

Introduction

1.1. Preliminaries

The debate over linkages between social and ecological system¹ has generated a widespread attention in the theories in social sciences (Dalby: 2006; Wilson: 1992; Cohen: 1995; Kneese et al: 1972; Maler: 1974; Baumol and Oates: 1975; Dasgupta: 1982; Nepal: 2004). The dependence of humans on ecosystem services² reflects directly the profound co-evolutionary processes that underlie the origins of Earth's biosphere. The biosphere and its ecosystems provide life support to all species. Further, the biosphere is itself the product of life on Earth. The composition of the atmosphere and soil, the cycling of nutrients through waterways, and many other ecological assets³ are all the result of living processes—and all are maintained and replenished by living ecosystems. Accordingly, the term ecosystem can refer to any functioning unit at any scale. This, on the part of the humans, requires an adaptive management to deal with the complex and dynamic nature of ecosystems and to the absence of complete knowledge or understanding of their functioning.

The ecological processes and the ecological system impact the social system in myriad possible ways. The essence of the impact of ecosystem and environment is that the life of mankind is possible only on Earth facilitated by the ecological processes⁴ and the system. The social system at large benefits from the ecological system and processes, such benefits are generally referred to as the ecosystem

services. However, certain ecological processes may produce negative externalities for the humans (Narayan: 1999; Acharya: 2005). Broad range of factors, lead directly or indirectly to the changes in ecosystems, ecosystem services and consequently on human well-being⁵. Many ecosystem changes are intended or unintended consequences of human decisions and the ensuing actions. However, at times the natural ecological process itself has been found to be detrimental to the concerns of human well being where the natural process of self regulating the ecological balance by the nature itself creates human insecurity. The reference in this context can be made of the phenomenon of *bamboo flowering* at regular intervals which is a regular and natural process, which, however, has quite often than not, led to the production of human insecurities.

Such phenomena, however, can be approached from a variety of perspectives. But political ecological approach, which is of course a relatively new area of critical exploration, bears a greater prominence. Simply understood, political ecology is a new approach rooted in political economy and cultural studies and critically branching out to understand the relationship between society and the natural world. It is a historical outgrowth of the central questions asked by the social sciences about the relations between human society, viewed in its bio-cultural political complexity, and a significantly human nature (Keil *et al*: 1998). Hence, we analysed the threats to human security arising out of the ecological processes from a political ecological perspective.

Bamboo is an enduring, versatile and renewable material, an integral part of cultural, social and economic traditions (Wong: 1991; Taylor: 1987; Taylor: 1993; McClintock: 1970; Kelly: 1994). Bamboos grow abundantly in most parts of the world and millions of people depend on it for their livelihood. Brazil, Canada, Nepal, Myanmar, Thailand,

China, United States of America, Korea, Bhutan, Srilanka, Bangladesh and India are some of the major bamboo producers in the world. India is richly endowed with bamboo resources, with more than 120 million tones of growing stock on forest land, plantations and homesteads. The most visible uses of bamboo are in the every day lives of people. Bamboo is used for fooding, housing, implements and household articles. The construction industry utilizes bamboo as scaffolding and ladders. Bamboo plantations enhance food security, assist in soil conservation and the reclamation of wasteland. Bamboo has many new uses too, developed through the application of technology. These offer promise and potential for value addition, income and employment (Gadgil: 1984; Hossain: 1962; Janzen: 1976). It is an eco-friendly alternative, and amenable to simple processing technologies to produce high value products. Bamboo is in the process of being '*rediscovered*' in India. The global bamboo market is expected to reach about US \$ 20 billion by 2015. The size of the domestic bamboo industry is estimated to be around Rs. 6505 crores, which may grow to Rupees 26000 crores by the year 2015 (World Bank: 2006).

Despite the utilities of bamboo and its contribution to human well being it also produces some externalities which adversely affect human security. The most vital of externalities produced by bamboo for humans is associated with the phenomena of bamboo flowering. The bamboo flowers in a cycle of about fourty eight years, which brings nothing but tragedy to the people. There is a strange phenomena of bamboo flowering, called '*gregarious bamboo flowering*⁶' (Bourdillon: 1895; Bradley: 1914; Kawamura: 1927; Blatter: 1930; Campbell: 1985; Keeley & Bond: 1999; Saha & Howe: 2001; Kelley & Sork: 2002) because the bamboo clumps flower all at the same time only once in the plants' lifetime (Hossain: 1962; McClintock: 1970; Janzen: 1976). Bamboo flowering has been

reported from almost every corner of the world at various times, however, the major cases of bamboo flowering impacting the human lives have been the following areas:- Austria; Brazil; Canada; China; Columbia; England; Ecuador; Germany; Guatemala; India; Indonesia; Iran; Iraq; Jamaica; Japan; Kenya; Malaysia; Mexico; Nepal; Philippines; Puerto Rico; Spain; Sri Lanka; Sweden; Switzerland; Thailand; Trinidad; Uganda; United States of America; USSR; West Java etc (Kitamura and Ishizuki: 1953; Heck: 1956; Kitamura: 1963; Itoh and Shimaji: 1981; Janssen: 1981; Lakkad and Patel: 1981; Janssen: 1986; Janssen: 1987). It is reported that it has created ecological havoc on the civil society because of two reasons. First, bamboo plants die after flowering (Campbell: 1985; Gadgil and Prasad: 1984; Janzen: 1976). It will be at least some years before bamboo plants take seed again, leaving bare exposed soil - which could be disastrous in mountainous states (Taylor:1987)- and also leading to food scarcity, since animals depend on bamboo plants. The second factor is that rats feed on the flowers and seeds of the dying bamboo tree. This activates a rapid birth rate among the rodents, (Wolff: 1976) which leads to the huge rat population feeding on agricultural crops in the fields and granaries and causes famine (John and Nagauda: 2002). This affects human security (Keeley & Bond: 1999; Saha &Howe: 2001).

The concept of human security emerged as a part of the holistic paradigm of human development. It represents an effort to re-conceptualise security in a fundamental manner exploring options aimed at mitigating threats to human insecurity of individuals and is central to goal of policy recommendations and actions. We need a new concept of security which gets reflected in the lives of the people. It has to describe a condition of existence in which basic material needs are met, and in which human dignity, including meaningful participation in the life of the community, can be realized. Every step

in this direction, from poverty to property, insecurity to security, fear to freedom for the present as well as future generations may be defined as human security (Thomas 2000; Sen: 1999; Annan: 2002). Human security is concerned with safeguarding and expanding people's vital freedoms. It requires both *protecting* people from critical and pervasive threats and empowering people to take charge of their own lives. Human security is therefore, people-centered, multidimensional, interconnected and universal.

United Nations Development Programme (UNDP) (1994) categorises the whole range of human security into seven broad categories: Economic Security, Environmental Security, Food Security, Health Security, Personal Security, Community Security, and, Political Security.

Broadly speaking, economic security refers to assured basic income, food security refers to physical and economic access to food, health security refers to relative freedom from disease and infection, environmental security refers to access to sanitary facilities, water supply, clean air and non-degraded land system, personal security refers to security from physical violence and threats, community security refers to cultural identity and lastly political security refers to protection of basic human rights and freedom. This classification makes Human security as multidimensional incorporating the psychological, material, moral, cultural, civic, legal and political domains (Lodgaard: 2000; Takasu: 2000; Acharya: 2001, Sabur: 2003).

Human security now represents the security of the people by way of a paradigm shift from the traditional resort to the state as the provider of security, by focusing on the people who are the very victims of today's security threats including environmental insecurity

(Verghese: 1997; Thomas: 2000). Security management by the state consists of creating wealth, opportunities for work, and a better life for many who has so far been affected by the crisis at different levels i.e. vulnerable strata of society (Taylor: 1993; Thomas: 2000). Many of these groups of people are left to the mercy of violence and disorder and crisis as affected civilians. It has been observed that the explosion of rodent population following the mechanism of bamboo flowering creates food shortage as the rats attack the crops in the field as well as granaries with the exhaustion of bamboo seeds in the forest (Strom: 1991; Singh: 1994). Food insecurity thus is the epiphenomenon associated with the mechanism of bamboo flowering (Keith: 1995; Tehranian: 1999). This often leads to internal displacement of the people and the more acute is the level of food crisis, the more is the rapidity of human movement, within and outside the state boundaries (Dutta: 1997; Naqvi (ed): 1996).

