SUSTAINABLE DEVELOPMENT IN MEGHALAYA A GEOGRAPHICAL APPRAISAL

By

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I, ***Sansing Kharkongor***, hereby declare that the subject matter of the thesis is the record of the work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

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CONTENTS

		Page No.
	ACKNOWLEDGEMENTS	i - ii
	LIST OF MAPS	iii
	LIST OF FIGURES	iii
	LIST OF TABLES	iv
	LIST OF APPENDICES	iv
Chapter-I:	INTRODUCTION	1-29
Chapter-II:	CONCEPT OF SUSTAINABLE DEVELOPMENT	30-53
Chapter-III:	RESOURCES OF MEGHALAYA	54-84
Chapter-IV:	POLITICAL AND ADMINISTRATIVE SET-UP IN MEGHALAYA	85-110
Chapter-V:	ECONOMIC GROWTH IN MEGHALAYA	111-135
Chapter-VI:	LEVEL OF DEVELOPMENT BASED ON REGIONALISATION	136-176
Chapter-VII:	CONCLUSION	177-188
	BIBLIOGRAPHY	189-200
	APPENDICES	
	BIO-DATA	

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Dated: Shillong,
the 14th October, 2002

(Sansing Kharkongor)

List of Maps

1. Location of Meghalaya in India
2. Administrative Division 2001
3. Ri Hynñiewtrep
4. Agricultural Efficiency 2001
5. Agricultural Development 2001
6. Industrial Development 2001
7. Infrastructural Development
8. Socio-Cultural Development
9. Composite Levels of Development

List of Figures

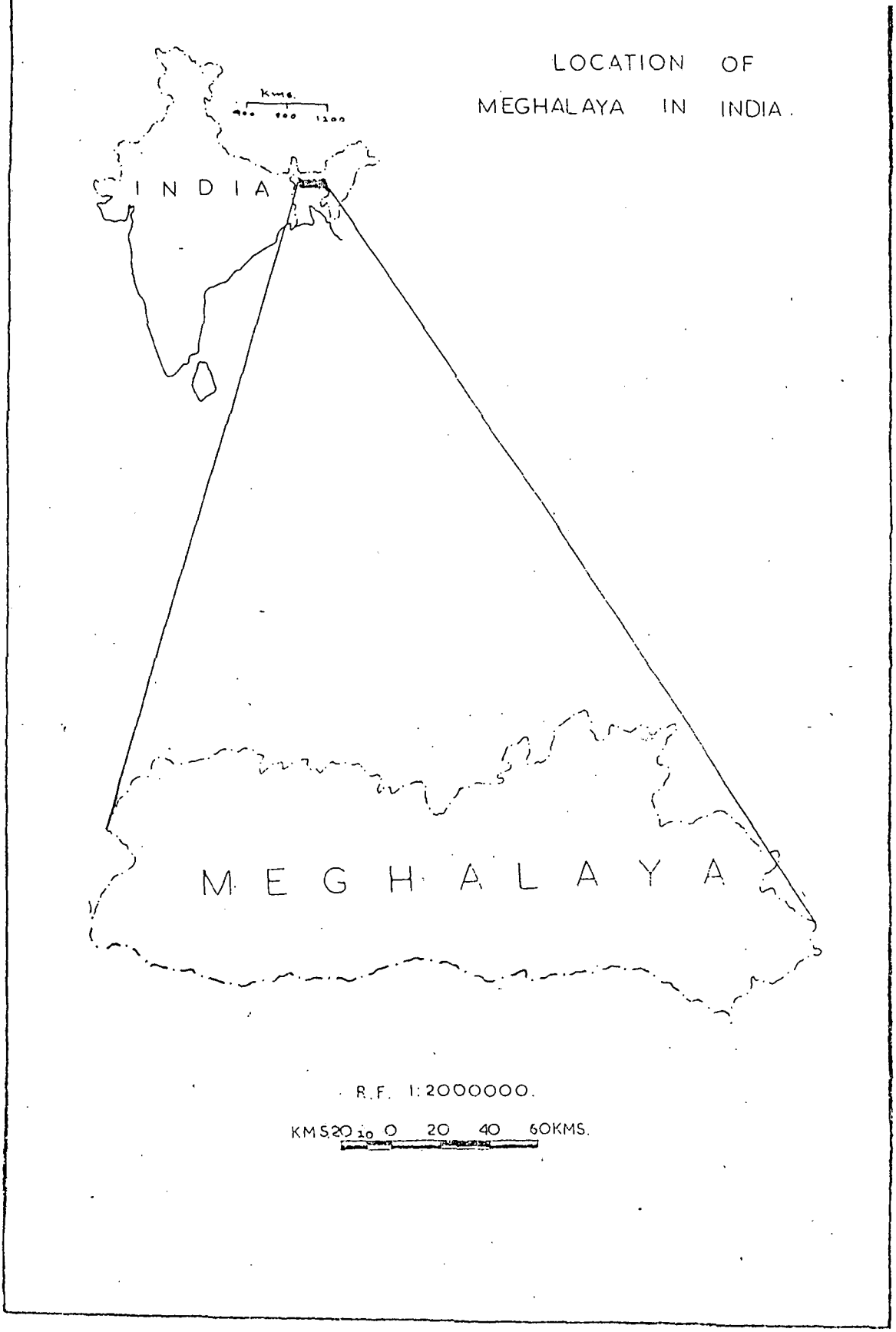
1. District-wise Area
2. Population 2001
3. Literacy 2001
4. Educated Unemployed
5. Area Under Some Selected Crops
6. Production of Some Selected Crops
7. Yield of Some Selected Crops
8. Villages Electrified
9. Post Offices
10. Telephone Exchanges
11. Public Call Offices
12. Biogas Plants
13. Density Of Population 2001

List of Tables

Title of the Table	Table No.
Basic Statistics of Meghalaya (2001)	1
Production of Sillimanite	2
Literacy Rate in Meghalaya	3
Existing Hydro and Thermal Power Projects in Meghalaya	4
Proposed Hydro Projects	5
Annual Generation and Utilisation of Power in Meghalaya	6
Utilisation of Power in Meghalaya	7
Distribution of Forest Cover in Meghalaya	8
Small Scale Industries in Meghalaya	9
Road Networks in Meghalaya (1996)	10
Allotment of Funds for Transport	11
Some Selected Social Amenities of Meghalaya	12
Some Indicators of Banking Sector of Meghalaya	13
Agricultural Development	14
Industrial Development	15
Infrastructural Development	16
Socio-Cultural Development	17
Composite Development	18

Appendices

Agricultural Efficiency Indices	1
Some Selected Crops and Horticultural Products of Meghalaya	2
Road Linkages and Distances in Meghalaya	3


LOCATION OF
MEGHALAYA IN INDIA.
Kms.
400 800 1200
INDIA
MEGHALAYA
R.F. 1:2000000.
KMS.20 10 0 20 40 60KMS.

MAP. 1.

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

[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

---

[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.

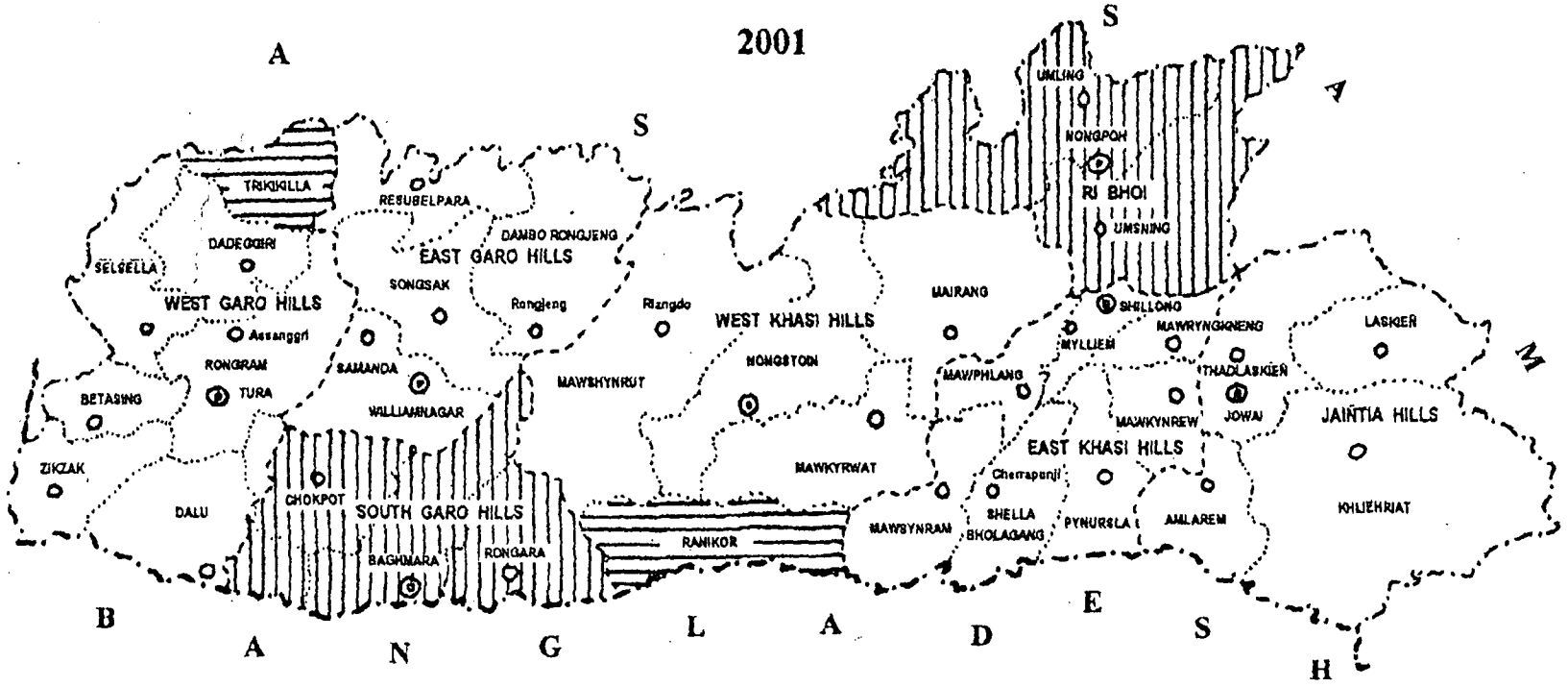
[5] Singh, R.P., "Geomorphology of the Shillong Plateau of Assam" in H.P. Das and A.S. Rao (eds.) *21st International Geographical Congress India – 1968.*

MAP 2

MEGHALAYA

ADMINISTRATIVE DIVISIONS

2001



BOUNDARIES:

INTERNATIONAL

STATE

DISTRICT

C.D. BLOCK

HEADQUARTERS:

DISTRICT

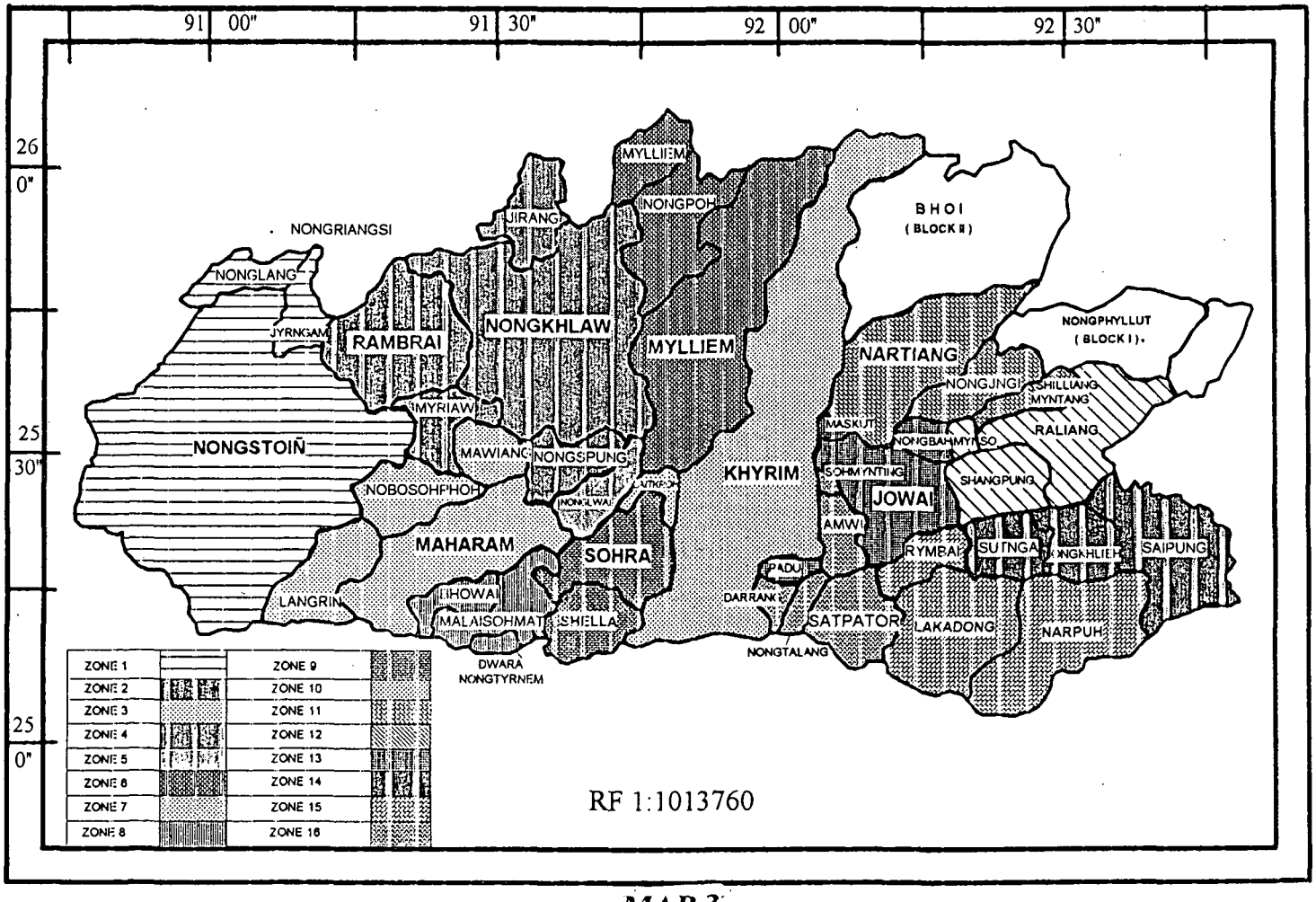
C.D. BLOCK

10 5 0 10 20 30 Km

NEWLY CREATED DISTRICTS

NEWLY CREATED C.D. BLOCKS

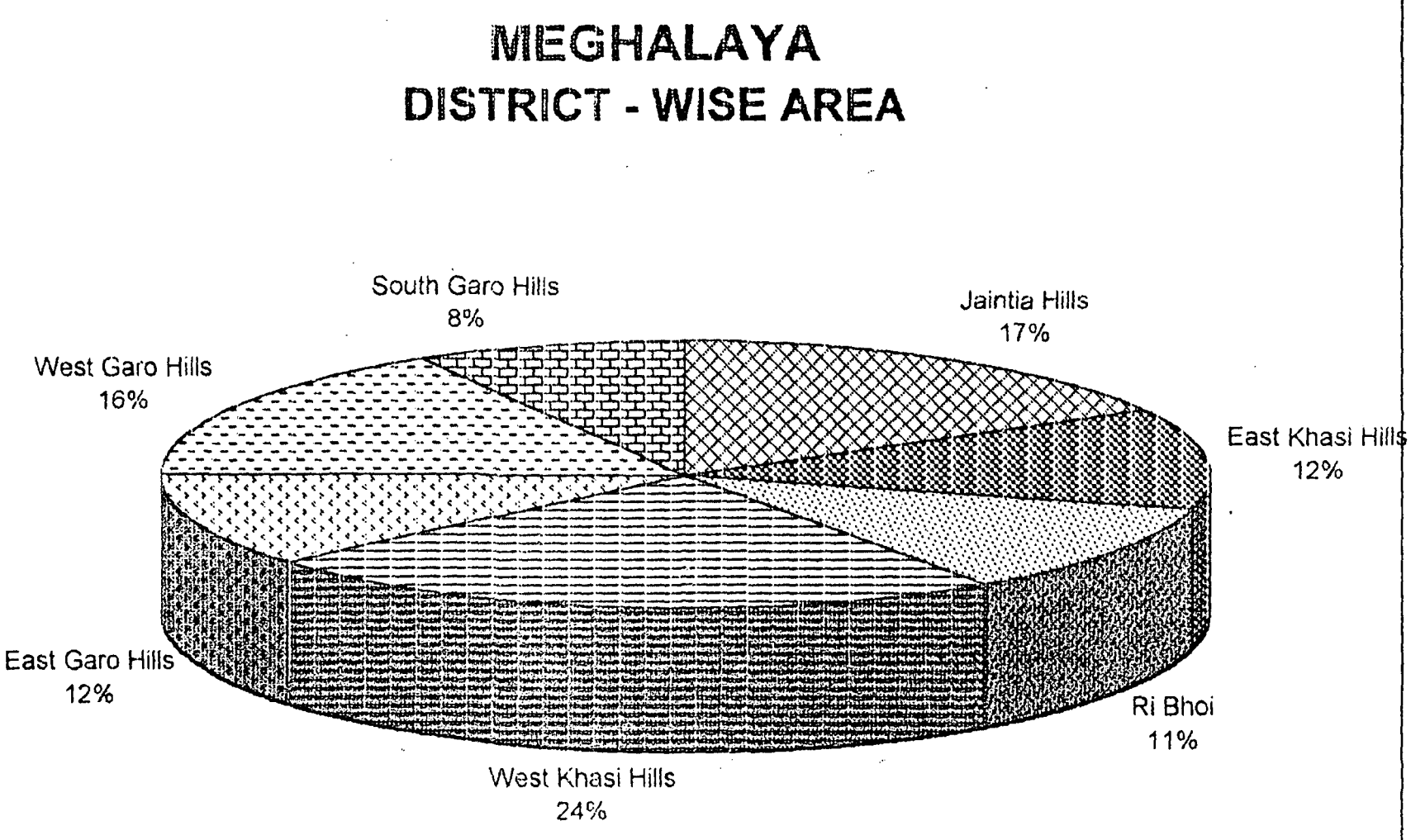
MAP OF RI HYNÑIEWTREP



MAP 3

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

FIG. 1

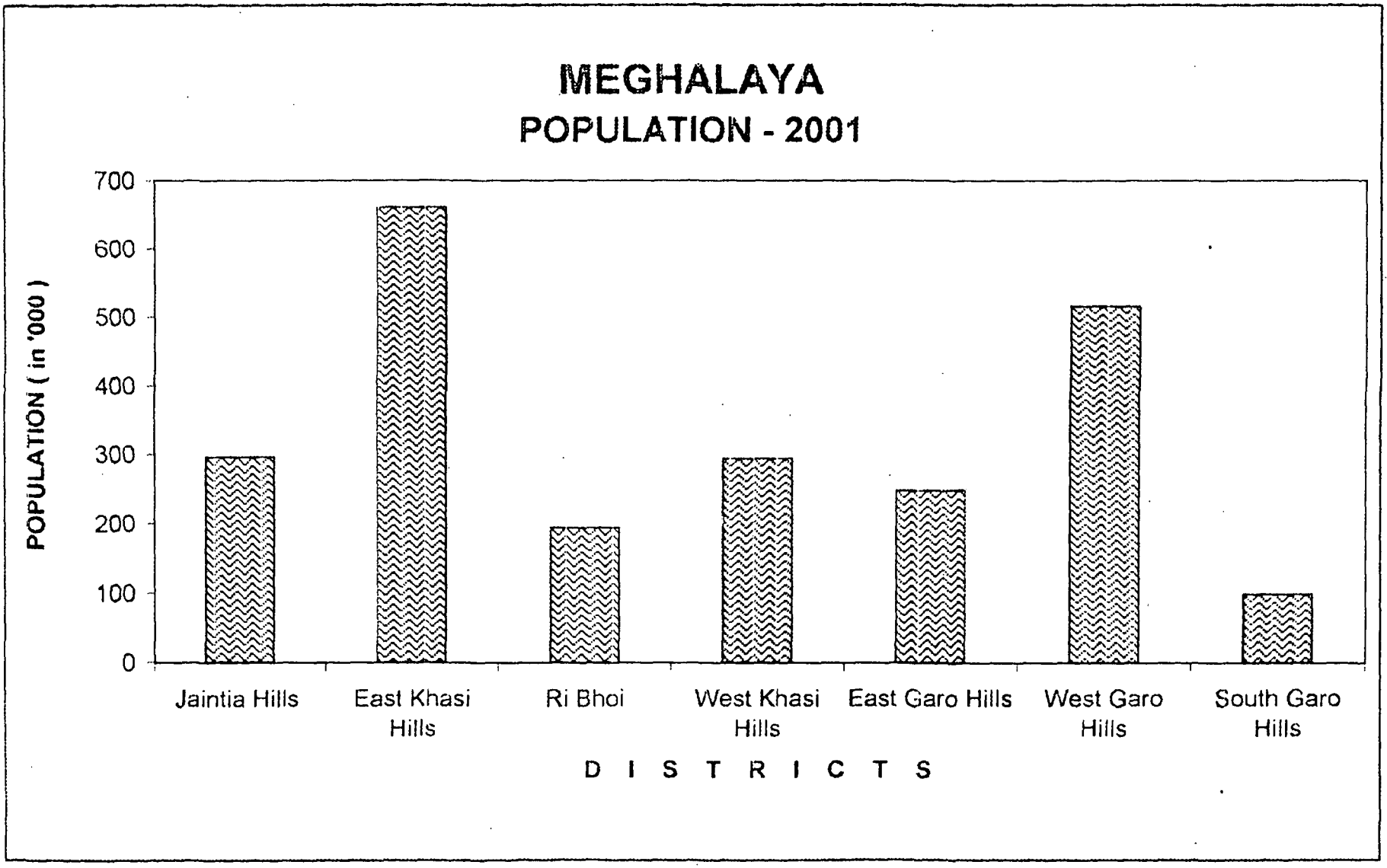

MEGHALAYA
DISTRICT - WISE AREA
South Garo Hills
8%
Jaintia Hills
17%
West Garo Hills
16%
East Khasi Hills
12%
East Garo Hills
12%
Ri Bhoi
11%
West Khasi Hills
24%

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

[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 silt[illegible] 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-II

CONCEPT OF SUSTAINABLE DEVELOPMENT

It is an accepted fact that our world will be a much comfortable and better place to live in, in the years to come. However, what will be the nature of the environment in the years to come is anyone's guess. Will the future generation be able to see and name the different flora and fauna? How clean would the air then be? – are few questions that need to be answered. Today in many parts of the world, including Meghalaya, people are buying water for their daily uses. The reasons are many. Suffice it to say that, what guarantee can the various administration give, the water that would be provided in the future will be a safe and pollution-free. It is worthwhile to say that some hundred years ago land was free for man to till and work according to his need, so also was water and air. But today empty air space – not to mention land and water – are sold. One would not be surprised that in the near future air to breath may also carry a price tag in some forms or the other.

There is an immediate need to check this rapid deterioration of the quality of environment. The world community and society should evolve some concrete measures to sustain the environment. Thus the word 'Sustainable Development' was coined by the World Commission on Environment and Development (The Brundtland Commission) in its report *Our Common Future* in 1987. The Brundtland Commission in its finding defined the word 'Sustainable Development' "as development which meets the need of the present generation without compromising on the need of the future generations to meet their own needs".

According to the investigator sustainable development can be defined as development that does not only aim at quantitative improvement but also a qualitative improvement of the population. It is not only important that the standard of living of the people is to be raised but their perception towards each other and the environment should be change – since man is a social being who needs the support of society for his survival.

The definition given by the Brundtland Commission on sustainable development stated thus:

> "Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to

> meet their needs. The concept of sustainable development does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be managed and improved to make way for a new era of economic growth... In the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs." (*Our Common Future*, World Commission on Environment and Development, 1987)[1]

It is a fact that there cannot be development without growth. First there has to be growth then development would follow. But with growth there is deterioration and despoiling of the environment. Therefore, the global community must take note of sustainable development, sustainable growth and the future environment, whether it could still sustain the world community in the years to come.

On account of the development and advancement in science and technology man has been able to tap the different natural resources for his use, to make his life easier and comfortable. Sad to say, but this advancement in science and technology and the availability of natural

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[1] Ghosh, R.N., Ray, B and Roy, K.C. "Sustainable Development: Some Issues" in R.N. Ghosh, R. Gabbay and K.C. Roy, *Sustaining Development. Human Resources, Gender and Environment*, p.251.

resources is confined to few countries of the world. The developed nations have developed in all spheres of activities by exploiting the resources to the fullest possible extent. However, their cumulative action has resulted in the rise in the sea level, global warming, deforestation, soil erosion, desertification, and many other problems affecting mankind. In addition, rampant use of resources also has resulted in some resources becoming scarcer and not available for use. To make up for this, more of other resources have to be used through the induction of more trained people and the introduction of new technology. Therefore, the growth of population with technical progress results in the economic growth of a country.

In this regard, one can restate the first law of thermodynamics, which states that matter and energy are fixed and therefore cannot be created or destroyed. The second law of thermodynamics states that as energy is converted from one form to another, there is a dissipation of energy. Therefore as population goes on increasing resources also has to be used and exploited. In this process the non-renewable resources once used are loss for good as they are being converted from one form (matter) to another and their inherent energy also get dissipated in the process.

Moreover, as resources become scarcer and energy being lessened as they are converted from one form to another, a time would come when the world would be bereft of the resources required – since much of the resources by then would be changed to another form or matter. Now, is the world community accountable only for the present population and not think of the future generation? Are some of the questions that need to be answered by all and sundry. There is a debate today on what is more important the present hungry population or the future generation to come. The fact of the matter is that both are equally important.

Thus one can argue that the impact of environmental problems such as global warming, ozone depletion, water pollution, destruction of bio-diversity etc. are not the problems of one nation but matters of global concern. It was this concern that led to the evolution of the United Nations Conference of the Human Environment. The United Nations Conference on Human Environment first met in 1972 at Stockholm, Sweden, where many nations – rich and poor – took part. In 1992 the second meeting, which was held at Rio-de Janeiro, Brazil came to be known as the First Earth Summit. Needless to say, during the span of twenty years, i.e. between the first summit in 1972 and the second

summit in 1992, many remarkable changes have been observed in the world. Firstly, people have become more aware and concerned for their environment. Secondly, many nations of the world have created separate ministry to deal exclusively with the environment. Thirdly, numerous environmental treatises relating with the environment has been signed by many nations. Lastly, a worldwide network was established to monitor and assess the global environmental degradations.[2]

In 2002 after a gap of ten years the Second Earth Summit was being held at Johannesburg, South Africa to deliberate on the despoiling of the earth. This Summit, which concluded in Johannesburg, South Africa in the last week of August 2002, pledged to reduce world poverty and take suitable measures to safeguard the fragile eco-system. The Summit also issued a declaration whereby 189 states affirmed their commitment to rake the more than two billion poorest world's population out of their miserable condition and to restore and nurture the damaged environmental web that sustains all of earth's life. The strategies evolved for achieving sustainable human development is that which reduce

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[2] Mallikarjunaiah, S. "Global Environmental Education – Vision of 2001 in P.R. Trivedi and U.K. Singh, *Global Environmental Education – Vision of 2001*, Indian Institute of Ecology and Environment, p.11.

poverty, create employment opportunities, and strengthen social integration, among other things.

The statement issued by the submit stated that

> "The deep fault line that divides human society between the rich and the poor and the ever-increasing gap between the developed and developing worlds pose a major threat to global prosperity, security and stability."[3]

It painted a stark warning of the planet's ecological health, making the exceptional assessment that global warming was no longer a future peril it was already starting to affect the climate system.

In the light of these development and concern on environment, there emerged a need to study about the scale, extent and impact of degradation and deterioration of the environment in the country particularly in the State of Meghalaya. This study, therefore, endeavored to do just that.

Indian Approach to Sustainable Development

The nation's concern of the environment and the need for sustainable development was clear from the speech made by the late Prime Minister Indira Gandhi at the Stockholm Conference in 1972. She clearly stated, "Poverty was the greatest polluter". This culminated in her

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[3] Akbar, M.J., *The Asian Age*, 6th September 2002.

strongly advocating for family planning programmed among other things in the country. The setting up of the National Committee on Environment Planning and Coordination to look into environmental degradation in the country and the establishment of the Ministry of Environment in 1981 further shows that the country is trying to initiate steps for sustainable development.

The approach to the Eighth Plan (1990-95) document while laying stress on sustainable development, laid down the following objective:

> "... Improvements in the standards and quality of life of the people have to be based on sustenance of life support systems through conservation and regeneration of the natural resource base. The present generation owes this not only to itself but also to future generations and to myriad other species with which its survival is organically and irrevocably linked. What is needed is an ecological imagination that informs development thinking.
>
> "... There should be more rigorous scrutiny of the environmental impact of every development scheme, and ecologically sustainable development accepted as an end in itself" (p.44).[4]

Growth and Development

Development is synonymous with 'growth' and often these two words are used arbitrarily to carry about almost the same meaning.

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[4] Ganguly, J.B. *Sustainable Human Development in the North-Eastern Region of India*, Regency Publication, New Delhi, 1996, p.16.

However, this is a misconception. 'Growth' is the process of growing up in quantitative attributes whereas 'Development' implies an overall improvement in qualitative and quantitative attributes. Even before the term Sustainable Development became popular, this issue had emerged when there was an attempt to distinguish between Growth and Development, making the latter a more comprehensive concept. It was realized that there was need for a broader concept, which would do justice to the requirements of the developing countries to improve the quality of life of the masses, and to remove poverty and hunger. Though "development became an imprecise term in the process, it became more sensible and relevant to developing countries.[5] There can be growth without development but not vice-versa. Economic growth means improved living conditions of the people. One often hears of the term "Gross Domestic Product or Growth" but not "Gross Domestic Development". Most nations' Gross Domestic Product usually shows an upward increase year after year. This increase in the overall Gross Domestic Product gives rise to an increase in the Net National Income, which leads to an increase in the per capita income of the people.

