URBAN GROWTH AND CHANGING LANDUSE PATTERN IN SHILLONG

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Dissertation

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C E R T I F I C A T E

This is to Certify that the dissertation submitted by Miss Gita Singh for the degree of Master of Philosophy (M.Phil) to the Department of Geography, North Eastern Hill University Shillong, Meghalaya, entitled " Urban Growth and Changing Landuse Pattern In Shillong ", is a bonafide study of the author to the best of my knowledge and belief.

It may be placed before the examiners for the evaluation.

Dated the 15.5.92
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C O N T E N T S

A C K N O W L E D G E M E N T

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Date : 15/5/92
Place : Shillong.

Gita Singh
(GITA SINGH)

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CHAPTER I

INTRODUCTION

Urban growth is to be conceived of as a dynamic process. However,growth takes place not only in a definite time setting but also in a spatial or geographical setting. Urban growth involves the growth of towns and cities. Changes of economic and socio-cultural variables, changes in landuse pattern over time and conceptions of explanatory inter-relations between them and value judgements of the directions and qualities of changes.

Man's concept of intervening or manipulating land is the concept of Landuse. The history of landuse is as old as the history of mankind[1]. "Landuse is any kind of permanent or cyclic human intervening to satisfy human needs, either material or spiritual or both from the complex of natural and artificial resources which together are called 'Land'.

Land is a part of physical environment and there is a marked variation in the physical environment, type of economy, mode of production, types and levels of technology, society, culture etc. from place to place. The changes in technology, society, economy and culture over time change the concept of Landuse and this is strongly linked with the advances of human civilisation. Though changes occur in physical environment, but it is a very slow process and in fact,hardly it has any impact in the change of the concept of landuse.

1. Kanak Haloi, "Concept of Landuse And Ownership in Khasi Hills, 1984

Since the beginning of this century, some standardised classification of Landuse of a few countries had been attempted.

In Great Britain, reports were written describing the Landuse in between 1936 and 1946[2] in the summary volume, "The land of Great Britain, its uses and misuse". Thirteen main groups were identified for the survey[3]. These were:-

1. Settlement
2. Industry
3. Transport
4. Derelict land
5. Open space
6. Grass
7. Arable
8. Market Gardening
9. Orchards
10. Woodland
11. Health
12. Water and Marsh, and
13. Unvegetable Land.

In recent years, different land utilization studies have been carried out in Eastern European countries[4].

2. L.D.Stamp.,-"The Land of Britain -its use and misuse", end ed.London; Longmans Green,1950.
3. L.J.Symons., "Agricultural Geography" Bell and Wayman Ltd. London,1978.
4. Sarfalvy,et.al., 1967, in A.P.A.Vink,"Landuse in Advancing Agriculture", Springer Veriage, Berlin,etc.1975.

Similar type of studies including land evaluation were carried out in Soviet Union. Emphasis was given primarily towards a more thorough study of natural & socio-economic conditions of landuse. It also points towards systematic research into questions of ownership and of organisational and technical matters leading to the elaboration of land utilization system. Thus it also included a critical study of the relative suitability of the existing types of land utilisation to the lands on which they are being practised.

This objective is clearly expressed in a publication from Romania (Grumazescu in Sarfalvi et al, 1967)[5] in which the suitability of different types of land spaces is discussed.

Thus from relatively simple system of Stamp, a complicated structure for describing landuse has been developed by these countries.

The World Landuse Survey Commission of the International Geographical Union functioned from 1949 to 1976. During that period, it promoted the making of maps and reports of landuse in a number of countries and aimed to produce a world landuse maps on the scale of 1:1000,000.

Standardised classification and uniform definitions of the landuse in India, was first recommended in 1950. India, like other countries experienced rapid urban expansion since

5. A.P.A. Vink., "Landuse in Advancing Agricultures" Springer Veriag, Berlin, etc.1975.

the beginning of this century which has brought forward the concept of urban structure and urban landuse[6]. Increasing number of urban problems have become major concern of Geographers and Planners.

The present study emphasizes at outlining physical growth of Shillong and its changing landuse pattern study of landuse pattern of a city is undoubtedly a basic need for fuller comprehension of urban system. The landuse pattern in the town explicitly speaks of planned or unplanned growth.

Landuse of Shillong is partly a legacy of the past as is the case with most other cities. To what use the land is put to need not always be rational or socio-economically most desirable[7]. Urban Landuse is dynamic and the use which was rational and desirable at one particular time period do not remain rational and desirable for ever. As the needs, tastes and values of the urban community change and as the community itself expands, the older use become square peg in round hole.

1.2 SURVEY OF LITERATURE

The phenomenon of urbanisation, universal in the contemporary world is being generated by so many different factors operating with different emphasis in each separate country.

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6. Kanak Haloi.,(1984),op.cit

7. P.P.Mahadev.,"People, Space and Economy of an Indian City" 1975.

In the past one hundred years, an increasing proportion of India's rapidly expanding population has become concentrated in urban places. This trend has received its stimulus from the emphasis on decentralised industrialisation and the development of transport. It has brought manifold changes in urban landuse pattern. Landuse pattern of any urban place is the result of long continued operation of the whole range of environmental factors, basically physical but modified by socio-economic and historical elements related to sequence of human occupance.

There has been a fairly good number of studies on urban growth with emphasis on landuse pattern and ownership in the developed, developing and under-developed countries of the world. The works of Stamp(1930)[8], Devis(1976)[9] and Vink(1976)[10] are important among them.

Chancey Harris and Edward Ullman[11] in "The Nature of Cities" has given importance to economic forces for different landuses.

Ernest Burgess[12] in his concentric zone concept, in the book,"The growth of the City", places great emphasis on economic determinism in land utilization. According to

8. L.D.Stamp;(1950), op.cit

9. K.P.Devis., "Land Use" The Mc Graw Hill Book Company, New York, Delhi etc.(1976).

10. A.P.A.Vink;(1975),op.cit.

11. Harris and Ullman,"The nature of Cities", The Annals of American Academy of Political and Social Science, Vol.242, 1945,pp.7 17.

12. E.W.Burgess.,"The Growth of City" in R.E.Park,E.W.Burgess and R.D.Mackenzie(eds),The City,University of Chicago Press, 1925.

him, human values and group actions though self regulating are encompassed by the dominance of economic forces.

✓Homer Hoyt[13] in the book, "The Structure and Growth of Residential Neighbourhoods in American Cities" has sought to explain the structure ofthe city and the landuse pattern primarily in terms of universal economic forces which tend to make up the present geographical pattern. He has also analysed the influence of these forces in the evolution of the pattern. Berry, Brian J.L.[14] studies various forces which promoted the growth of the cities in United States.

✓L.S.Bourne, R.Sinclair and K.Dziewski[15] in "Urbanisation and Settlement System" emphasised on recent trends in urban growth, city sizes and functions, demographic structure, economic structure, and administrative reorganisations and population redistribution with those system and the varied responses of government to those trends.

In "Information Theory and Urban Spatial Structure" M.J.Webber[16] described city as evolving phenomenon and discusses about the rate of change of the spatial structure of a city.

13. Homer Hoyt.,"The Structure and growth of Residential neighbourhoods in American cities" Washington,1939.

14. J.L.Brian, Berry.,"Urbanisation and Counter Urbanisation" Sage Publication, London,1976.

15. L.S.Bourne,R.Sinclair and K.Dziewski,"Urbanisation and Settlement System"-International Perspective Oxford Univ. Press,1984.

16. M.J.Webber.,"The Growth of Cities in Nineteenth Century" A Study of Statistics, New York,1899.

He has focussed on three kinds of dynamic forces which shapes the evolution of cities. One is the external source-shocks transmitted from the remainder of the economy (These shocks include variations in demand for the city's goods and services, the migration of unemployed or retired people to and from the city, and changes in taste and technology, all of which are independent of the spatial structure of an urban area). Second, the two internal sources of change are ageing process and mutual readjustment of facilities and population overtime, which together cause a city to change even in the absence of external shocks.

D.T.Herbert(1972)[17], R.J.Johnston(1971)[18] and Mayer and Kohn(1969)[19] offers a review of the range of models that have been used to represent urban dynamics and spatial structures and relates these to the effects of policy determination and discusses research priorities.

In "Urbanisation and its problem" by R.P.Beckinsale and J.M.Houston[20], origin and developments of towns of various countries, continents of world have been discussed. They have

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17. D.T.Herbert., "Urban Geography : A Social Perspective" David and Charles, Newton Abbot, 1972.
18. R.J.Johnston., "Urban Residential Pattern", Bell, London, 1971.
19. M.Mayer and Clyde.F., Kohn., "Readings in Urban Geography" 1969.
20. Beckinsale and Houston., "Urbanisation and its Problem" Basil Black well, Oxford.

also discussed about the various forces responsible for their growth and also influence of social habits on urban growth. They also described the influence on towns and cities of these modern technical advances in general.

William Gorham and Notham Glazer[21] in "The Urban Predicament" presents a comprehensive analysis of the circumstances which are responsible for shift in regional economic vitality, changes in population sizes and fortunes of major central cities and persistence of large, low-income minority ghettos with low opportunity levels in and around most of the large central cities.

Urban growth and landuse pattern of different Indian cities has been studied by N.V.Sovani(1965)[22], Ashish Bose(1973)[23], Akinchan(1982)[24], Lalta Prasad(1985)[25], H.G. Hanumappa(1981)[26], Baleshwar Thakur(1980)[27] and others.

21. William Gorham and N.Glazer., "The Urban Predicament", The Urban Institute Washington D.C , 1976.
22. N.Sovani.,"Urbanization and Urban India", Asian Publication, 1965.
23. Ashish Bose.,"Studies in India's Urbanisation 1901-71" Delhi 1973.
24. Sitaram Akinchan.,"Urban Growth and Political Socialisation in India", New Delhi., 1982.
25. Lalta Prasad.,"The Growth of Small Town -A Sociological Study of Ballia(U.P.)" Concept Publication,New Delhi,1985.
26. H.G.Hanumappa.,"Urbanisation Trends in India -Case Study of Medium Town", 1981.
27. Baleshwar Thakur.,"Urban Settlement in Eastern India",1980.

The landuse study in case of North East India and specially in the hilly areas is very limited. However, some of the studies like "Land Ownership and Agricultural practices of Tribes of Arunachal Pradesh" by S.G.Barman, "Agricultural Potential and Planning in Hill Regions in India" by S.P.Shukla[28], "Landuse under shifting cultivation" study conducted by Agro Economic Research Institute[29], Jorahat "Social Institutions of Garo of Meghalaya" by M.C. Mazumdar[30] are worth mentioning.

A good number of seminars on the landuse and land ownership in North East Region have been conducted by various organisations of which "Land tenure in and around the town of Shillong" by Kynpham Singh[31], "Methodological Problems involved in Landuse Classification in a Tribal Region", A case study of the Khasi Hills Areas by Dr A.C.Mohapatra and K.Haloi[32] provides a conceptual basis for the study of the classification of landuse for Khasi Hills.

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28. S.P.Shukla.,"Agricultural Potential and Planning in Hill Regions in India" (Chugh Publications),1983.

29. Landuse under Shifting cultivation conducted by Agro-Economic Research Centre for N.E.India,Jorahat,1972.

30. M.C.Goswami and D.N.Mazumdar.,"Social Institution of the Garos of Meghalaya", Nababharat Publishers, Calcutta-9,1974.

31. K.Singh.,"Land tenure in and around the town of Shillong" presented in Seminar,"Land and Land Relations in hills of N.E.India",1981.

32. A.C.Mohapatra and K.Haloi.,"Methodological Problems involved in landuse classification in a Tribal Region" presented in the Seminar, "Integrated Rural Development" 1983.

The paper, "Land As Property: Its Importance in the Traditional Society and Polity in Khasi-Jaintia Hills" by Soumen Sen[33] provides property concepts of the Khasi of Khasi Hills.

These papers gives us basic understanding of the concept of landuse and land-ownership in Khasi Hills.

D.N.Majumdar and B.Dutta Ray[34] in Tribal and Occupational Mobility has attempted to trace the growth of Shillong along with other towns of Meghalaya. Occupational structure along with ethnic variation in occupational structure and other influencing cultural factors has also been discussed in detail.

J.P.Singh[35] in the book, "Morphology of Towns edited by C.S.Yadav has made an attempt to describe systematically about the growth and evolution of Shillong town from 1872. He has also shown the present demographic structure and landuse pattern of the city.

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33. S.Sen., "Land as property; its importance in the hill traditional society and polity in Khasi-Jaintia Hills" presented in Seminar, "Land and Land Relations in the Hills of N.E.India", 1981.

34. D.N.Majumdar and B.Dutta Ray., "Tribal Occupational Mobility" Calcutta, 1984.

35. J.P.Singh., "Urban Landuse Planning in Hill Area" Inter-India Publication in Delhi, 1980.

1.3.1 OBJECTIVES OF THE STUDY:

Any effective plans for the improvement or arrangement of the future city must take account of the present pattern of landuse within the city, of factors which have produced this pattern and of the facilities required by activities localized within particular districts. Therefore, the present study has been centred around the following broad objectives:-

1. to focus the problems of urban growth(Pattern and process).
2. to highlight the spatial pattern of landuse of Shillong and its decadal variation.
3. to analyse the impact of present landuse pattern on the growth of this city.
4. to forward suggestions as regards to the future landuse planning so as to sustain better urban growth.

1.3.2 RESEARCH QUESTIONS:

1. Whether the ecological set up of the city have influenced the existing landuse pattern of Shillong and whether like in othergrowing cities Shillong is infected with problems specifically related to unplanned landuse pattern.
2. Whether the socio-economic forces governing the present landuse pattern reflect more to concentric zonal or sectoral or 'Multiple Nuclei' growth or a combination of these.

1.4 DATA BASE AND METHODOLOGY

The present study is based on data collected both at the primary and secondary level. Primary datahasbeen collected from the field by interview method in relation to all the households located in Ward IV of Shillong city comprising Laitumkhrah Police Point and surrounding areas. Random household Sampling has been carried out in different parts of the city to find out the rent value and otheraspects. Pertaining questions have been asked regarding the year of construction of differenthouses and their respective rent so as to analyse the residential structure of the particular area. Besides,this the number of shops engaged in retail trade activities have been identified. Pilot surveys have been carried on to locate other aspects of landuse.

Secondary data have been collected from the census of India publication[36] with special reference to demographic and economic activities of Shillong. Published books and records have been referred to, to collect information regarding the general ecological setting, historical growth and broad outlines of the landuse characteristics of Shillong.

Various maps and data have been collected from Town and country Planning Office and Municipality Office.

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36 Census of India Publications include:

Census of India	1911	Vol	III	Assam	Part	II
" " "	1921	"	III	"	"	II
" " "	1931	"	IX	"	"	II
" " "	1951	"	XII	"	"	I-A and

Particularly Census of India, 1981, Series XIV, Meghalaya Part II-A and B.

To make the study more comprehensive, mapping, cartographic as well as statistical techniques have been applied to analysed data collected both from Primary and Secondary sources.

However, because of non availability of maps at appropriate scale, the landuse map prepared have been generalised.

1.5 LOCATION OF THE STUDY AREA

Shillong, the district headquarters of the East Khasi Hills District and capital city of Meghalaya state is bounded by co-ordinates 25°32'10" to 25°36'20"N and 91°51'30" to 91°56'30"E (vide map No.1). The city occupies a valley called Shillong valley of about 45 sq.km in area.

Shillong is one of the largest cities of north eastern region. In north it is linked with Guwahati(103 kms) by metalled road. On east at a distance of 65 km with Jowai, the district headquarter of Jaintia hills. On the south are situated Cherrapunji(51 kms) and Mawsynram(53 Kms) the two rainiest places known all over the world. It has road links with all important places of north east India. However, because of topography, it has no rail link, the nearest railway station is Guwahati. Nearest aerodrome for the city is about 22 Kms towards north in Umroi, near Barapani.

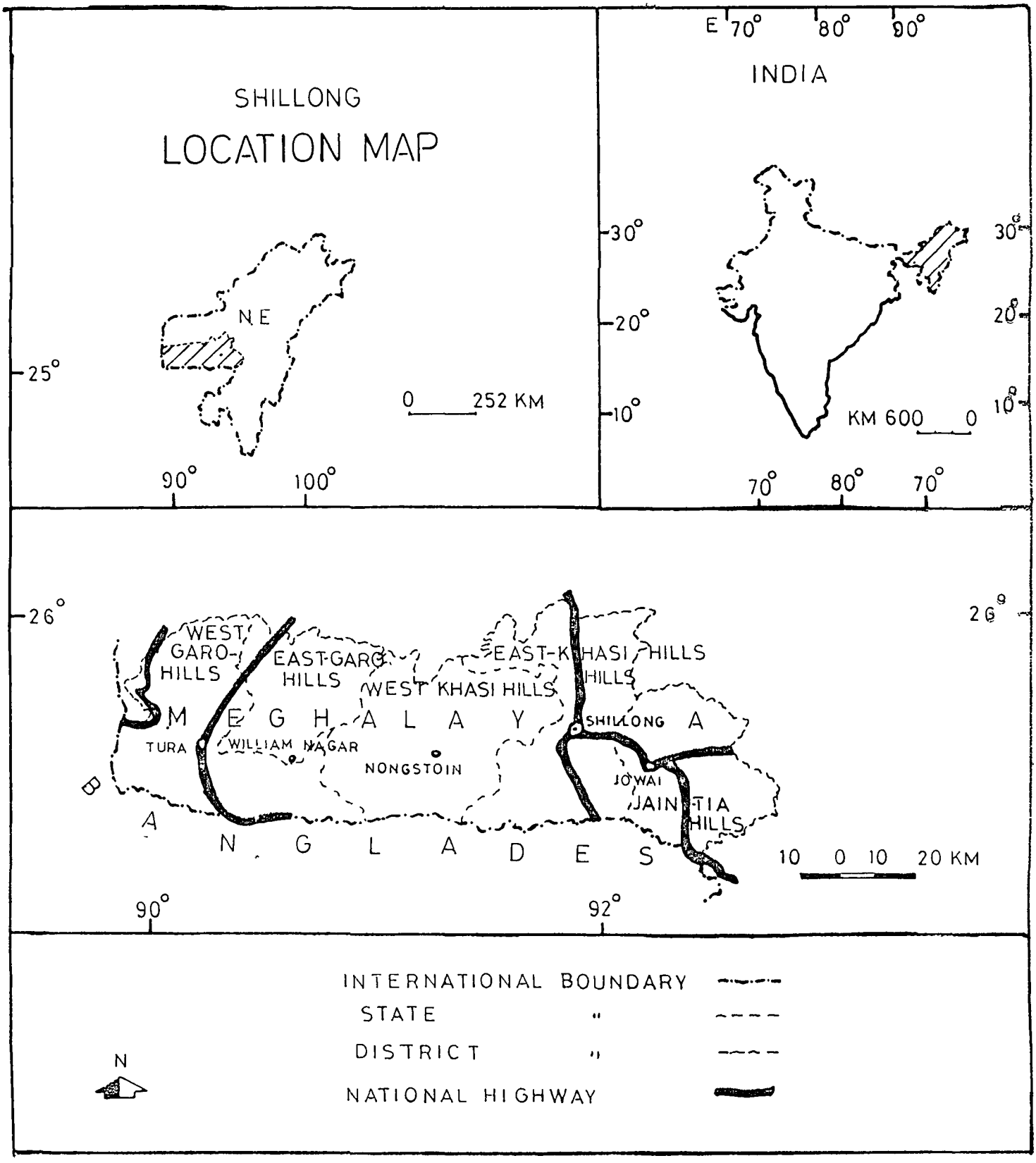
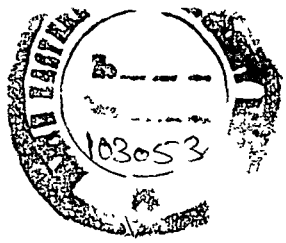

SHILLONG
LOCATION MAP
NE
25°
0 252 KM
90°
100°
E 70° 80° 90°
INDIA
30°
20°
10°
KM 600 0
70° 80° 70°
26°
WEST GARO-HILLS
EAST-GARO HILLS
WEST KHASI HILLS
EAST-KHASI HILLS
HILLS
M E G H A L A Y A
SHILLONG
TURA
WILLIAM NAGAR
NONGSTOIN
JOWAI
JAINTIA HILLS
B A N G L A D E S H
10 0 10 20 KM
90°
92°
INTERNATIONAL BOUNDARY
STATE "
DISTRICT "
NATIONAL HIGHWAY
N

FIG 1.



Physical environment of any place provides man with living space, with food and with a vast variety of raw materials used for the satisfaction of human wants[37]. Physical environment consists of landforms, climate, water, soil, natural vegetation and native animal life etc. Undoubtedly various ecological factors have guided the growth and expansion of urban activity and landuse pattern in Shillong.

PHYSIOGRAPHY

Shillong and its suburb falls on the central upland zone of Meghalaya Plateau named as Shillong Plateau which is mainly a dissected plateau with intervening valley zone. The city occupies the valley called Shillong valley about 45 sq.kms in area, the valley is bounded on south by Shillong range(1900 mts) on the north east by the Mawpat hills(1600mts) on the east by the water divide of tributaries of the Umkhrah-Umshing water divide and on the other side by minor water divide.

Upper most part is a mild undulating plateau with limited width stretching roughly along East-West direction and having an average altitude of 1800mts to 1900 mts above mean sea level. Highest points in the area, Shillong Peak (1964mts) and Laitkor peak, lie on the East-West stretching water divide on two sides. This upper part decends down the

37 Munindra Konwar., "Soil Rating Status in different Ecological zones - A field based study of West Khasi Hills district of Meghalaya" unpublished dissertation, 1981.

slopes of 20° at a lower surface of greater Shillong which has an average altitude around 1500 mts and is having undulating terrain. Because of such discripancies within limited areas, in altitude, not much continuity is observed in the expansion of urban activities in all direction.

GEOMORPHOLOGY

Geomorphology can be depicted by average slope map of the area prepared by Wentworths method, to visualise the existing landuse in contrast(vide fig.no.2). Shillong being situated on Meghalaya Plateau has areas with different slopes[38] which indirectly has its influence on landuse of the city. Usually areas with less slopes are found crowded and favourable for various purposes - commercial, residential and industrial. On the other hand areas with steep slopes are sparsely populated. For analytical review the slope map has been divided into five slope range(vide fig.No.2).

a) Slope Range 0-5°: This is a gentle slope category areas having upto 5° of slope are distributed mostly in Upper Shillong south of water divide. In lower Shillong, this slope range is seen in very limited areas in Happy Valley, Pynthorumkhrah, Polo ground and streches of narrow valley fields.