1.1.1. About Field Work

Field work in social science research bears a significant role and importance involving a range or variety of methodological tools varying from informal interviews, participation in the life of the group, direct observation, collective discussions, analyses of personal documents produced within the group, self-analysis, results from activities undertaken offline or online and life-histories etc. It has been established that the quality of research to a great extent depends on the quality and authenticity of the results obtained in the field in field based researches. The present study being partially dependent on the field study demanded the field visits to be conducted regularly to find out the mechanisms involved in rat famine following the bamboo flowering in forests as well as in and

around human settlements. Field work in one of the remote corner of North-east India was definitely a challenge based on both the time and economic factors. Mizoram is a restricted area having a provision of Inner Line Permit for securing entry into Mizoram for the visitors. Securing Inner Line Permit from the Mizoram State Liaison Office was not found to be tough for the academic activities. The initial visit was carried on during the month of October in 2008, when the bamboo flowering had occurred in abundance and flowering had gripped almost the entire area of Mizoram having abundance of *melocanna baccifera* population. The food shortages could not be noticed in this stage. However, the visits of 2009-10 showed a different scenario. The bamboo clutches and bamboo vegetations were lost from the scene due to the death of bamboos after gregarious flowering thus impacting the activities relating to the commercial exploitation of the bamboo in the form of bamboo shoot delicacies, bamboo handicrafts and such other activities having both a cultural as well as economic values. The growing rodent population had diminished the agricultural crops from the field. They attacked all sorts of crops including rice, paddy, maize, pulses and even vegetables. The food shortages were visibly seen in the village areas as well as in the market. The available food items in the market were also being sold at higher prices in comparison to the normal situations. The menu in the hotel too had changed with higher rates and even rat delicacies were being served. Personal interviews with the farmers who had lost their entire crops due to the rat infestations and still awaiting the government relief measures, revealed the nature of politicking bamboo flowering in Mizoram. The rats were being caught in abundance and used as alternative food source. The cash reward of re. 1/- per tail initially with subsequent increase to rs. 2/- per tail encouraged people to undertake rat kill activities. However, the apparatus involved in rat combat mechanism has often come under the scanner in peoples' eyes because of the inborn

malpractices and corruptions involved in it. However, the insights from the informal interaction, field mapping, transcend walk with the people has provided significantly to the present study. Besides, the field trips also unlighted us that the magnitude of rat famine being projected and shown was larger than what had actually taken place and the situation was too being captivated by a section for the economic and political wellbeing. Throughout Mizo history, there has been contextualisations of politics in bamboo flowering and politicking bamboo flowering was common in this stage too.

1.2. The Problem

The general approach of depending on human security perspectives as an extension from state security, perspective has opened up different aspects of human insecurities, the relative importance of one of them, however, varies from time to time and situation to situation. Different studies sponsored by the United Nations have identified some important sources of human insecurities varying from poverty, terrorism, ecological catastrophe, war, plague and so on. For us, the research problem is not one of determining which one is of greater importance for the people of Mizoram or for that matter for any other area. In a sense, the areas of security and insecurity are quite inter-related and the one has a bearing on the other.

The approach to human security has also lead to another genre of studies where the limitation of the state centric approaches are examined as a problem and usually a solution is sought in a balance of measures from global or regional networks, from the above and the peoples' capacity building from the below. If we concentrate on this line, then we would have focused mostly on the international measures for controlling environmental or ecological disasters and

peoples' own effort to control the same. However, our proposed study is not concerned with this.

Our research problem more specifically relates to the political ecological aspect of human security where one can find an imbalance between the global and local ecological issues in terms of attention and control measures. The case of bamboo flowering in Mizoram is both an ecological problem and an aspect of human insecurity, but it is quite endemic where we neither find a setting of local movement or initiative to control the same, nor powerful state response and of course not any tangible involvement of international agencies. This marginality of a human security issue, the incidence of bamboo flowering is a problem for us to understand which we propose to take up by considering state responses to it. To elaborate a little more on it, we can refer to certain more general ecological issues like climate change or global warming which are considered to be high impact issues. For instance, focus on global warming has lead to studies on arctic region where we have both groups of accepters and deniers. While the accepters conjure up visions of global catastrophe and recommend drastic restriction on global carbon emission. The deniers find encouragement in ice meltdown as a precursor of new vegetation and opportunities for oil extraction. At the same time they cannot care less about the loss of cultural diversity, ecosystem and life-worlds of traditional arctic residents. What is most revealing has been a call by people like Barrack H. Obama, 'a war on climate terror'. The global players in the world economy also want to be the captains of this new war. No such attention has been given to an issue like bamboo flowering in Mizoram, though periodically it has lead to famines, starvations and deaths affecting tens of thousands of people and a total lack of innovation in state sponsored control regime. Our research problem is to understand this marginality in the light of low priority in the neo-liberal dispensations. If the market

value of an ecological issue determines the face of it what one can expect with regard to an issue of bamboo flowering which is insignificant in world economic terms, but significant for people at large in a remote north-eastern part of India. More specifically, we want to examine state policy as a factor in peoples' perception of insecurity, by its policy of tackling militancy, which is fairly common in India's North-east but the policy adopted for dealing with bamboo flowering and the question of its efficacy and shortcomings including the government corruptions.

Mizoram, located in the north east corner of India and sandwiched between Myanmar and Bangladesh, is a hilly state, which became the 23rd State of India in February 1987. Mizoram is one of the industrially backward state due to many persistent inhibiting factors among which, lack of basic infrastructure, shyness of capital and unregulated marketing facilities are prominent (John & Nagauda: 2002). Due to absence of any big industries, small scale and tiny industries play a key role in the economic development of the State. Thus, Mizoram is an agricultural state where majority of the population are engaged in agricultural activities (Vanlalchhawna: 2004). Jhum or Shifting Cultivation continues to be the principal and prevalent method of cultivation. Over 35,000 hectares of land which is about 34 per cent of the total cropped area is put under Jhum Cultivation⁷ every year (Ramakrishnan: 1993). This method is one of the most wasteful methods of cultivation resulting in fertile top soil erosion due to large scale destruction of valuable forest vegetation and its natural resources and the yield is also comparatively low. The slash and burn of the vegetation exposes the barren land resulting in erosion of the fertile soil during rainfalls which directly results in low yield as compared to terraced cultivation. (Zakhuma: 2001; Government of Mizoram: 2003).

Mizoram has a vast area of forest covering as much as 18,338 sq. km which forms about 87 per cent of the total geographical area of the state. Types of forest found in Mizoram are mainly tropical wet evergreen forest, semi-evergreen forests, moist deciduous forests and sub-mountain forests. Forest in Mizoram supports 22 species of Bamboo that have been reported to exist. (John & Nagauda: 2002). The reserved/protected forests constitute about 38 per cent of the geographical area. The pure bamboo forest occurs over 834 sq. km., which is approximately 15 per cent of the forest area of the state (Government of Mizoram: 2003). The rest of the bamboo forests are mixed with miscellaneous trees which account for 2397 sq. km and bamboo clumps in small private holding is about 109 sq. km. If all these figures put together, bamboo accounts for about 33 per cent area of the State. This huge tract of bamboo forest has a life cycle of its own which as suggested and understood varies from forty five to fifty years. (Keith: 1995; Nef: 1999; Newman: 2000) The recorded bamboo flowering in Mizoram suggests that the two earlier events of gregarious flowering occurred in 1911-1912 and 1959-1960 respectively. The last gregarious flowering of *muli*⁸ bamboo in Mizoram, Tripura, Manipur and Barak Valley of Assam was reported in 1958-59 and was followed by famine in those areas (John & Nagauda: 2002; Overdorf: 2007). The documented history of bamboo flowering in Mizoram dates back to 1881, wherein it has not only lead to the failure of crops (Reid: n. d), but even affected the then existing power configuration and political arrangements among the Chiefs. (Elly: 1881).

Hence, as one of its primary functions, the state is expected to play a vital role in providing mechanisms through which human security is guaranteed in such eventualities. For instance, the traditional discourses on the nature and functions of state often revolved around the issues of human security and insecurity in justifying the

reasons behind the emergence and perpetuation of the institution of state (Bain: 1999; Chatterjee: 1990; Dutta: 1995; Keith: 1995; Kwe: 1903; Nag: 1993; Nef: 1999; Newman: 2000; Parry: 1976; Singh: 1994; Strom: 1991; Taylor: 1993; Tehranian: 1999; Thomas: 2000; Verghese: 1997). The entire corpus of political theories of the state from Plato to the present day have stressed on the role of the state in providing security and welfare to its citizens. The teleological perspective on the state is built on the fact that the social institutions in general and the institution of the state in particular owe their origins to some pertinent human needs and perpetuate so long as these institutions protect and promote common good. A forceful justification of the state as a security providing agency has come, for instance, from Thomas Hobbes (see, for instance Dunne: 1998) which makes him relevant in contemporary debates on political theories of the state. The state has/had to describe a condition of existence in which basic material needs of the masses are met, and in which human dignity, including meaningful participation in the life of the community, can be realized. However, the contextual changes both in terms of insecurities for the humans and the role of the state, there is an urgency to relook at things (Chatterjee: 1990; Verghese: 1997). Thus, in this context it becomes necessary to examine the role of the state in mitigating human insecurities specially arising out of the natural ecological processes like the phenomenon of bamboo flowering.

