The Cognate Tribes of Mizos in North East India

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Abstract *: The term Mizo is a generic name given to a particular group of people inhabiting north eastern part of the Indian sub-continent. The area includes parts of India's North East, extreme east of Bangladesh and western part of Myanmar. In India these groups of people are concentrating mainly in Mizoram, Manipur, Assam and Tripura. The term 'Zo' commonly appears as an inclusive name among these peoples. With this consciousness of commonness, the majority of the people call themselves 'Zo', 'Yo', 'Sho' 'Zomi', or 'Mizo'. According to general understanding 'Mi' simply mean people, and Zo mean hill. Thus it could mean either Mizo (ethnic-base name) or Zomi (geographical-base name). However, in this study, the term 'Mizo' is taken as a generic name by which all the tribes variously known as Kuki/Chin/Mizo/Zomi are known all over the world. The authors have classified these groups of people based on field survey, geographical locations, languages and the lists of scheduled tribes of India recognized under various State Governments.*

Introduction

The term Zo or Jo was mentioned as name of a people in a few historical publications of the Indo-Burman peoples. Fanch'[1] a diplomat of the Tang dynasty of China mentioned in 862 A.D. a kingdom in the Chindwind Valley whose princes and chiefs were called 'Zo'. In 1783, Father Sangermo[2] mentioned in his book titled "A Descriptive of the Burmese Empire" the petty nation called 'Jo'. G.A. Grierson recorded in 1904 "The name is not used by the tribes themselves, who used titles such as Zo, Yo or Sho".[3] Vanchhunga who had intensive investigations on all the Mizos in Burma, claims that the forefathers of the Mizos used the phrase Keini Mizote chuan meaning, "We the people of Mizos".[4]

However, the Mizos were known in early times to the British and others by various names such as "Kuki", "Chin" and "Lushai". Mizos were first known as "Kuki" because they were the first batch to have arrived in Mizoram. They were found during the reign of the Tipeperah Raja Chachag who flourished about A.D. 1512. The name Kuki is given to the hill men by the Bengalis literally meant 'Wild hill people'.[5] "Chin" is another term by which the Mizos were known in Burma (now Myanmar). It is believed to be a corruption of the Chinese word of Jin or yen meaning "Man". Grierson says that 'Chin' in Burmese denotes all hill tribes living in the bordering region between Burma and Assam.[6] Finally, when the British intensified their intervention in Mizoram; they were called "Lushai". The word "Luchye" a variant of Lushai, first occurs in a "Report of 1853" by Colonel Lister.[7]

The people of Mizoram disliked being called "Kukis", or "Chin" and called themselves "Mizo". Similarly, the northen Zos in the northern part of Chin Hills and southern part of Manipur called themselves "Zo, Zou or Zomi". However, there is an exception to this acceptance and variations in the generic name of the people. For instance, the Thado speaking group of Manipur accepted "Kuki" as their nomenclature probably

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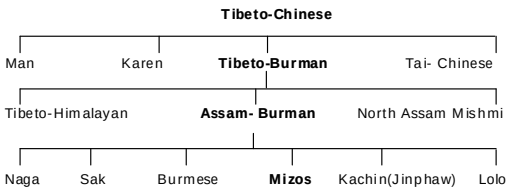
due to political advantages they are entitled by the governments.

Whatever may be the case, the term "Kuki" or "Chin" is a word unknown to the people until recent times. These words are alien to the people themselves. T. Gougin rightly observes: "the words like Kuki, Chin and Lushai are foreign words for the express reasons that these words are completely alien to the language of the Zomis(Mizos).[8]

Racial Stock

Racially the Mizos belong to the Tibeto-Chinese race. Lalthangliana (2000)[9] claims that, "the Mizos are the Assam-Burman sub-groups of the Tibeto-Chinese race. MIZOS are of the Assam-Burman sub-group that branches from the Tibeto- Burman group of the main Tibeto-Chinese race. The following diagram would make this point more clear.[10]



They belong to the Chin/Kuki family according to many scholars. Kunsstadter, (1967)[11] Mizos are grouped as part of the Tibeto-Burman family. They speak the Tibeto-Burman language.[12]

Classification of Mizos

According to Nag (1993)[13], "The word 'Mizo', if taken liberally, will include all the hill people, but it still does not identify a particular race. But, if the word 'Mizo', is used in the restricted sense to cover only those hill people who came together to this land and have same origin, similar language, culture, cult and way of life, then the name bears significance. It is therefore concluded that the word, 'Mizo' is chosen in the restricted sense to mean the identity of the race".

In this study, the term 'Mizos' is taken and used as a generic name of the people who belonged to the Tibeto-Burman race and speaking Tibeto-Burman Languages variously known as Kuki/Chin/Mizo/Zomi in various part of North Eastern Indian Sub-Continent. Thus, in a nutshell, the people considered 'Mizos' exclusively include the ethnic tribes who are commonly called 'Chin' in Myanmar, Kuki, Zomi and Lushai in Manipur, Kukis under else while Tripura Halam-Kuki Socio-Culture and Linguistic Organization (THKSCALO) in Tripura, Kuki and Mizo in Assam, Meghalaya and Nagaland and 'Lusei, Ralte, Mara, Hmar, Pawi, Paite, Thado, Vaiphei as Mizo' in Mizoram.

The above descriptions of identifying the Kuki/Chin/Mizo/Zomi group of people proved beyond doubt that these groups of people belong to one family tracing to one origin. They share many things in common which make them inseparable as one people having the same traditions and cultures in all aspects of life. These groups of people are also closely connected linguistically. The general classification of the Mizos is highly complex and no all scholars agreed to the different principles of classifying them.

The authors have classified this group of people based on field survey, geographical locations, languages and the lists of scheduled tribes of India recognized under various States' governments. This classification is

most acceptable by the different linguistic groups from various geographical locations. So, the researcher has classified the 'Mizos' on the basis of geographical locations and Linguistic similarities based on his experiences and field visits to the length and breadth of their occupied territory. Moreover, this classification is also done taking into consideration their migration pattern, language affinity and their distribution over space and time; and the generic term 'Mizos' is used in a restricted sense. The following are four groups of Mizos on regional basis;

1. The Northern Groups

The Northern Groups of the Mizos belong to various tribes and clans of the Chin/Kuki/Mizo racial group of Tibeto-Burman, speaking Assam-Burman languages. These groups of people are scattered in all the districts of different states, north of Mizoram. They are mostly concentrated in the southern districts of Manipur. The state of Manipur is their main concentration areas and spread in all neighbouring districts of Assam and Nagaland. The Chin-Kuki-Mizo groups of people of Manipur and adjoining regions are the most diverse groups known and recognized under various Scheduled Tribes of India among the Mizos. They depict the highest diversity due to many reasons. The most notable reasons may be attributed to their entry into their present settlements in the long process of their migration pattern. It is also highly attributed to the policy of successive governments in Manipur from the very beginning of princely Monarch and Kings. According to the Scheduled Tribe lists of Manipur, there are 35 recognized tribes of which more than half belongs to the Chin-Kuki-Mizo groups. The Northern Groups of the Mizos are mainly known by the term Kukis since time immemorial. They were indeed identified by this generic name since the time they came into contact with other more advanced form of civilizations in North Eastern part of India. The Kuki groups are classified and identified on the basis of the name they bear from the time they have settled in this part of their settlement. It would not be wrong to say that they were called Kukis from the very beginning they came in contact with the Princely Monarch of Bengal, Cachar, Tripura and Manipur. It is this reason, the name bears significance. The Kuki groups can be divided into two main branches on the basis of their migration pattern and present site of their settlements. They are the old Kukis and the new Kukis. The old Kukis includes the following main tribes;

(i) Anal. (ii) Aimol. (iii) Kom. (iv) Chothe. (v) Lamkang. (vi) Monsang. (vii) Chiru. (viii) Purum (ix) Mirawng or Milawng. (x) Maring.

Most of tribes and clans of the old Kukis,(excepting some clans of Aimol, Kom and Chiru) have accepted the nomenclature of Naga as their new racial identity. They joined the Nagafold in recent times due to political and economic reasons only. They had accepted their new identity with a sense of pride and dignity.

The New Kukis: The new Kukis includes mainly the Thadou-Speaking groups accepting the nomenclature of Kuki as their generic name. They are recognized under the Thado-Kuki tribes in Manipur and Kuki elsewhere in North East India. It includes the following tribes, sub

tribes and clans;

(i) Baite / Biete (ii) Chansan (iii) Chongloi (iv) Doungel (v) Guite(vuite) (vi) Hanneng (vii)Houkip / Haupit (viii) Haulai (ix)Hengen (x) Hongsung (xi) Hrangkhol / Rangkhol (xii) Jongte (xiii) Khawchung (xiv) Khawthlang (xv) Khothalong (xvi) Khelma (xvii) Kholhou (xviii) Kipgen (xix) Lengthang (xx) Thlangawm (xxi) Lhoujem (xxii) Lhouvum (xxiii) Lupheng (xxiv) Mangjel (xxv) Missao (xxvi) Saihrem (xxvii) Selnam (xxviii) Singson (xxix) Sitlhou (xxx) Thadau (xxxi) Thangngeu (xxxii) UIbuh (xxxiii) Mate (xxxiv) Lhungdim (xxxv) Khongsai (xxxvi) Gangte (xxxvii) Vaiphei (xxxviii) Simte etc.

Among the new Kukis whom people have known them as Kukis are few tribes who do not want to be called and identified as Kukis. These groups of people are known by their brethren Lushai (Mizo) as 'the Hmar and the Paite'. They include; (i) Hmar and their many clans. (ii) Paite and their many clans. (iii) Vaiphei and their many clans. (iv) Simte and their many clans. (v) Tedim-Chin and their many clans. (vi) Zo / Zou and their many clans.

2. The North Western Groups

The North Western groups mainly comprise of Hallam-Kuki groups linguistically belonging to the Kuki-Chin language family. The Chin-Kuki-Mizo groups are numerically insignificant but depict the largest variations in dialects and languages. According to scheduled tribe list of Tripura, there are three main tribes of the Kuki-Chin origin and their sub-clans. They can be classified on these three main groups namely, the Hallams, the Kukis and the Lushais. The Hallams are also known as Mila Kuki and are divided into several sub-clans which is refered as "Barki Hallam". The Major sub-clans of Hallams are; Kaloi. Kov-Bong, kaipeng, bong, Sakachep, Thangachep, Dab, Bongser, Molsum, Rupini, Rangkhawr, Chorai, Langai, Kaireng, Ranglong, Naveen and Murasing. Among Hallams Kolai, Murasing and Rupini speak in Kok-Borok and their social and religious culture also similar with Tripuri. They can be excluded from the Hallam Kuki groups. The kukis of Tripura includes the following twenty six sub-clans; Paitu, Chotlang, Khareng, Baibek, Amrai, Chamlen, Batle, Riyete, Balta, Rangchon, Rangchia, Chhailoi, Jangtei, Pailai, Beltu, Paite, Phun, Phuntei, Lentai, Hraltei, Sowailai, Powaktu, Dhum,Burdoia, Chhaljen and Rangte. Thirdly, Lushais are another tribe under Kuki-Chin groups of tribes in Tripura. They live in the Jampui range of the State. The Lushai groups or the Mizo will be included in the Central Groups owing to their language and distribution over space and time. Thus, the North Western Groups include the tribes and sub-tribes of Hallam and Kuki origin. They belong to the old kuki tribes according to many scholars in India. The Hallam-Kukis of Tripura includes the following tribes and sub-tribes;

1. (i) Molson (ii) Kaipeng (iii) Hrangkhawl (iv) Bongcher (v) Darlong (vi) Ranglong (vii) Dab (viii) Halam (Khoknu / Nabin) (ix) Cholai (x) Longhai (xi) Morsophang (xii) Korbong (xiii) Saihmar (xiv) Sahkachep (xv) Thangachep (xvi) Bong
2. Biate 3. Langrawng 4. Bawng 5. Bawm 6. Pangkhaw 7. Mawk.

In Tripura, there has been a conscious effort by the various Kuki

tribes/sub-tribes to mould unity through an acceptable language of common usage and, to this effect, they are organized under the umbrella of the Tripura Halam-Kuki Socio-Culture and Linguistic Organization (THKSCALO). Under the aegis of THKSCALO, the constitution Drafting Committee, with Pu. B.K. Hrangkhawl as its Chairman and Pu. H.T. Kluma Darlomg and Pu. S.K. Darlong as members, drafted a booklet entitled 'Constitution / By -Law of the Tripura Halam-Kuki Socio-Culture and Linguistic Organization'. This booklet was approved and adopted on the 31st May 1992 by the Central Executive Committee of THKSCALO.[14]

The Kuki tribes of Tripura organized under THKSCALO are as under;
(i) Molson (ii) Kaipeng (iii) Hrangkhawl (iv) Bongcher (v) Darlong (vi) Ranglong (vii) Dab (viii) Halam (Khoknu/Nabin) (ix) Cholai (x) Longhai (xi) Morsophang (xii) Korbong (xiii) Saihmar (xiv) Sahkachep (xv) Thangachep (xvi) Bong

3. The Southern Groups

The southern region comprises of two districts namely, Saiha and Lawngtlai districts. These two districts are inhabited by distinctive tribes originated from the east and the west. The district of Saiha is inhabited by mostly of the Mara people popularly known as the Lakhers. On the other hand, the district of Lawngtlai is inhabited by mostly of two big tribes namely, the Pawis and the Chakmas. Both of these two districts are in fact an autonomous districts council of the state of Mizoram.

Saiha District: The district of Saiha is an autonomous district Council of the Mara people. The Maras are largely homogenous. They consist of five principle sub-groups or clans. These are the Tlosaih-Siaha, Zyhno, Hawthai, Chapi and Vytu. All these sub-clans of the Maras occupied separate territory of their own right from the very beginning of occupying the present Maraland. Each and every group speaks a dialect of their own with slight variant from other sub-groups. But all of them can understand each other. The Tlosaih, one among the languages is the official language among the Maras. It is the language which unites the Maras as one people having one ethnic identity.

Lawngtlai District: The district of Lawngtlai is inhabited by two major tribes. These two tribes inhabit their own land and having distinct traditions and cultures. They are the Pawis or the Lais in the east and the North East and the Chakmas in the western fringe of the district. The respective lands of the Pawis and the Chakmas are indeed an autonomous region under Mizoram. The Pawis as they called themselves consist of various clans having distinct way of life. They were largely concentrated in and around two big towns of Lawngtlai and Sangou in the North East, north of Kolodyne River. They were originally from the Chin Hills and known to be one of the strongest as well as ferocious tribe of the Mizos. They had originated from Chin Hills in Myanmar somewhere in the later part of the seventeenth century.

4. The Central Groups

The Central groups include a homogeneous groups belonging to various tribe and clan groups of the Chin/Kuki stock. This region is taken as the Central and core region because these districts are more or less

inhabited by numerous clan groups who are identifying themselves by a common nomenclature 'Mizo' which is a unifying entity for all the Mizos in the world. This region also can be identified as one linguistic region speaking in Duhlian dialect popularly known as the Mizo. They are the most numerous among all other tribes. They are indeed belonging to all tribes and clans included under various Chin / Kuki Clans in the distant past. But at present, these various groups of Chin / Kuki clans accepted and identified themselves as 'Mizo' which becomes a national symbol of pride for all people alike in Mizoram and elsewhere. Among these various groups, the Lushai groups owing to their big numbers, diplomacy and power exerted their influence over other smaller tribes in the then Mizoram. Some of the tribes and clans belonging to Kukis were pushed westward and northward by the powerful Sailo's Chiefs. Many of them were conquered and subjugated by them and became one with them. It would not be out of text to mention that the smaller tribes and clans subjugated under the Sailo's Chiefs were assimilated and their dialects went to oblivion due to disuse for a very long time. But, these groups of people maintained their distinct traditions and cultures in one form or the other. However, at present, all the good traditions and cultures of all the tribes and clans are interwoven as the cultures of the Mizos. The intermingling of traditions and cultures became a potent force of transformation within the Mizo society. In fact, the Northern and North Western groups are highly influenced by the Lushai Chiefs in the past. This has led to the evolution of similar traditions and cultures throughout the length and breadth of their Land. This also became a living testimony to prove that they belong to one people having similar traditions and cultures. It can also be seen by the presence of common clan groups among the Mizos of the present with their brethren outside Mizoram. They are in fact, who originated from Chin Hills in Myanmar at around 1700 A.D. This points out that, these groups of migrants belong to the third wave of the Mizos to the present settlement in India's North East. As has been mentioned at the outset, they belong to the Lushai groups who pushed westward and northward to the old and new kukis as they were known. The Mizo / Duhlian speaking group of people originated from Seipui Village in Chin Hills of Myanmar in the beginning of 17th century.

The Mizos in the Central Groups comprise of a number of tribes which may be broadly divided into five major and eleven minor sub-tribes. This classification of the Tribes, Sub-Tribes and Clans are based entirely on Liangkhai's "History of Lushai" (2002), Vanchhunga's "Lusei leh a vela Hnam dangte Chanchin" (1955) and Zatluanga's "Mizo Channchin" is as under;[15]

The five major tribes are;

1. LUSEI 2. RALTE 3. HMAR
4. PAITE 5. PAWI

The eleven minor sub-tribes are known under a common name of AWZIA.

Lusei

The Lusei consists of ten commoners and six chiefs' clans. These are Pachuau, Chhangte, Chawngte, Hauhnar, Chuaungo, Chuauhang, Hrahsel, Tochhawng, Vanchhawng and

Chhakchhuak. The chiefs' clans are Zadeng, Palian, Thangluah, Rivung, Rokhum and Sailo.

Ralte

This is the sub-tribe, which according to the legend produced a couple who made such loud noise that the guardian-god of the cave closed the cave stopping all further exit of human beings to the surface from under the earth. The clans under Ralte are Khelte, Siakeng, Relhchhun and Kawlni.

Hmar

Hmars are one of the most numerous. They are as many as thirteen clans. These are Lawitlang (Hrangchal), Zote, Khawbung, Ngurte, Thiak, Leiri, Lungtau, Banzang, Pakhuang, Darngawn, Biate, Hrangkhawl and Hmar-Lusei. The last one is so named because they are the descendents of Chuauhanga Lusei who lost his way and joined hands with the Hmars.

Paite

The Paites trace their descent from the sun. The Legendary Liandova and his brother are said to be their fore-fathers. The most powerful clan amongst them is the Suktes who had been upholding the chieftainship among them.

Pawi

There are three main divisions among them. The first are those descended from Hringluma; the second are those who stayed back at Falam area of Burma and the third are the Fanais.

Awzia

Under this common name, there are as many as eleven sub-tribes. They had either lost their distinctive dialects or forgotten them as a result of disuse when they mingled with the larger groups. They have not, however, lost their separate identities. Some of the most notable characters in the ancient history of the Mizo people belonged to some of these minor sub-tribes. These sub-tribes are Chawngthu, Chawhte, Ngente, Khawlhring, Khiangte, Pautu, Rawite, Renthlei, Tlau, Vangchhia and Zawngte.

Conclusion

The above classification by famous Mizo Historians are accepted and authenticated by the researcher and taken as a basis of classification of the Mizos in Central Regions. The classification in the Central Regions is all encompassing and inclusive of all various cognate tribes of the Mizos all over the world. Indeed, it was this reason the need for a common nomenclature was felt first in the present Mizoram as early as the 1950s. The people of Mizoram at this time were simply known as the Lushai and the government of India wanted to recognize them as 'Lushai Tribe'. But, it would not represent all the clans belonging to various tribes at that time. Thus, the word 'Mizo' was chosen and preferred by the people to represent all cognate tribes in Mizoram.

Finally, the movement for changing the name from 'Lushai' to Mizo as the racial identity took its stand in the Parliament of India and in consequence, the name 'Mizo' rather than 'Lushai' as the racial identity came into force with effect from 1.9.1954 by the Act 18 of 1954 16. The term 'Mizo' by the Act 18 of 1954 is most inclusive and applied to all tribes, sub-tribes and clans of the Chin / Kuki / Mizo / Zomi groups of people. Thus,

the racial identity 'Mizo' recognized by the Government of India stands for all tribes of Mizoram belonging to various clans of the so called Chin/Kuki/Mizo/Zomi family. It should also be mentioned that the sub-groups of different regions are the branches of the main tree. These groups and sub-groups is regarded and addressed as Mizos in this study. Thus, the study relates to the Mizos of the above four geographical locations which nearly fit Linguistic Regions of all the Mizo Tribes.

The above description of classifying the Mizos is only a view of the authors which needs to be studied and researched more closely. This does not necessarily express the view of others or contradicts other scholars of other allied disciplines. It is an attempt to highlight the Mizos as one people having same, similar or common cultures and traditions occupying one contiguous territory in the Indian Sub-Continent.

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Growth and Trend of Public Eexpenditure And its Impact on the Economy of Mizoram

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Abstract *: Public expenditure refers to the expenses incurred by the government for its own maintenance, the society and the economy as a whole. Public expenditure lies at the root of economic uplift in a backward economy like Mizoram and its behavior is a conditioning factor of economic development. Through the analysis of public expenditure in its proper perspective, one can measure the course of economic development as well as the administrative skill of the government. On the other hand, lack of proper planning of expenditure, its magnitude and of productive directions may cause a serious setback on the efforts of economic development.* Public expenditure on both revenue and capital accounts have increased tremendously during the plan periods in Mizoram. *The examination of the growth trend and pattern of expenditure shows that increase in expenditure on Economic Services has been comparatively lower than that of the increase in General and Social Services. This has clearly indicated that the Government of Mizoram has put more importance to welfare programme with immediate result than to long-term development programme. Besides, non-development expenditure has increased enormously over the years. The state's own revenue plus the share in central taxes taken together have fallen short of the growing expenditure. Even the grant from central government has left a wide gap between the state's receipts and expenditure. Though expenditure on capital head has been rising gradually, the state's capacity to enhance income generation has not increased correspondingly. While the state's liability on interest payment has come to one-third of the total non-development expenditure, it would be certainly impossible for the state to save for net capital formation. Consequently, the state has resorted to massive borrowings from various sources. This has led to a huge increase in public debt of the state government. This rapid increase in debt service has become a serious problem and a loathsome drag to the process of economic development of a poor state like Mizoram. It is now clear that if this trend continues any further, the state will be bankrupt in the near future.*

Keywords *: Backward economy, revenue and capital accounts, public debt, borrowing, capital formation, bankrupt.*

Introduction

The significance of Public expenditure as an instrument of promoting the socio-economic development of a country is now well accepted by the development economists all over the world, particularly in the developing countries which shelters roughly two-thirds of the world's poverty ridden people. The growing concern over the necessity of improving the future well-being of these people is of paramount importance, and therefore, has impelled the governments of the developing countries including India to overcome the problems of mass poverty, unemployment, social and economic backwardness, illiteracy etc.

