

EFFICACY OF PUBLIC UTILITY – A CASE STUDY OF SHILLONG CITY

By

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DISSERTATION

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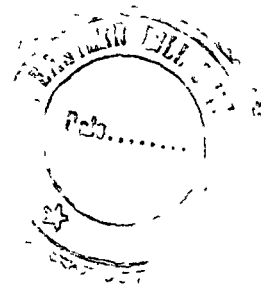
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Certified that the subject matter of this dissertation entitled, "Efficacy of Public Utilities - A case study of Shillong City" is the record of work done by Mrs. Ruma Paul under my supervision, that the content of this dissertation did not form a basis of the award of any previous degree to her, or, to the best of my knowledge, to anybody else and that the dissertation has not been submitted for any degree to any other University.

She has been duly registered and the dissertation presented is worthy of being considered for the award of M.Phil degree. In habit and character, she is a fit and proper person for the degree of Master of Philosophy.

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LIST OF TABLES

<u>No.</u>	<u>TITLE</u>	<u>PAGE</u>
I.1	: POPULATION OF SHILLONG (1901-1981)	10
I.2	: UNIT WISE POPULATION DISTRIBUTION (1981)	13
I.3	: DENSITY OF POPULATION IN MEGHALAYA & SHILLONG CITY	14
II.1	: POPULATION OF SHILLONG (M)	17
II.2	: POPULATION OF NONGTHYMMAI	18
II.3	POPULATION OF SHILLONG TOWN (AREAS OTHER THAN SHILLONG (M) & NONGTHYMMAI)	19
II.4	: DISTRIBUTION OF HOUSEHOLDS IN THE DIFFERENT AREAS OF SHILLONG	23
III.1	: RESPONSES FROM SAMPLE HOUSEHOLDS (ELECTRICITY)	32
III.2	: RESPONSES FROM SAMPLE HOUSEHOLDS (WATER)	35
III.3	: HOSPITALS APPROACHED AS REPORTED BY DIFFERENT PERCENTAGE OF HOUSEHOLDS	39
III.4	: VARIED REASONS - SHOWING PREFERENCE OF PRIVATE HOSPITALS TO GOVERNMENT HOSPITALS	40
III.5	: FACILITIES & CONDITIONS OF THE HOSPITALS/ DISPENSARIES AS REPORTED IN DIFFERENT AREAS	40
IV.a.	POSITION OF WATER SUPPLY IN SHILLONG (M)	49
IV.b.	DISTRIBUTION OF WATER	51
IV.c.	SEWAGE DISPOSAL FACILITIES	55
IV.d.	ELECTRICITY SUPPLY	59

		63
IV.e.	MEDICAL FACILITIES	
IV.f.	FACILITIES IN THE MEDICAL CENTRES	66
V.1	CONSTRUCTION OF OVERALL INDEX OF PUBLIC UTILITIES	
	SHILLONG	77
V.2.	WATER SUPPLY	78
V.3.	HOSPITALS	79
V.4.	BUS SERVICES	80
V.5.	SEWAGE & DISPOSAL	81
V.6.	ELECTRICITY	82
VI.1.	COST ESTIMATES	94 - 95
VI.2.	PROJECT COST SUMMARY	96 - 97
VI.3.	CENTRAL GOVERNMENT ASSISTANCE	98
VI.4.	STATE GOVERNMENT ASSISTANCE	98

LIST OF FIGURES

<u>NO.</u>	<u>TITLE</u>	<u>PAGE</u>
1.1.	MAP SHOWING THE POSITION OF SHILLONG IN MEGHALAYA	7
1.2.	MAP SHOWING THE AREAS OF STUDY IN SHILLONG URBAN AGGLOMERATION	8
1.3.	GRAPH SHOWING POPULATION GROWTH IN SHILLONG TOWN	11
1.4.	MAP SHOWING DENSITY OF POPULATION IN SHILLONG	16
2.1.	GRAPH DEPICTING THE SPATIAL VARIATION IN POPULATION DENSITY	22

C O N T E N T S

CHAPTER I	: INTRODUCTION	1
	Relevance of public utilities - Welfare considerations of public utilities -Productivity aspects of public utilities - Urban growth and Demand and Supply of public utilities.	
CHAPTER II	: GROWTH OF THE SHILLONG URBAN COMPLEX	6
	Growth of population - Intensification of density of population - Spatial variations in population density - Load on public utilities in Shillong-Reference.	
CHAPTER III	: ASSESSMENT OF EFFICACY OF PUBLIC UTILITIES :	29
	What people say.	
	Responses from the sample households/respondents and spatial variations.	
CHAPTER IV	: COMPARISON OF OFFICIAL REPORTS WITH SAMPLE RESPONSES	46
CHAPTER V	: CONSTRUCTION OF INDEX OF OVERALL EFFICACY OF PUBLIC UTILITIES - DEMARCATION OF DEFICIENT AREAS	72

