strengthen the rate of agro based industries in the state.

3. It is obvious from the present study that the people of Mizoram have only land as the most important natural resources. But due to large scale 'jhum' cultivation the land resources is being damaged. Extension of areas under permanent cultivation will certainly reduce area under jhum as the rate of production, yield in terraced field are twice as compared to jhum.
4. Economic utilization of livestock must be encouraged. The mountainous slope may provide pasture lands for bovine animals. And though ploughing animal except in the foot hills, are not of much use, they must be reared for meat and hide and skin which the people of Mizoram so far have failed to utilize in most cases.
5. The lack of power generation capacity is the acute problem in the state. The major rivers in the state must be surveyed in order to developed and generate hydel power. Availability of assured power is expected to diversify economic activities in the state.
6. Poor communication and transport facilities also hinder exploitation of natural resources in the state. Attempts should be made to make the state and its different parts more accessible. The increased accessibility with developed transport resources will also encourage development and more equitable distribution of natural, human and cultural resources in the state.
7. Tourism should be encouraged as an industry in the state. External tourists are expected to bring substantial revenue to the state. On the other hand, it will also

give local people the opportunity to understand the beauty of their natural environment. It is expected to help in conservation of forest resources of the state.

Framework of long term plan for regional development

The state government has the primary responsibility of accelerating the process of development of backward blocks to bring about balanced regional development in the state. In this regard identification of resource region may serve as a tool for planning for balanced growth in the state. To discover this, regional evaluation of resource endowments at the smallest unit of block level is necessary. This requires a long term plan. But its success will bring improvement in the long run.

Long term plan envisages the formation of three autonomous agencies to manage and look after the natural, human and cultural resources of the state independently. The prime concern of these agencies should be to collect relevant information and regulate the utilization of assigned resource respectively. A fourth autonomous agency may also be formed to coordinate and assess the function of three bodies. Thus while the three autonomous will strive to developed their respective resources on micro level, the fourth agency may coordinate their activities so that one resource is not developed at the cost of the other. This agency may also try to rehabilate the resource if possible, to reduce regional disparities.

Moreover, these bodies may collect all types of information which otherwise may not be available. Such collection of information will help resource planner in their appraisal and planning of individual as well as composite resource.

Keeping in view the present distribution of resources which the present study attempts, it is suggested to develop the resource base of the state in the interest of the well being of its people.

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APPENDIX- I

SLOPE CATEGORIES AVAILABLE IN BLOCKS OF MIZORAM

	SLOPE CATEGORY OF BLOCKS								
		0- 3 %		3- 10 %		10- 15 %			
Sl.No	Block	Area in hectares	Percentage of area in hectares	Area in hacteres	Percentage of area in hacteres	Area in hacteres	Percentage of area in hacteres	Area under cultivable slope	Ranking
1	Thingdawl	567.27	0.41	2766.52	1.98	8315.93	5.96	8.35	1
2	Reiek	220.31	0.26	686.55	0.82	3700.55	4.44	5.52	2
3	zawlnuam	125.25	0.12	970.44	0.9	2913.06	2.71	3.73	4
4	Lawngtlai	120.05	0.09	1725.38	1.3	3073.41	2.31	3.7	5
5	Serchhip	75.88	0.08	418.24	0.24	2183.67	2.19	2.69	8
6	Khawzawl	612.92	0.37	510	0.31	1798.79	1.1	1.78	10
1	Chawngte			627.92	0.94	2515.8	3.73	4.69	3
2	Tlangnuam			20.89	0.03	2336.04	3.67	3.7	5
3	W.Phaileng			164.08	0.15	3016.25	2.74	2.89	7
4	Lungsen			213.25	0.16	2727.96	2.01	2.17	9
5	Aibawk			7.43	0.01	906.54	1.75	1.76	11
6	Bunghmun			87.57	0.08	1083.9	0.98	1.06	12
7	Ngopa			605.81	0.71	300.46	0.35	1.06	12
8	Tuipang			687.69	0.45	832.01	0.55	1	14
9	Khawbung			23.82	0.03	595.82	0.84	0.87	15
10	E.Lungdar			103.56	0.16	266.78	0.41	0.57	16
1	Darlawn					786.09	0.8	0.8	20
2	Lunglei					298.05	0.27	0.27	17
3	Thingsulthliah					152.05	0.22	0.22	18
4	Phullen					87.46	0.17	0.17	19
	Total	1721.68	0.08	9619.15	0.46	37890.62	1.80		

APPENDIX- II

DISTRIBUTION OF MOISTURE THROUGH RAINFALL IN MIZORAM

AMOUNT OF RAINFALL IN MIZORAM (IN CENTIMETERS)					
Sl no.	Block	Summer	Winter	Total Rainfall	Rank
1	Aibawk	732	28	760	1
2	Darlawn	151	4	152	21
3	Phullen	165	3	202	19
4	Thingsulthliah	240	14	350	9
5	Tlangnuam	423	20	443	8
6	Bunghmun	97	3	100	22
7	Hnahthial	305	10	315	10.5
8	Lungsen	236	7	243	17
9	Lunglei	303	12	315	10.5
10	Ngopa	242	11	253	15
11	Khawbung	250	10	260	12
12	Khawzawl	233	12	245	16
13	E. Lungdar	179	7	186	20
14	Serchhip	564	28	592	2
15	Sangau	450	25	450	7
16	Tuipang	472	22	494	6
17	Thingdawl	556	21	577	3
18	Chawngte	304	15	534	5
19	Lawngtlai	544	31	575	4
20	Reiek	320	12	238	18
21	W. Phaileng	150	4	254	13.5
22	Zawlnuam	249	5	254	13.5