A phenomenal increase in the level of public expenditure in relation to the national income has aroused interest in the study of the growth trend and pattern of government expenditure. Scholars and researchers are starting to analyse the growth of public expenditures in an attempt to understand the root causes of such growth and predict future trends.

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Everyone argues for the effective utilization of government funds. Therefore, during the last few decades, attempts have been made to study the behaviour of public expenditure on the basis of empirical data and historical facts. These studies examined the level of economic development after heavy allotment of funds to be incurred on public welfare programmes and observed the structural changes in government expenditure as a proportion of national income. But the irony of the fate is that there has been a general tendency among the economists to think and write only on the problems of all-India scaling and ignore the importance of the study of regional development. It is true that macro-studies are essential but it is equally desirable to study the economic changes of the country on micro level so as to remove the problem of regional disparities.

The rapid growth in the volume of public expenditure has been one of the most remarkable features of economic development in the past few years in Mizoram. This is primarily because new functions are being performed by the state and the administrative machinery has continued to expand at a fast pace with its inevitable consequence of huge increase in public expenditure. Economic development requires that there is an increase in the stock of capital with which to produce more output. Such a required investment expenditure is not likely to come out of the saving of individuals in poor countries. Moreover, the opportunity of investment is also limited and whatever small amount of saving exists is directed into unproductive channel of investment as there is no other outlet. To overcome these difficulties of underdeveloped countries, the state has to initiate and sustain the programme of development. A backward state like Mizoram is characterized by severe shortage of infrastructural facilities which in turn, paralyzed market functions. This situation calls for the active intervention of public authority and the public expenditure has to play a positive and dynamic role for accelerating the tempo of economic development.

Need for the study

Public expenditure lies at the root of economic uplift in a backward economy like Mizoram and its behaviour is a conditioning factor of economic development. Through the analysis of public expenditure in its proper perspective, one can measure the course of economic development as well as the administrative skill of the government. On the other hand, lack of proper planning of public expenditure, its magnitude and lack of productive directions may cause a serious setback on the efforts of economic development.

While the role of public expenditure appears to be the central issue of Mizoram economy, there has not been any systematic and scholarly attempt in studying public expenditure in the state. Many scholars who have conducted research works in this field paid little attention to the behaviour of public expenditure despite knowing well that it is a conditioning factor of economic wellbeing of the poverty ridden population. This has called for an indepth study in this field.

Objectives

* To study how public expenditures

have effected structural changes in the government expenditure as a proportion of the state's gross domestic products.

* To measure the course of economic development and the administrative skill of the government through the analysis of its expenditure patterns.
* To appraise the progressive and regressive value of fiscal operations at various levels of government functionaries.
* To examine the efficiency of resource allocations through the use of public expenditure in the state.

Methodology

The study is in the nature of descriptive analysis. Transactions of all agencies whose finances are administered through the general budget of the state have been taken as public expenditure. In attempting a functional classification of expenditure, the broad approach suggested by the Department of Economic and Social Affairs of the United Nations in their Manual on the subject which was latter reclassified by an expert team appointed by the Government of India adopted from 1974 - 75 has been followed. The details of expenditure figures have been first grouped under two heads : (i) development expenditure and (ii) non-development expenditure. Again, the category of development expenditure has been sub-grouped under Social & Community Services and Economic Services. Non-development expenditure consists of General Services. The present study defines development expenditure to consist of expenditures on economic services such as agriculture and allied activities, rural development, special areas programmes, irrigation and flood control, energy, industry and minerals, transport and other general economic services on the one hand, and on the other, expenditure on social & community services such as education, health and family welfare, water supply, sanitation, housing and urban development, information and broadcasting, welfare of SC / ST and other backward classes, labour and employment, social welfare and nutrition and other secretariat social services. Non-development expenditure consists of expenditure on organs of state. fiscal services, interest payment and servicing of debts, civil administration, pension and miscellaneous general services. Tables are arranged to show the behavior, pattern and growth trend of expenditure in term of annual and five year plan.

Sources of Data

The study covers a period of 38 years from 1974 - 75 to 2011 - 12. This period exactly falls between the Fifth Five Year Plan and the Eleventh Five Year Plan including the Annual Plans. The work is mainly based on secondary sources of data, collected mostly from the Financial Statement of the Government of Mizoram (Budget) for various years, published and unpublished reports, documents of government of Mizoram, audit reports of the CAG, reports of the state Assembly and standard works done by different scholars on the subject. Unpublished government's information has been obtained by personal interviews and discussions with the senior officials of Finance Department of the government of Mizoram. In order to make the work realistic and useful for restricting infructous and nugatory

expenditure we have studied intensively a large number of cases reported by the Accountant General in his audit reports and the consequent follow up enquiries and reports made by the three legislative committees such as Estimate Committee, Public Accounts Committee and the Committee on Public Undertaking.

Growth Trend of Public Expenditure

Public expenditure has increased tremendously during the plan periods in Mizoram as shown in the Appendix Table-1. Examination of the growth trend of expenditure during the last four decades shows that total public expenditure increased many folds at a multiple of 156 folds. Expenditure both on revenue and capital accounts in 1974 was Rs. 31.09 crores which increased to Rs. 4803.72 crores in 2011-12 revised estimate. However, the analysis of expenditure based on Five Year Plan showed an increase over 80 times during the same period. While total expenditure during the Fifth Five Year Plan was Rs. 216.02 crores, the Eleventh Five Year Plan recorded an expenditure of Rs. 17333.70 crores. In other words, public expenditure increased by 15352 per cent within 38 years. This shows the increase in the Eleventh Plan over the Fifth Plan was 7924 per cent.

The analysis of expenditure between revenue and capital accounts exhibits that expenditure on both the accounts have been continuously increasing over the year. This study points out that year-wise increase on revenue accounts is higher than that of capital accounts. While the increase in expenditure on revenue accounts in 2011-12 over 1974-75 was 156 folds, the increase in expenditure on capital accounts was 149 folds during the same period. Plan-wise analysis shows a different result. The increase in expenditure on Revenue accounts during the 11th Plan over the 5th Plan was 80 fold, Capital accounts recorded an increase of over 83 folds during the same period.

Revenue Expenditure

Expenditure on Revenue Account has been appended in Appendix Table - 2.

A study on the growth trend of expenditure on different services such as General, Social and Economic Services on revenue accounts highlights that expenditure increased by a multiple of 208 on General Services, 218 on Social Services and 98 on Economic Services during the 38 years of this study period. The total expenditure incurred on General Services in 1974 - 75 was Rs. 5.94 crores which increased to Rs. 1238.16 crores in 2011-12. The increased express in percentage term was as high as 20744 per cent. On Social Services Rs. 6.54 crores was spent in 1974-75, the expenditure shot up to Rs. 1427.35 crores in 2011-12, showing an increase of 21725 per cent. The increase in expenditure on Economic Services was relatively lower than that of the other two services which recorded a total expenditure of Rs. 12.46 crores in 1974-75 and Rs. 1221.34 crores in 2011-12. If we calculate the increase in percentage term, it amounted to 9702 per cent only. Plan-wise analysis also shows the same trend of expenditure on different services. While expenditure on General Services increased by 109 folds between the 5th Plan and the 11th Plan, expenditure on Social and Economic Services increased by 113 folds and 48 folds respectively.

A close look at the trend and pattern of the annual and plan-wise expenditure on revenue account of the State reveals that increase in expenditure on Economic Services was comparatively lower than that of the increase in expenditure on General and Social Services. Expenditure on Economic Services always promotes productive activity within the economy. It enhances benefits to individuals as producers. A study of development expenditure also indicates that expenditure on Social and Economic Services were in the ratio of 36:64 per cent of the total development expenditure in the 5th Plan which changed to 57:43 per cent in the 11th Plan. In other words, expenditure on Economic Services in the 5th Five Year Plan was nearly two times more than the expenditure on Social Services, but the ratio was reversed in the ensuing plan periods such that the expenditure on Social Services was greater than that of Economic Service in the 11th Plan. This changing trend of expenditure between Social Services and Economic Services clearly indicates that The Government of Mizoram has put more importance to welfare programme with immediate result than to long-term development programme. It is now of utmost importance for the planners and policy makers to seriously look into the pattern of public expenditure in the State. A backward state like Mizoram cannot afford to enhance too much welfare programmes at the cost of long-term development programmes. This is the reason why even after 40 years when the State joined the ambit of planned development programme, Mizoram has poor infrastructural facilities and no industrial base. If the trend goes on like this, the economy of the State is bound to entangle in secular stagnation and be capsized in a vicious circle of poverty.

This study further reveals that expenditure on non-development revenue head not only increased in rupee terms, but also in real terms. Non-development revenue expenditure increased by a multiple of 208 in a span of 38 years. While the total expenditure on this head was Rs. 5.94 crores in 1974 -75, it soared up to Rs. 1238.16 crores in 2011-12, showing an increase of 20744 per cent. Expenditure on this head exhibited a continuous upward movement at a rather fast pace during the plan periods. While total expenditure during the 5th Plan stood at Rs. 42.55 crores, it increased to Rs. 4646.35 crores in the 11th Plan. In percentage terms, the share of non-development expenditure to total revenue expenditure recorded 24.24 per cent in the 5th Plan, it shot up to 33.03 per cent in the 11th Plan. Notwithstanding the fact that huge expenditures are required for a new state like Mizoram where expansion of the administrative machinery was inevitable in the wake of restructuring political status of the state in the recent past. However, it is essential to contain expenditure within a certain limit.

Debt Servicing

In 1974-75, total expenditure on debt service was to the tune of only Rs. 0.46 crores, constituting 7.75 per cent of total non-development expenditure and 1.84 per cent of total revenue expenditure. But this has increased to Rs. 294.45 crores accounting for 22.89 per cent of total non-development expenditure and 7.58 per cent of total revenue expenditure in a span of 38 years of this study. This indicated an

increase of over 640.11 times. In 1986 - 87, more than 50% of the total non-development expenditure was spent for debt servicing. This is a clear indication of the unhealthy trend of state financing which runs into serious deficit year after year. (Appendix Table - 3)

Expenditure on Capital Account

Expenditure incurred by the State Government on Capital Accounts has witnessed an increasing trend during the planning periods. The total expenditure on development and non-development heads was Rs. 40.46 crores in the 5th Five Year Plan. Expenditure has continuously been increasing during the ensuing Plans. In the 11th Plan the total expenditure on both heads shot up to Rs. 3365.80 crores recording an increase by a multiple of over 83. In percentage terms, the increase in expenditure in the 11th Plan over the 5th Plan was as high as 8218.89 per cent. This study reveals that the government of Mizoram has been able to contain its expenditure on development head within the range of 96.43 per cent. As expenditure on development head results to the creation of assets directly or indirectly, the performance of the state government on this account has been so far commendable. Regarding selection of priority, agriculture and allied services shared the highest expenditure, transport and energy occupied the second and the third place respectively.

However, this study clearly shows that capital expenditure other than development and non-development heads such as repayment of loans to the Central Government and other autonomous bodies, discharge of internal debt and State Government's own loan assistance to third parties have shown a tremendous increase over the years. The share of expenditure on settlement of debt to the aggregate capital outlay during the 5th Five Year Plan was only 2.15 per cent which increased to 8.13 per cent in the 6th Plan. However, the 7th Plan recorded a fall from the previous Plan at 7.26 per cent. During the following two Annual Plans a little over 42 per cent was spent for debt settlement. In 8th Plan, an exorbitant amount was spent for the same purpose with a record of 46.68 per cent but it fell to 35.77 per cent in the 9th Plan. In the ensuing 10th Plan, it again soared up to 44.29 per cent but reduced to a level of 33.53 per cent in the 11th Five Year Plan.

Findings and Conclusion :

First of all, it is necessary to make huge investment on the development of economic overheads such as construction of rail and roadways, communications, power installations, marketing facilities, soil improvement etc., which require a large expenditure but a long waiting period for the return to come forth. Besides, there is a high risk of losing the fund invested for the distant future is uncertain. For this reason, the private investors are not always willing to lock in their money for a long period in an uncertain outcome of business venture. In a hilly terrain like Mizoram, roadway is the only means of conveyance. As the cost of transportation constitutes the cost of production, firms are at disadvantageous position in competitive

strength. Moreover, because of its mountainous physical feature, lands are not easily manageable to large-scale operation to get advantage of scale-economies.

Secondly, in Mizoram, it is found that there is a sharp difference in living standard between the urban and the rural areas. Owing to the neglect of applying scientific methods of farming and the absence of marketing facilities, the agriculture sector remain depressed, and is deteriorating due to population pressure. Because of this worsening condition, many rural work force have been migrating to urban centres in search of wage-employment. It is observed that urban population has been increasing at a rapid rate which is indicated by a concentration of nearly a quarter of the state population in Aizawl city alone. This is because the investment in rural development is either inadequate or does not reach the people for whom the money is invested. Here the public authority will be well advised to invest for equitable allocation of resources. The government should deliberately attempt to set up new industries in backward areas where resources remain unutilized. Developing rural area is essential to ease urban congestion and squalor. It is irrational to spend too much on the luxury and comfort of the elite groups and to allow the mass of the poor people to drift to greater poverty.

Thirdly, the study of the effectiveness of control of public expenditure in Mizoram reveals that the administrative control of public expenditure is insufficient in several respects. Urgent instructions regarding any financial matters are generally ignored. The present system of administrative sanction is highly complex and dilatory. The process of judging the efficiency of executive officers on the basis of achieving the targets for a particular year seems to have been confused by the present bureaucratic organism of the administration. The rise in the number of idle investment of government funds, incurring of wasteful and infractuous expenditure, inordinate delay in expediting the files, and the delay in the completion of projects due to lack of experience and sense of responsibility, faulty planning, misappropriation of government money and material, negligence of normal verification of works, lack of imagination and initiative in execution of plans and the like are the glaring examples of ineffective government control over public expenditure in Mizoram. The extraordinary delay in the disposal of disciplinary cases under the cloak of departmental enquiries and investigations has an adverse impact upon the efficiency of the administration, as corruption breeds corruption.

Fourthly, so far as the Legislative control over expenditure is concerned, it is far from effective. The deliberations of Public Accounts Committee have had little impact on the spending of the State Government. Their advices regarding the cases of irregularities and lapses have not been timely responded to, and as a result, the standard of fiscal discipline has deteriorated. Nevertheless the Public Account Committee of Mizoram has made a modest attempt to make its presence

felt in the field of control of public expenditure in the State. Not only this, proceedings of the Estimate Committee have also highlighted the same deficiencies. Though the role of audit has been felt by the administrative departments, the study observes that even the senior officers of first class cadre very often ignore the mandatory orders and consequently the number of cases of major irregularities and lapses continue to increase unabated despite repeated warnings by the Accountant General in his reports. The above circumstances show that the legislative control over the expenditure of the State has not been quite satisfactory and effective.

Fifthly, over the past few decades, there has been an enormous increase in non-development expenditure. The state's own revenue plus the share in central taxes taken together have fallen short of the growing expenditure. Even the grant from the Central Government has left a wide gap between the state's receipts and expenditures. Consequently, the state has resorted to massive borrowings from various sources. This has led to a huge increase in the public debt of the state government. Though expenditure on capital head has been rising gradually, the state's capacity to enhance income generation has not increased correspondingly. While the state's liability on interest payment has increased at a fast pace, it would be certainly impossible for the state to save for net capital formation. The rapid increase in debt service has become a serious problem and a loathsome drag to the process of economic development of a poor state like Mizoram. In spite of its little effort to enhance tax collection and asset creation, the state has created a plump sector of the government which consumed all the flows of fund for unproductive purposes. It is now clear that if this trend continues any further, the state will be bankrupt in the near future.

And lastly, in the light of the foregoing analysis, the financial position has deteriorated with a successive five year plan, and the state is heavily under pressure to correct its fiscal deficit. Since, even the last money have always been used for unproductive conspicuous consumption and borrowed funds are being used either for paying interest or invested on government companies which yield no return, it will not be wrong to say that Mizoram is under debt trap.

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Table-1. Growth and Pattern of Public Expenditure During the Plan Period

Rupees in crores

Year	Total Revenue Expenditure	Total Capital Expenditure	Total
1	*2*	*3*	*4*
1974 - 75	24.94	6.15	31.09
1975 - 76	33.39	6.7	40.09
1976 - 77	39.88	6.45	46.33
1977 -78	32.89	8.63	41.52
1978 - 79	44.51	12.59	57.1
5th Plan	**175.5**	**40.52**	**216.02**
1979 - 80 (A.P.)	**52.41**	**13.85**	**66.26**
1980 - 81	58.01	18.56	76.57
1981 - 82	71.42	24.31	95.73
1982 - 83	85.24	30.1	115.34
1983 - 84	95.35	35.78	131.13
1984 - 85	120.66	33.36	154.02
6th Plan	**432.9**	**142.11**	**575.01**
1985 - 86	143.44	45.77	189.21
1986 - 87	46.31	3.7	50.01
1987 - 88	268.01	59.44	327.45
1988 - 89	254.06	67.47	321.53
1989 - 90	260.44	85.67	346.11
7th Plan	**972.27**	**262.05**	**1234.32**
1990 - 91	307.78	58.07	365.85
1991 - 92	349.38	113.8	463.18
Annual Plan	**657.16**	**171.87**	**829.03**
1992 - 93	332.16	116.86	449.02
1993 - 94	400.6	87.32	487.92
1994 - 95	449.99	97.97	547.96
1995 - 96	553.7	123.72	677.42
1996 - 97	633.36	158.42	791.78
8th Plan	**2369.81**	**584.29**	**2954.1**
1997 - 98	661.57	247.76	909.33
1998 - 99	690.83	236.97	927.8
1999 - 00	894.28	251.17	1145.45
2000 - 01	1021.61	227.94	1249.55
2001 - 02	1128.23	186.42	1314.65
9th Plan	**4396.53**	**1150.26**	**5546.79**
2002 - 03	1128.96	246.84	1375.8
2003 - 04	1266.97	402.7	1669.67
2004 - 05	1295.51	396.41	1691.92
2005 - 06	1587.98	451.37	2039.35
2006 - 07	1717.29	466.45	2183.74
10th Plan	**6996.71**	**1963.77**	**8960.48**
2007 - 08	1908.62	544.25	2452.87
2008 - 09	2313.62	578.28	2891.9
2009 - 10	2702.81	572.79	3275.6
2010 - 11	3155.83	753.61	3909.44
2011 - 12	3886.85	916.87	4803.72
11th Plan	**13967.73**	**3365.8**	**17333.53**

Source : Computed and arranged from Financial Statements, Government of Mizoram

Table-2. Growth of Expenditure on Revenue Account

Rs. In crores

Year	General Services	Social Services	Economic Services	TOTAL
1	*2*	*3*	*4*	*5*
1974 - 75	5.94	6.54	12.46	24.94
1975 - 76	8.88	7.94	16.57	33.39
1976 - 77	8.43	10.08	21.37	39.88
1977 -78	8.56	10.73	13.6	32.89
1978 - 79	10.85	12.33	21.33	44.51
5th Plan	**42.55**	**47.62**	**85.33**	**175.5**
1979 - 80 (A.P.)	**11.91**	**15.74**	**24.76**	**52.41**
1980 - 81	14.23	17.87	25.91	58.01
1981 - 82	17.73	21.19	32.5	71.42
1982 - 83	24.07	27.49	33.68	85.24
1983 - 84	28.85	33.77	32.73	95.35
1984 - 85	33.33	40.54	46.79	120.66
6th Plan	**120.43**	**140.86**	**171.61**	**432.9**
1985 - 86	39.12	50.49	53.83	143.44
1986 - 87	15.28	13.86	17.17	46.31
1987 - 88	63.62	98.02	106.37	268.01
1988 - 89	58.43	91.79	103.84	254.06
1989 - 90	58.16	95.99	106.29	260.44
7th Plan	**234.62**	**350.15**	**387.5**	**972.27**
1990 - 91	88.08	99.43	120.27	307.78
1991 - 92	87.82	116.24	145.32	349.38
Annual Plan	**175.9**	**215.67**	**265.59**	**657.16**
1992 - 93	85.31	109.59	137.26	332.16
1993 - 94	111.4	153.85	135.35	400.6
1994 - 95	128.07	158.67	163.25	449.99
1995 - 96	165	200.64	188.06	553.7
1996 - 97	185.62	251.09	196.65	633.36
8th Plan	**675.4**	**873.84**	**820.57**	**2369.81**
1997 - 98	216.51	227.46	217.6	661.57
1998 - 99	224.99	256.14	209.7	690.83
1999 - 00	294.02	336.31	263.95	894.28
2000 - 01	334.85	371.03	315.73	1021.61
2001 - 02	392.37	417.93	317.93	1128.23
9th Plan	**1462.74**	**1608.87**	**1324.91**	**4396.52**
2002 - 03	405.63	406.53	318.8	1130.96
2003 - 04	462.54	435.5	368.93	1266.97
2004 - 05	514.65	476.5	304.36	1295.51
2005 - 06	541.63	547.57	498.78	1587.98
2006 - 07	616.92	592.89	507.48	1717.29
10th Plan	**2541.37**	**2458.99**	**1998.35**	**6998.71**
2007 - 08	645.88	696.78	565.96	1908.62
2008 - 09	803.74	898.19	611.86	2313.79
2009 - 10	947.75	1105.69	649.37	2702.81
2010 - 11	1010.82	1137.34	1007.67	3155.83
2011 - 12	1238.16	1427.35	1221.34	3886.85
11th Plan	**4646.35**	**5265.35**	**4056.2**	**13967.9**

Source : Computed and arranged from Financial Statements, Government of Mizoram

Table-3 . Percentage Growth of Revenue Expenditure on Interest Payment & Serving of Debt