[5] Shukla Amitabh, *Regional Planning and Sustainable Development*, Kanishka Publishers & Distributors, New Delhi, 2000, p.236.

Therefore, though the Net National Income may increase, the qualitative attributes of the nations may stagnate or may even show a downward decline. Therefore this is an economic growth and not development. Economic development means general improvement of the well being of society. This will imply the rise in the standard of living of the people with regard to health, education, social amenities and others. The freedom of speech, religion and political liberties and the freedom to freely exercise one fundamental right are all basic parameters of economic development. The aim of all government is to raise the economic as well as the social status of the people.

The term 'growth of population' is often referred to mean an addition of more people to the already existing population. This addition – as one understands – is only in quantitative term and not qualitatively. This term is different from 'development of population' a phrase not so often heard off. Thus the aim of all government and good governance is for sustaining economic development and not merely economic growth, as this is necessary for the people and society.

When the term 'development' rather than 'economic growth' is used in the study, one has to overlook the limitations that crop up while taking Gross National Product or Gross Domestic Product as the indicator

that measures the well being of the nation. Further, since development is concerned with providing better quality of life to the people the concept of 'sustainability' means that in so doing, a policy should be worked out so that all developmental achievements last long into the future.[6] This is needed since most of the past developmental activities have benefited the people only in the short run. Sustainable development should strive at working out a minimum set of conditions for all development to be sustainable. This should be done keeping in mind that the 'Natural Capital Stock' is not reduced over the years but remain constant if not, increased.[7]

Before going further in this, there are several concepts supporting sustainable development that can be pointed out here. Firstly, for sustainable development to be viable there has to be an economic growth since only through an increase in the per capita income of the people can one thinks of improving his well-being; secondly, an economic development policy based on sustainability should be one that ensures equal distribution of the fruits of development to the society, irrespective of caste, creed, class, etc. and thirdly, the global community, as one,

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[6] *Ibid.*, p.21.
[7] Peach, David *et al.*, *Sustainable Development* (1993), p.ix-x-1.

should feel the need for protecting the environment. Protection of the environment has become a global concern for all nations. Mankind today has either to conserve the environment or face self-extermination. Today, any development that destroys the environment destroys development in the long run. Conversely, any development that conserves the environment conserves the fruits of development. The relationship between the two, i.e. development and environment is therefore a symbiotic one. This fact is important because, only if all nations and heads of states fully understand its long-term implications, can the efforts by some nations and states to sustain the environment be effective. Its wider and global implications lie in the fact that the different areas like the ozone layer, the emission of green house gases and conservation of biodiversity are all global phenomena.

Dimensions of Sustainable Development

Dimension is a multi-dimensional process, which at times cannot progress due to certain forces at work. According to the M.A. Qureshi,[8] the following are some of the dimension of sustainable development.

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[8] Qureshi, M.A. "Science and Technology: Policy and Sustainable Development", *Journal of Scientific and Industrial Research, Vol.49*. September 1990, p.437.

1. Geographical sustainability, which required that developmental programmes do no harm to the landscape.
2. Biological sustainability which ensures that living things of the biosphere are not depleted, since elimination of one specie may result in a change reaction resulting to the elimination of other species and ultimately man himself.
3. Ecological sustainability sees to the judicious and rationale use of resources.
4. Social sustainability ensures that development should also see to an equitable growth of the income and standard of living of the people.
5. Cultural sustainability is that which see that the process of modernization have indigenous roots since the coming of western culture has brought about with it many negative elements detrimental to society.
6. Demographic sustainability sees to the balance growth of population both in the rural and urban areas.
7. Economic sustainability is that which try to achieve a continuous flow of investment, and tries to ensure a more equitable distribution of economic benefits to the masses.

Applicability of Sustainable Development in Meghalaya

For the people of Meghalaya, land is a divine gift to man, to tilt and cultivate for man's survival during his short sojourn on earth. Over exploitation of land and wanton felling of trees was never permitted and even taboo in some cases. For example, a Khasi is expected to work and earn honestly in the land that God has given him without any deceitfulness.[9] The Khasi believed in the principle of 'one for all and all for one'. Most things are done collectively by the village/villagers in the traditional Khasi community. In agriculture right from the time of clearing the forest for agricultural purposes to the harvesting period, all works are done collectively by the community or the village. In other words the villagers collectively, clear the forest, sow the seeds, harvest the crop, and thresh it. They do this by turns going from the field of one family to another.

The Khasis rightly believed and strove for the economic development of the entire community. This was well in line with their understanding of development of the community as meaning development of the individual. This is true because when the village

[9] The oft-quoted saying *Kamai ïa ka Hok* is a popular maxim followed and revered by the Khasis till lately.

community as one works together, there is a feeling of oneness in the society. The elders are respected and given their place of importance, the women and children get their due share of recognition and status and this makes the society a close knit one. In such a society, theft, murders and different kinds of vices are minimal. This is so because people are ashamed to commit these crimes because if they are caught they will be shunned by society and may even lead to them being ostracized by their community. According to B.C. Allen in 1904, the total crimes reported was 131, of which 77 were detected.[10]

It is observed that till today construction and clearing of roads and playgrounds, fighting against social evils in the society and completing the funeral rites of persons are collectively done by the village or community in a Khasi society. Similar is the case in the Jaintias and Garos communities.

Concept of Sustainable Development in the Realms of Agriculture

Agriculture is indispensable for the survival of society. Therefore to cater to the ever-increasing demand of agricultural products the farmer has to improve his farming techniques, switch over to mechanisation of

[10] Allen, B.C., *Gazetteer of the Khasi and Jaintia Hills, Garo Hills, Lushai Hills*, Gian Publication, Delhi, Table VI & X.

agriculture, improve the transport and marketing facilities, increase international trade in food products and take various other measures. All this is aimed at providing the world community with adequate agricultural products. However, in trying to meet the above demands, the farming communities in different parts of the world have over-exploited and degraded the environment so much so that the very resources that agriculture depends upon, i.e. soil, water and air has deteriorated. Soil has been degraded by over application of chemical fertilizers, pesticides, insecticides and others. Water has been polluted by the run off from agricultural fields, which are contaminated by the above crop enhancing substances. Air contains more of smoke, dust and smog and frequent inverse of temperature takes place because of *jhum* cultivation.

To add to this, the problem of over-production and storage facilities of the produced, displacement of rural population and international trade are some of the difficulties that are encountered. These problems led to cold war between different nations and sometimes between producing nations. For example in 1979, when tension mounted between the United States and Iran over the fifty plus American hostages held by the Iranian Government, the United States – which was supplying

large quantities of wheat to Iran – had to dumped all the wheat meant for Iran to the sea on account of storage problem.

Therefore it is expedient from the environmental point of view to see that whatever agricultural activities undertaken, a balance has to strike between farming methods, national resource and environmental protection. If such a move were initiated, agriculture would be more viable and sustainable for a long time to come.

During the 1980s in the State of Meghalaya, there has been a reckless and unscientific overdose application of chemical fertilizers, insecticides, pesticides, etc. for the sole aim of increasing the yield in agricultural production. This move has today backfired with a disastrous effect on the people of the State. It resulted in most of the land today, particularly in the East and West Khasi Hills districts, becoming unproductive and barren. As a result of the desertification of land, farmers are compelled to abandon their age-old traditional occupation. This leads to other repercussion on the economy of the state and society at large. Firstly, the state is deprived of the different crops usually produced by the farmers, compelling it to import these crops from outside the State. Thus, the revenue earned would now result in revenue loss to the State Exchequer. Secondly, many people are forced by circumstances

to leave their villages in search of their means of livelihood in other places. However, a majority of them generally end up in urban areas, which are already overcrowded. Further, their flocking to the city compounds the existing social evils and vices already prevailing in the cities. Thus the urban areas have to take the brunt of all on account of agriculture.

Concept of Sustainable Development in the Realm of Industry

This is another sector the society is bound to develop since industrial growth is the backbone of modern economic development and societal upliftment. The 'Group of Eight'[11] constituting the eight most industrialised nations of the world is looked upon by other nations of the world as the benefactor and aid donor of the world community. This proves beyond any shadow of a doubt the importance of being an industrialised nation. Though there are several negative aspects of industrialisation, industries do play a significant role in solving human problems.

Thus in such a situation, the environment-industrial relationship should be one that improves the rationale management of resource and its

[11] The Group of Eight includes the United States of America, Great Britain, France, Germany, Italy, Japan, Canada and Russia.

competitive position. Secondly, it should highlight the different information to the consumers so as to gain their confidence and set aside whatever prejudices they have on industrialisation. Thirdly, it should ensure quality production of items, and finally relationship should be one that accord special consideration for small-scale and cottage industries. If these guidelines are followed, industrial development can sustain for a longer period of time and wasteful exploitation of resources can be curtailed.

Most of the industries set up in the State of Meghalaya today are profit oriented. Industrialists and entrepreneurs of the State are at present setting up different industries in different areas with scant regard for the environment and sustaining it.

The setting up of the Mawmluh-Cherra Cement Limited (MCCL) at Mawmluh near Cherrapunjee (Sohra) – a medium scale industry of the State – has no doubt brought substantial revenue to the State. However, the investigator has observed that the unscientific and unplanned extraction of limestone (the main raw material for this plant) in the region has totally disfigured the landscape. Further, the smoke emitted from the factory has had tremendous impact on plants, trees, birds,

insects, fishes, etc. of the region. The landscape has become devoid of any vegetation, few birds and insects are seen in its sky, and all forms of life in the rivers are virtually absent.

Some of the few notable factories that have precipitated the deterioration of the environment in the state includes stone crushing works, lime kiln, refractory brick, plywood and veneers factories, automobiles repair works, pharmaceuticals, tablets and pills factories, etc.

The need of the hour is to enlighten people on the impact of the above and other industries, which would cause immense harms to the environment. Therefore if steps are not initiated to curb and streamline their haphazard growth, the coming up of the different factories and industries in an unplanned manner will have a far-reaching effect on mankind.

The Concept of Sustainable Development in the Realm of Transportation

The key to agricultural, industrial and economic development of society is a good transportation network. The present trend of modern society of transportation network is moving towards congestion, pollution, wastage of time and value, damage to health, danger to life and general economic loss.

For a sustainable transport mobility the following measures have to be adopted: Firstly, planning has to be done at the local, regional, national and international levels to improve transport network once and for all. Secondly, public transport system should be encouraged to compete so as to attain efficiency in the long run. Thirdly, technical improvement of vehicles and fuels should be brought about so that in future only vehicles using less polluting fuels are allowed. In this regard, Delhi has taken a bold step by prohibiting the plying of diesel buses on its streets. Only those public vehicles using Compressed Natural Gas (CNG) as fuel are permitted to ply on its roads. Lastly, there should be a move for the introduction of a more environmentally friendly family car along with changes in driving rules and habits.

Therefore, in the light of these and other development, there is a need to make the people aware of these unhealthy practices. In so doing, it will directly and indirectly helps in sustaining the environment.

Government and Non-Government Organisations: Their Role in Sustainable Development

The first step in sustainability in Meghalaya was the State's Government initiative in ordering a ban on cutting of trees in the State. The dawn of the millennium saw this ban vigorously implemented by the

State Government; as it was also the Supreme Court order. Next, the Government of Meghalaya initiated various measures like encouraging farmers to start terrace cultivation, mono-crop farming, growing of commercial crops, starting of horticultural farms, orchard plantation, etc. to dissuade the people from continuing with shifting cultivation. Further, reckless mining and quarrying in different parts of the State have been checked so as to curtail the disfiguration of the landscape. The latest move by the State Government was the ban on the use and sale of low-density plastic bags in the State.

All these measures show that the State Government is aware of the fact that if immediate steps are not taken to check the wanton destruction of the environment, the need of the future generation to meet their own needs is bleak.

Further in Meghalaya, some Non-Government Organisations have come out strongly in support of the preservation of the environment. A non-government organization named "The Meghalaya Environmental Active Legislators" or MEAL was established in recent years. This organisation's aim is to make the State green and pollution free. The different organisations and society like the "Meghalaya Adventures Club", All Meghalaya Adventure Academy, Hynñiewtrep National

Geographic Society, The Mother's Earth Society, The Shillong We Care Society, The Meghalaya Environment and Wildlife Society and "The Meghalaya Heritage Society", just to name a few, have surfaced in the State with similar objectives as the MEAL. The aim of these and other non-governmental organisations is to either directly or indirectly to preserve or conserve the environment and the beauty of the State for the future generation.

The world community today is trying its best to find out ways and means to initiate steps for sustainable development. India too has begun taking concrete measures to sustain her land. In Meghalaya, the working together of the community in all spheres of activities has helped in achieving sustainable development to some extent. What is more needed today is the government's initiation and active participation of the people to strengthen this cause. In fact the concept of what is more important is economic growth; sidetracking economic development, is a dangerous notion. Both are equally important and needed by society. However, it is important to note that while trying to achieve economic growth and development, there must be minimum despoiling of the environment to achieve sustainable development.

Growth and development can be achieved through the realms of agriculture, industry, transportation and others. However, these different sectors contributing to growth and development have to bear in mind the maintenance of the quality of the environment for sustainable development. Since the government is unable to effectively press for achieving these goals, for obvious reasons, the role of different non-governmental organisations doing the task has to be appreciated and encouraged. The different N.G.Os have thus far been able to check the mismanagement in the preservation of the environment in the State.

CHAPTER-III

RESOURCES OF MEGHALAYA

According to the Oxford Dictionary of Current English "'Resource' is a country's collective sources of wealth". This is a broad definition of 'resource'. "Resource" in the strict sense of the word includes many things. For this study resource has been broadly divided into the following groups:

1. Mineral Resources: Under this head would include all the minerals found in the earth's surface, which have contributed either directly or indirectly to the economic growth and development of the people.
2. Human Resources: This would include man's physical ability, endurance and prowess coupled with his mental capacity, wisdom and intelligence all used for the welfare and economic development of society.
3. The Power Resources: All the forces of nature like the wind energy, the geothermal energy, the solar energy, the tidal energy and waterpower come under this head.

4. The Agricultural Resources: The richness of the soil which helps bring forth good agricultural harvest year after year is the agricultural products or the agricultural resources. However, this particular resource is not fully independent but dependent on certain factors like climate, dexterity of the people, the government policy and other factors.
5. Forest Resources: Forest plays an important role in the economic development of a region. It directly provides man with some of his basic needs particularly with regard to food and shelter. Indirectly, it provides man with raw material for setting up of different factories thereby providing employment to hundreds and thousands of people. Further, this resource is the most susceptible to extinction if proper steps are not initiated for its wanton destruction. However, this resource is renewable and replenishable and can sustain for a long period of time, if its proper and judicious use is undertaken.

1. The Mineral Resources of Meghalaya

The State of Meghalaya is endowed with a rich variety of mineral resources and is next only to Assam in terms of quantitative and qualitative deposits of minerals among states of North-East India.

Coal: This is one of the most important minerals of the State. Coal was extracted right from the time it was first discovered in the region in 1815 by Mr. Stark. At that time coal was offered for sale at one rupee, eight *annas* per *maund* by Mr. Stark.[1] Since there were no takers at that time, no work was taken up at the mines. It was only in 1832 that Mr. Cracroft made known about the presence of coal beds in the vicinity of Charrapunjee (Sohra).[2] Thereafter, coal was discovered in other parts of the Khasi and Jaintia Hills District and later on in the Garo Hills District. Between 1840 and 1844, a good amount of coal was exported from Cherrapunjee (Sohra) to other parts of the country. This was the genesis of coal exploitation in Meghalaya. The total estimated reserve of coal in Meghalaya is about 501.9 million metric tonnes[3] and the total production between 1999-2000 was 4,060 thousand metric tonnes.[4]

The following are the coalfields of Meghalaya:

The Khasi Hills region: In the Khasi Hills district coal is found from Sohrarim to Cherrapunjee in an approximate 31 Square Kilometres

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[1] Thomas Oldham, *Geology, Meteorology and Ethnology of Meghalaya*, Mittal Publications, reprint, Delhi 1984, p.57.

[2] *Journal of Asiatic Society of Bengal Vol.I*, pp. 250 & 252.

[3] Nandi, Kamal. "Resource Potential of North East India", *Meghalaya Science Society*, Vol.I, 1982, pp.A20-21.

[4] Lyngdoh, W.L. "District Level Statistics 2002", Government of Meghalaya, Directorate of Economics and Statistics, Meghalaya, Shillong, 2002, p.19.

area. Laitryngew, Mawmluh, lower and upper Cherrapunjee (Sohra) regions, are some of the important coal producing areas of the Khasi Hills. To the west of Laitryngew coal is found in Laitduh area. It is also found in Mawbehlarkar, Mawlong, and Wahlong in the Shella Bholaganj Community Development Block.

In the Mawsynram Community Development Block coal is found at Rangsokham, Jathang, Moisngi and Lumbidon all within Mawsynram area. The Nongstoin Community Development Block boasts of the Langrin, Goalbari, Barsaura, Mongokhor Khonjoy, Nongplu-Nongjion, Sohling, Nangmawli, Nongmaharu, Um Tongkut and Kushang coalfields. Coal is also found around the following river basins of the Nongstoin Community Block, i.e. Um Mawblei River, Um Bytit River and Wah Rangah streams.

The Jaintia Hills Region: In this region coal is abundantly found at Umlatdoh and Pamsaru of the Lakadong area. In the Bapung area coal is found in Jarain and Tkhentalang. Another important coal producing area of Jaintia Hills District is Sutnga area.

The Garo Hills Region: Coal is extensively found in the East and West Darranggiri. In the East Darranggiri areas, coal occurs at Jangkhre, Mermelsaram, Rengdim-Agalgithim, Nabru, Holwang Baljong, Dogring,

Asilgaon Hill and the Kylas Hill. In the West Darranggiri area Nangwalbibra and Rongkhandi are two important coal-producing areas.

Another coal producing areas of the Garo Hills are Rongrenggiri, Pendengrew-Balphakram and the Siju coalfields. The notable coalfields of the Siju areas are Rakmanggiri, Siju-Songmong, Dapsi-Garogithim, Dapsi-Khosgiri and Table Nala.

Coal of Meghalaya is at present exported to Assam and Bangladesh. The lower grade coal is used for the running of locomotive engine and steamers and in factories. Some quantity of this mineral is used by the local people to warm themselves during winter. Some of the local hospitals use coal for their boiler, the water and heat thus generated, is being used for their various works. The small-scale factories of the State also use the local coal and coke for their day-to-day uses. However, with the inventions of various modern electrical appliances which are easy to operate and pollution free, the use of coal for this purpose is fast on the decline. The use of coal for other purposes like the manufacturing of coal tar, *naptha* and others has yet to be taken up in the State.

Limestone: Limestone is one of the oldest minerals exploited in Meghalaya. Since 1750's Mr. Robert Lindsay is believed to have extracted this mineral and export it outside the region. Messrs Duncan

and Gibson and Mr. Inglis were the other Europeans to have worked this mineral during that time.[5]

Limestone bed with a thickness of 75 feet was first discovered near Cherrapunjee (Sohra). It is estimated that the region has an estimated reserve of 40 million metric tones of cement grade limestone. Two areas viz. Mawmluh and Mawsmai have an estimated reserve of 4.25 million tones and 7 million tones of high-grade limestone respectively.

The Laitryngew area has high-grade limestone particularly in Umstew and Mawkma. A large deposit of limestone also occurs in the Mawlong-Ishamati-Shella region to the south of Cherrapunjee (Sohra) abutting the Surma valley. The Therriaghat and Komarrah areas are other limestone producing areas in the south of Meghalaya. East of Cherrapunjee (Sohra) good quality limestone deposits are found in the Pynursla area particularly at Langkyrdem and Thangjinath. The total estimated reserve of limestone in the Khasi Hills region is about 900 million metric tonnes.

In the Jaintia Hill district limestone deposits are found at Lumshnong, particularly near the Um Lunar and Um Seshymba rivers.

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[5] Nongkhlaw, D.G. "Mineral Resources of Meghalaya: Problems and Prospects", M.A. Dissertation, NEHU, Shillong (unpublished), 1982, p.42.

About 652 million tonnes of limestone reserve are found in this region. Further, limestone is also known to occur at Sutnga, Nongkhlieh, Lakadong Syndai and Nongtalang areas of Jaintia Hills District.

In the Garo Hills District, Limestone deposits occur at Nangwalbibra, Darrang-Era-Aning, Siju and Tura town region. Some traces of low quality limestone are also noticed in Rongrenggiri, Dapri and Gurugiri in the Garo Hills region. The total estimated reserve of limestone deposits in the Garo Hills is placed at 5.5 million metric tonnes. The total limestone production during 1999-2000 was 493.6 thousand metric tonnes.

Sillimanite: Sillimanite was first extracted in 1916. In 1947, the rights of working and trading this mineral was leased to the Pilkington Brothers Limited; a British glass manufacturing firm. Later on, in 1951 the Assam Sillimanite Limited took over the running of the mines, which at a later stage gave permission to the Bharat Refractories Limited and the Nongstoin Cooperative Society Limited to extract and trade this mineral.[6]

The State of Meghalaya boasts of one of the best Sillimanite deposits in the world. In fact, about 97 percent of India's Sillimanite deposit lies in the State of Meghalaya. This mineral is found in the

[6] *Ibid.*, p.43.

Sunapahar (Riangdo-Mawshynrut) region of the West Khasi Hills District. Some Sillimanite deposits also occur in the Garo hill region particularly at Dapsi-Tholegiri. However, due to their low-grade quality they are of little economic importance. According to the data published by the Directorate of Mineral Resources, Government of Meghalaya, there has been a decline in the production of Sillimanite in the State as shown below:

Table 2: Production of Sillimanite[7]

Year	Production ('000 tonnes)
1989	4.2
1990	3.1
1991	1.6
1992	0.9
1993	0.1
1994	Nil

Since no significant exploitation of this mineral has been taken up, its estimated reserve has also not been properly accounted for. Conservative estimates put at 0.2 million tonnes while liberal estimates put it at more than 2 million tones.[8]

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[7] Gupta, S.S., Directorate of Economics and Statistics, Government of Meghalaya, 1995, Table 8.06.

[8] Kharkongor, Sansing, "A Geographical Analysis of Resource Potentialities and Its Development in Meghalaya", M.Phil Dissertation submitted in the Department of Geography, NEHU, Shillong, 1988 (Unpublished), p.75.

Glass Sand: Glass sand, which is suitable for the manufacture of glass and glass sheet, are found abundantly in Meghalaya. This mineral is found in an around Laitryngew area and Umstew. It is also found in the southern outskirts of Shillong town along the Shillong-Jowai road, around Mawphlang region and close to the Simsang river of East Garo Hills near Siju and Tura town. The total reserve has yet to be properly assessed, as they have not been thoroughly exploited.

Kaolin: Kaolin use for the manufacture of China ware and porcelain occur in large quantity in the State of Meghalaya. In fact Kaolin found in the state can be compared with that of the famous Cornwal Kaolin of Great Britain.. This mineral occurs in the Cherrpunjee region particularly at Mahadek, Sohrarim and Umstew. The Mawphlang-Mawngap region is another area where Kaolin is found. In Jaintia Hills, Kaolin is found in the Thadlaskeiñ area along the Shillong-Jowai Road and at Sutnga and Shangpung. In the Garo Hills region, Kaolin occurs near Darugiri. Since this mineral has not been fully exploited, its reserve has also not been accounted for by the Directorate of Mineral Resources of the State Government.

Clay: China clay like Kaolin, which is suitable for the manufacture of different porcelain, is found in different parts of the State. Some of the

notable areas where clay occurs are Cherrapunjee region particularly Mahadek, Sohrarim and Umstew and around Laitlyngkot, Laitkseh, Nongryngkoh, Myntriang and Kharkor river basins. In Jaintia Hills region clay occurs at Larnai. In Garo Hills region clay occurs around Tura town, particularly along the Tura-Dalu road to the south of Tura town, Tura-Garobadha road to the west of Tura town and Tura-Rongram road to the north of Tura town. The Rongchugiri-Rjabala road, the Rongrim-Rongchugiri road, the Rongrenggiri-Khera region; Songsak, Darugiri, Khobal, Dobu, Nengkhra, Akawal and Nangwalbibra are all notable areas where clay occurs. The estimated reserve of clay in Meghalaya is about 10 million metric tonnes.

Iron Ore: The Khasis have known the art of smelting iron for the last hundred years. Lt. Col. Watson and Lt. Yule had written about the iron and steel plants at Cherrapunjee and the washing and smelting of iron by the Khasis. According to available records, the principal mining sites in the Khasi Hills were Mylliem, Nongkrem and Laitlyngkot and Lyngkhoi in West Khasi Hills. The principal smelting areas were Nongspung, Umphrup (near Nongkrem) and Nartiang in Jaintia Hills. Further, it is observed that the Khasi iron is of a comparatively superior

quality and is comparable to the Swedish iron.[9] According to Col. Lister, an estimated 20,000 *maunds* of iron in the form of hoes was exported to Assam in 1853. Even today in some parts of Khasi Hills like Mylliem, Laitlyngkot and Laitryngew – to name a few – some families still earned their main sources of livelihood from the smelting of iron and iron manufactures. In the Khasi Hills iron ore occurs in Aradanga and Hahim. In the Garo Hills region iron ore deposits occur at Nishangram, Athiabari and Dabu.

The extraction and exploitation of this mineral has been on the decline in the last few years. This is because of the fact that its by-products like agricultural and household implements and others have faced stiff competition from imported ones. Thus a proper assessment of its total reserve was deemed unnecessary.

Atomic Mineral: Uranium was first discovered by H.M. Klaporth in 1789. In Meghalaya, the earnest exploration for tracing the presence of Uranium began in 1958-59. It was subsequently discovered at Dawki of East Khasi Hills district in 1962-63. Later on traces of this mineral was also found at Umrynga near Tarang Blang in Jaintia Hills District. Today

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[9] (a) *Asiatic Researches*, Vol.XVII, p.499, published in 1832; excursion made in 1828; (b) *Journal Asiatic Society*, Vol.III, p.25, Jan. 1834; (c) *Journal Asiatic Society*, No.CXXIX, p.853, 1842; (d) *Journal Asiatic Society*, Vol.I, p.150, 1832.

Uranium has been discovered in the Gomaghat-Shella region of south Meghalaya. The Sung valley of Jaintia Hills District has traces of Niobium, Tantalum and Phosphate. At present Domiasiat, lying within Mawkyrwat sub-division of the West Khasi Hills District boasts of huge reserves of Uranium deposits. However, due to public opposition to the extraction of this mineral, the extraction and exploitation of this mineral is yet to make any major headway. The total estimated reserve of Uranium ore in the State is put at 9.22 million tonnes, which can produce about 10,000 tonnes of uranium.

Other Minerals: Some of the other important minerals found in the State, but whose quantity and quality are of little economic significance are gold, traces of which, are found at Tyrsad and Mawphlang in the Khasi Hills; Gypsum, which occurs at Mahendraganj of Garo Hills and Quartz-Feldspar. The other mineral found in Meghalaya includes copper, lead, zinc, phosphate and building stones.

2. Human Resource

Human resource is an important index of economic development. The developed countries of the world owe their progressive economy to their developed human resource. Whereas the literacy rate of some of the developed countries of the world like USA is 97 percent, Japan 100

percent, UK 100 percent, France 99 percent, Canada 97 percent, Germany 100 percent; that of the under-developed and developing countries are all below 50 percent.[10] Further, if one studies the age-sex pyramid of the developed countries, one would notice that there is no significant shrinking from the base to the apex. However, in the developing and under-developed countries, the base of the age-sex pyramid is generally broad but upwards towards the higher hierarchy, the apex gets narrower and narrower. This is true for the country as a whole and also the State of Meghalaya.

According to the 2001 Census, the overall literacy rate in the country was 65.38 persons, with 75.85 percent for male and 54.16 percent for females. In Meghalaya the overall literary rate is 63.31 percent with 66.14 percent for males and 60.41 percent for females. This almost balance literacy rate between males and females is observed only in the State of Mizoram (Literacy – Male 90.69 percent, Female 86.13 percent) and Kerala (Literacy – Male 94.20 percent, Female 87.86 percent).[11] The matrilineal form of society prevailing in the State may be one of the reasons for this status. Table-3 shows the literacy rate in the State.

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[10] *Manorama Year Book 2002, 37th Edition*, Malayala Manorama Press, Kottayam.

[11] Laskar, N.K., *Census of India 2001*: Provisional Population Totals Meghalaya, Series 18, Paper-2.