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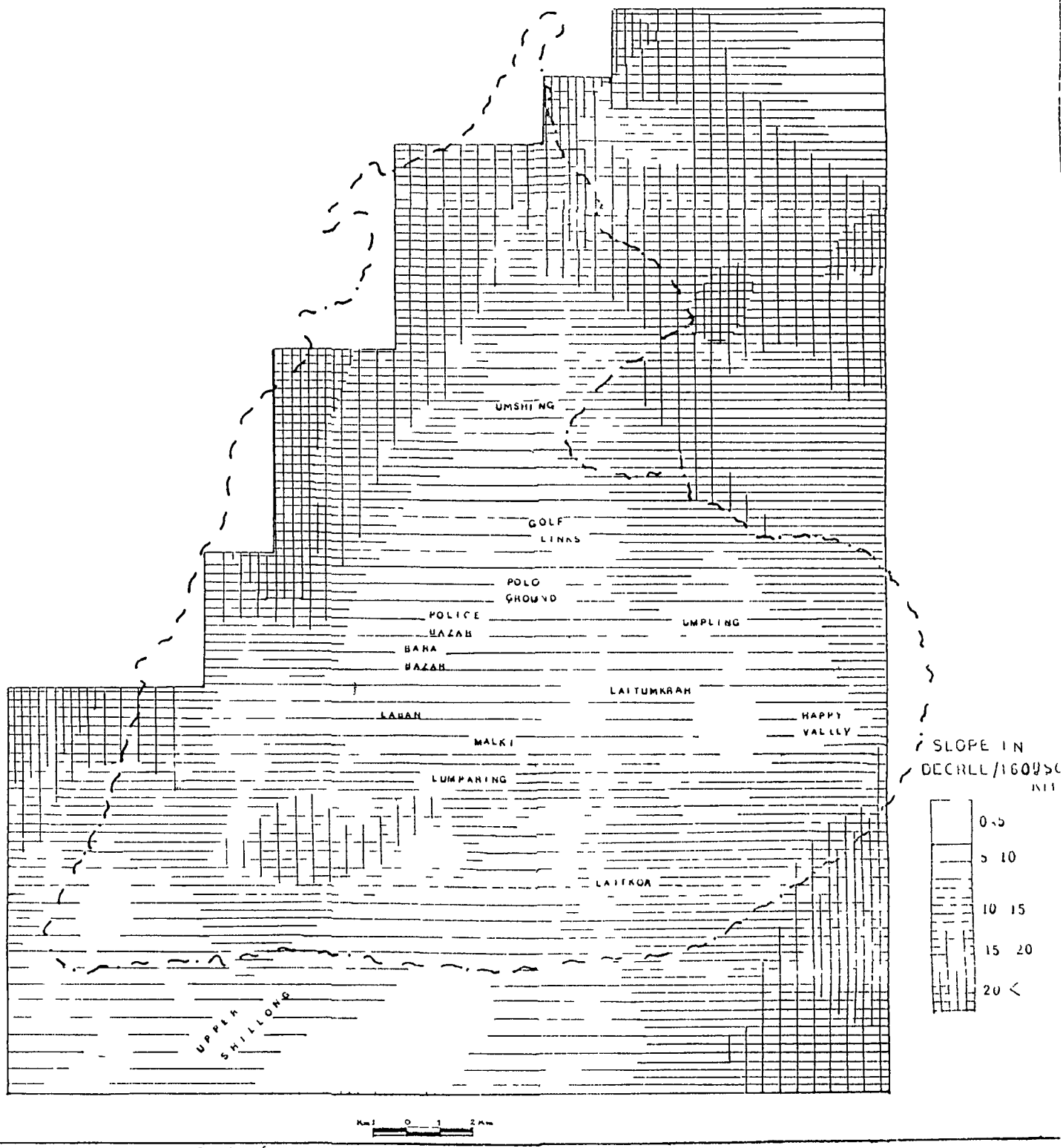
38. Report on Development Plan., Town and Country Planning Department, Govt. ofMeghalaya, Shillong 1976.

SHILLONG ~~STANDARD~~ URBAN AREA

AVERAGE SLOPE MAP

WENTWORTHS METHOD



SOURCE URBAN DEVELOPMENT OFFICE GOVT OF MEGHALAYA

FIG 2

b) Slope Range 5°-10° : This slope range representing undulating uplands are found in large part of Greater Shillong (vide map No.2) covering areas of Laban, Bara Bazar, Police Bazar, Golflink , Polo ground, Laitumkhrah, Umpling etc. These areas of Shillong have well developed road network and have high density of population. Major commercial centres also falls in the area of this slope category.

c) Slope Range 10°-15° : Area under this slope category representing undulating uplands are found in alarge part of Greater Shillong as can be seen from the figure(No.2). Steepness has made it difficult to develop road with favourable gradient. This range of slope is also not favourable for settlement purposes.

d) Slope Range 15°-20°: This category of slope occupies areas between lower and upper Shillong and mostly on eastern,western and northern side of Shillong. This category is occupied by forest. Construction of roads is very difficult. These areas are very sparsely populated with less settlements.

e) Slope Range above 20°: This category of slope can be noticed in north-west and south east. These areas are totally occupied by forests. Hardly any settlement can be noticed here.

CLIMATE

Climate includes a number of measurable weather conditions[39]. Usually Shillong experiences cold climate with

39. Dr Ali Hafiz.,"Landuse changes in Darrang District", Assam, Oct.1984.

the temperature varying from 3°C to 24°C. During December and January, ground temperature reaches sub-zero in the early morning causing ground frost. The hottest month is April and May with temperature reaching to 24°C. Summer is mild and of short duration. However, for the last few years the temperature has shown a sudden rise upto 26.2°C giving a feel of the heat at this hill station. This is attributed to the "Green House Effect" owing to massive deforestation in the area.

The mean annual rainfall is 242 cm two-thirds of which comes during the four months of June to September[40]. Relative Humidity all over the year is more than 50 percent.

These climatic characteristics have favoured immense vegetation growth which provides raw material to many forest based industries. The cold climate of Shillong also attracts tourists from all over India especially during summer. Because of its cold climate, Shillong was opted by Britishers instead of Cherrapunji for the establishment of Cantonment for British.

SOILS

Rock types in and around Shillong have weathered into a reddish latosolic clayrich mass. The development of soil cover is highly irregular and shows greater variations

40. J.P.Singh., "Shillong - An Urban Survey", 1976.

from place to place. The soil profile on the northern side of the water divide is better developed as compared to that on the southern side of the water divide. Loose soil on the slopes restrict the construction of houses.

The common variety of soil are red loam or hill soil and laterite soil. Red loam soil are generally loamy varying between sandy and clayey loam. The laterite soil which occupies patches in and around Shillong is highly leached, por in plant nutrition and acidic in reaction.

Generally all the soils are acidic in nature. Electrical conductivity is well within normal limit. Alluvial fills are heavy loams and contain larger amount of organic matter. They have greater moisture retaining capacity and are occupied by paddy cultivation. Paddy cultivation is extensively practiced around Shillong city.

Soil order types identified in and around Shillong following the U.S.system of soil classification are oxisols, Entisols and inceptisols, oxisols are available on hill slopes. It is oxidised and red in colour. It is normally clayey with iron oxides formed due to weathering and chemcial leaching of quartzite. Forests thrive on this soil, which forms one of the most important natural resources of whole of the region and provide raw material to many industries at Shillong.

Inceptisols are found mainly on hill-tops[41]. They comprise clay-loam-silt matter and can retain moisture during monsoon. Entisols generated along rivers have clay-silt-loam composition can retain moisture throughout the year, have dark grey colour and are used for agriculture throughout the year.

VEGETATION

Vegetation of Shillong include wide variety of species like pine, broad leaf trees, bamboos, herbs and medicinal plants etc. which not only provide raw material to industries but are also used extensively in construction purposes.

The pines form the pure forest in and around Shillong In the depressions are some pockets of broad leaved evergreen forests. However Pinus Khasia is the principal flora while Schima Wallichia is obtained in very little percentage. Pinus Khasis has fair to poor water retaining capacity and is found between altitude of 950 mts to 1850 mts Bambusa Polida and Dendrocalmus hamiltoni are the bamboo species found within the urban complex while some Angiosperms are grown on valley fields.

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41. Report on Development Plan; (1976) op.cit.

CHAPTER II

2.1 HISTORICAL PERSPECTIVE AND ADMINISTRATIVE GROWTH

Shillong today is an integral part of the urban system of North-East region, which is in nexus with metropolis of Calcutta urban system developed around Port[1]. The growth of the city can be attributed to the peculiar location of the city in a predominantly tribal and hill areas with limited sedentary agricultural practices and inadequate transport linkages within and surrounding region and being located at about 5000 meters above mean sea level, its location provides relief for exasperated administrators, the planters and other fortune seekers from the oppressive climate and often hostile social life of plain. That is why Sten[2] preferred to call it as the Scotland of the East.

Shillong derived its name from a person named Shyllong who discovered god at the highest peak known as Shillong peak. And Shillong urban centre evolved around the weekly market centre calley 'Iewduh' i.e., present Bara Bazar. Thus from a mere village, today Shillong has grown to a large city covering about 25 sq.kms with a population of 214595 according to 1991 census. Shillong agglomeration consists of six towns. Shillong Municipality, Shillong cantonment, Nongthymmai, Mawlai, Madanrting and Pynthorumkhrah. Growth of population in spatial extent can be elaborated in two periods.

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1. H.B.Mahanta., "Continuity and change" 1986.
2. H.W.Sten., "The Meghalaya Year Book", North Eastern India News and features Services, 1971.

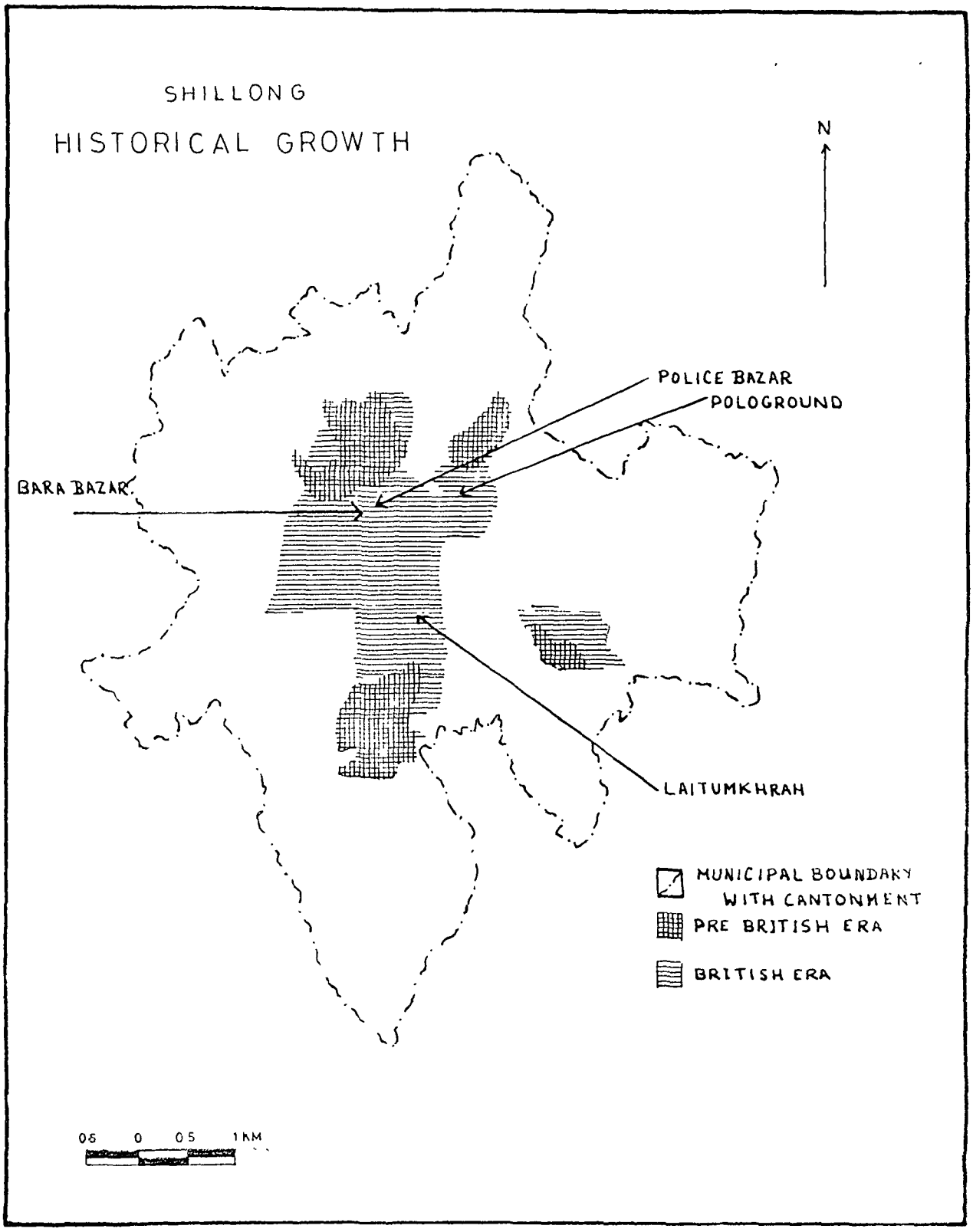
SHILLONG
HISTORICAL GROWTH
N
POLICE BAZAR
POLOGROUND
BARA BAZAR
LAITUMKHRAH
MUNICIPAL BOUNDARY
WITH CANTONMENT
PRE BRITISH ERA
BRITISH ERA
0.5 0 0.5 1 KM

FIG 3

i) Colonial period, and

ii) Post Independence period.

COLONIAL PERIOD: It has already been discussed that Shillong was a mere village during pre-colonial period. The growth of Shillong can be traced back to the acquisition of the Diwani of Bengal by East India Company in 1765 AD[3] and Yandaboo Treaty in 1826 AD[4] by which Shillong plateau and Khasi and Jaintia hills came under the British rule. Britishers selected Cherrapunji for sanitorium and cantonment for the British Military in 1829. But due to inclement weather condition of the place and due to lack of water supply facilities, Shillong was opted in 1834 abolishing Cherrapunji as the capital. Shillong was opted because of its central location with the advantage of military post and civil station and easy access. Under the guidance of Captain Rowlatt Civil Assistance Commissioner of the Khasi Hills, a place near 'Iewduh' was selected and renamed Shillong. The district headquarters of the Khasi and Jaintia hills were transferred to Shillong from Cherrapunji in 1863. However, shifting was completed in 1866.

Thus the growth of Shillong started with the establishment of military posts by Britishers in and around 'Iewduh' or present Barabazar. Establishment of Cantonment led to the incorporation of surrounding areas to be used for residential purposes by the persons serving in these military

3. Govt.of Meghalaya Report

4. Govt.of Meghalaya Report

post. The bungalows of the European Officers were clustered on a particular area known as "European Quarter". Construction of many buildings started during this period(1864-1865) at Cutchery to be used for official purposes. Even residential buildings started clustering up near Laban so taking into consideration all these developments, Shillong was constituted into a Municipal Station in November 1878 with only three wards, British Shillong, Laban and Mawkhar. Villages of Laban and Mawkhar were included in the station as the sanitary improvement of the town was impossible without them. The boundaries of Shillong were for the first time notified in 1896[5].

In 1905, a new province of Eastern Bengal and Assam was created and Dacca was made its capital, Shillong was made its summer capital[6]. Thus it continued to receive waves of human migration which contributed to its growth. The town was at that time divided into five wards(1904) -

1. European quarter
2. Jailroad
3. Laban
4. Police Bazar
5. Mawkhar

---

5. J.P.Singh;(1980) op.cit.
6. Shillong was the capital of Assam since 1874 till 1905; however, between 1905 to 1911, it ceased to be capital of the province, which was joined in East Bengal. After 1912, it continued as capital of Assam till the creation of the new state of Meghalaya.

Due to the seperation of Assam from East Bengal, Shillong was made provincial headquarters of Assam in 1912, encouraging the establishment of many administrative offices and leading to immigration of people from plains either in hunt for jobs, or because of their business enterprises.

In 1910, Municipal boundaries were further extended. Laitumkhrah, Malki and Mawprem were constituted into new wards of Municipality and Mawkhar was split in Jaiaw and Mission Compound and Quallapatty and southern Mawkhar[7]. Then there were altogether 10 wards.

I Laitumkhrah

II European Quarter

III Jailroad and Haveng Umkhrah

IV Police Bazar

V Mawkhar

VI Mission Compound and Jaiaw

VII Quallapatty and Southern Mawkhar

VIII Jhaluparaand Mawprem

IX Laban

X Malki[8]

The boundaries of Shillong Municipality was revised and new boundary in 1914 was fixed as:

---

7. V.V.Rao., "A Profile of Shillong Municipality Board" From the cultural profile of Shillong, Calcutta.

8. Umasaday Bhattacharya op.cit.,p.37

East : Village Laitumkhrah

West : Cantonment and village Mawkhar

South: Village Malki,Government forest and village.

North: The Umkhrah river from its junction with Pandngiem stream down the Polo bridge and in a straight line to a pillar in the north of Haveng Umkhrah and then to another straight line to a point in the Umkhrah river where the path from Mawkhar to Mawlai crosses it.

In 1929 there were eleven wards of the Municipality. Three in the so called British area and eight in the native or non British Syiemship area. The British wards were:-

I European ward

II Police Bazar

III Jail road,

And the non British wards were -

IV Kenches trace

V Laitumkhrah

VI Malki

VII Mawkhar Proper

VIII Mawprem Jhalupara

IX Mission Compound and Jaiaw

X S.E.Mawkhar and Garikhana, and

XI Laban.

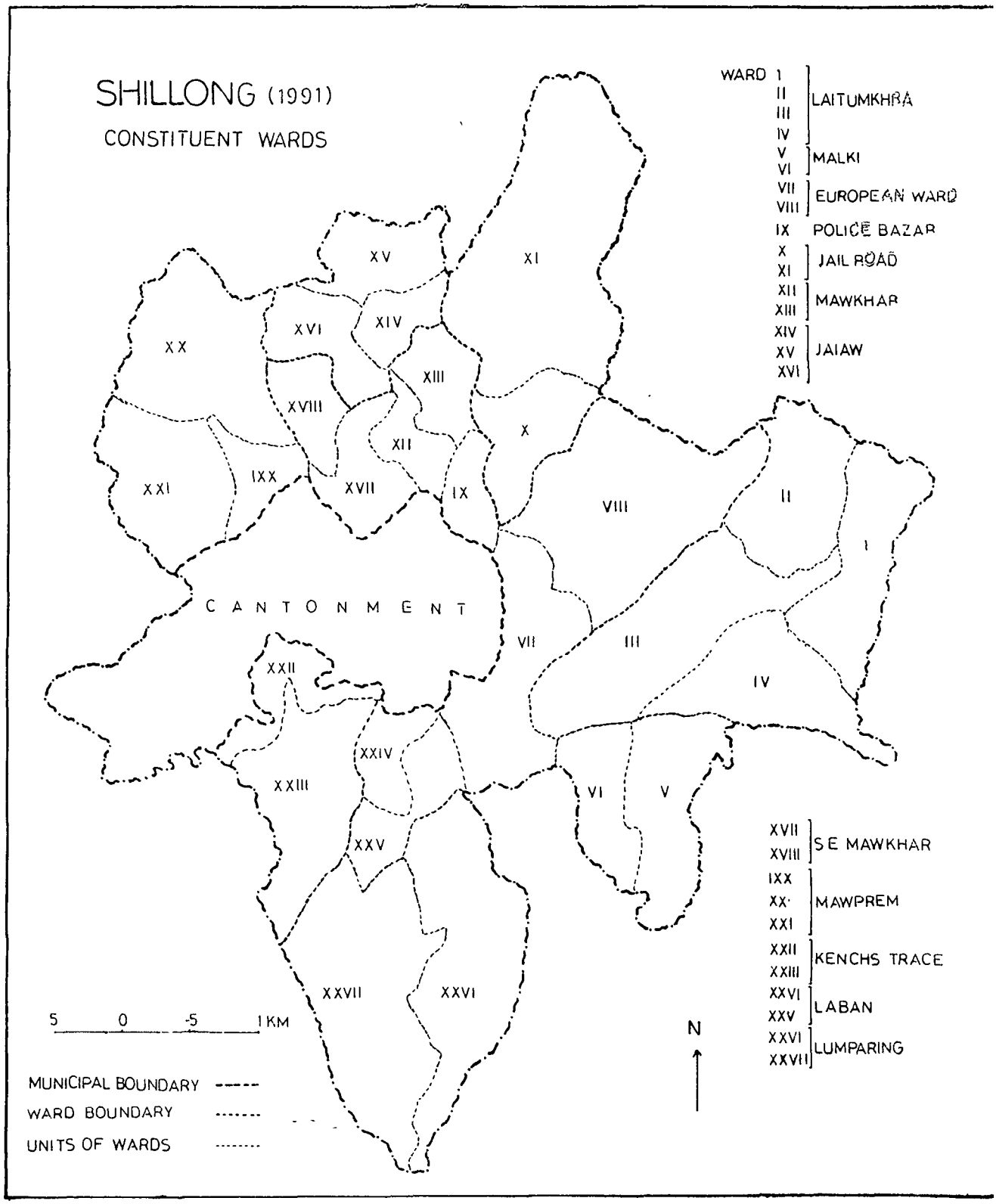
SHILLONG (1991)
CONSTITUENT WARDS
WARD 1
II
III
IV
LAITUMKHRA
V
VI
MALKI
VII
VIII
EUROPEAN WARD
IX POLICE BAZAR
X
XI
JAIL ROAD
XII
XIII
MAWKHAR
XIV
XV
XVI
JAIAW
XVII
XVIII
SE MAWKHAR
IXX
XX
XXI
MAWPREM
XXII
XXIII
KENCHS TRACE
XXVI
XXV
LABAN
XXVI
XXVII
LUMPARING
CANTONMENT
5 0 5 1KM
N
MUNICIPAL BOUNDARY
WARD BOUNDARY
UNITS OF WARDS

FIG 4

In 1931, Laban was split into Laban and Lumparing cum Madan Laban. Since 1931 the Shillong Municipality has not added any new ward (vide map no.4).

POST INDEPENDENCE PERIOD: A new thrust in horizontal and vertical expansion was experienced by Shillong after independence due to large inmigration. Under the circumstances expansion of residential buildings and administrative building were of urgent necessity and for this purpose, vacant lands in Laitumkhrah, Laban, Malki were occupied.

The Municipality did not provide enough scope for residential colonies to be developed and the town began to grow outside the Municipality limit.

Till 1951 Shillong consisted of cantonment and municipality with 12 sq.kms of area. By 1961 Nongthymmai and Mawlai developed urban characteristics and became integral part of Shillong urban agglomeration.

The concept of urban agglomeration has been brought out in 1971 census. The urban agglomeration made up of main town with the adjacent areas of urban growth was treated as the urban spread, the population covered by such spread being categorised as 'urban'[9]. An urban agglomeration should be constituted of a town and its adjoining urban out growth or two or more physically contiguous towns together with continuous and well organised urban growth.

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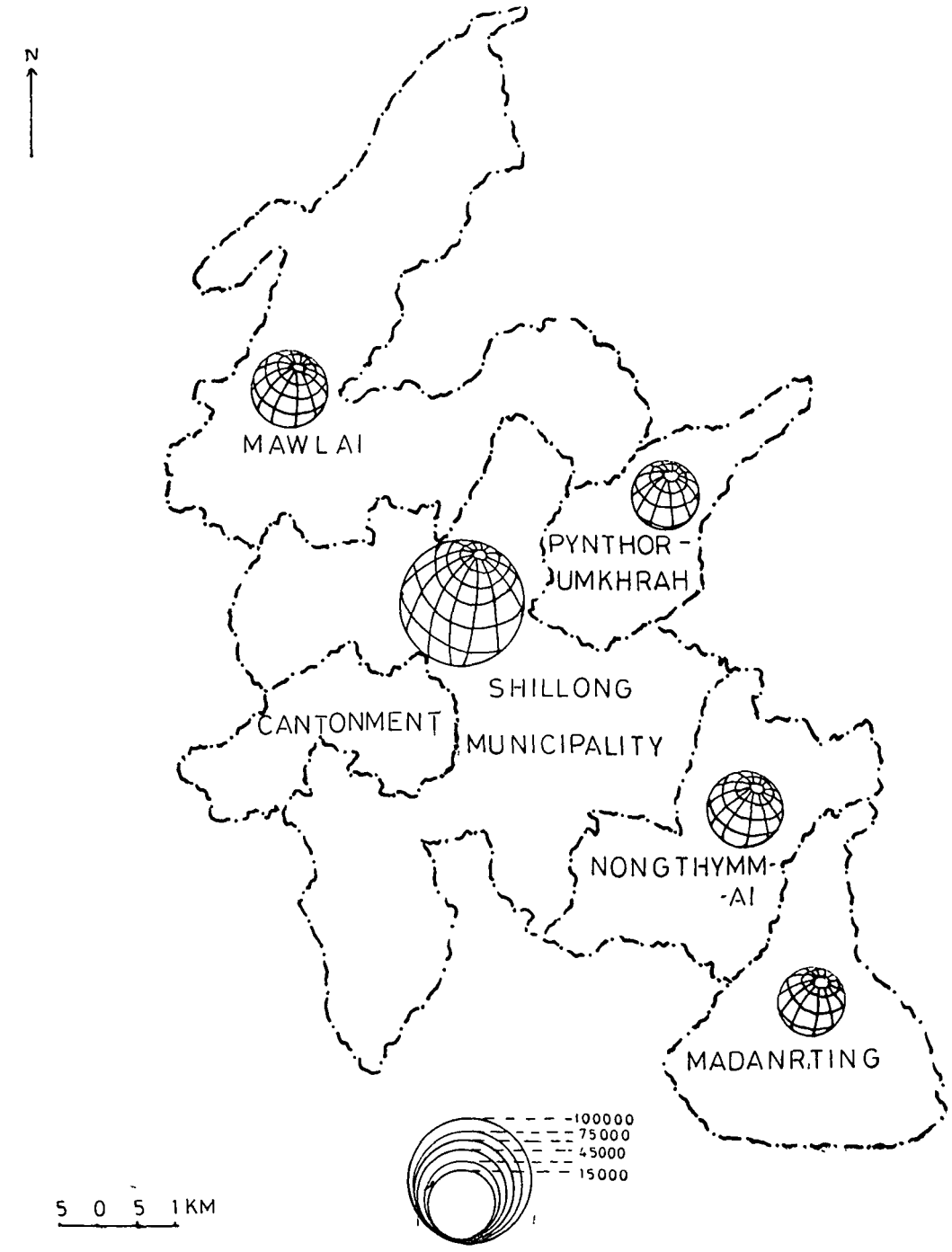
9. Census of India, 1981, Series XIV, Meghalaya Part II A & B.