Rupees in crores

Year	Interest Payment & Debt Servicing	Non-Development Expenditure	Total Revenue Expenditure	2 as a per cent of 3	2 as a per cent of 4
1	*2*	*3*	*4*	*5*	*6*
1974 - 75	0.46	5.94	24.94	7.75	1.84
1975 - 76	0.8	8.88	33.39	9.01	2.4
1976 - 77	1.05	8.43	39.88	12.46	2.63
1977 -78	1.27	8.56	32.89	14.84	3.86
1978 - 79	1.69	10.85	44.51	15.58	3.8
5th Plan	**5.27**	**42.55**	**175.5**	**12.39**	**3**
1979 - 80 (A.P.)	**2.23**	**11.91**	**52.41**	**18.72**	**4.25**
1980 - 81	2.83	14.23	58.01	19.89	4.88
1981 - 82	3.85	17.73	71.42	21.72	5.39
1982 - 83	4.44	24.07	85.24	18.45	5.21
1983 - 84	6.2	28.85	95.35	21.49	6.5
1984 - 85	7.92	33.33	120.66	23.76	6.56
6th Plan	**27.47**	**120.43**	**432.9**	**22.81**	**6.35**
1985 - 86	9.51	39.12	143.44	24.31	6.63
1986 - 87	7.77	15.28	46.31	50.86	16.78
1987 - 88	13.09	63.62	268.01	20.57	4.88
1988 - 89	2.11	58.43	254.06	3.61	0.83
1989 - 90	0.85	58.16	260.44	1.46	0.33
7th Plan	**33.33**	**234.62**	**972.27**	**14.21**	**3.43**
1990 - 91	33.2	88.08	307.78	37.69	10.79
1991 - 92	14.25	87.82	349.38	16.23	4.08
Annual Plan	**47.45**	**175.9**	**657.16**	**26.98**	**7.22**
1992 - 93	14.02	85.31	332.16	16.43	4.22
1993 - 94	22.51	111.4	400.6	20.21	5.62
1994 - 95	29.77	128.07	449.99	23.24	6.62
1995 - 96	34.88	165	553.7	21.14	6.3
1996 - 97	47.73	185.62	633.36	25.71	7.54
8th Plan	**148.91**	**675.4**	**2369.81**	**22.05**	**6.28**
1997 - 98	65.79	216.51	661.57	30.39	9.94
1998 - 99	73.68	224.99	690.83	32.75	10.67
1999 - 00	93.72	294.02	894.28	31.88	10.48
2000 - 01	103.45	334.85	1021.61	30.89	10.13
2001 - 02	148.18	392.37	1128.23	37.77	13.13
9th Plan	**484.82**	**1462.75**	**4396.52**	**33.14**	**11.03**
2002 - 03	**136.06**	405.63	1130.96	33.54	12.03
2003 - 04	170.62	462.54	1266.97	36.89	13.47
2004 - 05	186.5	514.65	1295.51	36.24	14.4
2005 - 06	190.64	541.63	1587.98	35.2	12.01
2006 - 07	235.75	616.92	1717.29	38.21	13.73
10th Plan	**919.57**	**2541.37**	**6998.71**	**36.18**	**13.14**
2007 - 08	222.01	645.88	1908.62	34.37	11.63
2008 - 09	240.61	803.74	2313.79	29.94	10.4
2009 - 10	270.85	947.75	2702.81	28.58	10.02
2010 - 11	122.08	1010.82	3255.73	12.08	3.75
2011 - 12	294.45	1238.16	3886.85	23.78	7.58
11th Plan	**1150**	**4646.35**	**14067.8**	**24.75**	**8.17**

Source : Annual Financial Statement, Government of Mizoram

Table-4. Growth and Pattern of Capital Expenditure During the Plan Period

Rupees in crores

Year	Development Expenditure	Non-development Expenditure	TOTAL
1	*2*	*3*	*4*
1974 - 75	6.15		6.15
1975 - 76	6.7		6.7
1976 - 77	6.45		6.45
1977 -78	8.62	0.01	8.63
1978 - 79	12.39	0.2	12.59
5th Plan	**40.31**	**0.21**	**40.52**
1979 - 80 (A.P.)	13.62	0.23	**13.85**
1980 - 81	18.46	0.1	18.56
1981 - 82	24.17	0.14	24.31
1982 - 83	29.44	0.66	30.1
1983 - 84	33.69	2.09	35.78
1984 - 85	32.35	1.01	33.36
6th Plan	**138.11**	**4**	**142.11**
1985 - 86	44.7	1.07	45.77
1986 - 87	3.25	0.45	3.7
1987 - 88	57.7	1.74	59.44
1988 - 89	64.16	3.31	67.47
1989 - 90	82.9	2.77	85.67
7th Plan	**252.71**	**9.34**	**262.05**
1990 - 91	56.47	1.6	58.07
1991 - 92	112.04	1.76	113.8
Annual Plan	**168.51**	**3.36**	**171.87**
1992 - 93	114.07	2.79	116.86
1993 - 94	84.21	3.11	87.32
1994 - 95	95.06	2.91	97.97
1995 - 96	118.82	4.9	123.72
1996 - 97	155.06	3.36	158.42
8th Plan	**567.22**	**17.07**	**584.29**
1997 - 98	241.52	6.24	247.76
1998 - 99	232.6	4.37	236.97
1999 - 00	243.16	8.01	251.17
2000 - 01	221.97	5.97	227.94
2001 - 02	177.49	8.93	186.42
9th Plan	**1116.74**	**33.52**	**0**
2002 - 03	238.31	8.53	246.84
2003 - 04	386.68	16.72	403.4
2004 - 05	385.46	10.95	396.41
2005 - 06	437.91	13.46	451.37
2006 - 07	442.01	24.44	466.45
10th Plan	**1890.37**	**74.1**	**1964.47**
2007 - 08	530.75	13.5	544.25
2008 - 09	558.49	19.79	578.28
2009 - 10	546.8	25.99	572.79
2010 - 11	730.25	23.36	753.61
2011 - 12	886.02	30.8	916.82
11th Plan	**3252.31**	**113.44**	**3365.8**

Source : Computed and arranged from Financial Statements, Government of Mizoram

Topographic changes in Aizawl city and its surroundings during 1973 - 2013 : A digital terrain analysis through Remote Sensing and GIS Techniques

Ch.Udaya Bhaskara Rao

Abstract : *The mountainous terrain of Aizawl the capital city of Mizoram and its surrounding areas have undergone large-scale topographic changes due to various natural and human-induced causes. The human intervention in the form rapid unplanned urbanization over the precipitous slopes appears to be the major cause along with the natural factors like soil erosion and landslides in this tectonically active young sedimentary terrain. The total loss of sediment in this area due to landscape changes is estimated to be 60054352 m3 during the last 40 years with an average rate of 1501359 m3/year. An attempt has been made in this study to analyze spatio-temporal changes in the topography of Aizawl and its surroundings by analyzing multi-date digital elevation models using ArcGIS software tools.*

Introduction

Topographic changes are quite common in a fragile sedimentary hilly terrain like Mizoram. Aizawl, the capacity of Mizoram has witnessed high population growth in recent decades. The city and its suburbs are prone to frequent topographic changes due to several endogenic forces and exogenic erosional processes owing to its tropical location in addition to tectonically active zone. Basically the area exhibits highly undulating topography with young sedimentary formations belonging to Tertiary age (Ganju, 1975). The Aizawl city and its adjoining areas are subjected to landslides to the maximum magnitude due to slope instability. In fact, the whole urban complex is directly resting over these steeply sloping unconsolidated sedimentary formations as the limited availability of nearly leveled or gently sloping lands. The cumulative effect of natural and human-induced factors appears to be responsible for large scale landscape changes in this area.

The present study is an attempt to find out temporal changes and to analyze possible cause for frequent changes in the topography that occurred during 1973-2013 using multi-date digital elevation models generated from 1973 survey of India toposheets and the data of digital elevation models acquired by Shuttle Radar Topography Mission (SRTM) of United States Geological Survey of the year 2013 with the help of advanced ArcGIS software tools and techniques.

Materials and Methods

Survey of India topographic maps 84A/9 and 84A/10 of the year 1973 on 1:50,000 scale have been used to extract contours and other relevant topographic information. Contours at 20 metres interval have been digitized using ArcGIS 9.1 workstation edit tools from the scanned topo-sheets. The digitized contour data has been processed for label errors. A new tic coverage has been created and updated the tics with geographic coordinates. Later, the coverage has been projected to polyconic coordinate system. A triangulated irregular network has been generated using contour data with the help of Spatial analyst module tools in ArcMap 9.1. Similarly, digital elevation model, slope, flow direction and flow

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accumulation layers have been generated sequentially from triangulated irregular network using Spatial analyst module tools in ArcMap 9.1. A digital elevation model of the year 2013 has been downloaded from the United States Geological Survey website (www.cgiar.csi.org) to find out temporal changes in the landscape between 1973 and 2013.

Study area

The area is located in the Aizawl district between 92°24'51"- 92°26'34" east longitudes and 23°25'11"- 23°27' 25" north latitudes (Fig.1). The total areal extent of the area under study is about 448 hectares. The area experiences moist tropical to sub-tropical climate with an average rainfall of about 210 cm. Topographically, the prominent geomorphic features seen in this area are linear to curvi-linear structural hill ranges with alternate deep valleys and occasional valley plains. The major perennial river flows in the western part of the area is river Tlawng. Several major and un-named streams also flow in the eastern and also western parts of the area. Most of the rivers and streams which flow in this area are largely controlled by faults and fractures as the area falls in tectonically active zone. In addition, the landscape is also criss-crossed by a number faults and fractures which shows the intensity of on-going tectonic activity in the area. Tropical wet-ever green forest covers the adjoining areas of the city.

Results and Discussion

Analysis of multi-date thematic layers

The analysis of multi-date layers such as triangulated irregular network (TIN), digital elevation model (DEM), slope, flow direction and flow accumulation have revealed several significant spatial changes in the surface topography.

TIN is an alternative two dimensional vector data model to DEM to represent a network of irregularly spaced surface elevation points arranged in a triangular facet form of continuous sheet (Burrough, 1998). As TINs have an advantage to represent variations particularly, in the areas of complex relief and also the best model to avoid redundant data in regions where the terrain is even (Bhatia, 2008), TINs are widely used in various terrain studies. Topographic changes are apparent on TIN due to simplicity and accurate representation of the elevation data in the form of facets. Similarly, DEM is the best model to represent surface topography in a three dimensional raster format due to representation of evenly spaced values of topographic elevations in a continuous surface form.

The multi-date TIN layers generated from Survey of India topographic maps of the year 1973 and direct digital elevation models generated from the data acquired by Shuttle Radar Topographic Mission of United States Geological Survey of the year 2013, clearly depict changes in the topography as seen in figure 2. Based on the analysis of both TIN and DEM models it is revealed that the existing topographic elevation of the study area ranges between 480 and 1180 metres while it was between 520 and 1200 metres in the year 1973 (Fig.2).

It has been observed that drastic changes have occurred comparatively, in the eastern parts of the city rather

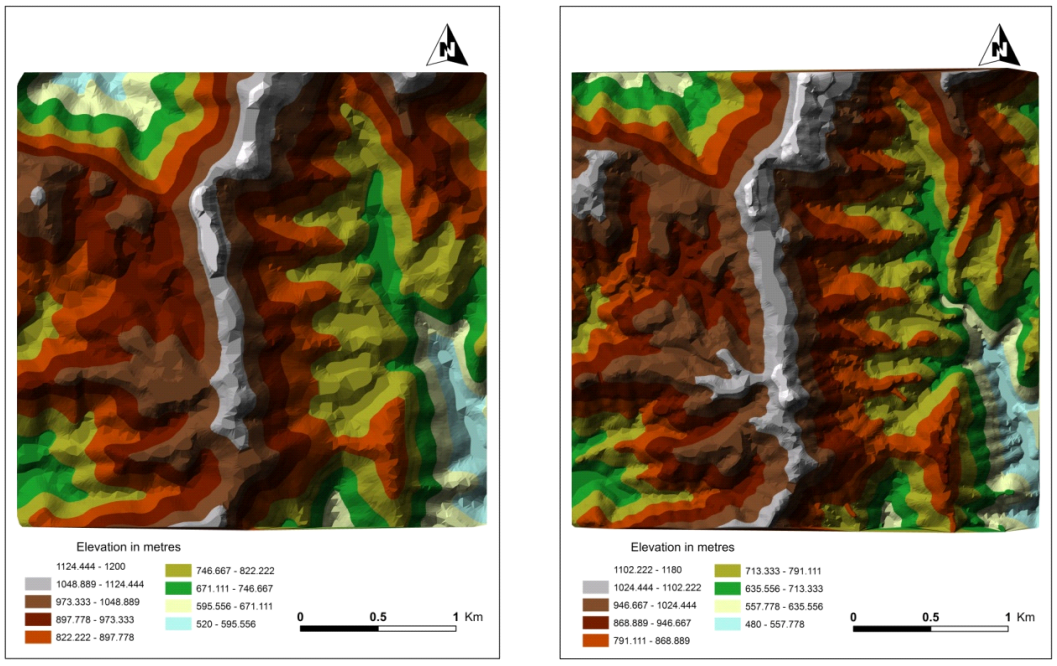
Fig.1 Location map of Aizawl city and its environs.

than the western parts. It is apparent from the maximum and minimum elevations of the topography of the two-date TIN models, a decrease in elevation of about 40 metres. It has been observed that on an average there is a 40 metres decrease in elevation at the lower level and about 20 metres decrease at higher levels particularly along the main ridge at a majority of the places.

Slope is found to be the most significant terrain properties particularly in understanding surface topography. Slope is measured in an elevation raster by identification of maximum rate of change in value from each cell to neighbouring cells (DeBarry, 2004). As seen on the slope maps of 1973 and 2013, the changes area quite discernible along the main ridge and also along its flanks. The expansion of the city is found to be much faster on the eastern flank of the main ridge due to availability of gently sloping lands than along western flank of the city as evidenced from the slope maps (Fig.4).

Similarly, flow direction is also found to be one of the advanced aspects in understanding the terrain condition at different time intervals. Flow direction indicates the direction of surface flow in eight possible prominent directions such as north, northeast, east, southeast, south, southwest and west beginning from north in clock-wise direction (Fig.5). In fact, flow direction is an integer value which ranges between 1 and 255. The flow direction is determined by the minimum cell value than the neighbouring cells while when multiple neighbours have the same value then the resultant flow will

Fig.2 Triangulated irregular network (Left -1973, Right-2013).

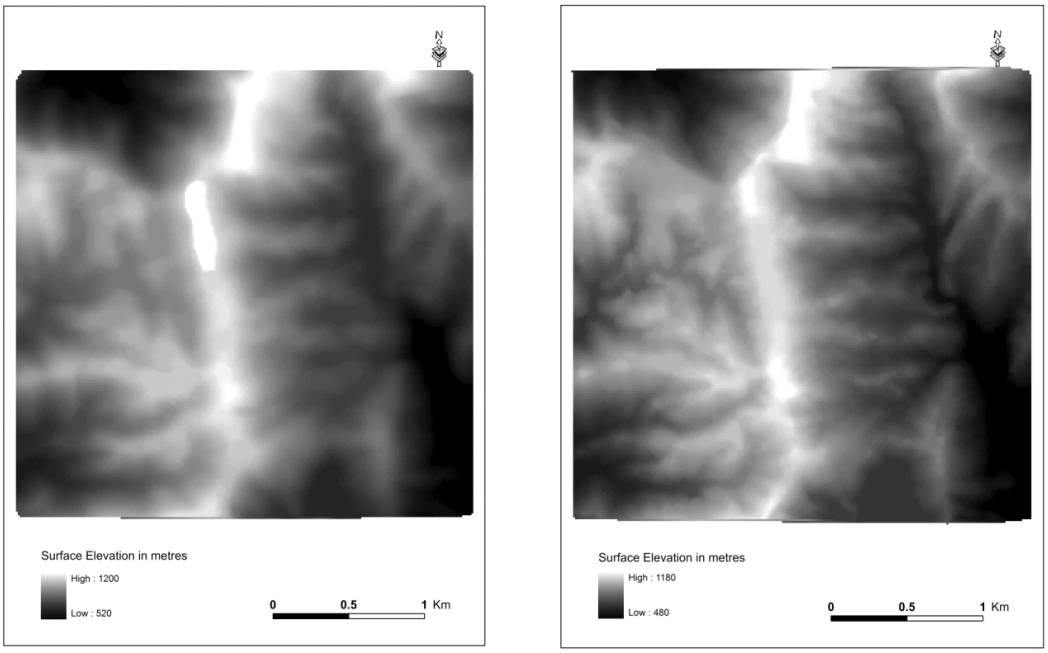


be defined by filtering out one cell sinks (DeBarry, 2004). Similarly, flow accumulation appears to be the most significant in assessing the overall changes in the landscape. Flow direction and flow accumulation are useful to detect changes in terrain of an area. The changes in topography reflect in the resultant flow accumulation which is similar to natural flow of streams.

The changes are obvious in the flow accumulation layer of the year 2013. It is revealed that the flow accumulation capacity of the streams adjoining the city has been reduced from 26376 m^3 in the year 1973 to 18446 m3 by the year 2013 (Fig.6). The existing drainage pattern in the area is also quite contrasting with the drainage in the year 1973.

Perhaps, this could be due to erosion at higher levels and subsequent siltation at down slope and valley sites. Further, analysis of multi-date thematic layers has revealed that the total volume of the sediment above the base plane at 480 metres in the year 1973 was estimated to be about 3455833399m^3 while in the year 2013 it is about 3395779047m^3. It is estimated that there is a decrease in the volume of the sediment of about 60054352m^3 during the last 40 years at the rate of 1501359 m^3/year. It has to be noted that the rate of erosion may not be uniform throughout the period as nature of erosion depends up on the intensity of rainfall, nature of terrain and degree of slope failure along with human intervention, the rate of soil loss may also vary accordingly. The study shows that there is a definite loss of sediment in the area due to various physical as well as anthropogenic causes. It is obvious that the changes are seen

Fig.3 Digital elevation model (Left-1973, Right-2013)



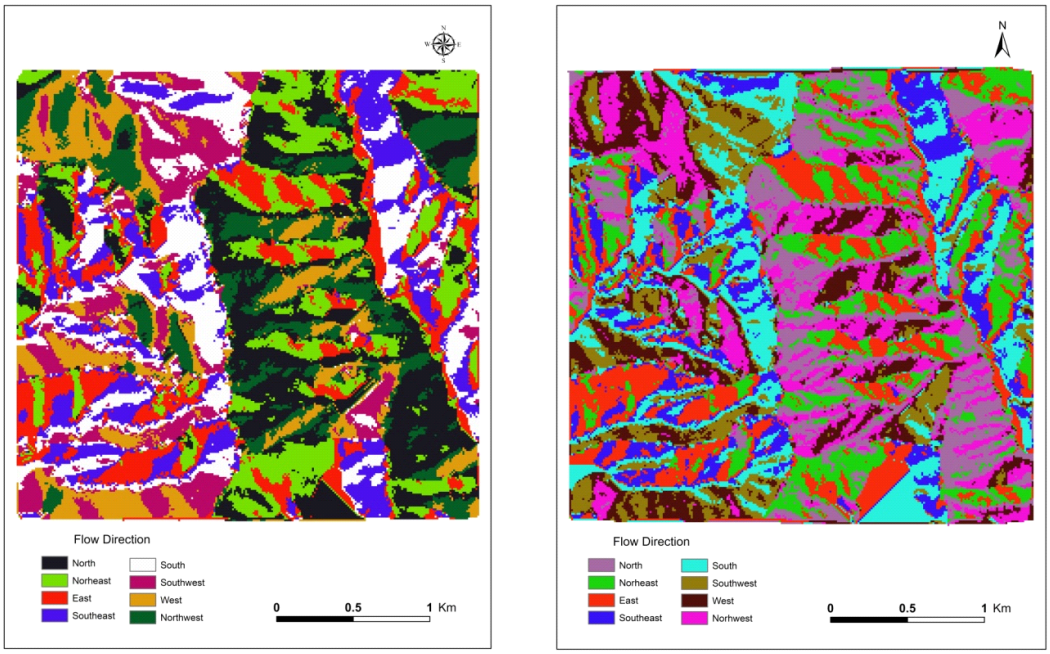
particularly, at lower elevations on both sides of the main ridge on which the city is located.

The 2-fold increase in the areal spread of the city from 1.88km^2 (188 hectares) in the year 1973 to 4.48km^2 (4.48 hectares) by the year 2013 has largely responsible for slope instability thereby contributing to severe erosion, slope instability and subsequent physical degradation of land in the area. The carrying capacity of the streams that exist in this area is reduced due to erosion at higher elevations and subsequent siltation along the lower slopes and valleys. The changes are quite obvious in the pattern of streams in the area.

Causes

The major driving forces which are responsible for the changes in surface topography appear to be natural as well as man-made. Basically, the area is composed of sedimentary rock formations with high topographic relief. Moreover, as the area falls in a tectonically active zone, the topographic changes are quite strong by the natural processes like erosion, slope failure and soil slumping at a very faster rate. The terrain parameters such as lithology, slope, degree of weathering, soil texture, drainage pattern and tectonic features like faults and fractures also enhance the intensity of erosion and further physical degradation of land. The major causes that are responsible for these topographic changes that have occurred in this area over a period of time can be attributed to different mass movement processes like soil erosion, landslides and mud-flows in this unconsolidated sedimentary terrain mostly aided by the on-going tectonic

Fig.5 Flow Direction (Left-1972, Right-2013)



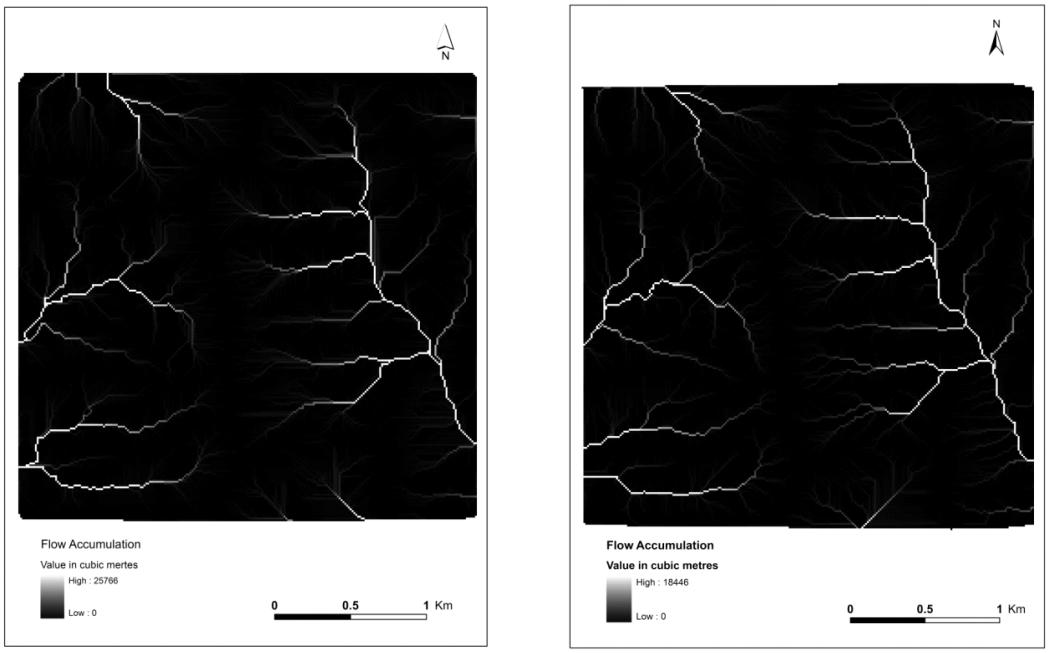
activity and torrential rainfall during monsoon periods. In addition, the human intervention in the form of construction of high rise buildings over precipitous slopes has led to slope failure thereby physical degradation of the terrain at much faster rates. Similarly, deforestation for shifting agricultural practices in the adjoining areas, unscientific land use practices and unauthorized large scale mining activities are also found to be the major causes to bring large scale changes in the landscape.