FIG. 3

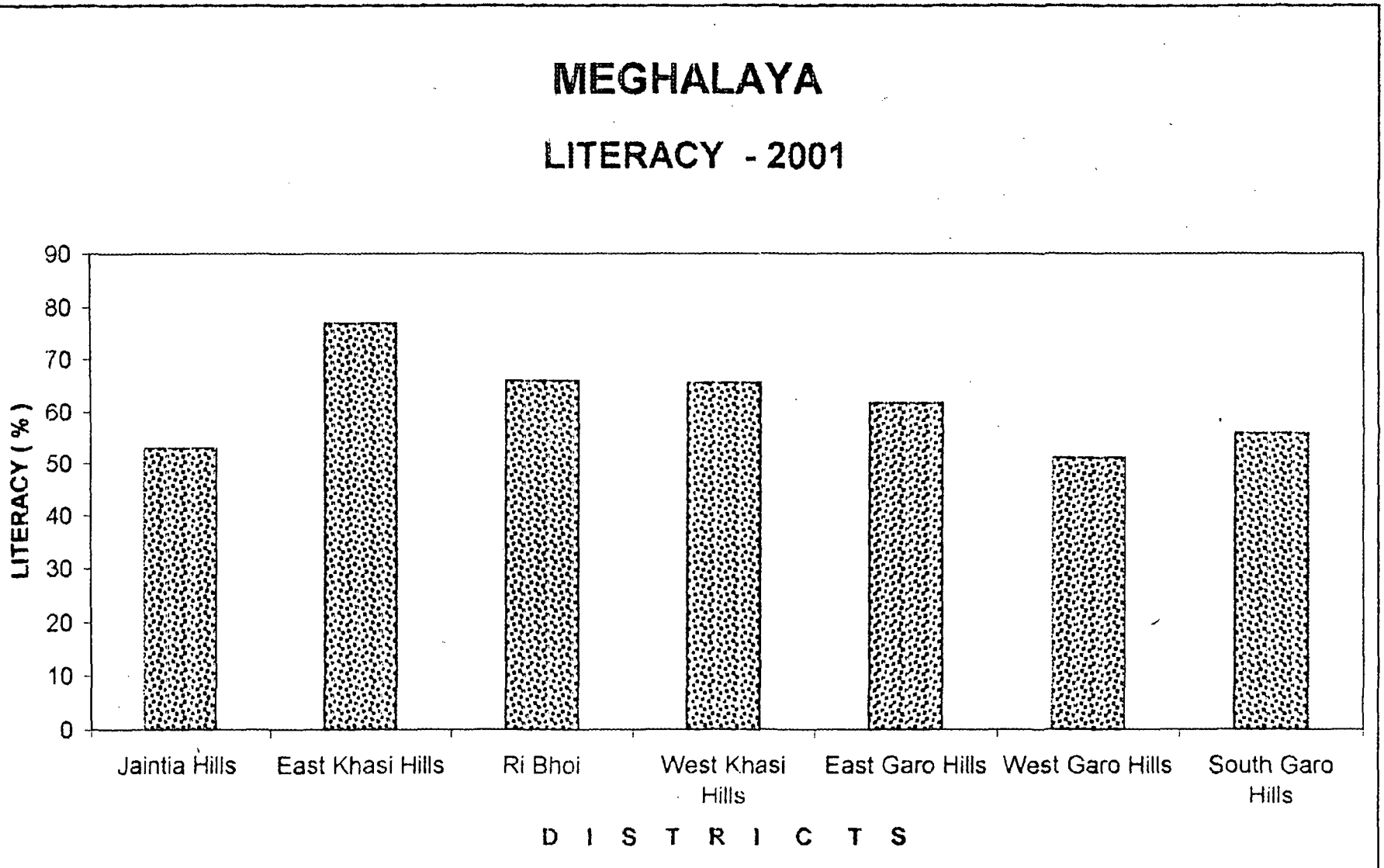

MEGHALAYA
LITERACY - 2001
LITERACY (%)
90
80
70
60
50
40
30
20
10
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

Table 3: Literacy Rate in Meghalaya, 2001

State/District	Percentage of Literacy		
	Persons	Male	Female
Meghalaya	63.31	66.14	60.41
Jaintia Hills	52.79	50.13	55.52
East Khasi Hills	74.74	74.89	74.58
Ri Bhoi	63.67	65.77	61.40
West Khasi Hills	65.50	66.74	64.21
East Garo Hills	61.57	67.17	55.72
West Garo Hills	50.78	57.12	44.41
South Garo Hills	55.21	61.42	48.61

According to P.R.T. Gurdon[12] "the Khasis are certainly more industrious than the Assamese", and "He is not above manual labour". This is true for the Khasi men and women. It is common to see both men and women, young and old working side by side in the fields and in their homes unlike other tribals of the region. The Garo males too like their Khasi brethren do not shy away from working together with the females in the field but the household works remain the exclusive responsibility of the women folk.

During the year ending 2000, the Directorate of Economics and Statistics, Meghalaya have shown that the percentage of main workers to the total population of the State is 34.8 percent, that of non-workers 60.4 percent and marginal workers 2.2 percent. Of the total main workers,

[12] Gurdon, P.R.T. (1990), *The Khasis*, Low Price Publication, Delhi (reprint), pp.4 & 5.

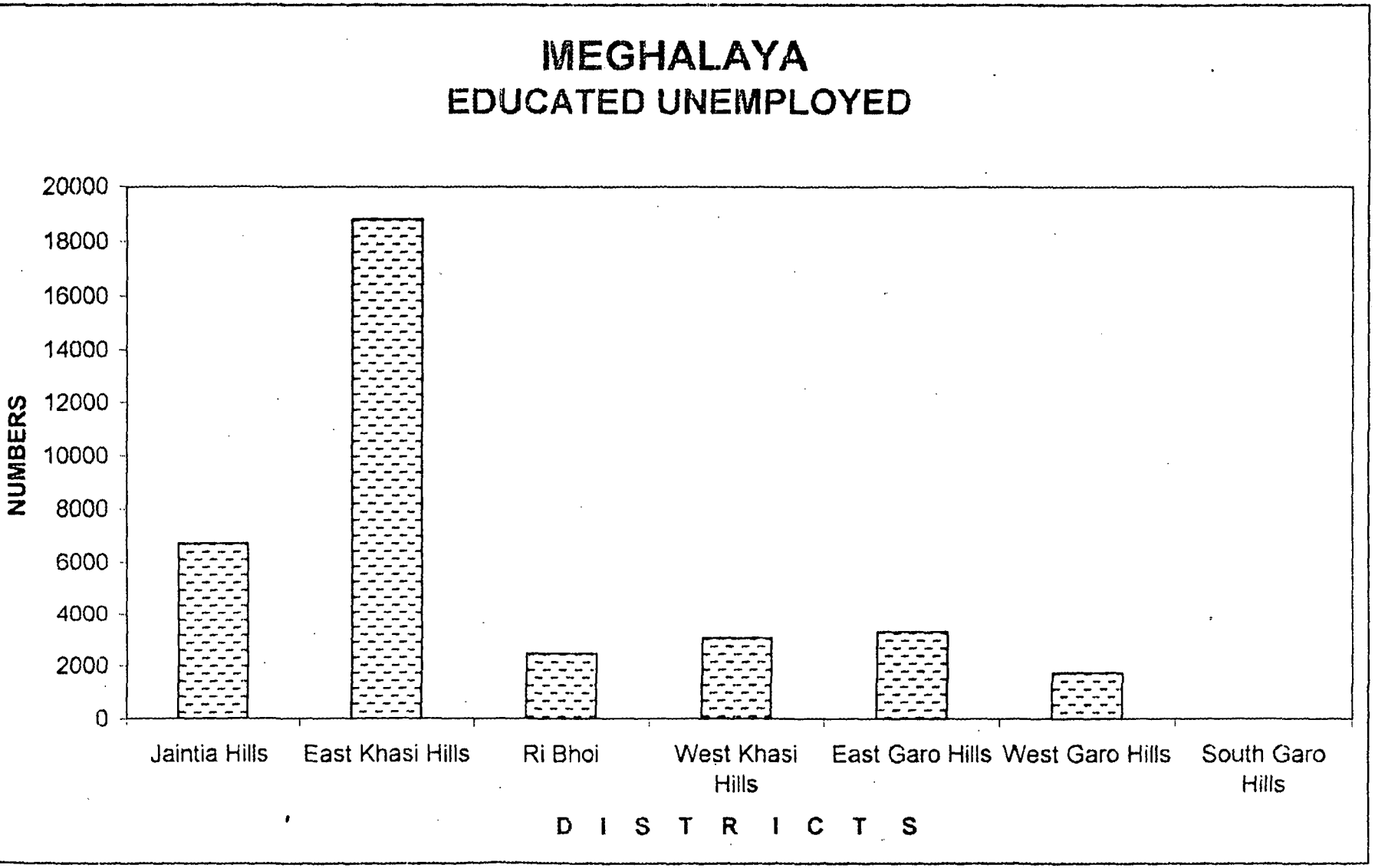
about 54 percent of them are cultivators and another 16.5 percent agricultural labourers. The next important service is trade and commerce (7.7 percent) followed by livestock. Forestry, fishing, hunting and plantation orchards and allied activities together constitute 6.7 percent. The other services like mining and quarrying, manufacturing, construction and transport and communication shows an insignificant percentages of the population engaged in them. This shows that the State is predominantly an agricultural one where about 70 percent of the population is dependent on it either directly or indirectly.

During the period ending 1997-98, the number of persons employed in the public sector is 73,437 persons and in the private sector 7,884 persons. Together they constitute less than 4 percent of the total population of the State. However, there has been an overall increase of persons employed in the public sector (6.28 percent) and private sector (2.26 percent).[13]

The educated unemployed registered in the live register of the employment exchange have been on the rise year after year. In 1996, the total number of matriculation and above registered in the live register of

[13] Lyngdoh, W.L. *Statistical Handbook of Meghalaya 2000*, Directorate of Economics and Statistics, Government of Meghalaya, Table13.

FIG. 4


MEGHALAYA
EDUCATED UNEMPLOYED
NUMBERS
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
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

the employment exchange of the State was 9302 persons and in 1997 it rose to 10,909 persons. The cumulative figures between 1995 and 1998 are 38,700 persons.[14] The total number of educated unemployed in Meghalaya till 1999 was 36,094 persons.[15] From Figure 4, it is evident that the number of educated unemployed is highest in East Khasi Hills district. The number of educated unemployed in this district is more than double that of Jaintia Hills district and more than four times that of other districts of the State. This district, therefore, do not lack in human resources.

The North-Eastern Council encouraged students of the State to attend various technical and non-technical training outside the State, so as to meet the shortfall in some departments. The banks on their part float different schemes like the PMRY – in active collaboration with the State Government – for extending financial assistance to the vast majority of educated unemployed youth of the State. However, the fact that the number of educated youth registering themselves in the live register of the employment exchange has increase over the years proves that more and more people of the State are craving for higher and better education.

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[14] *Ibid.*, Table 13.03.

[15] Lyngdoh, W.L., *Op. cit.* p.11.

This is another indicator that shows that there is an economic development in the State. All this goes to show that there is no dearth of human resource in the State.

3. The Hydel Power Resources of Megahalaya

The Khasis were familiar with the working of the Hydel power generation, thanks being to U Kynjro Khar Ngapkynta who built the Weiking dam in Shillong to generate power for a flourmill. This first hydel power plant in the State was later called the Sunapani Hydel Power Plant and later transferred to the Shillong Hydro Electric Company Limited.

The first Post-Independent modern hydel power project in the state of Meghalaya was the Umtrew Electric Project commissioned in 1963. With an installed capacity of 11.20 Mega watts this project was inaugurated by the then Governor of Assam Shri Fazl Ali on the 19th of July 1957. This project built by the Indian Government in collaboration with the Canadian Government and took five years to complete. Thereafter many more hydel projects were set up in the State and many more projects were proposed to be set up as can be seen from the tables below:

Table 4: Existing Hydro and Thermal Power Projects in Meghalaya

Sl.No	Projects	Installed Capacity (M.W.)	Year of Commission
1	Umtru Hydro Electric Project	11.20	1963
2	Umiam Hydro Electric Project (Stage I)	36.00	1965
3	Umiam Hydro Electric Project (Stage II)	18.00	1970
4	Garo Hills Thermal	5.00	1977
5	Kyrdem Kulai Hydro Electric Project (Stage III)	60.00	1979

Source: Kamal Nandi, "Resource Potential of North-East India", *Meghalaya Science Society*, Vol.I, 1982, p.C2.

Table 5: Proposed Hydro Projects

Sl.No.	Projects	Expected Power Generation	Expected Date of Starting	Expected Date of Commission
1	Leska (Jaintia Hills District)	100 M.W.	1984-85	1991-92
2	Umling (E.K. Hills District)	150 M.W.	1982-83	1989-90
3	Kynshi (W.K. Hills District)	600 M.W.	Preliminary investigation has been taken up for Rs.96.18 lakhs[16]	
4	Umiam-Umtru Hydro Electric Project Stage IV	60 M.W.	NA	

Source: Kamal Nandi, "Resource Potential of North-East India", *Meghalaya Science Society*, Vol.I, 1982, p.C2-10.

Till 1995-96, the per capita electricity consumption in Meghalaya was 143 Kilowatt per hour (K.W.H.). According to the 1991 Census data only 2510 or 46 percent of the total 5485 villages in Meghalaya are electrified. The installed capacity and the effective capacity of Hydel Power in Meghalaya till 1999 were 185.20 Mega watts. The total projects sanctioned and the cumulative position upto 31st March 1999 under the

[16] NEC, "Plans and Programmes for Regional Development 1990", p.12.

Rural Electrification Corporation Limited financed programme is 79 and the total loan sanctioned is Rs.6311 lakhs.[17]

The annual generation and utilization of power in Meghalaya till 1997-98 is as follows:[18]

Table 6

Gross Hydro Electric Generation	594.57	M.U. (Mega Unit)
Auxiliary Consumption	5.74	M.U.
Net Generation	588.83	M.U.
Net Import	161.19	M.U.
Net Consumption	427.64	M.U.

Till 1998-99 the energy requirement in the State was 435.5 Mega units whereas the energy availability is 460.4 Mega units. Thus the state has a surplus of 24.9 Mega units of energy. This is a unique achievement, making it the only state amongst states of North-East India to have a surplus energy.

Table 7 shows the utilisation of power in the state according to the Administrative Report of the Meghalaya State Electricity Board (Me.S.E.B.) between 1975-1988.

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[17] *Basic Statistics of North-Eastern Region 2000*, North Eastern Council, Ministry of Home Affairs, Government of India, Shillong, Table 99; p.100.

[18] *Ibid.*, p.105.

Table 7: Utilisation of Power (Million Kilowatt/Hr.)

Year	Total Power available for sale	Power sold inside the State	Power exported	Total Power sold	Power loss	Loss in %	Export in %	Power sold in the State in %
1975-76	175.47	33.43	125.54	158.89	16.58	9.40	71.50	19.05
1980-81	351.53	40.62	277.28	317.93	33.50	9.50	78.90	11.50
1985-86	374.85	107.33	236.77	344.14	30.71	8.10	63.10	28.60
1991-92	471.21	217.66	199.38	417.04	54.17	11.40	42.30	44.00

Source: Journal of the North-Eastern Council, Vol.14,No.2, April-June, 1994, p.20, Table 4.

4. Agriculture Resources

The State of Meghalaya is endowed with a fertile soil. The people of the State grow various crops and some crops are believed to be indigeneous to the State. The very fact that the Khasis, for example, have different names for the numerous local plants substantiates this argument. The Khasis has different names for 140 medicinal plants, for 29 species of poisonous trees, for 220 fruits and nuts, 38 varieties of grasses, reeds and bamboos, 41 varieties of vines and creepers[19] and above all more than 500 different names for different other crops and plants.[20]

Agricultural practices among the Khasi and Jaintia people are as old as its people. Cultivation of rice — the main staple diet of the people, have been known by the people from time immemorial. This can be

[19] Khongsit, S. 2002. *Ka Spah Mariang ha Meghalaya*, Modern Offset Printing, Shillong.

[20] Khongsit, S. 2001. *Ki Khlaw ki Btap bad ka Kam Ri Ngap*, Shillong.

corroborated by the fact that in most religious and cultural ceremony rice occupies the central stage in divination.[21] Wet rice cultivation known as *hali* or *pynthor* and hill rice cultivation known as *rep bun* or *rep khyllip* have been practised by the Khasis through different generation.

Hunter wrote that the agricultural system of the Khasis was quite advance to that of other tribals of North Eastern Region. Different irrigational methods have been devised by the Khasis in wet cultivation as well as in dry cultivation. For example in rugged terrain when water is scarce, particularly in the Ri-War (southern Meghalaya) region pan leaves are regularly supplied with water by what is known as 'drip' irrigation.

The Khasis have different names and terms for different agricultural systems and implements, which also goes to prove that agriculture system has taken a deep and long root among the Khasi society — as all these cannot be coined overnight. The areas under shifting cultivation or *rep shirti* are fast on the decline. Mr. S. Khongsit lamented that if shifting cultivation or *rep shirti* ultimately ceased, many terms of common usage relating with this system would hitherto become

[21] One form of divination of the Khasis is the casting of lots by throwing rice on the ground. After doing so, they read the signs of things to come from the manner and the direction by which the rice grains are scattered and arranged.

unknown to our future generation. This situation is very much similar with the Jaintias and the Garos.

The total cropped area in the State between 1994-95 and 1998-99 averages 11 percent of the total geographical area. During the same period, the net sown area ranges between 8 to 9 percent and the area sown more than once is less than 2 percent of the total geographical area. Till 1999-2000 rice and potato were the principal crops of the State. Rice occupies first place in terms of acreage (1,05,402 hectares) and second in terms of production (14,974 tonnes). Potato occupies second place in terms of acreage (20,753 hectares) but first in terms of production (2,01,059 tonnes). The other important crops of the State include maize, cotton, arecanut, ginger, sweet potato, jute, mesta and tapioca; citrus fruits, banana, pineapple besides different cereals and pulses. Some of the other notable crops of the State include sesamum, castor, sugarcane, chilies, tobacco, turmeric, soyabean and papaya. The State is also famous for its different varieties of orchids, medicinal plants, herbs, and vegetables, some of which are exported to different parts of the country and abroad.

The State grows all types of fruits and vegetables. The most common horticultural crops are oranges, pineapples, papaya, plums,

peach, litchi, lemon, banana, pears, guava and jack fruits. There are also different varieties of citrus fruits grown extensively in the State. Of late, however, the production of different fruits has been on the decline because of the neglect of the orchards and the virus diseases in the trees.

The main of vegetables grown in the different parts of the State are chilies, sweet potato, ginger, tapioca, cabbage, cauliflower, radish and squash. Mushrooms cultivation has become popular in the State and a large number of people are now engaged in the cultivation of this crop on a large scale. Mushroom is even exported to as far places as Kolkatta. However, the production and the quantity exported is insignificant when compared with other crops.

Till 1998-99, the yield per kg/hectare of rice was 1421 kg/hectare, maize 1468 kg/hectare, jute 1150 kg/hectare, potato 9688 kg/hectare and rapeseed and mustard seed 661 kg/hectare.[22]

The percentage of the state's population engaged as cultivators in 1981 was 27 percent but in 1991 it was 22 percent. The number of persons engaged as agricultural labourers in 1981 was 4 percent and in 1991 it was 5 percent.[23] Thus there is a sharp decline in the number of

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[22] Lyngdoh, W.L. *Statistical Handbook Meghalaya 2000*, pp.26, 28 and 30.
[23] *Ibid.*, Table 13.04, p.82.

persons engaged as cultivators and a steady increase in the persons engaged as agricultural labourers over the years. The reasons for this may be manifold, but a few can be cited as follows:

i. Shifting cultivation: On account of this traditional method of cultivation, which is still being practised today, more and more lands are made unproductive for agricultural uses and in some cases barren. The *Jhum* cycle over the years are being reduced due to pressure of population on land, compelling farmers to come back too early to their once farmed land resulting in that particular land becoming unproductive. In course of time, this land would become barren leaving the farmers with no land to tilt, and as such, they are transformed from landowners (cultivators) to agricultural labourers who have to work in someone else's field. Some of the farmers are compelled to abandon their age-old occupation and venture into another occupation for their sustenance.

ii. Population: As mentioned in Chapter I (Table I), the population is increasing year after year and employment opportunities have become scarce over the years. Since the land is fixed, the ancestral land of the people can no longer feed the need of the ever spanning nucleated families of the different clan. Therefore people have to find employment for their livelihood as agricultural labourers. This has led to

the decrease in the number of cultivators and an increase in the number of agricultural labourers.

iii. Absentee Landlordism: The pressure of population on land and the deterioration of the soil due to unscientific application of fertilizers, pesticides, and insecticides – and at times the failure of the monsoon – agricultural production drops leading to hardship of the cultivators. At such time the cultivators are forced to sell their land and in most cases to the elite urban dwellers. These new owners who have only elementary knowledge of agriculture, are in turn compelled to employ the village folk to work in their fields. Further, these urban-rich people usually do not buy only one plot of land but several plots at a time. This is another reason that contributes to the sharp decline of cultivators and the increase of agricultural labourers.

Large areas of the State do not favour the growth of commercial and plantation crops and the soil of the State is also not so favourable for the growth of industrial crops. Of the total cropped area in the State in 1998-99, jute occupies only 1.6 percent, *mesta* 0.7 percent and cotton 2.8 percent.

Since the pattern and cropping system in the State is of the traditional one, it would be better for the State to switch over to crop specialization. Cash crops like coffee, tea, cotton, jute, sugarcane and millets – just to name a few – could be grown in selected areas of the State on a commercial scale. This endeavour would enhanced the economic development of the State vis-à-vis its people. In other words the State should embarked on crop specialization whereby it can compete with the neighbouring states in terms of export and revenue earnings. For example, the southern Meghalaya has for generation been an important producer of bettlenut, pan leaves, oranges and turmeric. Since the first two crops face stiff competition from other states, it would be more viable for the region to specialize in the production of the last two than the first two commodities.

5. Forest Resources

The total recorded forest area in Meghalaya is 9496 Sq. Kms. or 42.34 percent of the geographical area of the State. The following table (Table 8) shows the distribution of forest cover in the different districts of the State of Meghalaya.

Meghalaya	=	Total Geographical Area	= 22,429 Sq. Km.
	=	Total Area under Forest	= 9,496 Sq. Km.
	=	Percentage Area under Forest	= 42.33 percent.

Table 8: Distribution of Forest Cover in Meghalaya

Sl.No.	District	Geographical Area (in Sq. Km.)	Forest Cover (in %)
1	East Khasis Hills	2748	35.34
2	West Khasi Hills	5247	53.52
3	Jaintia Hills	3819	46.13
4	West Garo Hills	3714	54.45
5	South Garo Hills	1850	64.11
6	East Garo Hills	2603	58.38
7	Ri Bhoi	2448	50.24

Source: Documents, Sustainable Development: Forest – Type and Density, Internet 'Google'.

The actual forest cover, however, is 15,657 Sq. Kms. or 69.8 percent of the State's geographical area. The State has 981 Sq. Kms. (4.37 percent) of Reserved Forest and a mere 12 Sq. Kms. of Protected Forest. There are the 'Sacred Groves' (*Law Kyntang* or *Law Adong*), '*Law Lyngdoh*' and others. The forest density in the State is 4,044 Sq. Kms. or only 18.03 percent of the state's geographical area are covered with dense forest. The per capita forest area in Meghalaya works out to 0.8437 hectare.[24] Out of the total area under forest, 722.36 Sq. Kms. or about 8 percent is directly under the control of the Forest Department and the rest managed and controlled by the respective autonomous district councils of the State, i.e. the Khasi, the Jaintia and the Garo Hills Autonomous District Councils. The administration of the forest in the Khasi and Jaintia Hills was taken

[24] *Journal of North-Eastern Council, Vol.VI, No.4*, July-August 1984, p.23.

over by the Government as early as 1870's. The first reserved forest is the Saipung Reserved Forest notified on 25th July 1876 and the last forest to be notified as reserved forest is the Tura Peak Reserved Forest, notified on the 23rd June 1982.[25]

Forest is a renewable resource provided measures are initiated for its replenishability. For example the Meghalaya Forest Development Corporation at one point of time devised a method that while cutting and utilizing the trees for various uses also embarked on a transplanting drive. What the official of the department does is that initially they let planters start the plantation of tree samplings from one end and move towards another end of the forest. Since the reserved forest span hundred of kilometers, by the time the planters reached the middle position of the forest, the trees they had initially planted at the beginning have started maturing. By the time the planters reach the far end of the forest, the trees they had planted in the beginning are now fully matured and ready to be cut for industrial and other uses. Now after the trees are being cut, the plantation processes again start with the planters planting their new tree samplings. At this stage, the tree cutters move in front of the planters

[25] Document, Sustainable Development: Forest Type and Density 2000 via Internet – *Google*.

while the planters follow from behind, till they reach the far end of the forest. Now again by the time both reach the far end of the forest the trees, which they had planted the second time, are now matured and ready for cutting again. This cycle goes on and on through the years thereby providing uninterrupted supply of trees for industrial and other uses. This method so adopted while ensuring regular supply of forest products to the state also keep in mind the sustainable aspect.

The annual area under Shifting Cultivation in the State is 530 Sq. Kms. and the minimum area under Shifting Cultivation at one time or another is 2,650 Sq. Kms. The number of years an area is left fallow after cultivating varies between 5 to 7 years and the number of families still practicing Shifting Cultivation in State is 52,290. All these figures are till 1983, for which data are available. The lost of forest cover in the State till 1997 was 75 Sq. Kms. on account of Shifting Cultivation and 2 Sq. Kms. due to other minor reasons. The forest cover gain due to Natural Regeneration in Shifting Cultivation was 20 Sq. Kms. Therefore, the total forest covers loss till 1997 in the State was 67 Sq. Kms.

According to the Pre-investment Survey of Forest Resources of Meghalaya, there is a vast potential for setting up of forest-based

industries in the State. The following are the proposed major industries that can be set up and their production capacity:

Proposed Major Industries	Production Capacity
1. Paper Industry	1,000 tonnes/day
2. Plywood Industry	6,000 m^3/day
3. Saw Mill Industry	2,450 lakh m^3/year

According to a recent economic survey conducted by the State Forest Service College-Cum-Research Centre, Byrnihat, Assam, the forest of Meghalaya has vast raw materials for setting up of paper and pulp industries and wood for specialized uses like furniture, cabinet making, etc. From the forest of Meghalaya raw materials for the setting of match factory, railway sleepers factory and plywood factor can also be obtained. Beside these, Tans and dyes factories, gums and resins, essential oils and oils seeds, medicinal plants, bamboos and canes works and few other factories can also be set up in Meghalaya based on the forest wealth.

It is clear from the above paragraphs that there is no dearth of resources in the State of Meghalaya. This State has the potential for setting up of different industries based on its own resources. The abundant of human resources would also play an important role in the

setting up of the different industries in the State. Power resources, agriculture resources and forest resources are all adequately available in the State. All these, therefore, can help in accelerating the pace of growth and development in the region with the aid of the State Government machinery. However, it is important to note that while exploiting the different resources, efforts should be made to see that the reckless and wanton destruction of these resources are not resorted to. This being done, the State will go a long way in helping to uplift the present state of economic condition of the people to a higher state of economic condition, without upsetting the balanced environmental condition existing in the State.

CHAPTER-IV

POLITICAL AND ADMINISTRATIVE SET-UP IN MEGAHALAYA

Pre-Independent Political and Administrative Set Up

The State of Meghalaya was created encompassing three groups of people, viz. the Khasis, the Jaintias and the Garos who together share one unique social custom in that they are the only tribals of North-East India who follow the matrilineal social custom. Though the form of matriarchal customs that exist between these three groups of people are by and large similar, there are few dissimilarities that prevail if one goes deep into the intricacies of their custom.

The Khasis: The Khasi administrative set up was initially made up of *Basans* and *Lyngdohs* who were assisted in their duties by the *Pators*, *Sangots*, *Majis*, *Chutiyas* and *Metabors*. In course of time these *Basans* and *Lyngdohs*, who were heads of their own clans, decided to elect one common chief who came to be known as *Syiem*. This was done so that the people can be more united and can protect themselves from their enemies.

Thereafter, these *Basans* and *Lyngdohs* – who were also known as *Sirdars*, *Wahdadars* and *Dalois* in different regions – later on decided to select one clan and ordain it as a royal clan, wherefrom all the future *Syiem* would be chosen.

Prior to the advent of the British to the hills of Meghalaya, the chief (*Syiems/Dalois/Nokmas*) were ruling independently in small fragmented areas of their own. However, in 1835 the Khasi states were reduced to 25 semi-independent states[1] and 31 disjuncted British areas.[2] According to V. Venkata Rao[3], in 1934, Keith Cantlie recommended the amalgamation of the Mylliem and Khyrim states into one state. This suggestion having been considered, the total number of Khasi states from then on was 24, which later was reduced to 23 due to the re-union of Khyrim and Langkyrdem states into one. Later on, the Mylliem and Khyrim states were again separated into different states.

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[1] Allen, B.C., *Gazetteer of the Khasi and Jaintia Hills, Garo Hills, Lushai Hills*, Gian Publication, Delhi, Part I, p.44.

[2] Giri, Helen (1998). *The Khasi under British Rule (1824-1947)*, Regency Publications, New Delhi, p.97.

[3] The 31 British areas are: 1) Byrong, 2) Jyrngam, 3) Laitlyngkot, 4) Laitkroh, 5) Lakading, 6) Myrdon, 7) Mawmluh, 8) Mawbehlarkha, 9) Mawthangsohkhyllung, 10) Mawsmai Nongthymmai, 11) Marbisu, 12) Mynting, 13) Nongbah, 14) Nongpoh, 15) Nongkroh, 16) Nongjri, 17) Nongriat, 18) Nongshluit, 19) Nongriangsi, 20) Nonglang, 21) Nonglyngkein, 22) Nonglait, 23) Ramdait, 24) Saitsohpen, 25) Synei, 26) Sinai Mawshynrut, 27) Sohbar, 28) Tynrong, 29) Tyrna, 30) Tynriang, 31) Umniuhtmar.

This region was under the direct administration of the Governor General emissary stationed at Calcutta. For administrative convenience, the region was initially divided into two districts. These are the Khasi and Jaintia Hills District and the Garo Hills District with their headquarters at Shillong and Tura, respectively.