APPENDIX- III

PROPORTION OF FOREST RESOURCES IN BLOCKS OF MIZORAM

Sl.No	Block	Geographical Area	Total forest cover	Percentage of forest to total Geographical area of the block	Ranking
1	Aibawk	616.88	544.3	88.2	7
2	Darlawn	1037.48	916.16	88.31	4
3	Phullen	515.15	454.5	88.23	6
4	Thingsulthliah	874.13	771.44	88.25	5
5	Tlangnuam	532.67	470.6	88.35	3
6	Bunghmun	1389.26	1240.38	89.28	2
7	Hnahthial	985.39	850.06	86.26	13
8	Lungsen	1046.29	918.67	87.8	9
9	Lunglei	1117.06	985.14	88.19	8
10	Ngopa	891.77	729.12	81.76	14
11	Khawbung	705.97	577.05	81.74	15
12	Khawzawl	1588.08	1297.83	81.72	16
13	E. Lungdar	623	471.94	75.75	19
14	Serchhip	798.6	605.06	75.77	18
15	Sangau	565.91	387.23	68.43	20
16	Tuipang	1399.9	957.77	68.42	21
17	Thingdawl	1382.51	1266	91.57	1
18	Chawngte	686.35	375.95	54.77	22
19	Lawngtlai	1304.84	994.43	76.21	17
20	Reiek	937.42	819.33	87.4	10
21	W. Phaileng	999.57	872.19	87.26	12
22	Zawlnuam	1088.76	951.48	87.39	11

APPENDIX- IV

AVAILABILITY OF LIVESTOCK UNITS IN BLOCKS OF MIZORAM

Sl.no	Blocks	Livestock Units	Percentage of Livestock units from total livestock unity	Rank
1	Aibawk	1382	1.26	21
2	Darlawn	1863	1.7	19
3	Phullen	1129	1.03	22
4	Thingsulthliah	2631	2.39	15
5	Tlangnuam	13952	12.64	3
6	Bunghmun	1427	1.3	20
7	Hnahthial	2314	2.11	17
8	Lungsen	2522	2.29	16
9	Lunglei	5692	5.18	5
10	Ngopa	4267	3.88	8
11	Khawbung	4654	4.23	7
12	Khawzawl	15421	14.03	2
13	E.Lungdar	2743	2.5	13
14	Sherchhip	5041	4.59	6
15	Sangau	3614	3.29	9
16	Tuipang	11007	10.01	4
17	Thingdawl	15530	14.13	1
18	Chawngte	2759	2.51	12
19	Lawngtlai	3556	3.24	11
20	Reiek	2085	1.9	18
21	W.Phaileng	2739	2.49	14
22	Zawlnuam	3581	3.26	10

APPENDIX- V

RANKING OF BLOCKS BASED ON PROPORTION OF CULTIVATED LAND

CULTIVATED LAND				
Sl.no	Blocks	Total Agricultural Area/ Cultivated Land(hac)	Percentage from total area of block	Rank
1	Aibawk	2198	3.56	14
2	Darlawn	3370	3.24	18
3	Phullen	1908	3.7	11
4	Thingsulthliah	3394	3.89	10
5	Tlangnuam	2140	4.02	7
6	Bunghmun	3559	2.56	22
7	Hnahthial	2553	2.6	20
8	Lungsen	2712	2.59	21
9	Lunglei	3895	3.47	15
10	Ngopa	3534	3.96	9
11	Khawbung	3034	4.3	5
12	Khawzawl	7824	4.93	4
13	E.Lungdar	3322	5.33	3
14	Serchhip	5259	6.59	2
15	Sangau	1837	3.25	17
16	Tuipang	5044	3.61	13
17	Thingdawl	10205	7.38	1
18	Chawngte	2906	4.23	6
19	Lawngtlai	4763	3.65	12
20	Reiek	2892	3.09	19
21	W.Phaileng	3383	3.34	16
22	Zawlnuam	3359	4	8

APPENDIX- VI

RANKING OF BLOCKS BASED ON INTENSITY OF PRODUCTIVITY

Sl.no	Blocks	Intensity of Productivity	Rank
1	Aibawk	58.04	5
2	Darlawn	58.34	3
3	Phullen	58.39	1
4	Thingsulthliah	58.33	4
5	Tlangnuam	58.37	2
6	Bunghmun	9.49	18
7	Hnahthial	9.7	17
8	Lungsen	9.76	15
9	Lunglei	9.72	16
10	Ngopa	27.08	9
11	Khawbung	28.38	7
12	Khawzawl	28.1	8
13	E.Lungdar	5.79	21
14	Serchhip	5.78	22
15	Sangau	7.83	19
16	Tuipang	7.81	20
17	Thingdawl	49.97	6
18	Chawngte	10.65	13.5
19	Lawngtlai	10.65	13.5
20	Reiek	26.08	11
21	W.Phaileng	24.18	12
22	Zawlnuam	26.27	10

