SUSTAINABLE DEVELOPMENT IN MEGHALAYA A GEOGRAPHICAL APPRAISAL

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CHAPTER-I

INTRODUCTION

The State of Meghalaya is located in the North Eastern part of India sandwiched between the State of Assam in the north, northwest and east and Bangladesh in the south and southwest. It lies approximately between 25°5' to 26°10'N latitudes and 89°47' to 92°47'E longitude (Map 1). Shillong (the headquarters of this predominantly tribal inhabited State), lies at the intersection of 25°34'N latitudes and 91°53'E longitudes.

The east-west extension of the State is about 300 Kilometre and the north-south span averages about 100 Kilometre giving the State a rectangular shape. The relief of the State is basically a plateau or a tableland. The State is dissected by numerous streams and rivers and the drainage pattern in general is radial in nature. It can roughly be divided into three major physiographic features from west to east. These are the Garo Hills in the west, the Khasi Hills in the central part and the Jaintia Hills in the eastern part. The north-south physiographic division of the

State has also been identified by Prof R.L. Singh in 1971 as three different units.[1] These are:

1. The Northern Undulating Hills in the North.
2. The central Upland Zone in the central part.
3. The Southern precipitous face of the Upland in the southern part.

The above 3 (three) units were traditionally known in the Khasi and Jaintia Hills region as: i) Ri Bhoi, ii) Ri Lum and iii) Ri War.

i) The Ri-Bhoi: This region lies in the northern part of the State. The areas falling under this region are all below 600 m. above mean sea level with the lowest elevation of 150 m. above mean sea level. The climate of the region is sultry and enervating with a mean summer temperature of 30°C and a mean winter temperature of 18°C. The average annual rainfall in the region is 1500 mm.

ii) The Ri-Lum: This region comprises the major portion of the Shillong region or the Central parts of the Shillong/Meghalaya plateau. The average elevation varies from 600 to 1200 m. above mean sea level. The highest elevation being the Shillong Peak (1961 m.). The climate of the region is cool and pleasant throughout the year. The mean maximum

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[1] Singh, R.L. *India: A Regional Geography*, National Geographical Society of India, Varanasi, 1971. p.681.

and mean minimum temperatures during the summer months (April to September) is 23.5°C and 16.5°C respectively; the mean maximum and mean minimum temperature during the winter months (October to March) is 18.5°C and 9.5°C respectively. In the upper reaches of the region temperature frequently drops below 0°C. However, this is restricted to some pockets in the region. In fact, it is experienced only during the peak of winter, i.e. December and January. The average annual rainfall in the region is 2000 mm.

iii) The Ri-War: The area falling under this region lies in the southern part of the State. This area is dominated by escarpment that falls abruptly from the Ri-Lum region to merge with Bangladesh plains. This region experiences the heaviest average annual rainfall in the State, and the world, with Mawsynram and Cherrapunjee (Sohra) receiving an average annual rainfall of 11,410 mm and 10,870 mm respectively. The highest ever-recorded annual rainfall at Mawsynram was 13,832 mm. and Cherrapunjee (Sohra) 14,189 mm. in 1995.[2]

The climate of the region is hot and humid during summer but cool and dry during the winter months. The mean maximum and mean

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[2] Lyngdoh, W.L. *Statistical Handbook of Meghalaya, 2000*, Directorate of Economics and Statistics, Government of Meghalaya, Table 2-03, p.22.

minimum temperature during the summer months (April to September) is 22°C and 16.5°C. The mean maximum and mean minimum temperatures during the winter months (October to March) is 18.7°C and 11.2°C.

The Khasi and Jaintia Hills, which make up the central and eastern Meghalaya, account for more than 14,000 Square Kilometre of area. This senile region has within it all the characteristics features of a true tableland or a plateau. If one draws an imaginary line from Shillong to Sohra in the south, from Sohra to Nongstoin in the west; from Nongstoin to Umsning in the north and finally from Umsning to Shillong, the region thus encompassed exhibits the real Plateau region. In fact prior to the emergence of the name "Meghalaya" this region was known as the "Shillong Plateau".[3]

The major portion of Meghalaya is made up of Archæan rocks. According to Dr. C.C. Bhattacharjee:

> "Probably during the pre-Cambrian the Shillong Plateau experienced alternate episodes of igneous activity and sedimentation, till all the depositional activities ceased after the intrusion of the Mylliem granite and its equivalents. The plateau probably also remained a high ground till the later part of the Cretaceous period when the deposition of the

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[3] Prior to the emergence of Meghalaya, this region was referred to as the Shillong Plateau by many scholars who presented Papers in the 21st International Geographical Congress India, 1968, organized by the Department of Geography, Gauhati University,Guwahati.

> sediments of the Mahadek Stage began. The seas again moved away from the plateau perhaps during the Eocene-Oligocene period and the plateau gradually rose to its present height."[4]

Geomorphologically the evolution of the Shillong Plateau, involved several phases of:

> "Erosion, sedimentation, diastrophism, intrusion, movements of land and sea and emission. .... The Plateau presents a polygenetic surface with some defined peniplanes at varying altitudes ..."[5]

Thus, it is evident that the State of Meghalaya was made up of one of the oldest rock segments similar to the rocks of the Deccan plateau.

The Western part of the State, inhabited by the Garos, accounts for a little over 8000 Square Kilometres or roughly 45 percent of the state's area. This region is made up of different hill ranges running the length and breadth of the region, prominent among them being the Tura Range in the central part with Nokrek 1,412 m. as its highest point, the Arabella range in the north, and the Kylas range in the south.

The State of Meghalaya has undergone numerous changes in the form of government, geographical area, administrative set up and

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[4] Bhattacharjee, C.C., "Structure and Petrology of the Shillong Plateau" in H.P. Das and A.S. Rao (eds.). *21st International Geographical Congress India- 1968*, p.17.