CHAPTER VI	: PROPOSED PLAN FOR IMPROVEMENT OF DEFICIENT AREAS	86
	· Cost estimates for construction and improvement.	
	Mobilisation of resources. Needs for finance-	
	Various sources for financing the project -	
	Aid from Central Government - Allocation by	
	the State Government - Exploration of other	
	possibilities.	
CHAPTER VII	: CONCLUSION	103
	BIBLIOGRAPHY	107
	APPENDIX (INTERVIEW SCHEDULE)	110

CHAPTER I

INTRODUCTION

Introduction :

The question of efficacy of public utilities in a township assumes importance mainly because of three reasons : the first, because the growth of population in a township is an almost smooth function of time, while building, expansion and capacity utilisation of public utilities are jumping functions of time. Second, because the efficacy (or otherwise) has significant relationship with the welfare and quality of life of the people. Thirdly, because it has a close relationship with public awareness and the concern of the public authorities with regard to the benefit and welfare of the people.

Relevance of Public Utilities :

Public utility services are fundamental to the existence of an urban society and economy. Life in an urbanized society would not be possible without a sufficient and reasonably priced supply of public utility services on which the structure of a dynamic and diversified economy is to develop. Public utilities influence the business activity as a whole through providing the social overhead capital and making a demand for individual product.

Public utility services securities are generally regarded as desirable by investors. In a developing economy like India, public utility services contributed much towards economic research and development too.

The relevance of public utilities assumes more importance considering the practical needs of a state or region, political ideology, social philosophy and the stage of economic development. In developing countries it is these public services on which the foundation of a strong economy lie.

A plan to be successfully implemented and regulated, the active participation and co-ordination of these utility services are required. Investment in these services has subsequently increased in recent years and thus makes public utility services more relevant.

Welfare Considerations of Public Utilities :

Welfare consideration of Public Utility stem from the very defination of Public Utility. Public Utility comprises one part of a general class of business which are designated by our laws and courts as "business affected with a public interest". The main objective of Public utilities is maximising social welfare. This responsibility of Public utilities necessiates it to be run by Government enterprise whose one objective is "maximising social welfare" unlike private enterprise whose main objective is "maximising profit". Public utilities by their very character operate with welfare and public interest in view because they are :

- i) free from business competition to a substantial degree and are often pure monopolies.
- ii) required to charge only reasonable rates that are not unjustly discriminatory.

- iii) allowed to earn but are not guaranteed for a reasonable profit.
- iv) obligated to provide adequate service to the entire public on demand.
- v) closely associated with the process of transportation and distribution.

The dominant reason for the failure of competition to serve in the utility industry is the fact that these public utilities operate at or near lowest Average Cost in supplying a particular market, when free from competition of other sellers of the same service. When cost are low, prices are bound to be low, which would have reduced burden on the consumers. This indirectly has a bearing on the welfare of the community.

The main objective for the operation of public utility services are that they function as "engine for social betterment". Thus their functions are based on certain norms, ideals or criteria with which these services evaluate economic issues and pass judgement on what is good and what is bad from the view point of social welfare.

The effective performance of a public utility service has direct relation to the satisfaction of 'socialised wants'. And it is the effective satisfaction of these socialised wants which ultimately increase individual well-being and social welfare.

Urban Growth and Demand Supply of Public Utilities :

The process of urban growth has been described as technological and organisational. The increase in urban growth is closely linked with economic development and change in the social order and man's conduct and thought. Development of urban growth and problem are however simultaneous and, with change in the economic set up, cities and towns are faced with a major challenge. On examining the acute position of urban population, it becomes evident that with urban growth, threat is posed to the existing services available. The requirements of water supply, the drainage system, facilities for proper education, problems of transport, medical and health and various other services become a liability to the local body concerned. An inadequate supply of services and the resources at the disposal of local bodies do not have the necessary perspective or administrative machinery to keep pace with the rate of urban growth. The matter of social and psychological adjustment and unfamiliarity with the urban way of living give rise to a need for a consideration for the authorities.

With urban growth, demand for essential services gradually increases and public utilities are required to stand ready to serve whatever reasonable demands the consuming public may place upon them which distinguishes them from monopolies as they are not able to withhold their services from the market. Future demand for public utility services requires them to study the direction and character of expected market growth. In surveying the demand for public utility

services it is one character which stands prominent i.e. its wide periodic fluctuations which follow daily, weekly and seasonal patterns throughout the year which becomes prominent with urban growth. As these services are non-storeable they must be produced and delivered as and when demanded by consumers. In order to meet the continuous demand, the services require to provide reserve plant capacity in order to assure continuity of service. However, there are certain public utilities which are faced with essentially similar time patterns of consumer demand, although differences in market characteristics due to local or regional circumstances necessarily have an impact. (e.g. water and electric services).

In the process of urban growth, as the demand for public utility services grows simultaneously, the supply of public utilities though not constant grows at a slower rate than the demand. In spite of the growing demand, public utility services usually operates under a single seller supply, supplying one or more utility services in a city or area. In this case the unit cost of supplying utility services becomes lower when monopoly exist than when competition is attempted. The supply of public utilities are influenced again by investment pattern and availability of equipment for operation and expansion of output to meet necessary demands. These services have a continuous process of production and supply and thus increased demand with urban growth is finally met.