APPENDIX- VII

RANKING OF BLOCKS BASED ON INTENSITY OF CROPPING

Sl.no	Blocks	Intensity of Cropping	Ranking
1	Aibawk	117.03	12.5
2	Darlawn	117.02	14.5
3	Phullen	117.14	11
4	Thingsulthliah	117.02	14.5
5	Tlangnuam	117.03	12.5
6	Bunghmun	128.16	9
7	Hnahthial	128.33	7
8	Lungsen	128.06	10
9	Lunglei	128.17	8
10	Ngopa	183.81	1
11	Khawbung	184.34	2
12	Khawzawl	184.04	3
13	E.Lungdar	110.4	21
14	Sherchhip	110.47	18
15	Sangau	110.22	19
16	Tuipang	109.84	22
17	Thingdawl	158	4
18	Chawngte	149.47	5
19	Lawngtlai	149.23	6
20	Reiek	110.85	17
21	W.Phaileng	110.8	20
22	Zawlnuam	110.86	16

APPENDIX- VIII

RANKING OF BLOCKS BASED ON INTENSITY OF IRRIGATION

Intensity of Irrigation				
Sl.No	Blocks	Irrigated area (in Hac)	Intensity	Rank
1	Aibawk	659	0.253	3
2	Darlawn	63	0.014	17
3	Phullen	185	0.085	8
4	Thingsulthliah	81.3	0.022	13
5	Tlangnuam	95	0.042	10
6	Bunghmun	4	0.001	20
7	Hnahthial	238	0.093	7
8	Lungsen	0	0	21.5
9	Lunglei	402	0.138	5
10	Ngopa	0	0	21.5
11	Khawbung	500.5	0.164	4
12	Khawzawl	257	0.037	11
13	E.Lungdar	21	0.006	19
14	Serchhip	123	0.028	12
15	Sangau	242	0.131	6
16	Tuipang	83	0.018	15
17	Thingdawl	952	0.078	9
18	Chawngte	27	0.01	18
19	Lawngtlai	2222	0.466	2
20	Reiek	54	0.019	14
21	W.Phaileng	46	0.015	16
22	Zawlnuam	3340	0.994	1

APPENDIX- IX

RANKING OF BLOCKS BASED ON Z- SCORE FOR DIFFERENT COMPONENETS OF PHYSICAL RESOURCES

Physical Resources					
Sl.No	Blocks	X1	X2	Total	Rank
1	Aibawk	-0.28	2.31	2.03	4
2	Darlawn	-0.73	-1.2	-1.93	20
3	Phullen	-1.03	-0.92	-1.95	21
4	Thingsulthliah	-1.01	-0.07	-1.08	14
5	Tlangnuam	0.64	0.92	1.56	6
6	Bunghmun	-0.61	-1.51	-2.12	22
7	Hnahthial	-1.11	-0.3	-1.41	18
8	Lungsen	-0.09	-0.69	-0.78	12
9	Lunglei	-0.99	-0.27	-1.26	16
10	Ngopa	-0.61	-0.63	-1.24	15
11	Khawbung	-0.7	-0.59	-1.29	17
12	Khawzawl	-0.27	-0.67	-0.94	13
13	E.Lungdar	-0.84	-1.02	-1.86	19
14	Serchhip	0.16	1.33	1.49	7
15	Sangau	-1.11	0.51	-0.6	10
16	Tuipang	-0.64	0.77	0.13	8
17	Thingdawl	2.84	0.22	3.06	1
18	Chawngte	1.11	1	2.11	3
19	Lawngtlai	0.64	1.24	1.88	5
20	Reiek	1.5	1.03	2.53	2
21	W.Phaileng	0.26	-0.85	-0.59	11
22	Zawlnuam	0.65	-0.62	0.03	9

APPENDIX- X

RANKING OF BLOCKS BASED ON Z- SCORE FOR DIFFERENT COMPONENTS OF BIOTIC RESOURCES

Biotic Resources					
Sl.No	Blocks	X3	X4	Total	Rank
1	Aibawk	0.64	-0.79	-0.15	12.5
2	Darlawn	0.64	-0.69	-0.05	10
3	Phullen	0.64	-0.85	-0.21	15
4	Thingsulthliah	0.64	-0.52	0.12	6
5	Tlangnuam	0.66	1.97	2.63	2
6	Bunghmun	0.76	-0.78	-0.02	9
7	Hnahthial	0.43	-0.59	-0.16	14
8	Lungsen	0.6	-0.54	0.06	7
9	Lunglei	0.64	0.15	0.79	4
10	Ngopa	-0.07	-0.16	-0.23	17
11	Khawbung	-0.07	-0.08	-0.15	12.5
12	Khawzawl	-0.07	2.29	2.22	3
13	E.Lungdar	-0.73	-0.49	-1.22	20
14	Serchhip	-0.73	0.01	-0.72	18
15	Sangau	-1.54	-0.3	-1.84	21
16	Tuipang	-1.54	1.32	-0.22	16
17	Thingdawl	1.01	2.31	3.32	1
18	Chawngte	-3.04	-0.49	-3.53	22
19	Lawngtlai	-0.68	-0.32	-1	19
20	Reiek	0.55	-0.64	-0.09	11
21	W.Phaileng	0.54	-0.5	0.04	8
22	Zawlnuam	0.55	-0.31	0.24	5