It is surmised, therefore, from this study of multi-date elevation models and flow accumulation layers, coupled with the spatial variations in the Aizawl cityscape and its surroundings that the area is prone to several endogenic and exogenic processes causing drastic topographic changes resulting in severe erosion and slope failure.

Conclusion

Aizawl city and its suburbs are experiencing severe topographic changes and subsequent physical degradation of land. The study has revealed the changes in the terrain that took place during the last 40 years based on the application of advanced GIS technology through the analysis of multi-date significant thematic layers like triangulated irregular network (TIN), digital elevation model (DEM), slope, flow direction and flow accumulation. It has been estimated that about 60054352m3 of sediment was lost between 1973 and 2013 due to physical degradation of land mostly by natural causes like on-going tectonic activity, slope failure and anthropogenic activities in the form of rapid unplanned urbanization, deforestation, illegal

Fig.6 Flow Accumulation (Left-1973, Right-2013)



mining and unscientific land use practices.

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Morphometric Aspects of the Tut watershed, Mizoram

K. Srinivasa Rao
K. Lalduhawma

Abstract *: The Tut watershed stretches in north-south direction in an area of about 846 km^2 covering parts of Lunglei and Mamit districts in Mizoram. The computed basic, derived and shape parameters of a total of 42 sub-watersheds reveal significant clues such as coarse drainage texture, contrasting lithology and structure, structurally controlled drainage over steep slopes, tectonic activity in the form of folding and faulting, The present study is an attempt to understand terrain conditions and on-going tectonic activity through drainage morphometric analysis.*

The morphometric parameters of drainage density ranges from 1.30 to 4.58, stream frequency of 3.49 to 16.57 and drainage texture varies between 3.00 and 9.68 indicate that coarse to intermediate drainage texture in the study area. The mean bifurcation ratio ranges from 2.16 to 5.94 shows that variation in lithology and rock structure in the drainage basin. The variations in the elongation ratios ranges from 0.39 to 0.97 indicate that the sub-basins in the Tut basin were affected by structural disturbances as faulting. The relief ratio (Rl) ranges from 0.05 to 0.95 indicates that the overall steepness of a drainage basin and is a measure of intensity of erosional processes of the watershed. The Relief ratio ranges from 0.05 to 0.95 shows that the high relief ratio indicates the study area is having steep slope and high relief. The ruggedness number varies from 0.4 to 4.2 indicates that the steepness of slope and stream length. The form factor values of the present study varies from 0.31 to 0.89 shows that the flow intensity of a basin.

Key Words*: Drainage morphometry, tectonic activity, faulting.*

Introduction

Watershed is a natural hydrological unit of land, which collects water as well as sediment and drains through a common point by a network of streams (Paranjape, et. al., 1998). Watersheds of required sizes can be taken as planning units in order to achieve sustainable development and management of available natural resources (Kumar et. al., 2014). As drainage basin morphometry is a measurement and mathematical analysis of configuration of surface, shape and dimensions of landforms (Clarke, 1969) that will be useful to analyze terrain characteristics. Drainage morphometry provides important clues to understand basin geometry for analyzing initial slope, rock hardness, structural controls, recent diastrophism along with geological and geomorphic history of a drainage basin. Based on a thorough analysis of physiographic as well as lithological conditions aided by drainage morphometric aspects soil loss can also be estimated. Similarly, drainage morphometric studies are also useful to delineate ground water potential zones in an area.

In order to understand significant geometric properties and stream network of a watershed requires measurement of various basic, derived and shape parameters of a drainage basin precisely. The present study aims at understanding various linear, areal and relief parameters such as stream order, mean bifurcation ratio, form factor, elongation ratio, circularity ratio, form factor, compactness coefficient, ruggedness number, stream length,

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drainage density, relative relief and relief ratio, of Tut watershed.

Materials and Methods

The drainage network of the watershed has been delineated from the Survey of India toposheets of 83 D/12, 84 A/5, A/6, A/7, A/9, A/10, A/11 and 84A/12 on 1: 50,000 scale. The entire watershed has been sub-divided into 42 fourth order sub-basins for its detailed morphometric analysis. The different linear, areal and relief aspects of drainage network have been carried out by following the methods and formulae (Table 1) proposed by Horton (1945), Strahler (1956), Schumm (1956), Strahler (1964) and Singh (2004). Strahler's (1956) scheme of ranking of streams has been adopted to assign stream orders.

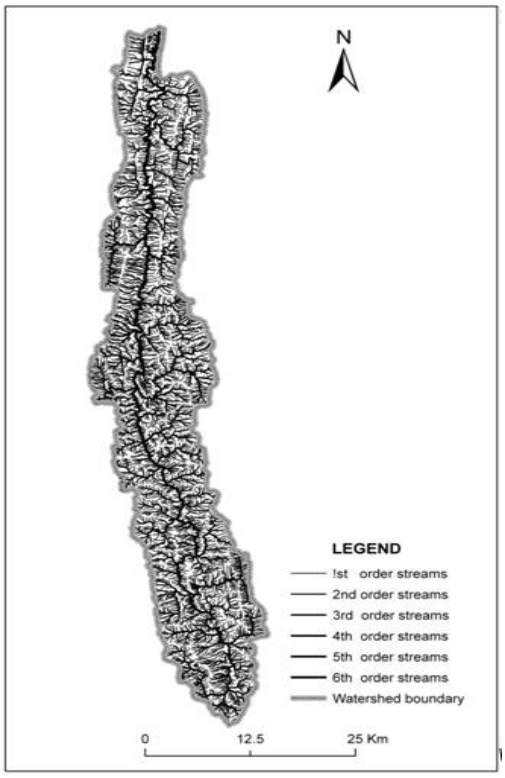
Study Area

The Tut drainage is a tributary of Tlawng River, which covers an area of about 846 km2 extending parts of the Lunglei and Mamit districts in Mizoram. The drainage area spreads in between the latitudes of $92^0$30' and $92^0$42'E and longitudes from $23^0$10' to $24^0$02'N. The Tut river originates of 900m. above mean sea level near Chengpui settlement in Lunglei district of Mizoram. It flows from south to north and finally joins the Tlang river at Pathiontlang near Hartoki in Mamit district. The area is mostly covered by the deciduous ever green forest and most of the area is in accessible due to lack of road connectivity (Fig. 1).

The geology of the area comprises of Surma Group of rocks mainly Bhuban formation belongs to the Tertiary age. The lithology consists of arenaceous and argillaceous sequences comprises of sandstone and siltstone/Shale. Geomorphologically, the area is occupied by undulated topography with a series of strike ridges and valleys. The drainage network of the present study shows that the terrain exhibits trellis, parallel to sub-parallel drainage patterns which indicate structurally controlled drainage. The shape of the basin is elongated due to the influence of the tectonic activity (thrusting and faulting) of the Tut basin.

The drainage patterns have revealed the degree of lithological, structural controls, initial slope, rainfall and vegetation of the area. The influence of lithology on drainage development in the study area is mentioned in Table 2. The

Fig. 1. Location map of Tut watershed.



parallel to sub-parallel drainage were developed by the influence of lithology on drainage development. The area is having the impermeable rocks shows the dendritic or radial drainage. The trellis type of drainage pattern development has produced by the unconsolidated and highly permeable sediments which might be controlled by the underlying geological structures such as folds and faults.

Results and Discussion

The drainage area of 846 km^2 Tut watershed was divided into 42 fourth order sub-watersheds for morphometric analysis. The morphometric characters of the Tut watershed is further divided into basic parameters such as stream order, stream length, basin area, basin length and perimeter of the basin. The derived parameters like bifurcation ratio, drainage density, stream frequency, drainage texture and compactness co-efficient and the shape parameters are Elongation ratio, circularity ratio, form factor, ruggedness number, relative relief and relief ratio calculated and compared with sub-basins in the present study (Tables 3 and 4).

Basic Parameters

Stream order (Nu)

The stream order is a dimensionless number and it can be used as comparison of geometry for drainage networks on different linear scales. The entire Tut watershed drainage network has been delineated into 42 fourth order sub-basins based on the Strahler's (1952) method (Table 1). In this method, the smallest finger tip tributaries are designated as first-order streams; When two first order streams join, a second order stream is generated; where the two second order streams join, a third order stream formed and so on. The main stream considered through which all discharges of water and sediment supplied by the lower order streams, become a stream of highest order. It is also observed that when stream order increases stream frequency is decreasing. The stream characteristics support the Horton's (1945) first 'law of stream orders' indicate that the number of streams of different orders in a given watershed tends closely to approximate an inverse geometric relationship.

Table 2. Lithological influence on drainage development in the Tut Watershed.

Sl. No.	Morphometric Units	Drainage	Bed rock properties
1.	Summit surface	Radial	Impervious bed rocks with steeply sloping ground
2.	Hill slopes i) Hill-side slopes with free faces ii) Valley side slopes with colluviums	Sub-parallel to dendritic Dendritic	Impervious bed rocks, steep to moderate slopes Less pervious bed rocks, moderate slopes
3.	River valleys with terraces	Trellis	Highly permeable unconsolidated material flat or gently sloping ground

Stream Length (Lu)

The stream length (Lu) is a dimensional property to understand the characteristic size of the components of a drainage network. The areal distribution of consecutive stream orders in a basin reflects the underlying hydrological characteristics of the rocks. The stream length of each order in the Tut watershed is given Table 3. The stream length is the total length of all streams in a given order. The number of streams in various orders in the sub-watersheds and their lengths were measured manually.

Area of the basin (Au)

The total area of the Tut watershed is 846 sq.km and the areas of sub-watersheds shown in Table 3. The maximum area of the sub-watershed is 25.57 km2 and the minimum area contains 1.95 km^2.

Perimeter of the basin (P)

The perimeter is the total length of the basin boundary. The various sub-basins perimeters are mentioned in Table 3.

Basin Length (Lb)

The basin length is known as maximum length of the basin, which measures parallel to the main drainage. The length of various sub-watersheds under study is mentioned in Table 3.

Derived Parameters

Bifurcation Ratio (Rb)

The bifurcation ratio is calculated from the stream order data. The bifurcation ratio is not constant from one order to the next order. Strahler (1968) has introduced mean bifurcation ratio (Rbm) for achieving accuracy of bifurcation ratio. The mean bifurcation ratio of the streams in the study area ranges between 2.16 to 5.94. The Study area is geomorphologically represented by undulating topography. The present study suggests that most of the rocks are permeable in nature. The Tut watershed under study indicates that suffered structural disturbance as indicated by Strahler (1964).

Stream Frequency (Sf)

The Sf is the ratio between the total number of streams (Nu) in a given order to the area of the basin (A) and also known as channel frequency. The Sf varies from 3.49 to 16.57 (Table. 4) in the present study area, the higher Sf reflects the greater surface run-off and a steeper ground surface.

Drainage Density (Dd)

The Drainage density is the ratio of the total stream lengths of all orders in a given basin to the area of the basin. The computed values of the Drainage density are presented in Table 3. It ranges between 1.30 and 4.58 km/km^2 in the Tut sub-watersheds. The Drainage density is one of the important indicators of linear scale of the landform elements in stream eroded topography (Horton, 1945). It reflects the direct relationship between the closeness of spacing of the streams and indirect evidences of the structural framework of the watershed. The low Drainage density is favourable for the regions of high resistant or high permeable lithology under dense vegetation and low relief, when a high drainage density supported in the regions of weak or impermeable rocks with sparse vegetation and mountainous relief (Strahler, 1964).

Drainage Texture (T)

The drainage texture (T) is the relation between the total number of stream segments in all the stream orders and perimeter of the drainage area (Horton, 1945). The derived value of drainage texture varies from 3.00 to 9.68 (Table 4) suggesting that the texture is relatively coarse to intermediate. The drainage texture is the measure of closeness of channel spacing, depending on climate, vegetation, soil, geology, relief, infiltration rate and stage of development of a landform (Smith, 1950; Doornkamp and King, 1971).

Compactness Co-efficient (Cc)

The compactness co-efficient is used to express as the relationship of a hydrological basin with that of a circular basin having the same area as the hydrological basin. The compactness co-efficient of Tut watershed highest is 2.57 and lowest 1.50.

Shape Parameters

Elongation Ratio (Re)

According to Schumm (1956) was defined by the ratio of between the diameter of the same area as the basin and basin length. The variations in the elongated shapes of the sub-basins within the watershed basins are caused by the effects of structural disturbances (Sreedevi, et. al., 2005). The elongation ratio observed in the present work ranges from 0.39 to 0.97. The computed elongation ratios of each sub-watershed is mentioned in Table 4.

Circularity Ratio (Rc)

The Rc is a quantitative expression of the shape of the watershed, which is indicated by the ratio of basin area (a) to the area of circle having the same perimeter (P) as the basin (Miller, 1953). It is a significant ratio, expressing the stage of dissection in any region and also gives an index of the structural fabric of the underlying rocks. The stream length, stream frequency and stream gradient of the various orders play an important role on the Rc rather than the slope conditions and drainage pattern of a basin. The Rc value of the drainage basin exactly 1.0 indicate that the basin is set to be a perfectly circular shape, in which the discharge is in greater quantity (Miller, 1953). The Rc for the Tut sub-basins ranges from 0.35 to 0.95. (Table 4).

Form Factor (Ff)

The Ff was first proposed by Horton (1945) that this parameter predicts the flow intensity of a basin of a defined watershed area. It is expressed as the ratio between the area of the basin (A) and the square of the basin length (L2). The Ff value of the sub watershed in the present study varies from 0.31 to 0.89 and mentioned in Table 4. The form factor indicates the inverse relationship with the square of the axial length and has a direct relationship with peak discharge (Gregory and Walling, 1973).

Ruggedness number (Rn)

The Rn is the product of a basin relief and drainage density (Strahler, 1957), it indicates the qualities of steepness of slope and stream length. The Tut sub-watershed Rn values range from 0.4 to 4.2. (Table 3).

Basin Relative Relief

The basin relative relief is the elevation difference between the highest and minimum elevation. The relative relief of the Tut sub-watersheds

ranges between 0.30 and 1.30 km (Table 4).

Relief Ratio (Rl)

Relief ratio is the elevation difference between the highest and lowest points on the valley floor (Schumm, 1956). It indicates the overall steepness of a drainage basin and is a measure of intensity of erosional processes operating on the slope of the watershed. The Rl of Tut sub-watersheds ranges from 0.05 to 0.95 (Table 4).

Conclusion

The present study is undertaken to analyze the quantitative morphometric parameters of fourth order sub-watersheds of Tut basin. The areas is underlain by the Surma group of rocks consists of Bhuban formation, which belong to Tertiary age. The Tut river is a six order watershed having the development of drainage patterns such as trellis, parallel and radial drainage development. The morphology, high rainfall in the hill ranges and structure control the development of drainage network. However, lithology and structure of the drainage basin have great influence on the evolution of drainage in study area.

The morphometric analysis is broadly divided into three categories as basic parameters, derived parameters and shape parameters. The computed morphometric parameters indicate that lower order streams are more dominant in the sub-watersheds of Tut basin. The high values of mean bifurcation ratios and also high values of drainage densities indicate that drainage has affected by structural disturbances. The values of form factor and circularity ratio of sub-basins indicate that most basins are elongated in nature. The stream development is affected by the slope, local relief and climate in the Tut basin. These are the controlling factors for producing variations in drainage densities and stream frequencies among the sub-watersheds.

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Table 2. Formulae for the computation of Morphometric parameters of Tut watershed.

S.No	Parameter	Formula	Reference
	Basic Parameters		
1.	Stream Order	Hierarchical Rank	Strahler, 1957
2.	Area (Au)	Area of the watershed	-
3.	Perimeter (P)	The perimeter is the total length of the basin	-
4.	Length (Lb)	Maximum length of the basin	-
5.	Stream Length (Lu)	Length of Stream	Horton, 1945
6.	Mean Stream Length (Lsm)	Lsm = Lu/Nu, Where Lu = The total stream length of order 'u' Nu = total no. of stream segments of order 'u	Strahler, 1964
7.	Stream Length Ratio (RL)	RL = Lu/Lu-1 Where Lu = The total stream length of order 'u' Lu-1 = The total stream length of its next lower order	Horton, 1945
8.	Maximum and Minimum Heights (H, h)	Maximum and Minimum elevation	-
	Derived Parameters		
9.	Bifurcation ratio(R_b)	R_b = Nu/Nu+1 Where Nu = Total number of Stream segments Nu+1 = Number of segments of next higher order	Schumm,1956
10.	Mean Bifurcation ratio(R_{bm})	Rbm = Average Rb of all orders	Strahler, 1957
11.	Drainage density (Dd)in km^{-1}	Dd = Lu/A Where Lu=The total stream length of order'u' A = Area of the basin (Km^2)	Horton, 1932
12.	Stream Frequency (Fs)	Fs = Nu/A Where Nu=Total number of stream segments A = Area of the basin (Km^2)	Horton, 1932
13.	Drainage Texture (T)	T = Nu/P Where Nu = Total number of stream segments P = Perimeter of the basin (km.)	Horton, 1945
14.	Form factor (Ff)	$Ff = A/Lb^2$ Where A=Area of the basin(Km^2) Lb^2 = Square of the basin length	Horton, 1932
15.	Basin Relief (H)/ Relative Relief	$H_{max} - H_{min}$ Where H_{max} = Maximum relief of the basin H_{min} = Minimum relief of the basin	Hadley and Schumm,1961
16.	Relief ratio (Rl)	Rl = H/Lb Where H = Total relief (relative relief) of the basin (km.) Lb = Basin Length (Km.)	Schumm,1956
	Shape Parameters		
17.	Circularity Ratio (Rc)	$Rc = 4*pi*A/P^2$ Where pi = pi value i.e 3.14 A = Area of the basin (Km^2) P^2 = Square of Perimeter of the basin	Miller, 1953
18.	Elongation Ratio (Re)	Re = 2x(A/pi)/Lb Where A = Area of the basin pi = pi value i.e 3.14 Lb = Basin Length (Km.)	Schumm,1956
19.	Length of overland flow (Lg)	Lg = 1/D*2 Where D = Drainage density	Horton,1945
20.	Ruggedness Number (Rn)	Rn = DdxHu Where Dd = Drainage Density Hu = Relative relief	Strahler, 1968
21.	Compactness Co-efficient(Cc)	$Cc = 0.2821P/A^{0.5}$ Where P=Perimeter of the basin(km A = Area of the basin (km^2.)	Gravelius,1914 Rymbai & Jha, 2012

Table 3. Morphometric properties of fourth order sub-basins in the Tut watershed.