CHAPTER II

GROWTH OF SHILLONG URBAN COMPLEX

Growth of the Shillong Urban Complex :

The objective of the discussion and description in this chapter is to portray the growth of population of Shillong town over time for different areas under investigation. Increase in the demand for public utility services is directly related to the growth of population. Therefore our second objective of discussion in this chapter is to determine how the population growth has created an impact on the existing public utility services.

Location :

Shillong, the locale of the present study and the capital town of Meghalaya is located in the East Khasi Hills District between longitude $91^{\circ}56'E$ and latitude $25^{\circ}34'N$ at an altitude 1850-1900 metres above mean sea level (Fig.1.1). The area enjoys a sub-tropical monsoon climate with average annual rainfall of 250-300 cms.

Growth of Population - (Historical Background) :

There was no settled habitation by the name Shillong until the British settled this area for their headquarters. There were only a few scattered houses in the adjoining villages of Laban, Laitumkhrah, Nongkseh and Lawsohtun (Fig. 1.2). The area of Shillong, as it came to being in the second half of the 19th century was the habitat of the Khasis although quite a few had been living in these hills from time immemorial. With the coming of the British and other outsiders it undertook a great change in the political and social set up of the community. The new political and administrative set

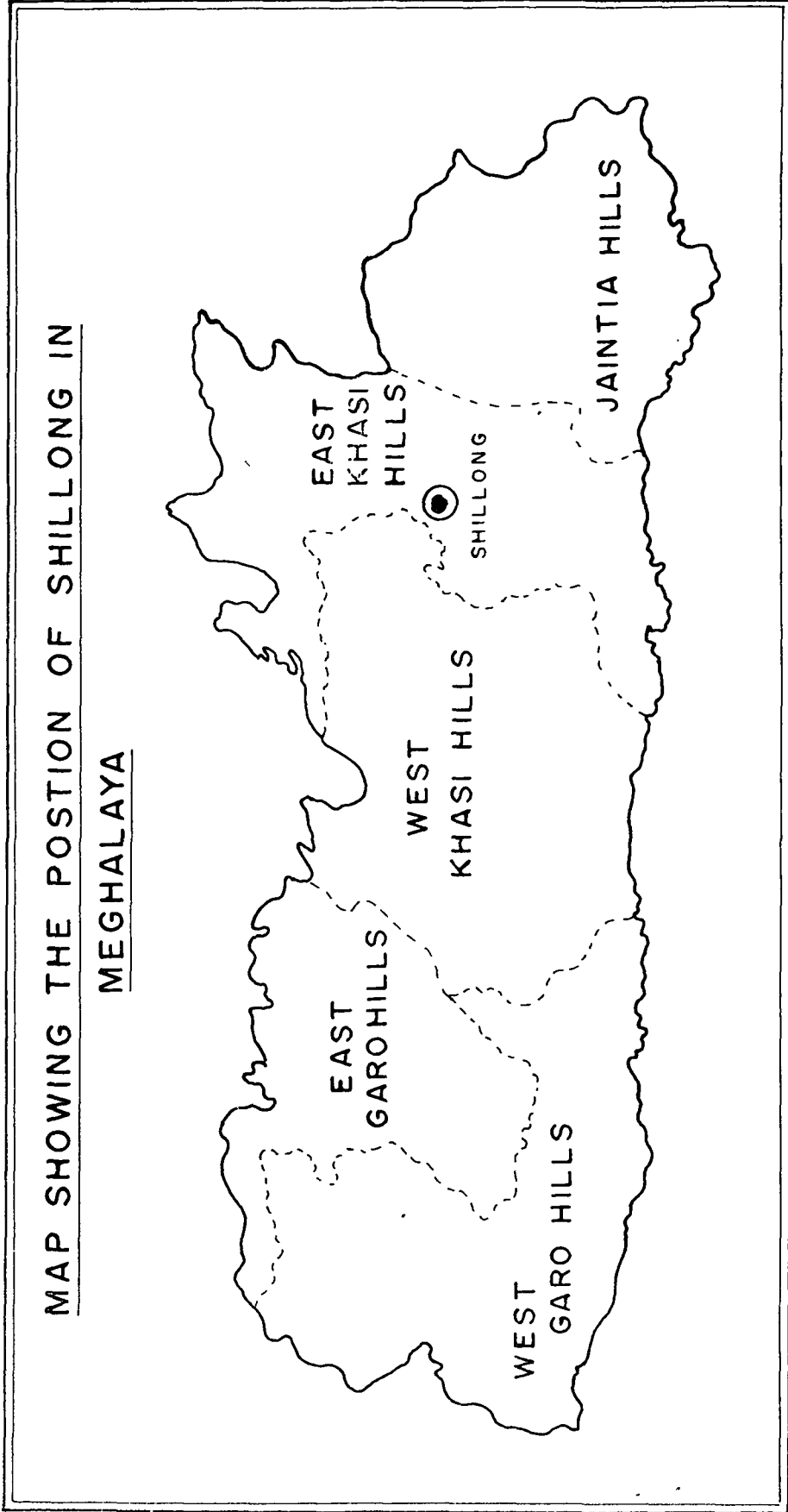


Fig.1.1

MAP SHOWING THE AREAS OF STUDY
IN SHILLONG-URBAN AGGLOMERATION

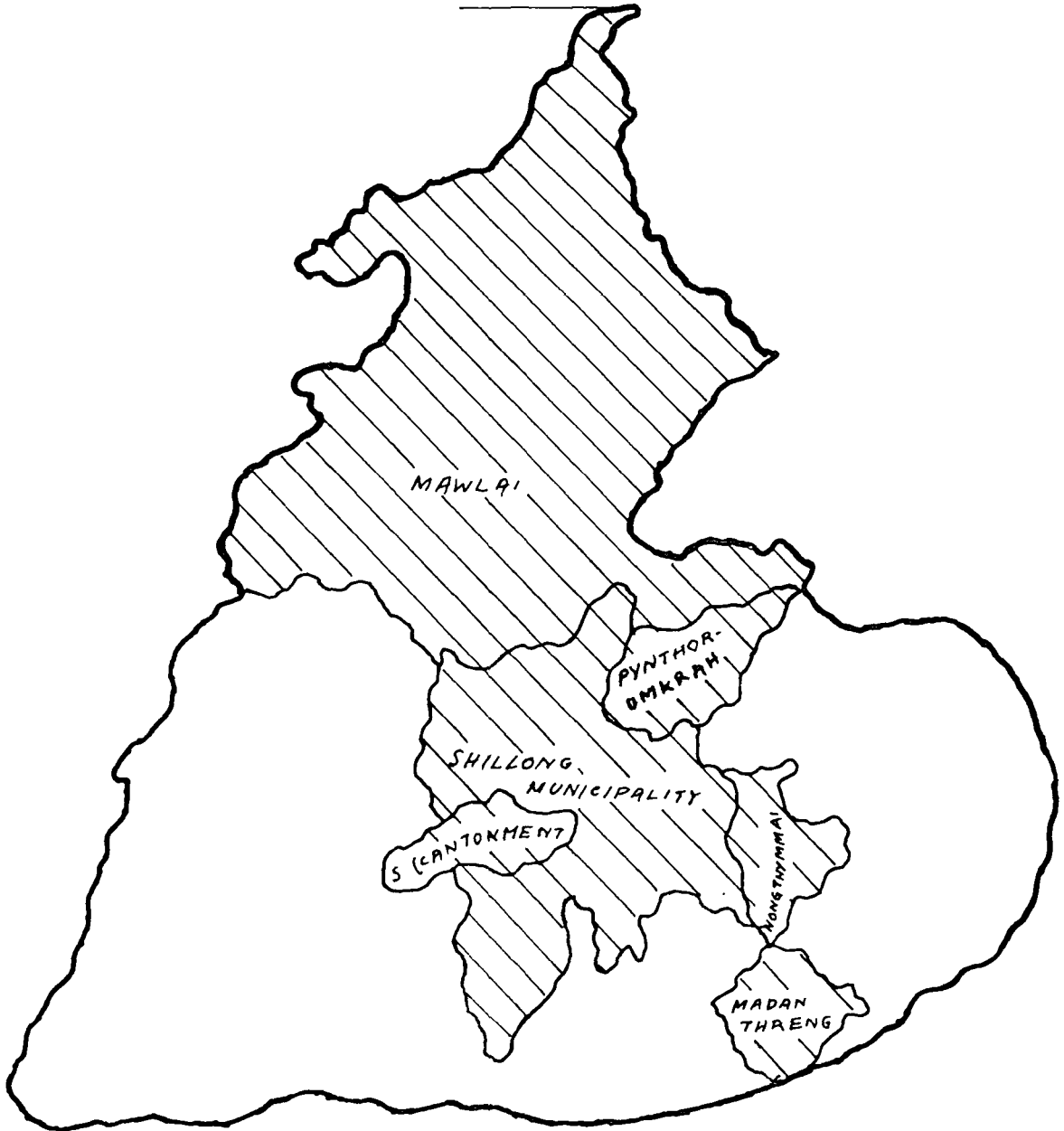


Fig.1.2.

-up demanded the settlement of the British and other European officials in the area. Soon the centre of political gravity was shifted from the plains to the Khasi Hills District of Assam. Gradually, however, people from outside started flocking in to this centre either for the purpose of business activity or for the purpose of seeking job connected with the new administration. Moreover, the pleasant climate was another major source of attraction, which is comparatively better than other places of Assam.