1991

SHILLONG URBAN AGGLOMERATION

TOWN AND CITY SIZE



SOURCE - CENSUS OF INDIA

FIG 5

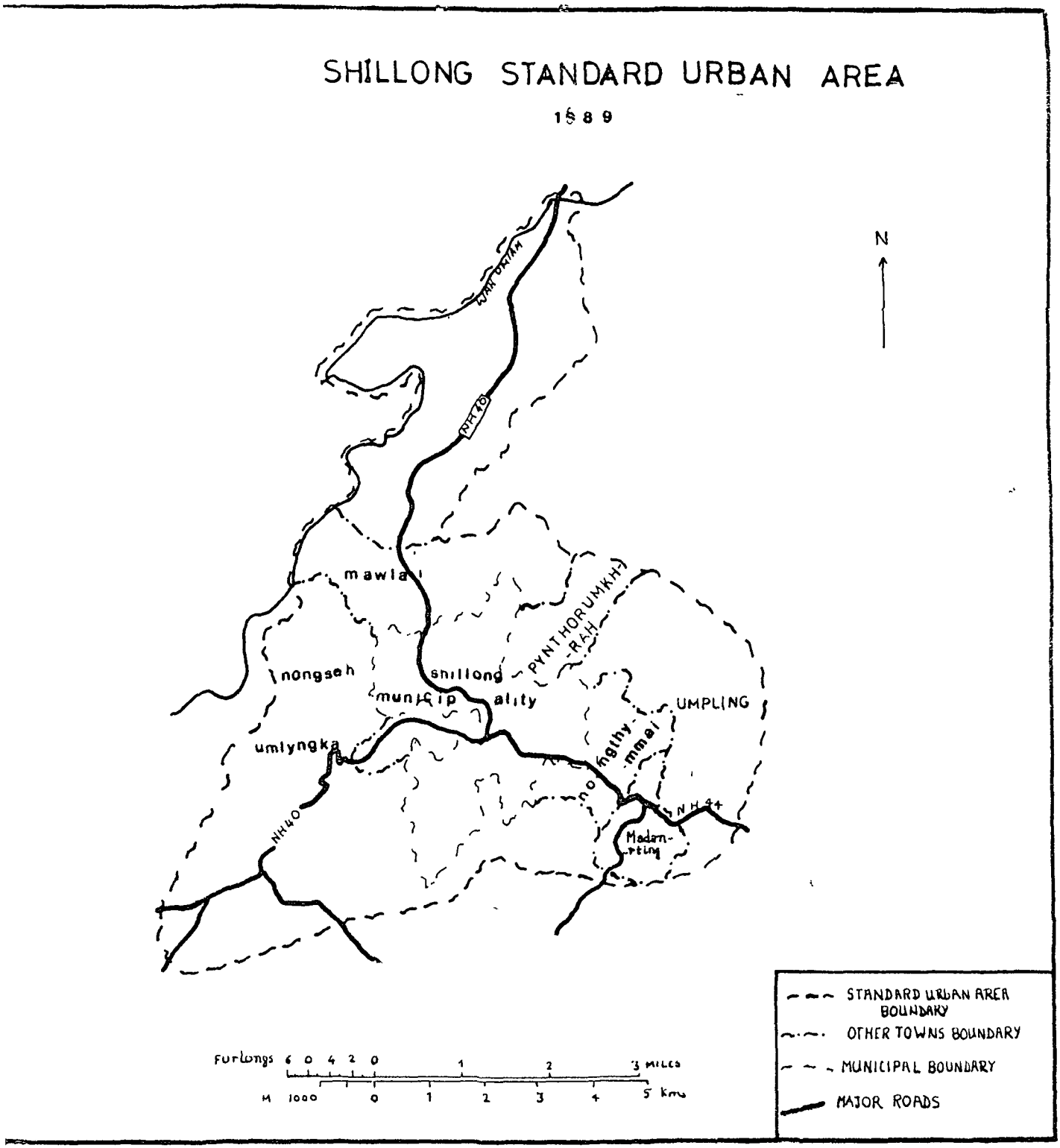

SHILLONG STANDARD URBAN AREA
1989
N
NH40
mawlai
nongsah
shillong municipality
PYNTHORUMKHRAH
UMPLING
umlyngka
kgithymmai
NH44
Madanriting
Furlongs 6 0 4 2 0 1 2 3 MILES
M 1000 0 1 2 3 4 5 kms
STANDARD URBAN AREA BOUNDARY
OTHER TOWNS BOUNDARY
MUNICIPAL BOUNDARY
MAJOR ROADS

FIG 6

In 1970 in Assam capital was shifted to Dispur Shillong remained as the capital of newly created state of Meghalaya. This gave impetus to the establishment of many more government offices along with other services.

Since 1981, two other towns have also been amalgamated in Shillong agglomeration. These are Madanrting and Pythorumkhrah (vide fig.No.5).

Today Shillong standard urban area which can be defined as the projected growth area of a city or town as it would be in near future taking into consideration not only the town and village but intervening areas which are potentially urban including Umlyngka, Happy Valley, Upper Shillong, Nongkseh, Low Sohtun and a few nearby villages. These places are rapidly growing around urban Shillong. They have considerably developed sub-urban characteristics.

GROWTH IN POPULATION

Shillong town is an overgrown village. The population of Shillong has increased at a rapid pace leading to acquisition of new settlements under urban areas. Similarly, the share of workers in traditional non primary occupations has declined to a great extent adding more to their existing urban characteristics(vide Fig.No.18).

SHILLONG URBAN AGGLOMERATION

POPULATION GROWTH

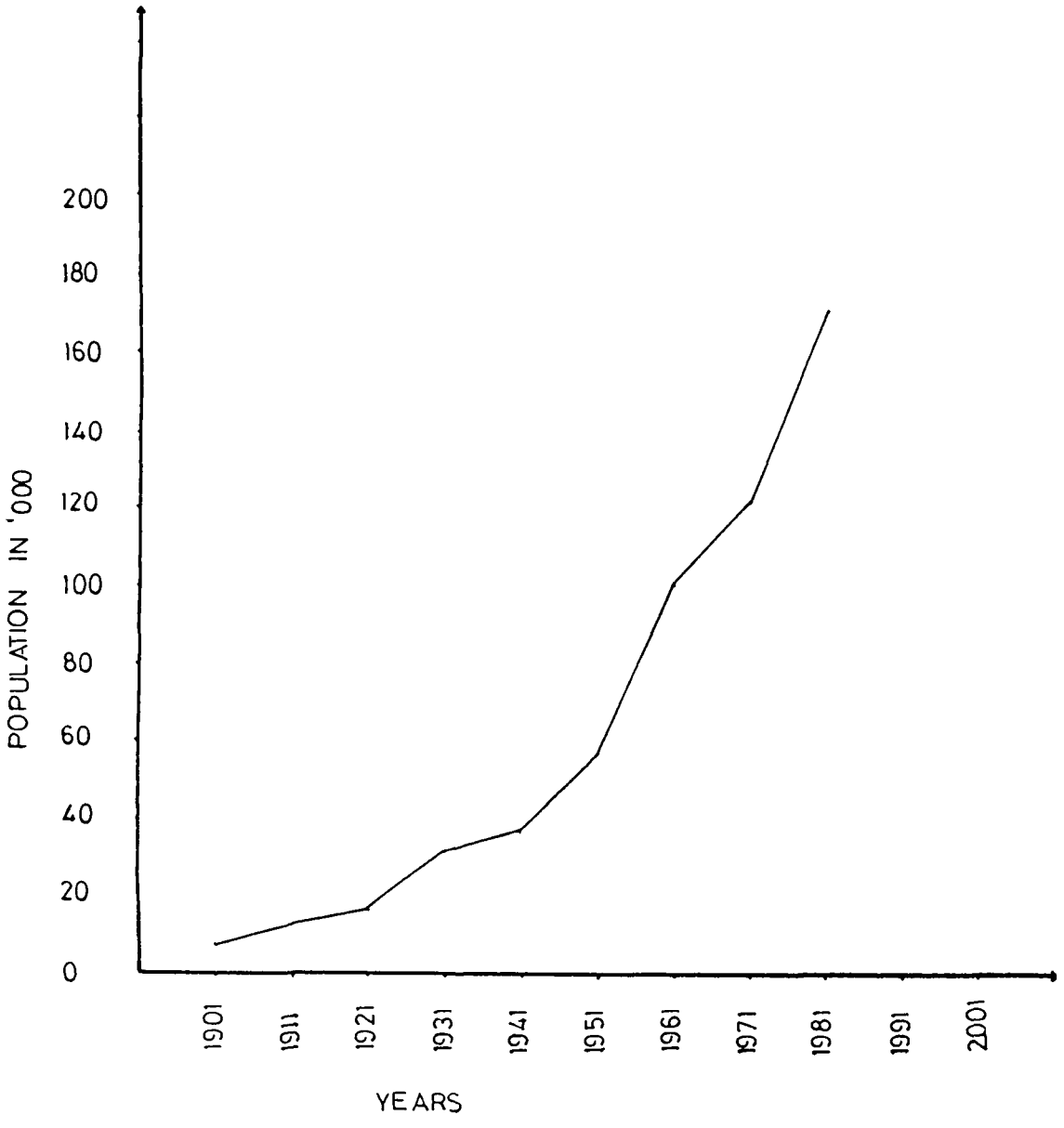


FIG 7

The following table shows the population of Shillong. Prior to 1871, no attempt have been made to prepare population census in whole of Khasi and Jaintia hills.

Table No.1

Shillong - Population Growth

Years	Population	Decadal variation	Decadal Percentage
1881	4288	-	-
1891	6720	2432	+56.76
1901	9621	2901	+43.17
1911	13636	2018	+41.76
1921	17203	4015	+26.13
1931	26536	6333	+54.25
1941	38192	11656	+43.93
1951	58512	20320	+53.20
1961	103398	43886	+75.00
1971	122752	20354	+19.88
1981	175180	52428	+42.71
1991	214595	39415	+22.49

Source : i) Census of India, 1981, Assam Vol.II

ii) Census of India, 1971, Meghalaya Part II-A

iii) Census of India 1981, Meghalaya Part I of 1981 Provisional Population table.

The above table(No.1) and Fig.(No.7) reveal a tremendous growth in the population of the town all these

years. The population has increased many times on account of the ever expanding administrative machinery both central and state. The population is bound to show a steady rate of increase in future also. Shillong was a Class V town in 1901, Class III town in 1931 and 1941, a Class II town in 1951. From 1961, it became Class I town.

From the table, it is evident that Shillong has experienced rapid initial growth followed by a relative trough growth period(1901-21) and then a period of high growth (1931 onwards). Only during 1971-81 decade has the growth been low; during this period the population of Shillong increased at a low rate mainly due to the shifting of capital of Assam to Dispur. The growth during the last decade took place largely during the latter half as noted earlier and in effect decadal variation is higher.

The growth of population in early years may be attributed to-

a) Natural growth and,

b) Immigration from surrounding rural areas as well as from distant places including interstate migration.

Immigration was on account of various employment and business facilities. Widening educational scope and developmental and construction work also created more job facilities and thereby population increase continued at high rate[10].

10.K.D Shah.,The Study of Community wise distribution and growth of population in Shillong,"Cultural Profile of Shillong"

Also expansion of the existing departments and opening up of new ones led to an increased inflow of people from the Brahmaputra valley and other states. High inflow of refuges mainly Hindus from erstwhile East Pakistan is also responsible for high post independence growth of population.

Inmigration into Shillong could be of two types-

i) One is augumented by migration stream from the immediate hinterland of Shillong, and

ii) the other is the migration stream from distance place of inter-state migration[11].

Considering the traditional agricultural tribal surrounding, the probable fact is that first stream is not as significant asthe second.

However, it should be noted that constitutional safeguard has been provided to the schedule tribes of the area in sixth schedule of the constitution in employment opportunities in white collor job. So it can be assumed that large stream of inmigration usually consists of unskilled or semi skilled labourers.

Table No.2 shows the projected populations for 1991 and 2001 for the Shillong Urban Agglomeration and its constituent units, based on the 1971-81 growth rates.

---

11. A.C.Mohapatra., "Infrastructural constraints on urban development in Hill and Tribal areas on N.E.India", 1984.

Table 2

Projected Population of Shillong Urban Agglomeration

Agglomeration/ Town/City	Area in Sq.Km	Popula- tion 1971	Density (Sq.Km)	Popula- tion 1981	Density (Sq.Km)	Popula- tion 1991	Density (Sq.Km)	Population 2001	Density (Sq.Km)
Shillong Urban Agglomeration	24.40	122752	4833	174703	6878	248637	9789	353,860	13931
Shillong Municipality	10.36	87659	8461	109244	10545	136140	13141	169658	16376
Cantonment	1.84	4730	2571	6620	3598	9265	5035	12967	7047
Nongthymmai	2.93	16103	5496	21558	7358	28865	9851	38640	13188
Mawlai	6.14	14260	7059	20405	3323	29197	4771	41778	6804
Madanrting	2.11	-	-	6165	2922	8773	4158	12486	5918
Pynthorumkhrah	2.02	-	-	10711	5302	15243	7546	21694	10740

Sources : District Census Handbook, East Khasi Hills District, Census of India,(The 1991 and 2001 projections are based on the 1971-81 growth rates).

Analysing the population of various towns of Shillong urban agglomeration, it can clearly be noticed that Shillong Municipality accounts for more than 60 percent of total population (vide table No.2). High percentage share of population in Shillong Municipality is attributed to the availability of various facilities. Nongthymmai accounts for 12.8 percent and Mawlai 11.5 percent. Pynthorumkhrah and Madanrting were added in 1981 in Shillong Urban agglomeration. They account for 6.1 and 3.5 percent respectively. Shillong cantonment has always been kept out of Shillong Municipality. It account for 3.8 percent of total population of Shillong urban agglomeration. Thus Shillong municipality is the most densely populated part of Shillong urban agglomeration.

It has also been found out that city population density declines exponentially away from the city centre towards other towns. Here an attempt has been made to illustrate change in population density gradient. A density distance scattergraph and a regression line has been plotted to detect the change in the scatter of points(Vide Fig.No.8). The rate of decline of population density with distance is measured by the slope of line which is denoted by the letter 'b' (this can be thought astangent of the angle θ). The larger is b, the steeper is the city population density gradient. Usually 'b' is greater in the early stage of city growth than in later stages[12]. The 'a' describes position of the line on

12. Hugget and Meyer.,"Settlements" Geography: Theory in Practice Book one, 1981.

the graph by giving the point at which it cuts the Y-axis.

Table No.3

Towns	Distance from Shillong town(x)	Population Density per/Km (y)	(x-x)	(y-y)	$(x-x)^2$	$(y-y)^2$	$(x-\bar{x})$ $(y-\bar{y})$
Shillong Municipality	0	10545	-2.5	5037	6.25	25371369	-12592.5
Shillong Cantonment	2	3598	0	-1910	0	3648100	0
Nongthymmai	3	7358	1	1850	1	3422500	1850
Mawlai	2	3323	0	-2185	0	4774225	0
Madanrting	5	2922	3	-2586	9	6687396	-7758
Pynthorumkhrah	3	5302	1	-206	1	42436	-206

Source : Census of Meghalaya, 1981.

Slope of Regression line

$$b=\frac{\Sigma(x-\bar{x})\ (y-\bar{y})}{\Sigma(x-x)^2} = \frac{-18751.5}{17.25} = -1087.04$$

which means that for every Km increase away from the Shillong Municipality population decreases by 1087.04 persons per km.

To draw the regression line the value of population density at the city must be found that is 'a'. This is given by the equation -

POPULATION DENSITY GRADIENT

SHILLONG URBAN AGGLOMERATION

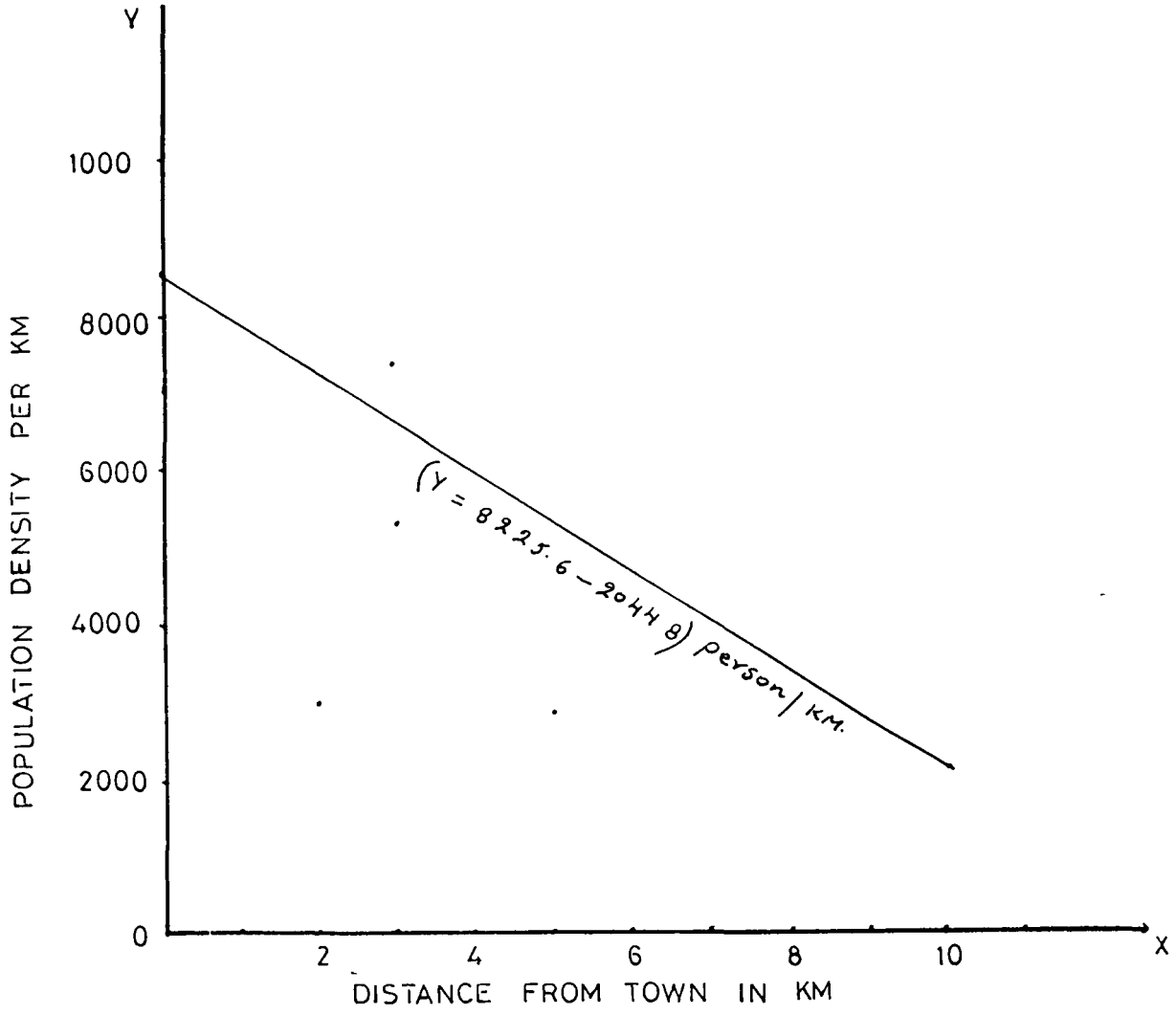


FIG 8

$a = \bar{y} - b\bar{x}$

$= 5508 + 1087.04 \times 2.5$

$= 8225.6$ persons per Km.

In other words when x=0, then y is 8225.6 persons or population density at city centre is 8225.6 per sq.km. Now to substitute the value of 'a' in the equation of the regression line, y=a+bx which is y=8825.6+ (-1087.04x). In order to draw the Regression line i.e., when x=10,

$y = 8825.6 - (1087.04 \times 10)$

$= 8825.6 - 10870.4$

= 2044.8 per sq.km (At a distance of 10 Km from the city centre population density is 1044.8 persons per sq.Km.

In Shillong Municipality few pockets of population concentration can be noticed from the table(No.4). High density of Police Bazar, Mawkhar and S.E.Mawkhay is mainly due to the high concentration of commercial activities whereas Laban and Jailroad is residential areas. Wardwise picture of population density and changes in them can clearly be seen from Fig.No.9, 10 and 11. Growth of population in Municipality has been shown in fig.No.12

Table No.4

Ward-Wise Population Projection of Shillong Municipality

Ward	Area in Sq. Km.	Total Population 1971	Density (Sq.Km)	Population 1981	Density (Sq.Km)	Population 1991	Density (Sq.Km)	Population 2001	Density (Sq.Km)
Laitumkhrah	1.87	11,726	6,271	15,620	8,353	20,807	11,127	27,717	14,822
European Ward	1.50	5,626	3,752	8,804	2,501	10,277	6,851	13,890	9,260
Police Bazar	0.10	3,141	31,410	7,604	76,040	3,276*	32,760	4,082*	40,820
Jailroad	1.42	5,371	3,782	2,629	1,851	12,626	8,892	19,385	13,632
Mawkhar	0.31	8,800	28,387	8,235	26,565	11,052*	35,652	15,762*	50,845
Jaiaw	0.57	8,991	15,774	8,869	15,560	11,587	19,978	13,154	22,679
S.E. Mawkhar	0.29	7,060	21,345	10,207	35,197	10,352	35,697	12,535	43,224
Mawprem	1.09	13,113	12,030	8,549	7,843	25,839	23,705	36,270	33,275
Kench's Trace	0.67	3,659	5,461	18,408	27,475	10,730	16,015	18,374	27,424
Laban	0.34	5,882	17,300	6,266	1,843	7,356*	21,635	10,491*	30,856
Lumparing	1.60	7,334	4,584	5,903	3,689	9,057	5,661	10,065	6,290
Malki	0.60	6,956	11,593	8,150	13,583	11,170	18,617	14,138	23,563

* Based on average growth rate of Shillong Municipality.

Source : Based on 1971 and 1981 data from Municipality and 2001 data compiled by Researchers.