Thus, the phenomenon of bamboo flowering as a natural ecological process, with the potential of adversely affecting human security as in the past, bears implications for the contemporary political arrangements, institutions and processes (Government of Mizoram; 2002 and 2006). This is more true in the present context where the phenomenon of bamboo flowering, roping in the 'state' as the principal security providing agency, has been playing a mediating

role in the politics of grants in aid at the level of union-state relations on the one hand; and, shaping the nature and contents of both ruling and oppositional politics in the state politics of Mizoram, on the other. It therefore implies that the dynamics of state and national politics and the role of the state as a security providing agency be evaluated in any attempt to understand the provisions of human security against such ecological processes which affect human security. However, hitherto this has been largely left unexplored (as it is evident from the review of existing literature below) academically. This constituted the problem of the present study.

1.3. Profile of the Study Area

North East India consists of eight states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim), and is enclosed by Bangladesh, Bhutan, China (Tibet), and Myanmar. A narrow corridor between Bhutan and Bangladesh provides the only overland connection between the North East Region and mainland India. The population of the North East consists of the indigenous inhabitants together with various ethnic groups, including people from Tibet, Burma, Thailand and Bengal, who migrated into the region at various periods of history. The 'Northeast' in general and Mizoram, a north eastern state of Indian union in particular provides a unique experience in understanding the trends in everyday politics as a living space in contemporary India (Lefebvre: 1991). Mizoram, as a category in contemporary Indian politics 'rings the faint bell' (Lefebvre: 1991) of 'the protracted insurgency led by the legendary Laldenga, of the Mizo National Front in the Christian area'; and the success of India's democratic mechanisms as reflected through the dual processes of (1) the signing of the Peace Accord -1986 (Jyotirindra in Basu & Kohli: 1998) and (2) the implementation of

'Cosmetic Federalism' (Baruah, 2005). The State of Mizoram under the Indian Union is situated on the North-Eastern corner of India. The erstwhile Lusai Hill district became Union Territory on 21st January 1972 and got statehood on 20th February 1987. The Mizo district was not only upgraded but also got its present name Mizoram. Mizoram, the name of the state is a combination of two words-Mizo and Ram. Ram means country or land, thus Mizoram means the land of the Mizos. The territory having a total area of 21,087 square kilometers consists of 8 districts constitutes the modern Mizoram state under Indian Union. Mizoram has a rich tropical forest with large number of flora & fauna accompanied with bamboo groves which perhaps is the most important floral group in Mizoram. A proper contextualisation of the study area is necessary for streamlining the study. Hence, in this section we have prepared in brief the profile of the study area to space the study in proper setting.

1.3.1 Geographical Profile

Mizoram lies between 92.15' and 93.29' East Longitudes and 21.58' and 24.35' North Latitudes (Government of Mizoram: 2001) and shares a common international boundary of 404 kms with Myanmar and 318 kms with Bangladesh. Its total area is 21,081 Sq. kms with a total population of 10, 91,014 (2011 Census), it constitutes only 0.64 per cent of India's total area and merely 0.09 per cent of the India's total population (Centre for Monitoring Indian Economy: 2012). In the table given below, we are presenting the geographical area and population of Mizoram based on the 2011 census of India.

Table 1, Geographical Area and Population of Mizoram

Sl.No.	District	Headquarter	Area (sq km)	Population
1	Aizawl	Aizawl	3576.31	4,04,054
2	Champhai	Champhai	3185.3	1,25,370
3	Kolasib	Kolasib	1382.51	83,054
4	Lwangtlai	Lwangtlai	2557.10	1,17,444
5	Lunglei	Lunglei	4358.00	1,54,094
6	Mamit	Mamit	3025.75	85757
7	Saiha	Saiha	1399.00	56,366
8	Serchhip	Serchhip	1421.60	64,875
MIZORAM			21087.00	10,91,014

(Source: Census of India, Mizoram, 2011).

Mizoram enjoys a moderate and pleasant climate; it is neither very hot nor too cold throughout the year. The climate is humid tropical characterised by short dry winter and a long summer with heavy rainfall. This type of the climate with 3.5 (approx) ph level of the soil is favorable for the growth of bamboo forests both in the wild and in and around human settlements; resulting in the enrichment of bamboo species in Mizoram. Most of the bamboo forests are however, inaccessible for exploitation socially and commercially. The topography of the state is fascinating. Steep and rugged, the hill ranges of Mizoram are in sharp contrast with the major mountain ranges of the country. The large part of the state area is uncultivable and inhabitable due to its topography. Therefore only a small portion of the land is actually put into agricultural practice the resulting in the insufficient agricultural production. The yield further decreases during the bamboo flowering cycles due to many externalities involved in it. In the table below, we are presenting a picture of land use statistics in Mizoram, which may help us to understand the impact of famines during low yield years.

Table 2: Land Use Statistics in Mizoram

Sl. No.	Particulars	Area (Sq. Km.)
I	Geographical area	2,1087.00
II	Area for Land Utilization Statistics (1-5):	2,1087.00
	1.Forest	1,5853.05
	2. Not Available of cultivation (a + b):-	1021.88
	Land put to non agricultural use	934.04
	Barren and uncultivable land	87.84
	3.Other uncultivated land excluding fallow land (a + b+ c):-	441.58
	Permanent pastures and other grazing land	52.50
	Land under miscellaneous tree, crop and groves not included in net area sown	322.08
	Culturable waste	67.00
	4.Fallow land (a + b):-	2468.23
	a) Fallow land other than current fallow	1808.00
	b) Current fallow	660.23
	5. Net Sown Area	1302.26
	6. Total Crop Area	1332.26
	7.Area Sown more than once	30.00
III	Total Irrigation Area	103.61
IV	Area Irrigated for the year	102.44

(Source: Statistical Handbook of Mizoram, 2010)

The table shows that approximately less than 7 percent of the total land is put to agricultural practice. Forest in Mizoram occupies more than 75 % of the total land of the state contributing significantly to the state's economy. 7-8 %of the agriculture area is cultivated using the artificial irrigation and this area is cultivated more than once in a year.

The entire State of Mizoram is under the direct influence of monsoon receiving an annual average rainfall of 2693 mm (Kelvom: 1992; Lalthanliana: 2000). The whole state is composed of several ranges of hills of tertiary rocks, and the ranges are separated from one another by narrow deep river valleys. There are a few and small patches of

flat lands of which the largest is Champhai stretching about 11.27 km, other small patches of plains are found in North Vanlaiphai, Thenzawl and Chamdur. Most of these flat lands are now covered under permanent rice cultivation (Government of Mizoram: 2003).

Table 3: Rainfall in Mizoram

Sl. No.	Districts	Average Rainfall in mm (2006 – 2010)
1	Aizawl	1680.4
2	Champhai	1132.5
3	Kolasib	1398.1
4	Lwangtlai	1337.5
5	Lunglei	1353.5
6	Mamit	1772.3
7	Saiha	1628
8	Serchhip	1276

(Source: Statistical Handbook, Government of Mizoram; 2010)

Mizoram usually gets more rainfall in comparison to the other parts of India. The monsoon reaches early during may and continues till September. The pattern of rainfall in Mizoram during the past 5 years i.e., from 2006 to 2010 follows the usual expected trend in which maximum downpour occurred during the monsoon seasons and declined during the rest of the seasons. The temperature throughout the year remains cool and moderate, thus suitable for human settlements.

Mizoram is a land of forest; rich in botanical diversity. However, the major portion of the forest has an abundant reserve of bamboo covering 1,254,400 hectare, with a yield of 3.2 million tonnes per year, of which around 99% remains unexploited. The rest forest consists of various sub-tropical plants and trees making the area an ecological hotspot. Notwithstanding the fact, huge tracts of forest is destroyed every year for jhum cultivation, the variation in the forest



cover is not that alarming and the bamboo grooves still remain as a source of anticipated calamity in the form of famine following the incidence of flowering. Keeping this apart, the tremendous growth of the population over the years had an adverse impact on the per capita consumption of the forest resources. The state of the forest report 2010 suggests the same in case of Mizoram. The forest coverage in Mizoram is healthy in comparison to many other states of India. The table given below shows the forest coverage of the state of Mizoram for the last two decades.

**Table 4: Forest Coverage of the State in Mizoram
(1991-2009)**

Sl. No	Year	State area (Sq KM)	Forest area(Sq Km)	
			Area	%
1	1991	21090	15935	75.6
2	1993	21090	18178	86.2
3	1995	21090	18861	89.4
4	1997	21090	18697	88.6
5	1999	21090	18576	88.07
6	2001	21090	18775	89.02
7	2003	21090	15980	75.77
8	2005	21090	15935	75.55
9	2007	21090	16717	79.26
10	2009	21090	16260	77.09

(Source: State of Forest Report, 2009, Govt. of India, Mizoram)

Being rich in biological diversity, forest contributes a good share to the state income. The adequate rainfall with moist deciduous climate has been suitable for many species of botanical importance. The forests contributes significantly to the treasury of the state as the forests are rich in commercial woods. The table given below shows the quantity of the forest extracts and the revenue generated from the same in the given year.