Shillong thus became a coveted place in the North-Eastern region. In due course, small villages formed a cluster which gradually gave rise to the big cosmopolitan town. However, the flow of people (Khasis) from the rural areas to the town was slow and less. The influx of other communities from outside was instead much greater. Moreover, the Khasis have comparatively smaller families. As such, there is a slow rate of increase in the population. However, in recent times, Shillong has acquired a distinction of being a good educational centre. This attracted students and families from outside to contribute to the growth of population. Again, the advantages of town life have attracted people from the neighbouring areas leading to an increase in population.

Population Growth :

Shillong town is an overgrown village which expanded over the last one hundred and twenty years. Prior to 1871, no attempt was made at census survey in the whole Khasi and Jaintia hills. It was in 1872, that census operations started in these hills. In

that year (1872) Shillong had only 1363 inhabitants but the population of the town had been entirely altered after that year. The growth of population of the town Shillong could be observed from the Table I.1 given below.

TABLE - I.1

Population of Shillong since (1901-1981)						
YEAR	AREA IN Km ²	PERSONS	DECADE VARIATION	PERCENTAGE DECADE VARIATION	MALES	FEMALES
1901	21.27	9,621	6,577	4,044
1911	21.27	13,639	4,018	41.76	7,762	5,877
1921	25.40	17,203	3,564	26.13	9,512	7,691
1931		26,536	9,333	54.25	15,634	10,902
1941		38,192	11,656	43.93	22,696	15,496
1951		58,512	20,320	53.20	32,790	25,722
1961	21.27	102,398	43,886	75.00	58,082	44,316
1971	21.27	122,752	20,354	19.88	66,161	56,591
1981	25.40	174,703	51,951	+ 42.32	91,728	82,975

SOURCE : DISTRICT CENSUS HANDBOOK

Fig. 1.3 presents as to how population has grown in Shillong over the years since 1901.

From Table 1.1 what one may observe is that there has been a rapid growth of population in the town during these 80 years. From the year 1901 to the year 1931, the growth has been steady and slowly increasing. But a rapid rise is observed between the