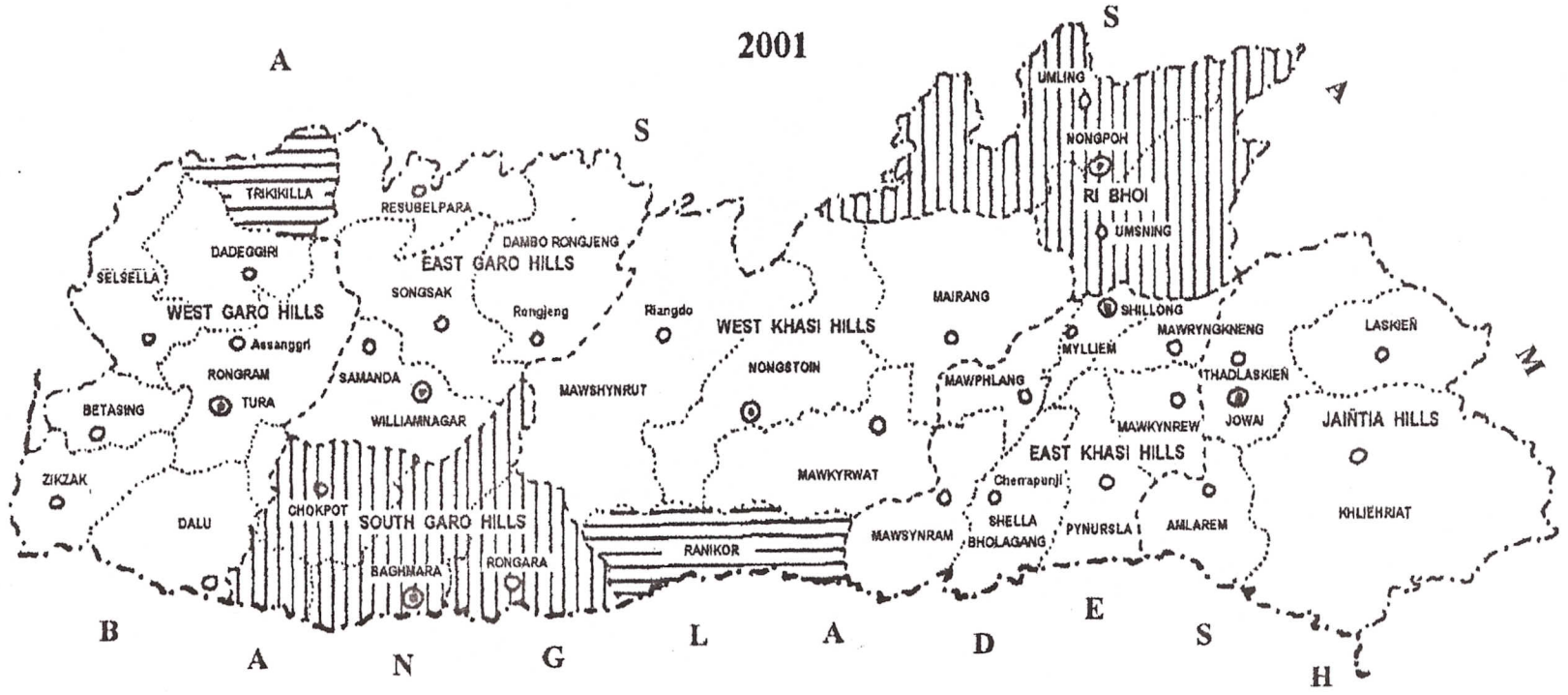
[5] Singh, R.P., "Geomorphology of the Shillong Plateau of Assam" in H.P. Das and A.S. Rao (eds.) *21st International Geographical Congress India – 1968.*

MAP 2

MEGHALAYA

ADMINISTRATIVE DIVISIONS

2001



BOUNDARIES:

INTERNATIONAL

STATE

DISTRICT

C.D. BLOCK

HEADQUARTERS:

DISTRICT

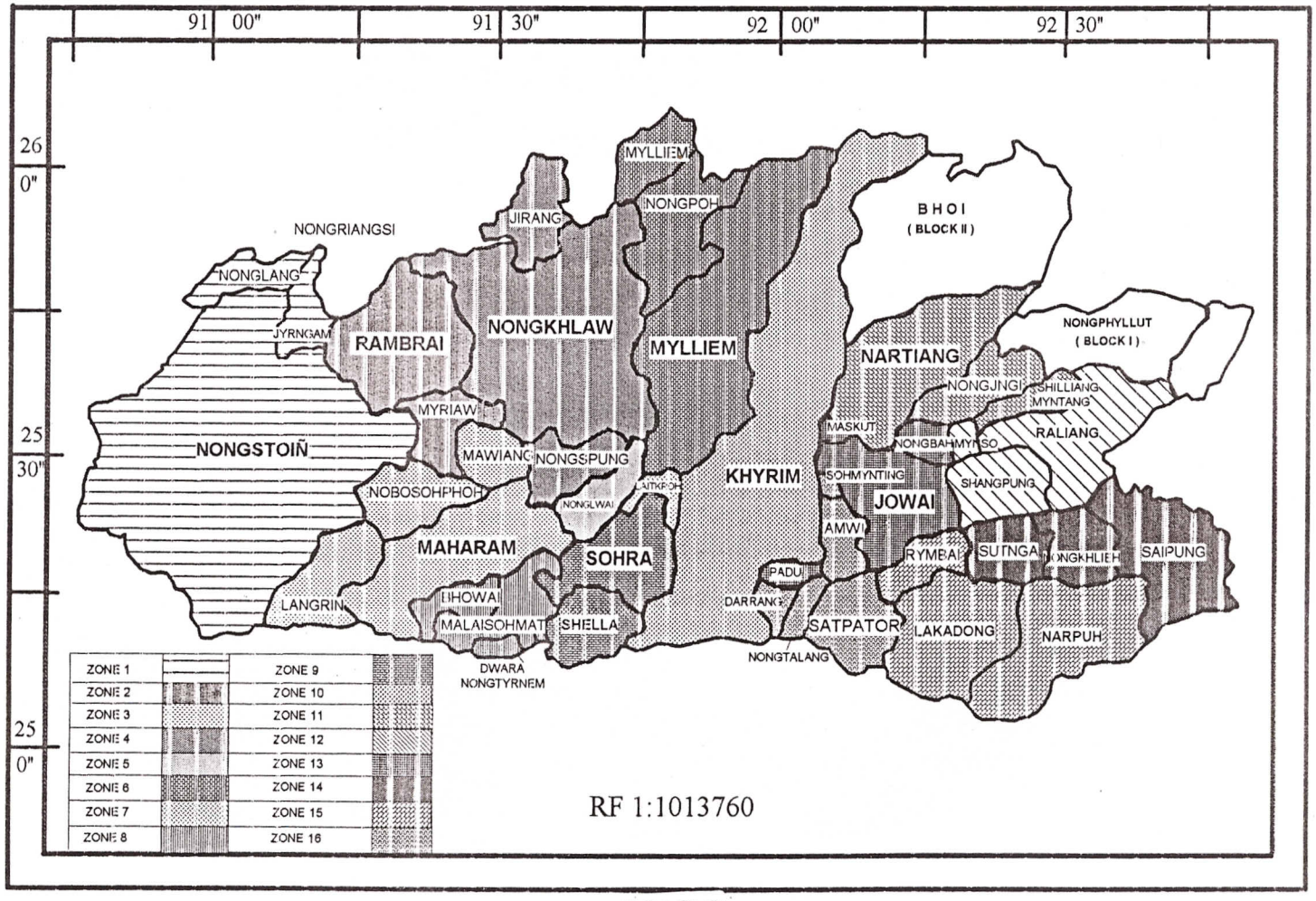
C.D. BLOCK

10 5 0 10 20 30 Km

NEWLY CREATED DISTRICTS

NEWLY CREATED C.D. BLOCKS

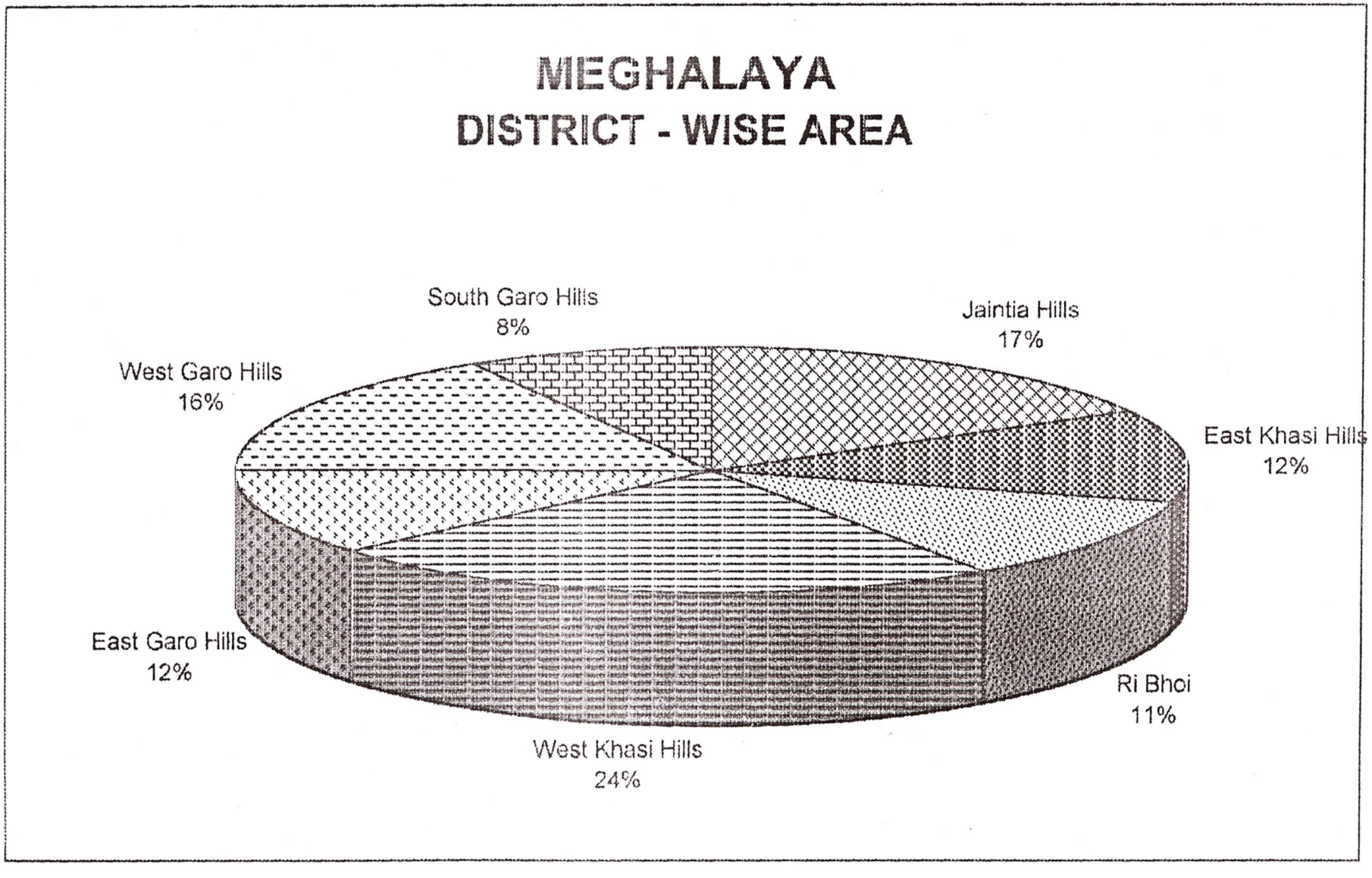
MAP OF RI HYNÑIEWTREP



MAP 3

Source: Courtesy D.G. Nongkhlaw, Head, Department of Geography, Synod College, Shillong

FIG. 1

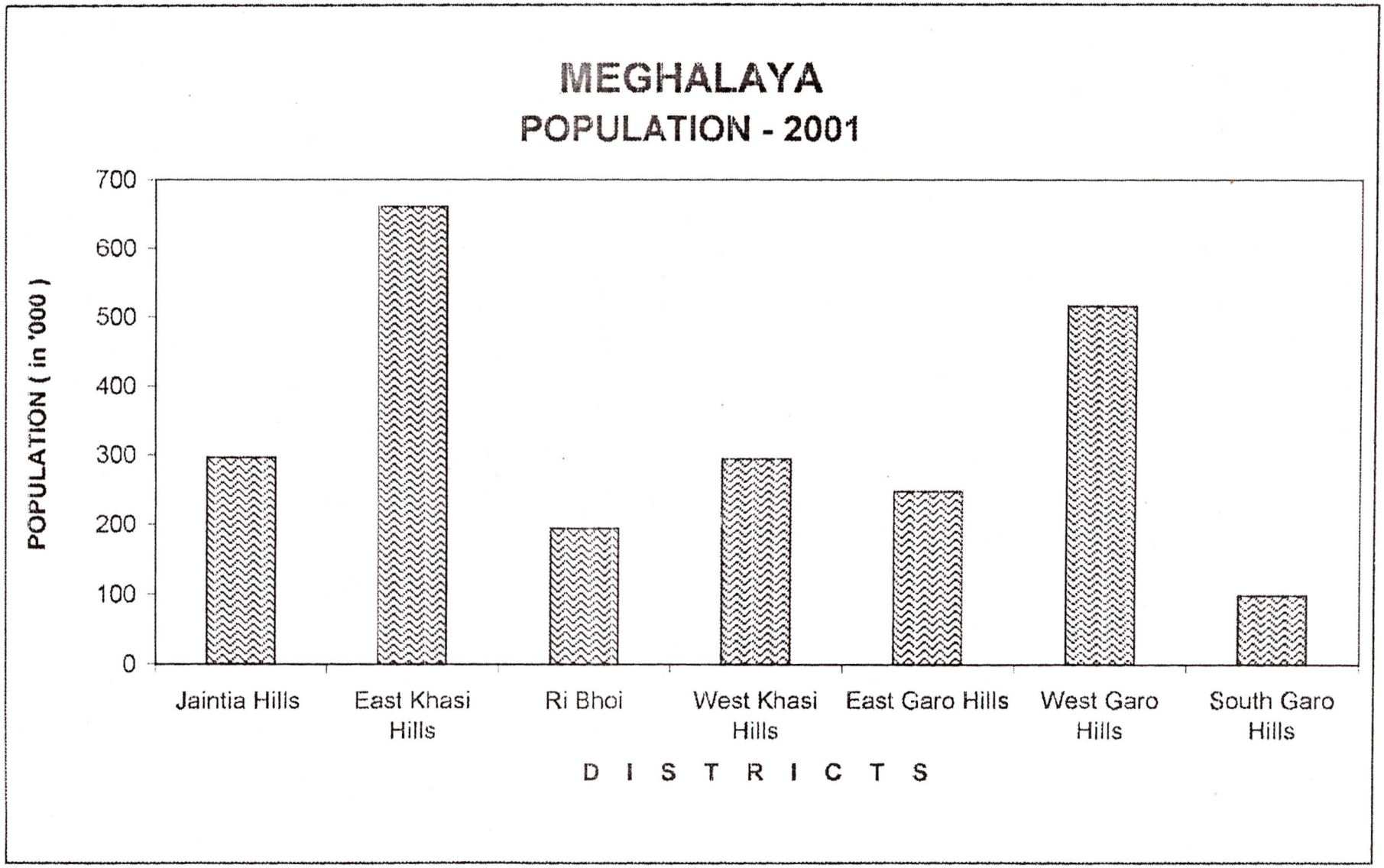

MEGHALAYA
DISTRICT - WISE AREA
South Garo Hills
8%
Jaintia Hills
17%
West Garo Hills
16%
East Khasi Hills
12%
East Garo Hills
12%
Ri Bhoi
11%
West Khasi Hills
24%