**Table 5: Forest Products and Revenue Collected
(2006-07)**

Sl No	Items	Unit	Quantity Extracted	Revenue In Lakhs
1	Teak	CuM.	0	0
2	Round timber	CuM	11.4	34.24
3	Sawn timber	CuM	605	34.24
4	Firewood	CuM	5027.42	4.06
5	Bamboo	Nos	4257478	135.41
6	Broomstick	Qtl	9000	32.16
7	Anchiri	Qtl	1078	3.45

(Source: Socio-Economic Survey 2006-07, Govt. of Mizoram)

In the year 2006-07, the state could generate two crores forty three lakhs and sixty one thousand of rupees as revenue from the sale of forest products. The principal forest products include the bamboo and timbers which contribute to more than 2/3rd of the revenue. Bamboo from Mizoram gets supplied to the nearby paper mills primarily located in the state of Assam. In Mizoram too, bamboo are used for handicraft and incense stick industries, contributing significantly to the state's economy. A fairly large population is directly involved in these industries and is a greater provider of employment.

1.3.2. Demographic Profile

Mizoram demography shows a homogenous blend of several ethnic tribes who are either linguistically or culturally linked. The collection of this homogenous group is known as the Mizo. The Population of Mizoram according to 2011 census is 10, 91,014. The Scheduled Tribe population in the state was 1030401 i.e. 94 per cent of the total population of the state. The Scheduled Caste population was only 691. The population consists of 5, 52,339 males and 5, 38,675

females, by which the sex ratio works out to be 975 females per 1000 males.

Table 6: District Wise Population of Mizoram

District	2001			2011			Dec. Growth
	Male	Female	Total	Male	Female	Total	
Mamit	33114	29671	62785	44567	41190	85757	36.59
Kolasib	34562	31398	65,960	42456	40598	83054	25.92
Aizwal	166877	158799	325676	201072	202982	404054	24.07
Champhai	55756	52636	108392	63299	62071	125370	16.31
Serchhip	27380	26481	53861	32824	32051	64875	19.12
Lunglei	71402	65821	137223	79252	74842	154094	12.29
Lawngtlai	38776	34844	73620	60379	57065	117444	34.08
Saiha	31242	29814	61056	28490	27876	56366	19.71
TOTAL	459109	429464	888573	552339	538675	1091014	22.78

(Source: Census 2011, Govt. of India, Mizoram)

The density of population as compared to other major states of India is still very low. Stated otherwise, the population is thinly distributed as compared to other states. The density of population in the state as per the latest Census of 2011 is 52 per square kilometer while that of all India is 324 according to 2011 census. The low density of population is a significant indicator for the possibilities of more per capita entitlement of natural resources for livelihood. The population of Mizoram on the other hand is growing considerably thus reducing the land man ratio and thereby reducing the possibilities in increased per capita utilization of land mass and natural resources. The situations can get aggravated during the phenomenon of bamboo flowering having the capacity of initiating a famine or famine like situations in the context of Mizoram. In the subsequent table we are presenting the population trend in Mizoram expanding over 100 years.

Table 7: Mizoram Population Trend (1901-2011)

Sl No.	Year	Male	Female	Total	Density	Decadal Variation (%)
1	2	3	4	5	6	7
1	1901	39,004	43,430	82,434	4	x
2	1911	43,028	48,176	91,204	4	10.64
3	1921	46,652	51,754	98,406	5	7.90
4	1931	59,186	65,218	124,404	4	26.42
5	1941	73,855	78,931	152,786	7	22.81
6	1951	96,136	100,066	196,202	9	28.42
7	1961	132,465	133,598	266,063	13	35.61
8	1971	170,824	161,566	332,390	16	24.93
9	1981	257,239	236,518	493,757	23	48.55
10	1991	358,978	330,778	689,756	33	39.70
11	2001	459,109	429,464	888,573	42	28.82
12	2011	5,52,339	5,38,675	1091014	52	22.78

(Source: Census 2011, Govt. of India, Mizoram and statistical Handbook of Mizoram, 2010)

Table 7 shows the decadal variation of population in Mizoram during 1901 – 2011. In 1911 the total number of population in Mizoram was only 91,204 persons which increased to 1091014 in 2011. This shows that during the last century, the population of Mizoram has increased by 999,810 persons. On an average, the population of Mizoram has increased by more than eighty thousand persons per decade during the period 1901 – 2011. The decadal growth rate shows that the lowest growth rate, i.e.7.90 percent was witnessed during 1911 -1921 where as the highest growth rate, i.e. 48.55 percent was registered during 1971 -81. However, the decennial growth rate of population during the period 2001 to 2011 was 22.78 per cent, which works out to be around 2.27 per cent per annum which was observed to be lower by 10.87 percent than the previous decade. The growth rate of population of the state has been higher than the national average in the past decade.

Literacy level among the people is an important indicator of the quality of population of a country or state. The quality of human resources and the manpower depends on the educational background in any given society. The literacy rate in Mizoram is one of the highest in India thus creating a strong foundation for high quality manpower and human resources in India. The existence of Christian Missionaries in Mizoram since the pre-independence period has significantly contributed to the growth of literacy awareness among the Mizos. The District wise literacy rate in Mizoram is presented in the table below:

**Table 8: District Wise Literacy Rate in Mizoram
(2001-2011)**

DISTRICT	2001			2011		
	Male	Female	Total	Male	Female	Total
Mamit	82.98	74.81	79.10	90.15	81.37	85.96
Kolasib	92.34	90.22	91.30	95.50	93.53	94.54
Aizawl	96.75	96.26	96.50	99.01	98.00	98.50
Champhai	93.12	89.06	91.20	94.80	92.20	93.51
Serchhip	96.21	94.11	95.10	99.24	98.28	98.76
Lunglei	87.44	80.60	84.20	92.74	85.85	89.40
Lawngtlai	72.74	60.96	64.70	74.68	57.62	66.41
Saiha	87.12	78.46	82.20	91.00	85.80	88.41
TOTAL	90.72	86.75	88.49	93.76	89.40	91.58

(Source: Census 2011, Govt. of India, Mizoram)

As per the report of the National Sample Survey Organization (NSSO), Mizoram was declared as the top in literacy level among the other states in India with a literacy rate of 95 percent. However, the

latest survey reveals that the literacy rate has been showing a decreasing trend over the years in the state. According to the 2011 census Mizoram boasts with the literacy rate of 91.58 per cent. District wise literacy level is shown in Table 1.8 which indicates that the overall literacy level in the state of Mizoram is 91.58 per cent. Aizawl district shows the highest level of literacy (98.50 %) among its population while Lawngtlai district shows the lowest level of literacy with 66.41 per cent literacy level. However, the literacy rate in the state is much higher as compared with the national level. While the literacy percentage in India is 64.8 in 2011, Mizoram is having 91.58 per cent literacy level.

1.3.3. Economic Profile

Economy constitutes the backbone of any healthy society and the economy of the region depends to a large extent on the availability of natural and non-natural resources and the capacity of the humans to exploit the same. Some regions despite remaining rich in natural resources remain economically backward in comparison to those which have lesser natural resources but better equipped to utilize whatever is available. This to some extent also depends on the nature and character of the human resources too. Likewise, an important aspect of a countries population relates to the size and the structure of its total work force. The total number of healthy persons with capabilities to work constitutes the working population of a country. The workers participation rate or the proportion of population engaged in economic activities varies from one region to another depending upon several factors like age, sex, life expectancy, definition of worker, wage structure, attitude towards work and availability of work etc. In the table below, we are presenting the

number of enterprises in Mizoram along with the workforce engaged therein.

Table 9: Enterprise and Persons Employed in Mizoram

Sl. No	District	No. of Enterprises			Persons Employed (2009-10)		
		Rural	Urban	Combine	Rural	Urban	Combine
1	2	3	4	5	6	7	8
1	Mamit	1725	794	2519	2959	1782	4677
2	Kolasib	1796	2431	4227	2760	4576	7336
3	Aizawl	4167	18108	22275	6805	45846	52651
4	Champhai	2738	2620	5358	4439	5238	9677
5	Serchhip	1256	1377	2633	2160	2931	5091
6	Lunglei	3033	3573	6606	5331	9582	14913
7	Lawngtlai	2266	-	2266	6282	-	6282
8	Saiha	1035	811	1846	2642	3437	6079
	TOTAL	18016	29714	47730	33314	73392	106706

(Source: Statistical Handbook, Government of Mizoram, 2010)

All occupations are broadly divided in to three groups, viz. (1) Primary or Agricultural sector, which includes cultivation and other occupation allied to agriculture, like animal husbandry, forestry, fishery, horticulture etc. (2) Secondary or Industrial sector which includes large, medium and small manufacturing units, constructions etc. (3) Tertiary sector or Service sector includes trade, transport, communication, bank and other government and non-government services. The Occupational structure of Mizoram shows the distribution of work force among various sectors of the economy. Occupational structure of a country means the distribution of work force in various activities or occupations. The table below shows the employment data for the year 2009-10.