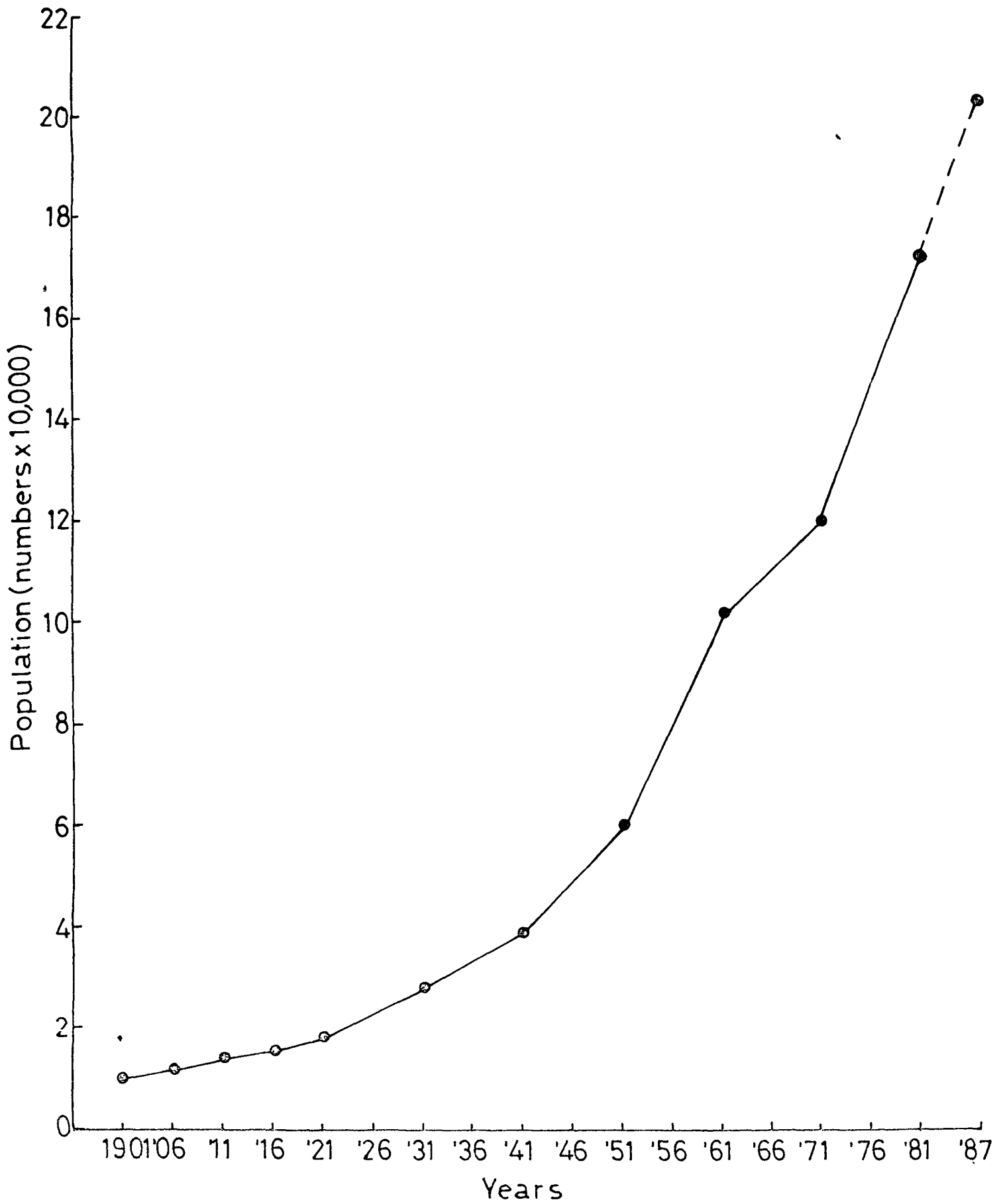


Fig1.3 Showing Population growth in Shillong town

years 1931-41 followed by a remarkable increase in the years 1941-51. This has been followed by a greater rise in the years 1951-61-71 and again a rise in the year 1981.

The rise in population during the first three decades is characterised by natural rate of growth which comes naturally with the growth of a town or city. The growth has also been due to the ever expanding business centres, educational institutions and diverse activities. The sudden increase of population to 87,659 in the year 1971 and 109,244 in 1981 has been due to the formation of Meghalaya as an autonomous state on 2nd April 1970. During this period there has been a large influx of people from rural to urban areas in the state and also from outside, thus increasing the overall population.

From Table 1.1 (percentage of decadal variation of population) it is evident that from the decades 1901 to 1981 population increases at a disproportional rate. The decades 1911-1921 and 1951-1981 show a sudden fall in the percentage increase of population. It is strange to see that in the urban areas of the state (Shillong Urban Agglomeration) there has been an overall increase to 74.9% during the year 1941-51. This is due to the addition of new towns (4). The percentage increase suddenly drops down to 25.27% in the decade 1961-71-81. The reason again may be attributed to the shifting of the capital to Dispur.

Population wise, the individual units of Shillong city stand as follows as given in Table 1.2.

TABLE 1.2

Unit wise population distribution (1981)	
SHILONG URBAN AGGLOMERATION	Total population (1981) census
A Shillong Municipality	107673
B Nongthymmai	21063
C Mawlai	20280
D Pynthor Umkhras	10735
E Shillong Cantonment	6653
F Madanrting	6160

SOURCE : DISTRICT CENSUS HANDBOOK

Density of Population :

The term 'Density of Population' refers to the number of persons per sq.km. In other words, density of population indicates the man-land ratio. Density measures the degree of population concentration in a particular area.

The population in the state of Meghalaya is not evenly distributed. The density of population in Meghalaya per sq.km in 1981 is 59 persons while in 1971 it was 45 persons. In Meghalaya East Khasi Hills district has the highest density of population.

According to the 1981 census, the density of Shillong town is 5763 persons per sq.km. With development and growth of urban sector, density goes on increasing which has both direct and indirect

effects on the utilisation of public goods of the society. The densities of population in Meghalaya and Shillong city have been given in the following table :

TABLE 1.3
DENSITY OF POPULATION IN MEGHALAYA & SHILLONG CITY

STATE/URBAN AGGLOMERATION	TOTAL RURAL URBAN	AREA IN Km ²	DENSITY OF POPULATION
	T	22429.0	60
MEGHALAYA	R	22344.2	49
	U	84.8	2,847
SHILLONG URBAN AGGLOMERATION	U	25.40	6,878
SHILLONG (M)	U	10.36	10,545
SHILLONG (CANTONMENT)	U	1.84	35,98
MAWLAI	U	6.14	3,323
NONGTHYMAI	U	2.93	7,358
PYNTHORUMKHAH	U	2.02	5,302

From Table 1.3, it follows that in the Shillong Urban Agglomeration Shillong (M) records the highest density of population. The density was 6993 and 8461 in the years 1961 and 1971 respectively. The population is concentrated more in this area because of the easy availability of different amenities in this area. Schools and Colleges have sprung up in this area during the last decade. Nongthymmai also records a high density of population. This is because of the existence of various schools which have opened in this area and the existence of N.E.H.U. This area comprises mainly of Khasis. The density of population in Mawlai, Pynthorumkhrah and Madanring

are lower as compared to other areas. These areas are far off from the heart of the city making the population less intense in these areas. These areas again are dominated mainly by Khasis.

Police Bazar, Burrabazar and parts of Laitumkhrach is a cosmo-type business centre and the population is heavily concentrated in these areas. The population consists mostly of Marwaris, Khasis and Bengalis. Density of population is heavy in this area because of location of schools, colleges and shopping complex being mainly concentrated in these areas.

Population in the Cantonment area is 6653 and the place is inhabited by the Defence forces. Density of population is very scanty in this area.

Madanrting and Pynthorumkhrach have developed recently. The population is steadily growing in these areas. However, the density is less as compared to other areas like Nongthymmai, Mawlai and Shillong Municipality. These areas are mainly dominated by the Khasis (Fig. 1.4).