Sub-Basin No.	Stream Order				Total Streams ∑N	Stream Length				Total Length ∑L	Basin area (Au)	Basin Length (Lb)	Basin Perimeter (P)	Mean Bifuraction ratio (Rbm)	Ruggedness No. (Rn)	Drainage Density (Dd)	Stream Frequency (Sf)
	1st (N1)	2nd (N2)	3rd (N3)	4th (N4)		L1	L2	L3	L4								
1.	51	13	3	1	68	15.5	4.5	4.0	1.0	25.0	8.95	4.25	13.5	3.75	1.6	2.79	7.59
2.	18	6	2	1	27	5.0	3.5	1.0	0.5	10.0	3.55	8.30	7.5	2.66	1.2	2.81	7.60
3.	143	23	5	1	172	56.5	8.0	5.0	7.5	77.0	25.57	2.50	24.0	5.27	3.2	3.01	6.72
4.	61	18	4	1	84	27.5	8.5	2.0	5.0	43.0	14.45	6.40	17.0	3.96	3.2	2.97	5.81
5.	86	19	4	1	110	36.5	10.0	6.0	6.0	558.5	18.45	4.20	20.0	4.42	2.9	3.17	7.91
6.	25	5	2	1	33	9.5	2.0	2.5	1.5	115.5	5.57	3.90	11.0	3.16	1.7	2.78	5.82
7.	31	5	2	1	39	10.0	2.0	4.0	1.0	117.0	6.17	2.50	11.0	3.56	1.8	2.75	6.32
8.	45	11	3	1	60	17.0	6.0	4.0	2.0	229.0	10.12	3.70	12.5	3.58	1.9	2.86	5.92
9.	70	14	3	1	88	25.0	7.0	2.0	5.0	339.0	14.15	5.00	17.5	4.22	2.1	2.75	6.21
10.	29	6	2	1	38	7.5	2.5	3.0	0.5	113.5	5.55	2.90	9.5	3.27	1.9	2.43	16.57
11.	106	20	3	1	130	37.5	13.0	5.0	3.5	459.0	18.80	5.40	18.5	4.99	2.6	3.13	6.91
12.	97	14	3	1	115	30.5	12.5	7.0	3.5	553.5	14.40	5.20	16.0	4.86	2.8	3.71	7.98
13.	60	9	3	1	73	20.5	14.0	3.0	1.5	339.0	10.27	3.50	13.5	4.22	2.9	3.79	7.26
14.	100	24	2	1	127	35.0	15.0	3.0	4.5	557.5	14.90	6.90	17.0	6.05	3.2	3.85	8.52
15.	46	9	3	1	59	22.0	5.0	3.0	2.0	332.0	7.97	3.80	10.0	3.70	3.9	4.01	7.40
16.	57	15	4	1	77	29.5	7.5	8.5	3.0	448.5	15.52	4.25	16.0	3.85	3.7	3.12	4.96
17.	51	10	4	1	66	27.0	8.5	3.5	7.5	446.5	14.87	5.40	17.5	3.86	2.9	3.12	4.43
18.	23	5	2	1	31	12.0	4.5	4.5	1.5	222.5	9.45	3.30	13.0	3.03	2.2	2.38	3.49
19.	36	5	2	1	44	15.0	5.0	1.5	1.0	222.5	17.22	3.25	12.5	3.90	0.4	1.30	5.16
20.	84	19	4	1	108	44.0	6.0	3.5	5.0	558.5	14.37	6.50	20.0	4.39	2.5	4.07	7.58
21.	62	9	2	1	74	27.5	7.0	5.0	1.0	440.5	14.37	5.50	17.0	4.46	1.7	2.81	5.14
22.	164	24	3	1	192	80.0	8.5	7.5	8.0	1104	22.67	6.60	28.5	5.94	3.6	4.58	8.46
23.	87	12	4	1	104	42.5	11.0	7.5	0.5	661.5	19.70	7.75	21.0	4.75	2.0	3.12	5.27
24.	42	10	3	1	56	14.5	6.0	1.5	3.0	225.0	9.20	4.75	12.0	3.51	2.5	2.71	6.08
25.	75	16	4	1	96	27.0	5.5	1.5	5.5	339.5	13.80	5.75	16.0	4.22	2.8	2.86	6.95
26.	107	21	4	1	133	28.5	7.5	5.0	5.5	446.5	21.55	7.20	19.0	4.78	2.1	2.15	6.17
27.	29	9	2	1	41	14.0	3.5	1.0	2.5	221.0	5.77	3.25	10.0	3.24	1.6	3.63	7.10
28.	27	5	2	1	35	7.5	1.5	1.5	2.0	112.5	6.62	3.90	11.0	3.30	2.0	1.89	5.28
29.	49	13	2	1	65	12.5	6.0	4.0	0.5	23.0	9.72	4.50	14.0	4.08	2.0	2.36	6.68
30.	22	5	2	1	30	6.5	1.0	2.0	0.5	10.0	3.72	2.35	7.0	2.96	0.7	2.68	8.06
31.	82	12	4	1	99	27.0	6.0	3.5	4.0	440.5	14.77	5.85	16.5	4.94	3.0	2.74	6.70
32.	131	26	5	1	163	47.5	19.0	7.5	6.0	80.0	27.82	7.75	22.0	5.07	3.7	2.87	5.85
33.	36	6	2	1	45	12.5	4.0	2.0	1.0	119.5	7.05	3.25	10.0	3.66	1.5	2.76	6.38
34.	10	4	2	1	17	3.0	2.5	1.0	0.5	7.0	1.95	2.10	5.5	2.16	2.0	3.58	8.71
35.	22	5	2	1	30	7.5	1.5	1.5	1.0	111.5	4.02	2.95	8.5	2.96	1.9	2.86	7.46
36.	33	7	3	1	44	14.5	5.0	1.5	3.0	24.0	9.07	3.50	13.0	3.34	2.0	2.64	4.85
37.	31	9	3	1	44	13.5	3.5	2.0	2.5	221.5	8.45	4.75	14.0	3.14	1.9	2.54	5.20
38.	37	7	2	1	47	15.0	4.5	0.5	3.5	223.5	8.85	5.10	13.5	3.42	2.1	2.65	5.31
39.	14	5	2	1	22	5.0	3.0	0.5	1.0	9.5	4.07	4.00	9.5	2.43	1.5	2.33	5.40
40.	57	10	4	1	72	70.0	4.0	4.0	4.0	82.0	14.27	4.60	16.0	4.06	4.4	5.74	5.04
41.	46	15	3	1	65	24.5	6.0	2.5	3.5	336.5	13.05	5.80	15.0	3.68	2.0	2.79	4.98
42.	42	11	2	1	56	25.0	5.0	4.0	2.5	336.5	12.27	5.60	15.0	3.77	2.6	2.97	4.56

Table 4. Morphometric parameters of fourth order sub-basins of Tut watershed.

Sub-Basin No.	Circularity Ratio Rc	Elongation Ratio (Re)	Form Factor Ff	Relative relief (H-h) (km)	Relief ratio (H-h/L)	Longest Axis L Km.	Relief Ratio Rl	Texture Ratio T	Length of Over landflow Lg	Compactness Coefficent Cc
1	0.69	0.79	0.49	0.57	0.13	4.25	134.11	5.03	0.13	1.73
2	0.79	0.40	0.58	0.44	0.05	8.30	53.01	3.60	0.13	1.66
3	0.55	0.69	0.79	1.05	0.42	2.50	422.8	7.16	0.11	1.47
4	0.62	0.67	0.35	1.07	0.16	6.40	167.5	4.94	0.11	1.79
5	0.57	0.83	0.84	0.93	0.22	4.20	222.14	7.30	0.09	1.95
6	0.57	0.68	0.36	0.61	0.15	3.90	157.69	3.00	0.12	1.80
7	0.64	0.80	0.89	0.68	0.27	2.50	271.2	3.54	0.13	1.70
8	0.81	0.97	0.73	0.68	0.18	3.70	183.24	4.80	0.12	1.53
9	0.58	0.84	0.56	0.76	0.15	5.00	152	5.02	0.13	1.86
10	0.77	0.91	0.65	0.80	0.28	2.90	275.86	9.68	0.17	1.56
11	0.68	0.90	0.64	0.85	0.16	5.40	158.33	7.02	0.10	1.77
12	0.70	0.82	0.53	0.77	0.15	5.20	148.46	7.18	0.07	1.69
13	0.76	0.89	0.83	0.79	0.22	3.50	225.14	5.40	0.07	1.63
14	0.64	0.63	0.31	0.84	0.12	6.90	121.44	7.47	0.07	1.77
15	0.90	0.83	0.55	0.97	0.26	3.80	256.57	5.90	0.06	1.35
16	0.76	0.85	0.85	1.19	0.29	4.25	280.70	4.81	0.10	1.64
17	0.60	0.80	0.50	0.92	0.18	5.40	171.11	3.77	0.10	1.82
18	0.70	0.89	0.81	0.93	0.29	3.30	283.33	2.53	0.17	1.63
19	0.56	0.84	0.63	0.30	0.92	3.25	92.30	7.12	0.59	1.23
20	0.45	0.65	0.34	0.62	0.95	6.50	95.07	5.45	0.06	2.11
21	0.62	0.77	0.47	0.62	0.11	5.50	112.72	4.35	0.12	1.79
22	0.35	0.81	0.52	0.79	0.12	6.60	120	6.73	0.04	2.57
23	0.56	0.64	0.32	0.63	0.10	7.75	107.35	4.95	0.10	1.98
24	0.73	0.72	0.40	0.94	0.20	4.75	198.52	4.48	0.13	1.50
25	0.67	0.72	0.41	0.99	0.17	5.75	171.30	6.00	0.13	1.72
26	0.74	0.72	0.41	1.00	0.14	7.20	139.86	7.00	0.21	1.74
27	0.72	0.83	0.54	0.44	0.13	3.25	135.38	4.10	0.07	1.61
28	0.68	0.74	0.43	1.07	0.27	3.90	274.61	3.18	0,28	1.64
29	0.62	0.78	0.48	0.85	0.19	4.50	188.66	4.64	0.18	1.73
30	0.95	0.92	0.67	0.26	0.11	2.35	111.48	4.28	0.14	1.50
31	0.68	0.74	0.43	1.12	0.19	5.85	190.59	6.00	0.13	1.72
32	0.72	0.76	0.46	1.30	0.17	7.75	168.38	7.40	0.12	1.86
33	0.88	0.36	0.66	0.55	0.18	3.25	170.46	4.50	0.13	1.44
34	0.80	0.75	0.44	0.56	0.27	2.10	266.66	3.09	0.08	2.32
35	0.69	0.76	0.46	0.66	0.22	2.95	223.72	3.52	0.12	1.72
36	0.67	0.97	0.74	0.78	0.22	3.50	222.85	3.38	0.14	1.66
37	0.54	0.69	0.37	0.77	0.17	4.75	161.26	3.14	0.15	1.85
38	0.60	0.65	0.34	0.80	0.15	5.10	156.86	3.48	0.14	1.74
39	0.56	0.56	0.25	0.67	0.17	4.00	167.5	2.31	0.18	1.90
40	0.70	0.92	0.67	0.77	0.16	4.60	166.08	4.50	0.03	1.70
41	0.72	0.70	0.38	0.70	0.12	5.80	122.06	4.33	0.13	1.64
42	0.68	0.70	0.39	0.90	0.16	5.60	159.64	3.73	0.11	1.68

Changing Pattern of Agricultural Productivity in North East India : A Regional Interpretation

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Abstract *: Present paper examines the pattern of changing pattern of agricultural productivity and agricultural production systems prevalent in the North-East Region. Calculating agricultural productivity in its money term for two points of time - 1998-99 (liberalisation period) and 2008-09 (post-liberalisation), it is found that the agricultural productivity is changing very fast all over the North-east region of the country. Especially, hill areas have experienced very high increase in agricultural productivity. It happened due to two main reasons: first, a fast change in the food grain dominated cropping pattern to commercial cropping because farmers wish to grow high value crops to maximise their profit and, secondly, the growing market economy and expanding road network in rural areas which have been helping in regulating agricultural products within and outside North-East Region.*

Keywords *: Agricultural Productivity Pattern, General Productivity Pattern, Processes of change.*
Acknowledgement *: Surendra Singh, (Retd. Professor), Department of Geography, North-Eastern Hill University, Shillong.*

Introduction

In general agricultural productivity change conceals considerable regional differences because of farming practices, techniques availability of irrigation facilities, attitude of the farmers and so on. The difference of agricultural productivity change among the regions to some extent is a natural phenomenon, such as rainfall, temperature, humidity and some other agro-ecological factors influence productivity. It is not only the natural phenomenon but also population increase and government policies relating to agricultural extension, input distribution, institutional credit facilities, agricultural co-operatives, and some basic/institutional inefficiency are the causes of productivity variations in the regions. The era of mechanized agriculture began with the invention of such agricultural machines like reaper, cultivator, thresher, combine harvester and tractors, which continued to appear over the years leading to a new type of large scale agriculture (Altson et al. 2010). Industrial revolution also changes the behavior of the farmers in selection of agricultural crops with the need of agro-based industry.

In North-East Region of the country the agricultural type and pattern are diverse, ranging from subsistence to commercial types. It appears that the result of variability in resource endowments, physiography, climate, institution, technology and socio-economic factors. As a consequence, production performance of agricultural sector has followed uneven path and the large variations have been seen in productivity between agro-ecological zones or among districts. Large variations in productivity lead to regional disparity. Identification of various level of productivity helps to analyze the reason behind such variations that may control the future growth and development patterns. Such variations

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in productivity also indicate scope to raise production and productivity attaining balanced agricultural growth. In the present work attention is focused to describe the regional pattern of agricultural productivity and changes therein to visualize the changing pattern of productivity in general in order to study its factors. Classificatory approach is adopted to describe the productivity pattern.

Methodology

In the present case, agricultural productivity refers to land productivity that is defined as total agricultural output per unit of cultivated area. Going through the literature available on measurement of agricultural output, it is widely accepted that agricultural production is the result of combinations of infra-structural elements, viz, physical, techno-economic, socio-cultural, etc. by which agricultural efficiency is influenced (Singh and Chauhan, 1977). Since market price of agricultural product is influencing factor of agricultural output, the economists considered three elements of agriculture (Area, Yield and Price of crops) to measure the total output in terms of money value. For the purpose of aggregated agricultural output, the following standard formula used by Bhalla and Tyagi (1989) and Singh (1994), has been adopted:

$$O = \sum (A_i.Y_i.P_i) \quad (1)$$

Then agricultural productivity is simply the output per unit of cultivated land as

$$Y = (O/A) \quad (2)$$

Change in agricultural productivity over time

$$C = (t_0) - t_1) \quad (3)$$

where, Y = agricultural productivity per areal unit, A_i = area of ith Crop, Y_i = yield of ith Crop, P_i = hrvest price of ith Crop, O = total agricultural output in its money term, C= change over time, (t_0) = base year, (t_1) = current year.

For the purpose of analyzing changing pattern of agricultural productivity, the conversion of area and yield of the various crops has been used for two points of time (i.e. 1998-99 and 2008-09). Thus, the agricultural output of each of the areal unit (District) has been calculated by converting crop production in to its money term with the help of multiplying the total production of each crop by its constant harvest price of the base year (1998-99).

The regional analysis of agricultural productivity is solely based on secondary data collected district wise from Ministry of Information and Technology, Government of India and other government publications. Farm harvest price of 1998-99 is considered for both the time periods, 1998-99 the liberalisation phase and 2008-09 the Post-liberalisation phase of economic growth. A total number of 32 crops were included for the calculation of the total agricultural output. Classifying districts in to five productivity classes, the general pattern are visualized and studied. They are there are the areas of: (i) Very High Productivity (Above Rs 20,000/ha), (ii) High (Rs 15,000/ha - Rs 20,000/ha), (iii) Medium (Rs 10,000/ha - Rs 15,000/ha), (iv) Low (Rs 5,000/ha - Rs 10,000/ha) and (v) Very Low Productivity (Below Rs 5,000/ha).

Class Wise Interpretation of Agriculture Productivity

The general interpretation of inter-district variations in agricultural productivity envisaged the differences and inequality of development of agricultural productivity level within the study areas. Such variation over times provides the general understanding the speed and influx of agricultural technology and transformation.

1) Very High Productivity (Above Rs 20,000/ha)

During the liberalization period, the Areas of Very High agriculture productivity are confined only in 7 districts including Manipur Valley, Parts of Nagaland and N.C. Hills and Tripura (Fig-1A). While the occupied areas of was remarkably increased from 8.43% of total crop areas to more than 21.56% of the total crop areas (24 districts) during the period of post-liberalization (1998-99 to 2008-09). These mean that the surrounding areas of Patkai Hills and Eastern Himalaya and the entire Meghalaya Plateau including Karbi Hills of Assam were included in the expansion areas of Very High Productivity (Fig - 1B). During the decade, very high productivity class experienced significant declining trends of food grain crops area up to 21.43 % (Table - 1).

2) High (Rs 15,000/ha - Rs 20,000/ ha)

High agricultural productivity areas is identified in 10 districts and occupying around 15.94% of the total cropped areas, which are generally confined in the Manipur valley and Southern parts of Nagaland in 1998-99 (Fig-1A). However, in 2008-09 the high agricultural productivity areas are noticed in hills and plain areas. It account 23 districts and 41.8% of the cropped areas are falling under this category (Fig-1B). Similar to the above class, food grain crops area is decline 6.46% from 88.68% to 82.22% in between 1998-99 to 2008-09 respectively.

3) Medium (Rs 10,000/ha - Rs 15,000/ ha):

In 998-99, most of the areas of Eastern and Southern Hills Central Hills and Valley, Meghalaya Plateau and some plain areas of Tripura Hills and Valleys are included in this category. The percentage contribution of food grain crops area is significantly high and 93.67% of the crop area was under food grain crops. Contrary to base year, in 2008-09 numbers of districts falling under medium productivity areas are increased and identified in 18 districts of Tripura, Mizoram, Arunachal Pradesh and Lower and Upper Assam Valley. And counting 35.18% of total crops areas are falling under this category. While, the percentage shares of food grain crops was shrinking 10.67%. It means that the percentage share of commercial crops was increased up to10.67% during the ten years (Table - 1 & 2).

4) Low (Rs 5,000/ha - Rs 10,000/ha):

During the base year, low productivity category are recognized in 24 districts, isolated districts of Purvanchal North, Meghalaya Plateau, Mizoram and alluvial soil district of Lower and Central Brahmaputra Valley. Food grain crops were occupied 39.41% of the total crop areas of the North-Eastern Region. But, only 5 districts are falling under low agricultural productivity in 2008-09. Generally, food grain crops are dominant crop in low

agricultural productivity. Though, in this class the percentage share of food grains areas was increased 7.56% during the ten years.

5) Very Low Productivity (Below Rs 5,000/ha):

During the ten years, more than 10% of the total crops area were occupied by very low productivity and counting 21 districts in 1998-99 (Fig-1A). At 2008-09 the numbers of district falling under very low productivity are found in two southern districts of Mizoram. Similarly, during ten years the percentage share of food grains was increased up to 23.96% in this category (Table - 1).

Productivity class wise comparison of the productivity distribution would show its transformation processes cropping pattern and crop diversification. The comparison of area and output shares provide basis of productivity changes. These changes are discussed in the in the following.

A. Changes in Productivity Pattern

Comparing two map of agricultural productivity (Figs. - 1A & 1B), it is clear that the obliterated high and very high productivity pattern of 1998-99 has become unified by adding more areas under these categories of high and very high productivity. Expansion of this category was mostly in the hill and mountain areas of Arunachal Himalaya, Patkai Hills and Lushai Hills of the South. Most of the Meghalaya Plateau also raised productivity level from medium (1998-99) to very high (2008-09). Changing ratio of area and output of crops show the characteristic features of production transformation.

A 1998-99 **B 2008-09**

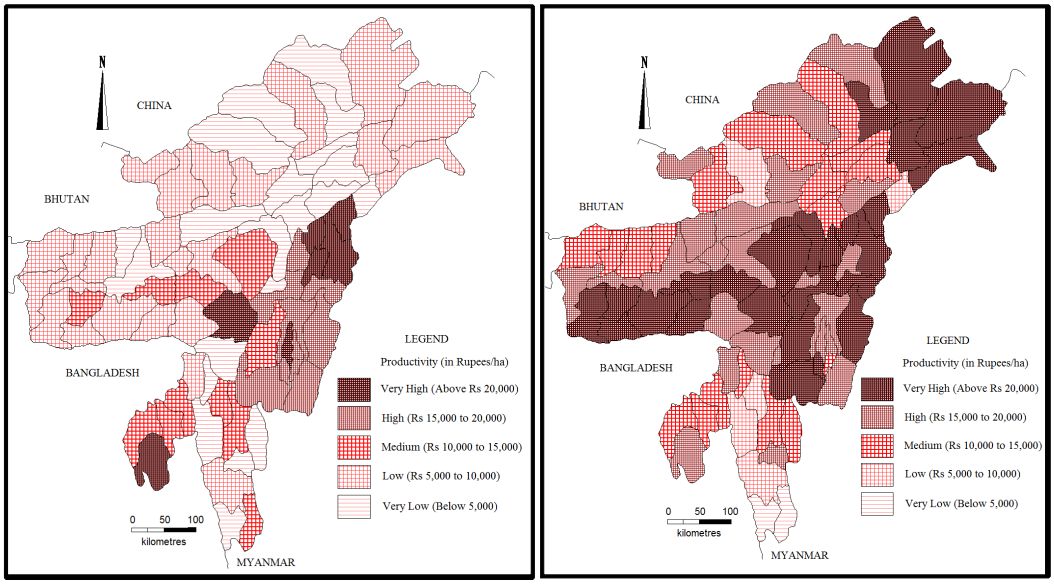

Fig-1: Levels of Agricultural Productivity in (A) 1998-99 and (B) 2008-09
Changing Pattern of Agricultural Productivity (1998-99 to 2008-09):

(B) Changes in Area and Output of Food Grain Crops

There is a decrease in the food grain crop area in moderate and very high productivity classes which shows that the cropping pattern is gradually transformed from food grain dominated to commercial crops. Food grains are low value crops so the production of food grains also decreases in this class of high productivity. Table - 1 reveals that there has been fairly high decrease of 25.50% percent from 78.72% to 53.22% in the food grain output with in the decade. In terms of areas and output, the percentage share of food grains has been declined towards high to low productivity classes (Table - 1) Such negative changes in food grain area and output shows that the cropping pattern changes fast in the North-East Region of the country. It affects productivity.

(C) Changes in Area and Output of Commercial Crops

In the North-East India, commercial crops became important to grow fast during the late 1990's when liberalization policies were adopted in the other part of the country. It may be due to its remote location, cultural diversity, technological lag, knowledge know how of farmer and poor economic setup. In between 1998-99 to 2008-09, the commercial crops became more popular. These crops occupy area of about 14.67 % to the total cropped area in North-East Region in 1998-99 that has been expanded to 16.08 % in 2008-09 (i.e. 1.41%) during the period of ten years. On the other hand, the total output of these crops was increased 25.48 % from 21.29 % to 46.77 % during the same period of time (Table - 2). Comparing the changes in area and output of commercial crops, it is fact the area under these crop were raised marginally but production contribution became about a half of the total agricultural production as it was raised from 4.9 million tons (1998-99) to 45.4 million tons (2008-09). It means the main thrust of adoption of technology (use of fertilizer, pesticides and HYVs of seeds) was towards the production and productivity increased of commercial crops.

The evidence of the same fact can

Table – 1: Change in Area and output of Food Grains Crops in Different Productivity Classes in 1998-99 to 2008-09

Sl.No	Productivity Class	Food Grain Area (ha)			Food Grain Output (Rs Lakh)		
		1998-99 (%)	2008-09 (%)	Change (%)	1998-99 (%)	2008-09 (%)	Change (%)
1	Very High (Above Rs 20000)	94.75	73.32	-21.43	62.31	22.00	-40.31
2	High (Rs 15000-20000)	88.68	82.22	-6.46	74.94	53.04	-21.90
3	Medium (Rs 10000-15000)	93.67	83.00	-10.67	81.24	54.19	-27.05
4	Low (Rs 5000-10000)	85.55	93.11	7.56	89.33	73.12	-16.21
5	Very Low (Below Rs 5000)	63.98	87.94	23.96	85.78	63.78	-22.00
6	Average	85.33	83.91	-1.42	78.72	53.22	-25.50

Source: Compiled by Researcher

be seen by establishing relationship between changes in area and output of commercial crops with productivity level. The areas of Low productivity level have lesser changes in area and output of commercial crops rather than the areas of the High productivity level are accompanied by high changes of area in North-East Region (Figs. - 4.5 & 4.6).