Agriculture is the major economic activity of a very large proportion of population in Mizoram and about 70% of the population are engaged in agriculture of which around 66 % are . Cultivators and agricultural labourers of the total work force is engaged in the primary sector of the economy whereas only 1.5 percent and 37.9 per cent of the total work force is engaged in the secondary and tertiary sector respectively. The agricultural activity includes the terraced and jhum farming of both food grains and horticultural cash crops. Out of 21,087 sq. kms. of the state area of Mizoram, approximately 11.56 lakhs Ha area is favorable for horticulture. However, at present not even 10% of the cultivable area is used. The principal horticultural crops and their yield are presented in the table below:

Table 10: Principal Horticulture Crops in Mizoram

Sl. No.	Name of Crops	2009-10		
		Area in Ha.	Production In MT	Yield MT/Ha
1	Orange	10607	13,265	1.25
2	Banana	8655	84,810	9.80
3	Passion Fruit	5341	27,880	5.22
4	Areca Nut	4800	12,000	2.50
5	Ginger	6200	31,000	5.00
6	Bird Eye Chilly	8700	47,850	5.50
7	Turmeric	4500	22,500	5.00
8	Squash (Chow Chow)	3500	54,250	15.50
9	Cabbage	2400	21,600	9.00

(Source: Statistical Handbook, 2010, Government of Mizoram)

The geo-climatic situation of Mizoram offers an excellent scope for growing different Horticulture crops varying from fruits, vegetables, spices, plantation crops, aromatic to medicinal plants of high economic value which can provide for a boost of the state economy. Economic development of the society depends highly on the nature and participation of the workforce in the production and associated activities. Mizoram witnesses a high range of participation in the

agricultural and the allied activities primarily engaged in horticultural crop production. Fruits like banana, orange and passion fruit, vegetables and spices considerably add to the cash flow in and out of Mizoram, contributing significantly thereby to the economy of the people. The participation of the people in the production related activities of these horticultural and non-horticultural activities has to be understood in order to map the viability of transforming agricultural activities during the course of rat famines. We are presenting the working population structures of Mizoram in the following table:

Table 11: Main and Marginal Workers in Mizoram

Main Workers (2001)			
	Rural	Urban	Total
Male	120662	104766	225428
Female	80937	56085	137022
Marginal Workers (2001)			
Male	18193	19387	37580
Female	36252	30887	67129
Total Workforce	256044 (57.20)	211115 (47.87)	467159 (52.6)
Total Population	447567	441006	888573

(Source: Statistical Handbook of Mizoram, 2010)

According to the 2001 census, the proportions of workers in rural areas were higher (57.20%) than in urban areas (47.87%) in the state. The proportion of male and female workers to total work force worked out to 56.30 per cent and 47.70 per cent respectively in the year 2011. Work participation rate which is defined as the percentage of total number of workers, both main and marginal to the total population has increased from 48.9 per cent in 2001 to 52.6 per cent in 2011 in the state. Champhai district recorded the highest work participation rate of 62.85 per cent while Saiha district shows the lowest WPR with 44.19 per cent. The WPR in rural areas has

indicates an increasing trend from 51.19 per cent in 2001 to 57.20 percent in 2011 while that of urban areas has increased from 46.23 per cent to 47.87 per cent.

1.3.4. Politico – Administrative Profile

The administrative machinery in Mizoram can be traced back to 1891 when the British formally annexed the hills and divided in to two districts namely, North Lushai Hills and South Lushai Hills with their head quarters at Fort Aijal (now Aizawl) and Fort Lungleh (now Lunglei) respectively under a Superintendent each. The Britishers were eager enough not to disturb the tribal set up of the then Mizo society leaving the day to day people administration to the local Mizo Chiefs.

Table 12: Districts, Head-Quarter and Sub-Divisions

Sl. No.	District	Headquarter	Sub Divisions
1	Aizawl	Aizawl	Aizawl, Sakawrdai, Saitual
2	Champhai	Champhai	Champhai, Khawzawl, Ngopa
3	Kolasib	Kolasib	Kolasib, Vairengte, Kawnpui
4	Lwangtlai	Lwangtlai	Lwangtlai, Tuichhak, Chawngte
5	Lunglei	Lunglei	Lunglei, Hnahthial, Tlabung
6	Mamit	Mamit	Mamit, Kawrthah, West Phaileng
7	Saiha	Saiha	Saiha, Tuipang
8	Serchhip	Serchhip	Serchhip, North Vanlaiphai, Thenzawl

(Source: Statistical Handbook 2010, Government of Mizoram)

In 1898, the two districts were merged together and put under the Assam Province. In the post independence period the area witnessed many administrative structural changes varying from autonomous district, regional council, Union Territory to the formation of state. Mizoram as the 23rd state of the Indian Union came into force with the passage of the Constitution 53rd Amendment Bill and the State

of Mizoram Bill (1986) by the parliament on August 7, 1986. The State initially was divided into three districts, namely Aizawl, Lunglei and Chhimituipui districts and was re-organized time and again for the administrative efficiency resulting in eight districts, twenty three sub divisions and twenty two blocks. Among the eight administrative districts Lunglei is the largest with an area of 4538 square kilometer and four Rural Development Blocks while Kolasib District is the smallest with an area of 1382.51 square kilometer. Each District is administered by a Deputy Commissioner while the Sub-Divisional Officer (civil) is the administrative head of the Sub-Division. There are 22 Rural Development Blocks in the State, each under a Block Development Officer. Apart from these districts and sub-divisions, Mizoram has three autonomous district councils as special arrangement for the smaller Non-Mizo tribes; Viz. Chakma, Lai and the Mara. The autonomous district councils with their headquarters and area are presented in the table below.

Table 13: Autonomous District Councils

Sl. No.	Autonomous District	Head Quarter	Area (sq. Km.)
1	Chakma	Kamalanagar	686.35
2	Lai	Lawngtlai	1870.75
3	Mara	Saiha	1399.90
Total			3957.00

(Source: Statistical Handbook, Mizoram 2010)

The three Autonomous District Councils are located at the Southern part of Mizoram. Chakma and Lai Autonomous District Councils are located in Lawngtlai District while Mara Autonomous District Council is located at Saiha District.

The fore going section on the profile of the area of study has been arranged for the facilitation of the study undertaken so as to have

clear picture of the socio-economic and political structure of the study area. This shall help us to evaluate the ability of the state and civil societies to cope with the impending calamity in the aftermath of bamboo flowering having the potential to create livelihood insecurities.

1.4. Conceptual Framework

The central concern of political ecology is to understanding the relationship between social and environmental change. Political ecology draws on insights from a variety of environmentally related disciplines in the social and environmental sciences. The outcomes of environmental change are often felt unevenly by different social groups. Explaining why and how this unevenness is generated links political ecology to political economy and makes conflict and contestation over resources central to most analyses. Contestation involves studies of struggles at the ideological and discursive levels including, but not restricted to, definitions of science, knowledge, environment, sustainability, and biodiversity.

Power is a central focus of the political in political ecology. Increasingly, a concern with power relations extends beyond the local level and decenters and problematizes unidimensional treatments of the state, donor groups, nongovernmental organizations, and their related discourses. In contrast to earlier approaches, which assumed that ecological systems tended toward equilibrium, political ecology recognizes that resource utilization patterns may be ecologically degrading while being socially profitable or functional, at least in the short term, for some actors. Ecosystems and social systems are regarded as mutually constituted. In theory, the goal is to develop modes of analysis that encompass and relate social and ecological

variables, although as noted there is an increasing tendency to focus analysis on social and political factors and to pay less attention to the ecological variables. Political ecology combines and relates different levels of analysis. Conceptualization of these levels requires new styles of analyses since much of the local is permeated by and can mirror and refract the global. Similar complexities exist in linking microhabitats and bioregions to global environmental change and to social factors operating on different scales. Political ecologists usually study the complex interactions between a changing environment and changing society within the context of local histories and ecologies. While Peet and Watts (1996) lament the absence of broader theories, political ecology has tended to yield historically and culturally contextualized conclusions. Most political ecologists share a concern with policy formation, social justice, and a linking of research to action.