In 1835, after a series of battles between the British and the Khasis and the subsequent executions of various treaties and agreements, the British converted some independent states of the Khasis to British territories or British areas. This was done basically to break and check the uprising of the Khasi states and for their administrative convenience. Proof of the first theory can be seen that the 31 (thirty one)[4] villages converted into British areas were not concentrated in one area but spread in different pockets of the Khasi Hills region. The British annexed the Jaintia Hills in 1835 and from that time onwards all of Jaintia Hills district became a British territory till 1947. In 1863, the British appointed their own officer to look after the administration of this region.[5] The Garo Hills was initially ruled by petty chiefs but later the British after

[4] Giri, Helen, *op. cit.*
[5] Allen, B.C., *op. cit.*, pp.50-53.

thoroughly subjugating them in about 1870 appointed Lieutenant Williamson to look after the Administration of the Garo Hills.[6]

Till about 1835, the Khasi kingdoms were known as the "Land of the Thirty Kings" or *Ka Ri ki Laiphew Syiems*. This means that the Khasis had 30 (thirty) independent kingdoms at that time. These kingdoms spread far and wide reaching upto the foothills of the Himalayas (*Makashang*). All the former Khasi and Garo states were independent and absolutely free from outside dominion. The grouping together of several villages makes these states. The villages, on their part, were under the administration of the *Lyngdohs*, *Sirdars*, *Wahdadars* or village headmen who formed their village council. The village council was directly governed by the *Syiem* and his *durbars*.

Dictatorship is unknown among the Khasis. The *Syiem* or chief of a state cannot function as a despot and has to abide by the collective decisions and advice of the *durbars*. Another unique feature of the Khasi political system is that every able male who has attained the age of 25 years can participate in the State or village *durbars*. Exception is, however, made only to female members of the society, who can neither attend, let alone, participate in the *durbars*. A male member of the society

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[6] *Ibid.*, Part-II, p.18.

who does not wear a mustache can attend the *durbars* but is not permitted to participate in its deliberations.

The Khasi political and administrative set up was based basically on language, land, clan system and religion. These four elements, unlike other society, are intrinsically linked with religion. For a Khasi, religion and culture goes hand in hand and one cannot be separated from the other.

The Jaintia political and administrative set up was very much similar to that of the Khasis. The only difference between the two is that among the Jaintias their institutional heads are either known as the *Dallois* or *Sardars* or *Pattors*. Their powers and functions are very much similar to that of the Khasis.

In case of the Garos, their chief is known as the *Nokma*. Four types of *Nokmas* existed among the Garos, viz. the *Gamni Nokma*, the *Gana Nokma*, the *Kamal Nokma* and the *Aking Nokma*. Of these four, only the *Aking Nokma* has power and authority similar to that type of power exerted by the Khasi *Syiems*. In terms of succession to Nokmaship (like the Khasis) the nephew, the *Nokma's* sister's son, is the rightful heir to the Nokmaship and property. It must be noted here that the *Nokma*, though functioning as the chief, cannot act as a despot or a tyrant. Like

the Khasi chief, he is governed by the village council and may even be dethroned at any period of time, if the council feels that he is not discharging his duties well. Besides the different *Nokmas* the Garos also have the *Laskars* who in turn appoint the *Sardars* to work under them. Later, the *Zimmadar* or the *Zimmadari* system was introduced. In later years as the *Zamindars* and the *Laskars* were not functioning well, their post was abolished and amalgamated into one; whereby only the *Laskars* was in vogue. Besides these, there were the *Monzadars*, the *Mandals* and *Konungos*, who function as revenue collecting officers.

Post-Independent Political and Administrative Set Up

With independence from the British rule, came the imposition of the Constitution of India, whereby the District Council was set up to oversee and control the functioning of the *Syiems* (the chiefs). The District Council enacted the Succession Act of the Khasi States 1956. This was done prior to Independence, since the *Syiem* (chief) used to obtain *Sanad* from the Deputy Commissioners, but with this new law the *Syiem* which also include the Jaintias and the Garos chiefs, had to get their *Sanad* from the District Council. All the *Syiems*, *Dallois* and *Nokmas* were converted into subordinate court, which were under the District Councils of the respective area. The District Council has the

absolute power to issue *Sanad* and to install and remove chiefs. Thus the role, function and power of the chiefs were curtailed to a very large extent.

With the creation of the State of Meghalaya, all powers were now vested upon the elected legislators who became the executive and legislative heads of the State. The powers and functions of the District Councils and the chiefs were relegated to the second and third position, respectively.

In the backdrop of the above politico-administrative change that took place through the years, it is interesting to note that the policies of the different administrative machineries vis-à-vis sustainable development in the State was different from one to the other. For example during the pre-independence period when the *Syiems*, *Dallois* and *Nokmas* were governing their states, the need for the preservation of the environment was seriously enforced. The Khasis considered land as a free gift of God for economic development and for the good of all and sundry. Land is sacred and it is to be utilized only for one's basic needs and so over-exploitation of the land was never encouraged. Land is the source of all wealth and the richness of the people, and the goodness of the soil determines the survival of its people. Since land and all of it is a divine

gift, the Khasis have never paid any tax for their land. The Khasis were never a landless community and though their forefathers were ignorant of the Marxist philosophy, they based their governance on this principle. This means that each individual can acquire land but only according to his need and capability. In implementing this rule, force and intimidation was not resorted to.

The Post-Assam Politico-Administrative Set Up

With independence from the British and its subsequent attainment of statehood, there were some changes in the state policy which had an indirect bearing on sustainable development in the State. For example, the introduction of the Assam Land and Revenue Regulation 1886 by the United Khasi and Jaintia Hills Autonomous District Council in 1953 was the beginning of the changes to come. Through this regulation an individual was transformed from a landowner to a mere landholder over night. Further, he can claim to be the landholder only till such time he pays the necessary tax to the Government. In case he defaults, he fails to become the landholder of the land, which from time immemorial, belongs to him. This is in contrast to the traditional customs wherein the Khasis are the landowners and do not have to pay taxes for his land.

In his *Notes on Khasi Law*, Mr. Cantlie rightly pointed, "The land is not the property of the Chief and his Durbar. It is the property of the people and the people of each raid or village are the absolute owners of this raid land and can do as they please with it. The present generation has no right to sell the right of the future generation. The raid land is common and cannot be alienated."

The Preamble of Regulation III of 1953 of the United Khasi-Jaintia Hills District (Land Revenue) Regulation III states as follows:

> "Preamble – whereas it is expedient to provide for the assessment and collection of Revenues from lands in the United Khasi-Jaintia Hills District."

Further, the Assam Regulation of 1886 under Section 9, states thus:

> "9 – A landholder shall have a permanent, heritable and transferable right of use and occupancy in his land subject to:
>
> a) the payment of all revenues, taxes, cesses and rates from time to time legally assessed or imposed in respect of land;
> b) the reservation in favour of the Government and quarries and of all mines, minerals and mineral oils, and of all buried treasures, with full liberty to search for and work the same, paying to the landholder only compensation for the surface damage as estimated by the Deputy Commissioner; and

c) the special conditions of any engagement into which the landholder may have entered with the Government."[7]

However, the District Council could not implement this Regulation III of 1953 and the Assam Land and Revenue Regulation 1886 as the then Assam Government did not assist in surveying the land held by the people. Ironically, the formation of the State of Meghalaya saw the reviving of this draconian anti traditional act in the form of the Meghalaya Land Survey and Record Preparation Act, 1980 (Act II of 1980). With its introduction surveying of all lands held by individual of the state was initiated amidst stiff opposition from various sections of the people. The scheme was successful in some areas whereas in other, particularly in the *Ri-Kynti* land, it could not be undertaken. Till date surveying of all land in the State is yet to be completed and the scheme kept in cold storage for the moment. Nevertheless, the stalling of this process of land surveying by the government which would have otherwise diluted the traditional system of the people; indirectly wakened the community and the villages to hold on to their traditional customs in preserving their *Ri-Kynti*, *Ri-Raid*, *Ri Lyngdoh* or *Law Lyngdoh*, *Law*

[7] Extracted from a Paper submitted by Mr. Hipshion Kharshiing at a seminar at St. Edmund's College, Shillong.

Kyntang, etc., a tribute to the farsightedness and wisdom of their forefathers of old.

Administration

As already mentioned in the previous chapter, the administrative set up in Meghalaya has undergone multifarious changes since the coming of the British to these hills – from independent state to British areas, to the formation of the District Councils and the legislative assembly. The government took up various administrative reforms and reorganization by creating more and more districts, sub-divisions and community development blocks. This was to create jobs opportunities for the literate as well as the uneducated masses, speedy and unbiased disposals of disputes were initiated. All these were done in order to make the people live in peace, tranquility and progress.

In the State of Meghalaya prior to 1971-72 when the State was administratively under Assam, very few developmental activities could be noticed. The pre 1971-72 eras saw the State having only two districts, viz. the United Khasi and Jaintia Hills District and the Garo Hills District. The post 1971-72 eras saw the initial creation of one district from the existing two districts, then two and then another two districts (totalling seven districts at present) in quick succession within a span of three

decades. There were only 24 (twenty four) Community Development Blocks in the State initially, but today, there are thirty-two Community Blocks in the State. The State Government sets up a good number of hospitals, primary health centers, schools, colleges and a university. All these are indicators of economic growth and development of the State. Therefore, if a region or a state has to progress, it has to initiate various developmental activities so as to make the people live more comfortably and sustainable.

The above ventures of the State Government are just part of the developmental activities that the State has been going through from time to time. Many such examples can also be cited from different areas, which are but indicators of developmental activities taking place through the years.

If one looks into the traditional tribal society, one would be awe-stricken that in spite of the many drawbacks, be it in the field of literacy, economic, locational and geographical disadvantages compared to the rest of the civilized world, some measures to sustain the environment exist among the tribal society of Meghalaya. The presence of the *Law Kyntang* (Sacred Grove or Sacred Forest), the *Law Adong* (Prohibited

Forest) and the *Law Lyngdoh* (Forest meant specifically for a particular set of ruling class), is proof of this.

The following are the various types of forest and land specifically identified by the society and the villagers of the Khasi community:

1. *Ki Ri-Kynti*: This is the land that is owned by an individual or clan. It may belong to a particular family or clan, and as such, the society has no rights over it. The head of the clan managed and oversee the management of this land.
2. *Ki Ri-Raid*: This land is owned either by the community, village, *Raj* or *Raid*. Any individual who resides within that particular village or *Raj/Raid* is entitled to the share of this land with the approval of *Village Durbar* and/or chief. However, an individual cannot have unlimited access to the land but only according to his basic need and requirement.

Besides the above lands, there is the following *Ri* (state) land and forest land of the Khasis:

1. *Ki Ri* or *Law Syiem*: These are lands exclusively set aside for the support of the *Syiem* (chief) and his family.

2. *Ki Ri Lyngdoh* or *Law Lyngdoh*: They are the lands and forests set aside for the support of the *Lyngdoh* or Priest of the State. Till today, there are Syiemship, which still maintain this category of land.
3. *Ki Ri Shnong* or *Law Shnong*: These are lands and forests set aside for the exclusive use by the village in case of exigencies. Normally, these lands are made use only in times of any natural calamities that may befall the village. In peace and normal times, lands and woods from these forests are not utilized.
4. *Ki Law Kyntang*: These are sacred groves maintained by the community. These sacred groves are believed to be thousand of years old, as old as the Khasi people themselves. Not a single branch or leaf from this grove is permitted to be taken or tampered with by anyone. Some ceremonial rites are at times performed at these sacred groves so as to appease the god and goddess.
5. *Ki Ri-Kur* or the Clan Lands: They are clan lands and are exclusively managed and maintained by the clan. The head of the clan known as the *Rangbah Kur* and his *Durbar* managed and distribute or allot this particular land to their clan members.

The land system amongst the Jaintias and the Garos are less complicated than that found amongst the Khasis. The Jaintias have only

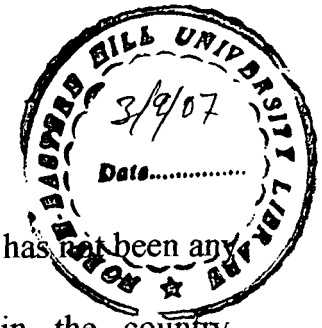
what is known as "Hall land" which belong to the chief. The rest of the lands are private lands.

Amongst the Garos, all land belongs to the village or community and every one has the right to cultivate these lands. However, no one has the right to permanently own the land. Later on, there were also private land and *Mahari* land or common village land.

There are certain traditional dictums, which forbid cutting down of trees and bamboos or shooting of animals at certain seasons of the year. The society also considers as a bad omen or a taboo for children to plant any tree or even to cut them down. If one were to analyse the dictums and taboos that exist among the tribal society of Meghalaya, one would clearly see that the far-sightedness and wisdom of the forefathers of yore, at preserving the environment. All these goes to show that the traditional tribal society of Meghalaya, while permitting what meagre development to take place in the society, takes serious view about sustaining its environment.

A sustained effort towards development is very much required in today's world. This means that while encouraging development steps should be taken to see that this should not be at the cost of leaving nothing for the future generation.

At the time when India attained Independence from the British, nearly 22 percent of its landmass was under forest cover. Today, the total area under forest cover is hovering around 10 percent. Deforestation brings about high silting, in the catchment's areas resulting in flooding in the lower reaches of the rivers. For example the report of the National Commission on floods (1980) shows that in India the losses dues to floods in 1976, 1977 and 1978 amounted to Rs.889 crores, Rs.1200 crores and Rs.1091 crores respectively. In Meghalaya also floods, which was hitherto unknown, has taken place in different part of the State and even in some parts of Shillong city in 2001. The absence of trees also results in wells drying-up and the perennial streams becoming seasonal. This is so because the rainwater does not percolate into the substratum of the soil but flows away as run-off to the plains. It is observed that in India the amount of topsoil getting washed away every six months is more than the total amount of soil used for making brick houses all over the country during the same period. Over and above all these, the growing of exhaustive crops, unscientific mining methods, industrialisations, urbanisations, uses of fertilizers, just to name a few, have compounded the problem ever more.



All the above factors go to show that of late there has not been any concerted effort towards sustainable development in the country. Surprisingly, in the State of Meghalaya, some record of sustainability exists since time immemorial. The Amendment Act of 1976 added 10 fundamental duties of the citizen under Article 51-A(g) which stipulates that it is the moral duty of every Indian citizen to protect the environment. This by itself speaks volumes about the need to protect the environment.

Countries of the world are today trying their best to utilize their resources to their utmost maximum so that people can reap the fruits of economic development. In all walks of life, there are improving standards of living and the material needs of man have been met with more adequately and properly than never before. All these, are basically due to two primary reasons, viz. the resources of the earth and the advancement of science and technology. The gap between the 'Haves' and 'Haves Not' are gradually being narrowed specially in the developed countries of the world on account of the resources. But all these developmental activities are not without a negative repercussion. Renewable resources like air and water have a definite capacity to absorb impurities and pollutants. When pollution goes beyond a certain limit, the natural power to purify themselves will naturally cease resulting in deterioration of the

environment vis-à-vis the ecosystem. The non-renewable resources like coal, oil, metal, minerals and others are also being recklessly exploited — all in the name of development.

In such an alarming situation, the U.N. General Assembly set up the World Commission on Environment and Development to thoroughly study the matter. This Commission, which was headed by Brundtland, submitted its report entitled *Our Common Future* in 1987. In its report the Brundtland Commission defines 'Sustainable Development' as "meeting the needs of the present generation without compromising on the needs of the future generation to meet their own needs".

To further endorse and strengthen the Brundtland Commission report, the Earth Summit which was held in Rio-de-Janeiro, Brazil stressed on the fact that *whatever development that are taking place in the world today should see that it does not upset the ecological balance of the ecosystem and society are justly benefited and it is economically viable.*

Environment and Sustainability

Prior to the emergence of the World Commission on Environment and Development, and the setting up of the Brundtland Commission, there were few other commissions, which were set up to look into the

global environmental protection and sustainable development. For example in England, the Barlow Commission of 1937 and the Political and Economic Planning Group of 1939 had then suggested the spreading of industries to the backward areas of the country. This suggestion gained support and momentum after the Second World War. The reason behind such move was – besides other important reasons – to make the air cleaner for its people. This can be seen as a first step in protecting the environment and towards sustainable development. Thereafter, many other commissions were set up on account of the growing concerned of the world community on the cumulative impact of man's activities on environment.

The United Nation Conference on Human Environment held at Stockholm Sweden in 1972 can be regarded as the first ever conference on sustainable development. This conference came out with an Action Plan whereby 109 recommendations were incorporated. Some of the other conferences and conventions which were convened by the United Nations with regard to Protection of the Environment and Sustainable development are as follows:

1. The United Nations Conference on the Human Environment 1972 held at Stockholm, Sweden.

2. Nordic Environmental Protection Convention 1974.
3. The World commission for the Economic and Development 1987.
4. Noordwijk Declaration on Climate Change 1989.
5. Helsinki Declaration on the Protection of the Ozone Layer 1989
6. The United Nations Conference on Environment and Development 1992. It resulted in the establishment of the United Nations Commission on Sustainable Development (CSD).
7. The Earth Summit held at Rio de Janeiro, Brazil 1992.

Since the formation of the Non-Aligned Movement (NAM), India too has taken serious note of the steady deterioration of the environment. In one of the NAM inaugural meet our late Prime Minister Indira Gandhi addressed the session:

> "Some people still consider concern for the environment an expensive and perhaps unnecessary luxury. But the preservation of environment is an economic consideration, since it is closely related to the depletion, restoration and increase of resources. In any policy decision and its implementation, we must balance present gains with likely damage in the not too distant future. Human ecology needs a more comprehensive approach."[8]

The above statement can be seen as a step towards environmental protection in the country. Some of the legislation passed by the Indian Parliament relating to environmental law is as follows:

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[8] Azad, S.A.K. *Environmental Law*, The Law House, Bhubasneshwar, Cuttack, p.19.

1. The Water (Prevention and Control of Pollution) Act 1974 (6 of 1974). dt.23.3.74.

An Act to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes of aforesaid, of Boards, for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

2. The Air (Prevention and Control of Pollution) Act 1981 (14 of 1981). dt.29.3.81.

An Act to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

3. The Environment (Protection) Act 1986 (29 of 1986). dt.23.5.86.

An Act to provide for the protection and improvement of environment and for matters connected therewith.

4. The National Environment Appellate Authority Act, 1997 (22 of 1997) dt.26.3.97.

An Act to provide for the establishment of National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards under the environment

(Protection) Act, 1986 and for matters connected therewith or incidental thereto.

Besides the above, the Government has also set up different tribunals dealing with the Environment. These are:

1. The National Environment Tribunal Act 1995 (Act 29 of 1995).
2. The National Environment Tribunal Act 1995 (27 of 1995).

All the above Acts relating to the environment were enacted and passed by the Indian Parliament and as such applies to the whole of India and also the State of Meghalaya. The implications of the above Act in relation to the State of Meghalaya can be summed up as follows:

1. The Water (Prevention and Control of Pollution) Act 1974 (6 of 1974). dt.23.3.74.

An Act to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes of aforesaid, of Boards, for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

This was the first Act passed by Parliament relating to the prevention of water pollution. At the time this Act was passed, Meghalaya was under the State of Assam, but as this Act applies in the first instance to the whole State of Assam, it therefore, has a bearing on

the people of the region. Since the State at that time did not encounter any large-scale water pollution anywhere, this Act was not enforced then and thus it was shelved away. Till date the Government has never tried to enforce this Act and none has been booked under it.

2. The Air (Prevention and Control of Pollution) Act 1981 (14 of 1981). dt.29.3.81.

An Act to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

This Act is undergoing the same treatment as the Water (Prevention and Control of Pollution) Act 1974 above.

4. The Environment (Protection) Act 1986 (29 of 1986). dt.23.5.86.

An Act to provide for the protection and improvement of environment and for matters connected therewith.

This was the first Act relating with the environment in its totality. So it is a comprehensive one. 'Environment' by its definition, includes water, air and land. The inter-relationship, which exists between water, air and land on the one hand, and human beings, living creatures, plants, micro-organisims and property on the other, is what this Act is all about.

At the time this Act was passed, the State of Meghalaya had not witnessed any significant environmental degradation apart from shifting cultivation. Though shifting cultivation at that time was phenomenal and should have been a cause of concern of all and sundry, the administration looked the other way and did not initiate any serious steps to check its protection. This is so because at that time, pressure of population on cultivable land was not so acute as today. However, with the present pressure of population on land increasing day by day, the government of Meghalaya has began initiating steps to wean away farmers from this unhealthy occupation. At times the Government has contemplated enforcing this Act in the State but till date there are no reports of any anyone being booked under this Act. Sufficed to mention here that the Act stipulates that "whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or order or directions issued there-under shall, in respect of each such failure or contraventions, be punishable with imprisonment for a term which may extend to five years or with fine which may extend to one lakh rupees or with both." [9]

The people of Meghalaya can, to a certain degree, be likened to the Bishnoi community of western Rajasthan in their efforts to protect the

[9] Azad, S.A.K., *Ibid.*, p.36.

environment through the ages. The traditional institutions and administrative set up in the different pockets of the State, has on its agenda the protection of the environment in one form or the other. Till the time the State attained its statehood, the people of the State have been trying to protect their environment by adhering to the different laws already in existence. Ironically, with the creation of the District Council – an institution created to see to the interest of the people vis-à-vis land – there were some bills and laws introduced and passed in the house which were against the interest of the State and seem to thwart the very efforts to protect the environment.

However, these laws could not be implemented and enforced as most of the people vehemently opposed them. The introduction of different laws relating to the protection of the environment by the Central Government has been welcome by environmentalists and different Non-Governmental Organisations working for the protection of the environment. This is so because these laws would strengthen the cause for protection of the environment of which the traditional institutions have been doing all along. Though these laws have not been strictly implemented in the State so far, the very fact that laws are there to protect

the environment is a pointer towards sustainable development in the State. Therefore, it should be the endeavour of the state machinery, the people along with the different N.G.Os to see that these laws are implemented so as to protect and save the environment.

Chapter-V

ECONOMIC GROWTH IN MEGHALAYA

A background on the different activities of the state in the field of agriculture, education, industries, trade and commerce, occupational structure and transport network from the 18th century till date is given below:

Agriculture

As mentioned in the preceeding chapter the region was from time immemorial famous for the production of commodities like coal, lime, iron, cotton, oranges, bettlenut, pan leaves, bay leaves, silk, lac, honey and potatoes. Potato was first introduced in this region by David Scott in 1830.[1] Besides these, some of the less important items of export include rice, millets, maize, *sohphlang* (local tuber plant), vegetables, pulses, sugarcane, pineapples, turmeric, cardamon and agricultural implements. The Khasi lime was much sought after on account of its purity, so also

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[1] Allen, B.C., *Gazetteer of the Khasi and Jaintia Hills, Garo Hills, Lushai Hills*, Gian Publication, Delhi, Part I, p.73.

coal, oranges and turmeric. Oranges believed to be indigenous to the State is a famous export commodity of the State.

Of the total cultivators in the State, West Garo Hills account for 33.80 percent. This is followed by East Khasi Hills 17.70 percent, West Khasi Hills 17.50, East Garo Hills 16 percent and Jaintia Hills 15.00 percent. With the exception of West Garo Hills, the distribution of cultivators in different districts of the State is even. The high percentages of cultivators presence in the West Garo Hills is because large areas are still cultivated and majority of its people are not settled agriculturist but *jhum* cultivators.

A large majority of the people (36.50 per cent) are agricultural labourers in the East Khasi Hills district. This is followed by West Garo Hills District 26.10 percent, Jaintia Hills 17.00 percent, West Khasi Hills, 16.50 percent and East Garo Hills District 3.90 percent. In the East Khasi Hills district land has become scarce due to pressure of population. Since lands in this district were the first to be ploughed with the help of chemical fertilizers, pesticides and insecticides, it has resulted in major areas becoming barren and depriving the people of good agricultural land. People are thus compelled by circumstances to work in other fields as

FIG. 5

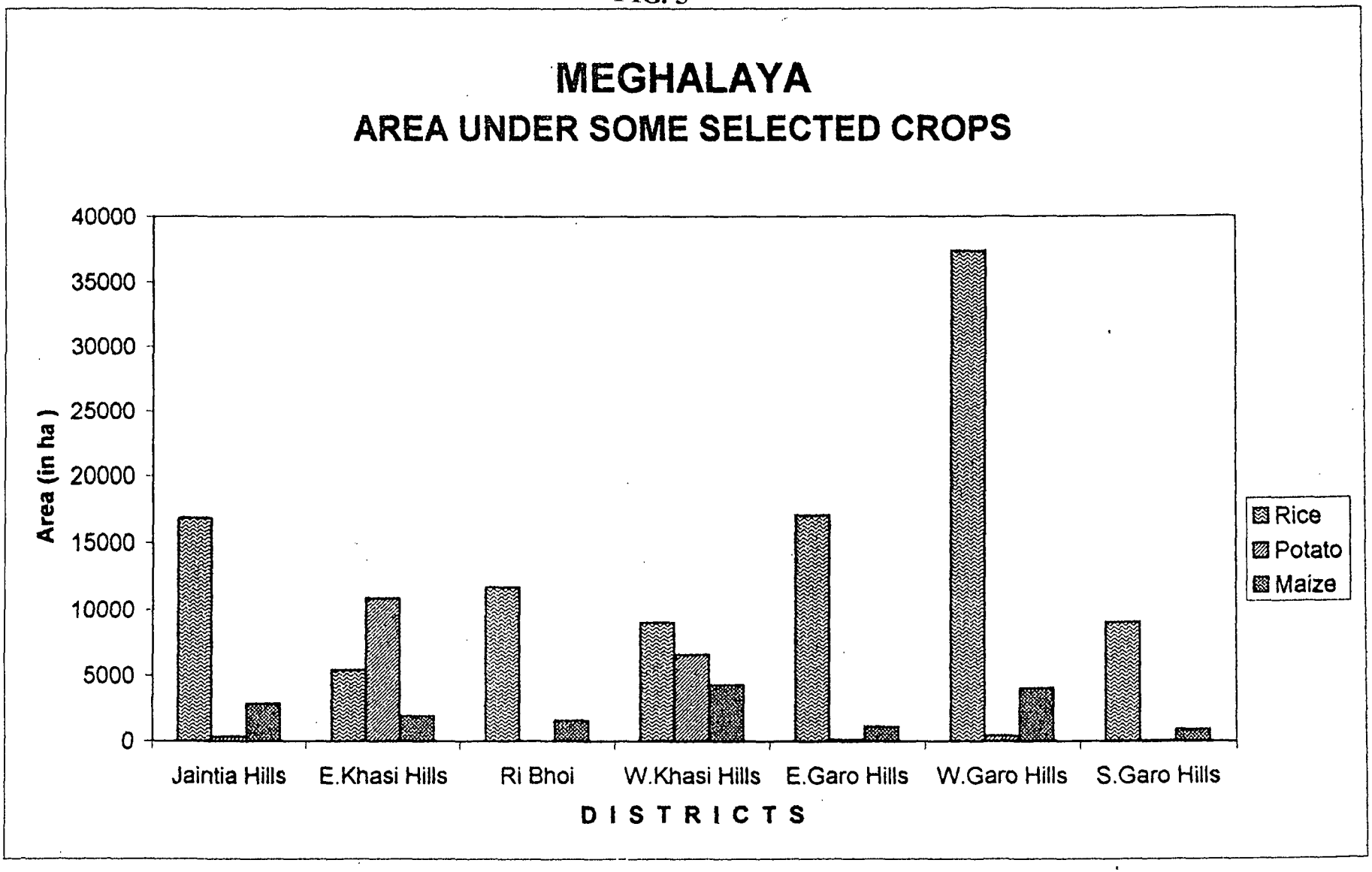

MEGHALAYA
AREA UNDER SOME SELECTED CROPS
Area (in ha)
40000
35000
30000
25000
20000
15000
10000
5000
0
Jaintia Hills
E.Khasi Hills
Ri Bhoi
W.Khasi Hills
E.Garo Hills
W.Garo Hills
S.Garo Hills
DISTRICTS
Rice
Potato
Maize