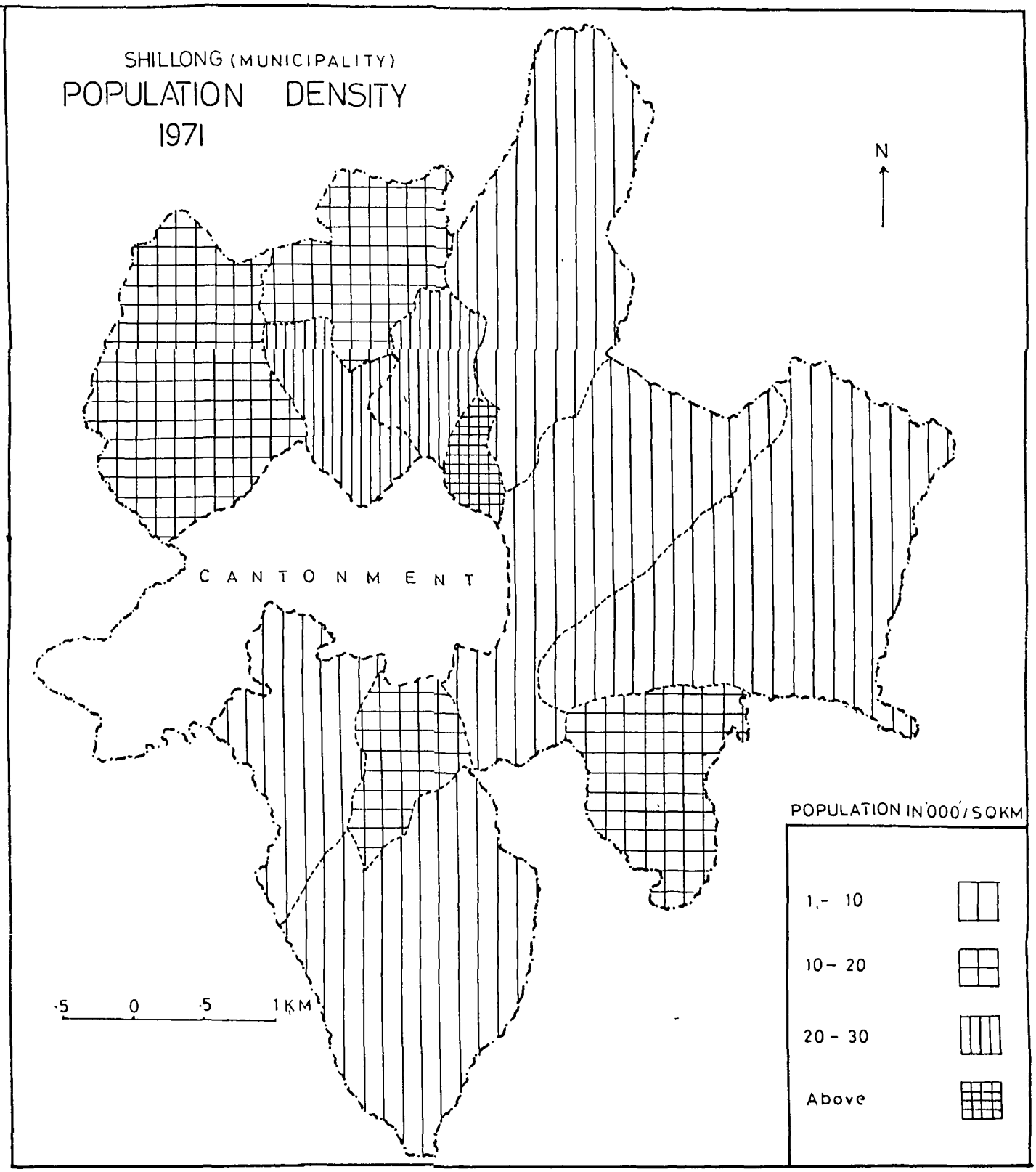

SHILLONG (MUNICIPALITY)
POPULATION DENSITY
1971
N
CANTONMENT
·5 0 ·5 1 KM
POPULATION IN '000'/SQKM
1.- 10
10 - 20
20 - 30
Above

FIG 9

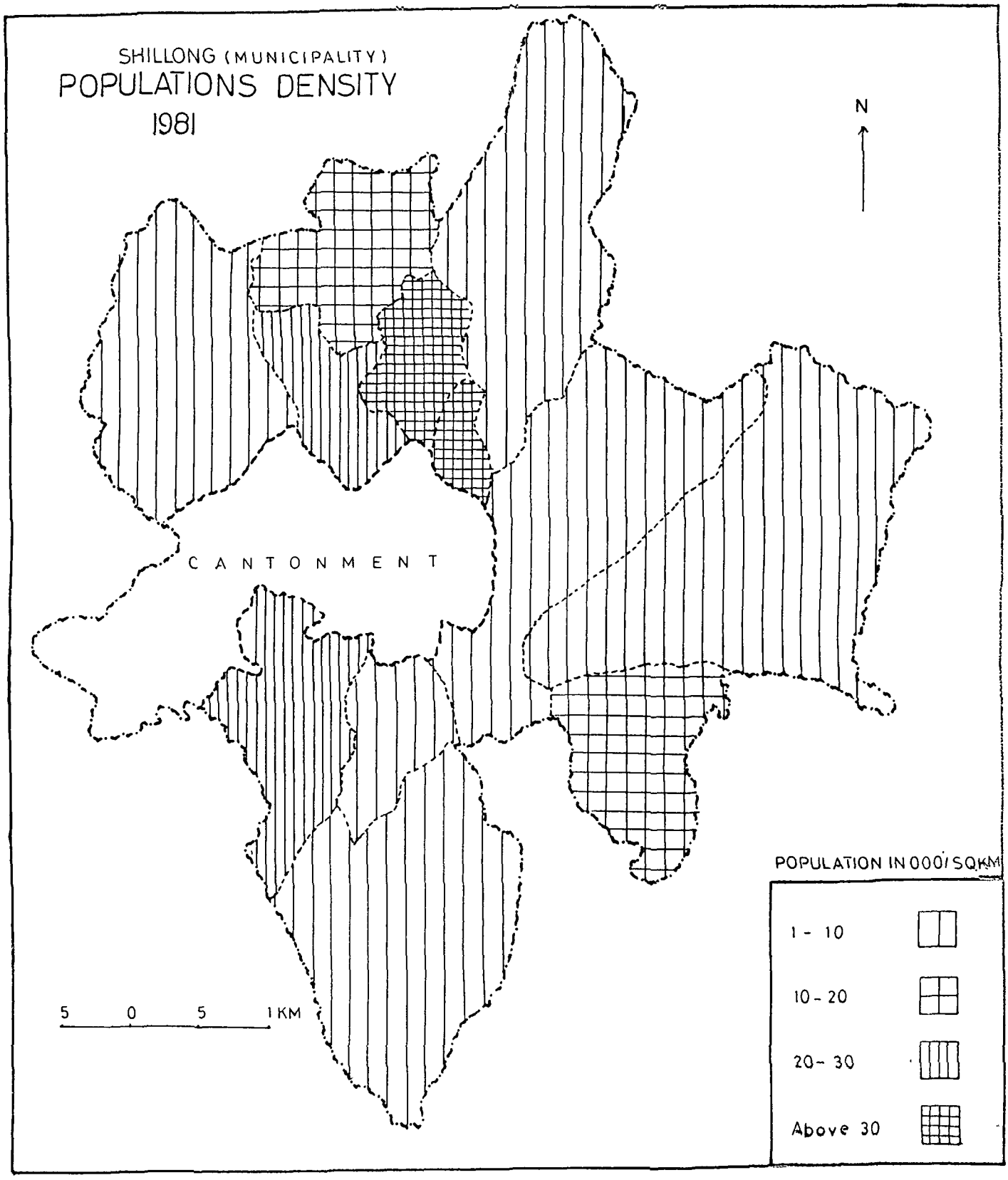

SHILLONG (MUNICIPALITY)
POPULATIONS DENSITY
1981
N
CANTONMENT
5 0 5 1KM
POPULATION IN 000/SQKM
1 - 10
10 - 20
20 - 30
Above 30

FIG 10

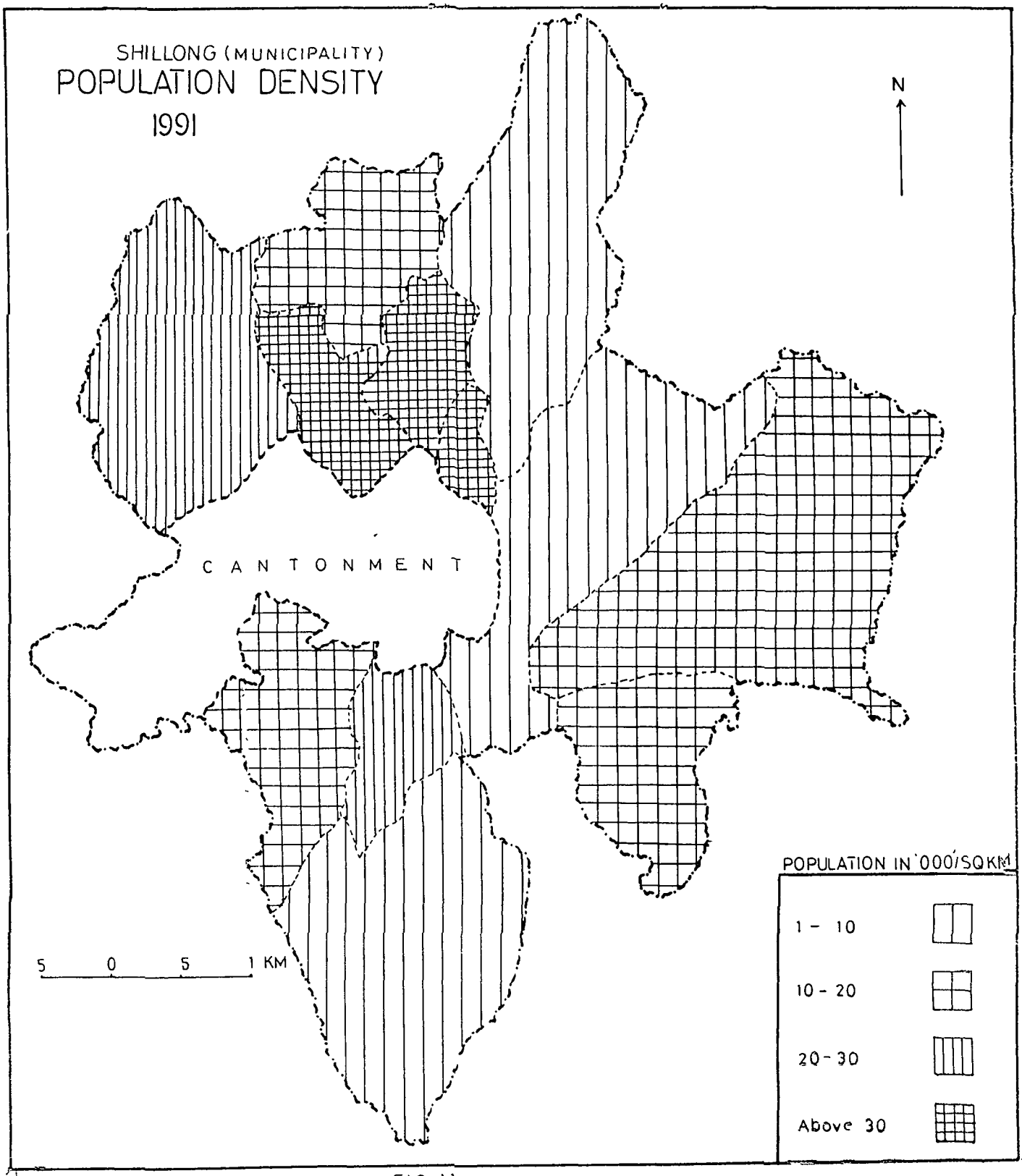

SHILLONG (MUNICIPALITY)
POPULATION DENSITY
1991
N
CANTONMENT
5 0 5 1 KM
POPULATION IN '000/SQKM
1 - 10
10 - 20
20 - 30
Above 30

FIG 11

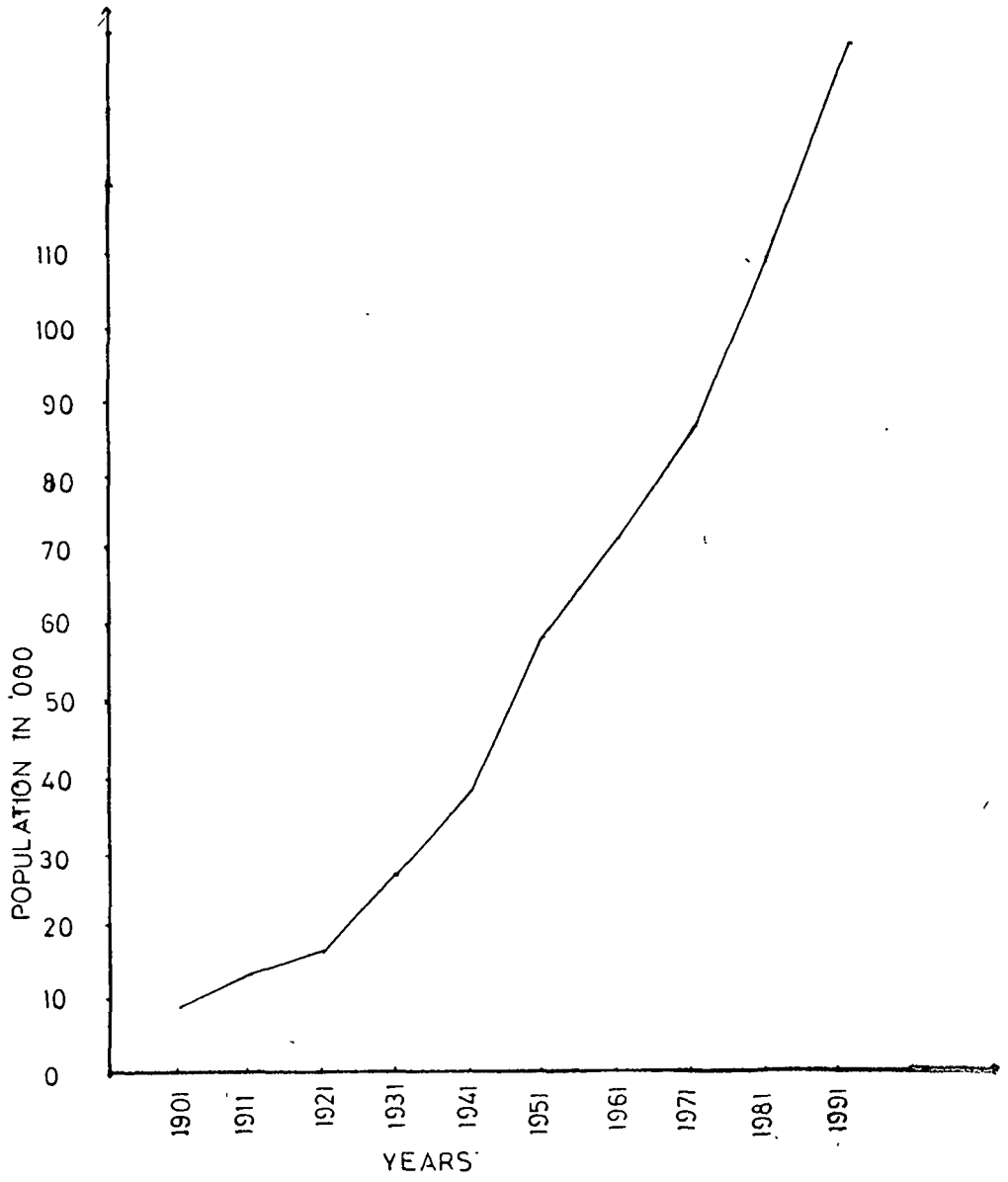

POPULATION GROWTH
SHILLONG (MUNICIPALITY)
POPULATION IN '000
0
10
20
30
40
50
60
70
80
90
100
110
1901
1911
1921
1931
1941
1951
1961
1971
1981
1991
YEARS

FIG 12.

2.2 CONCEPTUAL FRAMEWORK -(Growth Model):

The modern city is a dynamic organism constantly in process of evolution. The internal pattern of landuses and functions within the cities and metropolitan areas: the nature, extent, location and inter-relations of various types of establishments which together form the physical and functional pattern of cities have been of major concern to the geographers. Geographers are concerned with past, present and future urban patterns, and with the operation of functions which rely on support. The growth of any city or urban areas is due to the supporting base[13].

The support of cities as suppliers of urban services for the earth can be of three type, each of which presents a factor of urban causation[14]:

1. Cities perform comprehensive services for its surrounding areas. Through modern mechanisation, city should examine its surrounding area to take advantage of the changes such as newly discovered resources or crops.

2. Transport system of cities which encourage break-of-bulk and allied services along transport routes, supported by areas which may be remote in distance but close in connection because of city's strategic location on transport channels. Transport system also provides support in order to adjust properly to new or changed facilities.

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13. Harold M., Mayour and Clyde F.Kohn; (1969) op.cit.
14. Edward Ullman; (1945) op.cit.

3. Specialized function of cities performing one service such as mining, manufacturing or recreation for large areas, also act as important support for cities growth. Since the principal localising factor is often a particular resource such as coal, water, power or a beach such city benefits from technological advances.

The decision making process and support base shapes and changes the spatial pattern of any city or urban area. The pattern of any city is unique to which it is put. Most of the land of the city is devoted to fulfilling one or more functions or types of utilization. Sometimes the use made of land is intensive for example commercial land with many users per acre and other times the use made of urban land might be extensive for example recreational land with fewer users per acre, but in any case the land is satisfying some need for the urban residents. The forces underlying the pattern of landuse can be appreciated if attention is focussed on these generalisations of arrangement.

These models of arrangement as forwarded by different geographers at different point of time for different cities help us in understanding the landuse pattern of cities in general. As these models were developed at different time, criticisms and modifications were subsequently made. Concentric zone model which was developed by E.W.Burgess in 1925 was applied to many cities and later criticised by various

geographers. In 1939, Homer Hoyt came up with the sector model which was again tested on many cities and criticised by various geographers. In 1945, Harris and Ullman developed Multiple Nuclei Model. Gradient model and Social Area Analysis by Eshref Shevky was also introduced at later stages.

Many urgan geographers are coming up with different concept to analyse or to explain the growth and structure of cities.

I CONCENTRIC ZONE MODEL

This was developed by E.W.Burgess in 1925. Land-use pattern in this model is shown by several concentric zones of undetermined width. The model represents the outward growth of the city from the core area in a wave like fashion, which spreads aut more or less consistently in all directions. The model also explains the role of ecological processes like invasion, succession and filteration to design the functional zonation of the city structure. The model also takes into consideration the land value, accessibility and socio-economic status of the city residents which varies directly with distance from the city centre in a concentric form[15]. The various concentric zones are-

1) Central Business District

2) The zone in transition.

---

15. E.W.Burgess;(1925), op.cit.

3) The zone of independent worker

4) The zone of better residents

5) The commuters zone.

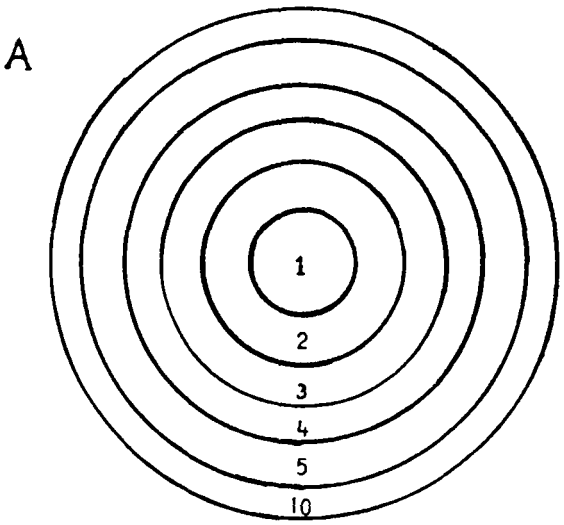
1) Central Business District; This zone is the focus of commercial social and civic life and of transportation. It is the down town retail districts, smart shops,office buildings,clubs, banks, hotels, threatres, museums and organisation headquarter. Encircling the downtown retail district is the wholesale business district(vide Fig.No. 13).

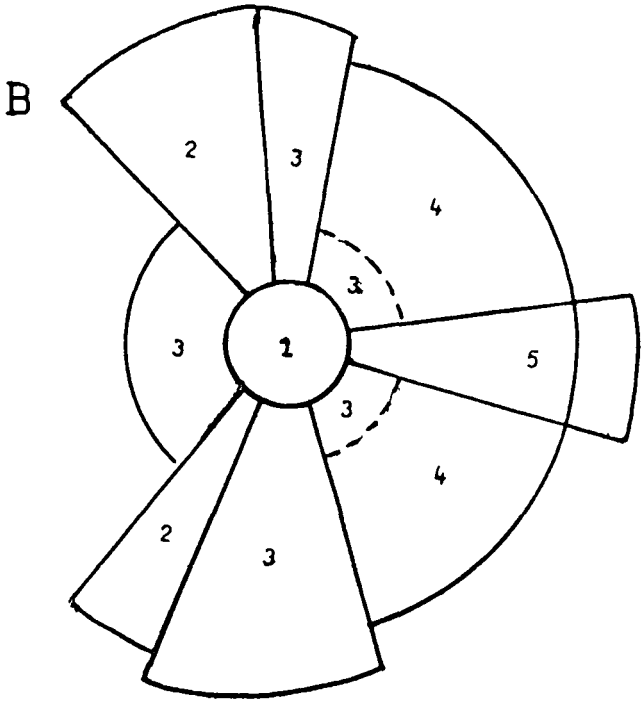
2) The zone in transition: This zone is of residential deterioration, business and light manufacturing. In this zone are the principal slums, with their submerged regions of poverty, degradation and desease and their underworlds of vice.

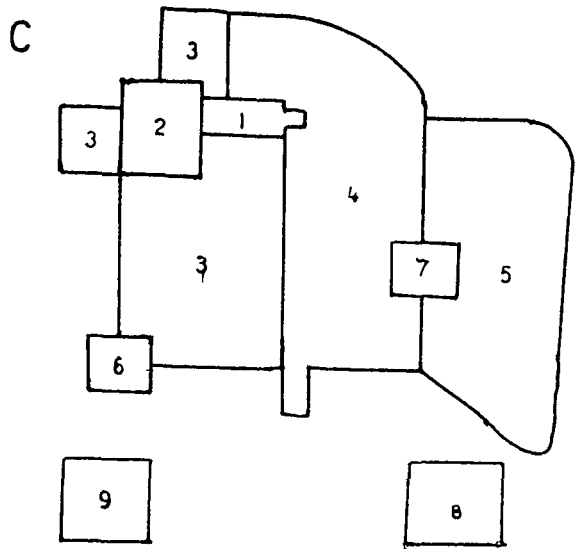
3) The zone of independent worker(Industrial) house: This zone is inhabited by industrial workers who have escaped from the zone in transition but who desire to live within easy access of their work.

4) The zone of better residences: High class apartment buildings or of exclusive residential buildings are the characteristic of this zone. These residences are made up of single family dwellings.

URBAN LANDUSE MODELS







1 CBD
2 WHOLE SALE LIGHT MANUFACTURING
3 LOW CLASS RESIDENTIAL
4 MEDIUM CLASS RESIDENTIAL
5 HIGH CLASS RESIDENTIAL
6 HEAVY MANUFACTURING
7 OUTLYING BUSINESS
8 RESIDENTIAL SUBURB
9 INDUSTRIAL SUBURB
10 COMMUTER'S ZONE

A. Concentric B. Sector C. Multiple Nuclei

FIG 13C

5) The Commuters zone: Often beyond the city limits in sub-urban areas or in satellite cities, this is a zone of spotty development of high class residences along line of rapid travel.

II THE SECTOR MODEL

This model was developed by Homer Hoyt[16] in 1939 according to which growth takes place along main transportation routes in a form of star-shape. It further states that growth along a particular axis of transportation usually consists of similar types of landuse. Similar types of landuse originate near the centre of the city and migrate outward towards the periphery. The critical elements of this model is high and low rent residential neighbourhoods. The five generalisation thus are-

1) The high rental areas are in every case located in one or more sectors on one side of the city.
2) The high rent areas extend in a wedge like fashion along radial roads from the city.
3) The intermediate rental areas fall just below the highest rental area and surrounds them on one side.
4) Intermediate rental areas lie on the periphery of the sectors of the city.
5) Low rental areas extend from centre to edges of the city settlement and are found in every city.