In the case of a political ecological assessment of bamboo flowering and its impact on human security is concerned, an appropriate conceptual framework must cut across spatial dimensions from local to global and across temporal dimensions from the recent past to projections into the next century. It must encompass the accessibility and sustainability⁹ of natural resources and systems and their products for the security of human lives; as well as for the maintenance of these systems in their own right. It must examine how the natural process of bamboo flowering in an ecosystem are being compromised or enhanced, and what mechanisms can be brought to bear to improve the access and delivery of services for human security. However, it must be noted that just as it is not enough to examine a single instance of bamboo flowering in isolation from its interaction with other natural processes and services, so too it is insufficient to focus on only a single attribute of human security and sustainable well-being. Changes in natural mechanism of

ecosystem services affect many aspects of human security as understood. We emphasize in particular the equity dimensions of these changes in the natural process particularly during the instances of bamboo flowering. Because poor people are often most directly dependent on harvesting ecosystem services, they are often most vulnerable to changes in the normal functioning of the given ecosystems which creates human insecurities.

Human insecurity is an ancient phenomenon. Threats of famine, war, drought, flood, wild animals, plague, and enslavement appear in ancient writings across the world. What has changed, and changed considerably, are the kinds of insecurity that people face, and the institutional possibilities of tempering that insecurity. Thus, a study of the present kind would benefit from a well developed conceptual framework. But, for a world that is primarily in need of direct and effective action, detailed conceptual reflection may seem spurious and distracting. This is because the very terrain under discussion is undeniably perplexing, requiring as it does: precise scientific and technological and environmental analyses of security threats (together with their associated probabilities and key preventive or mitigating measures); familiarity with local, national, transnational, and non-governmental institutional configurations worldwide (together with cultural understandings of key terms such as sovereignty, dignity, and security); clarity regarding the structure of law and its various formal and informal support and enforcement mechanisms; and a deep historical appreciation of social security and social security theories and arrangements around the context of the study. The hope that conceptual clarity can ease the job of operationalizing human security does not seem to be an isolated view.

In view of this, the following sections will delineate on the altered security environment that has mobilized the reconsideration of recent approaches to conflict, poverty, and security, and present a brief conceptual framework of analysis. The configuration of security threats in this post-Cold War period of globalisation and technological advance is clearly different than it was until recently. Some threats are ancient and persistent; others are unprecedented. But the further energy behind human security arises from an awareness that not only have threats increased; the opportunities to counter the threats have also increased. Technology as well as political changes has increased the possibility of effective coordination; scientific advances continue to expand our knowledge base; resources to address security threats are partially forthcoming. Thus whatever currently jeopardizes human security, the problem lies in the mismatch between security threats and response mechanisms. The altered security environment can be sketched by superimposing different descriptions of recent changes in the security environment: empirical, analytical, and institutional. Empirical accounts of rising threats are exceedingly familiar. For example, the nature of conflict has shifted to intra-state conflict, with higher incidence of civilian casualties. Population pressures together with consumerism contribute to environmental insecurity, increase immigration, and heighten the importance of water and energy resources. Inequality has increased, contributing to the mass mobilizations against states and the agencies promoting globalisation. Other threats that increase or change in form include international criminal activity, nuclear proliferation and security, drug-resistant disease, financial collapse, ecological threats, technological mishaps, and conflicts across gender, class, ethnicity, or religion. Empirical descriptions of security threats or of potential threats are essential to gauging the size and depth of a threat, to assessing how critical and pervasive it is or could be, and thus to

mapping the landscape of security threats. They describe only a part of this landscape, however. In response to a clearly altered security environment, theoretical, qualitative, and quantitative analyses unravel the causal relationships and interdependencies that link or activate security threats and form the basis for recommendations for action.

In the case of human security, the urgency of the problems rightly produces a search for insights that can be leveraged to safeguard human security. To give a central example, on the basis of a sequence of studies, insights into the interrelationship between poverty and conflict are emerging. While the relationship is not straightforward, despite the impatience of policymakers to make it so, there are clearly ways in which poverty contributes to conflict and vice versa (Sen: 2001). These insights and many others demonstrate the interrelationships between kinds of insecurity. The deepening analysis of interdependent insecurities provides a further reason to pursue human security, because persons recognize that there are considerable benefits from addressing interrelated variables (such as famine and ecological processes, or poverty and conflict) jointly. Institutional changes both within security structures and at the national and international levels affect the notion of human security. For instance, Rothschild, while talking about the historical linkages and prospective issues of human security roots the current accounts of 'extended security' (of which human security is one) in its conceptual antecedents in European political thought. In doing so, she notes that the newer approach to security has extended the national security concepts that immediately preceded (and coexist with) it in four directions: From the security of nations to the security of groups and individuals: it is extended downwards from nations to individuals; from the security of nations to the security of

the international system, or of a supranational physical environment: it is extended upwards, from the nation to the biosphere.

The extension, in both cases, is in the sorts of entities whose security is to be ensured; extended horizontally, or to the sorts of security that are in question. Different entities (such as individuals, nations, and 'systems') cannot be expected to be secure or insecure in the same way; the concept of security is extended, therefore, from military to political, economic, social, environmental, or 'human' security; and, political responsibility for ensuring security (or for invigilating all these 'concepts of security') is itself extended: it is diffused in all directions from national states, including upwards to international institutions, downwards to regional or local government, and sideways to nongovernmental organizations, to public opinion and the press, and to the abstract forces of nature or of the market" (Rothschild: 1995). Rothschild's contribution not only positions human security and related approaches historically, it also proposes thought-provoking ways to make them "less inclusive." The proposal as it stands is worthy of ongoing consideration; one can also hope that similar historical analyses will be carried out in relation to other national or regional concepts.

A number of authors like King and Murray, (2000) Thomas, Hampson, and Leaning and Arie (2002) have focused on the freedom from need or vulnerability aspect of human security, whether this is caused by war or by structural events such as a financial crisis. For example, King and Murray define human security as an individual's "expectation of a life without experiencing the state of generalized poverty." They proposed an index of human security that includes "only those domains of well-being that have been important enough for human beings to fight over or to put their lives or property at great risk." (King and Murray: 2000). These domains are identified as

health, education, income, political freedom, and democracy (Paris: 2001). Their index sets thresholds in each domain that are in some sense absolute; the index would identify a person as insecure if he or she fell below a threshold in any of the domains. Their approach does not include violence, but rather focuses on issues associated with the “freedom from want.” Caroline Thomas, who outlines the increasing inequality brought by globalisation, and the insufficiency of current international measures to address it, writes that human security entails basic material needs, human dignity, and democracy.

According to Hampson and others, (2002) “the concept of ‘security’ can be defined as the absence of threat to core human values, including the most basic human value, the physical safety of the individual.” They identify other core human values as physical security, and the protection of basic liberties, economic needs and interests (Hampson et al: 2002). After tracing the distinct roots of human security – in human rights, in sustainable development, and in safety of the peoples – they argue that human security in all instances is regarded as an “underprovided public good.” This leads naturally to an analysis of what market failures and political failures have led to an under provision of human security. (Ibid).

The World Bank has produced a very constructive contribution to the human security debate, although in this case they use the term security rather than human security. The World Bank’s World Development Report 2000/1 on Poverty identifies three pillars of poverty reduction efforts: facilitating empowerment, enhancing security, and promoting opportunities. The “security” pillar is described as follows: “Reducing vulnerability – to economic shocks, natural disasters, ill health, disability, and personal violence—is an intrinsic part of enhancing wellbeing and encourages investment in human capital and in higher-risk, higher-return activities.” In

substance, the report uses security to refer not narrowly to economic security for vulnerable populations, but also to conflict prevention and/or resolution (World Bank: 2001). The key contribution of this report from the human security perspective is the organic fusion of hitherto disparate areas of study: risks and vulnerabilities (including natural disasters, health threats, violence, safety nets, economic, political, and environmental risks), risk management strategies (prevention, mitigation, coping), and studies that recognize distinct strategies depending upon the size and nature of the affected community from the level of the individual household to the international community and planet. Hence, in the present context, the notion of human security and the role of the state in mitigating human insecurities can be best explained with the help of a synthetic framework, combining the empirical, analytical, and institutional changes that have altered the context of security environment, as outlined above, which has been presented in Chapter 3.

1.5. Research Questions

The area of our present concern has however been left largely unexplored. The following research questions have been designed to bridge the gap. The identified research questions are:

1. How has Bamboo Flowering affected Human Security in Mizoram?
2. What role has the 'State' played in mitigating the human insecurities arising out of Bamboo Flowering as regards to public policy pertaining to the mitigation mechanisms for combating human insecurities arising out of Bamboo Flowering?

3. What have been the sources of fund for tackling the human insecurities arising out of the phenomena of bamboo flowering?
4. Has the nature of the political arrangements under the federal scheme affected, in any form, the ability of the state government in effective management of this natural disaster?
5. What would be the alternative method more suitable for amicably solving the problem of human insecurity arising out of bamboo flowering?

1.6. Hypotheses

Owing to the information gap stated above, there is a consequent knowledge gap. The present research aims at bridging the said knowledge gap. To this end, the following Hypotheses were designed which are to be tested in course of the study:

1. That bamboo flowering (a natural ecological process) has impacted the livelihood entitlements of the marginal communities of Mizoram leading to human insecurities.
2. That the existing governance model has failed to address the issues of human insecurity (as those arising from the natural process of bamboo flowering).
3. That the state failures in mitigating human insecurities (as in the case of Mizoram in India, generate anti statist feelings.