FIG. 6

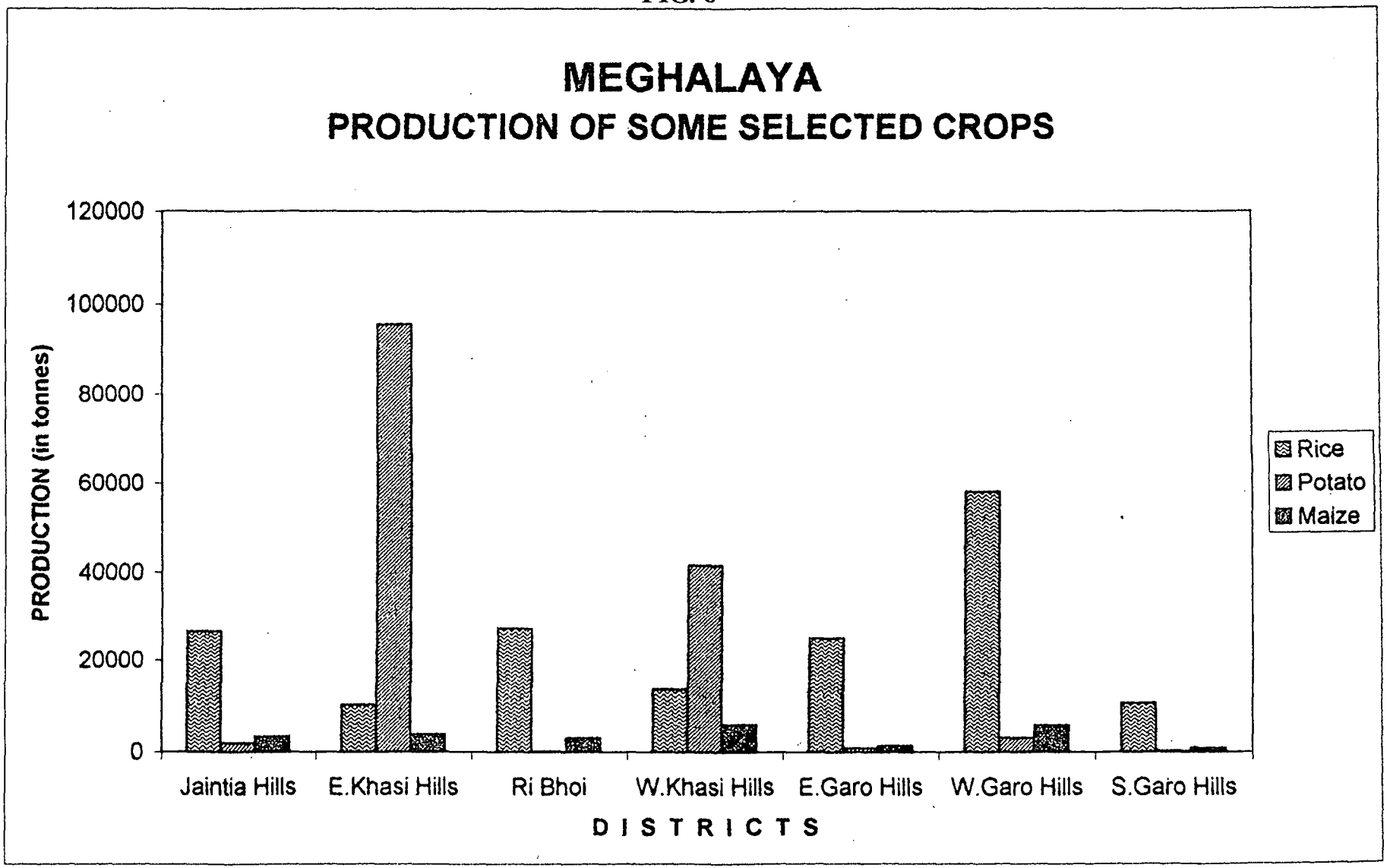
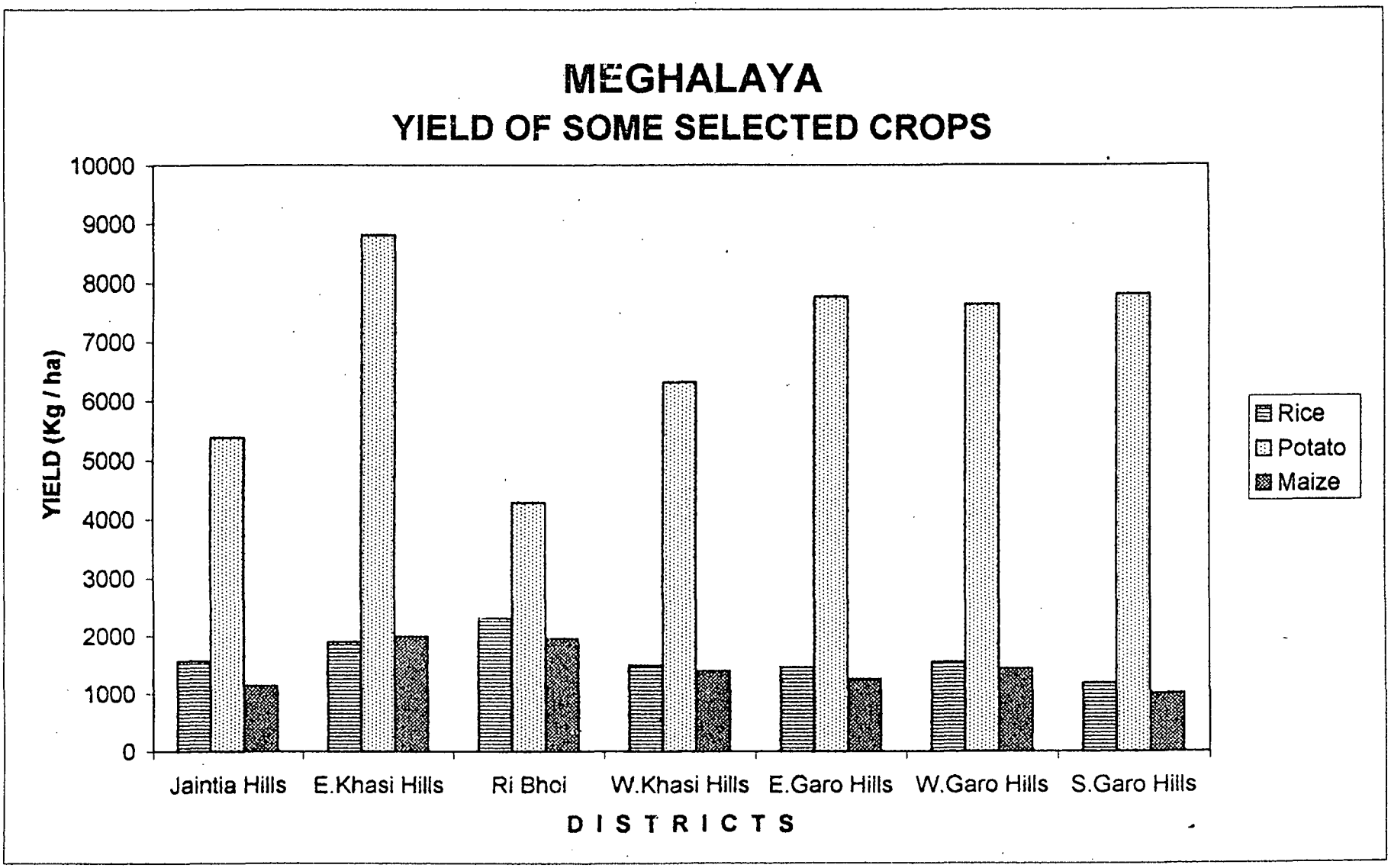

MEGHALAYA
PRODUCTION OF SOME SELECTED CROPS
PRODUCTION (in tonnes)
120000
100000
80000
60000
40000
20000
0
Jaintia Hills
E.Khasi Hills
Ri Bhoi
W.Khasi Hills
E.Garo Hills
W.Garo Hills
S.Garo Hills
D I S T R I C T S
Rice
Potato
Maize

FIG. 7


MEGHALAYA
YIELD OF SOME SELECTED CROPS
YIELD (Kg / ha)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jaintia Hills
E.Khasi Hills
Ri Bhoi
W.Khasi Hills
E.Garo Hills
W.Garo Hills
S.Garo Hills
D I S T R I C T S
Rice
Potato
Maize

labourers. This brought about a high percentage of the people engaged as agricultural labourers.

In the West Garo Hills district, the percentages of agricultural labourers are high due to similar reasons of the East Khasi Hills district. The high rate of urbanization also results in the elitist buying off large agricultural land from the 'haves not' thereby reducing the cultivators to agricultural labourers.

In the rest of the district, the percentage of people engaged as agricultural labourers is low. This means that the people of these districts are still holding on to their traditional occupation and retaining their ancestral land by themselves. The lowest percentages of people engaged as agricultural labourers are in East Garo Hills District, which is only 3.90 percent.

Agricultural Efficiency

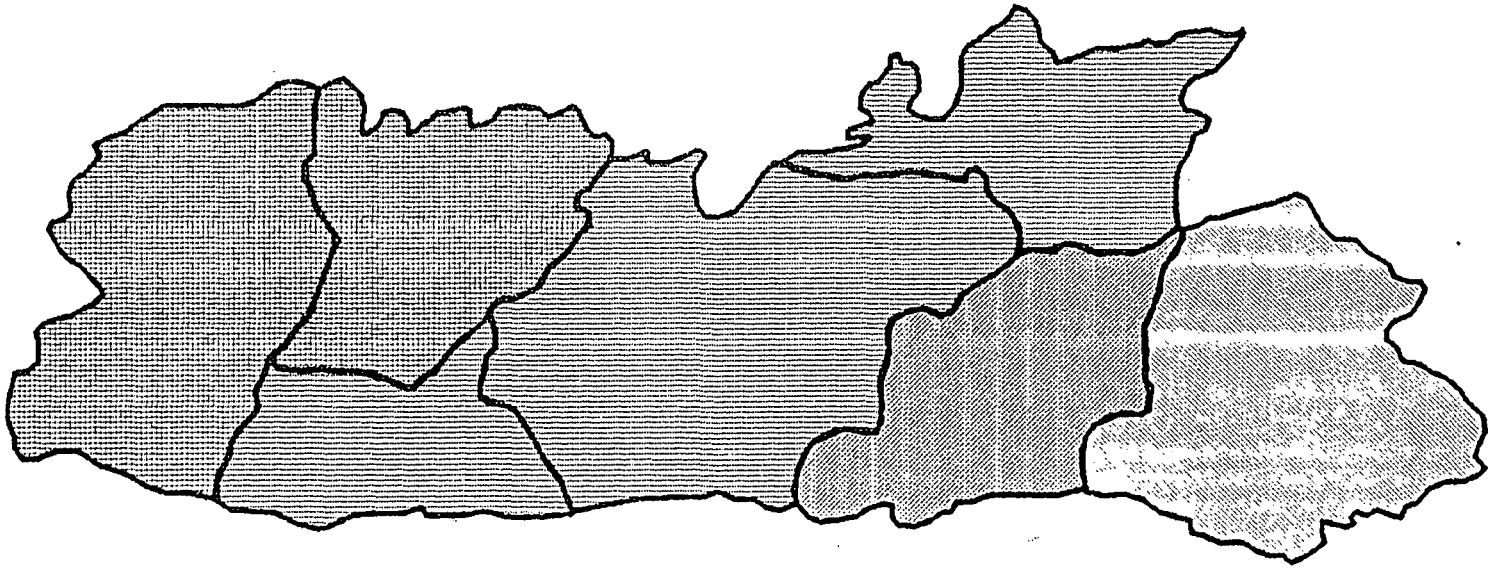
The area, production and yield of some selected crops of Meghalaya are shown in figures 5, 6 and 7 respectively and in Appendix-2. Only three major crops of the State, viz. rice, potato and maize have been taken into account for this analysis. It is interesting to note that though the area under potato in East Khasi Hills district is one among the lowest, when compared with other districts of the State, its production,

MAP 4

MEGHALAYA

AGRICULTURAL EFFICIENCY

2001



INDEX

- ABOVE 65.32
- 13.66 - 65.31
- 13.40 - 13.65
- BELOW 13.39

10 0 10 20 30 40 Km

however, is quite significant in most districts except in the Ri-Bhoi and South Garo Hills districts. The yield of potato is also significant in all districts despite its low acreage. The area under rice in the West Garo Hills district is the higher but its production is comparatively low when compared with other districts. Its yield is, however, quite significant in all districts. The yield of potato is high in all districts when compared with rice and maize.

The reasons for the above can be attributed to the different methods of farming, the nature of the soil, the climate of the area, the manner in the application of manure, fertilizers, insecticides, pesticides and other factors.

From Map 4, it is evident that East Khasi Hills district is agriculturally the most efficient. The district has an efficiency index of 394.37 in the production of all ten selected crops. Ri-Bhoi on the other hand has the lowest index of only 6.94 for producing all the ten selected crops. Ri-Bhoi district, however, dominates in the production of rice and pineapple and lowest in the production of citrus fruits (Appendix-1).

Education

On May 1821, the Seng Khasi Free Morning School was started with the sole aim of giving free education to tribal boys and girls of the

town. This was indeed the beginning of education in the Khasi and Jaintia Hills. However, the credit for the setting up of formal education in the hills goes to the Welsh Calvinistic Mission who on 22nd June 1841 through the persona of Rev. Thomas Jones started it. The Rev. Thomas Jones has also been accredited for having invented the Khasi alphabet and is thus rightly regarded as the father of the Khasi alphabet. The first Khasi High School was the Mission High School or better known today as the Khasi-Jaintia Presbyterian High School (1884-85). Thereafter, the Shillong Government High School was established in 1878 followed by the Nongsawlia W. Presbyterian Girls School at Cherrapunjee (Sohra) and the Shillong W. Presbyterian Girls School at Shillong in 1887.[2]

The report of the Inspector of Schools, Assam for the year 1874-75 indicates that there were only 73 schools at that time attended by 1,666 students. In 1900-01, the number of schools increased to 352 with 6,535 students on their rolls. These schools were graded into different sections, viz. lower primary, upper primary, middle and high school sections.[3] In 1901, the total literacy rate was 5.5 percent among the Khasi and Jaintia and 0.8 percent among the Garos. The male literacy rate for the Khasis

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[2] Shillong Centenary Celebration (1976). P.M. Lyngdoh, *Education in Shillong: A Profile*, Dr. N. Das Gupta, pp.35-38.

[3] Allen, B.C., *Op. cit.*, p.109.

and Jaintias was 7.7 percent and its female literacy was 3.4 percent. The literacy rate for the Garos was 1.2 percent for the males and 0.2 percent for the females.[4]

Industries

From whatever records and data that are available today, it is clear that there are no large and medium scale industries in Meghalaya. However, small scale and cottage and other village industries were in existence from time immemorial. The Khasis knew how to make earthenware pottery, baskets and mats, jewellery and cotton clothes. Blacksmithy and iron smelting have been carried out much before the coming of the British to these hills. In fact the Khasi iron was much sought after than the European iron by the Bengalis due to its superior quality. The art of weaving, production of lac rearing of bee or bee-keeping and fishing industry are the few other economic activities – though on a small scale – that are worth mentioning.

The North-Eastern Region of India including Meghalaya is very much lacking in large, medium and small-scale industries. Though Meghalaya is endowed with numerous raw materials for setting up of different industries, there is no important industry worth the name in the

[4] *Ibid.*, Part I, Table II and Part II, Table III.

State. The only major industry of Meghalaya is the Mawmluh Cherra Cement Limited factory and the Cement Plants at Jowai and Tura, the different food and fruits processing factories and the limestone processing factories.

The pace of industrial in the State has been rather slow due to various reasons; some of the reasons are the historical factor, lack of proper and good network of transport and communication system, lack of infrastructure, lack of capital, dearth of trained personnel and the lackadaisical attitude of both the central and state governments. However, all these hurdles can be overcome provided there is a sincere and concerted effort by all and sundry to tackle this problem resolutely.

The Indian Institute of Entrepreneurship, Guwahati has identified 10(ten) medium scale industries in Meghalaya as on 31st March 1998. During the same year, the number of small-scale industries in the State was put at 725 employing 3,780 people but with 136 of them declared sick and closed. Therefore, the number of functioning small-scale industries in Meghalaya till March 1998 stands at 584 numbers.[5]

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[5] Lyngdoh, W.L. *Statistical Handbook of Meghalaya 2000*, Directorate of Economics and Statistics, Government of Meghalaya, Table 9, p.53.

The Department of Industries of the Government of Meghalaya has categorised all registered industries in Meghalaya into four main heads. These are: i) Manufacturing industries; ii) Repairing and servicing industries; iii) Processing industries; iv) Other industries, which include tailoring, saw mills, arts and stone crushing industries.

More than three-fourths of the state industrial units are confined to Manufacturing and Repairing and Servicing. The bulk in the investment in plant and machinery and the number of persons employed also goes to these two heads. Other services account for a significant number in terms of their number, investment in plant and machinery and in the total number of persons employed.

The following Table 9 shows the district-wise number of persons employed in small-scale industries, the total investment in plant and machinery and the total number of small-scale industries in the State.

Table 9: Small Scale Industries in Meghalaya

Sl.No.	Districts/State	No. of Small Scale. *industries*	Investment in Plants & Machineries (Rs. in lakhs)	No. of Persons Employed
1	East Khasi Hills	1428	1447.47	9577
2	Ri Bhoi	92	278.00	742
3	Jaintia Hills	439	276.02	1755
4	West Khasi Hills	608	177.84	2733
5	East Garo Hills	292	113.47	1504
6	West Garo Hills	3950	160.19	1999
7	South Garo Hills	61	14.88	275

Source: Directorate of Industries, Govt. of Meghalaya, Shillong, 1988-89.
Statistical Handbook Meghalaya 2000, Table 9.02, p.54.

East Khasis Hills district of Meghalaya topped the list of district in terms of number of persons employed, the total investment in plant and machinery an the presence of small-scale industries. This is obvious for the following reasons:

i. The district is the seat of the headquarter of the State and right from the British time has function as the center of administrative, commercial educational and socio-cultural center till date.

ii. The Meghalaya Mawmluh Cherra Cement Limited (MCCL) the only medium scale industry of the State is situated in this district.

iii. Different food and fruit processing units, besides other manufacturing factories of the State, are found in and around this district particularly within the vicinity of Shillong city.

iv. This district being easily accessible to other parts of India through Assam, have better access of capital demand, technical know-how and other factors necessary for setting up different industrial units.

The Ri-Bhoi district comes second in term of investment in Plant and Machinery but sixth position in terms of the number of small-scale industries and the numbers of persons employed in this occupation. The high percentages of Capital investment shown in this district is on account of the presence of the Meghalaya Fruits and Beverages Plant at

Byrnihat which happens to be one of the oldest Beverages Plant in the State dating back to the early 19th Century.

The West Khasi Hills District comes second place both in terms of the number of small-scale industrial units presence and in terms of the number of persons employed in this sector. The reasons for this is due to the presence of numerous saw mills, whereby a large number of persons are employed in it.

The other districts of the State are almost at par in terms of the above attributes. The South Garo Hills district is the most industrially backward district of the State. This is because large areas of the district are under forest area and the Balphakram National Park. The fact that the district is located in the southern most corner of the State close to Bangladesh make it the most inaccessible district of the State.

Trade and Commerce

The Khasis were great traders of their time. They worked their limestone quarries and were the chief supplier of lime to Bengal. Wax, silk, ivory, coal and oranges were their chief commodities of export. In fact, oranges is believed to be indigeneous to the Khasi hills, which was later on disseminate to other parts of the country and abroad by the Arabs.

According to Lindsay, the Khasis and Jaintias were subsistence farmers. The Moguls showed the art of trading in the late 17th Century. At that time trading was transacted in the local markets or collection centers by the barter system. After the barter system the people transacted their business and trade by special *kowaris* or shells and later on by coins and currency notes.

The Khasis and Jaintias had good trade relation with the Garos, the people of the Surma Valley to the south and the people of the Brahmaputra Valley of the north. There are also evidences that the Khasis had trade relations even with the Chinese, when silk, ornaments and ivory was traded. The Khasis weekly markets or *hats* were important trading and collection centers of these days. Some of the notable *hats* of the southern periphery are The *Tyllap Hat*, The *Tharia Hat*, The *Majai Hat*, The *Dawki Hat*, The *Shella Hat* and The *Sohra Hat*. With the partition of the country into Hindustan (India) and Pakistan, trade relations between the people in the southern part of the State with that of those living in erstwhile East Pakistan (now Bangladesh) flourished very well. However, with the liberation and creation of Bangladesh in 1971, these markets or *hats* were not encouraged by the government to grow. This led to the ultimate closures of some of them like The *Tharia Hat* and The *Tyllap*

Hat. The Dawki, Shella and Sohra *hats* are still functioning today but with less bustling of economic activities and importance as the days of yore. The only functioning *Hat* of the northern periphery today is the *Byrni Hat.*

In those days the Khasis export fruits such as oranges and pineapples. Limestone, coal, iron ore, bettlenut, pan leaf, *tezpatta*, potatoes, honey, ivory, cloth (*Ryndia* and *Muga*), wax, ginger, turmeric, bee's wax and different types of agricultural implements were also exported by the Khasi. According to Bareh Ngapkynta about 16,80,050 maunds of limestone were exported outside the region in 1851.[6] Further Allen stated that the production of limestone in 1858 was 17 lakh *maunds.*[7] Now if for every 1000 *maunds* of lime the price is Rs.180/-, for 17,00,000 *maunds* the total money revenue received would be Rs.3,06,000 (Rupees three lakh six thousand). The total output of limestone till 1904 was estimated at about 1,23,000 tonnes and the revenue derived from it valued at an annual average of Rs.15,700/- for the

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[6] Bareh Ngapkynta, H. *The Economy of Meghalaya: Tradition in Transition*, D.K. Fine Arts Press, Delhi, p.37.

[7] Allen, B.C., *Op. cit.*, pp.18 & 21.

year ending 1904.[8] Coal is another important item of production and export of the region.

In 1842 Major Lister stated that more than 2,02,300 *maunds* of coal was sent to Calcutta and another 44,350 *maunds* sent to Chattack.[9] Oranges is believed to be indigeneous to the Khasi Hills. According to Allen more than 60 million oranges were exported from this region in 1903-04.[10] As a hundred oranges were sold for Rs.10/- to Rs.20/-, the average price of a hundred oranges works out to Rs.15/- per hundred. If this be taken as an average price for one hundred oranges, then the 60 million oranges exported would fetch Rs.90,00,000 (Rupees nine million). This is no meager amount if one is to go by the value of money at that time.

They in turn buy salt, rice, cotton and silk cloth, ornaments, fishes, metals and tobacco. They also buy the Garo cotton, which are of superior quality and export the Jaintia cotton of inferior quality.[11]

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[8] *Ibid.*
[9] Allen, B.C., *op. cit.* p.21.
[10] Allen, B.C., *Op. cit.*, p.76.
[11] Choudhury, J.N., 1978. *The Khasi Canvas,* Navana Printing Press, Calcutta, pp.68-70.

Transport Network

The first road that traverses through these Hills was the one that connects Gauhati with Sylhet via Cherrapunjee, Mawphlang and Nongkhlaw. The construction of this road was agreed upon between U Tirot Sing Syiem of Nongkhlaw with David Scott in return for Borduar.[12] The journey from Shillong to Gauhati was initially undertaken by bullock cart, which took three strenuous days. In 1888 Kasimuddin Molla introduced the horse drawn Tonga Service which took one day for a to and fro journey and charge Rs.30/- for one-way journey. In 1906, Mr. Molla then started the first motor service between Shillong and Gauhati. Till 1910, both the Tonga Service and the Motor service functioned together, but the Tonga Service was later on discontinued. Then in 1921 the commercial carrying company took over and started carrying passenger to and fro from Shillong to Gauhati till the country attain its Independence.[13]

There is no denying the fact that all developmental activities in the field of agriculture, industries, mining and other socio-economic

[12] This road led to some misunderstanding between the Khasi Syiem and the British resulting in a three-year battle between the two, which the latter triumphed leading to U Tirot Sing Syiem's arrest.

[13] Choudhury, J.N., *The Khasi Canvas*, pp.32-33.

attributes depend mainly on Road network of transport linkages. If an all-weather road is connected with the different pockets of the State, economic development will simply follow suit. Therefore, transport is the backbone of modern economic growth, which works along with other factors in accelerating economic development. In other words, an efficient system of transport is indispensable for any modern economy.

Prior to the attainment of a separate state, the transport system in the State was deplorable. There was only one National Highway No.40 having a total length of 161 kilometres, linking Jorabad with Tamabil in the Bangladesh border. The maintenance and improvement of this highway was very much neglected. It was only because of the fact that the highway previously existed and had played a vital role during the World War II that it acquired the status of a National Highway.

Other roads worth mentioning till date are as follows:

1. In the East Garo Hills there is the Damra-Darugiri-Nangalbibra-Baghmara road which links with the National Highway 37 in the north at Dudnai.
2. In the West Garo Hills District there is the Bajengdoba-Tura-Dalu-Baghmara road and the Phulbari-Tura road.

3. In the East Khasi Hills and Jaintia Hills Districts, the Shillong-Jowai-Garampani road, the Shillong-Mawphlang-Mawsynram-Balat road and the Umtyngar-Cherrapunjee-Shella road are worth mentioning.
4. The only important road of West Khasi Hills District proper is the Shillong-Nongstoin-Mawshynrut road.

Table 10: Road Network in Meghalaya as on 31.3.1996

	Total Length	Surfaced	Unsurfaced	Road per 100 sq.km.	Road per '000 People	% of Surfaced Road to Total Road Length
Meghalaya	8,391	3,946	4,445	37.40	4.66	47.03
N.E. India	1,32,838	32,106	1,00,732	52.08	4.23	24.17
India	24,03,634	13,34,078	10,69,556	73.00	2.85	55.50

Source: Basic Road Statistics of India 1995-96, Ministry of Surface Transport.

During the Fourth Five-Year Plan (1969-74) a little more than two-third of the State's total plan expenditure was diverted to transport. This indirectly shows that the newly formed State of Meghalaya was all along lacking in proper transportation network under the then Assam government.

Table 11: Allotment of Funds for Transport in Different Plan Period

Sl.No.	Different Plan Period	Meghalaya	N.E. Region
1	**4th Five-Year Plan (1969-74)**		
	Total	3,624	Not Available
	Transport	1,405	Not Available
	Percentage allotted to transport	(38.8)	
2	**5th Five-Year Plan (1974-79)**		
	Total	7,133	6,505
	Transport	1,467	11,515
	Percentage allotted to transport	(20.6)	(18.9)
3	**6th Five-Year Plan (1980-85)**		
	Total	23,500	2,38,700
	Transport	4,800	36,020
	Percentage allotted to transport	(20.42)	(15.09)

Source: Planning Commission and State Plan Document on Transport and Communication in N.E. Region, December 1983, N.E.C., Shillong, p.2.

The Fifth Five-Year Plan (1974-79) allotted 20.6 percent of its total actual expenditure on transport. It was also during this plan period that a total of six different routes were taken up by the newly constituted North-Eastern Council. These routes are as follows:

i. Jowai-Khanduli route having an approximate length of about 60 kilometres.

ii. The Paikan-Bajengdoba route having an approximate length of about 21 kilometres.

iii. The Medhipara-Tura route having an approximate length of about 133 kilometres.

iv. The Mankachar-Garobadha route having a total length of about 20 kilometres.

v. The Nongstoin-Rongjeng route having a total length of 106 kilometres.

vi. The Shella-Cherra-shillong route having a total length of 90 kilometres.

The total length of the above routes is 430 kilometres which is 40.5 percent of the total routes in the region. Further, one National Highway No.44 connecting Shillong and Agartala via Badarpur was recognised during this time.

The Sixth Five-Year Plan (1980-85) allotted 20.42 percent of its actual expenditure on transportation. One highway starting from Paikan on National Highway No.37 in Assam connecting Tura and Dalu in the southern extremity of the State was declared a National Highway No.51. During this plan period the North Eastern Council identified two types or roads in the region. These are as follows:

1. Roads of Regional Importance: They include the following:
   i. The Mairang-Ranigodown route whose length is about 86 kilometres.
   ii. The Mawshynrut-Hahim route whose length is about 38 kilometres.
   iii. The Dkhakia-Moulsei route whose length is about 100 kilometres.
   iv. The Ronasoi-Borohara-Bajengdoba route whose approximate length is 19 kilometres.
2. Roads of Economic Importance: The 41 Kilometres Mawkachar-Pura Khasia-Mahendraganj road is the only road in Meghalaya falling under this category. It account for about 1.7 percent of the total roads in the North-Eastern Region, which falls under the same head.

According to the draft proposal of different Five-Year Plans and Annual Plans published by the Planning Department, Government of Meghalaya, the following are the outlays on transport in Meghalaya.

Plan Period	Rs. in crores
1. VIIth Five-Year Plan (1985-90)	80.00
2. VIIIh Five-Year Plan (1992-97)	250.00
3. IXth Five-Year Plan (1997-02)	481.00
4. Proposed Xth Five-Year Plan (2002-07)	538.30

It is evident from the above, that funding to transport sector has been increasing throughout the different plan periods. This shows that the State Government is concerned for developing road and communication system in all parts of the State. The Planners also understand that a good transport network is the backbone of all economic growth and therefore have earmarked a substantial allotment of funds to this sector.

Till 31st March 1996, the total length of roads in India was 24,03,634 kilometres out of which 8,391kilometres lies in Meghalaya. This is just 0.34 percent of the total length of roads existing in the country. When compared with the total length of roads in the North-Eastern Region, the percentage of roads in Meghalaya is a mere 6.30 per

cent. However, the percentages of surfaced road are slightly better when compared with that of the North-Eastern Region, which is 12.30 percent.

The average length of surfaced road for every hundred square kilometers in Meghalaya is 37.40 kms. It is slightly lower than that of the North-Eastern Region, which is 52.08 km. It is again much below the all-India figure of 73.00 km. Further, the percentage of surfaced road length to total road length in the State is 47.03 km. It is much higher than that of the North Eastern Region of 24.10 km. but lower than the country's average of 55.50 kms. This means that though the State has less surfaced road per hundred kms. almost than fifty percent of its road are surfaced. There are 4.66 km. of roads for every one thousand persons. This figure though quite low is, however, better than that of the North Eastern Region (3.23 kms.) and the all-India (2.85 kms).

From Appendix-3, it appears that all areas of the State are properly linked with each other. However, the truth is far from correct. Most of the roads in Meghalaya are not all-weather roads. Further, they are ill maintained and even the important ones linking the different districts and Block headquarters of the state capital are not all-weather roads.

The eastern section of the State is fortunate as it lies on the district path of the only highway linking States of Tripura, Mizoram and part of

Assam with the rest of India, and as such has a National Highway No.44. This fact indirectly helped in the spreading of the transport tentacles to other areas of this region.

Admittedly, all facts indicate that the transport network in Meghalaya needs to be improved. As the State abut with a foreign country (Bangladesh) in its southern part, the only link with the rest of the country lies in the north and eastern part. But there are only two roads in the north and one in the eastern part that link this State with other neighbouring states and the country as a whole. Considering the immense strategic importance of this state, it is of vital importance that there are more all-weather roads connecting the State with the rest of the country.

Meghalaya is the only State of the North-Eastern Region, which still does not have a railway line. Though a railway line (Broad Gauge) was sanctioned at an estimated cost of Rs.1470 lakhs, the project was abandoned. Today this project has again been taken up and plans are being worked out to start a railway line in Garo Hills region.