governance before it attained its current status. In the Post-Independent period, the State consisted of only 2(two) districts i.e. the Garo Hills District and the United Khasi and Jaintia Hills District under the then State of Assam. It became a sub-state on the 11th September 1968 within Assam. The 2nd April 1970 saw the upgradation of this sub-state to an autonomous state. Then it was on the 21st January 1972 that the State attained its full-fledged statehood. Today the State has 7 (seven) districts, 32 (thirty two) Community Development Blocks, a Shillong Urban Agglomeration (embracing 7 urban centres) 9 (nine) other urban centres and over 4,800 villages (Map 2). The geographical area of the State is 22,429 Square Kilometres.[6] The district-wise share of the State geographical area is shown in Figure 1.

During the Pre-Independent period the area inhabited by the Khasis was divided into different kingdoms ruled by separate kings where there were 25 independent states present at that time (Map 3). Today with a democratic form of government is in governance as is practised in different parts of the country. The people elect the executive heads and

[6] According to the 1971 Census the geographical area of the State is shown as 22,489 Square Kilometres. This difference is due to two disputed area; one in the north bordering the State of Assam and the other in the south abutting with Bangladesh; which till lately remain unresolved.

FIG. 2


MEGHALAYA
POPULATION - 2001
POPULATION (in '000)
700
600
500
400
300
200
100
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

members of the Legislative Assembly once in five years. Although some of the chiefs of the Khasis, the *Dalois* of the Jaintias and the *Nokmas* of the Garos are continuing to aid and assist the State Government in solving petty civil and criminal matters; a majority of the traditional kingdoms have lost their importance and significance.

The State has a population of more than 2.3 millions persons (2001 Census), a density of 103 persons per Square Kilometre and a sex ratio of 975 (Figure 2). It has a decennial growth rate of 29.94 percent (2.99% annually) during the period 1991-2001. The percentage of urban population to the total population of the State is 19.63 percent. The literacy rate in the State is 63.31 percent the second lowest amongst the 7 (seven) sister states of the North Eastern Region[7] (Table 1).

Table 1: Basic Statistics of Meghalaya (2001)

State/Districts	Population	Growth Rate (1991-01)	Sex Ratio	Density	Literacy	% Urban Population
Meghalaya	2306069	29.94	975	103	63.31	19.63
Jaintia Hills	295692	34.12	980	77	53.00	8.46
E. Khasi Hills	660994	22.88	984	234	76.98	42.05
Ri Bhoi	192795	51.44	941	81	66.07	6.83
W.Khasi Hills	294115	33.59	972	56	65.64	11.40
E. Garo Hills	247555	31.10	960	95	61.70	14.50
W. Garo Hills	515813	27.98	988	139	51.03	11.32
S. Garo Hills	99105	28.59	941	54	55.82	8.72

Source: Provisional Population Totals Meghalaya. Series 18, Paper I of 2001.

[7] Laskar, N.K., *Census of India 2001*: Provisional Population Totals Meghalaya. Series 18, Paper I,Table I, p.22.

The State of Meghalaya has made slow and gradual but steady progress in different sphere of human and economic activities in recent times. This progress was evident in the seventies when the State attained its statehood from the erstwhile-composite Assam State. Some of the socio-economic indices that corroborated this fact were that, between 1981 and 2001 the literacy rate went up from 34.08 percent in 1981 to 49.10 percent in 1991 and to 63.31 percent in 2001. The total road length maintained by the public works Department increased from 3,090 Kilometres in 1973-74 to 6,491 Kilometres in 1996-97 and the road density increased from 13.78 per 100 Square Kilometres to 28.94 per 100 Square Kilometres during the same period.[8]

The percentages of urban population to the total population of the State has been steadily increasing from 18.07 percent in 1981 to 18.60 percent in 1991 to 19.63 percent in 2001. Agricultural and mineral production has shown a steep increase as also the establishment of different industries and factories. In 1989 the total number of Banks including Regional Rural Banks in Meghalaya was 145. In September 1994 this number swelled to 211 and within a span of just about five

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[8] Lyngdoh, W.L., *Op.* cit.

years, i.e. till March 1999 this number again rose to 216. A detailed description on this aspect has been dealt with in the later chapters.

To top all this the population has also been increasing steadily and today it has reached an alarming proportion, from just over 10 lakhs in 1971 to an estimated 23 lakhs in 2000-01. All these are the result of the development of basic infrastructure like better network of roads and communication system, better medical facilities and good market facilities for selling off their products at a higher prices thereby indirectly boosting of a better living conditions for the people and so on.

However these developments are not without any repercussion. The loss in forest cover in 1991 was 106 Sq. Km. and in 1997 it was 57 Sq. Km.[9]. These losses of forest cover year after year show that more and more forest areas are cleared for agricultural, industrial and residential uses.

From the health point of view the total number of hospitals has increased from 8 with a total number of 1,635 beds in 1992 to 9 with a total number of 1,867 beds in 1996. Sadly, there is only one doctor to a

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[9] *Basic Statistics of North Eastern Region 2000*. Table 22, North Eastern Council, Minister of Home Affairs, Government of India, Shillong.

population of 5,357 persons. This and other factors goes to show that economic development has a negative impact on the State.[10]

In today's world the need is for environmental protection and conservation. This is true because we need to sustain our environment for the present benefit as well as the future generation's requirements. In the world as a whole three major sectors of the environment are being degraded at a fast rate. These are water, air, and land. This also holds true for the State of Meghalaya. In fact even before Ecologist, Environmentalist and different N.G.Os of the 20th century heralded the ever-increasing deterioration of the environment, our forefathers of yore have already cautioned us about the fast degradation of our environment. Father Dominic Jala S.D.B., in his essay on "Ka Mei Ramew bad ki Laiphew Jynthaw", stated thus:

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[10] It is no wonder that in some of the developed countries of the world and even in our country many N.G.O have come forward openly to pressurize the government to save the environment. For example in April 1996 the Supreme Court directed the Delhi administration to set up a high-powered committee to shut down all polluting industries located in different parts of the city. In the State of Meghalaya too, several N.G.Os fighting for the preservation of the environment has emerged, notable amongst them is the Meghalaya Environmental Active Legislators (M.E.A.L.). All the above development emerged on account of a tussle between two groups. One group tends to maximize their return from the environment irrespective of the needs of the future generations while the other group, which fights for the protection of the environment, feels the need to sustain the environment keeping the need and requirement of the future generation in mind.