1.7. Methodology

Considering the nature of the research problem as stated above, we had proposed to adopt an analytical exploratory method of study. To this end, an extensive analysis of the documents, reports, field survey and other relevant works has been done. For the collection of primary data, the following tools and techniques were used: in-depth interviews (semi-structured and structured), non-participant observation, story narration, and informal discussions with primacy. We proposed to adopt a '*mixed*' method, a sort of a hybrid methodology, synthesizing the merits of both qualitative and quantitative methodologies. The mixed research design generally employs three techniques for conducting interviews: structured, semi-structured and unstructured or informal (Morse and Field: 1995). We however, focussed more on semi-structured interview both to control the nature and extent of vagueness as well as to focus on the area of our concern. According to Chambers (1994) semi-structured interviews entail having a mental or written checklist, but being open-minded and following upon the unexpected. The respondents were asked a set of prepared questions in the structured and semi-structured interviews, whereas, the interview followed a more flexible approach. Apart, the non-participant observation method of data collection were followed as because, the non-participant observation is a method of data collection whereby an investigator attempts to attain some kind of membership despite a degree of detachment from the group under study, and thereby, attempts to adopt perspective of the people in the situation being observed (Nachmias & Nachmias: 1999). Despite living amongst the community, the researcher adopts a non-participant observer's role in order to avoid subjective bias from creeping into the data. Transect

walk/ Field mapping were undertaken for the verification of the respondents' responses through personal observations.

The technique of Story narration was used as another method or technique of data collection, as it is a matter of fact that there is scarcity of written history of the study areas. The stories were recorded and used to corroborate with those of key information and with some written documents whatever were available. Occasional and unplanned Informal discussions were initiated with the respondents representing both the government as well as the affected citizens. Considerable reliance has been placed on data sources including books, journals, articles, and newspapers articles from local newspapers, websites, historical records, and other data from some non-governmental agencies. After the field study was complete, records in languages other than English were translated. Data obtained from the interviews, observations, transect walks and other research techniques have been properly analysed using the comparative research designs.

Therefore, a slight focus has also been given to the comparative perspectives of the political systems and their respective roles in mitigating the human insecurities arising out of the natural process of bamboo flowering or such other natural processes which have in one way or the other facilitated the growth of rodent population having the potential to create food shortages and insecurities. The comparative method of analysis is one of the oldest and most popular modes of research used in various scientific enquiries. The comparative analysis generally follows a general pattern of research design either on the basis of comparing most similar systems or the most different systems. For our convenience, we have used both the designs; Most Similar Systems Design (MSSD) and Most Different

Systems Design (MDS), to facilitate our analysis of rodent management in different political systems.

Long back JS Mill, in his book, *System of Logic* refer to four different methods of proving whether a relationship exist between two or more sets of variables. These are: the method of agreement, the method of difference, the joint method of agreement and difference and the method of concomitant variation. All these involve manipulation of variables with high degree of control and therefore, are considered applicable in experimental research design. When we deal with human beings not only such manipulation of variables is difficult, it is sometimes unethical too. An early example of a softer type of controlled experimental design was associated with the diagnosis of Scurvy where the affected sellers were grouped according to the similarities of height weight etc. into two groups: a controlled group and an experimental group. The controlled group was further subdivided in terms of diets. While one group was given the regular diet the other group was given fresh fruits. After a week the group that received fresh fruits got cured while the other group remained as worst as it was. So a relationship was reduced between scurvy and absence of fresh fruit in diet leading to a subsequent discovery of Vitamin C as a cure for scurvy. It was a softer version of experimental research design using joint methods of agreement and difference.

The case gets difficult when we come to larger groups like community or nation. As both the number and range of variables become difficult to specify if not impossible the degree of control becomes almost unachievable. Therefore, we are left with attempting to find the best possible substitute for the rigourous controls provided by the experimental method. For the purposes of comparative politics, these criteria from the natural sciences (if indeed they are actually

operative there) are almost certainly too restrictive. First, we may well want to compare cases that display a certain property with those that do not. What factors appear to separate democratic from non-democratic political systems (Lipset, 1959) or countries that experience revolutions from those that do not? Comparative politics involves the development of theories explaining behaviour within groups of countries that are essentially similar. It is also about contrasting cases that are different in any number of ways. Either focus of comparison - explaining similarities or differences - can tell the researcher a great deal about the way in which governments function. One crucial question in the selection of cases has been advanced by Adam Przeworski and Henry Teune (1970). This is the difference between most similar and most different systems designs. The question here is how to select the cases for comparative analysis, given that most comparative work does involve purposeful, rather than random, selection of the cases. Does one select cases that are apparently the most similar, or should the researcher attempt to select cases that are the most different? Further, like much of the other logic of comparative analysis, this logic can be applied to both quantitative and qualitative work. Theda Skocpol (1979: 40-1), for example, argued in essence for a most different systems design in her historical analysis of revolutions in France, Russia and China. These systems all generated major revolutions, albeit arising within apparently very different political economic and social systems. The question for Skocpol then became: What was sufficiently common among those systems to produce political events that were essentially similar?.

Most similar systems design is the usual method that researchers in comparative politics undertake. They take a range of countries that appear to be similar in as many ways as possible in order to control for 'concomitant variation'. Wickham-Crowley (1991: II) refers to this

strategy as the 'parallel demonstration of theory'. Any numbers of studies have been done of the Anglo-American democracies for example, or of the Scandinavian countries (Elder et al., 1988), or of the 'little tigers' in Asia (Evans, 1995; Alten, 1995; Clifford, 1994). The assumption is that extraneous variance questions have been dealt with by the selection of the cases. If a relationship between an independent variable X and a dependent variable Y is discovered, then the factors that are held constant through the selection of cases cannot be said to be alternative sources of that relationship. The most similar systems design has been argued (Faure, 1994) to be the comparative design, given that it is the design that attempts to manipulate the independent variables through case selection and to control extraneous variance by the same means. For our study we would also be depending mostly on MSS focusing on some countries other than India where the X, i.e. the incidence of bamboo flowering has been found to be recurrent. To the extent, these countries are politically different regimes we hope to find the relationship of X with A or B or C i.e. the state policies under different regimes. We do not propose to push the comparative study in an intensive manner because our primary focus would be on state responses to flowering in Mizoram.

1.8. Significance and Limitations of the Study

The post-independent period in India in general and post-New Economic Policy era in particular is characterized by the interrogation of the notions, modes and procedure of democracy, governance security and social justice. India's biggest challenge today is to identify and implement a development process that will lead to greater equity, growth and sustainability. The role of the state in this context to deal with the issues of livelihood, environmental

enrichment, social justice and political empowerment is simply immense. Moreover, the state responses in the form of social policy, social welfare and the security of its citizens, is the pressing demand of the civil society. The findings of the present study are envisaged to provide valuable information about the dynamic nature and impact of bamboo flowering on the rural poor in North East India in general and Mizoram in particular and its implications for governance on the one hand, and locate in it the possible remedies to the jeopardy produced by the extraneous forces of environment etc on the already marginalized sections of society. In this context, the present work, has attempted to unfold the adequacies or otherwise of the state's response to the problem of famine and associated human insecurity stemming from natural ecological processes like bamboo flowering. This has provided an insight in to the lapses on the part of the state to provide security and social justice and has contributed to the necessity of a relook at the functions of the state via policy processes in ensuring greater security and welfare of the citizens at large. More specifically, the study shall also have the merit of great illumination in the context of centre-state relations between the Government of Mizoram and the Union Government. This exercise would help policy-makers, planners, implementers, teachers, researchers, the state and the society at large. Therefore, our subject of study constitutes a matter of contemporary significance.

The under-discussed factors confronted the researcher though in a fainty scale during the conduct of the present research that might have created some anomalies. The first problem that confronted being problems relating to the obtaining permissions for visiting Mizoram and collecting data for the research from the Government of Mizoram (Inner Line Permit), lack of base line data on the impact of bamboo flowering on humans in Mizoram, etc. The main tool proposed for data collection being semi structured interviews, was

apt to suffer handicaps owing to the unavailability of the base line data. Moreover, the research being based on non-participant observation we could not get the inside stories. Although, an attempt was made to fill this gap by the technique of story narration yet the stories in the vernaculars had to be translated for comprehension might have contributed to the loss of charm and beauty that was in the vernacular. No translation can ever be reflecting the original mood and pulse of the story, and hence we might have missed a post in the process. Moreover, so far the primary data of the study was concerned, the study was limited to the available reports, memoranda, petitions, speeches made, articles and leaflets produced at different times and with the feedback from the personal interviews conducted with the famine affected people. The individual interviews may not always reflect the originality owing to the fact that they can be based on the personal mind setup up the interviewee and may lack conceptual clarity and accurateness. Hence, the findings might have been generally conclusive at places.