Thus it has been observed that if the present trend of growth continues, population is bound to increase by leaps and bounds in a decade or two. The density is expected to concentrate as it is in the Municipality area because of the mani-fold advantages it enjoys. However, with the increasing cost, and difficulty in getting residential houses people have shown a tendency to shift to areas such as Mawlai, Pynthorumkhrach and Madanrting thereby increasing the density of population in these areas. This trend may continue and become more marked in the future.

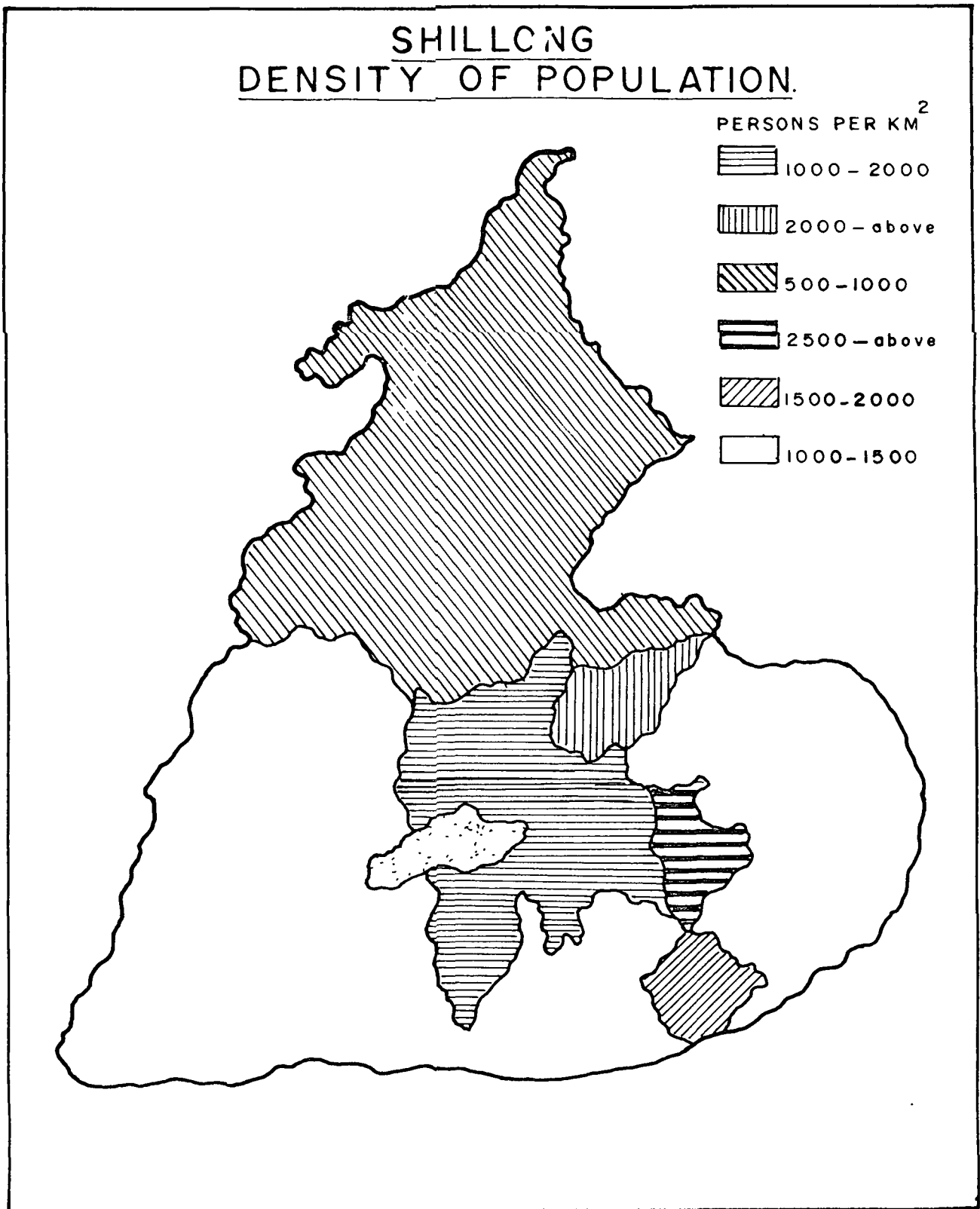


Fig. 1.4.

Spatial variations in population density :

Here we shall approach the problem from two view points:

- (i) That of tracing how the population density have varied with time and
- (ii) Accounting for their variations in space.

Table II.1, II.2, II.3 respectively shows the density of population in 1981 with variation since 1901.