APPENDIX- XI

RANKING OF BLOCKS BASED ON Z- SCORE FOR AGRICULTURAL RESOURCES

Agro Resources							
Sl.No	Blocks	X5	X6	X7	X8	Total	Rank
1	Aibawk	-0.34	1.53	-0.54	0.6	1.25	6
2	Darlawn	-0.61	1.54	-0.54	-0.48	-0.09	12
3	Phullen	-0.23	1.54	-0.54	-0.16	0.61	9
4	Thingsulthliah	-0.07	1.54	-0.54	-0.45	0.48	10
5	Tlangnuam	0.04	1.54	-0.54	-0.35	0.69	8
6	Bunghmun	-1.18	-0.84	-0.11	-0.54	-2.67	22
7	Hnahthial	-1.14	-0.83	-0.1	-0.12	-2.19	18
8	Lungsen	-1.15	-0.83	-0.11	-0.55	-2.64	21
9	Lunglei	-0.42	-0.83	-0.11	0.08	-1.28	15
10	Ngopa	-0.01	0.02	2.06	-0.55	1.52	5
11	Khawbung	0.28	0.08	2.08	0.2	2.64	3
12	Khawzawl	0.8	0.07	2.07	-0.38	2.56	4
13	E.Lungdar	1.13	-1.02	-0.8	-0.52	-1.21	14
14	Serchhip	2.18	-1.02	-0.8	-0.42	-0.06	11
15	Sangau	-0.6	-0.92	-0.81	0.05	-2.28	19
16	Tuipang	-0.3	-0.93	-0.82	-0.46	-2.51	20
17	Thingdawl	2.84	1.13	1.06	-0.19	4.84	1
18	Chawngte	0.22	-0.79	0.72	-0.5	-0.35	13
19	Lawngtlai	-0.27	-0.79	0.71	1.57	1.22	7
20	Reiek	-0.73	-0.03	-0.78	-0.46	-2	17
21	W.Phaileng	-0.53	-0.13	-0.79	-0.48	-1.93	16
22	Zawlnuam	0.02	-0.02	-0.78	3.97	3.19	2

APPENDIX- XII

PROPORTION OF DIFFERENT NATURAL RESOURCES IN BLOCKS OF MIZORAM

Percentage of natural resource evaluation from ranking				
Sl.No	Blocks	Physical	Biotic	Agro
1	Aibawk	40.8	22.58	36.56
2	Darlawn	11.11	48.15	40.74
3	Phullen	8.33	33.33	58.33
4	Thingsulthliah	23.08	43.59	33.33
5	Tlangnuam	32.08	39.62	28.31
6	Bunghmun	6.25	87.5	6.25
7	Hnahthial	26.32	47.37	26.32
8	Lungsen	37.93	55.17	6.9
9	Lunglei	20.59	55.88	23.53
10	Ngopa	25	18.75	56.25
11	Khawbung	16.43	28.77	54.79
12	Khawzawl	20.41	40.82	38.78
13	E.Lungdar	25	18.75	56.25
14	Serchhip	48.48	15.15	36.36
15	Sangau	68.42	10.53	21.05
16	Tuipang	60	28	12
17	Thingdawl	33.33	33.33	33.33
18	Chawngte	64.52	3.23	41.93
19	Lawngtlai	47.37	10.53	42.11
20	Reiek	53.85	30.77	15.38
21	W.Phaileng	35.29	44.12	20.59
22	Zawlnuam	26.42	33.96	39.62

APPENDIX- XIII

DISTRIBUTION OF POPULATION IN MIZORAM AT BLOCK LEVEL

Sl.no	Blocks	Density of Population	Rank
1	Aibawk	29	12
2	Darlawn	23	18
3	Phullen	28	13.5
4	Thingsulthliah	40	7
5	Tlangnuam	489	1
6	Bunghmun	12	22
7	Hnahthial	27	15.5
8	Lungsen	28	13.5
9	Lunglei	59	2
10	Ngopa	22	19
11	Khawbung	30	11
12	Khawzawl	44	5
13	E.Lungdar	35	8
14	Sherchhip	50	3
15	Sangau	27	15.5
16	Tuipang	33	9.5
17	Thingdawl	43	6
18	Chawngte	48	4
19	Lawngtlai	33	9.5
20	Reiek	17	21
21	W.Phaileng	21	20
22	Zawlnuam	25	17

APPENDIX- XIV

DISTRIBUTION OF WORKERS IN MIZORAM AT BLOCK LEVEL

Sl.no	Blocks	Total workers	Percentage	Rank
1	Aibawk	11064	61.77	4
2	Darlawn	15343	63.54	3
3	Phullen	7485	51.06	17
4	Thingsulthliah	19475	57.04	8
5	Tlangnuam	112776	43.32	20
6	Bunghmun	9300	56.54	9
7	Hnahthial	15028	56.36	10
8	Lungsen	16786	57.79	7
9	Lunglei	30679	46.77	19
10	Ngopa	10744	55.3	11
11	Khawbung	12443	58.7	5
12	Khawzawl	40837	58.15	6
13	E.Lungdar	13699	63.55	2
14	Serchhip	32523	82.1	1
15	Sangau	7779	51.46	16
16	Tuipang	19202	41.71	22
17	Thingdawl	32328	54.28	13
18	Chawngte	16175	49.05	18
19	Lawngtlai	17918	42.16	21
20	Reiek	8515	52.89	15
21	W.Phaileng	11425	54.05	14
22	Zawlnuam	15225	55.13	12