Thus according to Hoyt,the high rent residential neighbourhoods are basic in shaping urban landuse structure.

16. Homer Hoyt;(1939), op.cit.

III MULTIPLE NUCLEI MODEL

This model developed by Harris and Ullman[17] in 1945 states that there is not a single nucleus of the city but a number of seperate nuclei and landuse zones, which shapes the landuse pattern of the whole city. The number of nuclei results from the historical development, due to stimulated migration and specialization. The larger the city, the more numerous and specialized are the nuclei. The following districts however, are noticed.

1) The Central Business District: This district is the point of most convenient access from all parts of the city and the point of highest land values, the retail district, variety stores and Government buildings etc.

2) The wholesale and light manufacturing district: This district is conveniently within the city with its wholesaling and small scale manufacturing areas.

3) The heavy, industrial district: Normally at the outer edge of the city this zone is found as it requires good transportation either by rail, road or water.

4) The residential districts: Generally high class districts are likely to be on well drained high land and away from nuisances such as noise, smoke and railroad. Low class districts are likely to arise near factories and railroad district wherever located in the city.

17. Chaucy Harris and E.L.Ulman., "The Nature of cities," "Annals of the American Academy of Political and Social Science," 1945.

5) Minor nuclei or satellite or suburb: The rise of automobile and the improvement of certain suburban commuter rail lines in afew of the largest cities have stimulated sub-urbanisation. Satellite differ from suburbs in that they are seperated from the central city but are geared to those of the central city.

In this model, number of seperate nuclei and landuse zones based on them reflects a combination of four factors[18]-

i) certain activites require specialized facilities such as the retail district is attached to the point of maximum accessibility as the port district to a water front.

ii) certain alike activities cluster together because they profit from cohesion such as financial and office building district.

iii) certain unlike activities are detrimental to each other such as industrial and high rent residential districts.

iv) Certain activities are unable to afford the high rent of the most desirable site as bulk wholesaling and storage activities.

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18. H.M.Mayer and C.F.Kohn; (1969), op.cit.

This theory is the least structured of the three basic models. It does not include succession as an integral part as do the two previous theories but it does not allow for the areal growth of each of the zones and of the entire urban areas.

IV GRADIENT MODEL

Related to zonal and sectoral theory gradient analysis of generalising internal structure of cities focusses on regular and logical sequences or changes with distances from the city centre. However, application of gradient analysis had been made particularly to explain the density of population and has been use by Clark, Newling, Berry, Tennant, Brush, Korcelli, Pitts and David Thomas.

V SOCIAL AREA ANALYSIS

Eshref Shevky, for studying the internal structure of city have employed social-area- analysis. They stressed on the analysis of economic status, family status and ethnic status indexes to illustrate the concentric and sectoral nature of the city[19].

R.E.Dicknson(1951)[20] classified the internal morphology of western European cities in terms of historic centres of growth. The three concentric morphological zones are -

19. H.M.Mayer and C.F.Kohn;(1969), op.cit
20. R.E.Dicknson;(1944), op.cit

i) the central fully built up zone which is the core of the modern city.

ii) the compact and fully built middle zone that was erected mainly during the 19th century.

iii) the outer, partly built up zone in which urban and rural areas are mixed and to which urban areas have penetrated.

An attempt has been made in this study to relate the landuse with various growth models forwarded by various geographers as mentioned earlier.

As the internal structure of any city is unique in its particular combination of details[21]. In the city of Shillong also there is a degree underlying the mixed landuse pattern, which can be explained with certain modifications.

If we presume Police bazar where agglomeration of Assembly Hall, Secretariat, G.P.O.,C.T.O., Meghalaya Treasury, banking-financial institutions along with host of commercial activities as zone one or nuclei with characteristics of central Business District, it is certainly the heart of a city's commercial social and cultural life. In Shillong also, some of the characteristic of C.B.D. as -

i) high degree of accessibility

ii) high land value and,

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21. K.J.Chorley and P.Hagget, "Social Economic Models in Geography" Methuen and Co,Ltd. New Fetter Lane, London.

iii) relatively taller buildings etc. are noticed which act along with other centripetal forces as -

1) Site attraction

2) functional convenience

3) and functional magnetism.

Because of these characteristics, many functions have remained in or have gravitated to the central zone as they can be carried on more conveniently there. They in turn have attracted other functions which resulted in the concentration of functions here.

However, other concentric zones cannot be clearly defined which can be attributed to the physiography, altitude and drainage of the city.

Significance of transport route in the growth as emphasised in sectoral model can be noticed in Shillong also. The C.B.D. in Sectoral model as in concentric zonal model can be identified to the core. The National Highway No.40 and 44 which run through the heart of the city to Guwahati and to Jowai respectively have attracted not only small scale industries and wholesaling units as timber wood carriage, saw mill, wielding work etc. but retail shops, residences and institutions are also found along these main routes.

High, intermediate and low rental areas, however, are not found to be concentrated in definite sectors due to the physiographic constraint.

Due to high rent and non availability of space in central business nucleus and other centrifugal forces as high tax rate, traffic congestion, irksome legal restrictions and also physical constraints business and other activities startedgrowing in different nuclei of Shillong city like Laban bazar developed to cater to the needs of high and middle class residential area of Rilbong, Kenchestrace, Lumparing etc.

Laitumkhrah, another important nucleus developed with support of high and middle classresidential areas of Lachumiere, New Colony, Risa Colony, Motinagar etc. as well as educational institution situatedin and around Laitumkhrah.

Nongthymmai developed as a nucleus on the basis of a part of North Eastern Hill University located at Mayurbhanj Complex.

Another fast growing nuclei about 7 kms from Shillong city boundary can be noticed in Mawlai. Mawlai which was actually a village but now has developed as a contiguous urban area of Shillong city. Growth here, has been accelerated by the establishment of Permanent Campus of North Eastern Hill University, supported by the availability of space required for commercial, residential or other purposes.

As Shillongis not a industrial city like most of the other cities of India, the heavy industrial district which according to multiple nuclei model should be at the outer edge of the city, cannot be locatedin case of Shillong.

It can be mentioned here that original nuclei is being duplicated by other new nuclei. A hierarchy between nuclei can be noticed. As Bara bazar is normally opted for those things which we cannot get in Police bazar or Laitumkhrah or Nongthymmai. Thus a hierarchy of market centres have been well visualised.

2.3 GROWTH PROBLEMS:

In recent years, like any other urban centre, Shillong is also faced with increasing trend of urbanisation raising many basic problems for city planners. On the one hand, urban problems have become economically more real, Socially more visible and certainly politically more sensitive,on the other hand recent government initiatives in urban affairs have been largely implicit and indirect. Explicit urban policies generally represent direct extensions of a long standing government interest in two areas,regional economic development and urban landuse planning[22].

Existence of numerous bodies such as hill councils, town and country planning, Municipality etc. and virtually no co-ordination among them has resulted into haphazard growth of localities without any planned frame-work of development. The incoherent and unplanned growth hasresulted in congestion and inadequate infra-structural facilities as shortage of water supply, problem of waste disposal, water, air and noise pollution,sanitation and drainage problem causing several

22. L.S.Bourne.,"Urban System" Clarendon Press Oxford,1975.

environmental degradation. These utility systems are factors in landuse development. Some of these problems are discussed here.

1. PROBLEMS OF HOUSING: The rapid increased in activities within town has resulted in a growing demand for housing. It has been observed that most of the government offices, do not have sufficient living quarters of their own. The existing housing has been further strained for many government offices are located in private residential buildings. This accompanied with ever growing population has created acute shortage of housing. Due to the shortage of space several two-three storeyed residentialbuildings have been constructed as can be noticed in Dhankhei, Malki, Police bazar, Nongthymmai etc. Besides Multi-storeyed buildings which can accomodate more people in smaller space, many localities have come up in forest clearings, isolated places and steep slopes. In some places building activities have come up abutting the major roads of city.

A high rate ofurban growth coupled with the absence of proper legislation and building bye-laws have resulted in haphazard building growth and mushrooming of structures degrading the environmental condition. As regard legislation on regulation of building construction(only within Municipality limits of Shillong) the by-laws adapted and framed by the Shillong Municipality under Section 302 of Assam Municipal Act,

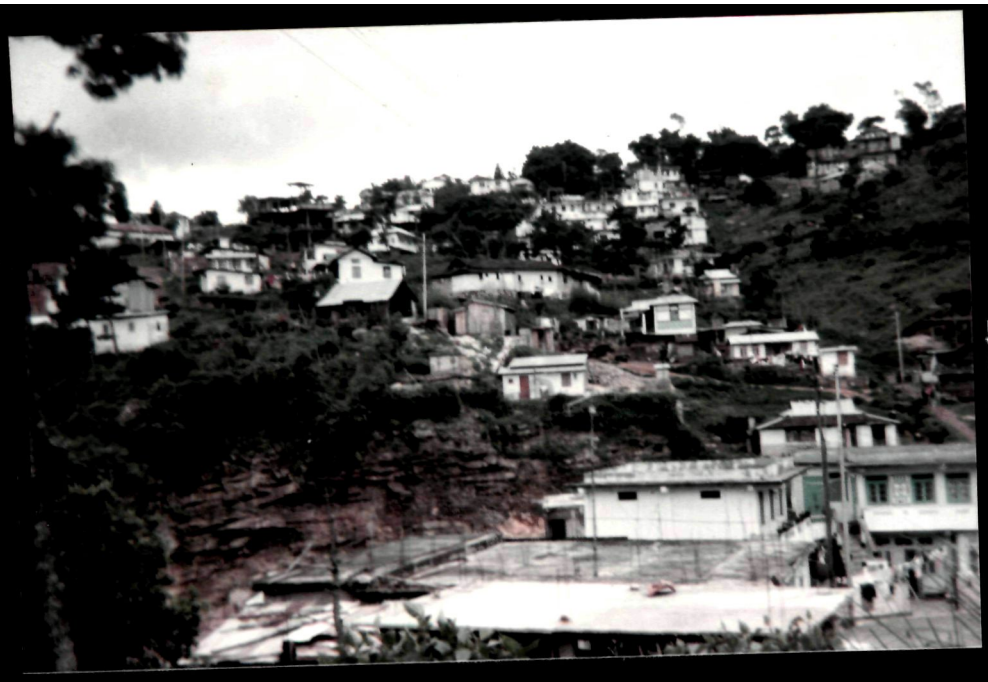
1956(as adapted by Meghalaya) and Section 171 of the Meghalaya Municipal Act[23](Assam Act XV of 1957, as adapted by Meghalaya) imposes restrictions on construction without the sanction of the Municipal Board. However, the bye-Laws being of a highly generalised nature are inadequate and have not been able to regulate haphazard and unsafe building construction in the state.

There is urgent need, therefore, for the creation of sufficient housing stock which can not only accomodate the backlog but could also accomodate the additional demands. It may however not be feasible to go for the construction of housing stock on a largescale within the town limits for which new areas in the outskirts may be acquired and developed for the purpose.

2. TRAFFIC AND TRANSPORT PROBLEM: Traffic in Shillong is mostly fast moving vehiclular traffic or predestrian traffic. Slow moving vehiculess is composed of ponycarts but they are few in number. In recent years, like many other urban centre, Shillong is also facing acute traffic problems. Two aspects of these problems arethe National Highway cutting through the heart of the town and acute parking problem.

The National Highway No.44 passes through the heart of the city. This highway which is the main supply route to Jaintia Hills, Tripura and Cachar district of Assam remains completely busy with heavy traffic.Parking of vehicles on this

23. J.N.Das., "An Introduction to the Land Laws of Assam" Calcutta,1989.

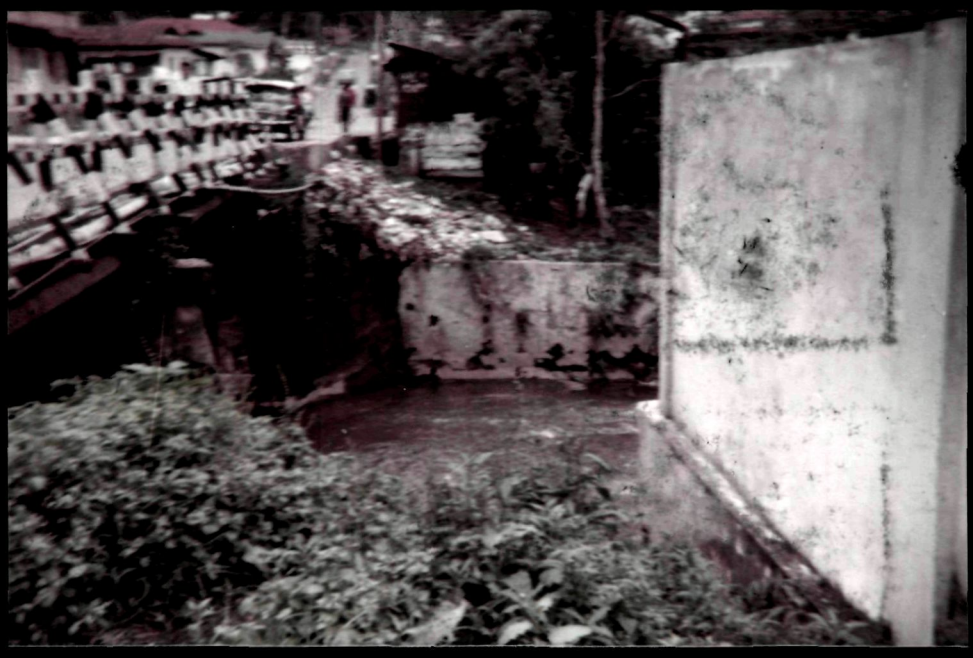


Construction of a three storeyed building on a relatively steep slope

Haphazard parking of vehicles on main Laitumkhrah road leading to traffic jam.

Dilapidated houses at Barabazar slum area.

Dumping of garbage on the road side disturbing the pedestrian and vehicular traffic.



Dumping of garbage on Wahumkhrah river and its surround polluting the urban environment.

highway pose obstacles in the movement of heavy vehicles[24]. Besides the narrow roads connecting various settlement, today, present obstacles in the movement of vehicles and pose nuisance in movement of pedestrians. Because of tremendous increase of vehicles plying on narrow roads, and non-availability of adequate organised parking space unwanted street parking, creating traffic congestion, traffic jam, delay in journeys and accidents especially are noted in central commercial and administrative areas covering Bara bazar, Police bazar, Gari-khana and Deputy Commissioner's Court area and outside these in Laitumkhrah, Dhankheti, Polo bazar, Nongthymmai and Gari-khana area.

3. SLUMS: Increasing number of slum pockets within Shillong city is another problem. The emergence of slums in Shillong may be attributed to the rapid influx of migrants both from the rural areas of the state as well as from other states which resulted in straining service facilities to the limit-creating slum like conditions. Besides high landuse and rent which most of the migrants are unable to pay has forced them to live in strained conditions. However the slum in Shillong are less bleak than those towns in plains because of its Societal structures, topographic advantage and less industrialisation.

The Meghalaya Slum Area(Improvement/Clearance)Act 1973[25] defines 'Slums' as the buildings in any area which are in any respect unfit for human habitation or are by reason of

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24 Anup Saikia.,"Road Network and Traffic Density in SHILLONG" M.Phil Thesis(unpublished) submitted to NEHU, 1990.

25. S.K.Agnihotri.,"Urban Development of Shillong-An overview", Paper, Urban Affairs Department, Meghalaya, Shillong.

dilapidation, over crowding, faulty arrangement of streets, lack of ventilation lights or sanitation facilities or combination of some or all these factors which are detremental to safety, health or morals of the people of the area".

On the basis of the criteria forwarded by this Act 32 slum pockets within the urban areas of Greater Shillong have been identified as shown in the Table(No.5). The slum dwellers in these pockets are estimated to be 58,420 persons. Slum pockets in other towns has also been identified(vide table No.5) Shillong Municipality has got maximum number of slum pockets and maximum number of slum dwellers. Slum pockets within Shillong Municipality as identified in 1991, (vide table No.6).

Table No.5

Slum Pockets and Estimated Slum Dwellers in different Urban Areas of Shillong (1991)

Name of the Urban Area	No.of Slum Pockets identified.	Estimated Slum Dwellers.
Shillong Municipality	21	42,000
Pynthorumkhrah	2	3,750
Cantonment	2	3,045
Nongthymmai	3	4,310
Mawlai	3	4,080
Madanrting	1	1,235
Total	32	58,420

Source : Agnihotri S.K.,"Urban Development of Shillong -An Overview"., Urban Affairs Department, Meghalaya, Shillong.

Table No.6

List of Identified Slum Within Shillong Municipality Area 1991

1. Naspatighari
2. Qualapatty
3. Laitumkhrah(Harijan colony)
4. Polo Bazar
5. Part of Jail Road
6. Sweeper Lane(S.E.Mawkhar)
7. Part of Laitumkhrah
8. Demseiniong
9. Malki
10. Madan Laban
11. Riat Laban
12. Lumparing
13. Lower Mawprem
14. Upper Mawprem
15. Wahingdoh
16. Barapathar
17. Laban
18. Part of Lamavilla
19. Part of Riatsamthiah
20. Part of Umsohsun
21. Wahthapbru

Source : Agnihotri S.K.,"Urban Development of Shillong - An Overview" Urban Affairs Department, Meghalaya,Shillong.

PROBLEM OF WATER SUPPLY: Water resources of Shillong include a number of water springs and a few low discharge streams. In 1910, when Shillong's first water distribution system was commissioned, water was tapped from surface sources of Jalymoh, Wahrisa and Madan Laban for population of 10,000. However, with the growth of population and increase in demand, new sources have been explored such as Umkhen, Umjasai, Crinoline, Sericulture spring etc. At the same time, ground water sources have also been expored, specially at Polo, Lady Hydari Park and near St. Edmunds School etc. to reprenish the supply. However, inspite of all effort, the gap between demand and supply has widened due to steady increase in population and water scarcity became a menace.

Besides scarcity of water tapped by Municipal Board is supplied untreated except post chlorination occasionally.

The responsibility of supply of water within the Municipal limits rests with the Shillong Municipal Board whereas in Mawlai, Nongthymmai, Madanrting, Pynthorumkhrah towns and other rural settlements, it is being managed by the Public Health Engineering Department.

Table No.7

Level of Water Supply

	Designed capacity (MLD)	Actual Supply (MLD)	Per Capita Supply(LPCD) Designed	Actual
1. Shillong	7.20	7.12	63.71	63.00
2. Indian average of 100000 - 200000 population city.	22.05	13.78	137.27	118.91
3. India average of all sized city	38.40	28.54	141.24	134.79

Source : Upgrading Municipal Services Norms and Financial Implications Vol.2, N.I.V.A. Research Study Services, 1987.

The above table shows a comparative view of the level of water supply in Shillong against other cities with average population of 100,000 to 2,00,000 and average of all city sizes in India during 1987. As can be noticed from the table per-capita supply of water is 6300 litres per capita per day which is much below the ideal standard of 200 litres per capita per day. The level of supply is also much below the recommended minimum level of 100 litres per capita per day. Taking into account a minimum of 100 litres per capita per day of water, the present requirement of water within the Municipal area alone is 11.30 million litres per day against the supply of 7.20 million litres per day.

Moreover, the wastage of water due to unscientific method of distribution of waters accounts to about 10 percent of the total supply. The water tapped from the source is stored in the reservoirs located at Bara bazar however, Mawprem, Lachumiere, Upland and Nongrim Hills etc. and then released to the subsidiary reservoir located at different localities. Household connections are then allowed from the subsidiary reservoirs or shortage through individual pipelines, which due to poor maintenance are found damaged in most instances resulting in wastage of water through these leaking pipelines.

Besides allthose problems, it should be noted that scarcity of water aggravates during the lean period as the sources dry up. This is because the supply of water in Shillong is mainly governed by rainfall. It should also be noted that not all the localities are linked by pipelines and it can be said that water problem in the town is almost all the year round.

PROBLEM OF WASTE DISPORAL (Garbage and Social waste):

In the absence of a clearly defined frame of planned development, the localities have come up without any consideration for the solid waste disposal site. The problem is serious in congested and crowded localities of Bara bazar, Police bazar, Mawprem, Mawkhar and Wahingdoh. Several garbage dumping points are located either on the banks of the streams

or along the drains. They do not have bounded bins. The settlement situated closeto water courses directly dump most of their domestic refuse into the water bodies. Besides, the faulty locations of some of the garbage dumping points as at Jinkieng (on the bank of stream Wah Nongthymmai), at G.S.Road (Dreamland Cinema crossing), at Garikhana, Mawprem and Bara bazar and many others also create problem. Garbage dumping point at Bara bazar S.C.B.S. terminus and many similar dumps in such a busy part of the town create misuse to the planned development of the city. During rain these garbages partly carried through the drains and are partly spread overthe roads. Besides visual pollution much of the garbage finds way into the drains, fills and result in gradual decomposition and degeneration.

Final solid waste disposal of Shillong is done a few hundred metres beyond Mawlai. On the west side of Shillong-Guwahati Highway waste disposal is in the form of an open dump with little regard for pollution control leaving far behind the aesthetic sense of the town planners. During rainy season spread over larger part of the year a substantial percentage from this open dump is carried down the nalas to the Umiam river and ultimately to Umiam reservoir which is close to the dumping point.

All these untreated garbage waste has been creating a tremendous threat to the basic purity ofthe natural streams criss crossing Shillong city.

At the population level of Shillong, the quantity of solid waste from municipal, industrial and agricultural sources combined would be of the order of around 1.5 lakh tonnes per year (at 2 Kg/head/day) and 20 percent of it finding its way to watercourses added to streams and reservoirs comes to the order of 30,000 tonnes per year which finally goes to Umiam reservoir per annum.

PROBLEM OF DRAINAGE: Drainage system of the city as a whole is mostly unorganised. Drainage is mostly carried by natural drainage channels and gullies from higher reaches to the foothills and valleys. Streets wash by rain water of the town are usually taken care of by the side slopes or drains on the hill side leading to the gullies and furrows.

House drainage is mostly unorganised except in case of government quarters on the slopes, where small drains are constructed and discharged into lower uninhabited areas. Unguided cross drainage and steep slopes, particularly during the rains have been responsible for heavy slips of embankments affecting road accessibility. An organised drainage system leading to desirable discharge location is essential.

OPEN SPACE : Open space within Shillong as found is not enough. To maintain healthy urban life, open space in the form of parks and other recreational places are required to increase.

1.4 SUGGESTION: Due to growth in size and complexity of town and changing inter-relationships of the structure of commercial activities numerous problems arise. Such problems suggest that some form of rational plan should be used to project a logical growth of population and urban services. As the haphazard character of the growth pattern is the result of poor development decisions such rationality would result in a system of planning that reviews human needs and evaluates and anticipates urban process and growth. If forecast solutions could be reviewed before problems become overwhelming optimal solution could be identified. Therefore, some of the major problems faced by Shillongcity and some significant suggestions have been forwarded.

1. De-centralisation and planned shifting of selected public and semi-public establishment, transport terminus and creation of parallel business and marketing centres in the newly created area are considered useful steps in relieving the congestion and improving the conditions of life within the centralised localities.

2. Considering the fact that Shillong falls under seismic zone V of seismic zoning map of India[20], multi storeyed building and concentration of buildings and commercial activities in a limited areas in Garikhana, Bara bazar, Police bazar densely populated area on Mawprem, Mawkhar, Wahingdoh, Police bazar on steep banks of Wah Umkhrah, Nongrimbah and otherstreams should be checked as these are liable to seismic hazards.

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3. Urban residential decay can be checked and new residential colonies with neighbourhood facilities may be developed in the surrounding peripheral towns. Construction activities within the centralised localities should be frozen with guarded permission for constructions in marginal areas. It is equally important to improve the existing buildings which are in a dilapidated conditions so that they can also be made habitable and contribute to the housing stock.