On the 18th March 1988 a helicopter service linking Shillong with Tura was inaugurated by the then Chief Minister of Meghalaya, Shri Purno A. Sangma. This service was opened to the public on the 22nd March 1988. However due to the high cost of maintenance, the service

was closed but again opened. The government has upgraded the existing Umroi airport near Shillong and constructed another airport near Tura in Garo Hills.

Till date, there are no commercially exploitable waterways in the State. The local people for short distances are using some rivers like the Simsang, the Umiam, the Umtru and others. They, however, do not play any significant role in the sphere of transport and communication system of the State.

According to the North Eastern Council, those ropeways, which are "economically justifiable" in relation to specific industrial projects, may be taken up. In view of this definition three ropeways were identified in Meghalaya. They are as follows:

1. The Ishamati-Byrnihat Ropeways
2. The Baghmara-Siju-Dudnai Ropeways
3. The Lumshnong-Budarpur Ropeways

During the North-Eastern Council's Sixth Five-Year Plan period, an amount of Rs.265 lakhs was earmarked to start work in one of the ropeways in Garo Hills or Khasi Hills.

One of the main hurdles that have retarded the development of good transport network in the State is relief. The State being situated on a

plateau, development of all forms of transport systems, i.e. roadways, airways and waterways are difficult. At higher elevation of the tableland, most of the existing hills run east to west rather than north to south. This has somewhat prevented the speedy development of roads south to north where lies the link with the rest of the country. The two existing parallel all-weather roads of significance in the State are also not well connected with the southern half of the region. Thus, when a close examination is made, it is found out that relief and the ruggedness of the region clearly effect the development and growth of good transport network in the State.

Occupational Structure

In 1901 the Khasis and Jaintias had a percentage of workers and dependents of 59.9 percent and 40.1 percent respectively. This figure is 57.6 percent and 42.4 percent respectively for the Garos. Further, the general labourers or cultivators were 11.4 percent for the Khasis and Jaintias whereas for the Garos it was 54.4 percent.[14] This shows that unlike their Garo brethren, a large section of the Khasis and Jaintias are not dependent on agriculture, even during those days; but on other activities like trade and commerce, production and manufacturing and other allied activities.

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[14] *Ibid.*, Part I, Table III.

The above parameters have been taken to assess the regional development of the State and to analyze the nature of balanced regional development in the State. Balanced regional development weigh the manner in which a region has developed given the existing potentials which the region has. Thus if a region with vast potential for development is at the same scale of economic development with a region with less potentials then the former region would be considered less developed than the latter and as such there exist an unbalanced regional development.

All economic growth is possible only through the working together of different sectors of the environment. For example, the tilting of the land brings about agricultural products which sustain the people, making it possible for them to engage in other activities. If people are well fed and nourished, they can engage themselves in other primary, secondary and tertiary activities and this would result in societal economic growth. However, if the backbone of all economic growth, i.e. agriculture, is not thriving well, all others sectors of the economy and society are bound to be affected. Thus if agriculture shows signs of development, then education, industry, trade and commerce and other sectors would indirectly follow suit. This would bring about the rise in the per capita

income of the people and their standard of living. In the long run, this would not only lead to economic growth but overall economic development. This goal having been achieved, people and society would thus think in term of sustaining their environment. The race is on today to see that the destruction of the environment by 'poverty'[15] in the guise of economic growth and development does not overtake the efforts of the global community to protect the environment.

[15] Narayanan, K.R., "Greening of Development: Problems and Prospects" in P.R. Trivedi and U.K.Singh (eds.),*Global Environmental Educations: Visions of 2001.* Indian Institute of Ecology and Evironment, 1993.

Chapter-VI

LEVEL OF DEVELOPMENT BASED ON REGIONALISATION

The basic concept of Geography is a region. A region has been defined as "an uninterrupted area distinguished by one or more characteristics that are some degree different from those of other areas."[1] Geographers have identified two types of regions, *Uniform* or *Formal* and *Functional* or *Nodal* regions. The best example of a uniform or formal region – for which this study also aims to dwell upon – is the division of world into (a) more developed region and (b) less developed region. It is evident the more developed countries of the world are countries of western Europe like Great Britain, France, Italy and Germany; North American countries, the United States of America and Canada; Japan, Australia, New Zealand and Russia to name a few. The less developed countries of the world are found mostly in Africa, Asia (with the

[1] Rubenstein, James M. and Bacon Robert, S. *The Cultural Landscape: An Introduction to Human Geography*, Prentice Hall of India, Pvt. Ltd., New Delhi, 1990, pp.25-26.

exception of Japan) and South America. The main distinction between the two is based on per capita income, literacy rates, per capita hospital beds, industrial production and other characteristics. In like manner this chapter will endeavour to identify the more developed and less developed districts of the State based on some selected indicators.

In this study when the terms 'more developed' and 'less developed' are used, it is not based on the parameters and scale used for determining the levels of development in the world as a whole. Here, these terms have been used in the context of the conditions existing in this part of the world. Thus when the indices like per capita income, literacy rate, industrial production etc. are taken, they are not to be compared with the international scale. So also the other indicators taken have been assessed and compared with local condition to have an insight into the levels of development in the State.

General Social Amenities and Development

The first sector in this study is the different social amenities available in the different districts of the State. The number of villages electrified, the number of post offices, the number of telephone exchanges, the number of public call offices and the number of biogas plants available in the different districts are collected and noted under this

sector. These selected indicators are expected to reflect the standard of living of the people in different districts of the State.

1. Village Electrified

Power, or electricity as it is commonly known, is the most convenient and versatile form of energy. It plays a key role in industrial, agricultural and commercial sectors of the economy. Power also provides the most crucial source of domestic energy requirements. The demand for it has, therefore, been growing at a faster rate than ever before in comparison with other forms of energy. This indicator has been chosen as it has a direct bearing on the scale of development in a region. In other words, the more area and villages of the state are provided with power resources, the more development would be noticed in them in the years to come. This is true because with the introduction of power energy, people are able to set up factories, cottage and small-scale industries and workers can also worked for longer hours, thereby increasing earnings and revenue for the region. Therefore more villages being electrified means more economic development would take place in those villages in the years to come in comparison with the villages not yet provided with power resources. Figure 8 shows the number of villages electrified in different districts of the State.

FIG. 8

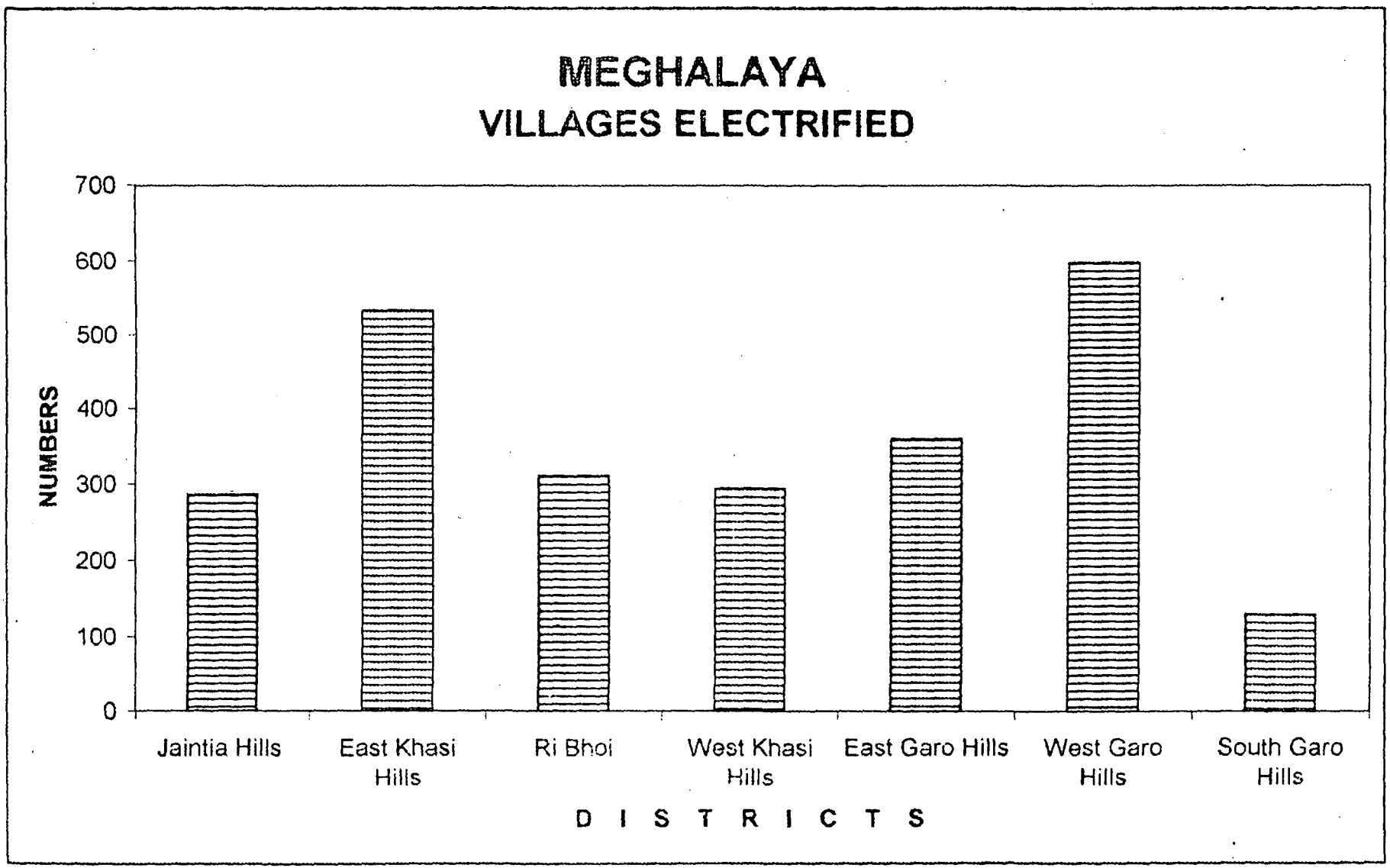

MEGHALAYA
VILLAGES ELECTRIFIED
NUMBERS
700
600
500
400
300
200
100
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

FIG. 9

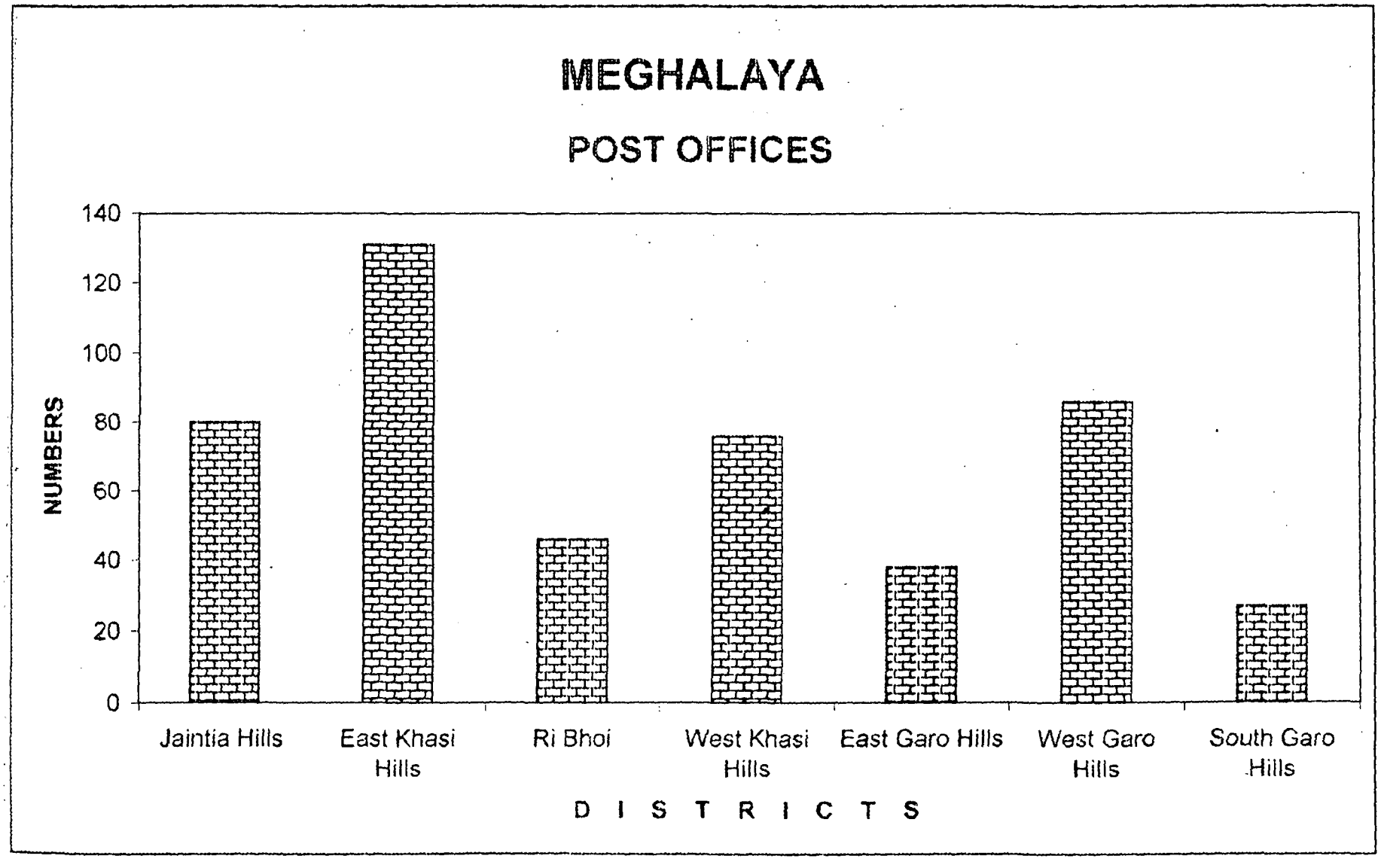

MEGHALAYA
POST OFFICES
NUMBERS
140
120
100
80
60
40
20
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

FIG. 10

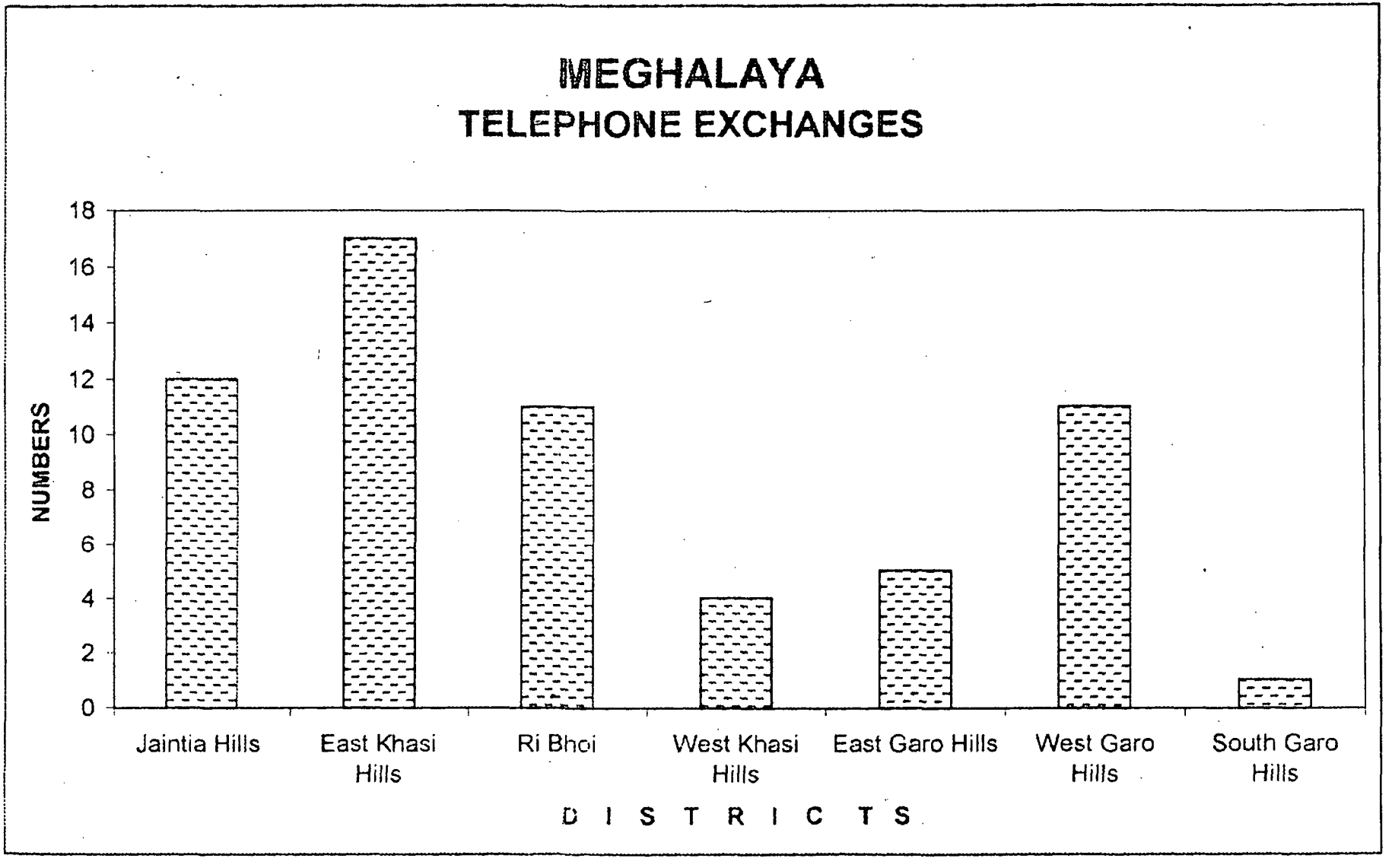

MEGHALAYA
TELEPHONE EXCHANGES
NUMBERS
18
16
14
12
10
8
6
4
2
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

FIG. 11

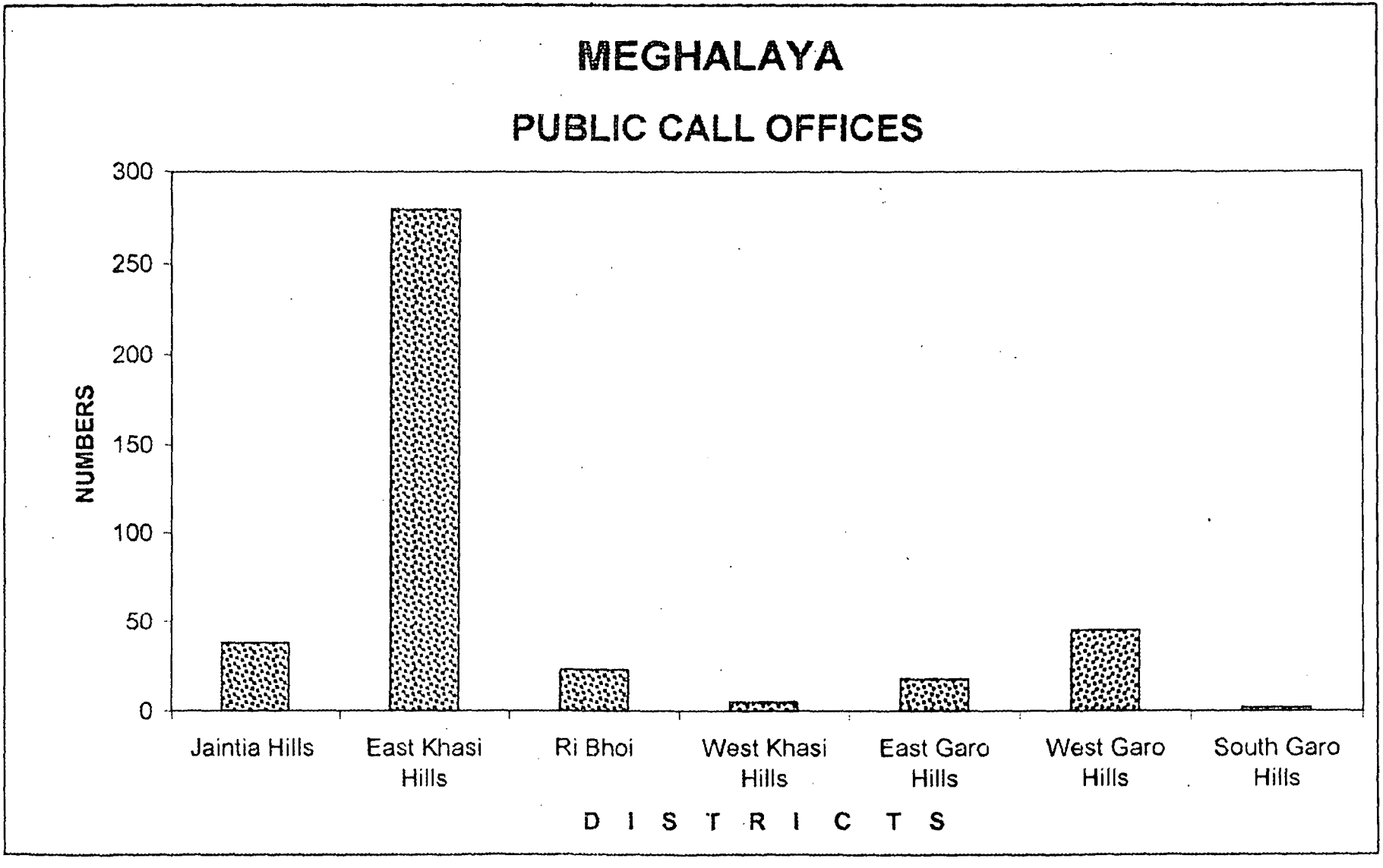
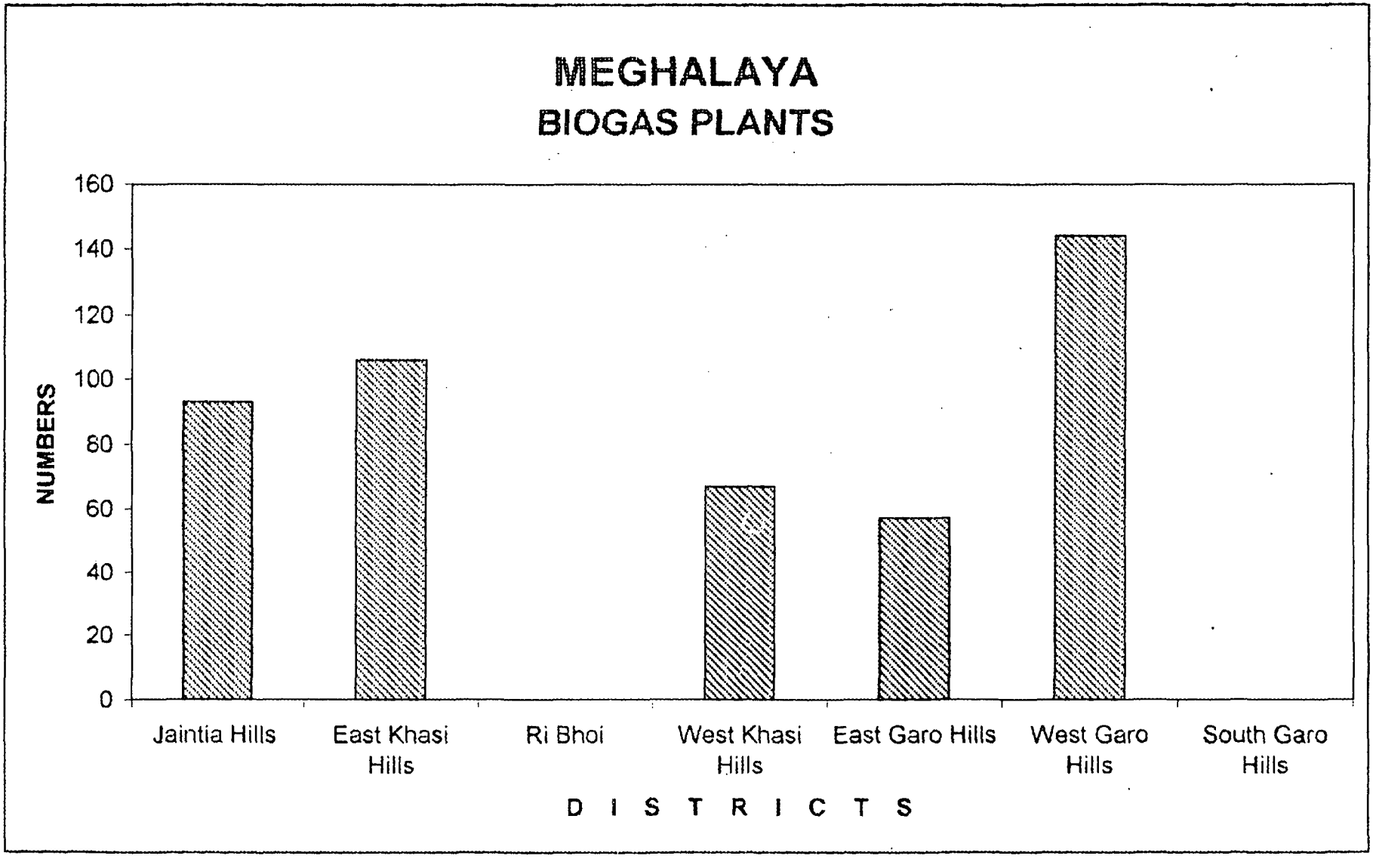

MEGHALAYA
PUBLIC CALL OFFICES
NUMBERS
300
250
200
150
100
50
0
Jaintia Hills
East Khasi Hills
Ri Bhoi
West Khasi Hills
East Garo Hills
West Garo Hills
South Garo Hills
D I S T R I C T S

FIG. 12


MEGHALAYA
BIOGAS PLANTS
NUMBERS
160
140
120
100
80
60
40
20
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

2. Post Offices, Telephone Exchanges and Public Call Offices

The above indicators have been selected as they reflect the scale of people awareness of the world beyond their world (villages). More of these social amenities would mean that people are communicating more frequently with other people outside their villages. This fact would naturally mean that the people are more aware of what is going on in other parts of the world. It may also mean that people are constantly in contact with other people for different purposes like business, exchange of knowledge, traveling and tourism and so on. The more people are exchanging ideas with other people of the world, the more knowledge would grow, leading to the setting up of more post offices, telephone exchanges and public all offices. These indicators of economic growth in different districts of the State are shown in Figures 9, 10 and 11.

3. Biogas Plant

This indicator has been selected for the study, as the increasing use of this modern invention by the people would mean many things. Firstly, it means that the people in their day-to-day life are using more and more power. Since the electricity power apply is not sufficient for their requirement, people are trying to utilize power from biogas plant. Secondly, if people are using more power it means that they are setting up

more small-scale factories and industries or are using this power for their domestic appliances — a sign of economic prosperity. Thirdly, and most important is the fact that people are aware of the trapped energy in the excreta and excrete of animals which could be tapped and use as a source of power. This is a noble step in conserving and sustaining power for the future generation to come. The distribution of different Biogas plants in the different districts of the State is shown in Figure 12.

Table 12: Some Selected Social Amenities of Meghalaya (units in '000)

District	No. of Villages Electrified	No. of Post Offices	No. of Telephone Exchanges	No. of Public Call Offices	No. of Biogas Plant
Jaintia Hills	286	80	12	38	93
East Khasi Hills	533	131	17	279	106
Ri-Bhoi	311	46	11	23	0
West Khasi Hills	294	76	4	5	67
East Garo Hills	360	38	5	18	57
West Garo Hills	598	86	11	45	144
South Garo Hills	129	27	1	2	0

Source: District Level Statistics.

From Table 12 and Figures 8, 9, 10 and 11 of "Some Selected Social Amenities of Meghalaya" it is clear that East Khasi Hills district is the most developed district of the State. This district stands first in all indicators selected; except in the 'number of villages electrified' and the presence of biogas plant where it stood second to West Garo Hills District. This district has the most number of post offices, telephone exchanges and public call offices. Further, this district has the second

largest number of biogas plant – being next only to West Garo Hills district.

Banking and Development

The second sector selected is the position of banking sector in the State. The different indicators selected in this sector are the total number of schedule commercial banks in the State, the position of the total deposits and total credits in the State, the per capita deposits and advances, the credit-deposit ratio and the total population served per bank office. The increase in all these indicators would reflect a higher level of income leading to a higher standard of living of the people.

Number of Banks: The presence of a large number of banks in a region generally means that there is much commercial activities and the money in circulation is also substantial. It is obvious that in a place where there is little economic activity, money extended would be less, revenue derived would be minimal and there would be few banks. Therefore, opening up of more banks means that the daily transaction of money is substantial and this reflects a growing economy.

Deposits and Credits and Per Capita Deposits and Advances

These indicators depend on the presence of number of banks. In other words, if the economy is growing, there is bound to be more banks,

which would indirectly lead to increase in deposits by individuals. Through enhanced deposits, banks would in turn be able to extend more credit facilities to members of the public. This being done, the per capita deposits and advances would naturally follow suit. All this would lead to the opening up of more banks offices to serve the population better. The fall out of all these developments would results in the creation of more jobs and employment opportunities would be enhanced.

Table 13: Some Indicators of Banking Sector of Meghalaya

State/District	No. of Scheduled Banks	Deposits (in Rs. lakhs)	Credits (in Rs. lakhs)	Popn. served per Bank Office (Nos.)	Per Capita Deposits (in Rs.)	Per Capita Advance (in Rs.)	Credit-Deposit Ratio (Nos.)
Jaintia Hills	22	11,614	1,472	13,441	5,268	668	1.8
East Khasi Hills	75	1,13,236	17,257	8,713	21,051	3,208	1.7
Ri-Bhoi	15	7,530	1,464	13,771	5,129	1,150	1.4
West Khasi Hills	20	3.956	1,201	14,706	1,797	546	1.3
East Garo Hills	15	4,035	1,081	16,504	2,137	572	1.4
West Garo Hills	30	10,507	2,595	17,194	2,607	644	1.4
South Garo Hills	3	915	384	33,035	1,187	498	1.2

Source: District Level Statistics 2002.