> "Lada u Khasi mynta pat um sngewthuh kumno kawei ka bynta jong ka pyrthei ka mariang ka ktah ïa kawei pat, ha ka jylli jingim ha pyrthei, u lah ban pynduh-pyndam ïa lade bad ïa baroh ki jynai u Blei."[11]

This means that, if the present day Khasi does not understand how one segment of our surroundings affect the other in our day to day existence on earth, he may bring about his self-extermination and all that God has bestowed upon him. This will not only befall the people of Meghalaya but all people of the world. As the Holy Bible in the book of Isaiah chapter five, verse six warns,

> "The earth shall wax old like a garment and they that dwell therein shall die in like manner".

Further, the Holy Bible in the book of Ecclesiastes, chapter five verse nine states that,

> "The profit of the earth is for all: the king himself is served by the field".

Thus water, air and land – their conservation and use is crucial for sustainable development. These are briefly explained as follows:

Water

Water is one of the fundamental requirements of man. Man can live for days without food but not without water. We require water from

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[11] Bachiarello, J., S.D.B., *Ki Dienjat Jong Ki Longshuwa*.

the cradle to the grave from morn till dawn. One just cannot think of agriculture, transportation, industries, power generation; sanitation and a host of other things without water. The demand for water has increase over the years. In the country as a whole only about 20 percent of the nation's population have access to a reasonably save drinking water and more than 1.75 lakh villagers are still without potable water. In many parts of the world people are quarrelling, fighting and dying for water. For example in Raigarh district of Madhya Pradesh people vehemently opposed the setting up of a steel plant because that would result in polluting the river Kelo which is their only source of water for their every needs. The people staged a hunger strike resulting in the death of a tribal woman.[12] The Narmada debate, the Farrakka river dispute between India and Bangladesh, the Cauvery river dispute between Karnataka and Tamil Nadu and the Sardar Sarovar Project are just some more examples that can be cited here.

According to the Ministry of Rural Areas and Employment more than 60 percent of villages in Meghalaya do not have save drinking water within 1.6 km. radius. As on 1st April 1985 these villages were designated

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[12] *Down to Earth*. Science and Environment Fortnightly, April 30, 1998. Dying for a River p.29.

as "Problem Villages". Till 1995-96 only 20 percent of these problem villages were provided with drinking water.[13] The State of Meghalaya is the only State amongst States of N.E. region to have covered a large proportion of the problem villages by providing safe drinking water. Till 2001 the water requirement in Meghalaya was 0.085 Cubic Kilometre. It has been observed by the author in the field as well that the pollution of water is basically due to domestic waste and industrial effluents. Of these two, the latter contributes only 10 percent of pollutants, which means that the domestic pollutants as of now, contributes more to the pollution of rivers than industrial effluent.

Air

The other sector of the environment, which has been polluted in recent times, is air. Air is being polluted due to the increase in the number of vehicles, factories and shifting cultivation to name a few. For example the number of registered vehicles in Meghalaya increased from 51,247 in 1997-98 to 53,960 in 1998–99 and the number of registered factories from 65 to 69 and small scale industries from 3,008 to 3,270 during the same period.[14]

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[13] *Basic Statistics of North-Eastern Region 2000*. North Eastern Council, Ministry of Home Affairs, Government of India, Shillong, p.123.

[14] Lyngdoh, W.L. *Op. cit.*, pp.53, 54 and 70.

On account of shifting cultivation it has been observed by the author that during the 'Slash and Burn' season, (April to May) the air in these areas is covered by smoke for days together. This makes the ground level air very suffocating and impure. It is also during this period that people generally suffer from throat and eyes ailments. Initially when the man - land ratio was low and the jhum cycle long, the air was not polluted for long. However with the increase of population and the shortening of the jhum cycle this phenomena has resulted in the air becoming increasingly populated every five years or so.

Though air pollution is not a serious problem in the State today, it will however result in innumerable respiratory sickness to the people in the years to come, if preventive steps are not initiated. Polluted air leads to lung cancer, impairment of trees, plants, crops, monuments, and above all children will be the worst affected.

Land

The third sector of the environment, which needs to be protected and conserved, is the land surface vis-à-vis soil. Much of the land surfaces in Meghalaya have been made barren due to age-long indiscriminate felling of trees and *Jhum* cultivation. These two activities have also resulted in wearing away or loss of valuable topsoil from the

mountain region. This soil erosion brings about high silting in the lower reaches of the rivers resulting in flooding in the valleys; (earlier this was unheard of). Further rainwater cannot percolate deep into the ground and subsequently some areas even like Cherrapunjee (Sohra) region have pronounced scarcity of water during the winter season.

According to figure brought out by the Directorate of Economics and Statistics, Government of Meghalaya till 2000 there has been an increase of livestock in the State from 1,017 in 1982 to 1,186 in 1992, a 16.62 percent increase. This means that more and more lands are getting grazed resulting in low productivity of soil vis-à-vis the land surface. One can also notice that during 1971-72 to 1998-99 the area under Reserve Forest in the State dropped from 74,000 to 71,270 hectares (a 3.68 percent decrease) and Protected Forest from 13,000 to 1,240 hectares (a sharp decline of 90.46 percent). If one is to look at the captions under "Area under Plantation/Afforestation" and "Progress of Forestry Schemes" published by the Principal Chief Conservation of Forest, Government of Meghalaya, there is an overall decline in both the sectors. Therefore this is another section of the environment, which must be looked into if the environment is to be sustained.

The State has to maintain a stable general economy that will help in meeting the aspirations and expectations of the population. In order to frame viable alternatives, the present study makes an effort to identify problems, approaches and resolutions that will help in creating a sustainable base for development. In order to do so the following paragraphs identify the approach to the present study.

Objectives of the Study

In different parts of the world, resources are concentrated in some regions whereas population in another. For example, in about 1800 A.D. developing countries had 74 percent of the world's population and produce 44 percent of the world's production, and today more than 75 percent of the world's population are living in under-developed countries of the world which produce about 21 percent of the world's production. Further, it is believed that 25 percent of the world's population which are confined in less developed countries of the world consumed more than 80 percent of the world's resources. This being the global scenario, the same may be true for the State of Meghalaya where some regions, which have little resources, are its large consumers. This situation may lead to large amount of resources being consumed by 'non-available-resource regions', with large population. The fallout of this would be that these resource

regions may be left with very little resource by the time they require them in future for their own needs.

This study is aimed at identifying the developed, developing and under-developed sub-regions in Meghalaya. The aim of this study is to find out the different resources present in the State and the extent at which they have been exploited vis-à-vis their estimated reserves. This study will try to find out how far the level of economic development had taken place in the state based on the ongoing exploitation of existing resources. The study also attempts to project the extent of the level of economic development, the state can achieve, if these resources are fully exploited. The study will also examine the present estimated reserve of resources and its sustainability and identify the "areas of plenty" and "the areas of scarce resources" of the State.

Finally, this study will examine the role played by the different levels of administrative set up of the State, viz. traditional (i.e. the *Syiems* and their *Dorbars*; the Village *Dorbars*, the *Raids*, the clan) and the modern institutions (i.e. the State Government, the District Councils, the Municipal Department and others).