4. Road width widening be taken up in the major roads of the city and along certain problem - prone segments such as those roads between Mawkhar and Bara bazar and Mawprem -Bara bazar. However, smooth circulation of traffic cannot be achieved unless parking spaces are generated at vintage locations specially in Bara bazar, Police bazar, Garikhana and along G.S.road. Creation of adequate space to accomodate parking needs and terminals for private buses and trucks in Bara bazar to keep the existing road totally available for moving traffic is also suggested.

5. Running of National Highway No.44 through the heart of the city leads to congestion and obstacles in the smooth flow of traffic particularly in central localities. One of the remedies shallbe the provision of a bye-pass road for the traffic for Jaintia hills, Cachar district and Tripura. Although a bye-passroad through N.E. part of the Shillong

urban complex is under active planning by the P.W.D., Meghalaya.

6. An attempt should be made to improve the environmental condition of the slums to make them habitable by providing sanitation and various other infra-structural facilities. Recently introduced two new scheme i.e.,"Urban Basic Services for the Poor" and "Nehru Rozgar Yojana" in the slum areas for the overall development of these areas should be effectively implemented.

7. Shifting of Sweeper's locality from the road side in Bara bazar area, widening and improvement of roads in this locality with properly aligned drains along with regulation of the traffic are considered other measures for smooth circulation of the traffic and improvement in environment in this part.

8. Limited land available for godowns and ware house has resulted in congestion and degradation of environment in Bara bazar area. Proper control measures should be taken up in this direction.

9. To minimise pollution garbage dumping points within the city should be located as far as possible away from the banks of the streams and drains in bounded cemented bins to minimise their influx into water bodies.

10. There is ample scope for exploiting ground water resources for augumenting water supply. Also the present water

supply system requires renovations and augumentations not only to meet the present demand of the consumers but also the future requirements of ever increasing population.

11. Integrated drainage and sewage system should be implemented in the urban complex to minimise ground water transport of pollutants to water bodies. Besides level of pollutants in the water course should be monitored regularly.

12. Meghalaya being surplus in power should take the initiative in having a properly designed distribution system for Shillong to give better service to its consumers and at the same time earn revenue to improve the financial position of the board.

13. Decentralisation of schools and colleges can be advised to avoid tremendous traffic congestion along main roads.

14. Narrow approach roads to various localities present problems in the pedestrian movement. It is a common sight to see buildings abutting against roads and discharging waste over them. Invariably these badly damaged roads are having small craters over them. Regulation in this direction along with improvement in drains is suggested.

15. Besides it hasbeen suggested that for effective planning of the city, Municipality must extend its limited

jurisdiction (which at present is confined only to Shillong) to all adjoining towns forming Shillong agglomeration.

It is also suggested that any development plan should incorporate the everchanging factors controling the dynamic growth. Since planning is a continuous process, the developmental plan should be reviewed after every five years.

Besides effective measures to be taken up by Government agencies, Public participation under certain circumstances is a must to solve with the intricate problems of human relationships consequent on concentrated urban living.

CHAPTER III

3.1. CHANGING LANDUSE PATTERN OF SHILLONG:

The urban setting is not static for any city but constantly changes and exhibits characteristics which lag in adjusting to new condition. A modification of long established functions and addition of new functions go on side by side. Such functional developments call for new functional forms, for modification of forms previously established and for extension of and realignments of the urban pattern. Apparently these developments of function, form and pattern are governed by a definite although imperfectly recognised set of forces.

In case of Shillong undulating topography and virtually no planning has rendered Shillong to develop a mixed pattern of landuses. Within mixed pattern, however, predominant land uses can be identified (vide fig.no.14). An analytical description of various landuses over a period of time gives insight into the pattern of functional changes and their modification.

1. RESIDENTIAL: Residential structure as mentioned earlier is the outgrowth of socio-economic factors operating through time. Residential areas in Shillong are found scattered throughout the town in almost all wards as can be seen clearly from fig.no.15. More than 50 per cent of the total area wasunder residential use in 1971 which came to 44 percent in 1981 and 37 percent in 1991(vide fig.no.14).

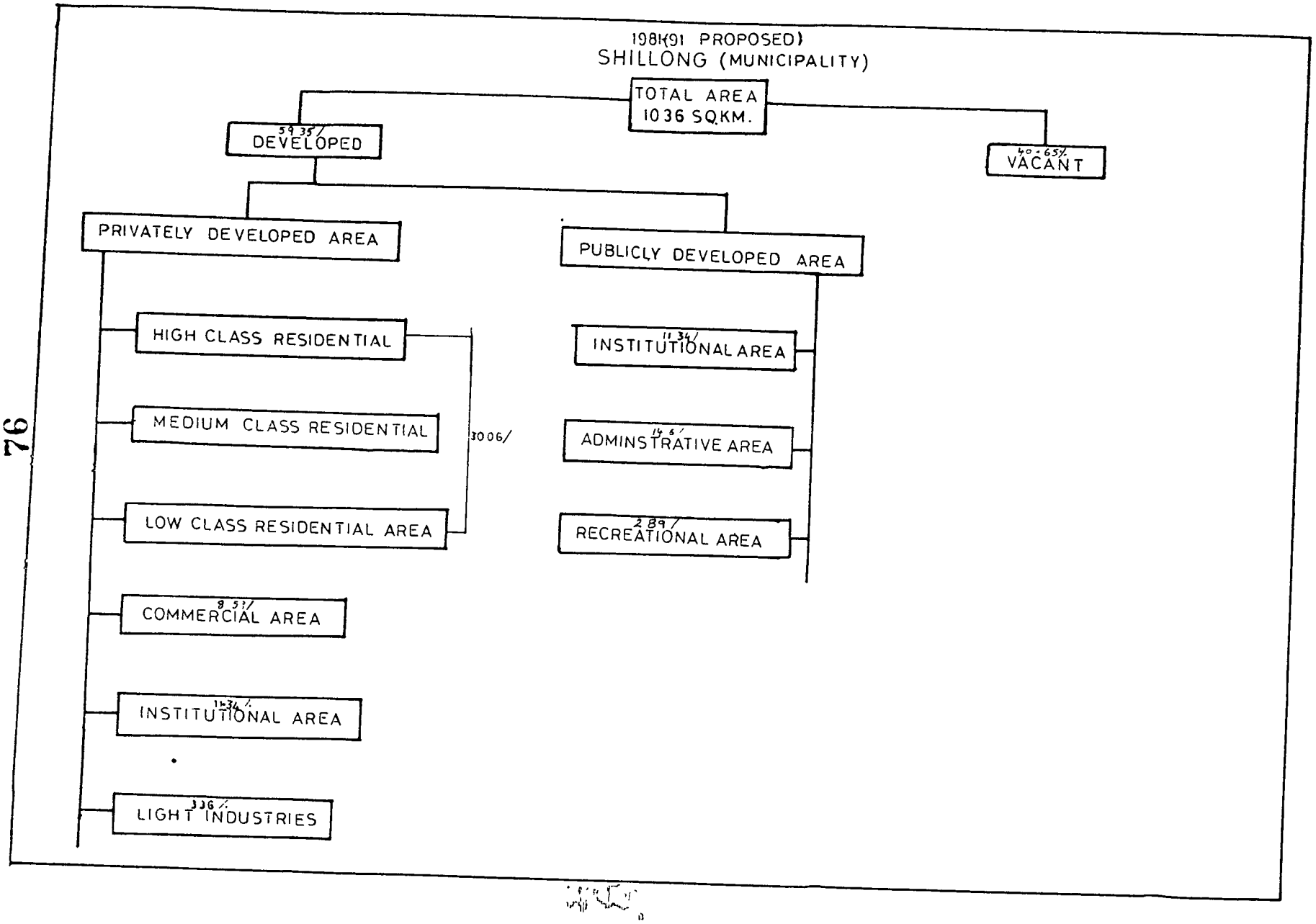
1981(91 PROPOSED)
SHILLONG (MUNICIPALITY)
TOTAL AREA
1036 SQ.KM.
59.35%
DEVELOPED
40.65%
VACANT
PRIVATELY DEVELOPED AREA
PUBLICLY DEVELOPED AREA
HIGH CLASS RESIDENTIAL
MEDIUM CLASS RESIDENTIAL
LOW CLASS RESIDENTIAL AREA
30.06%
COMMERCIAL AREA
8.5%
INSTITUTIONAL AREA
11.34%
LIGHT INDUSTRIES
3.36%
INSTITUTIONAL AREA
11.34%
ADMINSTRATIVE AREA
14.6%
RECREATIONAL AREA
2.89%

Table No.8

Areas and Percentages of Major Land Uses In Shillong.

Land Use	1971		1981		1991	
	Area in Sq. Km	Percentage of total	Area in Sq.Km	Percentage of Total	Area in Sq.Km	Percentage of total
Residential	5.68	54.65	4.57	44.19	3.84	37.06
Commercial	0.18	1.79	0.60	5.87	0.89	8.59
Industrial	0.12	1.15	0.21	2.02	0.38	3.66
Institutional	0.97	9.36	1.72	16.65	2.35	22.68
Administration	1.14	11.00	1.38	13.32	1.52	14.67
Recreation	0.12	1.21	0.31	2.99	0.30	2.89
Transportation	0.26	2.58	0.59	5.65	0.83	8.01
Cultivation	0.16	1.54	0.27	2.61	0.13	1.25
Forest	0.58	5.69	0.47	4.60	0.06	0.57
Open Space	1.14	11.03	0.21	2.10	0.07	0.67
Total	10.36	100.00	10.36	100.00	10.36	100.00

Source : 1971 & 1991 Town and Country Planning Department.

1981 Computed form Landuse Map from District Census Handbook, East Khasi Hills, Census of India.

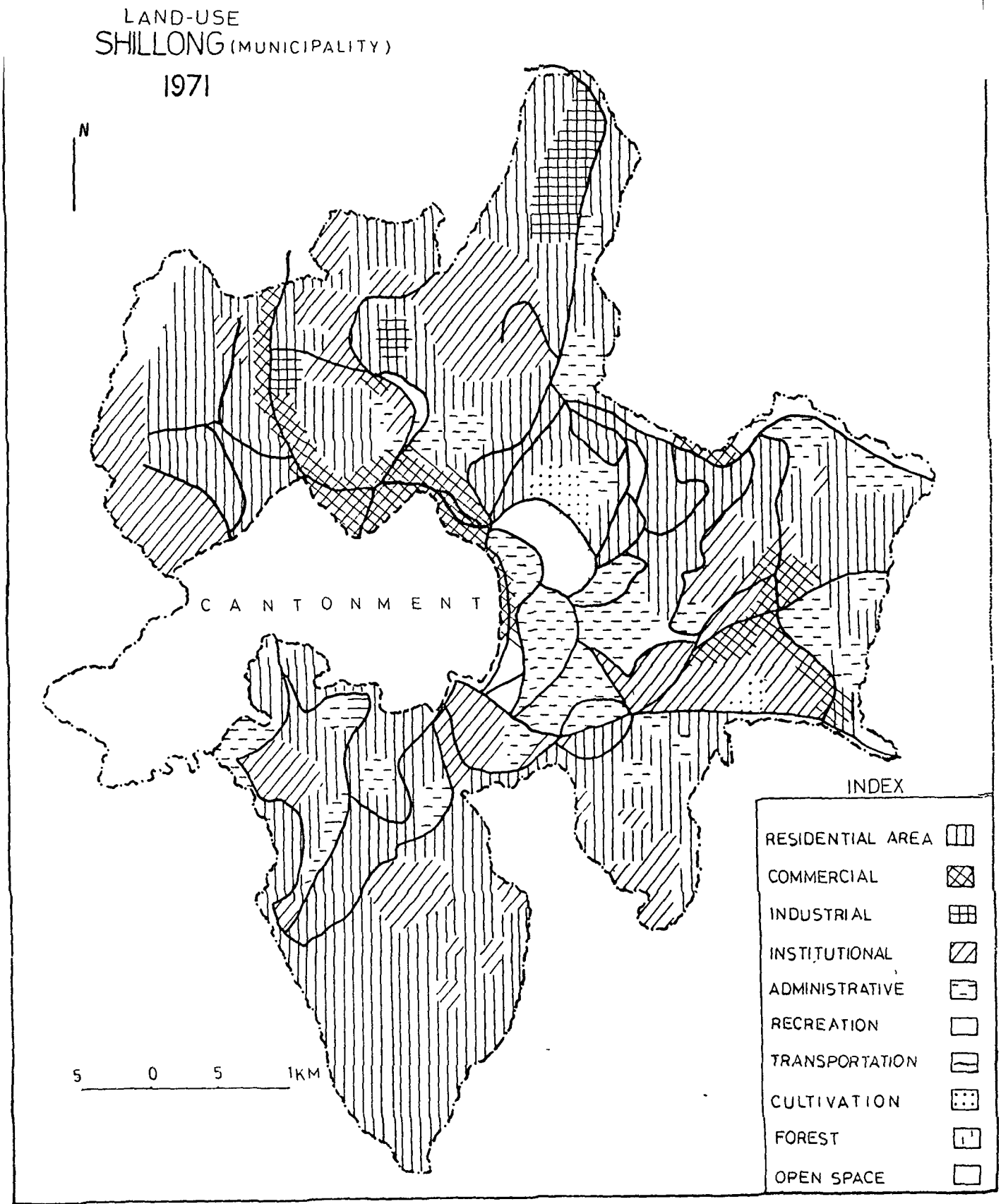
LAND-USE
SHILLONG (MUNICIPALITY)
1971
N
CANTONMENT
5 0 5 1KM
INDEX
RESIDENTIAL AREA
COMMERCIAL
INDUSTRIAL
INSTITUTIONAL
ADMINISTRATIVE
RECREATION
TRANSPORTATION
CULTIVATION
FOREST
OPEN SPACE

FIG 14

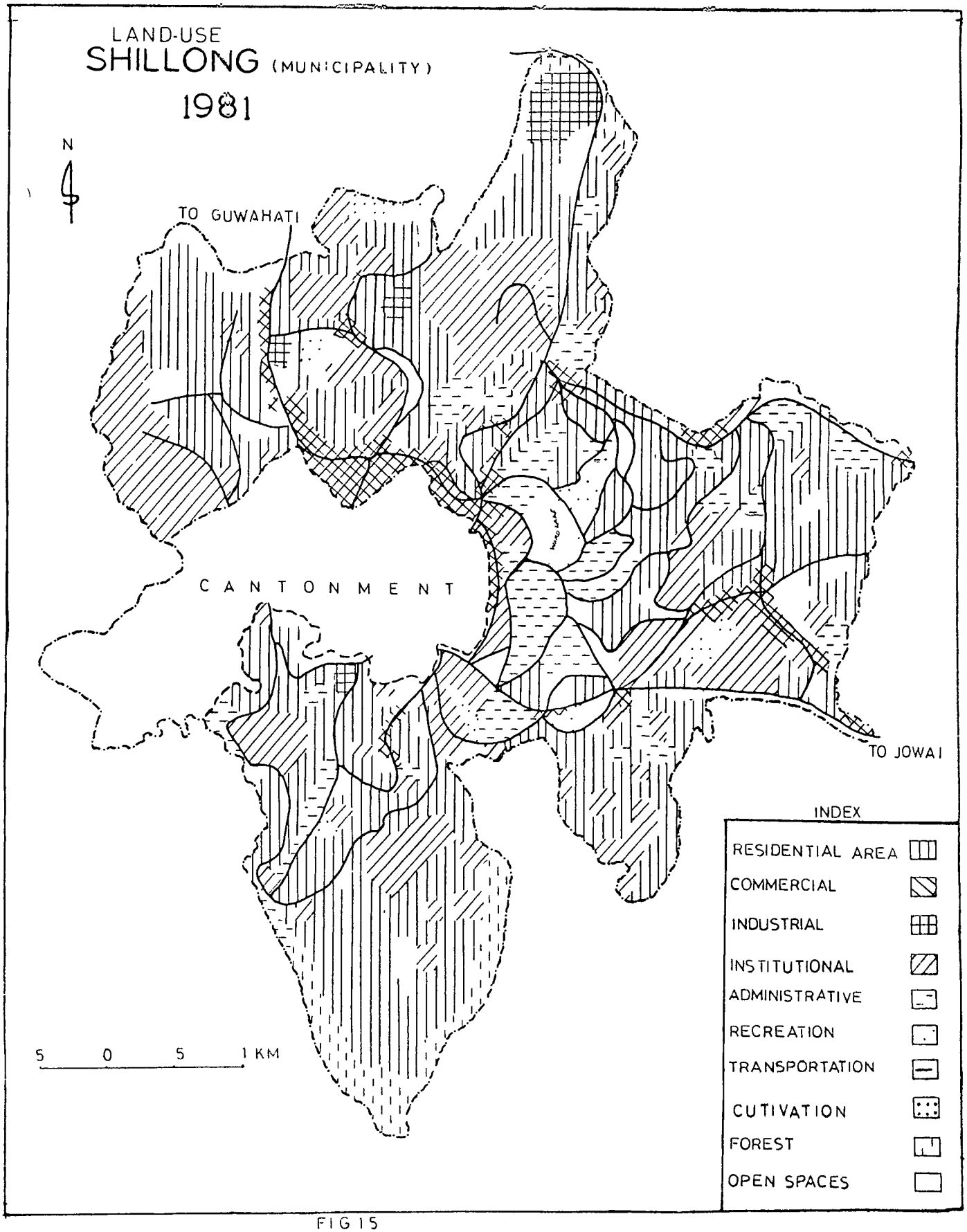
LAND-USE
SHILLONG (MUNICIPALITY)
1981
N
TO GUWAHATI
CANTONMENT
TO JOWAI
5 0 5 1 KM
INDEX
RESIDENTIAL AREA
COMMERCIAL
INDUSTRIAL
INSTITUTIONAL
ADMINISTRATIVE
RECREATION
TRANSPORTATION
CUTIVATION
FOREST
OPEN SPACES

FIG 15

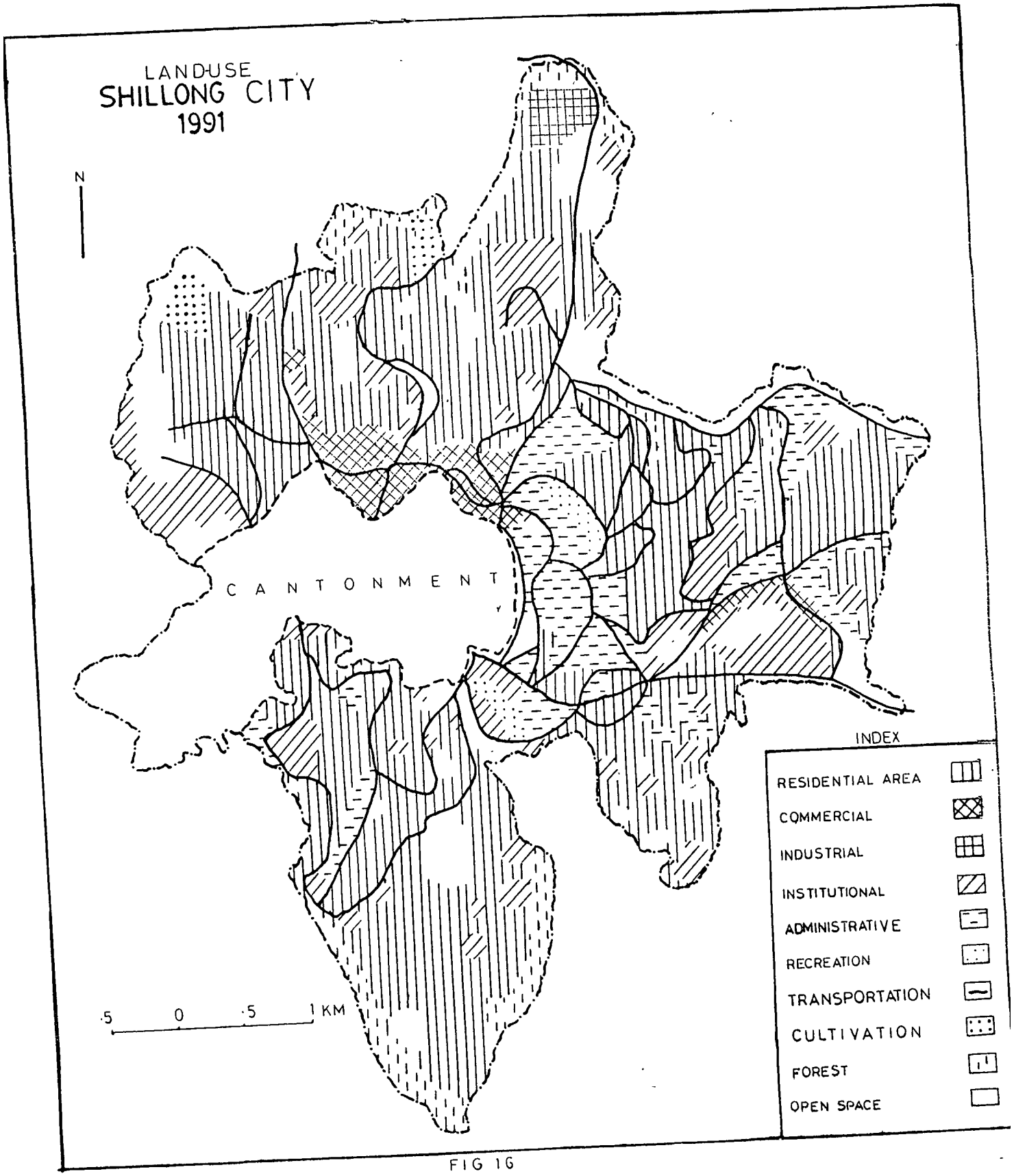
LAND-USE
SHILLONG CITY
1991
N
CANTONMENT
·5 0 ·5 1 KM
INDEX
RESIDENTIAL AREA
COMMERCIAL
INDUSTRIAL
INSTITUTIONAL
ADMINISTRATIVE
RECREATION
TRANSPORTATION
CULTIVATION
FOREST
OPEN SPACE

FIG 16

SHILLONG (MUNICIPALITY)

LAND USE PATTERN

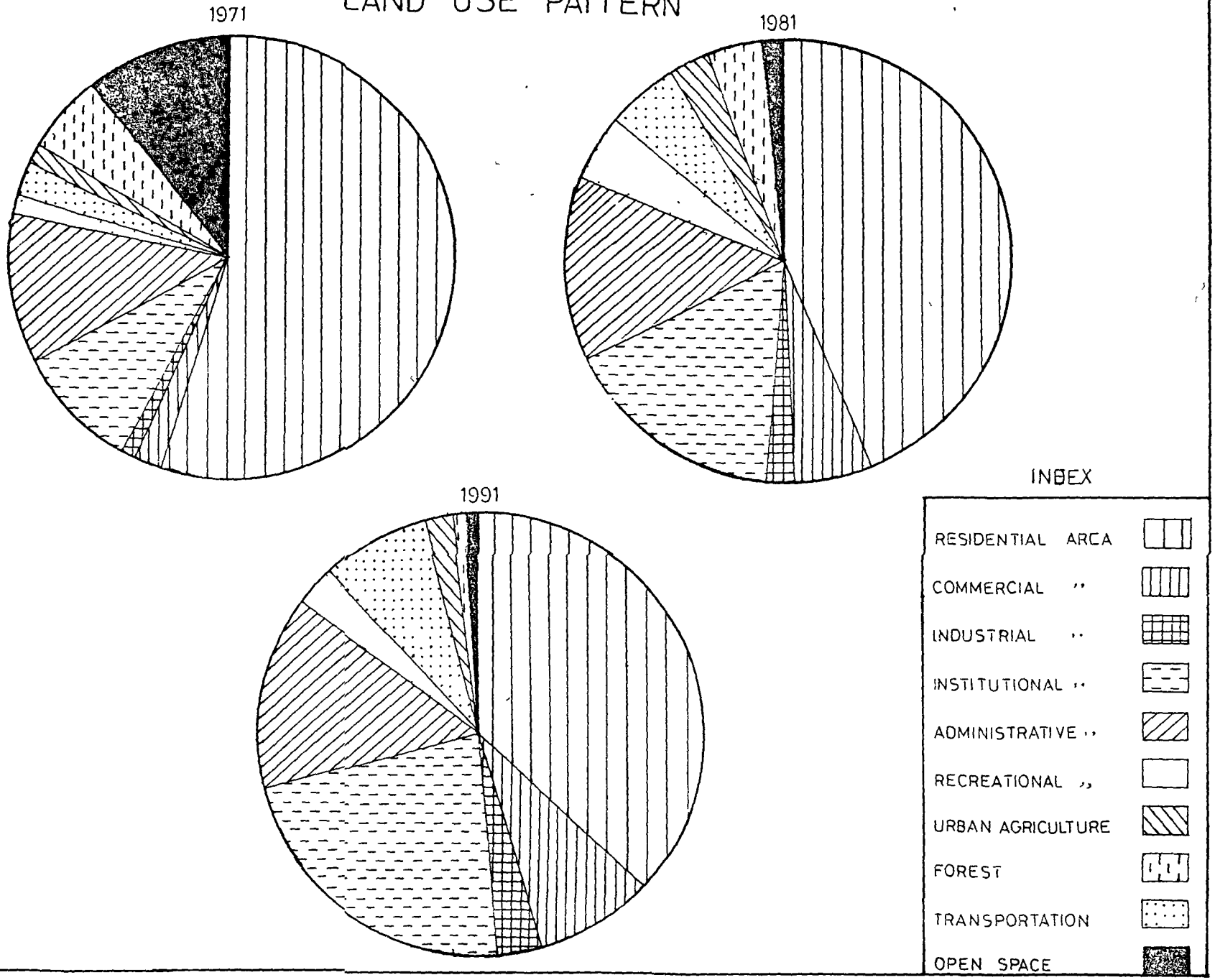

FIG 17

This decline can be attributed to residential cum commercial use of most of the houses as they are categorized under commercial uses in each ward. As found out, the ground flooris used as shops or for other commercial purpose and upper portion is used for residential purpose. Most of the houses in commercial areas of Mawkhar, S.E.Mawkhar, PoliceBBazar and Laitumkhrah are of this type.