APPENDIX- XV

DISTRIBUTION OF LABOUR PRODUCTIVITY IN MIZORAM AT BLOCK LEVEL

Sl.no	Blocks	Labour productivity in Metric tons	Rank
1	Aibawk	1.26	3.5
2	Darlawn	1.43	1
3	Phullen	1.29	2
4	Thingsulthliah	0.93	6
5	Tlangnuam	0.1	22
6	Bunghmun	0.88	7
7	Hnahthial	0.39	18
8	Lungsen	0.35	19
9	Lunglei	0.2	21
10	Ngopa	0.95	5
11	Khawbung	0.66	10
12	Khawzawl	0.48	16
13	E.Lungdar	0.51	13.5
14	Serchhip	0.26	20
15	Sangau	0.52	12
16	Tuipang	0.51	13.5
17	Thingdawl	1.26	3.5
18	Chawngte	0.44	17
19	Lawngtlai	0.63	11
20	Reiek	0.79	8
21	W.Phaileng	0.72	9
22	Zawlnuam	0.51	13.5

APPENDIX- XVI

RANKING OF BLOCKS BASED ON Z- SCORE

Density of population			
Sl.no	Blocks	X9	Rank
1	Aibawk	-0.24	12
2	Darlawn	-0.30	18
3	Phullen	-0.25	13.5
4	Thingsulthliah	-0.13	7
5	Tlangnuam	4.45	1
6	Bunghmun	-0.42	22
7	Hnahthial	-0.26	15.5
8	Lungsen	-0.25	13.5
9	Lunglei	0.06	2
10	Ngopa	-0.31	19
11	Khawbung	-0.23	11
12	Khawzawl	-0.09	5
13	E.Lungdar	-0.18	8
14	Serchhip	-0.03	3
15	Sangau	-0.26	15.6
16	Tuipang	-0.20	9.5
17	Thingdawl	-0.10	6
18	Chawngte	-0.05	4
19	Lawngtlai	-0.20	9.5
20	Reiek	-0.37	21
21	W.Phaileng	-0.32	20
22	Zawlnuam	-0.28	17

APPENDIX- XVII

RANKING OF BLOCKS BASED ON Z- SCORE

Total workers			
Sl.no	Blocks	X10	Rank
1	Aibawk	0.77	4
2	Darlawn	0.97	2.5
3	Phullen	-0.47	17
4	Thingsulthliah	0.22	8
5	Tlangnuam	-1.36	20
6	Bunghmun	0.16	9
7	Hnahthial	0.14	10
8	Lungsen	0.31	7
9	Lunglei	-0.96	19
10	Ngopa	0.02	11
11	Khawbung	0.41	5
12	Khawzawl	0.35	6
13	E.Lungdar	0.97	2.5
14	Serchhip	3.11	1
15	Sangau	-0.42	16
16	Tuipang	-1.54	22
17	Thingdawl	-0.10	13
18	Chawngte	-0.70	18
19	Lawngtlai	-1.49	21
20	Reiek	-0.26	15
21	W.Phaileng	-0.12	14
22	Zawlnuam	0.00	12

APPENDIX- XVIII

RANKING OF BLOCKS BASED ON Z- SCORE

Labour productivity			
Sl.no	Blocks	X 11	Rank
1	Aibawk	1.54	3.5
2	Darlawn	2.00	1
3	Phullen	1.62	2
4	Thingsulthliah	0.65	6
5	Tlangnuam	-1.59	22
6	Bunghmun	0.51	7
7	Hnahthial	-0.81	18
8	Lungsen	-0.92	19
9	Lunglei	-1.32	21
10	Ngopa	0.70	5
11	Khawbung	-0.08	10
12	Khawzawl	-0.57	16
13	E.Lungdar	-0.49	13.5
14	Serchhip	-1.16	20
15	Sangau	-0.46	12
16	Tuipang	-0.49	13.5
17	Thingdawl	1.54	3.5
18	Chawngte	-0.68	17
19	Lawngtlai	-0.16	11
20	Reiek	0.27	8
21	W.Phaileng	0.08	9
22	Zawlnuam	-0.49	13.5

APPENDIX- XIX

PROPORTION OF DIFFERENT COMPONENTS OF HUMAN RESOURCES IN BLOCKS OF MIZORAM

Percentage of human resources				
Sl.no	Blocks	Density	Total workers	Labour Productivity
1	Aibawk	21.78	37.62	40.59
2	Darlawn	10.31	44.33	45.36
3	Phullen	28	16	56
4	Thingsulthliah	33.33	31.25	35.42
5	Tlangnuam	84.62	11.53	3.85
6	Bunghmun	3.03	48.48	48.48
7	Hnahthial	32.08	49.06	18.87
8	Lungsen	34.43	52.46	13.11
9	Lunglei	77.78	14.81	7.41
10	Ngopa	11.76	35.29	52.94
11	Khawbung	27.91	41.86	30.23
12	Khawzawl	42.86	40.48	16.67
13	E.Lungdar	31.91	45.74	22.34
14	Serchhip	44.44	48.89	6.67
15	Sangau	32.08	26.42	41.51
16	Tuipang	55.77	3.85	40.38
17	Thingdawl	35.79	21.05	43.16
18	Chawngte	63.33	16.67	20
19	Lawngtlai	50.88	7.02	42.11
20	Reiek	8	32	60
21	W.Phaileng	11.54	34.62	53.85
22	Zawlnuam	21.82	40	38.18