1.9. Thesis Organisation

The present study was intended to map the linkages between the ecological system and the social system at large and the impact of the ecological processes on the questions of human security, taking into consideration the role of the state in providing human security with reference to the crisis arising out of the natural process of bamboo flowering in the Indian state of Mizoram. To this end, the proposed dissertation was designed to contain seven (07) chapters as underlined:

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Political Ecology of Human Security

Chapter 4: Bamboo Flowering and Human (In) Security: A
Historical Survey

Chapter 5: Mizoram: The Politics of Bamboo Flowering

Chapter 6: Security, State and Politics: Beyond the Limits.

Chapter 7: Summary and Conclusion.

1.10. Synoptic Review of the Study

'When bamboo flowers, death and destruction follows', thus goes a popular saying in Mizoram. True to the saying, the recurrence of bamboo flowering subsequently followed by the growth of rodent population significant enough to produce famine like situations have taken a toll on the lives of the Mizos, marginalizing the communities with the natural downfall in agricultural production and thereby creating livelihood insecurities. In other words, the history of Mizos throughout has been a history of recurrent threats to human security and desperate attempts to cope with shocks and stress. However, a close look at such a history of human insecurity reveals that at each stage of such history, the circumstances of management of crisis situations and adaptation mechanisms have provided contexts of power play and political struggles, albeit in a microscopic form. The present study was designed in a manner so as to locate the contextualisations embedded in such instances of natural or ecological process of bamboo flowering having an impact on the well being of the mankind.

The present study, therefore was designed drawing from the theoretical insights on human security and adopting a political ecological conceptual framework on human security keeping in mind the rich and complex interrelationships between the ecological, social and the political systems,. The study also attempted to evaluate the

role of the state in providing security to its citizens under such circumstances as bamboo flowering in Mizoram, and the complex interplay of local, regional, national and global politics involved therein. For the purpose of facilitating the study and giving it a proper direction, three inter-related hypotheses with five research questions were adopted. The research questions and the hypotheses have been dealt with thoroughly by checking in with the facts that we came across during the course of our study. As such to locate such other instances of bamboo flowering having an impact on livelihood insecurities or in any other form the growth of rodent population and the subsequent combat mechanisms, we depended on the Most Similar System Design and Most Different System Designs to arrive at proper conclusions and it was observed that the nature of political arrangement have a significant bearing on the livelihood entitlements and securities. A more general aspect of political ecology that was highlighted by this study was the hierarchy of political-ecological issues that is constructed out of production processes. Some issues like air pollution gets priority over water pollution in terms of scale of effects. One can hardly differentiate between air to be inhaled by the well offs and the poor and the supply of pure and safe drinking water to the marginal people gets low priority in the overall scheme of things. Bamboo flowering, though it affects a fairly large number of people has a low impact across the global production system and so continues to remain marginal for academic and administrative attention.

However, in the context of Mizoram, it has been observed during the course of study that the official point of view does underplay the magnitude of famine and the associated hardships and insecurities. The relief operations however, amplify some aspects of the crisis and issues are more socially and politically constructed. When ecological or environmental issues are so constructed and appropriate control

measures suggested involving a radical transformation of traditional cropping pattern hardly ever its destabilizing impact upon traditional Mizo lifestyle considered. Moreover, the fact that the growth of rat population severely affected the agricultural production with low yield in some areas and very low in the other, the projection of the state government, political parties and civil society has been found to be over ambitious politically, socially and economically.

Notes

¹ An *ecological system* consists of plants, animals and microorganisms which live in biological communities and which interact with each other and with the physical and chemical environment, with adjacent ecosystems and with the atmosphere. The structure and functioning of an ecosystem is sustained by synergistic feedbacks between organisms and their environment. For example, the physical environment puts constraints on the growth and development of biological subsystems which, in turn, modify their physical environment.

² Ecosystem services are those ecosystem functions that are currently perceived to support and protect human activities or affect human well being (*Barbier et al. 1994*). They include maintenance of the composition of the atmosphere, amelioration of climate, flood controls and drinking water supply, waste assimilation, recycling of nutrients, generation of soils, pollination of crops, provision of food, maintenance of species and a vast genetic library, as well as maintenance of the scenery of the landscape, recreational sites, and aesthetic and amenity values (*Ehrlich and Mooney 1983; Folke 1991; Ehrlich and Ehrlich 1992; Costanza et al. 1997*). Biodiversity at genetic, species, population and ecosystem levels all contribute in maintaining these functions and services. *Cairns and Pratt (1995)* argue that if a society was highly environmentally literate, it would probably accept the assertion that most if not all ecosystem functions are, in the long term, beneficial to society.

³ Ecological assets-are those objects, realities and existence that constitute an ecosystem and the natural capital. This consists of the elements of life, the biotic as well as abiotic components which supports the life system on earth. (For details, see *Folke: 1991*).

⁴ Ecological process is a process by which the ecosystem is coordinated, controlled, maintained and perpetuated. It signifies the presence of a mechanism by which the ecosystem supports the life system on earth (for details, refer *Cairns, J. and J. R. Pratt: 1995*).

⁵ Human well-being has several key components: the basic material needs for a good life, freedom and choice, health, good social relations, and personal security. Well-being exists on a continuum with poverty, which has been defined as “pronounced deprivation in well-being.” Ecosystems are essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being. Human well-being can be enhanced through sustainable human interaction with ecosystems with the support of appropriate instruments, institutions, organizations, and technology. Creation of these through participation and transparency may contribute to people’s freedoms and choices and to increased economic, social, and ecological security.

⁶ Gregarious flowering of bamboos is a situation whereby the entire flock of the bamboo flower at the same time for one species of one age and life cycle. This starts in September– October, immediately after the rainy season. Initially there are many young inflorescences. Within a few weeks whole clumps get transformed into huge inflorescences. People in northeast India and else- here in the world believe that bamboo flowering is the harbinger of famine. The popular belief is that the gregarious flowering of bamboo produces large quantities of seeds (it is reported that ‘a 40 square yard clump of Indian *Dendro-calamus strictus* can produce 320 pounds of seeds and there are 800–1000 seeds to an ounce, resulting in a population explosion of rats which in turn leads to famine. Though such famines are common in some East Asian countries like Myanmar and Japan, and also southern Africa, in the Indo-Myanmar frontier tract, especially in Mizoram, they cause much devastation.

⁷ Jhum cultivation is the form of agriculture in which a piece of forest land is slashed, burnt and cropped without tilling the soil, and the cropped land is subsequently fallowed to attain pre-slashed forest status through natural succession (see Ramakrishnan : 1993 for details). Among the two most conspicuous features of jhum, one is that all the agricultural operations are performed manually, using only a few traditional and primitive tools. Secondly, regeneration of forest and soil fertility are achieved cost-free and effortlessly. A number of the basic jhum practice occurs, particularly in the north eastern India. For example, there is the variation in the number of years for which a slashed-and-burned land is cultivated successively. Cropping on jhum lands in Mizoram is practiced for one year.

⁸ *Melocanna baccifera* (“Muli”) is a sympodial bamboo growing to about 20 meters tall. Unlike other sympodial bamboos the rhizomes are very long, and so rather than growing as compact clumps, *M. baccifera* produces groves of widely spaced culms more akin to those of large monopodial bamboos. It is an aggressive coloniser and often forms the dominant vegetation on the tropical and subtropical hill slopes on which it grows. It is naturally distributed in a swathe cutting south to north from southwestern Myanmar through western central and northern Myanmar and the Chittagong hill tracts of eastern Bangladesh, to the northeastern states of

India, where it represents between 60 and 95 percent of the regions bamboo resources.

⁹ Sustainability has been understood from different perspectives. From the Intergenerational Equity perspective, Sustainable Development is meeting the needs of the present generation without compromising the ability of future generations to meet their needs. (For details see Brundtland: (1987); Jefferson: (1786); Jefferson: (1789); Gilman: Wolfgang Sachs, et al: (1998). From Ecological Aspects sustainability would mean a thing which is right when it tends to preserve the integrity, stability, and beauty of the biotic community; it is wrong when it does otherwise. (see details in Aldo Leopold: (1966); Herman E Daly: (1998). From Ecological And Social Aspects, "Sustainability is more a symbol than a scientific concept. It's the focus for a new debate about the shape of the future, a signpost pointing to a general direction that we must take while the debate is engaged about the best path forward. See Dexter Dunphy (2002). In Ecological And Economic analysis, Sustainability is a relationship between dynamic human economic systems and larger, dynamic, but normally slower changing ecological systems, B.G. Norton (1992) Paul Hawken (1993)- Herman E. Daly (1996). From Systemic Aspects, a sustainable society is one that persists over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support... (See Donella H. Meadows, Dennis L. and Jorgen Randers (1992).