Another reason for the decline in the percentage share of area under this use can be attributed to the infilling and accretion process in the residential areas. Thus the areas which were already under residences were used for constructing new houses leading to virtually no increase in the areas under residences. Also increase in residences after 1971 has mainly been in surrounding towns. This infilling process can be noticed in almost every ward. There are two large and contiguous areas of high class residences.

a) Oakland, Pasteau, Institute and Lachaumiere with greater amenities of water supply and better roads and good educational institutionsetc.

b) houses in Motinagar, Malmi, Stoney land, Bishnupur, Mawlai, Kenches trace, Rilbong, Madan Laban and Lumparing are quite spaceous.

Houses in Jhalupara,Garikhana,Mawkhar,S.E.Mawkhar, Jaiaw are quite congested. It can be noted that while high class residences are located in eastern sectors, most of the earlier settlements which now are quite shabby in appearance are located near Bara bazar and Garikhana.

It should be noted that most of the residential houses in Shillong belong to private sector or are privately owned.

2. COMMERCIAL: Area under commercial use has been increasing since 1971. In 1971 area under commercial use was about 1.79 percent which increased to 5.87 percent in 1981 and 8.59 percent in 1991(vide table no.8).

Commercial activities have developed in most accessible part i.e., Police bazar and Bara bazar (vide fig.no.17). Earlier commercial establishments were concentrated at Bara bazar only, but recently newer business establishments have come up in Laitumkhrah, Laban and Garikhana resulting in decentralisation of commercial activities.

Areas under commercial use are devoted to retails and whole shale trade, commercial offices, hotels, restaurants, bars, cinemas, theatres, services stations etc. pertaining to buying and selling of goods and services.

Barabazar and Police bazar together form Central Business District with largest concentration of shops which draws people from all parts of city. Here the area of sale is large and it is conveniently located at or near the centre of the town which can be easily approached in comparatively less time from all or large parts of city. The wholesale business is localised in Barabazar and its fringe.

Though some commercial activities are found in every ward but the above mentioned four pockets share about 69 percent of the total area under commercial use.

It can also be mentioned here that commercial activities are mostly concentrated along NH 40 (Guwahati-Shillong National Highway) and NH 44 which goes to Jowai (vide Fig.No.1).

3. INDUSTRIAL: Land under industrial use is low. It was about 0.12 percent in 1971 which increased to about 2.02 percent in 1981 and 3.66 percent in 1991 (vide table no.8).

Industrial section includes cottage and household industries and most of the small scale service industries, which cater to local market and local materials as they have limited export market. Small industrial units includes saw mills, printing press, furniture and fixture, material, metal work and motor vehicles repairing establishments, bakeries, footwear, food and beverages, candle making etc.

Most of the industrial establishment are located along Keantinge road(NH 40) and the Laitumkhrah Main Road (NH 44).

Increase in area under industrial use can also be supported by percentage share of workers(table no.9)which has increased in this sector since 1971 along with the increase in the participation ratio. Percentage of workers in secondary sector has increased from 14.71 percent in 1971 to 20.83 percent in 1991. Though participation of workers in

tertiary sector is always highest being 74.3 percent in 1971, 73.77 percent in 1981 and 73.32 percent in 1991 (vide table no.5).

Table No.9

Workers Participation Ratio

TYPE	1971	1981	1991
Population	122752	175180	214595
Participation Ratio	32.85%	29.75%	29.8%
Primary Sector	5131 (10.89%)	4719 (7.93%)	15230 (5.85%)
Secondary Sector	6938 (14.71%)	10887 (18.30%)	15230 (20.83%)
Tertiary Sector	35064 (74.3%)	43895 (73.77%)	53600 (73.32%)
Total Workers	47133	59501	73106

Source : Census of Meghalaya 1971 and 1981.

4. INSTITUTIONAL: Land under institution has been steadily increasing. In 1971, it was about 9.36 percent which now has increased to 22.68 percent (vide table no.8).

Institutions include Assam House, Civil Hospital, Central Museum, Arunachal Pradesh Library, Indoor Stadium, State Central Library, Meghalaya Secretariat, State Bank, Religious buildings, training centres, community halls and others, Shillong Municipality Office, Meghalaya Circuit House, Ramakrishna Mission, Gorkha Panchayat Council Chamber,Churches,

SHILLONG URBAN AGGLOMERATION

OCCUPATIONAL STRUCTURE

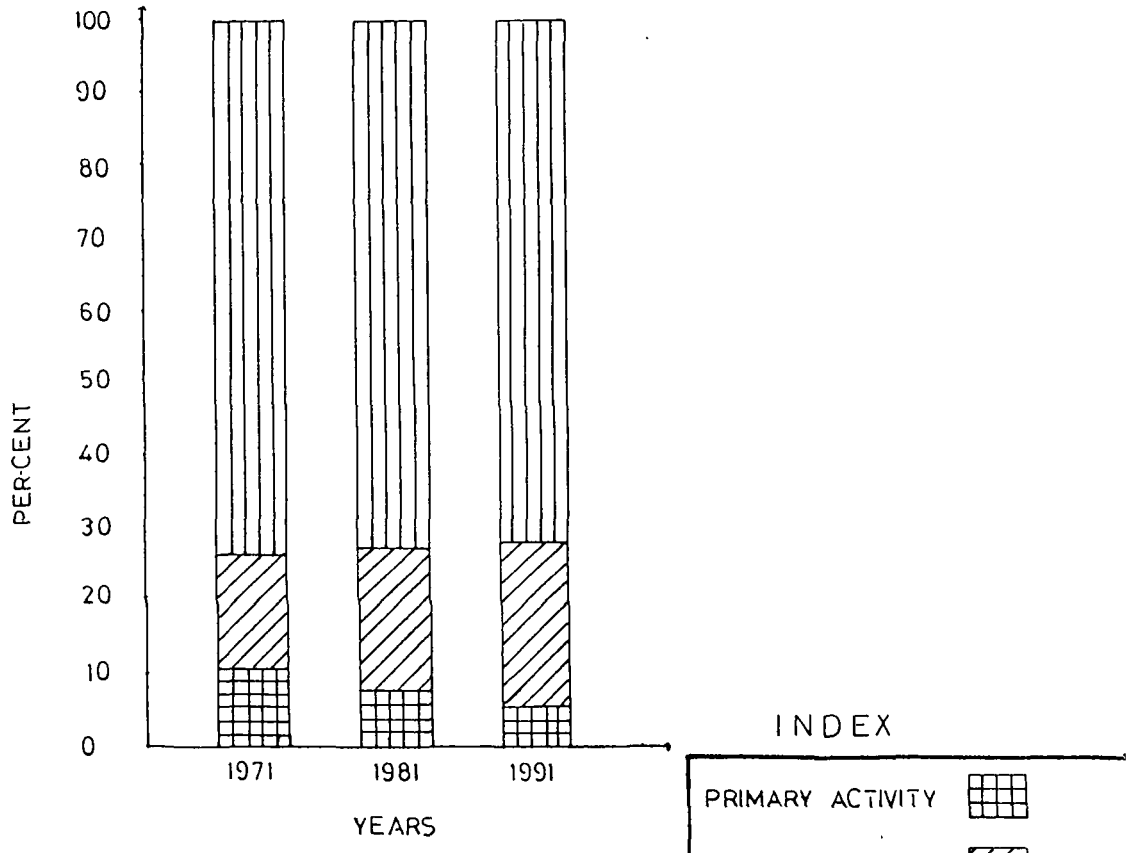

FIG 18

Temples, North Eastern Hill University, Schools, Colleges, Masjid, Rabindra Bhavan etc. All these are scattered throughout the Municipality.

Area under institutions has increased considerably (vide fig.no.17) which can be due to the establishment of many central, state and regional offices and also the incorporation of educational institutions in this category.

Education beside administrative functions is the second most important function of the town and to some extent has contributed towards its growth. Since the very beginning of this century many missionaries had opened up schools here with the government aid. First college in the state was opened up in 1924. Education has been and is responsible for the immigration of large number of people from the surrounding states.

Though educational institutions are scattered in different parts, most of them are localised in Laitumkhrah. Shillong has a University(North Eastern Hill University), altogether ten colleges and a number of schools.

5. ADMINISTRATIVE: Area under administrative use was about 11 percent in 1971 which increased to 13.32 percent in 1981 and 14.67 percent in 1991 (vide table no.8).

Administrative function being one of the significant force which have contributed towards the growth of Shillong has been increasing continuously. A plethora of central and state government offices like I.C.A.R., G.S.I., Survey of India, Botanical Survey of India, Zoological Survey of India, Anthropological Survey,N.E.P.C.O., N.E.C., A.G.O., G.P.O. etc. are mostly located in European ward close to commercial area viz. on the north eastern and southern side of Police bazar and Bara bazar respectively (vide fig.no.16), Thus located in almost centre of the city where rent is very high. However it should be noted that there has been decentralisation ofgovernment offices(vide map no.15).

Administrative area is characterised by tall buildings upto five storeys and non residential houses. It is characterised by an inflow of population during the day time and ebb of the same during the evening. Some extension of these activities towards the northern adjacent areas in European ward can be anticipated.

6. RECREATIONAL: Land under recreational use are scattered throughout the town. It includes cinema halls, clubs, parks, lakes, playgrounds, race course, golf-links , water falls and auditoriums. Golf-links and race course are located in the eastern part of the city(vide fig.no.14, 15 & 16). Most of the recreational places are located in the central part of the city.

Percentage share of land under this has increased marginally (vide fig.no.17). At present, there are five cinema halls, over ten clubs, two large parks, about half a dozen play grounds, six water falls and two public auditoriums. Picturesque landscape, numerous waterfalls, artificial lakes and golf course attracts not only domestic but also international tourists and provide them recreation.

7. TRANSPORTATION: Nearly 8.0 percent(1991) of land is under transport which was 2.58 in 1971(vide fig no.17).

The city is highly inter-connected with reasonably well surfaced roads and practically entire city is accessible to vehicular traffic(vide fig.no.16). However, the major traffic flows are along the axial routes inter-connected with National Highway No.44 and 40 which passes through the city connecting Shillong with Guwahati to the north and Cherrapunjee, Jowai and Silchar to the south(vide fig.no.16). Charles H.Cooley has also emphasized the importance of transportation in break-in-transportation theory of city location[3]. In Shillong, main transport routes within the city are from Bara bazar to Nongthymmai, Mawlai to Laban via Bara bazar and Happy Valley to Bara bazar. Total road length of Shillong Municipality in 1981 was 107.71 Kms. Recently road construction can be seen on rugged terrain and hilly areas outside Municipality.

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3. Charles H.Cooley.,"The Theory of Transportation", in Publications of the American Economic Association Vol.IX (1894) Reprinted in Charles H.Cooley ,"Sociological Theory and Social Research".

8. CULTIVATION: Area under cultivation accounts for less than 1.25 percent in 1991. It was about 0.16 percent in 1971 (vide table no.8 and fig.no.17).

Under the agricultural land, activities like poultry, dairy, market, gardening and agricultural research farms have been included. Cultivation is carried on in few scattered places (vide fig. no.16).

9. FOREST: Area under forest is very insignificant as with the increase in the population forest areas has also been occupied and houses have been built up even on steep slopes clearing forests as can be seen in Laban to the south. Only in north, some forests can be spotted (vide fig.no.16). Many localities like Kenches Trace, Bishnupur, Lumparing, Upper Nongthymmai, Madanrting, Alugodown, Rynjah have come up in forest clearings. Besides construction activitées are still going on, on the hill slopes of Lumparing, Upper Nongthymmai, Laitkor and Upper Shillong outside Shillong Municipality.

On the whole, it can be seen from the landuse map of Shillong that major functional activities of the town include Public and semi public activities and commercial activities. Commercial activities have remained generally centered in a limited area while settlement have come up all around without much continuity. Concentration of commercial activities in a limited area of Barabazar, Garikhana, and Police bazar areas

for entire township along with residential occupation in these areas have resulted in congestion and over crowding.

Lastly, a broad activity classification in wards shows four major functions -

a) Commercial

b) Institutional

c) Administrative and,

d) Residential

Thus although a given ward may posses shopping areas administrative centres, educational institutions etc, It has been classified as residential if most area or the major function of the ward is residential.

The following is the activity classification based on the above procedure.

Table No.10

Activity Classification

Ward No. (1)	Name of Ward (2)	Major Activity (3)
I	Laitumkhrah	Commercial-Educational
II	European	Administrative
III	Police Bazar	Commercial
IV	Jail Road	Residential
V	Mawkhar	"
VI	Jaiaw	"

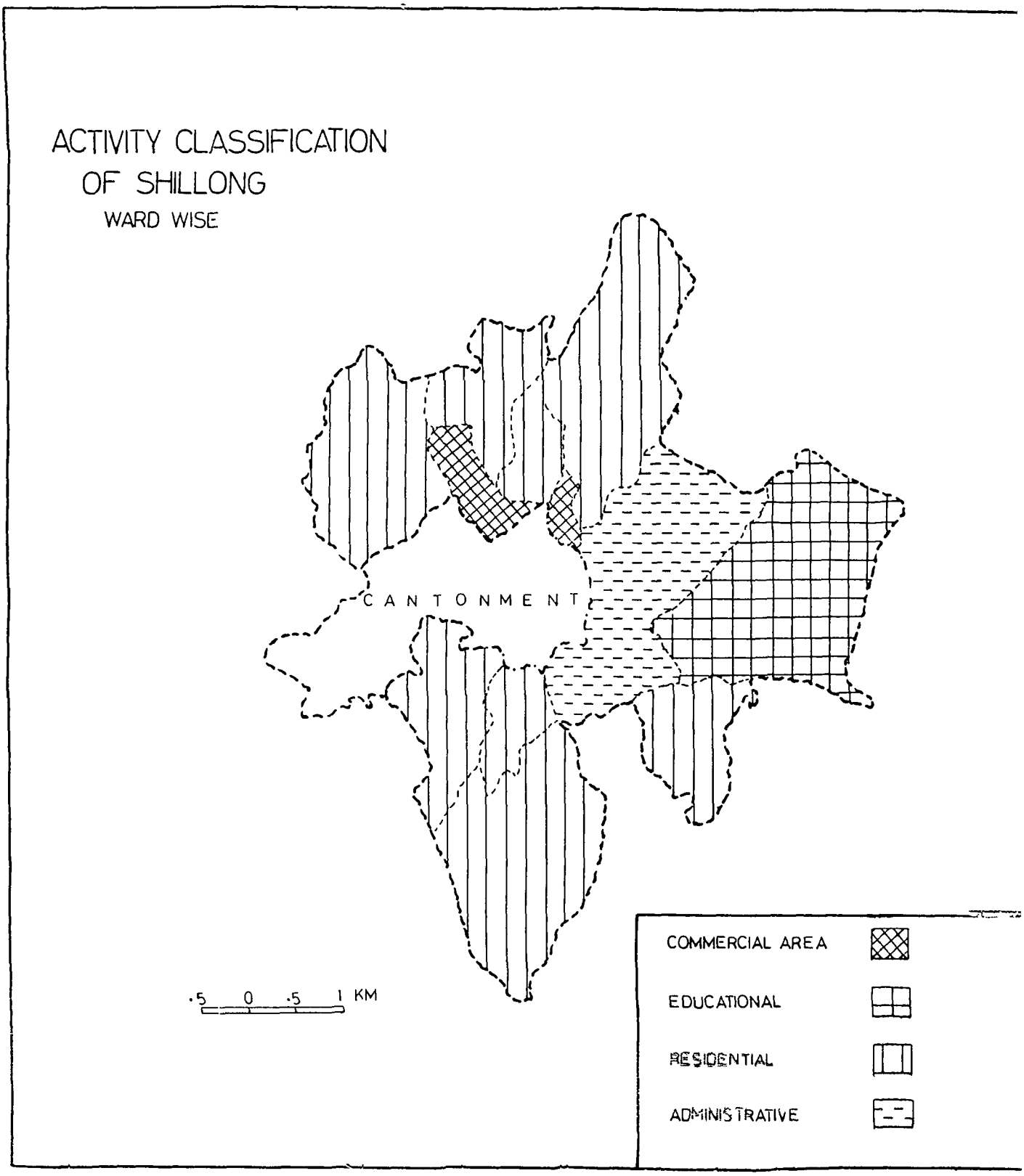

ACTIVITY CLASSIFICATION
OF SHILLONG
WARD WISE
CANTONMENT
·5 0 ·5 1 KM
COMMERCIAL AREA
EDUCATIONAL
RESIDENTIAL
ADMINISTRATIVE

FIG 19

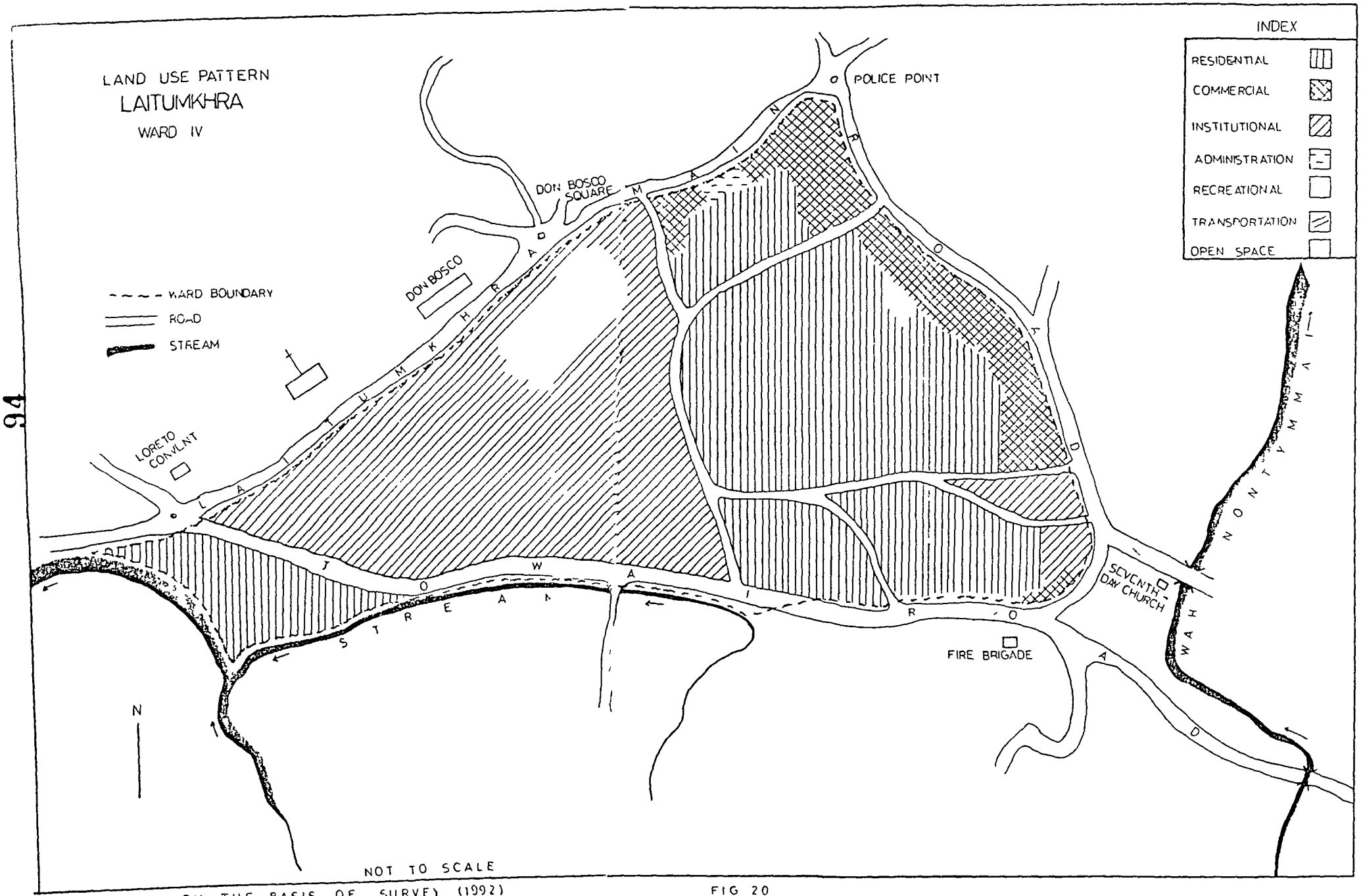
VII	S.E.Mawkhar	Commercial
VIII	Mawprem	Residential
IX	Kenche's Trace	"
X	Laban	"
XI	Lumparing	"
XII	Malki	"

Source : District Census Handbook, East Khasi Hills District, Census of India, Series XIV, Part II A and B.

As seen from the table No.10, most of the wards fall in residential category by this classification, while commercial and administrative/ educational areas are confined to the wards of Laitumkhrah, European ward andS.E. Mawkhar.

To find out the impact of newly developed market on landuse pattern, a detailed and intensive field study of ward IV of Laitumkhrah has been undertaken. Almost allmajor landuses can be found here. This ward covering .45 sq.km of area is also served by National Highway No.44.

COMMERCIAL USE: One of the remarkable feature of this ward is the old Laitumkhrah market which was started in 1932. This is the oldest market of Laitumkhrah. Actually around this market, commercial activities started growing since 1932, which today has become one of the important commercial centres of Shillong. Most of the house have also been constructed during this time.



PREPABED ON THE BASIS OF SURVEY (1992)

FIG 20

Not only this ward, but other constituent wards of Laitumkhrah and surrounding places are also well served by this market as its location is almost at the heart of the city.

Commercial area is found along the main Laitumkhrah road, from Dhankheti to Laitumkhrah Police point and from Police point to Firebrigade point (vide fig.no.20). National Highway No.44 to the south of the ward which goes to N Jowai doesnot have any significant commercial activity.