The study will try to correlate the existing resources in the state with the scale of development that has taken place in the state through

different periods of time. The study will finally review the degree of sustainable development in the state.

Hypothesis

On the basis of the above objectives, this study will examine and test the validity of the following hypotheses:

Firstly all developmental activities are the outcomes of a judicious and rationale utilisation of natural resources. But this in turn may have a negative effect on its people in the future. This has been happening in many parts of the world. For example, the establishment of different industries, factories, extraction of minerals and many other developmental activities has resulted in the pollution of air and water and the disfiguration of the landscape. Soil, the main life-supporting element of the biosphere has gradually become unproductive. This is largely due to the indiscriminate use of chemical fertilizers and pesticides in agriculture. This has rendered many areas of the state unfit for agriculture, leading to barrenness. The people weakened and handicapped by the lack of alternative economic opportunities were compelled to migrate to the urban centers. This gave rise to other problems.

Secondly, whenever development takes place it involves an overall transformation of organic processes from a simple to a more complex

structure and function of the region and the community. This being a universal truth, this hypothesis will examine beyond doubt the applicability of this law to the State of Meghalaya.

Thirdly, in real life circumstances where people are forced to work due to poverty and hardship; whatever development is taking place, is accompanied by unwanted economic distortions and environmental degradation. This study will examine whether this situation applies or not to the State of Meghalaya.

Finally, this study will examine that the working together of the different administrative setups – traditional and modern – will go a long way in achieving economic development and preservation of a viable ecological balance in the environment.

Survey of Literature

The concept of "Sustainable Development" is a terminology used very recently. It was the World Commission on Environment and Development, which brought out its report in 1987 under the caption "Our Common Future" that initially use the above term. As such, very few books (in comparing with other subjects) were written about this topic. No major work of significance was done on Sustainable Development in Meghalaya.

The book, *An Introduction to Our earth and Environment* (1988) written by J. Singh and D.N. Singh gives an overall view of the different environmental problems facing the world and how to overcome them. In his book, *The Global Environmental Movement* (1990), John McCormicks states that it is only if we are aware of what the environment is to us, can we understand the problems arising due to the (degradation of) environment. John Holmberg in his book, *Policies for a Small Planet* (1992) writes on the different policies relating to Sustainable Development. His main focus is on the developing countries. He deals at length on some aspects of sustainable development in these countries; in the realms of agriculture, forests, energy and public consumption.

In his book, *Down to Earth, Environment and Human Needs* (1989), Erik P. Eckholm points out that the economic progress of a region must go hand in hand with steps for protecting the environment so as to avoid future global environmental catastrophes.

Martin Wolterding, in his book, *The Poisoning of Central America* deals with the impending destruction of the Central American region due to wanton destruction of forests and the environment.

In his book, *The Fate of the Earth*, J. Schell pictures a bleak future of the earth due to the increasing environmental destruction. Further,

Norman Myors in his book, *The Exhausted Earth* pictures the future Earth as one that would be bereft of all resources if steps were not initiated to check their exploitation.

J.B. Ganguly's *Sustainable Human Development in the North-Eastern Region of India* (1996) makes a critical analysis of the various progress made in the North-Eastern Region of India. All these, according to him, are not without repercussions. As most of these developments have been carried out as a result of central decision they have adversely affected the role of the community that oversees the smooth and equitable functioning of the society which keeps in mind the sustainable aspect.

S.L. Sharma, in his work, *Towards Sustainable Development in India: Issues and Perspectives* (1996), published by NERC Special Lecture Series 6, speaks about the degradation of the environment in India, which he terms as alarming. He has suggested some measures that some East Asian countries have adopted for checking the fast-deteriorating environment.

Sources of Data

The sources of data and information by which this study have been conducted are through the primary sources, which include interviewing various people and spot observations. The second method is the

secondary sources in which various government publications, books, journals, magazines, articles, etc. were used to supplement and analyse the findings.

1. The Primary Sources: The first and foremost information that will help in understanding the problem would be the interaction with people of different walks of life like the farmers, the industrialists, the private financers, the *Syiems* (kings or chieftains), the *Dolois* or *Sirdars*, *Nokmas*, the village headmen and others. Information from the above persons will be in the form of questionnaire and field observations.

2. The Secondary Sources: To supplement the primary sources, the secondary data from various government publications, books, journals, magazines and articles written by different eminent scholars will help in this study. Data and statistical information from various governmental departments, non-governmental organizations, individuals and different research organizations will be used to gather information and for testing the validity of this study. Information derived from the Annual Reports and occasional monographs of different specialized agencies dealing specifically with or related with sustainable development – be it in the world, in India and the State of Meghalaya – will serve as another source

of secondary information for this study. The information, thus derived will help substantiating the finding of the primary sources.

3. The Tertiary Sources: Finally, the information thus gathered from the primary and secondary sources having been collected would be analysed. Based on the analysed data and information, different charts, maps and cartographic drawings would be made for a better understanding of the topic under study. The different maps thus obtained would give a better picture of the problem faced by the State. They also will depict a clear picture about sustainable development in Meghalaya.

The major sectors taken for this study are as follows:

1. **Agricultural**

In this sector the per capita land available for cultivation, the total cultivated land, the area sown more than once and the net area sown and the distribution of cultivators and agricultural labourers are taken into account.

2. Industrial

This sector includes number of registered industries, factories and small scale-industries; secondary sector working force as percentage to total working force, working force in mining and quarrying as percentage to total working force, working force in other household industries as

percentage to total working force in secondary sector, working force in manufacturing, processing, servicing and repairs as percentage to total working force in secondary sector, and working force in construction as percentage to total working force in secondary sector.

3. Infrastructural

The indicators included in this sector are the number of villages electrified, number of post offices, number of telephone exchanges, number of public call offices, and number of biogas plants.

4. Socio-cultural

The socio-cultural indicators included are density of population, urban population as percentage to total population, non-primary sector workers as percentage to total working force, literate persons as percentage to total populationersons, rural literary, total female literacy and hospital beds per thousand population.

Besides the above, some insight is also given on general health condition of the people and the nature of banking system in different districts of the State. The different indicators on health taken for general observation are the number of hospitals, community health centres, the number of beds in government hospitals and the number of doctors and nurses in the State. The different indicators taken for the banking sector

include the number of banks, deposits, credits, per capita deposits, per capita advance, credit-deposit ratio, bank offices per lakh population and the number of population served per bank offices.[15]

Methodology

It is obvious that no single indicator can represent the overall picture of the levels of development. Further, a host of indicators too, unless fused and synthesized into one index, would yield nothing comprehensible. It is, therefore, required to construct a synthetical index representing the whole set of indicators.

Usually, indicators cannot be added together and averaged as they not only involved unsummable (dissimilar) quantities, but also differ in their weightage, assimable distribution and admissible conformities. Therefore, for this study the method of principal components has been devised, as it is the most outstanding and sound from the conceptual points of view.

First a correlation matrix of the whole set of indicators have been built. Based on the availability of data maximum indicators have been taken. However, some non-conformal indicators have been left out as

[15] The indicators of these two sectors were not taken for the analytical study as they show very poor correlation with other sectors.

they have very poor or negative correlation with other variables (indicators) and if included, would adversely affect the representative-ness of the composite index constructed.