APPENDIX- XX

PERCENTAGE OF LITERACY IN BLOCKS OF MIZORAM

Sl.no	Blocks	Literacy in Percentage	Rank
1	Aibawk	96.8	2
2	Darlawn	92.16	10
3	Phullen	93.75	7
4	Thingsulthliah	94.55	5
5	Tlangnuam	97.35	1
6	Bunghmun	66.5	19
7	Hnahthial	92.9	9
8	Lungsen	57.35	22
9	Lunglei	96.4	3
10	Ngopa	88.2	14
11	Khawbung	89.7	13
12	Khawzawl	91.7	11
13	E.Lungdar	94	6
14	Sherchhip	95.55	4
15	Sangau	79.7	17
16	Tuipang	82.85	16
17	Thingdawl	91.3	12
18	Chawngte	59.85	20
19	Lawngtlai	68.2	18
20	Reiek	93.65	8
21	W.Phaileng	58.5	21
22	Zawlnuam	86.35	15

APPENDIX- XXI

AVAILABILITY OF SCHOOL IN RELATION TO STUDENTS IN THE BLOCKS OF MIZORAM

Sl.no	Blocks	School per 500 Students	Rank
1	Aibawk	8.58	5
2	Darlawn	8.28	8
3	Phullen	8.36	7
4	Thingsulthliah	7.38	16
5	Tlangnuam	5.6	22
6	Bunghmun	10.83	1
7	Hnahthial	8.18	11
8	Lungsen	9.38	4
9	Lunglei	8.05	13
10	Ngopa	8.48	6
11	Khawbung	8.08	12
12	Khawzawl	7.73	15
13	E.Lungdar	7.76	14
14	Serchhip	6.3	17
15	Sangau	9.74	2
16	Tuipang	5.88	21
17	Thingdawl	6.13	19.9
18	Chawngte	6.13	19.5
19	Lawngtlai	8.25	10
20	Reiek	9.49	3
21	W.Phaileng	8.27	9
22	Zawlnuam	6.28	18

APPENDIX- XXII

AVAILABILITY OF TEACHERS IN RELATION TO STUDENTS IN THE BLOCKS OF MIZORAM

Sl.No	BLOCK	Teacher/500 Student	Rank
1	Aibawk	40.33	13
2	Darlawn	43.16	10
3	Phullen	45.24	7
4	Thingsulthliah	45.32	6
5	Tlangnuam	29.82	20
6	Bunghmun	42.58	11
7	Hnahthial	45.46	5
8	Lungsen	31.92	19
9	Lunglei	51.33	3
10	Ngopa	43.31	9
11	Khawbung	29.39	21
12	Khawzawl	34.12	16
13	E. Lungdar	41.18	12
14	Serchhip	37.2	15
15	Sangau	53.84	1
16	Tuipang	38.39	14
17	Thingdawl	34.1	18
18	Chawngte	25.88	22
19	Lawngtlai	44.31	8
20	Reiek	52.92	2
21	W. Phaileng	34.11	17
22	Zawlnuam	47.56	4

APPENDIX- XXIII

AVAILABILITY OF ROAD IN RELATION TO AREA IN THE BLOCKS OF MIZORAM

Sl.No	BLOCK	Road Densisty/100 sq km	Rank
1	Aibawk	35.74	4
2	Darlawn	35.59	6
3	Phullen	35.77	3
4	Thingsulthliah	35.69	5
5	Tlangnuam	97.46	1
6	Bunghmun	19.5	20.5
7	Hnahthial	19.5	20.5
8	Lungsen	19.51	19
9	Lunglei	23.78	14
10	Ngopa	30.11	8
11	Khawbung	30.1	9
12	Khawzawl	33.11	7
13	E. Lungdar	23.82	13
14	Serchhip	29.8	10
15	Sangau	22.36	16
16	Tuipang	25.77	12
17	Thingdawl	36.53	2
18	Chawngte	19.42	22
19	Lawngtlai	23.08	15
20	Reiek	21.43	17.5
21	W. Phaileng	21.43	17.5
22	Zawlnuam	25.81	11

APPENDIX- XXIV

AVAILABILITY OF ROADS IN RELATION TO POPULATION IN THE BLOCKS OF MIZORAM

Sl.No	BLOCK	Roads per 1lakh population	Rank
1	Aibawk	1230.98	6
2	Darlawn	1529.34	2
3	Phullen	1258.09	4
4	Thingsulthliah	913.66	10
5	Tlangnuam	199.44	22
6	Bunghmun	1647.13	1
7	Hnahthial	720.76	15
8	Lungsen	702.57	17
9	Lunglei	405.03	20
10	Ngopa	1382.16	3
11	Khawbung	1002.55	9
12	Khawzawl	748.72	14
13	E. Lungdar	688.3	18
14	Serchhip	600.78	19
15	Sangau	837.08	12
16	Tuipang	783.6	13
17	Thingdawl	848.08	11
18	Chawngte	404.31	21
19	Lawngtlai	708.7	16
20	Reiek	1247.86	5
21	W. Phaileng	1013.25	8
22	Zawlnuam	1017.71	7