There has been increase of commercial output in each of the productivity classes (Table - 2). The percentage share of area under commercial crops increased about 21.43 percent and its output about 40.31% during the last ten years in the area of Very high productivity (Rs 20000 and above per hectare). These ratios of area and output of commercial crops are shrinking down in low productivity areas. It shows that cropping pattern changes fast from food grains to commercial crops especially in high productivity areas.

Findings and Conclusion

The farmers were concentrated to grow agricultural crops only for their subsistence level prior to implementation of economic policies. But, the pattern of agricultural land use and productivity have been becoming more market oriented and production of high value when they realized the importance of market and strong road network which was expanded during the early part of 20th century. There has been fast change in cropping and productivity pattern during the post-liberalization phase of economic development in the North-East Region. Such interesting changing pattern of agricultural productivity have peculiar characteristic as:

(a) The areas having medium and low productivity level in 1998-99 have fast change in productivity during the decade considered for. In 2008-09, about 63.37% of the total crop areas (47 out of 72 districts) are under the areas having high and very high productivity level. This means that agricultural productivity is increased in the moderate productivity areas. The main driving factors of productivity increased in

Table – 2: Change in Area and output of Commercial Crops in Different Productivity Classes in 1998-99 to 2008-09

Sl.No	Productivity Class	Commercial Crop Area (ha)			Commercial Crop Output (Rs Lakh)		
		1998-99 (%)	2008-09 (%)	Change (%)	1998-99 (%)	2008-09 (%)	Change (%)
1	Very High (Above Rs 20000)	5.25	26.68	21.43	37.69	78.00	40.31
2	High (Rs 15000-20000)	11.32	17.78	6.46	25.06	46.96	21.90
3	Medium (Rs 10000-15000)	6.33	17.00	10.67	18.76	45.81	27.05
4	Low (Rs 5000-10000)	14.45	6.89	-7.56	10.67	26.88	16.21
5	Very Low (Below Rs 5000)	36.01	12.05	-23.96	14.26	36.21	21.95
6	Average	14.67	16.08	1.41	21.29	46.77	25.48

Source: Compiled by Researcher

the North-East Region are due to the changes of cropping pattern and improvement of agricultural technology (irrigation, HYV seeds and road etc.) in North-East Region of the country.

b) Increasing area under food grain crops do not have effect on productivity level and its increase (Fig - 2A). Rate of increase in productivity is much faster than the increased in the area of food grain crops (Fig. - 2B). It means that increasing area under food grain crops does not have much effect on productivity. However the percentage share of food grain areas and output has been increased particularly in plain areas due to introduction of irrigation technology in the area and increasing demand of food grains, so the productivity

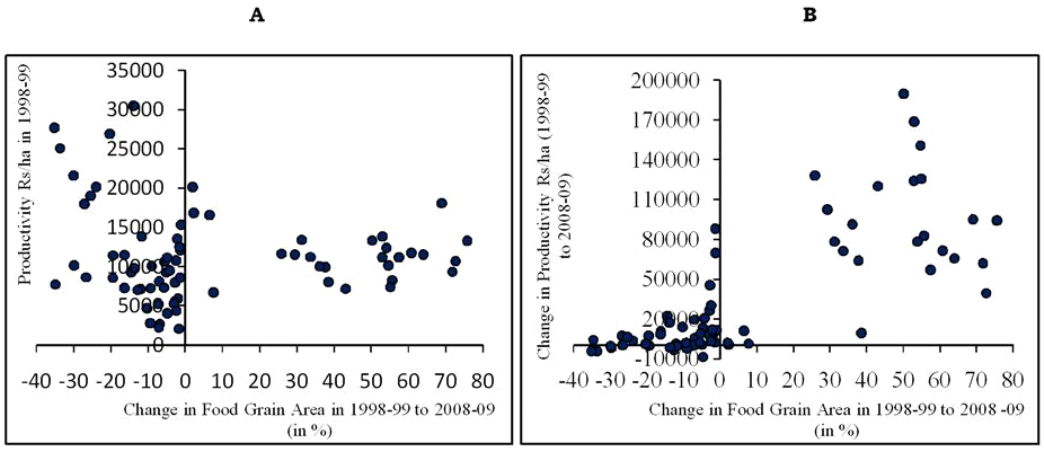

Fig. – 2: (A) Change of Food Grain Crops Productivity in 1998-99 and (B) Changes in Productivity of Food Grain Crops in 1998-99 to 2008-09

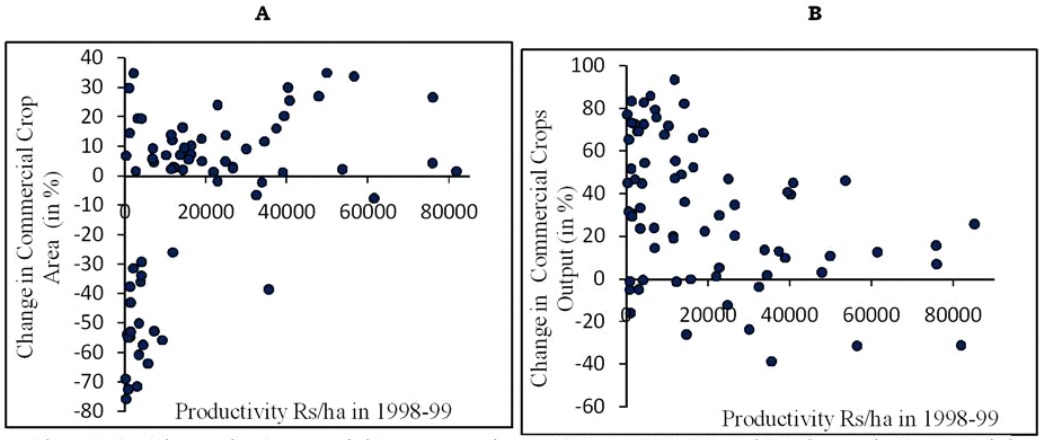

Fig. – 3: (A) Change in Commercial Crops Area in 1998-99 to 2008-09 and (B)Change in Commercial Crops Output in 1998-99 to 2008-09

level is observed low in these areas.

c) The occupied area of commercial crops became more in the North-East Region. The occupied area of commercial crops is unequal in all over the North-East Region in the beginning of liberalization and after ten years it becomes more uniform. Along with the increased of areas the output contribution of commercial crops to total output is increased during the ten years.

d) The occupied area of commercial crops is unequal in all over the North-East Region in the beginning of liberalization and after ten years it becomes more uniform. Along with the increased of areas the output contribution of commercial crops to total output is increased during the ten years. In the areas of low productivity the percentage share of area under commercial crops has been reduce. Inversely, the area under commercial crops increased fast up to even 21.43% in very high productivity areas of hills and mountains.

e) Only a few patches of high productivity (in the hill areas) have been expanded up to the half of the North-East area during the ten years. It happened due to changing pattern from food grain dominated (1998-99) to horticulture and fruits crop dominated (2008-09). Hill areas have potentials to expand horticultural crops because of humid climate, fertile soils and bio-diversity in this area.

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Pre-Marital Sex Attitude among Students of Mizoram University

K.C. Lalmalsawmzauva

Abstract *: This paper is an attempt to examine attitude of Mizoram University students and research scholars towards pre-marital sex. The sample size of present study is 170 (17%) university students and research scholars representing 1000 university students. This study tested 'how liberal or conservative' the educated youths are to prove the current general perception of 'increasing liberal ideas and openness of younger generation on pre-marital sex'. Paper also touched upon issues of 'virginity' to understand their social or moral values among the educated youth of present generation and also is the evaluation on perception about preferences on marriage type and their observation on the prevailing practices. It is interesting to find that girl students are more conservative than their male counterpart on issues of virginity. It is also significant to reveals that students having both rural and urban backgrounds are the most liberal on pre-marital sex compared with students possessing only urban or only rural background.*

Keywords*: Pre-marital sex, attitude, virginity, rural, urban, liberal,*

Introduction

Premarital sexuality is any sexual activity with an opposite sex partner or with a same sex partner before he/she has started a married life. The term is usually used to refer the intercourse before the legal age of a marriage. Adults who presumably marry eventually also fall under this definition. Premarital sex is sexual activity practiced by persons who are unmarried. The prevalence of pre-marital sex has increased in both developed and developing countries (http:/en.wikipedia.org/wiki/premarital_sex#cite_note-1).

Social attitudes to premarital sex have changed throughout history and continue to change today. In the past days pre-marital sex still usually occurred only with the promise of marriage in the future, but this attitude also changes over time and the practice of today's pre-marital sex seems much difference leading to the definition of pre-marital sex in ambiguity. It refers to all sexual relations a person has prior to marriage; this removes emphasis on the relationship between two promising marriage couples. It is not clear whether sex between individuals legally forbidden from marrying, or the sexual relations of one uninterested in marrying, could be considered premarital. Some people confused on the definition of pre-marital sex as it can be confusing with increasing modernity in which we experiences many unknown things of the past day. Two prominent confusing situations are that: One is sexual intercourse that is engaged between a man and a woman who are never been married. Second, a sexual intercourse done by a married person with someone else who is not his/her legitimate spouse. The later is adultery and prohibited by laws across the countries. Because of ambiguity of the definition of pre-marital sex with the passage of time alternative terms have been suggested, including non-marital sex, youthful sex, adolescent sex, and young-adult sex. Still these terms also suffer from a degree of ambiguity, as the definition of having sex differs from person to person.

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Beliefs about pre-marital sex also differ greatly according to people's cultures and religious beliefs. "For most people attitudes towards sexual permissiveness come from moral standards that are notably shaped by religious practice and orientation and by other sub-culture influence such as community standards and racial norms"(Smith 11). In some cultures premarital sex has traditionally been related to the concept of virginity. However, unlike virginity, premarital sex can refer to more than one occasion of sexual activity or more than one sex partner. There are cultural differences as to whether and in which circumstances premarital sex is socially acceptable or tolerated. Discussion on pre-marital sex can include issues such as virginity, sexual morality, extramarital unplanned pregnancy, legitimacy besides other issues.

Review of Literature

Many literatures show the different practices and prevalence of pre-marital sex across cultures and how it has been related with societal change and developments. E-sources particularly useful on this regards as talk about pre-marital sex is more opening up recently due to improvement of social media and internet where people can share opinion pertaining sex virtually.

In Britain prior to the Marriage Act 1753, British couples could live together and have sex after their betrothal or "the spousals". Until the mid-1700s, it was normal and acceptable for the bride to be pregnant at the nuptials, the later church public ceremony for the marriage. Indeed, in the 1170s in Wales "it was common practice for ordinary couples to co-habit before marriage and for cousins to marry one another" despite the disapproval of clerics sent to Britain by the Paris-based "Reform Church" movement, a Catholic faction that attempted to refocus society's moral compass with a particular emphasis on sex and marriage . With the Act in force after 1753, for the first time in British history, all marriages in England and Wales had to take place in their parish church. Illegitimacy became more socially discouraged, with first pregnancies outside of marriage declining from 40% to 20% during the Victorian era but returning to 40% by the start of the 21st century (http:/ e n . w i k i p e d i a . o r g / w i k i / premarital_sex#cite_note-4&5).

In a study conducted in the United States, 61 percent of men and 12 percent of women born prior to 1910 admitted to having premarital sex; the gender disparity may have been caused by cultural norms regarding the admission of sexual activity or by men frequenting prostitutes. Starting in the 1920s, and especially after World War II, premarital sex became more common; this was especially prevalent among women. This has been attributed to numerous causes, including the increasing median age at marriage and the widespread availability of efficient contraceptives (http:/en.wikipedia.org/ wiki/premarital_sex#cite_note, sex_and_society).

A 1938 survey of American college students found that 52% of men and 24% of women had had sex. 37% of women were virgins but believed sex outside marriage was acceptable ((http:/ e n . w i k i p e d i a . o r g / w i k i / p r e m a r i t a l _ s e x # c i t e _ n o t e - l i f e - 1938060666-15).

Beginning in the 1950s, the stigma attached to pre-marital sex diminished. Love began to become enough for a reason to practice sex, instead of marriage or engagement. By 2000, roughly a third of couples in the United States had lived together prior to marriage. Premarital sex has become, if not acceptable, tolerable. (http:/ e n . w i k i p e d i a . o r g / w i k i / premarital_sex#cite_note,footnote_ sex_and_society_663).

In a 2005 Kaiser Family Foundation study of US teenagers, 29% of teens reported feeling pressure to have sex, 33% of sexually active teens reported "being in a relationship where they felt things were moving too fast sexually", and 24% had "done something sexual they didn't really want to do" (http:/ e n . w i k i p e d i a . o r g / w i k i / premarital_sex#cite_note-kaiser-16) Several polls have indicated peer pressure as a factor in encouraging both girls and boys to have sex. (http:/ e n . w i k i p e d i a . o r g / w i k i / premarital_sex#cite_note-pollingdata-17).

According to the 2003 Australian Study of Health and Relationships conducted by La Trobe University, "over three quarters of men and women agreed that premarital sex is acceptable. There was little difference between men and women. (http:/en.wikipedia.org/ wiki/premarital_sex#cite_note-27).

By 2011, a survey of 500 parents found 80 per cent thought sex before marriage was acceptable. "The survey, which was conducted by TV station SBS, also found almost one in five parents thought it was acceptable for young people to start having sex at age 16 (http:/en.wikipedia.org/wiki/ premarital_sex#cite_note-28).

By 2007, according to a Roman Catholic website, "France has probably the highest rate of premarital sex by age 20 of any country in the world: 72% or almost three quarters of the young population indulged in pre-marital sex. (http:/en.wikipedia.org/wiki/ premarital_sex#cite_note-31).

The study conducted by Szeman (1985) showed that in Hungary a village had been characterized by the double standard view much on the role of men and as such the women are prohibited to engage in any type of sexual relationship prior to marriage. Szeman (1985) continued that this outlook has been affected through the exceptionally strong family socialization. Furthermore, the study has supported the assumption that despite the liberalization trend that is general in Hungary, there are still differences in the pre-marital sexual pattern from one region to the next, and there are particularly marked differences between rural and urban areas (Szeman, 1985).

Harding and Jencks, (2003) declared that since the early 1960s there has been a sharp increase in liberal attitudes toward premarital sex. Liberalism increased within most groups of people in1969; however, they have observed that in the 1970s with the new group of 18-year-olds, there is no clear trend of liberalism. Leyson (n.d.) impliedly agrees what was declared by Harding et al., (2003) when he stipulated in his paper that currently the sexual attitudes of the people are more liberal. Nevertheless, Harding et al. (2003) stated that the group of individuals having the age of over 30 shows

conservatism.

In 1989, 15% of women in Beijing engaged in premarital sex against 2013 where between 60% and 70% had done so. Chinese Academy of Social Sciences professor Li states that this shows an increase in the types of relationships amongst new generations in China. While several factors have been responsible for the increase, these figures were associated with the equally increasing trend of a growing educated generation of women who are foregoing or delaying marriage in lieu of further education, their careers, and personal independence. (http:/en.wikipedia.org/wiki/premarital_sex#cite_note-BW-40).

In the study conducted by Zablan (1994) revealed that 18 percent of Filipino youths approved premarital sex, 80 percent disapproved, and 2 percent were neutral (as cited in Leyson, n.d.). According to the World Bank, the Philippines are among the top ten countries where there are an increasing number of teenage mothers (Ong, 2009). Overseas Filipino Workers (OFWs) are present in North America or European countries and they noticed that there is widespread premarital sex among adolescents in their respective place. They learned that chastity is not important to them for they consider this as old-fashioned virtue. This the reason why OFWs especially mothers are praying deeply that their daughters and sons will continue to value chastity and do not follow what the Western societies are doing (Villegas, 2011).

In India more than 95% of population didn't accept premarital sex and most of the societies in India were restrict the people to stay in live in relationship. (http:/en.wikipedia.org/wiki/premarital_sex#cite_note, footnote_sex_and_society_663).

So far as Mizoram is concerned it appears that there is no such proper studied on pre-marital sex attitude and therefore, in light of the above literatures across different countries pre-marital sex is one of the most important issues to be discussed in Mizoram as understanding of one's sexual behavior and attitudes are deeply related with social norms, religious practices and developments among many other factors. Therefore, present study emphasis on attitude towards pre-marital sex among students of Mizoram University as it is expected that educated people moulded with modern liberal ideas compounded by western influence may be freer than older generations.

Research Questions

There is a general opinion that today's generations are comparatively more liberal than their old counter-folk pertaining to pre-marital sex. Present study question that how far this general perception is true in the context of Mizoram by examining and analyzing information collected from students of Mizoram University toward their attitude on pre-marital sex.

Data and Methods

To answer the above research question 170 questionnaires have been prepared to know attitude of university students towards pre-marital sex. Questions have been asked to students of different departments randomly and most of them from social streams rather than physical sciences. Interviews were conducted to students across ages, married and unmarried so as to understand attitudes towards pre-

marital sex of different age groups. Students are of different ages ranging from 19 years to 48 years as it includes research scholars.

Questions covered age, sex, marital status, rural or urban background of student, religion, attitude towards premarital-sex and under which situation lovers agree to indulge in pre-marital sex, degree of liberty on virginity for their partner, opinion on 'love or arrange marriage' and which one is 'according to them' more prevalent today. For present paper it was limited to attitudes towards pre-marital sex and excluding virginity and opinion on marriage.

After collecting all the required information data has been enter and tabulated in excel for further calculations. A simple mathematical technique of percentage calculation and variations of opinion on premarital sex based on backgrounds of the students is done.

Objectives

1. To understand the general attitude towards pre-marital sex among educated students of Mizoram University
2. To examine how far it is true to the general opinion that 'today's generations are more liberal and open on the issues of pre-marital sex.
3. To study that 'is there any background influence of the students on their attitude towards pre-marital sex
4. To compare male-female attitudes towards pre-marital sex for to understand 'which sex is more liberal' than the other.

Limitations

Present study has certain limitation and weaknesses on the following points-

1. Since this is a pilot survey the study covered only 170 students to represent 1000 students of Mizoram University (17%) and it would be better to ask the opinion of more students to obtain more authentic results.
2. The coverage of questionnaires was not sufficient as it streamline only on certain determining factors like background and age. It would be better to ask more detail questions relating to pre-marital sex and associated factors involved in the formation of one's attitude.
3. Since the topic is sensitive that there is a gap between what students report and what they are actually willing to do is different. Even though name of the interviewee is not asked to protect their identity still some students seem not true to their minds that seems cause to incongruous results.
4. Another weaknesses of the study is that there is no empirical study about pre-marital sex in Mizoram in the past to compare with present study this hamper the study pertaining to temporal analysis.

Disscussion

General Information of the Interviewees

Present discussion highlights the general information of students/ research scholars of Mizoram University particularly on sex, marital status, religion and rural or urban background. As many as 170 students of different sexes, married and unmarried, various

religious faiths and of different backgrounds were interviewed. As shown in table-1, of 170 students 84 (49%) were male students and 86 (50.6%) were female. Majority of the students interviewed were unmarried (120 or 70.6%) while a good number of them (50 or 29.4%) were married students.

Table-1. General information of interviewees		Total	%
Sex	Male	84	49.4
	Female	86	50.6
Marital Status	Married	50	29.4
	Unmarried	120	70.6
Religion	Christian	145	85.3
	Hindu	25	14.7
Background	Rural	51	30
	Urban	101	59.4
	Both	18	10.6

Source: Survey conducted by authors during May-June, 2014

Regarding religion, as many as 145 or 85.3% students embraced Christianity whereas 25 or 14.7% belongs to Hindu religion and there was no report of other religious faiths among the interviewees. Table-1 displays that majority of the students (101 or 59.4%) were having urban background while 51 or 30% students coming from rural areas and 18 or 10.6% reported having both rural and urban backgrounds.

General attitude towards Pre-marital Sex

This section examines the general attitudes of both sexes of different backgrounds on the issue of pre-marital sex. This is an attempt to milk-out the degree of liberty and openness of educated University students pertaining to pre-marital sex.

As shown in table-2, out of 170 odd students a few of the i.e 50 or 29.4% agreed that pre-marital sex is acceptable 'if lovers' are willing while as many as 120 or 70.6% disagreed at all. The number of students slightly increased when asked on 'if lovers really love each other' pre-marital sex is acceptable with 58 or 34.1% agreed on it while a large chunk of 112 or 65.9% students remain conservative by disagreeing even if lovers are really love each other. It is interesting to note that the same numbers of student agreed and disagreed on the questions of 'if lovers are going to marry' (table-2).

Table-2. Under what conditions Pre-marital Sex is condone				
Attitude on Pre-marital Sex	Agree	%	Not Agree	%
If lovers are willing	50	29.4	120	70.6
If they really love each other	58	34.1	112	65.9
If they are going to marry	58	34.1	112	65.9
If they are mature	47	27.6	123	72.4
If women can prevent from pregnant	40	23.5	130	76.5
Average	50.6	29.8	119	70

Source: Survey conducted by authors during May-June, 2014

Number of student who accepted pre-marital sex on the question of 'if lovers are mature' decreased to 47 or 27.6% while 123 or 72.4% disagreed on the same. Again, the proportion of students agree upon pre-marital sex on the ground of 'if women can prevent from pregnant' decreased to 40 or 23.5% whereas as many as 130 or 76.5% disagreed on it.

Thus, it can be concluded that only a little over one-fourth (29.8%) of Mizoram University students agreed upon lovers' indulged in pre-marital sex based on certain grounds whereas a fairly high proportion i.e 70 % still conservative on the issue of premarital sex. This clearly clarify the general perception of 'today's generations are more liberal on pre-marital sex' is not completely true.

Influence of Background on the attitude of pre-marital sex

Present section focus on influence of background of students on their attitude towards pre-marital sex. There is a

general opinion that people living in urban areas are more liberal, open and broad minded in their world view. In light of this common attitude test has been conducted here to prove or disprove the statement. Table-6 to 10 shows the opinion of students having different backgrounds like student who are coming from rural, from urban and those who are having a both rural and urban background.