If one looks at the banking sector (Table 13), the East Khasi Hills district stands out prominently among all other districts of the State. It tops in all but two variables, viz. the number of population served per

bank office and the credit-deposit ratio. This district has the maximum number of banks and account for more than Rs.1,13,236 lakhs of deposits. The different banks of this district have extended more than Rs.17,257 lakhs of credit to the people of the district. But in proportion to the total deposits accumulated in the district this credit facility extended is a mere 15.23 percent.

The main objective of planning for development is to achieve optimum social welfare where there is an equal distribution of benefits to the masses so as to attain a balance regional development.[2] The issue of balance regional development in the country has received more importance only after the Fourth Five-Year Plan when regional imbalances as a consideration for resource allocation for development came into account.[3] In the State of Meghalaya this task of planning for equitable regional development has started a few years after the State attained its statehood.

It is important that different levels of development and the order in which development has taken place in different districts be identified.

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[2] Gadgil, D.R., *Planning and Economic Policy in India*, Poona: Gokhale Institute, 1961.

[3] Planning Commission, India, *Guidelines for Formulation of District Plans*, New Delhi: Planning Commission, 1969.

When one mentioned about the levels of development of different districts, one would expect that in such an area people have a better command over material and immaterial wealth for their economic welfare. A command over more and better resources and factors of production, and the manner in which the fruits of economic development would be taken are some of the indices of higher level of development. For measuring such levels of development one cannot rely only on any single indicator but a host of other indicators. Further, one cannot select only those indicators associated with material production for showing the levels of development, but on other indicators as well.

Statistical Analysis of the Levels of Development

The assessment and observation made in the above paragraphs and the preceeding chapter is based on the writer's field observation and records stated in the gazetteer of the State government. However, these findings would not reflect the actual picture and would be valueless unless collection of data and their subsequent transformation into variables and identification of relevant facts are undertaken. One of the major hurdles encountered in this work is the lack of data. Nevertheless, efforts have been made to collect as much relevant data as available and based on these data an analytical analysis has been made. This chapter

has been confined to the interpretation of the various findings obtained through the selected indicators and their associates.

In this study the interregional disparities of development in the seven districts of the State have been taken on the basis of twenty-eight indicators. These indicators have been classified into four groups as follows:

1. **Indicators of Agricultural Development**

X_1 Per capita cultivable area available

X_2 Cropping efficiency

X_3 Percentage of cultivated area

X_4 Percentages of Area sown more than once to Net area sown

X_5 Per Capita Net Area sown

X_6 Percentages of cultivators to total main workers

X_7 Percentages of agricultural labourers to total main workers.

2. **Indicators of Industrial Development**

X_8 Total number of registered industries, small scale industries and factories.

X_9 Secondary sector working force as percentages to total working force.

X_{10} Working fore in mining and quarrying as percentages to total working force.

X_{11} Working force in other household industries as percentage to total working force in secondary sector.

X_{12} Working force in manufacturing, processing, servicing and repairs as percentage to total working force in secondary sector.

X_{13} Working force in construction as percentage to total working force in secondary sector.

3. **Indicators of Infrastructural and Facility Levels of Development**

X_{14} Per capita deposits in Banks.

X_{15} Number of post offices per thousand populations.

X_{16} Number of Banks per thousand populations.

X_{17} Number of villages electrified per thousand populations.

X_{18} Number of telephone exchanges per thousand populations.

X_{19} Number of public call offices per thousand populations.

X_{20} Number of Biogas plants per thousand populations.

4. **Indicators of Levels of Socio-Cultural Development**

X_{21} Density of population per square kilometer.

X_{22} Percentage Urban population as percentage to total population.

X_{23} Percentage Literate persons as percentage to total persons.

X_{24} Percentage rural literacy.

X_{25} Percentage female literacy.

X_{26} Hospital beds per thousand population.

X_{27} Hospitals/CHCs/PHCs and Sub-centres, etc. per thousand population.

X_{28} Non-primary sector workers as percentage to total working force.

Indicators of Agricultural Development

This is the first sector selected for the evaluation of the levels of development in the State. The following are the different indicators selected under this head.

a. The per capita cultivable area and the cultivated area available (X_1, X_3): These two indicators have been selected since they show the extent of land cultivated by the people in relation to the total area of the district and correspondingly the cultivable area available per individual. The extent of cultivated area and the per capita cultivable land available reflect the degree of agricultural development in different ways. In intensive agriculture lower indices of the two variables may not necessarily mean a low agricultural development. This is so because farmers may be resorting to scientific method of cultivation in their farming process. However, in general in an extensive agricultural system a higher cultivated area would generally mean a higher agricultural development independent of the 'per capita cultivable area available' indicator.

b. Cropping Efficiency (X_2): The Indian economy is basically dependent on agriculture so also in the case of Meghalaya. If the agricultural front is good, there is optimism in other sector of the economy as well.

The variation in this indicator may be due to relief, climate, soil cover, availability of water, socio-cultural, economic and political factors. This variation is due to the disparity of the above factors from one district to another. However, the fact remains that there is immense potential for increasing agricultural efficiency in all districts if the government and the people make concerted efforts to do so.

c. Net area sown and area sown more than once (X_4, X_5): These indicators are selected as they reflect the nature and extent of the area under cultivation. These two indicators also reflect the fertility of the soil in the district. The better is the fertility of the soil, the higher would be the percentage of 'net area sown' and 'area sown more than once'. The percentages of 'area sown more than once' to 'net area sown' show – besides other factors – the extent of desertification of the district.

d. The Character of cultivators and agricultural workers (X_6, X_7): The percentage of cultivators and agricultural labourers endorsed upon the other selected indicators. A higher percentage of cultivators means – among other things – that land holding is sill in the hands of the farming community. If, however, there is a higher percentage of

agricultural labouers, that would mean; firstly, that there is pressure of cultivable land on population. Secondly, it may reflect absentee landlordism and finally, it may mean degradation in soil fertility whereby farmers are switching over to other occupation for their livelihood and survival.

Therefore, the above indicators selected are expected to reflect vividly the agricultural scenario in the State. This fact also has a bearing on planning for sustainable development in the State.

Indicators of Industrial Development

This is the second sector selected for showing the overall development in Meghalaya. The following are the individual indicators selected under this head:

a. The number of Registered Industries and Factories (X_8): The presence of large number of industries and factories in the region would reflect several things. Firstly, it showed that the region has abundant natural resources as a result of which different factories and industries have been set up.[4] The investigator found out that this rule also applies to State of Meghalaya. Secondly, the presence of a large number of

[4] However, this may not necessarily be a rule, since if most of the factors needed for the localization of industries are present, but the natural resources are absent; industries and factories can still be set up.

industries and factories would also mean that the people of the region are also venturing into secondary activities besides the primary activities irrespective of the availability of resources.

b. The working force (X_9, X_{10}, X_{11}, X_{12}, X_{13}): Under this head are shown the percentages of working force in secondary sector (X_9), in mining and quarrying (X_{10}), household industries (X_{11}), manufacturing, processing, servicing and repairs (X_{12}) and construction (X_{13}). All these indicators are expected to show the level of industrial development in the region. If a higher proportion of the population were engaged in the above activities, it would mean that there is much industrial development in the region. If, otherwise, it will mean that there is less industrial activity and more of primary activities. If there are more industrial activities, then there is bound to be industrial development in the region. This fact would, therefore, mean that the region is moving towards an economic growth and development.

Indicators of Infrastructural and Facility Levels of Development

In this sector seven sets of indicators were taken. These different indicators are as follows:

a. The per capita deposits in Banks (X_{14}): The importance of this indicator has been dealt with briefly in the preceeding paragraphs of

this chapter. However, suffice to mention here again that the higher the value of this indicator the higher would be the economic growth in the region and vice-versa. This is true because if there are many activities, the region's economy is diversified resulting in more transaction of business and wider circulation of money. This would directly result in the increase in the per capita deposits in the banks. This fact would accordingly increase the number of banks per individuals in the district.

b. The number of post offices, Banks, Village Electrified, Telephone Exchanges, P.C.Os and Bio-gas Plant (X_{15}, X_{16}, X_{17}, X_{18}, X_{19}, X_{20}): The above indicators have been explained in the preceeding paragraph of this chapter from page 137 to 144 under the heading "General Social Amenities and Development". These indicators have now been incorporated under the "Infrastructural and Facility" because they help in depicting the levels of development statistically.

Socio-Cultural Development

This is another sector selected to show the nature of development in Meghalaya. The individual indicators taken are as follows:

1. The density of population (X_{21}): This indicator has been chosen since a high density of population area would naturally reflect better

economic condition of the area, resulting in people flocking to this region. This would also mean that the people are availing of social amenities, like better employment opportunities, good accessibility, religious tolerance and political freedom. It may also indirectly reflect the availability of resources in the region. On the other hand those areas which shows a low density of population would mean that the above amenities and facilities are meagre if not absent.

2. Urbanisation (X_{22}) : The next indicator chosen under this head is urbanization. This indicator shows that a higher degree of urbanization means a higher per capita income leading to a higher standard of living of the people. This would mean that most of the social amenities factors mentioned under density of population head (i) above are also found here. A low urbanization would mean that the region is devoid of the above developmental factors.

3. Literacy (X_{23}, X_{24}, X_{25}): This is another indicator that depicts development of the region. If more percentages of the people are literate (X_{23}), one would expect that these educated masses would be more willing to accept new innovations in all spheres of activities be it primary activities, secondary activities and tertiary activities. A low level of literacy would in most cases relate to a backward region

which is still nature-dependent. The higher percentages of rural (X_{24}) and female literacy (X_{25}) selected under this head endorse the general literacy rate.

4. Hospital beds (X_{26}, X_{27}): The general health conditions of the people are some of the selected indicators under this head. The very fact that there are more hospitals and more people flocking to hospitals shows that more and more people are discarding traditional belief and superstition, and are turning to modern method of medication. Though for some ailments, people (especially the tribal people) may still seek the help of traditional medicine but in general they can be considered no longer believers in witchcraft, sorcery, black magic and the different forms of superstitious belief. If, however, there were few hospitals (X_{26}) and fewer people getting admitted in these hospitals (X_{27}), it would mean that the people still have faith in the different forces of nature.

5. Working Force (X_{28}): This indicator has been selected as the nature of the working force reflects the type of occupation engaged by the people in the region. If the bulk of the working population were still engaged in primary activities, it would mean that the economy of the region is still nature-dependent. If, however, there are a larger

proportion of the population engaged in non-primary sectors, it would reflect that the economy of the people is techno-dependent irrespective of the presence of the natural resources.

Construction of Index

As already mentioned, no single indicator would suffice to show the levels of development in any region. Further, a number of indicators taken together would yield nothing comprehensible unless fused and synthesized into one index.[5] Therefore, keeping this fact in mind a synthetical index representing all the above selected indicators have been constructed.

Usually, indicators cannot be added together and averaged as they not only involved unsummable (dissimilar) quantities, but also differ in their weightage, assimilable 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 point of view.

Based on the availability of data maximum indicators have been taken. To normalize the data the mean of each indicator of the different

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[5] Pal, M.N., "Quantitative Techniques in Regional Planning", *Indian Journal of Regional Science*, 3(1971), pp.1-33.

sectors is worked out. A value for each indicator is obtained which is known as normalised values. From these normalised values, a correlation matrix is first obtained. An eigen value is then worked out and for this study the weights of the first eigen value only is taken. The different indicators are then divided by the respective mean value thus worked out. Then a correlation matrix for the whole set of indicators have been built. It has been found that in agricultural sectors, indicators like X_3 (Cultivated area) and X_5 (Per capita net area sown) are not conformable to the rest of the indicators in the subset. In industrial sector, however, all the selected indicators are conformable and hence taken for the analytical study. In infrastructural sector X_{15} (Number of post offices per thousand population), X_{17} (Number of villages electrified per thousand population) and X_{20} (Number of biogas plants per thousand population) are non-conformable and hence ignored since they are non-conformable with the rest of the variables in the subset. In the socio-cultural sectors X_{27} (Hospitals, CHCs, PHCs and Sub-centres, etc. per thousand population) is the only indicator which is non-conformable with the rest of the indicators in the subset.

All these non-conformable indicators have been dropped out from the further analysis as they have very poor or negative correlation with other indicators, and hence, if included in the analysis would adversely affect the representativeness of composite index so constructed.

In each sector taken for the study, weightage for each indicator have been worked out by the Kendall's procedure (8,9) through the retained correlation matrix. Finally, the sector-wise composite indices have been constructed by the weighted aggregation of the indicators.

Weightage of Indicators

The agricultural sector could retain only five indicators. These indicators are X_1, X_2, X_4, X_6 and X_7. The relative weightages of these indicators worked out through Kendall's method are as follows:

Sl. No.	Indicator	Weightage
1.	– X_1 (Per capita cultivable area available)	– 0.60
2.	– X_2 (Cropping efficiency)	– 0.82
3.	– X_4 (Area sown more than once to Net Area Sown)	– 0.25
4.	– X_6 (Percentages of cultivators to total main workers)	– 0.32
5.	– X_7 (Percentages of agricultural labourers to total main workers)	– 0.74

The agricultural composite index is calculated by the following formula and represents the set of the above-mentioned five indicators. The total variations explained by it are 43.86%.

$$I_1^i = \sum_{\substack{j=1,2,4,6,7 \\ j\neq 3,5}}^{7} (X^i 1_j)(W1_j)[i = 1,2,3....7]$$

All the indicators in the industrial sector have been retained. The relative weightages of these indicators worked out through Kendall's method are as follows:

Sl. No.			Indicator		Weightage
1.	–	X_8	(Number of Registered Industries/ S.S. Industries/Factories)	–	0.87
2.	–	X_9	(Secondary sector working force as percentage to total working force	–	0.94
3.	–	X_{10}	(Working force in Mining and Quarrying as percentage to total working force)	–	0.84
4.	–	X_{11}	(Working force in other household industries as percentage to total working force in Secondary sector)	–	0.92
5.	–	X_{12}	(Working force in Manufacturing, Processing, Servicing and Repairs as Percentage to total working force in Secondary sector)	–	0.68
6.	–	X_{13}	(Working force in Construction as Percentage to total working force in Secondary sector)	–	0.94

The Industrial Composite Index is worked out through:

$$I_1^i = \sum_{j\ 1,2,3,4,5,6}^{6} (X^i 2_j)(W2_j)[i = 1,2,3....7]$$

This is highly representative and can explain 75.66 percent of the total variations.

The infrastructural and facility sector could retain only four indicators. These are X_{14}, X_{16}, X_{18} and X_{19} whose relative weightages are as follows:

Sl. No.		Indicator		Weightage
1.	– X_{14}	(Per capita deposits in Banks)	–	0.961
2.	– X_{16}	(Number of Banks per thousand population)	–	0.962
3.	– X_{18}	(Number of Telephone Exchanges per thousand population)	–	0.431
4.	– X_{19}	(Number of Public Call Offices per thousand population)	–	0.968

The infrastructural and facility composite index is calculated through:

$$I_1^i = \sum_{\substack{j=1,3,5,6 \\ j\neq 2,4,7}}^{7} (X^i 3_j)(W3_j)[i = 1,2,3....7]$$

It is highly representative and can explain 74.32 percent of the total variations.

The following are the Socio-Cultural Indicators which could retain all but one indicator:

Sl. No.			Indicator		Weightage
1.	–	X_{21}	(Density of population per sq.km.)	–	0.84
2.	–	X_{22}	(Urban population as percentage to total population)	–	0.87
3.	–	X_{23}	(Literate persons as percentage to total population)	–	0.87
4.	–	X_{24}	(Rural literacy)	–	0.63
5.	–	X_{25}	(Female literacy)	–	0.86
6.	–	X_{26}	(Hospitals, CHCs, PHCs and Sub-Centres etc. per '000 population)	–	0.94
7.	–	X_{28}	(Non-primary sector workers as percentage to total working force)	–	0.74

The Socio-Cultural composite index is obtained through:

$$I_1^i = \sum_{\substack{j \\ j \neq 7}}^{8} (X^i 4_j)(W4_j)[i = 1,2,3....7] \quad j = 1,2,3,4,5,6,8$$

and represents 68.57 percent of the total variations in the original set.

On the basis of the statistical analysis, it is important to note that in the agricultural sector indicator X_2 (weigh = .827) and X_7 (weigh = .74), representing cropping efficiency and percentage of agricultural labourers to total main workers, show high weightages. This means that for assessing the levels of development, cropping efficiency and the number

of agricultural labourers engaged in the farms is more significant and accountable.

The Industrial Sector Indicators taken for this study like X_9, X_{11} and X_{13} have very high weights of 0.94, 0.92 and 0.94 respectively. The other indicators like X_8, X_{10} and X_{12} have high weights of 0.87, 0.84 and 0.68, respectively, but not as high as the above indicators. This means that presence of a large number of industries/factories etc. and the manner in which the different working forces are spread out in different sectors of the occupation are significant for measuring the levels of development in the different districts. In the infrastructural sector only one indicator, i.e. X_{13} whose weight is 0.431 is not significant for measuring the levels of development in the different districts. All other indicators, viz. X_{14}, X_{16} and X_{19} whose weights are respectively 0.961, 0.962 and 0.968 are significant and accountable. This means that the role of banks in measuring the levels of development in the different districts is very significant.

In the Socio-cultural sector almost all the indicators taken for measuring the levels of development are significant and accountable. The indicators like X_{21}, X_{22}, X_{23}, X_{24}, X_{25}, X_{26} and X_{27} shows weights varying from 0.63 to 0.87. This means that the density of population, the degree

of urbanisation, the literacy rate and the presence of medical facilities in the districts are most significant and accountable indicators for gauging the levels of development.

Composite Index

Besides the above different sectors taken for showing the levels of development, an overall composite index has been constructed by combining the above sectoral composite indices. Given below is the inter-correlation matrix for sectoral composite index:

Correlation Matrix

	I_1	I_2	I_3	I_4
I_1	1.0000	0.8965	0.8257	0.9680
I_2		1.0000	0.7004	0.8149
I_3			1.0000	0.8960
I_4				1.0000

Once again using the Kendall's computation scheme the relative weightages for I_1, I_2, I_3 and I_4 have been computed and the weights derived is as follows:

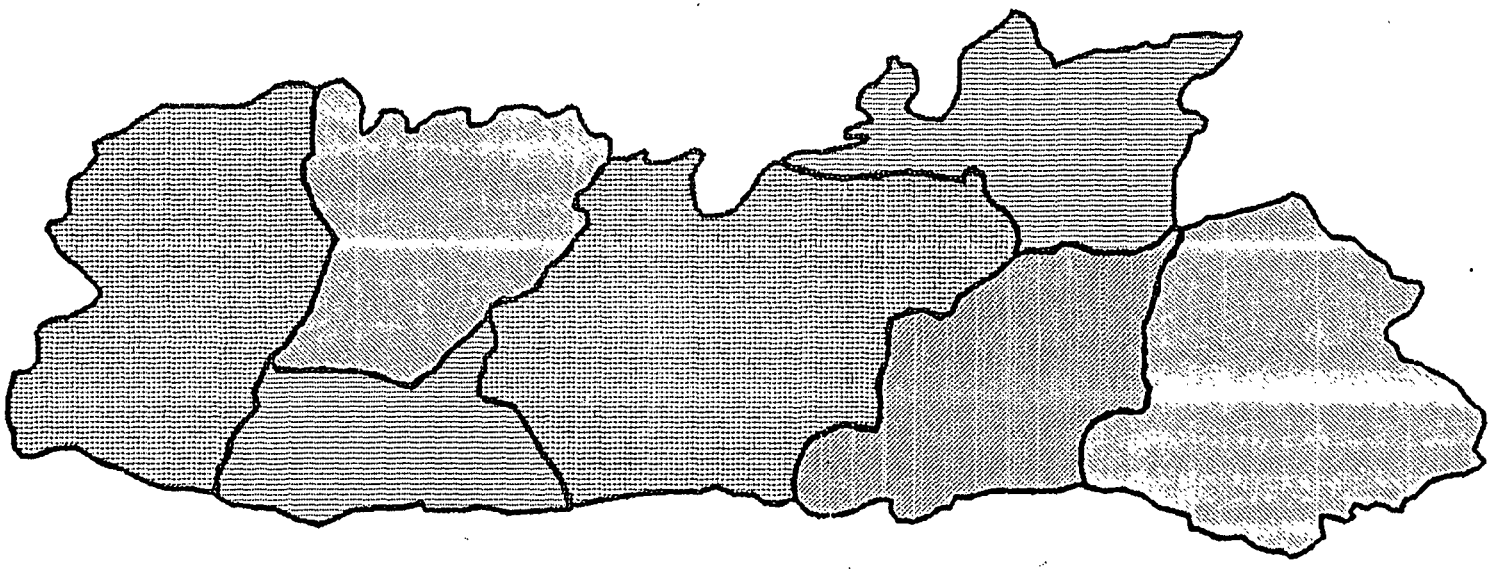
Sl. No.	Indicators	Weightages
1	I_1 Agricultural	0.980
2	I_2 Industrial	0.904
3	I_3 Infrastructural	0.907
4	I_4 Socio-Cultural	0.978

MAP 5

MEGHALAYA

AGRICULTURAL DEVELOPMENT

2001



LEVELS OF DEVELOPMENT

- ABOVE 3.03
- 2.48 - 3.02
- 0.77 - 2.47
- BELOW 0.76

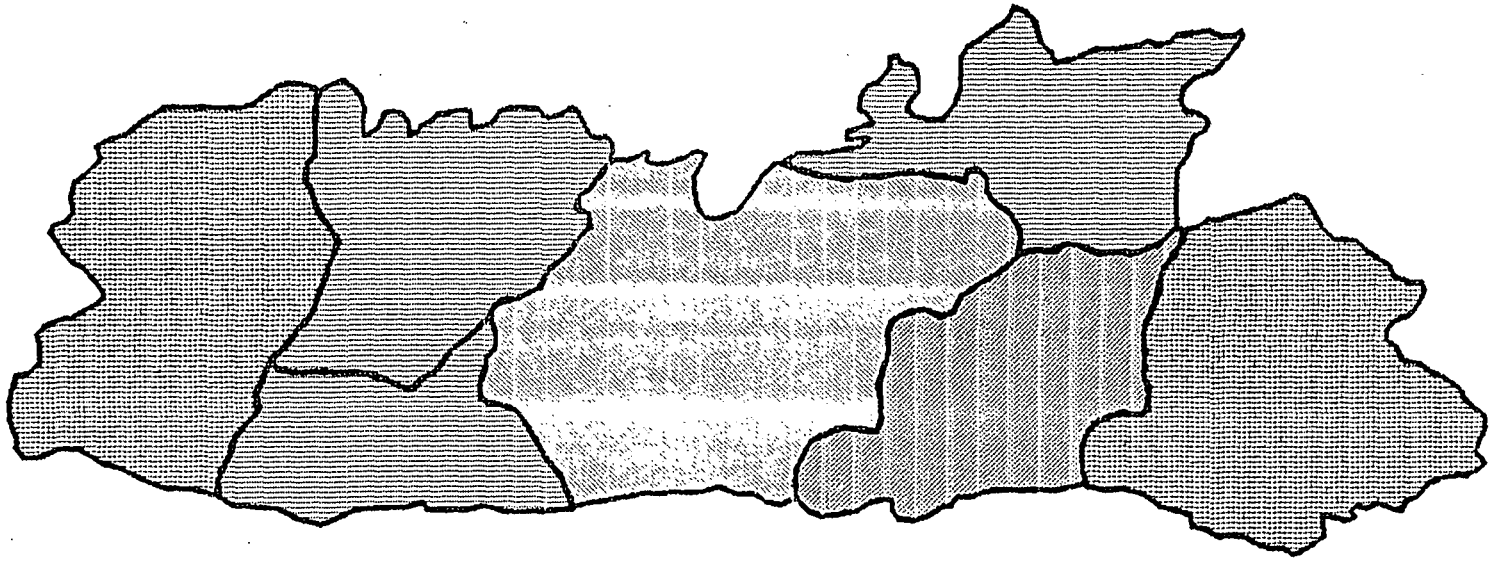
10 0 10 20 30 40 Km

MAP 6

MEGHALAYA

INDUSTRIAL DEVELOPMENT

2001



LEVELS OF DEVELOPMENT

- ABOVE 8.32
- 5.90 - 8.31
- 3.51 - 5.89
- BELOW 3.50

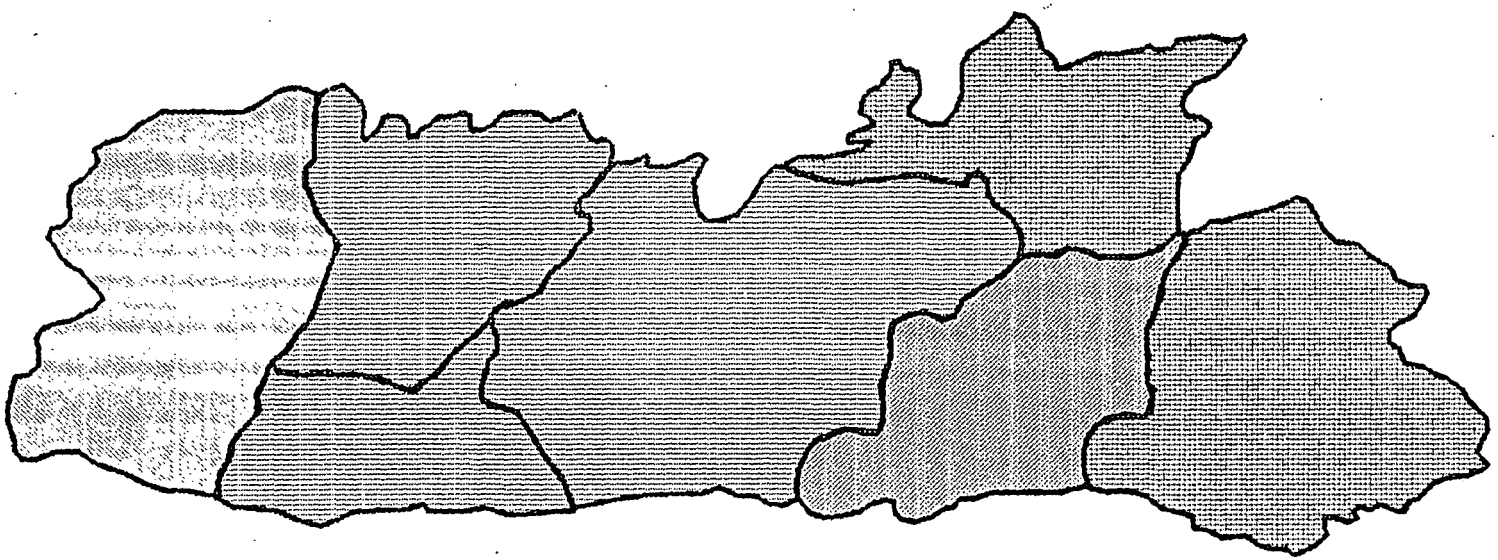
10 0 10 20 30 40 Km

MAP 7

MEGHALAYA

INFRASTRUCTURAL DEVELOPMENT

2001



LEVELS OF DEVELOPMENT

- ABOVE 3.82
- 2.28 - 3.81
- 2.10 - 2.27
- BELOW 2.09

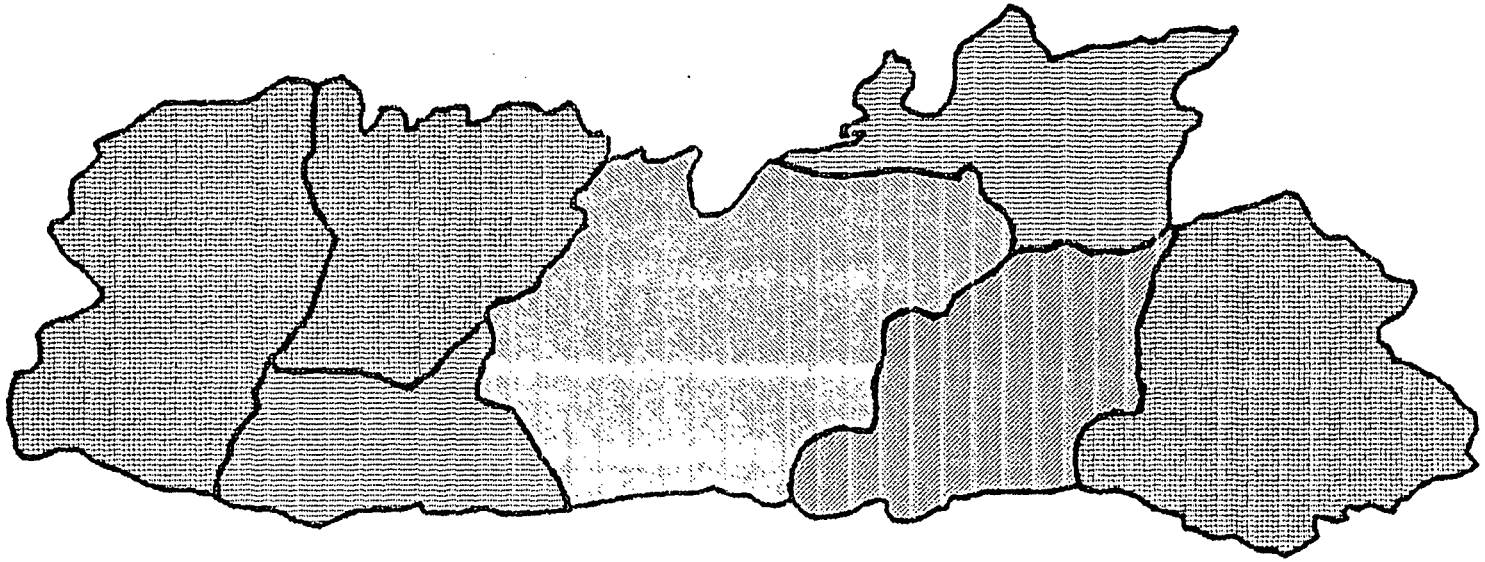
10 0 10 20 30 40 Km

MAP 8

MEGHALAYA

SOCIO - CULTURAL DEVELOPMENT

2001



LEVELS OF DEVELOPMENT

- ABOVE 5.71
- 5.00 - 5.70
- 4.38 - 4.99
- BELOW 4.37

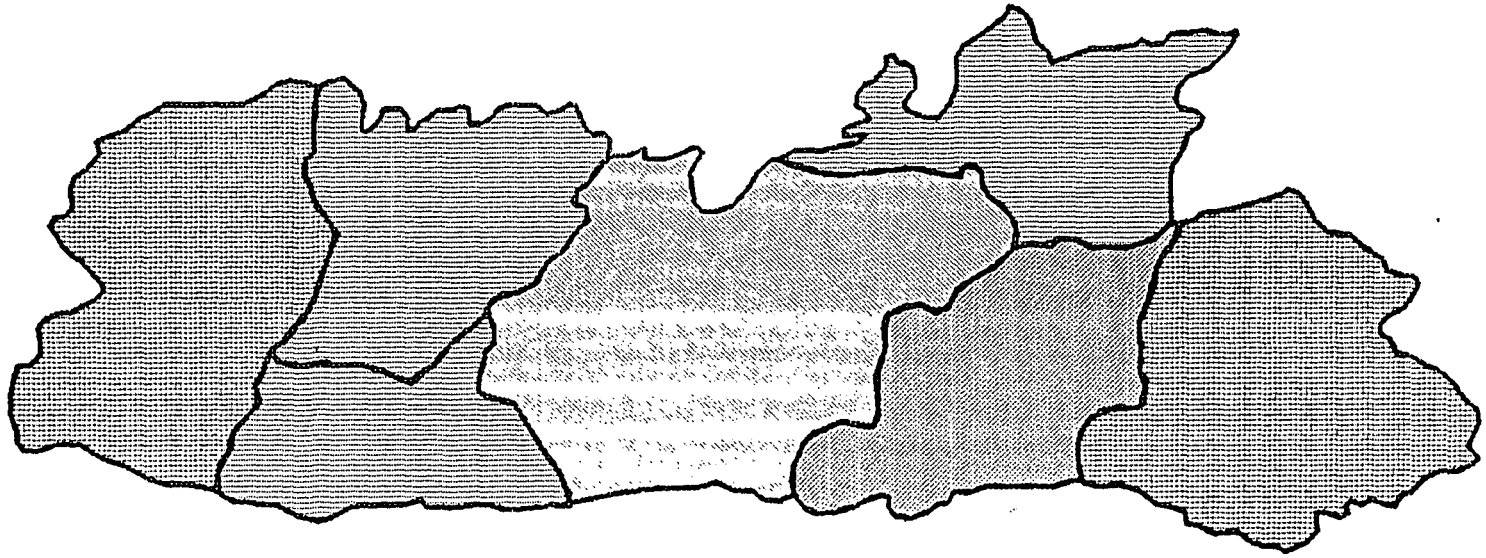
10 0 10 20 30 40 Km

MAP 9

MEGHALAYA

COMPOSITE LEVELS OF DEVELOPMENT

2001



LEVELS OF DEVELOPMENT

- ABOVE 18.15
- 14.63 - 18.14
- 13.02 - 14.62
- BELOW 13.01

10 0 10 20 30 40 Km

The overall composite index is given by

$$I^i = \sum_{J=1}^{4} (I_{ij})(W_j)[i = 1,2,3....7]$$

It is found to be highly representative of the set and represents 88.92 per cent of the total variations.