APPENDIX- XXV

AVAILABILITY OF DOCTORS IN RELATION TO POPULATION

Sl.No	BLOCK	Number of doctor per 500 Population	Rank
1	Aibawk	0.06	17.5
2	Darlawn	0.06	17.5
3	Phullen	0.06	17.5
4	Thingsulthliah	0.09	13.5
5	Tlangnuam	0.51	1
6	Bunghmun	0.06	17.5
7	Hnahthial	0.09	13.5
8	Lungsen	0.02	22
9	Lunglei	0.19	3
10	Ngopa	0.1	11.5
11	Khawbung	0.09	13.5
12	Khawzawl	0.21	2
13	E. Lungdar	0.12	7.5
14	Serchhip	0.16	5
15	Sangau	0.1	11.5
16	Tuipang	0.17	4
17	Thingdawl	0.15	6
18	Chawngte	0.06	17.5
19	Lawngtlai	0.12	7.5
20	Reiek	0.12	7.5
21	W. Phaileng	0.07	16
22	Zawlnuam	0.2	10

APPENDIX- XXVI

AVAILABILITY OF HOSPITAL BEDS IN RELATION TO POPULATION

Sl.No	BLOCK	Number of available beds per 500 Population	Rank
1	Aibawk	0.56	20
2	Darlawn	1.04	8
3	Phullen	1.02	9.5
4	Thingsulthliah	0.88	15
5	Tlangnuam	3.17	1
6	Bunghmun	0.61	18
7	Hnahthial	1.01	11
8	Lungsen	0.17	22
9	Lunglei	2.44	3
10	Ngopa	1.29	6
11	Khawbung	0.94	12
12	Khawzawl	1.64	4
13	E. Lungdar	1.48	5
14	Serchhip	1.26	7
15	Sangau	0.79	16
16	Tuipang	0.91	14
17	Thingdawl	1.02	9.5
18	Chawngte	0.67	17
19	Lawngtlai	0.47	21
20	Reiek	0.93	13
21	W. Phaileng	0.57	19
22	Zawlnuam	2.71	2

APPENDIX- XXVII

RANKING OF BLOCKS BASED ON Z- SCORE FOR EDUCATIONAL RESOURCES

Education						
Sl.No	BLOCK	x12	X 13	X 14	total	Rank
1	Aibawk	0.88	0.5	-0.02	1.36	6
2	Darlawn	0.54	0.27	0.34	1.15	7
3	Phullen	0.66	0.33	0.61	1.60	4
4	Thingsulthliah	0.71	-0.41	0.62	0.92	10
5	Tlangnuam	0.92	-1.74	-1.38	-2.20	20
6	Bunghmun	-1.36	2.19	0.27	1.10	8
7	Hnahthial	0.59	0.2	0.64	1.43	5
8	Lungsen	-2.03	1.1	-1.11	-2.04	19
9	Lunglei	0.85	0.1	1.39	2.34	3
10	Ngopa	0.25	0.42	0.36	1.03	9
11	Khawbung	0.36	0.12	-1.43	-0.95	16
12	Khawzawl	0.50	-0.14	-0.82	-0.46	13
13	E. Lungdar	0.67	-0.12	0.08	0.63	11
14	Serchhip	0.79	-1.22	-0.43	-0.86	15
15	Sangau	-0.38	1.37	1.71	2.70	2
16	Tuipang	-0.15	-1.53	-0.27	-1.95	18
17	Thingdawl	0.47	-1.35	-0.83	-1.71	17
18	Chawngte	-1.85	-1.35	-1.88	-5.08	22
19	Lawngtlai	-1.23	0.25	0.49	-0.49	14
20	Reiek	0.65	1.18	1.6	3.43	1
21	W. Phaileng	-1.95	0.26	-0.82	-2.51	21
22	Zawlnuam	0.11	-0.48	0.91	0.54	12

APPENDIX- XXVIII

RANKING OF BLOCKS BASED ON Z- SCORE FOR TRANSPORT RESOURCES

Transport					
Sl.No	BLOCK	X 15	X 16	total	Rank
1	Aibawk	0.34	0.89	1.23	6
2	Darlawn	0.33	1.7	2.03	2
3	Phullen	0.34	0.96	1.3	4
4	Thingsulthliah	0.34	0.03	0.37	8
5	Tlangnuam	4.11	-1.91	2.2	1
6	Bunghmun	-0.66	2.02	1.36	3
7	Hnahthial	-0.66	-0.5	-1.16	20
8	Lungsen	-0.66	-0.55	-1.21	19
9	Lunglei	-0.4	-1.35	-1.75	21
10	Ngopa	-0.01	1.3	1.29	5
11	Khawbung	-0.01	0.27	0.26	9
12	Khawzawl	0.18	-0.42	-0.24	12.5
13	E. Lungdar	-0.4	-0.59	-0.99	18
14	Serchhip	-0.03	-0.82	-0.85	16
15	Sangau	-0.49	-0.18	-0.67	15
16	Tuipang	-0.28	-0.33	-0.61	14
17	Thingdawl	0.39	-0.15	0.24	10
18	Chawngte	-0.67	-1.36	-2.03	22
19	Lawngtlai	-0.44	-0.53	-0.97	17
20	Reiek	-0.54	0.93	0.39	7
21	W. Phaileng	-0.54	0.3	-0.24	12.5
22	Zawlnuam	-0.27	0.31	0.04	11