The different socio-economic indicators taken have been analysed and the developed, developing and under-developed sub-regions of the State identified. To find out the variation of significance in the different regions the standard deviation from each region has also been calculated. The correlation method has been calculated for some characteristics like literacy rate, density of population, urbanisation, educated unemployed and growth of population.

The different central and state level plan document reports regarding the availability of resources, agricultural production, industrial development, energy utilization, planning processes, budgetary allocation have been extensively used for the study. The different Census publications of the Central and State Governments and the North Eastern Council have been taken for the analytical study.

Finally, the information gathered from the above sources after careful analysis, are depicted through different maps, charts and other suitable cartographic techniques.

Scheme of Chapterisation

In line with the proposed theme of research this dissertation has been systematically divided into various chapters as follows:

The first chapter gives a brief account of the area under study that is the State of Meghalaya. The basic statistics of the State as per 2001 Census data has been highlighted. Thereafter, a general economic progress of the State and its impact on development in the State has been given. In this chapter, the nature and the conditions of the three basic elements of the environment, viz. water, air and land are dealt with. Further, this chapter deals with the basic objectives of the study, the hypothesis, literature survey, data and information base and methodology necessary for this work.

Chapter-II focuses on the concept of sustainable development and its applicability in the world and the State of Meghalaya in particular. The concept of sustainable development in the selected realms of agriculture, industries, transportation and energy as applicable to the State of Meghalaya has been dealt with.

Chapter-III identifies the different resources of the State and their areas of occurrence. In this chapter, the location of resources, their

approximate reserve and the manner of their exploitation and production have been given.

Chapter-IV deals with the political and administrative set up in the State during the Pre-Independence and Post-Independence period. The initiative taken by the different administrative systems towards sustainable development in Meghalaya have been analysed.

Chapter-V tries to show the extent of development that has taken place in Meghalaya till now. It has also analysed the problems relating to economic growth. The future priorities of economic growth and development, in terms of sustainable development have also been highlighted.

Chapter-VI describes the district-wise and region-wise levels of development in the State. Some of the factors contributing to the development of the region are dealt with. The latest Census data has been presented after an analytical study to substantiate all arguments.

The chapter-VII is the concluding chapter in which major findings, and observations are presented. In this chapter various problems are identified and steps to rectify the same are recommended.

After highlighting the general aspects of the State, it is interesting to note that unlike other states of North-Eastern India, Meghalaya is a

State having varying contrasting features. For example, the relief in the State varies from 150 metres to 1900 metres, the range of temperature ranges from 0°C to 32°C and the annual rainfall received in different parts of the State varies from 100 cms. to 1300 cms. In Meghalaya one can find many of nature's wonder like the Hot Spring at Jakrem and the River Island at Nongkhnum. The Ri-Bhoi region is known for its fertile alluvium plain whereas some pockets of West Khasi Hills and Jaintia Hills districts are not suitable for agricultural purposes. The State also boasts of numerous waterfalls, lakes and caves which have attracted the local and foreign tourists alike.

Therefore, in such a unique environment, it is important to enlighten the people about the above fact. The air, water and land of the State, though presently have not degraded much, nevertheless it is imperative that if it does, the consequences on the people would be disastrous. If the people are conscious of this fact then they, and their future generation will not face any problem with regard to a clean air, water and land.

Chapter VII

CONCLUSION

The thrust of this study is on sustainability as a process, which includes economic security and people's participation. Initially focus was on the different sectors of the environment contributing to economic growth. Focus is then shifted to the utilisation of resources. The notion that sustainability is a social contract, make people think that the advancement of science and technology can solve all problems irrespective of the extent of utilisation of resources.

The problem that the State is now facing is but symptoms of the worse things to come if the concept of sustainability is not imprinted in the mind of the people. Therefore, the concern for sustainability requires the attention of all the hierarchy of administrative machineries – traditional and modern, village level upto state level – to see that the process is initiated. This is true because sustainability will have no

meaning if people's participation and involvement in all the spheres of planning is absent.

Growth and development in any region is necessary and desired by all. But one has to study its implications since maintenance of the ecosystem is indispensable for the security and existence of the people in the years to come. Management of resources and natural processes must be done with great care as Wolfgang Sachs has rightly pointed out "ecological reform must walks on two legs; scrutinising means as well as moderating goals".[1]

The concept of sustainability is rarely discussed at the administrative organisational and bureaucratic level. The reasons for this are because there is an overlapping of the legislative and executive powers making it difficult to implement the different policies and programmes of sustainability. The vision of sustainability should be one that addresses the issues of power and policies directly so that there is no conflict of interests within the community. Therefore, all this requires that people's mind are imprint with a love and commitment for the land.

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[1] Sachs, Wolfgang (ed.) (1993), *Global Ecology: A New Arena for Political Conflict*, London.

This can be done by effecting a change in the behaviour of the institution and the individuals.

The State of Meghalaya has a rich flora, fauna and other natural resources. The districts of the State including East Khasi Hills district (which is a developed district) are to identify their ecosystem that are in urgent need of conservation due to the reckless exploitation of their resources. From such an exercise, the other areas in need of conservation will also emerge. This having been done, there will be a renewed thrust on sustainability in the State.

From this study it is observed that the East Khasi Hills district surpasses all other districts in the levels of development. This district has no doubt developed in the field of agricultural, industrial, infrastructural and different social factors through large exploitation of its resources. These resources are agricultural, mineral, power and forest.

The three districts, viz. Jaintia Hills, West Garo Hills and West Khasi Hills districts are the developing districts of the State. Though there may be some fluctuations in their levels of development in some sectors, they are by far more developed than other districts of the State apart from East Khasi Hills district. The other three districts, viz. East Garo Hills, South Garo Hills and Ri-Bhoi districts are the least developed

districts of the State. The above economic growth in the different districts, however, has had a tremendous impact on the ecosystem. For example, the Botanical Survey of India, Ministry of Environment and Forests, Government of India, states that

> "The rich flora of Meghalaya is exposed to a variety of external factors that adversely affect the flora. The generally recognized causal factors like population explosion, urbanization, settlements, developmental activities like road, dam, industrial and other constructions, different land use practices like jhum agriculture, conversion of natural forest to horticulture, industrial plantation, are all active in the State in a very significant way. Meghalaya is a developing state and is rapidly changing in terms of forest cover. Many climax vegetation seen a decade ago have been disseminated to secondary degraded types with poor plant diversity."[2]

Therefore, in the East Khasi Hills district the increase of population and the high density of population (Figure 13), besides degrading the environment, lead to high unemployment (Figure 4 of chapter III).