On the basis of the different sectoral indices the composite index of the levels of development for each sector have been quartiled. Using the quartiling method of classification, different maps for different sectors have been prepared. The different maps number 5, 6, 7, 8 and 9 prepared for the different sectors are based on the class interval given in the respective tables.

Table 14: Agricultural Development

Class	Range	Districts
I	Above 3.03	East Khasi Hills
II	2.48 – 3.02	West Khasi Hills, West Garo Hills
III	2.47 – 0.77	Jaintia Hills, East Garo Hills
IV	Below 0.76	Ri-Bhoi, South Garo Hills

Table 15: Industrial Development

Class	Range	Districts
I	Above 8.32	East Khasi Hills
II	5.90 – 8.31	Jaintia Hills, West Garo Hills
III	3.51 – 5.89	West Khasi Hills
IV	Below 3.50	Ri-Bhoi, South Garo Hills, East Garo Hills

Table 16 : Infrastructural Development

Class	Range	Districts
I	Above 3.82	East Khasi Hills
II	2.28 – 3.81	Jaintia Hills, Ri-Bhoi
III	2.10 – 2.27	West Garo Hills
IV	Below 2.09	South Garo Hills, East Garo Hills, West Khasi Hills

Table 17 : Socio-Cultural Development

Class	Range	Districts
I	Above 5.71	East Khasi Hills
II	5.00 – 5.70	Jaintia Hills, West Garo Hills, East Garo Hills
III	4.38 – 5.99	West Khasi Hills
IV	Below 4.37	Ri-Bhoi, South Garo Hills

Table 18 : Composite Development

Class	Range	Districts
I	Above 18.15	East Khasi Hills
II	14.63 – 18.14	Jaintia Hills, West Garo Hills
III	13.02 – 14.62	West Khasi Hills
IV	Below 13.01	Ri-Bhoi, South Garo Hills, East Garo Hills

Interrelationship of Indicators

The levels of development can be gauged by the cumulative analysis of different interrelated indicators selected. With proper coordination and selection of indicators, the outcome is expected to project a better picture on the levels of development in the State. With this in mind, four different sectors of the State have been correlated and

interpreted by using correlation matrix. The level of significant using t-value, i.e. $t = r\sqrt{\frac{n-2}{1-r^2}}$ with *n-2* as the degree of freedom, *n* the number of observation and *r* the correlation coefficient have been used in this analytical study. The correlation coefficient *r* is the value computed to measure the strength of the relationship between matrix of different indicators. To test the significance of correlation, two levels of significance, i.e. 0.01 and 0.05 or 1 percent and 5 percent have been used for this study.

On account of paucity of data at different hierarchy of different administrative units, few sectors and their indicators are available for statistical analyis. Only those indicators that show positive correlation are given below:

Correlation Matrix of the Agricultural Sectors

	X_1	X_2	X_4	X_6	X_7
X_1	1.0000	0.8521**	0.0077	0.0030	0.5092
X_2		1.0000	0.2699	0.1387	0.2515
X_4			1.0000	0.1018	0.0535
X_6				1.0000	0.6317*
X_7					1.0000

** = Significant at 1 percent level of significance
* = Significant at 5 percent level of significance

On the basis of the above Correlation Matrix it may be noted that the per capita cultivable area available (X_1) has a strong positive correlation with cropping efficiency (X_2) which is 0.8521 and there exists

a high degree of relationship between X_1 and X_2 and is significant at 1 percent level of confidence. The indicator X_1 has a weak correlation with other indicators of the sub-set. This proves the fact that efficiency of agricultural cropping depends on the amount of land available per person. The cropping efficiency X_2 on the other hand has very weak and negative correlation with other indicators of the sub-set. Further, the only other indicator which has a strong positive correlation with the sub-set, is indicator X_6 with X_7 which is .6317 which is significant at 5 percent level of confidence. This means that the proportion of farmers engaged as cultivators and agricultural labourers are directly related with agricultural development.

Correlation Matrix of the Industrial Sector

	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}
X_8	1.0000	0.8435**	0.7240*	0.8715**	0.3830	0.6592*
X_9		1.0000	0.7756*	0.7580*	0.6852*	0.8133**
X_{10}			1.0000	0.7340*	0.3103	0.7962*
X_{11}				1.0000	0.5182	0.8683**
X_{12}					1.0000	0.7418*
X_{13}						1.0000

** = Significant at 1 percent level of confidence
* = Significant at 5 percent level of confidence

It is obvious from the above correlation matrix that the presence of industries and factories has an impact on the number of working force in the different occupation. This is true since the number of persons working

in the secondary sector and the working force in other Household industries, have a strong positive correlation with it, i.e. indicator X_8 and is significant at 1 percent level of confidence. Indicator X_8 also has a positive correlation with indicator X_{10} and X_{13} which is .7240 and .6592 and significant at 5 percent level of confidence. Indicator X_8 has a weak correlation with X_{12}, i.e. the working force in manufacturing, processing, servicing and repairs.

Correlation Matrix of Infrastructural Sector

	X_{14}	X_{16}	X_{18}	X_{19}
X_{14}	1.0000	0.8860**	0.1964	0.9904**
X_{16}		1.0000	0.4391	0.8855**
X_{18}			1.0000	0.2468
X_{19}				1.0000

** = Significant at 1 percent level of confidence

In this sector, indicator X_{14} has a strong positive correlation with only X_{16} and X_{19} which are .8860 and .9904, respectively. This shows that there is a high degree of relationship between them and this is significant at 1 percent level of confidence in both cases. X_{16} indicator shows strong positive correlation with X_{19} indicator which is 0.8855 and significant at 5 percent level of confidence. All other indicators have weak correlation with other indicators of this sector.

Correlation Matrix of Socio-Cultural Sector

	X_{21}	X_{22}	X_{23}	X_{24}	X_{25}	X_{26}	X_{28}
X_{21}	1.0000	0.9061**	0.5257	0.1972	0.4907	0.8396**	0.8476**
X_{22}		1.0000	0.6307	0.3116	0.5250	0.8175**	0.8041**
X_{23}			1.0000	0.9260**	0.9372**	0.7184*	0.3449
X_{24}				1.0000	0.8536**	0.4300	-0.0012
X_{25}					1.0000	0.7897*	0.4128
X_{26}						1.0000	0.7778*
X_{28}							1.0000

** = Significant at 1 percent level of confidence
* = Significant at 5 percent level of confidence

In this sector, indicator X_{21} has strong and positive correlation with indicator X_{22} (0.9061), indicator X_{26} (.8396) and indicator X_{28} (.8476) all being significant at 1 percent level of confidence. It has a weak correlation with all other indicators of this sub-set. This means that the density of population has an impact on urbanization, health condition and the non-primary sector workers. On the other hand, indicator X_{22} has strong correlation only with X_{26} and X_{28} and significant at 1 percent level of confidence. This means that the degree or urbanization has a positive impact on health condition and non-primary sector working population. Meanwhile X_{23} has a strong positive correlation with X_{24} and X_{25} and significant at 1 percent level of confidence. It has positive correlation with the general health condition but a negative correlation with the non-primary sectors working population.

The indicator X_{24} (rural literacy) has very strong positive correlation only with female literacy X_{25} which is obvious. Its value of .8536 is significant at 1 percent level of confidence. Female literacy (X_{25}) has a positive correlation only with indicator X_{26}. This means that female literacy has a direct bearing on their general health condition. Lastly, indicator X_{26} has a positive correlation with X_{28} i.e. .7778 which is significant at 5 percent level of confidence.

East Khasi Hills District

It is evident from the preceding chapter that the East Khasi Hills District, particularly the Shillong region is the most developed region in the State of Meghalaya. This is due to the following few facts:

1. The Locational Aspect

The British first set foot in this part of the region through the war region of the south via what is known today as Bangladesh. They entered these hills through Shella, Dawki, Laitkynsew, Cherrapunjee (Sohra) and ultimately to Shillong. This is evident from the numerous Bungalows, mission houses and tales narrated by people through different generations till today. Proof of this is the different buildings still standing today in the above villages. These houses have typical European architectural designs and structure quite different from the common Assam type houses of

today. The route in which these settlements have come up in a linear fashion, i.e. at Laitkynsew, Nongsawlia, Mawmluh, Cherrapunjee (Sohra), Mawjrong and Shillong depict the route undertaken by the British before reaching the present day capital of the State. There are no traces of these types of buildings and monuments in the Bhoi region of the north, the Jowai region of the east and the Nongstoin region in the west which means that the Europeans did not enter these hills from this region. Whatever European architectural constructions found in these regions today are of very recent times.

The above fact make the people living along this route traversed by the British, fortunate in being the first amongst the other people of the State to be educated – the seed of all enlightenment and development. Till the 1960s majority of the great writers, statesman, religious leaders, social workers, administrators etc. came from this region. This means that since the people of this region were the first to receive proper education, they became good statesmen, administrators and leaders in society.

2. A Resource Rich Region

The areas lying within the above route, i.e. the Shella-Sohra-Shillong is the richest in terms of mineral deposits. The bulk of the state's mineral deposits like coal, limestone, china clay, iron ore are found

concentrated in this region. The lion's shares of the state's orchard production like oranges, pineapples, bettlenut and different varieties of citrus fruits are also exported from this region to other parts of the State and outside. This region is also famous for some products like, cardamon, turmeric, bay leaves (*Tezpata*) honey, pulse, and spices. About 80 percent of the State's iron smelting works and the manufacturing of different agricultural and domestic implements are made from this region.

The British must have come to this region because of its richness in mineral and agricultural resources. They initially came to this region primarily to exploit the rich natural resources of this region to the fullest possible extent and then left. Their coming was, however, a blessing in disguise for the people of this region. This is so because alongwith the British Traders came the Welsh Christian Missionaries (of British Citizenship) who were bent upon converting the pagan tribal community of this region to Christianity. They started by establishing schools in the different villages they came across and through these schools taught about the principles of Christianity and Christian living. Their perseverance and dedication bore fruits resulting in the majority of the people living along this route being converted to Christianity. When people saw the fruits of education, they began enrolling their children in

the schools and this resulted in the opening up of more schools from the primary to the higher secondary level. This indirectly helped in the development of human resource in the region.

2. Accessibility of the Region

From olden days till date the East Khasi Hills district is the most easily accessible part of the State. The district is easily approachable both from the north and south. From the north it is linked with the rest of the country through Guwahati and towards the south it is (and still is) connected with important ports of Bangladesh and the world through Chattack, Sylhet and Chittagong port of Bangladesh.[6] Both the two national Highways of the eastern part of the State, viz. National Highway 40 linking Jorabad (Meghalaya) with Tamabil (Meghalaya border with Bangladesh) and National Highway 44 linking Shillong (Meghalaya) with Agartala (Tripura) passes through the heart of this district.

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[6] Dr. Hamlet B. Ngapkynta in his book *The Economy of Meghalaya* (p.49) wrote "The Khasis on the eve of British entry even exported home-made guns to Sylhet from Cherra station and Kamrup from Rambrai-Myriaw along with other goods. A tradition preserves the story that a fishing hook was exchanged on barter with one cow from the plains. Of course, the neighbouring areas in Sylhet and Kamrup were entirely dependent for the supply of iron goods, oranges, and fruits and other articles from these hills as no such produce was obtained from other areas nearby. And this took place at a time when money was more in a state of deflation than today. Khasi traders, cultivators, miners and smelters by far became wealthy".

The East Khasi Hills district is well connected with the rest of the State. In fact, the other important state roads, district roads, block roads and village roads are linked with this district in one way or the other (this has been dealt with in detail in Chapter III). Thus, this has made the region grow faster economically.

4. Trade and Commerce

The people of this region had trade relations with the people of the Surma Valley from time immemorial. Their kingdoms had also extended up to a major part of the Surma Valley – proof of this is the village Jaintiapur which is now under Bangladesh. Their trade relations may have resulted in their frequent travels to the Surma valley reaching at times possibly even up to the Chittagong port, Dacca port, and even Calcutta port.[7] This frequent interaction with other people sharpened their wits and makes them more enterprising than other people of the region. Thus, when the British came to their land the Khasis were willing to accept them (the British) and could easily adapt to the changes brought by

[7] Dr. Hamlet B. Ngapkynta in his book *The Economy of Meghalaya* (p.46) quoted the following from the book entitled *Geological Structure of Part of Khasi Hills, 1854* : "a large proportion of potatoes is annually sent from the hills. For the most part these potatoes are purchased in small quantities in each family by Khasi merchants or by Bengalese who come up for the purpose and the accumulated store is then shipped from Pondua or Chattue to Calcutta. From the hills also, Calcutta and other places are principally supplied with pine-apples".

them than other people of the region. This indirectly paved the way for their being more economically and socially advanced than others.

The present day lingua-franca of the Khasi and Jaintia communities is the dialect spoken by the people of Cherrapunjee (Sohra). It is also the spoken and written dialect of the above communities. This language has today been recognized by the Sahitya Academy as one of the major languages of the North-East. The credit of this goes to Rev. Thomas Jones, a Welsh Missionary who gave the Khasis their present day alphabets. He is also rightly regarded as the father of the Khasi literature. If the British had entered these hills from some other region, the dialect used by that particular area at that time through which they (the British) had entered would have been used as the spoken and written languages of the Khasi and Jaintia people. But the fact that the dialect used at that time by the people of Cherrapunjee (Sohra) has been used as the common spoken and written languages of the present day Khasi and Jaintia people proves beyond doubt that the British including Rev. Thomas Jones entered this region through this area.[8]

[8] Monuments of this fact are still seen today at Mamluh, Laitkynsew and other villages of the region.

West Garo Hills District

This district by all measures is the most developed district of the Garo Hills region and the second most developed district in the State of Meghalaya. The following are some of the facts that can be pointed to back this statement.

1. The Locational Aspect

This district like the East Khasi Hills district of eastern Meghalaya is the centre of all commercial and administrative activities of the western Meghalaya from time immemorial. As pointed out in the preceeding chapter, the British first set up their headquarter at Tura, the headquarter of the then whole Garo Hills district and the present day headquarter of West Garo Hills district – as early as 1870 A.D. While it was the Welsh missionaries who first helped in educating the Khasis, the Garos were aided by the American Baptist missionaries in the establishment and spread of education in the Garo Hills region and schools were also first started at Tura town. Evidence of this is still seen today in this town. Thus, fortunate by being the headquarter of the whole of Garo Hills area, the people of this district were the first to receive formal education. This fact enabled the people of this region to advance very much when

compared with the people in other parts of Garo Hills region. This has indirectly helped in making the region more developed than other areas of the region.

2. Resource region

This district has good amount of minerals like coal, limestone, clay and other minerals as already pointed out in Chapter III of this work. The district has abundance of mineral and human resources. The seat of administration for the Garo Hills region is located in the headquarters of this district and this has facilitated the easy and abundant procurement of funds for the all-round development of the district. This fact has contributed in making the district a more developed district than other districts of the State.

3. Accessibility, Trade and Commerce

The West Garo Hills district is well connected with a good network of transport and communication system with all parts of Garo Hills region. All the districts and the Community Development Blocks of the Garo Hills region are linked with Tura, the headquarters of the West Garo Hills district, by an all-weather motorable road. Tura serves as the main market and shopping center of the region. Therefore, majority of the people of the region are to come to this town to obtain their basic

essential necessities and requirements. This naturally helps in enhancing trade and commerce in the district and brings about its steady economic growth.

When all things are taken into account, the East Khasi Hills district stands out high among all districts of the State in the level of development. The West Garo Hills district though more developed than other districts cannot match that of East Khasi Hills district. Therefore, this district can be grouped together with Jaintia Hills district and West Khasi Hills district as developing districts. The East Garo Hills district, South Garo Hills district and Ri-Bhoi districts are found to be the least developed districts of the State. The backwardness of these districts is basically due to under-utilisation of their different resources. In trying to raise the levels of development in these districts through the extraction and exploitation of their resources one should see that this is done in a sustainable manner and not in a manner that was done in the other developed districts of the State.

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.

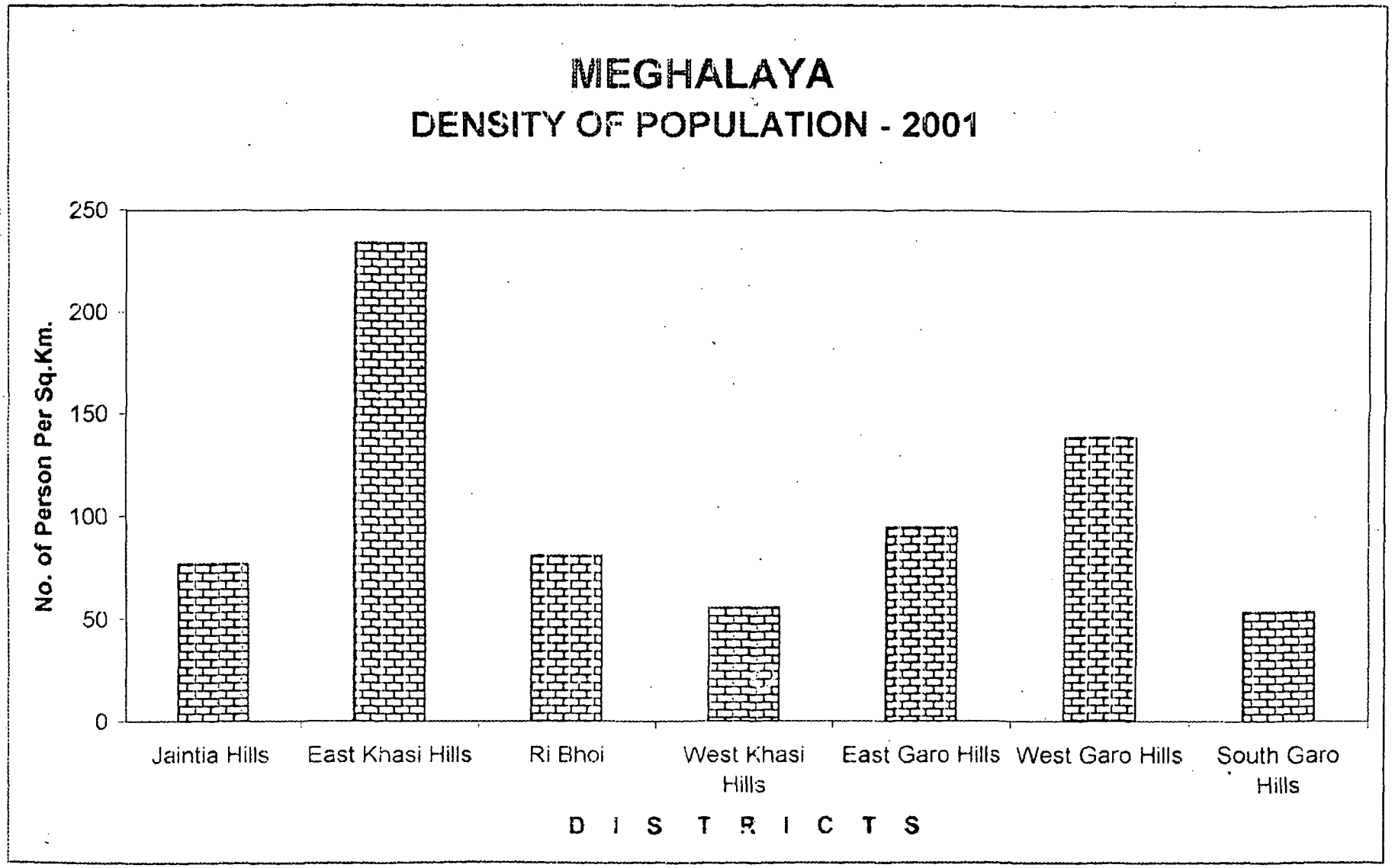
This can be done by effecting a change in the behaviour of the institution and the individuals.

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

FIG. 13


MEGHALAYA
DENSITY OF POPULATION - 2001
No. of Person Per Sq.Km.
250
200
150
100
50
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

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.

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Appendix-1

Agricultural Indices

District	Crops/Fruits									
	Rice	Potato	Maize	Ginger	Rabi & Others	Rape & Mustard	Pineapple	Citrus fruits	Banana	Papaya
Jaintia Hills	13.7	11.2	11.1	11.3	12.9	16.1	17.3	23.5	5.6	5.5
East Khasi Hills	16.6	18.3	19.6	20.5	13.4	15.2	17.3	21.9	17.1	16.5
Ri-Bhoi	20.2	8.9	19.3	19.0	11.1	11.8	18.8	3.4	2.2	17.2
West Khasi Hills	13.1	13.1	13.7	10.3	20.2	3.0	11.0	16.8	7.6	3.0
East Garo Hills	12.7	16.2	12.3	15.8	11.9	16.0	3.7	19.7	16.1	19.8
West Garo Hills	13.5	15.9	14.1	11.5	15.2	18.7	18.0	10.5	15.4	17.8
South Garo Hills	10.3	16.3	9.9	12.0	15.3	19.3	13.9	4.1	15.9	20.3

District-wise Agricultural Efficiency

District	Efficiency Index
Jaintia Hills	13.65
East Khasi Hills	394.37
Ri-Bhoi	6.94
West Khasi Hills	13.39
East Garo Hills	65.31
West Garo Hills	14.27
South Garo Hills	11.06

Source: Compiled by the Investigator based "District Level Statistics 2002", Government of Meghalaya, Directorate of Economics and Statistics, Meghalaya, Shillong.

Appendix-2

Area, Production and Yield of some Selected Crops & Horticultural Products of Meghalaya

Crops	Meghalaya	Jaintia Hills	E.Khasi Hills	Ri Bhoi	W.Khasi Hills	E.Garo Hills	W.Garo Hills	S.Garo Hills
Rice: i) Area (in hectares)	106411	16853	5379	11697	9030	17070	37352	9030
ii) Production (in tonnes)	170733	26431	10243	27053	13528	24869	57978	10631
iii) Yield (kg./hectare)	1604	1568	1904	2313	1498	1457	1552	1177
Potato: i) Area (in hectares)	18339	344	10854	14	6581	110	404	32
ii) Production (in tonnes)	143287	1852	95635	60	41547	855	3088	250
iii) Yield (kg./hectare)	7813	5384	8811	4286	6313	7773	7643	7812
Maize: i) Area (in hectares)	16637	2868	1900	1565	4303	1094	4034	873
ii) Production (in tonnes)	24051	3241	3784	3064	5958	1365	5763	876
iii) Yield (kg./hectare)	1446	1130	1992	1958	1385	1248	1429	1003
Ginger: i) Area (in hectares)	7606	107	405	782	233	3550	2381	146
ii) Production (in tonnes)	44710	487	3348	6018	971	22063	11112	711
iii) Yield (kg./hectare)	5878	4551	8267	7696	4167	6215	4667	4867
Rabi & Other Pulses: i) Area (in ha.)	1957	87	213	58	20	205	1166	208
ii) Production (in tonnes)	1540	61	155	35	22	132	962	173
iii) Yield (kg./hectare)	787	701	728	603	1100	644	825	832
Rape & Mustard: i) Area (in hectares)	7042	12	60	162	29	752	5770	257
ii) Production (in tonnes)	4648	7	33	69	31	435	3893	180
iii) Yield (kg./hectare)	660	583	550	426	107	578	675	700
Pineapple: I) Area (in hectares)	9382	281	805	3367	774	860	2310	980
ii) Production (in tonnes)	82461	2262	6464	29467	3946	14709	19295	6308
iii) Yield (kg./hectare)	8789	8050	8030	8752	5098	1710	8353	6437
Citrus Fruits: i) Area (in hectares)	7569	1012	4343	100	933	203	605	273
ii) Production (in tonnes)	33966	5520	22062	80	3640	929	1473	262
iii) Yield (kg./hectare)	4487	5454	5080	800	3901	4576	2435	960
Banana: i) Area (in hectares)	5319	315	662	775	657	1087	1553	268
ii) Production (in tonnes)	63383	1369	8844	13525	3918	13665	18735	3327
iii) Yield (kg./hectare)	11916	4346	13359	17452	5963	12571	12064	12414
Papaya: i) Area (in hectares)	507	10	72	129	31	133	103	29
ii) Production (in tonnes)	3941	25	545	1014	42	1208	838	269
iii) Yield (kg./hectare)	7773	2500	7569	7860	1355	9083	8136	9276

Source: Lyngdoh, W.L. "District Level Statistics 2002", Government of Meghalaya, Directorate of Economics and Statistics, Meghalaya, Shillong.

Appendix-3

Road Linkages and Distances in Megalaya

Shillong to:	Distance (in Kms.)
Jowai	66
Nongstoin	93
Tura	323
Williamnagar	312
Nongpoh	53
Baghmara (via Tura)	445
Sohra (Cherrapunjee)	49
Shella	93
Mairang	44
Mawkyrwat	74
Betasing (via Tura)	370
Amlarem	93
Khliehriat	100
Mawsynram	58
Mawkynrew	46
Mawryngkneng	37
Umling	70
Umsning	30
Umroi	35
Mylliem	45
Mawphlang	24
Dawki	82
Pynursla	55
Dadenggirri (via Tura)	377
Mawshynrut	138
Ronjeng	201

Jowai to:	Distance (in Kms.)
Amlarem	27
Khiehriat	34
Laskein	35
Thadlaskein	10
New Garam Pani	67
Dawki	59

Nongstoin to:	Distance (in Kms.)
Mairang	49
Mawkyrwat (via Mawphlang)	127
Balat	149
Ranikor (via Balat)	168
Mawthengkut (Sunapahar)	45

Tura to:	Distance (in Kms.)
Baghmara	122
Dadenggiri	54
Betasing	47
Selsella	47
Rongara	145
Risubelpara	88
Zikzak	51
Dalu	50
Chatpot	53
Ampati	49

Williamnagar to:	Distance (in Kms.)
Risubelpara	74
Ronjeng	35
Songsak	30
Samanda	19

Shillong to N.E. State Capitals	Distance (in Kms.)
Itanagar	406
Imphal	576
Kohima	434
Guwahati	103
Aizawl	415
Agartala	662

Source: Lyngdoh, W.L. "Statistical Handbook Meghalaya 2000", Government of Meghalaya, Directorate of Economics & Statistics, Meghalaya, Shillong.

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