Table-6. Under what condition Pre-marital sex is condone

If lovers are willing-		Agree	%	Disagree	%	Total
Background	Urban	33	32.7	68	67.3	101
	Rural	14	27.5	37	72.5	51
	Both	5	27.8	13	72.2	18

Source: Survey conducted by authors during May-June, 2014

Out of 101 students having urban background 33 or 32.7% reported that pre-marital sex is acceptable 'if lovers are willing' while majority i.e 68 or 67.3% disagreed on the same. Out of 51 students having rural background 14 or 27.5% reported of agreeing pre-marital sex 'if lovers are willing' while as many as 37 or 72.5% do not agree at all. Those students attaining both 'rural and urban background' reported that 5 or 27.8% agreed on pre-marital sex 'if lovers are willing while majority of them i.e. 13 or 72.2% disagreed on the same.

Table-7 shows that out of 101 students coming from urban areas 36 or 35.6% reported to agree pre-marital sex 'if lovers are really love each other' but more number of students i.e 65 or 64.4% disagree on the same condition.

Table-7. Under what condition Pre-marital sex is condone

If they really love each other		Agree	%	Disagree	%	Total
Background	Urban	36	35.6	65	64.4	101
	Rural	14	27.5	37	72.5	51
	Both	9	50.0	9	50.0	18

Source: Survey conducted by authors during May-June, 2014

Out of 51 students coming from rural areas 14 or 27.5% agreed pre-marital sex between lovers 'if they really love each other'. It is interesting to note that those students attaining both rural and urban background are the most liberal as 9 or 50% of them agreed on pre-marital sex 'if lovers are really love each other' while another half disagree on the same.

Table-8 shows the result of another criteria test on students based on their backgrounds. 37 or 36.6% urban students can condone pre-marital sex 'if lovers are going to get married' whereas majority of them i.e 64 or 63.4% disagreed on the same.

Table-8. Under what condition Pre-marital sex is condone

If they are going to marry		Agree	%	Disagree	%	Total
Background	Urban	37	36.6	64	63.4	101
	Rural	17	33.3	34	66.7	51
	Both	7	38.9	11	61.1	18

Source: Survey conducted by authors during May-June, 2014

Comparatively lesser number of students coming from rural areas i.e 17 or 33.3% agreed on pre-marital sex 'if lovers are going to get married' while 34 or 66.7% of them are not approved pre-marital sex even if lovers are going to get married. Another interesting finding is that students having both rural and urban background are most liberal as 7 or 38.9% of them agreed pre-marital sex ' if lovers are going to get married' while a good number i.e 11 or 61.1% of them still conservative on the same.

Another criteria set forth to test impact of background on attitude towards pre-marital sex is 'if lovers are mature'. Out of 101 urban students 31 or 30.7% agreed pre-marital sex 'if lovers are mature' whereas as many as 70 or

69.3% students disagreed on the same (table-9).

Table-9. Under what condition Pre-marital sex is condone

If they are mature		Agree	%	Disagree	%	Total
Background	Urban	31	30.7	70	69.3	101
	Rural	13	25.5	38	74.5	51
	Both	5	27.8	13	72.2	18

Source: Survey conducted by authors during May-June, 2014

Out of 51 students having rural background 13 or 25.5% reported to agreed pre-marital sex 'if lovers are mature' while majority i.e 38 or 74.5% disagreed on the same. Out of 18 students having both rural and urban background 5 or 27.8% agreed that pre-marital sex is acceptable 'if lovers are mature' while 13 or 72.2% disagreed on it (table-9).

Table-10 reveals that 25 or 24.75% students coming from urban areas agreed on pre-marital sex 'if women can prevent from pregnant' whereas a huge proportion of 76 or 75.2% reported disagreed on the same condition.

Table-10. Under what condition Pre-marital sex is condone

If women can prevent from pregnant		Agree	%	Disagree	%	Total
Background	Urban	25	24.75	76	75.2	101
	Rural	7	13.73	44	86.3	51
	Both	5	27.78	13	72.2	18

Source: Survey conducted by authors during May-June, 2014

Out of 51 students of rural origin merely 7 or 13.73% agreed pre-marital sex 'if women can prevent from pregnant' while an overwhelming number of 44 or 86.3% disagreed on the same condition. And again for the third time students having both rural and urban background are most liberal as 5 or 27.78% students agreed pre-marital sex 'if women can prevent from pregnant' while a large proportion of 13 or 72.2% disagree on it.

It can be concluded that among the three category of students' i.e urban background, rural background and both backgrounds students having both rural and urban background are most liberal on pre-marital sex issues followed by student having urban background and students coming from rural areas are least liberal or conservatives.

Table-11. Ranking in based on background of the students who are liberal on pre-marital Sex

Attitude on Pre-marital Sex	Agreed based on %		
Conditions	Urban Rank	Rural Rank	Both Rank
If lovers are willing	1	3	2
If they really love each other	2	3	1
If they are going to marry	2	3	1
If they are mature	1	3	2
If women can prevent from pregnant	2	3	1
Rank	Liberal	Conservative	Most Liberal

Comparative analysis on Male-Female attitude towards Pre-marital sex Table -15 shows that opinion of male students and female students on their attitude towards pre-marital sex on the condition of 'if lovers are willing'. It is interesting to find that male-students are more liberal than their female counterpart. Out of 84 male students interviewed 34 or 40.5% agreed pre-marital sex 'if lovers are willing' while only 16 or 18.6% agreed on the same condition in case of female students.

Table-15. Under what condition Pre-marital sex is condone

If lovers are willing					
Sex	Agree	%	Disagree	%	Total
Male	34	40.5	50	59.5	84
Female	16	18.6	70	81.4	86

Source: Survey conducted by authors during May-June, 2014

However, the proportion of 'disagree' students on the same condition is enormously higher than 'agree' students. A good number of 50 or 59.5% male students 'disagree' on pre-marital sex even 'if lovers are willing' while as many as 70 or 81.4% female students 'disapprove' pre-marital sex on the same ground.

Table-16 also tries to test the attitude of students towards pre-marital sex on another condition of 'if they (lovers)

really love each other. In correspondence with the above results male students are more liberal than female students as 35 or 41% male students reported that 'if lovers are really love each other' pre-marital sex should be accepted while 22 or 25.6% in case of female students who agreed on the same ground.

Table-16. Under what condition Pre-marital sex is condone				
If they really love each other				
Sex	Agree	%	Disagree	%
Male	35	41.7	49	58.3
Female	22	25.6	64	74.4

Source: Survey conducted by authors during May-June, 2014

Numbers of disagreement are higher in both male and female students. 49 or 58.3% male students 'disagree' to have pre-marital sex even 'if lovers are really love each other' while higher proportion of female students i.e 64 or 74.4% 'disagree' on the same situation.

Another option has been offered to students to understand their attitude towards pre-marital sex is that 'if lovers are going to marry'. Table-17 clearly shows that the proportion who 'agree' is higher in case of male students than female i.e 45.2% versus 20.9% while proportion of 'disagree' also higher for male student compared to female students i.e. 54.8% versus 79.1%.

Table-17. Under what condition Pre-marital sex is condone				
If they are going to marry				
Sex	Agree	%	Disagree	%
Male	38	45.2	46	54.8
Female	18	20.9	68	79.1

Source: Survey conducted by authors during May-June, 2014

Out of 84 male students 86 female students 32.1% male and 22.1% female students agreed that pre-marital sex should be condoned 'if lovers are mature' enough while larger proportion of 67.9% male and 77.9% female students 'disagree' on the same (table-18).

Table-18. Under what condition Pre-marital sex is condone				
If they are mature				
Sex	Agree	%	Disagree	%
Male	27	32.1	57	67.9
Female	19	22.1	67	77.9

Source: Survey conducted by authors during May-June, 2014

Among the list of options given to Mizoram University students those who 'agreed' pre-marital sex on 'if women can prevent from pregnant' scored the lowest with 31% male student versus only 12.8% female students. 69% male and as many as 87.2% female students 'disagreed' on the same (table-19).

Table-19. Under what condition Pre-marital sex is condone				
If women can prevent from pregnant				
Sex	Agree	%	Disagree	%
Male	26	31.0	58	69.0
Female	11	12.8	75	87.2

Source: Survey conducted by authors during May-June, 2014

Findings and Conclusion

Overall analysis reveals that a little over one-fourth (29.8%) of Mizoram University students agreed upon lovers' indulged in pre-marital sex based on certain grounds whereas a fairly high proportion i.e 70 % still conservative on the issue of premarital sex. This clearly clarify the general perception of 'today's generations are more liberal on pre-marital sex' seems true but might not be as high as presumption.

Analysis based on background of the University students shows that students having both rural and urban background are most liberal on pre-marital sex issues followed by student having urban background and students coming from rural areas are the least liberal or most conservatives.

However, students having 'rural' background cherished 'love' more than students having 'urban' background and 'both' backgrounds.

Analysis on attitude differences between male and female students, it can be concluded that female are persistently more conservative than their male counterpart in all parameters relating to pre-marital sex. Among the indicators of attitude test on premarital sex 'if lovers are going to marriage' become the most acceptable excuse among male students (45%) while 'if lovers are really love each other' become the most permissible excuse for female students (25%).

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Geopolitical Situation in Manipur: An Appraisal

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Abstract *: The present study examines the fundamental concepts related to geo--political situation of Manipur based on its historical evolution and socio-political structure . The analysis has been undertaken with reference to the existing theories on development of a geo-strategically important region and establishes causal links between domestic problems and international conflicts in relation to India's security. The study aims to find out the internal elements of Manipur leading to security crisis and seeks the possible ways of solution understanding the political limitations viz a viz the whole geographical setup of the state.*

Introduction

Manipur has been undergoing a political crisis with the Indian Union since it's merge red to the later in the year 1949. As the conflict remains protracted till today, it is so complex that the solution in one matter doesn't mitigate the core issue. So, a holistic study of some of the prioritized problems needs to be understood and analyzed so as to bring the state of Manipur in a better developmental condition in harmony. The questions that the developmental works can go along in this kind of political turmoil and further can be looked into from multi-dimensional angles. Geography and history were part of a larger whole of the problems.

The socio-political problems facing today had the outcomes of the historical and geographical situation of Manipur. The theoretical approach captures the historical trajectory of Manipur but does not fully explain the present situation of conflict. As far as the civilization trajectory is concerned, Manipur which had an almost uninterrupted political history from 33 AD as an independent kingdom was in a position to choose its allies in terms of trade and commerce and others. At the same time, the state was centre in itself as far as its cultural practices and others are concerned. This independence status ended in 1891 after Manipur became a colony of the British under its imperialist expansion. After the departure of the British and when Manipur was merged with India, she became a border state, and her territorial integrity is at stake. The age old bondage of love and peaceful co-existence of all the different ethnic groups started breaking up with no point of turning back. For instance, the internal conflicts between different ethnic groups have come up and the fault line between hill and valley is widening.

Manipur being a sub-state after her merger with the Indian Union lost its independent decision making capacities. At the same time the policies and programme of the Indian government has never been so consistent. As with all political theories, geostrategies are relevant principally to the context in which they were devised:

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the nationality of the strategist, the strength of his or her country's resources, the scope of his or her country's goals, the political geography of the time period, and the technological factors that affect military, political, economic, and cultural engagement. The trust of the common people to both the state and central government has gone and the feeling of step-motherly treatment aroused. People felt that the geopolitical advantages of Manipur were misused by the Central government.

Geopolitical Issues

Geopolitics is an overall method of geographical analysis of concrete socio-political situations viewed as localised and the usual representations which describe them. It determines the geographical coordinates of a situation and socio-political process. Coordinates refers does not with geographical 'data' per se but to the internal and external factors of a situation that impinges on the nature of politics and other socio-economic conditions that is bound to unfold in the course of history (Foucher, 2000).

The epistemological problem posed is that of thought made up of heterogeneous and discontinuous elements, for the internal and the external are not of the same 'nature'. It might therefore be considered that geopolitical reasoning seeks to discover the relationships, which connect isolated geographical facts. The case is aptly true regarding India's security dilemmas and in forging the relationship with neighboring countries such as China, Bhutan, Nepal, Myanmar, Bangladesh, etc. with respect to the conflict ridden North-Eastern states particularly Manipur. Although India follows the principle of Panchsheel with respect to her neighboring forging a sound relationship with the above mentioned countries underwent moments of ups and downs as India suspected (in many instances true) these countries to be supporting the centrifugal forces in Northeastern states in terms of arms, logistics, training and sanctuary, etc. But after the end of the Cold War and paradigm shift occurring at the global geo-political landscape, and specially after India underwent structural adjustment programmes in the early 1990s, she also started forging better ties with the neighboring countries, with the exception of Pakistan, in terms of trade and security. Formation of regional trading and security blocs such as Bangladesh, India, Myanmar, Sri Lanka and Thailand Economic Cooperation (BIMSTEC), and Bilateral Trade relationship with countries like Myanmar although India refrained from having a bilateral relationship with Myanmar on account of its military rule and support.

Manipur had always occupied central strategic position right from British imperial expansion into the region because of the former's location and status of a regional power. Geopolitics of imperial powers coupled with strategic location, even to armed rebels in the Northeast and India's Look East Policy are notable moves. Such recent moves can be explained in terms of theoretical elaboration given by Michel Foucher. He stresses:

The essence of strategic reasoning is the choice of routes for a movement depending on the configurations encountered and the hierarchical

organization of decision-making and means, and/or the choice of measures which make it possible to oppose enemy movements, that is, localised threats. It is based on a reading, not of maps but of routes, possible or probable transport lines. Yet any movement implies a differentiation in the use of space (Foucher, 2000).

The moves in terms of forging trade and security ties are dictated by strategic reasoning on the part of India. In such moves the physicality of Manipur as a land bridge between South Asia and South East Asia becomes a compulsory component thus, proving its geo-strategic location, although earlier and continues to be a localised threat to India's internal security. So in order to bring an acceptable solution, there is need to explore the geopolitical setting of Manipur, the demands of the people, external linkages and the central government's policies towards the state of Manipur.

Geo-political Setting of Manipur

With a total area of 22,327 Sq.Km. present day Manipur is divided between Hills and valley. The valley account for only of 2238 Sq.Km. that is only 10.02 per cent of total area that represents 58.85 per cent of the total population of state, which is 27,21,756 (2011 Census). The hill areas with 20089 Sq.Km. represent 41.156 per cent of population. With about 350 Km. of international border with Burma (Now Myanmar) Manipur is bounded by upper Burma in east, Chin Hills of Burma in southeast, Nagaland in north, Mizoram in south and southwest and Assam in west. The state is presently having nine administrative districts including five in hills namely Churachandpur, Ukhrul, Chandel, Tamenglong and Senapati and four in valley which includes Imphal East, Imphal West, Bishenpur and Thoubal.
The arrival of British brought about major changes in the boundary of Manipur, thus undermining its own notion of geopolitics. For example, the Kabaw Valley became a part of Burma officially in 1834 in return of compensation. Regarding the Kabaw Valley, Sir R Temple said, "Then there came some territorial adjustment of the Eastern frontier of the Kingdom of Upper Burma, and we actually had to arrange for a small transfer of territory from Manipur to Burma in consideration of which the Maharaja was glad to receive a small sum per annum in rupees" (Sanajaoba, 1993). Secondly, in 1834 it was declared by the Governor General and the Supreme Council of Hindoostan, "With regard to the two ranges of hills the one called the Kalanaga Range, and the other called the Noonjai Range, which are situated between the eastern bend of the Barak, and the western bend of the Barak, we will give up all claim on the part of the honourable Company thereunto, and give him (the King) the line of the Jiri and the western bend of the Barak as a boundary, provided that the Rajah agrees to the whole of what is written in this paper which is given in the agreement between Rajah Gumbhir singh and Commissioner F. J. Grant in the year 1835 (Sanajaoba, 1993).

The Marquess of Ripon, in rising to call attention to the papers relating to the affairs of Manipur lately laid before the house, and referring to the state of Manipur, he said " it is a small state probably until these events took place very little known to your Lordships, unless, indeed, some of you may have heard of it as the birthplace of the game

of Polo; but it is a protected state, which has been under our protection for a considerable time, and where we have had for long a political Agent to represent us. In the year 1851 the Government of India took a step , in guaranteeing the then Maharaja in the possession of his state, which made somewhat closer our connection with that state than it had before" (Proceedings of the House of lords on Manipur, 1891, quoted in Sanajaoba, 1993).

Finally, according to the Pemberton Report in 1935, the territory of Muneepoorwas declaraed to lie the routes leading from the districts of Sylhet and Cachar to the Ningthee river, and central portion of the northern province of Ava . The territory comprised within the boundaries thus specified, occupies an area of 7000 square miles, of which a valley of 650 miles of rich alluvial soil, constitute the central portion; the remainder is formed by an encircling zone of hilly and mountainous country inhabited by various tribes, who have all been brought under subjection to the paramount authority of Muneepoor (Proceedings of the House of lords on Manipur, 1891, quoted in Sanajaoba, 1993).

Geographical understanding of politics in the world today or the phrase 'world polities' conveys a sense of a geographical scale beyond that of any particular state or a locality in which states and other actors come together to engage in a number of activities. This includes diplomacy, military action, aid, fiscal and monetary activities, legal regulation, charitable acts, etc. that are intended to influence others and extend the power of the particular actors who engage in them. But the activities also rest on more specific geographical assumptions about where best to act and why this makes sense. Thus, the world is actively 'spatialised,' divided up, labeled, sorted out into a hierarchy of places of greater or lesser 'importance' by political geographers, other academics and political leaders. This process provides the geographical framing within which political élites and mass publics act in the world in pursuit of their own identities and interests (Agnew John, 1998) played a pivotal role in shaping the history Manipur. Commercial factors and geo-strategic consideration were of paramount elements that informed the British policy toward the erstwhile independent Manipur. Recognizing, the strategic significance of Manipur, the British on the eve of the Anglo-Burmese War in 1824 "decided to establish Manipur as an independent buffer state between Burma and the British India in North to make British interests more conducive". The British declared war against Burma on 4th March 1824. There was convergence of interest between Manipur and British against the common enemy (sic Burma) that Manipur Levy of 500 strong soldiers under Gambheer Singh and Nara Singh fought the invading Burmese along with British soldiers (Jhaljit, R.K. 2009).

In the 20th century, the strategic importance of Manipur became all the more evident, when looked against the backdrop of imperial powers colonization of South and South East Asia. More precisely, the Battle of Imphal, highlights the strategic importance of Manipur with regard to the geopolitics of imperial powers such as British and Japan. No other factor has produced so compelling and determining impacts on

the political history of Manipur than its geo-strategic location. Geographically, Manipur, as well as the so-called the North-East presented a buffer zone between Indian sub-continent and South-East Asia. In political sense, the region acted as the interface between the imperial powers that were consolidating and expanding their sphere of domination on and across the interface. Though Manipur was never a geopolitical player by itself, she occupied a crucial site in the geopolitics of opposing powers. Because of the geo-strategic location of Manipur, one of the bloodiest chapters in the history of World War II, perhaps took place there. Moreover, it can be mentioned here that British's competition with the France and Netherlands later on with Japan for the possession, consolidation and defense of their colonies in South-East Asia had put Manipur into central stage of British and Japanese geopolitical thinkers particularly during the Second World War period. In the post Cold War era, the geopolitical strategic importance of Manipur has been recognized by India: from that of land lock and border state to that of a land of golden opportunity connecting South Asia and South East Asia in India's Look East Policy (Chatterjee, 2009).

After the end of British suzerainty, Manipur enjoyed a brief period of independence in terms of putting in place a democratic constitution with the monarch as the constitutional head of the state, and holding of a democratic general elections based on the principles of adult franchise. However, merger with the Indian Union resulted in the suspension of the sovereignty of the erstwhile ancient kingdom. The emergence of armed opposition movement is, today, understood to be on account of the forced annexation of Manipur in 1949. Since then, the armed movement for restoration of sovereignty and self-determination has been the scourge of Manipur and disturbing the neighbouring regions. Insurgency centres around not only on historical and cultural configurations but also on the centrality of geopolitical imagination both by the non-state actors and the Indian State itself. In other words, understanding insurgency problems from the perspective of geopolitics can help in bringing about a lasting solution and peace in the state.

Constitutional and Extra-constitutional Demands

Misunderstanding that informs centre-state relationship as well as the lack of awareness of the interest of Manipur and North East leads to a political conflicts leading to societal breakdown. Two types of local demands mark the situation of crisis in Manipur against the Indian state. One is constitutional in the sense that these demands are implicit provisions of the constitution of India. Constitutional demands taken into account in the study includes statehood movement, inclusion of Manipuri in the 8th Schedule of the Indian constitution and autonomous movements in the form of demands for separate districts and inclusion of hill areas in the 6th Schedule of the Indian Constitution. As far as the constitutional movements are concerned, the Indian State took years to address the genuine demands of the people. Moreover, the demands for autonomous status such as inclusion in the 6th Schedule remains unanswered, thereby, heightening the anger of the people. One common

characteristic is that other than fire-fighting the demands of the people, no political efforts have been undertaken to address the concerns of the people. The other form of local demands circulating in Manipur are the separatist movements or movement for sovereignty (Naorem, Joykumar, 2005), which can said to be extra-constitutional. During colonial times, except for the states of Manipur, Tripura and Sikkim, the remaining areas of Northeast India formed parts of the erstwhile British province of Assam. In post-independent period of India, however, different kinds of tribal and non-tribal nationalisms have emerged in the region. In Manipur, several forms of nationalism are seen in different times. Among some Meitei intelligentsia and extremist groups, secessionist nationalism was and continued to be seen ever since the merger of Manipur with Indian Union. Once a powerful kingdom, Manipur comprises three culturally diverse ethnic communities: (a) the non-tribal Meitei community constituting more than 50 per cent, (b) the Naga tribes forming 25 per cent, and (c) the Kuki-Chin tribes accounting for 15 per cent of the population. The majority Meitei people are located in the Imphal valley region and the Naga and Kuki tribes dominate the hill areas of the state. Since 1960 the majority Meitei people are debarred from buying and owning land in the tribal dominated hill areas of the state. The anti-merger sentiment, on the one hand, and the cultural differences of the inhabitants and the economic disadvantage imposed on the Meiteis, on the other, provided a viable platform for secessionist nationalism to grow among the Meiteis in Manipur.

The insurgency movement carries the threat of destabilizing India's boundary as well as security. Underscoring this fact, from time to the Government of India has entered into bilateral relations with the neighboring countries to combat insurgency. However, so far, there have been no political initiatives to end the tragic situation.