Out of a total of 64 'Threatened and Rare Taxa' of Meghalaya, 30 of them are indigeneous to East Khasi Hills alone. The Jaintia Hills and West Khasi Hills districts are the homes of another 8 threatened flora of Meghalaya. The above flora together account for about 60 percent of the

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[2] Mudgal, V. and P.K. Hajra, *Floristic Diversity and Conservation Strategies in India in the Context of States and Union Territories*, Vol.III, Botanical Survey of India, Ministry of Environment and Forests, published by the Director, BSI, Calcutta, 1999, p.1203-1206.

threatened flora of Meghalaya. The bulk of the threatened flora in the Garo Hills is found in West Garo Hills district. Thus we can conclude that economic growth – as far as the State of Meghalaya is concerned – has an adverse effect on the environment. Further, the fact that vices of all nature are high in the East Khasi Hills, Jaintia Hills, West Garo Hills and West Khasi Hills, all developed and developing districts of the State also point to the unhealthy relationship between economic growth and deterioration of the environment. Many more examples can be cited to substantiate this fact.

Thus the need of the hour is to see that utilisation of any resources does not lead to the deterioration of the environment. This is true because if environment were degraded the ecosystem will also be affected and the material needs of the people would be curtailed. If this happens, many people would be displaced and this would have adverse consequences and providing the needs of the future generation would also be hampered.

Findings, Problems and Recommendations

The following are the major findings of this study:

1. The State witnessed significant economic growth but very little economic development throughout the colonial period, the post-

independent period to the present day. Whatever economic development had taken place so far is insignificant considering the immense potential of the State. The lack of economic development during the pre-independence period is understandable due to undeveloped infrastructure. Nevertheless, it is to be noted that the people of the region had held in high esteem the social values during the days of yore. Ironically, today both the social and economic values have degenerated day by day leading only to social and economic growth but not development.

2. The region is endowed with rich and abundant natural resources. Some of these resources could have been utilized within the State for the people's benefit but sadly enough they have all along been exported outside the State. Different auxiliary industries – with proper planning – could have been set up based on the State's resources. For example, the majority of tribal population of Meghalaya is known to be meat consumers or a non-vegetarian community. The result is that a large amount of meat is consumed daily by the State's population leading to a huge collection of animal's bone. Instead of setting up of a bone crushing plant for the manufacturing of manure and fertilizer within the State, these bones are collected and sent to Assam for the

above purpose. After being processed outside the State, the finished products are again imported back to the State thereby incurring huge losses to the State in one form or the other.

3. From the result of the levels of development, the East Khasi Hills district is found out to be the most developed district of the State. However, this district is not the richest in terms of natural resources.
4. Though the West Khasi Hills district is one among the riches districts in terms of mineral deposits, surprisingly, it has no registered factory or industry. This means that the mineral resources of this region are either under exploited or exported outside the State, thereby depriving the people of all its benefits.
5. Though the per capita deposits in banks of the State are Rs.8496, the per capita advance or assistance is a mere Rs.1434 and the credit deposit ratio only 1:6. The per capita deposit to the per capita advance is decimally low in most districts and the State as a whole. It is only significant in South Garo Hills (41.95%) and the West Khasi Hills (30.38%). In the East Khasi Hills and Jaintia Hills districts where major economic activities are noted and per capita deposits the highest at Rs.21,051 and Rs.5268, respectively, the study reveals the per

capita advance of only 15.23 percent and 12.68 percent respectively. This means that though banks are receiving huge deposits, they are not inclined to advance loans to the people. This would naturally slow the pace of economic growth and development in the region.

6. The concept of sustainability was very much prevalent among the local population in one form or another from time immemorial. This study found out that with the introduction of new and modern hierarchy of administrative set up – where one would expect the strengthening of the age old practices – the reverse is the condition. Many flora and fauna have slowly disappeared and many more are on the verge of extinction. This is due to the callous attitude of the present administrative machinery and those persons assigned to look after the maintenance of the environment.

Problems

The following are some of the problems to be encountered while implementing the projects and schemes of sustainable development:

1. Illiteracy of the people is the first and foremost reason why schemes and projects to be initiated on sustainable development in the State could not be successful. Though the Census figures of 2001 show that

63.31 percent of the State's population are literate (according to the Census of India a literate person is one who can just read and sign his name). These are not really socially, economically and politically conscious of the ground realities of sustainable development. The oft-quoted statement of late Prime Minister Indira Gandhi "Poverty is the greatest polluter" holds true in this context. Therefore, if people are not really aware of the importance of protecting the environment for the need of the future generation, it is futile at this juncture to implement any scheme and project on sustainable development. In other words, the people have to be made to understand first, and then all other things would be viable.

2. The indifferent attitude and ineffectiveness of the state and district legislators and administrators about sustainable development is another obstacle that hinders tackling the problem effectively. Further, the frequent change of power and politicking within the state machinery has compounded the problem even more.
3. The inexorable of the people to switch over into different occupation, e.g. the switching of occupation (say) from shifting to settled agriculture or terrace cultivation, poses great problems in

implementing the scheme and programme for sustainable development.

Recommendations

The following are some of the recommendations suggested for making the state, society and the people in particular, conscious of sustaining their environment which would lead to sustainable development:

1. The state machinery should earnestly strive at improving the literacy rate particularly in the rural areas, as these are the areas where the impact of despoiling the environment is most evident. This can be done by strengthening adult education programme, literacy campaign, meeting the village chiefs and elders and explaining to them about the impact of environment if environment is recklessly degraded.
2. Environment Protection Laws like check to wanton felling of trees, banning of low-density plastic bags, checks on *jhum* cultivation, and others, should be promulgated and strictly enforced. Any one found violating the laws should be dealt with firmly according to laws.
3. The traditional institutions which have been doing commendable work of preserving the *Law Kyntang*, *Law Adong*, etc. should be encouraged

to continue doing the work. A status quo should be maintained as far as introducing new laws that may affect the environment.

4. The problem of disposing excreta, non-degradable waste and other waste materials particularly in the urban areas should be done in a manner that does not affect land, air and water. The authorities concerned should think in terms of recycling them back, thereby making the environment, clean and also creating job opportunities to people in different ways.
5. A separate department should be set up at the cabinet level to look into matters concerning the environment and its consequences. Officers of integrity, especially those who had contributed to the protecting and conservation of the environment, could be recruited to implement the different projects and schemes relating to sustainable development.
6. Schools and colleges could be encouraged to hold seminars, workshops, symposia to make students aware of their surroundings and the benefits derived from protecting and sustaining the environment. Essay writing by students could also be encouraged and prizes for the best essays be instituted.

7. Through the media like the newspapers, T.Vs, radios, books and write-ups awareness programmes could be initiated for the benefit of the masses. This could be done at least every month if not every week.
8. Decentralization of industries should be initiated and encouraged so as to make the environment cleaner.

If the above recommendations are considered for implementation, there would definitely be an awakening of the people and society on the need to protect the environment and its surrounding. This first objective having been achieved, things would slowly move into the direction of sustainable development. While stressing on the importance of sustainable development, it does not necessarily mean that growth should be curtailed. Exploitation of resources should only be within the limit of 'necessity' and not beyond. Further, the policy of specialization of different products should be encouraged at all levels. This having been done, the state would surely see a resurgence of growth which would be accompanied with an all-round economic development and a utopia economic condition of the people in the years to come. Thus the goal of sustainability in the State would be achieved and this can set an example to other states and regions of the country in general and the North-Eastern region in particular.