This comparatively recently developed market with various diversified commercial activities is one of the fast growing commercial centre in whole of Shillong. Increasing importance of this market is due to the S.B.I.(State Bank of India) Evening branch which has enhanced and encouraged the growth of this market. Since retail trade plays important part which includes - General stores, restaurants, stationaries, photostudio, electrical goods store, bakeries, leather goods, motor car spare store, medical stores, furniture shops, cloth shops, tailor shops, saloons, audio visual stores etc. Fruits and vegetable market are mostly run by peddlers, though some shops are also seen. The peddlers come every day in morning from the villages and go in evening. From the field study it is analysed that at present, there are around 184 shops along the road. Table No.11 showsthe number of shops in 1971, 1981 and 1991. Wholesale trade is not found here.

Table No.11

Increase in Number of Shops

Year	Number of Shops
1971	85
1981	116
1991	184

Source : Field work by the author

RESIDENTIAL USE: From the fig no.20, it can clearly be noticed that quite a large area of this ward is under residential use. Residential areas is found in the south east of this ward (vide fig.no.20 and 21).

Table No.12

Increase In Number of Houses

Year	Number of Houses
1971	239
1981	251
1991	255

Source: Field work by the author

Through field work and questionnaire, we have found that there are about 255 houses. Of these 239, houses have been built before 1971 and only twelve houses have been built during the period of 1971-81 and four houses have been built during 1981-91. Now in 1992, construction of two houses is going on of which one is the extension of the old house.

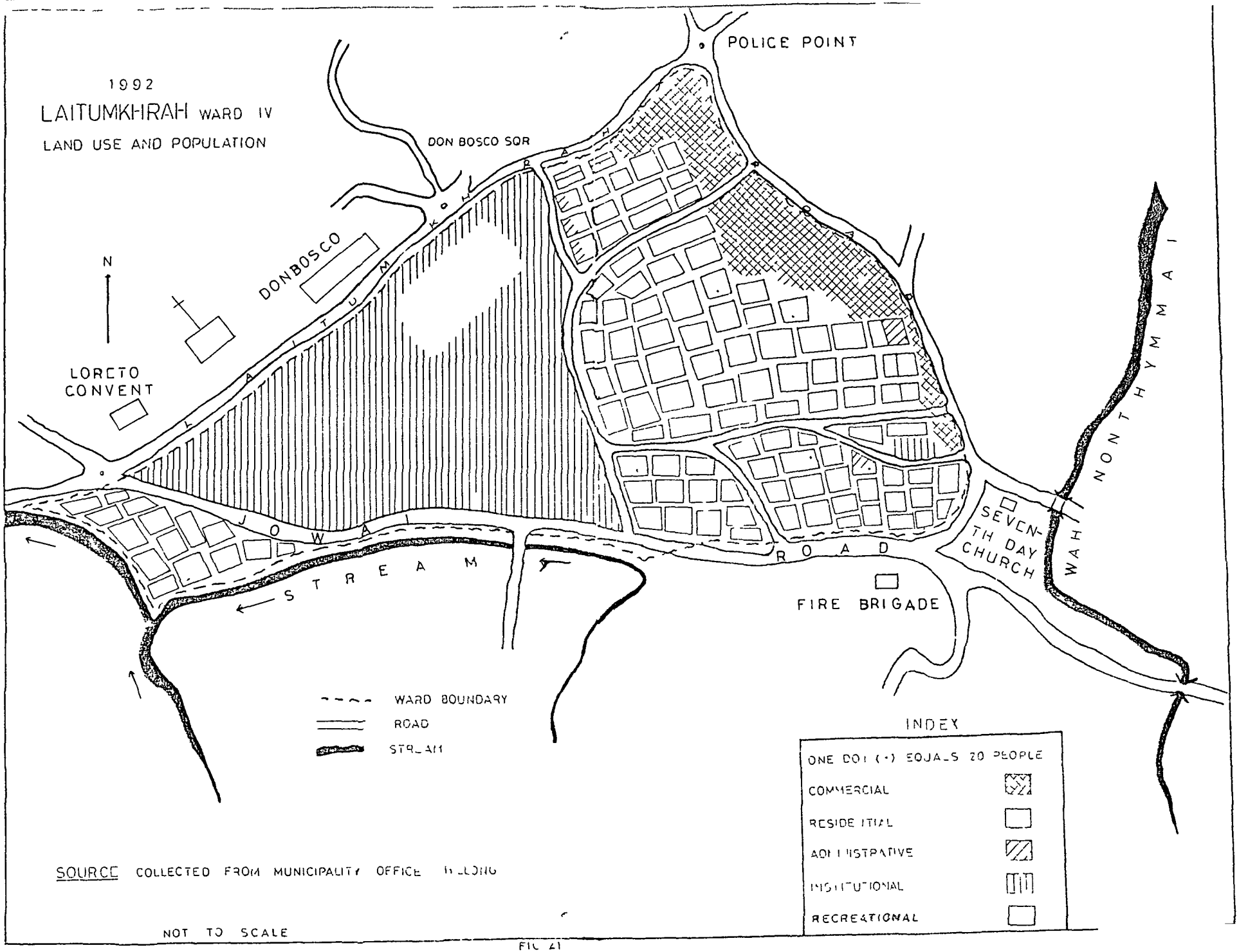

1992
LAITUMKHRAH WARD IV
LAND USE AND POPULATION
POLICE POINT
DON BOSCO SQR
LAITUMKHRAH ROAD
DONBOSCO
N
LORETO CONVENT
JOWAI
STREAM
ROAD
SEVEN-TH DAY CHURCH
WAHNONTHYMMAI
FIRE BRIGADE
WARD BOUNDARY
ROAD
STREAM
INDEX
ONE DOT (•) EQUALS 20 PEOPLE
COMMERCIAL
RESIDENTIAL
ADMINISTRATIVE
INSTITUTIONAL
RECREATIONAL
SOURCE COLLECTED FROM MUNICIPALITY OFFICE JOWAI
NOT TO SCALE

FIG 21

Most of the houses which were built after 1971 are extensions of the old houses. Thus like in other parts of town, process of accretion and infilling can be seen in this ward also. Houses having road frontal location are used for both commercial and residential purposes. Almost all the houses are privately owned and mostly by local people. Most of the houses are found to be rented out. The residential structure of this ward shows that this is one of the posh area of Shillong. The land value of this areaand the rent are considerably high in this ward.

INSTITUTION USE: In this category we include educational institutions, banking and insurance and post office. Area under this category is largest.

Educational institutions include St.Anthony's School, Catholic Evening School for womens, Donbosco Youth Centre, Laitumkhrah Presbyterian High School, St.Edmund's School and College, May fair School for kids etc.

St.Edmund's educational institution covers the largest area of this ward. Most of the institutions are old.

TRANSPORTATION: Though the percentage of area under transport is less, still the area is well served by roads all along its boundaries. Main Laitumkhrah road runs from south west to north east and then from Police beat house to farther south east (vide fig.no.20). National Highway no.44 which goes to

Laitumkhrah old market.

Laitumkhrah Police Point-
A busy commercial hub.

Jowai runs along the southern boundary of this ward. Inside the ward a network of lanes can be seen some of which are motorable. These lanes are connected with main road and with each other.

Because of these roads, this ward is well connected with other parts of Shillong and the number of commuters is quite high. However, acute traffic congestion and chaotic condition can be noticed at certain peak hours of day time as in the morning when the educational institutions start and at the evening around (3.30PM) when these institutions close. Inadequate and improper parking space around this market makes the situation worse. It is suggested that the National Highway No. 44 can be used for only heavy traffic like trucks, buses etc. while the main Laitumkhrah road can be used for plying taxis and other light vehicular traffic thus reducing the congestion.

OPEN SPACE: Though the demand for land is tremendous hardly any open space is found in this ward. Only near Laitumkhrah old market a small size vacant land is noticed which can be reclaimed and be better utilized for the expansion of the existing market.

3.2 LANDUSE PLANNING: Problems of planning and problem of implementation

Ian McHarg[4] has pointed out, land can be put to many uses and unfortunately it is put to wrong use. Some of the

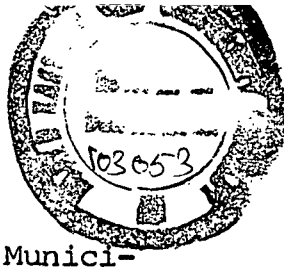
4. Ian McHarg.,"Design with nature", Natural History Press, New York, 1971.

problems arising out of improper planning and suggestions to imbue the entire town with a wholeness and consistency and with an efficiency are discussed here.

Meghalaya being an autonomous area under the Sixth schedule of the constitution, the management and administration of land of greater part of State is under the jurisdiction of Autonomous District Councils, although legislations concerning with urban planning and development are also in operation in the state.

As regards legislation on Town and country planning, Meghalaya has adopted the Assam Town and Country Planning Act, 1959 and the same has been extended to the entire State in January, 1989. There was practically no legislation in operation during 1972-1989, the period during which huge amount of Public Investments were made. This is perhaps one of the reasons for haphazard growth of Shillong. This Act allows for setting up of an Advisory Council and Development Authorities for the implementation of Master Plans and Development Schemes.

These along with Municipality, Public Works Department, Public Health Engineering Department, The Meghalaya Housing Board, Urban Affairs Department, District Councils and number of agencies engaged in various development works in urban area with their isolated approach and lack of co-ordination and integration, defeats the very purpose of an integrated and overall planned development of the urban area.



Municipality as constituted under the Assam Municipal Act 1955 (as adapted in Meghalaya) though are expected to take up various schemes of urban development, is severely handicapped by a weak resource base and absence of adequate sources of revenue like Octroi etc. Although the Municipality is empowered to collect the taxes and fees as house, water, lighting tax, market fees, service charges on central government buildings, vehicle entry tax, car parking, trade licence fee, rent on land and houses, stalls and shops etc. It has been superceded by Government and their only major source of revenue is in the form of Government grants and loans. Apart from this Municipality is also handicapped by an inefficient administrative set up and over staffing pattern engaged primarily with maintanance of services like town roads, water supply, drainage etc.

Shillong with nearly 2.50 lakhs of population and Municipal administration covering only 50 percent of urban population cannot plan for the whole urban area in an integrated manner. The civic affairs and investment are still managed by the traditional local bodies in other parts of Shillong and investments are made by various departments of State Governments.

It is in this context that setting up of Shillong Municipal Corporation is suggested. The structure of the proposed Municipal Corporation need not be like in other cities but may have unique feature by involving the members of the

District Council, the Syiem and the Headmen as nominated members. This is important as there are many local bodies involved in the civic affairs and virtually no co-ordination exist between them.

Meghalaya Urban Development Authority which has been constituted under the Meghalaya Town and Country Planning Act, 1973 (Assam Town and Country Planning Act, 1959 as adapted by Meghalaya) and started functioning with March, 1990 is also dependent on Government grants for its survival as it has no source of revenue at present. The Authority has to consider other sources of revenue like fees from building permission and also through service charge from channelisation of funds to government agencies for urban development schemes and through creation of assets.

The function of the Authority is enforcement and implementation of Shillong Master Plan. Though government of India has been emphasising on implementation of schemes for urban poor like Nehru Rozgar Yojana, Urban Basic Services, Environmental Improvement of urban slum, Liberation of scavergers, but except environmental improvement of urban slums hardly any work has been done in implementation ofother schemes. This is mainly due to the fact that there was no co-ordinating agency for implementation of such schemes. Since implementation of these schemes calls for a new approach and flexibility, the State Government has assigned Meghalaya

Urban Development Agency to get the schemes implemented through voluntary agencies, local durbars and direct participation of the community.

The Meghalaya Transfer of Land(Regulation)Act, 1971 as passed by the Assembly received the assent of the President on the 28th Dec.1971 under Section 3(1) of this Act -"No land in Meghalaya shall be transfered by a tribal to a non- tribal or a non-tribal to another non-tribal except with the previous sanction of the competent authority". Because of this Act, transaction of land has become difficult and artificial scarcity of houses has been created. To solve this problem, it is imperative to revise this Act.

As pointed out earlier the Department of Urban Affairs has prepared a Master Plan for Shillong covering an area of nearly 104 square kilometers, the Municipal Area being only 10 square kilometers. 90 percent of the Master Plan area is outside the jurisdiction of the Municipal Board. This is creating unique problems for the administration in providing infrastructure and other facilities in the area as one shot investment may create assets but cannot sustain the benefits.

Thus for proper landuse management of urban area, the existing boards should be strengthened, their jurisdiction may be extendedwhere ever necessary or new boards should be set up. These boards should function efficiently and should make attempts to mobilise additional resources for providing the desired level of services to the rate payers.

3.3 SUGGESTED PLANNING: To maintain dynamic healthy urban environment co-ordination in infrastructural and landuse planning with suitable flexibility is essential. A model[5] (vide fig.no.22) of use space rapproachment among dominant groups of aspirants for land occupancy is suggested here to determine the city's desirable future development. The model emphasis on creative action for the development of new areas in accordance with need and with corrective and preventive actions to guide the regulation. The model also takes into consideration public facilities for providing maximum comfort for community, folk-value implication and resource provision.

It is suggested that Master Plan should aim at -

i) creative actions in making provisions for adequate scope for the development of new areas in conformity with the need of accomodation of ever increasing dimensions of users of land;

ii) corrective and preventive actions to guide an orderly, efficient and attractive development of the city under the effective role of regulation and control.

iii) suggestive actions to release the maximum comfort for community by augumenting and improving public facilities and,

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5. C.S.Yadav.,"Morphology of Towns" Concepting Publishing House, New Delhi,(1987).

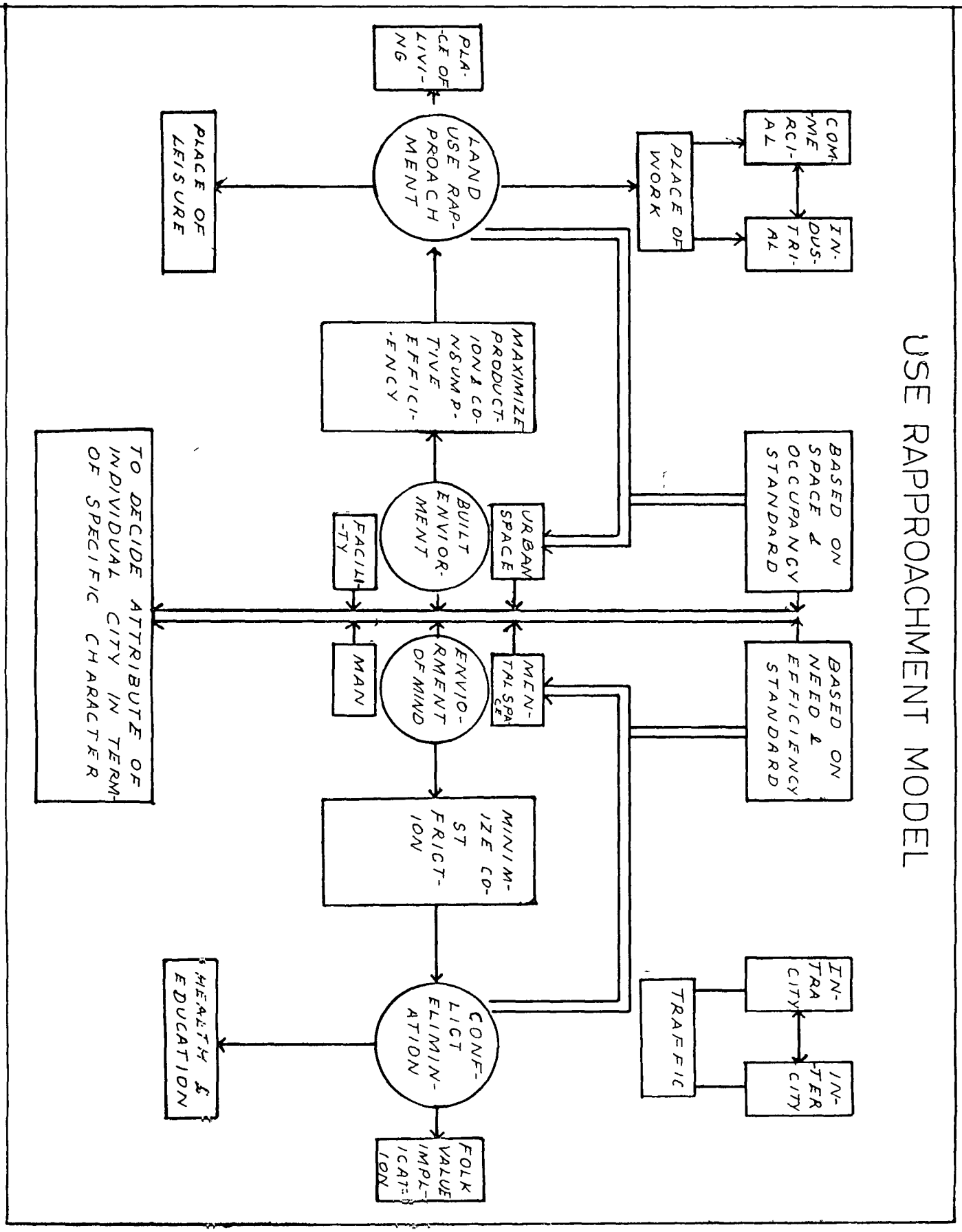
USE RAPPROACHMENT MODEL
PLACE OF LIVING
LAND USE RAPPROACHMENT
PLACE OF LEISURE
COMMERCIAL
INDUSTRIAL
PLACE OF WORK
MAXIMIZE PRODUCTION & CONSUMPTIVE EFFICIENCY
BUILT ENVIORMENT
FACILITY
URBAN SPACE
BASED ON SPACE & OCCUPANCY STANDARD
TO DECIDE ATTRIBUTE OF INDIVIDUAL CITY IN TERM OF SPECIFIC CHARACTER
MAN
ENVIORMENT OF MIND
MENTAL SPACE
BASED ON NEED & EFFICIENCY STANDARD
MINIMIZE COST FRICTION
INTRA CITY
INTER CITY
TRAFFIC
CONFLICT ELIMINATION
HEALTH & EDUCATION
FOLK VALUE IMPLICATION

FIG 22

iv) applicative actions to weigh its rationality with reference to issues of implementation, folk-value implication, use conflict elimination and resource provisions.

The essence of a Master Plan lies, therefore, in its being in a position to determine the city's desirable future development exhibiting an appropriate relation among different users of land, people and facilities.

CHAPTER IV

CONCLUSION

Shillong, the capital of Meghalaya, besides being the district headquarters of East Khasi Hills District, is one of the gateways of North-Eastern India. Shillong, at an elevation of 1600 mts is considered to be the queen of hill stations.

Shillong urban agglomeration is rectangular in shape. The Shillong Municipality, however, is starshaped. Shillong agglomeration consists of six towns - Shillong Municipality, Shillong Cantonment, Nongthymmai, Mawlai, Madanriting and Pynthorumkhrah which together cover about 25 sq.Kms of area and have a population of 214595 according to 1991 Census(provisional).

Shillong with a very rapid rate of increase in population (23 percent 1981-91) is faced with many urban problems. Urban problems have become economically more real, socially more visible and certainly politically more sensitive.

Efforts have been diverted to document the problems and other major issues of urban growth of Shillong. The specific argument for the inclusion of review of urban growth both in spatial extent and size (population)is that expansion in these areas has been very fast resulting in many complexities. The summary of major findings of the present study has been highlighted.

The evolution and growth of Shillong have been studied in two phases - colonial and post colonial with empha-

sis on spatial extent and size. It has been found out that growth of Shillong was laid by Britishers for the establishment of British sanitorium and cantonment, thus inducing the growth of the township. Since then, there has been continuous growth of the township. Since 1904 with the establishment of Municipality till 1931, consecutive amendments as regard to the consequent wards were made. Gradually Shillong urban agglomeration has taken its present shape with six towns.

Shillong has witnessed a very rapid urban expansion during the last decade though Growth rate has increased continuously since 1921. In 1961, Growth rate was 75 percent but in 1971, it came down to 20 percent which may be due to the shifting of Assam capital to Dispur and creation of new state of Meghalaya. However, in 1981 again, the growth rate increased to 43 percent.

With the increase in the population, urban expansion of Shillong have taken heavy toll on the forests. Many localities have come up in forest clearings and urban invasion has engulfed steep forested slopes. Localities like Kenches Trace, Bishnupur, Lumparing, Upper Nongthymmai, Madanrting, Alugodown, Laitkor, Rynjah have come up in clearings of upland forests. While city has out grown to occupy isolated places, forest clearings and even steep slopes in all directions under increasing population pressure, open space, nala beds, steep nala banks have been encroached upon within the central localities.

Study of various growth models and the discussions in context of Shillong, in the review, exhibits city having not only the combination of three types of urban supports but also aspects of three generalisations of landuse arrangement- Concentric zone, Sectors and Multiple nuclei.

As a general picture subject to modifications because of topography, transportation and previous landuse, the concentric zone is not found in a rigid form as much as growth or arrangement often reflects expansion within sectors or development around seperate nuclei. Both the concentric zone as a general aspect and sectors as applied primarily to residential use, assume (although not explicitly)that there is but a single urban core around which landuse is arranged symmetrically in either concentric or radial patterns.The sector aspect has been particularly to the outward movement of residential district. Construction activities which have taken place after 1971 has mainly been due to the infilling and accretion process in the already existing residential area. Both the concentric zone theory and sector theory applies the general tendency of central residential area to decline in value as new construction takes places in the outer region. Because of actual physical impossibility of such concentration and the existence of seperating factors,however seperate nuclei arise.

The inner zone or nuclei however has clearly been demarcated as Bara Bazar and Police bazar area, with characteristics as -

i) high degree of accessibility

ii) high land values and,

iii) relatively taller buildings.

Certain centripetal forces which contribute to these characteristics has also been identified as -

i) site attraction and

ii) functional convenience.

The analytic study of the map depicting the landuse pattern of the last few decades shows that the land-use pattern of Shillong is not static but dynamic one. A comparative review of landuse pattern and their decadal variations from 1971 to 1981 and from 1981 to 1991 shows that area under commercial, industrial, institutional and recreational use has increased at the cost of open space, forest and cultivation.

The discussion is especially focussed on spatial consequences of landuse. However in a comparative review designed to draw general lessons from each decade a trend has been established. To study the impact of newly developed market centre on landuse pattern intensive field study of ward IV of Laitumkhrah was undertaken. Due to the large numbers of commuters, problems of traffic congestion and lack of parking facilities has become acute here. Comparative study of landuse of different decades shows similar trend as of this ward.

In absence of state regulations and any defined framework of planned development the town has grown in a haphazard way resulting in congestion, over crowding and over straining of services and infra-structural facilities.

As the township was laid by British with the infra-structural facilities to sustain a few thousands of population, out growth of urban complex with around 2,00,000 of population from a meagre populace of 1363 has resulted in the problems of water supply, waste disposal, sanitation and drainage, debasement of basic resources like soil, water and air/ pollution siltation and pollution of water courses causing environmental degradation and steadily declining quality of life for many.

It has been found out that increasing administrative, commercial, transport and communication activities have remained mostly confined in a limited area. This combined with unplanned growth has increased the problem.

Suggestions regarding co-ordinated infrastructural and landuse planning has been forwarded.

It has been found out that most of the growth and landuse problems are the result of fragmented approach taken up by number of agencies engaged in developmental work. Also it has been found out that the Meghalaya Transfer of Land (Regulation) Act 1971, which imposes restriction on the transaction of land is one of the factors leading to artificial

scarcity of houses in Shillong. Limited jurisdiction of municipality with limited resource is another reason of ineffectiveness of measures taken by Municipality to eradicate these problems. Extension of the jurisdiction of municipality or setting up of Shillong Municipal Corporation has thus become imperative.

Besides to maintain healthy urban environment co-ordination in infra-structural and landuse planning with suitable flexibility is essential. A model of use space rapproachment among dominant groups of aspirants for land occupancy is suggested here to determine the city's desireable future development.

The model emphasises on creative action for the development of new areas in accordance with needs and preventive actions to guide and order the effective role of regulation and control in relation to efficient landuse. The model also takes into consideration public facilities for providing maximum comfort, folk-value implication and resource provision to the community.

It is suggested that any development plan should incorporate the everchanging factors controlling the dynamic growth, since planning is a continuous process, the Development plan should be reviewed after every five years.

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