The political movements in Manipur within the category stated above, constitutional and extra-constitutional and see how it has affected the national interest of the country. In the first category, we group the demand for statehood, inclusion of the Manipuri language in the eight Schedule of the Indian constitution, demand for the sixth schedule and the Sardar Hills Autonomous District Council. Within the category of the extra-constitutional movements, which directly challenges the sovereignty and the national security of the India, we examine the armed opposition movements or the separatist movements for sovereignty. What we often encounter in the context of Northeast is that the Indian ruling class, through executing terror tactics and unjust policies, often attempts to silence the genuine demands of the people. Inability of the Indian State or the concerned authority is responsible for the prevailing state of law and order problem in the region. Political maneuvering and use of military forces to solve many of the problems has added to misery of the people.

Critical Interpretation of External Factors

One understanding is that the anti

social elements or demands for sovereignty more than 50 per cent, (b) the Naga tribes forming 25 per cent, and (c) the Kuki-Chin tribes accounting for 15 per cent of the population. The majority Meitei people are located in the Imphal valley region and the Naga and Kuki tribes dominate the hill areas of the state. Since 1960 the majority Meitei people are debarred from buying and owning land in the tribal dominated hill areas of the state. The anti-merger sentiment, on the one hand, and the cultural differences of the inhabitants and the economic disadvantage imposed on the Meiteis, on the other, provided a viable platform for secessionist nationalism to grow among the Meiteis in Manipur.

The insurgency movement carries the threat of destabilizing India's boundary as well as security. Underscoring this fact, from time to the Government of India has entered into bilateral relations with the neighboring countries to combat insurgency. However, so far, there have been no political initiatives to end the tragic situation are being aided by the foreign countries (Kumar, Anand, 2010). To begin with, almost every insurgent movement in the northeast received help from China (Huyien Lanpao, 2014). For example, NSCN as well as PLA had received armed and guerilla warfare training from China at the time of their inceptions. Besides, political regimes in both Bangladesh and Pakistan have given open support to insurgents in the Northeast. Many of the training camps of the insurgents are in Bangladesh and Myanmar. The drive against the insurgents in these countries are of recent origin and in the case of Bangladesh, the situation depends on which political party comes to power. At present there is a India-friendly government in Bangladesh, and helping the Indian forces to push out insurgents from its soil. Arrest of RK Meghen and ULFA leaders are cases in point (Yenning, 2010).

In addition to the insurgents movements, the changing global space after the end of cold war, also added to the emergence of Northeast region in global prominence. Liberalization and globalization, which India undertook in the early 1990s are also responsible for the change in perception about the region. India's look east policy, a policy that aims at capturing the market of the South East Asia as well as bolster trade are evident cases. The reality of the geo-strategic importance of the region crops up here. In order to capitalize on the unfolding scenario, India has undertaken to open up border trade between Myanmar and Manipur, a primary step in relation with catapulting India's and at ASEAN, , India the same time is undertaking to lay down the Trans-Asian Highway passing through Manipur. The only concern is if these endeavors remain to benefit the needs and aspirations of the common people. As statistics show, there has been no improvement in the border trade between Myanmar and Manipur, but the overall sea trade between these two countries has witnessed an upward escalation in the few decades.

India's Policies Towards Manipur

In the face of multifarious demands, one pertinent issue that arises is whether, policies and developmental packages formulated by the Government of India are in response to the peoples' demand or the Government of India

takes advanced initiative for the development of the state. In order to discern this complex issue a quantitative analysis of the development funds for various heads needs to be undertaken right from Manipur was granted statehood. Another fact is that Manipur is totally dependent on the Central Government for its financial survival. In other words, Manipur survives on grants received from India. However, as far as her development is concerned, all its development are crafted from outside by so called experts without taking into account the local specific needs. This external factor is equally responsible for its backwardness. Official estimate revealed a yield of 4,959 Kg per hectare on the average, which ironically is not much below the yield in post-Green Revolution Manipur. Even on the eve of centralized economic planning (1951), rice yield in Manipur Valley was 1,422 Kg per hectare compared to all India's 714 Kg per hectare (Chongtham 2005). The claim that there was self sufficiency of rice in pre merger status of Manipur but it is not so today need to question the role of policy makers.

As far as the question regarding if the Government of India frames policies and packages with regard to needs of the people, the blame cannot be entirely placed on the central government. Rather, the failure is on the part of the state government as she fails to communicate squarely on the needs of the people. The federal structure of the Indian polity has been time and again by-passed, when issues related with the state is concerned and when there are demands from certain sections of the society, Government of India directly deals with them without taking into confidence the state government. The policy of neglecting the productive base of economy, inherited from the British policy of treatment of the state as part of a 'frontier', still continues. It connotes only strategic importance from the defense matrix of India (Konthoujam, 2006). The case of the Nagas' demand for a separate political arrangement is an enlightening one. In the entire process of secret talk between India and the NSCN-IM, the state government has been entirely sidelined. Only when talks are finalized, the Government of India directs the state government to follow its commands. Secondly, even when the Supreme Court of India has declared economic blockade a punishable crime, when there were economic blockades of the Highways, the blockades are not lifted until and unless, the Government of India enters into centre stage. These are unfortunate precedents for the Indian federalism as a whole in its working and procedure, and evidences that the Government of India has not responded to the genuine demands of the people.

Conclusion

A state as diverse as India, in terms of its ethnic composition, fauna and floral and physical setting, Manipur is marked by local demands of various kinds but which can be broadly categorized as constitutional and extra-constitutional. Constitutional demands have ranged from demand for statehood to granting of autonomy in the form of districts. As much as there are diverse ethnic groups, each group has voiced for autonomy in order to own the demarcated area and utilize the resources. Such demands often erupt into conflict that calls for genuine

political interventions. However, in the case of Manipur, almost every political demand has not been met with a political will. Instead, political expediency dictates over the genuineness of the demands. Sometimes, it takes years to reach the ears of the New Delhi about the problems engulfing Manipur under needless fire. Statehood demand, movement for inclusion of Manipuri to the 8th Schedule of the Indian Constitution, demand for 6th Schedule and demand to make the National Highways blockade free zones, etc. are evidences. In this regard, governments have failed to recognize the voice of the people.

The same also can be said about the extra or unconstitutional demands that have erupted in the form of movement for sovereignty. So far, there have been no concerted efforts to end insurgency in the state. The Indian State still favours to call the movements insurgency and the insurgents misguided unemployed youths without delving into the historical and political nature of the movements. Moreover, while there has been persistent movement for the removal of the Armed Forces Special Powers Act, the government of India has been silent. At the same time, one can say that with the inception of the Look East Policy, there have been efforts to develop the Northeast region, especially Manipur. However, the policy orientation is shrouded under security drives other than development. On the other side , the Chinese hegemony in the ASEAN gives a deep impact on governments and people of North East India.

In such a scenario, certain policy initiatives can be forwarded. Since Manipur occupies a geo-strategic position in terms of being the land bridge between South Asia and Southeast Asia, deserves investment and economic development rather than being a purely militaristic out-post. It is imperative for the Government of India to devise mechanisms to end the political conflict for prosperity and peace. Every demands need patient ears, solve the problems at the earliest instead of fostering a deep rooted problem over the years. Finally, policies should be made in consultation with the people with due respect for human security.

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Marketing Pattern of Squash and the Role of Growers Association of Mizoram

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Abstract *: Squash has been among the important cash crops of Mizoram cultivated with regular market opportunities in and outside the state. Unlike other commercial crops grown in the state, its marketing system is organized one following the effort of growers' association. Despite the unavailability of basic market infrastructure for its marketing, the crop shows efficient market characterized by competitiveness and market stability.*

Key words*: Organized Market, Iskut, Growers' Association, Market Stability and Efficiency.*

Introduction

Marketing of agricultural products include all activities, agencies, and prices involved in the procurement of farm inputs by the farmers and the movement of agricultural products from the farms to the consumers (Acharya and Agarwal 1987). It is a process which starts with a decision to produce a saleable farm commodity and involves all aspects of marketing structure or system both functional based on technical and economic consideration and includes pre- and post harvest operation, assembling, grading, storage, transportation, and distribution. It is general acceptance that production and marketing are the two sides of the same coin. Efficient marketing system transferred price signal arising at the consumers' level to the producers which in turn acts as price incentive for the producers to increase the production of the commodities. The presence of efficient physical and organized market function in agricultural market in the country would be conducive for the emergence of efficient agricultural market. The existence of a network of organized marketing functionaries is very crucial for many underdeveloped countries where there is lack of efficient physical infrastructure.

Agriculture occupies a very prominent place in the economy of Mizoram. As per the Economic Classification of Workers in 2001 Census, about 60 percent of the total workers are engaged in agriculture and allied sector. However, the state agriculture has been facing structural problems and of which minimal availability of physical market infrastructures vis-à-vis absence of organized marketing functions have been the serious lacuna for further development. In spite of it being agrarian since time immemorial, its commercialization had started only since the last few decades. At the same time, there is still no sufficient physical market infrastructure to cope with the growing marketable surplus. At this juncture, no one can overemphasize the importance of well organized marketing function to relief the suffering of farmers due to uncertainty on prices and marketing opportunities. To gauge this scenario, attempt is made in this paper to study the various aspects of squash marketing in the state.

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Cultivation of squash in Mizoram is known to have started with the coming of western Christian missionaries and locally it is named *Iskut*. Squash being a minor cucurbit was not cultivated extensively and was not a commercialized vegetable in other parts of the country at the time of its introduction in Mizoram. As it is a semi-perennial crop, the state was found to be an ideal place for its successful cultivation considering its soil and climatic conditions. There are different varieties of squash classified according to the fruits shape and colour, i.e. *Round white, Long white, Pointed green, Broad green and Oval green*. Normally, two types of green and other creamy green are grown in Bangalore and North Eastern region. A well-grown plant of about one year yields 500-600 fruits per year and each weight 200-450 grams; and it lasts for 3-4 years.

Extensive cultivation started only since the 1980's when farmers of Sihphir village initiated its cultivation for onward adoption to their permanent livelihood, as an alternative to unsustainable practice of jhumming. As of now, there are around 1200-1600 families engaged in its cultivation. These farmers are spread in the villages in and around Sihphir within Aizawl and Kolasib districts, viz. Sihphir Vengthar, Sihphir, Neihbawih, Lungdai, Serkhan, Nisapui and in other villages at smaller scale. Unfavourable climatic conditions in the neighboring state of Assam made its cultivation more attractive with potential marketing opportunities in Cachar district of Assam, like Karimganj, Silchar, Bagha, and Hailakandi. Thus, it is one of the most important crops grown and exported from Mizoram in huge quantities. To facilitate its marketing, a well organized NGO, named "Mizoram *Iskut* (Squash) Growers' Association" (MIGA) was formed in 1982 with its headquarters in Sihphir.

The rest of the paper is organized into different sections such as methodology of the study; growth of area and production; marketing channels and market stakeholders; seasonal conditions; market stability, market/ price information; role of MIGA in squash market and concluding observations.

Methodology

There are two main data sources-records of the state government's department and state agencies on the one hand, and sample survey on the other. The former is taken as secondary sources while the latter is primary source. Primary data have been collected using *cluster sampling method*. This method consists of the selection and identification of the cluster, and the selection of final sample from the selected cluster using suitable random sampling method.

Though squash is cultivated in an extensive ways as commercial crops among the farmers of Sihphir village and farmers in its neighboring villages, there is no area in the state which cultivates this crop in the scale as this area did till date. Accordingly, Sihphir Cluster appeared to be the only reasonable option for the selection of cluster. Further, there has been an active growers association, named MIGA, in place for the promotion and facilitation of cultivation and marketing respectively in this area. Member list of this association was simply adopted as sampling frame of our study, and

thus, a sample of farmers/growers were selected from this frame using simple random sampling method.

Growth of Area and Production

Table 1 presents the expanding volume of squash production and area coming under its cultivation since 2003-04. There has been gradual increase in the total area and production of squash and significant jump in the year 2008-09 following the implementation of Technology Mission by the State Government. However, the productivity as represented by average production per hectare has declined drastically in the recent years. This may be due to the area expansion, with the implementation of this Mission, unaccompanied by quality improvement in its cultivation.

Table 1: Area and production of Squash in Mizoram 2003-2013

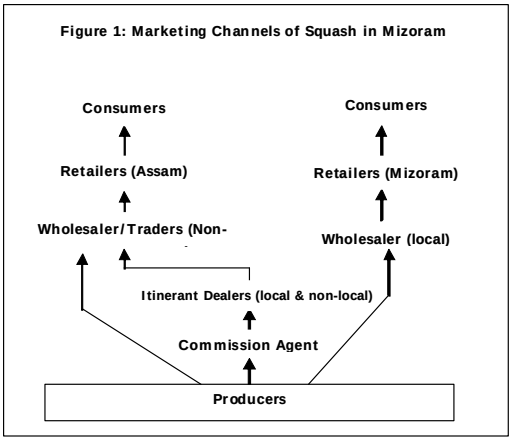
Year	Area(in Ha)	Production(in MT)	Yield /Ha (MT)
2003-04	580	20949	36.12
2004-05	583	19886	34.11
2005-06	604	21593	35.75
2006-07	664	24455	36.83
2007-08	714	26418	37
2008-09	3200*	48000	15
2009-10	2250	34875	15.5
2010-11	3500	56350	16.1
2011-12	4000	66500	16.63
2012-13	4250	73525	17.3

Source: Dept of Horticulture, Government of Mizoram, 2012
**New Technology Mission*

Marketing Channels and Stakeholders

Marketing of squash goes to some extend in an organized basis under the strict supervision of "Mizoram *Iskut* Growers' Association" (MIGA). Though the association is hardly involved in marketing the commodity directly to the traders, usually coming from outside, it is trying to prevent price crash on account of market flooding by the farmers (this will be discussed later). At the same time, farmers, themselves, have clear knowledge on market destination and the prospective buyers who would come to the village to collect the produce. Further, squash produce in the state are normally disposed in the retail and wholesale markets in Carchar District of Assam, around 150 km from the farm gate. Meanwhile, all the records of marketing agents being contacted during the course of field work do not show the product being sold beyond Assam State. The main marketing channels identified in the study are given in Figure 1.

Figure 1: Marketing Channels of Squash in Mizoram



The major portion of the squash produced in the state has been exported to the neighbouring state of Assam. An interview of farmers suggested that more than 80 percent of the total quantity produce is exported to Assam. There are two major ways of procurement operation done by wholesalers of Assam viz. (i) direct procurement from the farmers and (ii) procurement through local commission agents and itinerant dealers. Itinerant Dealers are those middlemen who facilitate local men or local commission agent with fund and material to procure the commodity by offering certain margin as dealing charge. These dealers would collect the same for

onward sale to the bigger wholesalers operating in Cachar District of Assam. At the same time, local market has increasingly assumed importance for squash. Ignoring the possibility of sale by traders and commission agents in the local market, produce disposed in the local market through local retails constitute around 10 percent. The main actors in this channel are local Wholesale Commission agents (sometimes acting as retailers), who have direct contact with the producer. They procure the produce from the farmers and brought to various market places of Mizoram. Interestingly, these agents are organized in the form of association, named 'Mahni Thlai Zuar Association (MZTA)' (Own Produced Vegetable Marketing Association), though they actually function as wholesalers in addition to marketing of own produce. Depending on the prevailing producer's price, MZTA has strong influence on the retail price. To prevent price competition among the member, the association set the wholesale price limits (minimum and maximum) to be followed by the members.

Seasonal Conditions

Squash assumed considerably longer period as marketing season which starts in the month of April and ends in January the next year, and August - September being the peak period. The price also changes according to the volume of market arrivals that it is highest at the beginning of the marketing season and decline continuously to a minimum point at the peak month of quantity arrival. After reaching this point, price starts to increase gradually. Thus, squash market is showing systematic relationship of price and quantity arrivals, suggesting market efficiency which exhibits significant causal relationship between the two. The trends showing the quantity arrival and price observed in the study areas for a period of 3 years is presented in Table 2.

Table 2: Month-wise market arrival and price of Squash during 2010-13

	2011-12		2011-12		2012-13	
Month	Arrival (In Qtls)	Price/ Qtl	Arrival (In Qtls)	Price/ Qtl	Arrival (In Qtls)	Price/ Qtl
April	250.6	2200	248.7	2150	231.95	3000
May	723.7	1500	639.45	1100	717.6	1900
June	1456	800	1483.04	750	1482.8	750
July	4788.7	700	4813.52	600	5043.99	650
August	8125.9	500	8333.12	400	8588	600
September	9124.8	300	8874.04	250	9577.35	275
October	6007	375	5754.37	350	6471.1	320
November	3323.8	400	3356.44	400	3392.49	400
December	1867.3	500	1923	450	1865.96	450
January	1256.3	550	843	500	737	500

Source: Sample survey 2013

To test the status of squash on marketing efficiency, log-linear regression model is estimated with price being dependent variable and arrivals in the current and previous year as explanatory variables. The results are presented in Table 3. It is observed that quantity arrivals, both current and previous period, are the significant determinants of market prices. With the coefficient of log-linear model having

Table 3: Estimated Log-Linear Regression.

Dependent Variable: Log(Price)

Method: Least Squares

Included observations: 30

Log(Price)= C1+C2*Log(Arrival)+C3*Log(One Year Lagged Arrival)

Parameters	Coefficient	Std. Error	t-Statistic	Prob.
C1	10.4	0.44	23.86	0.000
C2	-0.25	0.08	-3.13	0.004
C3	-0.27	0.07	-3.65	0.001
R-squared	0.77		Adjusted R-squared	0.75

been the elasticity parameters, it may be concluded that there is negative price elasticity for squash market in conformity with the traditional Law of Demand. Further, the negative elasticity with respect to lagged price may be interpreted alternatively as current quantity stock in the market have future price market price ramification negatively.

Market stability

Stability of a market is the characteristic of good and efficient market (Rhodes, 1978). If prices are not stable, it poses uncertainty not only to the farmer but also for the consumers. Stability of prices is essential characteristics of sound market. To examine the stability of squash market, ANOVA is conducted on the stability of market prices across the marketing seasons. The result is presented in Table 4.

Table 4: Analysis of Variance for Testing Variability Differences between Marketing Seasons

Items	Factors	Sum of Squares	df	Mean Square Effect	F-Ratio	Sig.
Squash	**Quantity Arrivals**					
	Between Seasons	173858.1303	2	86929.06516	0.0082*	0.9919
	Within Season	287937124.2	27	10664337.93		
	Total	288110982.3	29			
	Prices					
	Between Seasons	179901.6667	2	89950.83333	0.1855*	0.8318
	Within Season	13094435	27	484979.0741		
	Total	13274336.67	29			

*Insignificant estimate

The results presented in Table 4 do not show significant differences of prices over the marketing seasons. Thus, ANOVA result can lead us to the conclusion that the existence of market stability across the marketing seasons in case of squash in Mizoram.

Market/Price information

The availability of prompt and reliable information about quantities arrivals and prices quotations for different commodities improve the decision-making capacity of the farmers and strengthen their bargaining powers. To assess the existing status of market information system in place for the farmers in the study area, they were asked to recollect the sources of market information during the recalled period. The results are presented Table 5. Interestingly, the result showed growers association having played a very crucial role in disseminating market information to the farmers.

Table 5: Sources of market information (market price) by the farmers

Sl. No	Information Sources	No of farmers	Percentage
1	Other farmers	5	10.42
2	Growers' Association (MIGA)	25	52.08
3	Traders and their local agents	18	37.5
	Total	*48*	*100*

Source: Sample survey 2013

Role of Mizoram Iskut Growers' Association

The Mizoram Iskut Growers' Association (MIGA) was formed in 1982 with its headquarters at Sihphir village. Presently, the Association has branches in 9 villages with most of the squash growers being its member. MIGA has its branches in the villages mainly where there are enough surplus production of squash, they are N. Chaltlang, Lungmuat, Serkhan, Nisapui, North Bualpui, Lungdai, Sihphir Neihbawih, Sihphir and Sihphir Vengthar. The main objective of this association is initiate better and efficient marketing system side by side with sustainable system of cultivation. To achieve the objective, it has instituted certain strategies since the mid 1980s. They are as follows:

First, '*Quota System*' was introduced to check flooding of market and its

subsequent price crash. Under this raj, the state's Trade & Commerce Department, in consultation with the association, gave permit/license, and appointed marketing contractor to buy commodity from the growers. This association, on it part, decided to form groups consisting of few growers and each group was allocated a day or two to sell their produce on rotational basis. The size of the group was decided according to the volume of their produce to prevent flooding of market and the potential price crash in the market destination (normally Cachar District of Assam). Quota System was also facilitated with by the government by providing price support subsidy for some time. This system of squash marketing could go well for quite some time with a price-support subsidy extended to the growers by the government during 1994-95 and 1996. In addition to price subsidy, the government offered minimum procurement price to the extent of Rs 1.25 per kilogram to the farmers since the marketing season of 1996-97. However, the new Market Intervention Scheme (MIS) of the government did not get much response from the growers and hence was discontinued consequently. Second, with the increase in production and withdrawal of price support subsidy from the government, and the coming of new entrants in squash market, i.e. Meghalaya, in the late 1990s, Quota System did not work well to the satisfaction of farmers. MIGA in its search for new marketing avenues conducted a market survey under financial support of North Eastern Council (NEC) to the extent of markets in New Delhi, Sikkim, Shimla, and some cities. Based on this market study, MIGA finally decided to do away with the 'quota system' and have instituted 'free marketing system' since 2000 till date. Under the new raj, every producer was given liberty to sell his produce any time and any place whatever he/she thinks profitable.

Under the new marketing system, MIGA is still taking various initiatives and measures to ensure that the farmers get a remunerative price in marketing of their products. It is still holding the authority of selecting procurement contractors or wholesaler in its jurisdiction. The initiative has effectively prevented cartelization wholesale markets as well as procurement agents, which would otherwise monopolize market price. Though the association is not directly involved in procurement and marketing, it clearly shows itself to be the main coordinating institutions that facilitate the functioning of organized market functions in the areas.

Concluding Remarks

The squash marketing in Mizoram is found to be following systematic pattern with price stability and the elements of market efficiency with very limited public interventions in its operation. This has clearly suggested that a well functioning of organized market could greatly benefit the farmers and enhance market sustainability. However, one should not deny the fact that organized market does not emerge on its own, but has to be initiated with facilitations and accommodating effort by the government as well as the farmers and their organized effort.

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