APPENDIX- XXIX

RANKING OF BLOCKS BASED ON Z- SCORE FOR HEALTH RESOURCES

Health					
Sl.No	BLOCK	X 17	X 18	total	Rank
1	Aibawk	-0.7	-0.81	-1.51	4
2	Darlawn	-0.7	-0.16	-0.86	15
3	Phullen	-0.7	-0.19	-0.89	16
4	Thingsulthliah	-0.4	-0.38	-0.78	13
5	Tlangnuam	3.8	2.27	6.07	1
6	Bunghmun	-0.7	-0.74	-1.44	20
7	Hnahthial	-0.4	-0.2	-0.6	11
8	Lungsen	-1.1	-1.34	-2.44	22
9	Lunglei	0.6	1.73	2.33	3
10	Ngopa	-0.3	0.18	-0.12	9
11	Khawbung	-0.4	-0.3	-0.7	12
12	Khawzawl	0.8	0.65	1.45	4
13	E. Lungdar	-0.1	0.43	0.33	6
14	Serchhip	0.3	0.14	0.44	5
15	Sangau	-0.3	-0.5	-0.8	14
16	Tuipang	0.4	-0.34	0.06	7
17	Thingdawl	0.2	-0.19	0.01	8
18	Chawngte	-0.7	-0.66	-1.36	18
19	Lawngtlai	-0.1	-0.93	-1.03	17
20	Reiek	-0.1	-0.31	-0.41	10
21	W. Phaileng	-0.6	-0.8	-1.4	19
22	Zawlnuam	0.7	2.09	2.79	2

APPENDIX- XXX

PROPORTION OF CULTURAL RESOURCES IN BLOCKS OF MIZORAM

Sl.no	Blocks	Education	Transport	Health
1	Aibawk	47.22	47.22	5.56
2	Darlawn	35.56	46.67	17.78
3	Phullen	42.22	42.22	15.56
4	Thingsulthliah	34.21	39.47	26.36
5	Tlangnuam	6.38	46.81	46.81
6	Bunghmun	39.47	52.63	7.89
7	Hnahthial	54.55	9.09	36.36
8	Lungsen	44.44	44.44	11.11
9	Lunglei	47.62	4.76	47.62
10	Ngopa	30.43	39.13	30.43
11	Khawbung	21.88	43.75	34.38
12	Khawzawl	24.69	28.4	46.91
13	E.Lungdar	35.29	14.71	50
14	Sherchhip	24.24	21.21	54.55
15	Sangau	55.26	21.05	23.68
16	Tuipang	16.67	30	53.33
17	Thingdawl	17.65	38.24	44.12
18	Chawngte	14.29	14.29	71.43
19	Lawngtlai	42.86	28.57	28.57
20	Reiek	43.14	31.37	25.49
21	W.Phaileng	11.43	65.71	22.86
22	Zawlnuam	25	27.27	47.73

APPENDIX- XXXI

PROPORTION OF RESOURCE ASSOCIATION REGIONS OF MIZORAM

Sl.no	Blocks	Natural	Human	Cultural
1	Aibawk	33.96	39.62	26.45
2	Darlawn	16.67	45.83	37.5
3	Phullen	25	38.64	36.36
4	Thingsulthliah	30.77	41.02	28.21
5	Tlangnuam	33.87	30.65	35.48
6	Bunghmun	3.7	48.15	48.15
7	Hnahthial	21.05	31.58	47.37
8	Lungsen	35.71	50	14.29
9	Lunglei	32.26	6.45	61.29
10	Ngopa	28.89	33.33	37.78
11	Khawbung	45.71	34.29	20
12	Khawzawl	46.51	25.58	27.91
13	E.Lungdar	11.11	51.85	37.04
14	Sherchhip	34.88	46.51	18.6
15	Sangau	9.09	22.73	68.18
16	Tuipang	54.55	9.09	36.36
17	Thingdawl	47.83	39.13	13.04
18	Chawngte	64.29	28.57	7.14
19	Lawngtlai	68	12	20
20	Reiek	30.77	23.08	46.15
21	W.Phaileng	34.15	51.23	14.63
22	Zawlnuam	40.43	17.02	42.55

BIO- DATA

A. GENERAL INFORMATION:

a). Name : Lalrinmawia

b). Father's Name : K.Thangchuanga

c). Nationality : Indian

d). Sex : Male

e). Address : Chaltlang, Dawrkawn.
Aizawl- 7960012.

f). Occupation : Assistant Professor.

B. EDUCATIONAL QUALIFICATION:

a). M.A. : In Geography, North Eastern Hill University.
First Class

b). M. Phil : North Eastern Hill University, Overall 'A' Grade

Topic : Levels of Regional Development in Mizoram.

C. WORKING EXPERIENCE : Six Years as Assistant Professor in Government Aizawl North College.