TABLE II.1
Population in Shillong (M)

NAME OF TOWN	YEAR	AREA IN KM ²	PERSONS	DECADE VARIATION	PERCENTAGE DECADE	MALES	FEMALES	DENSITY OF POPULATION
SHILLONG (M)	1901		9,621			5,577	4,044	1961-6992
	1911		13,639	+4,018	+41.76	7,762	5,877	1971-8461
	1921		17,203	+3,564	+26.13	9,512	7,691	1981-10544
	1931		21,300	+4,097	+23.82	12,087	9,213	
	1941		30,734	+9,434	+44.29	17,263	13,471	
	1951		53,756	+23,022	+74.91	29,554	24,202	
	1961	10.36	72,438	+18,682	+34.75	40,550	31,888	
	1971	10.36	87,659	+15,221	+21.01	47,569	40,090	
	1981	10.36	109,244	+21,585	+24.62	57,092	52,152	

SOURCE : DISTRICT CENSUS HANDBOOK

An observation of the Table II.1 shows that Shillong Municipality which as an area of 10.36 sq.km occupies about 12.22% of the total urban area of the state and has a big size of population. The density of population is very high in this area and is increasing at a very rapid rate since 1901.

It is not unlikely that the steep rise in persons per square kilometre is due to the growth of business establishment, location of educational institutions and close proximity to markets and other necessary amenities.

TABLE II.2

Population in Nongthymmai Area

NONGTHYM- MAI	YEAR	AREA KM ²	PERSONS	DECADE VARIATION	% DECADE	MALES	FEMALES	DENSITY OF POPU- LATION
	1961	2.93	10,084	5,443	4,641	1961- 3441.6
	1971	2.93	16,103	+6,019	+59.69	8,558	7,545	1971- 5495.9
	1981	2.93	21,558	+5,455	+33.88	11,271	10,287	1981- 7357.6

Nongthymmai has also a fairly dense population and it has been growing over the years. The growth of population in this area is influenced by various factors. Since 1971 there has been a steep growth of residential houses in this area. New schools have sprung up in this area during the past 10 years leading to more in-coming of people from nearby towns and villages.

TABLE II.3

Population in Shillong town (Areas other than Shillong (M) and Nongthymmai)

NAME OF TOWN/URBAN	YEAR	AREA IN KM	PERSONS	DECADE	% DECADE	MALE	FEMALES	DENSITY OF POPULATION
MAWLAI	1961	6.14	8,528					<u>MAWLAI</u>
	1971	6.14	14,260	+5,732	+67.21	7,355	6,905	1961-1388.9
	1981	6.14	20,405	+6,145	+43.09	10,716	9,689	1971-2322.4 1981-3323.2
SHILLONG CANTONMENT	1931		5,236			3,547	1,689	<u>SHILL (CANT)</u>
	1941		7,458	+2,222	+42.44	5,433	2,025	1961-6167.3
	1951		4,756	-2,702	-36.23	5,236	1,520	1971-2570.6
	1961	1.84	11,348	+6,592	+138.60	7,739	3,609	1981-3597.8
	1971	1.84	4,730	-6,618	-58.32	2,679	2,051	
	1981	1.84	6,620	+1,890	+39.96	3,7657	2,863	
PYNTHORUMKHAH	1981	2.02	10,711					<u>PYNTHORUMKHAH</u> 1981-5302.4
MADANRTING	1981	2.11	6,165					<u>MADANRTING</u> 1981-2921.8

SOURCE : DISTRICT CENSUS HANDBOOK

From Table II.3 it follows that the growth of population in Mawlai town has been due mainly to 4 reasons.

1. Guwahati-Shillong road falls on this area leading to growth of tiny enterprises, business enterprises leading to the increase in the number of people.
2. Mawlai lies at a close distance to the main market and business centre of Shillong in Burrabazar.
3. Beyond Mawlai, Barapani has been identified as an industrial area. This has attracted more people into this area.
4. It has been decided that the township is to extend towards Barapani. This again has caused population to grow towards that direction.

However increase in population in Mawlai since 1961 cannot be attributed to non-tribal population influx as Mawlai locality is totally dominated by local populace. So the population increase is intrinsic.

In Shillong Cantonment area (Table II.3) the initial increase in population from 1931 to 41 has been very small compared to Mawlai. Such a low amount of increase could be attributed to lack of public amenities as this area lies outside the Municipal jurisdiction. Moreover, this area being an Army Cantonment area it is restricted for the general public. The subsequent population decline in 1951 could possibly be due to the transshipment of army personnel during

the 2nd World war. However, the next decade experienced an increment of the population to nearly double which again could be attributed to newer enterprises by way of business establishments and residential areas fringing the actual cantonment limits. Curiously, the next decade experienced a decline to nearly half. The only possible explanation to such a sharp decline could be a mass exodus into the Municipal areas of Shillong proper offering better enterprise prospects and new residential areas within the town proper. In the next decade the remnant population increased by about 2000 numbers and this could be explained by some amount of influx brought about by increasingly better public amenities and also by the intrinsic population increment.

The following graphs (Fig. 2.1) depict the spatial variation in the density of population since 1961 to 1981. The variation is shown for the six different areas.

As Pynthorumkhrah and Madanrting are newly formed towns their population is recorded only for the year 1981 and as such comparison with the previous years is not possible.

Table II.4 provides the distribution of the urban households in various areas of Shillong Urban Complex.

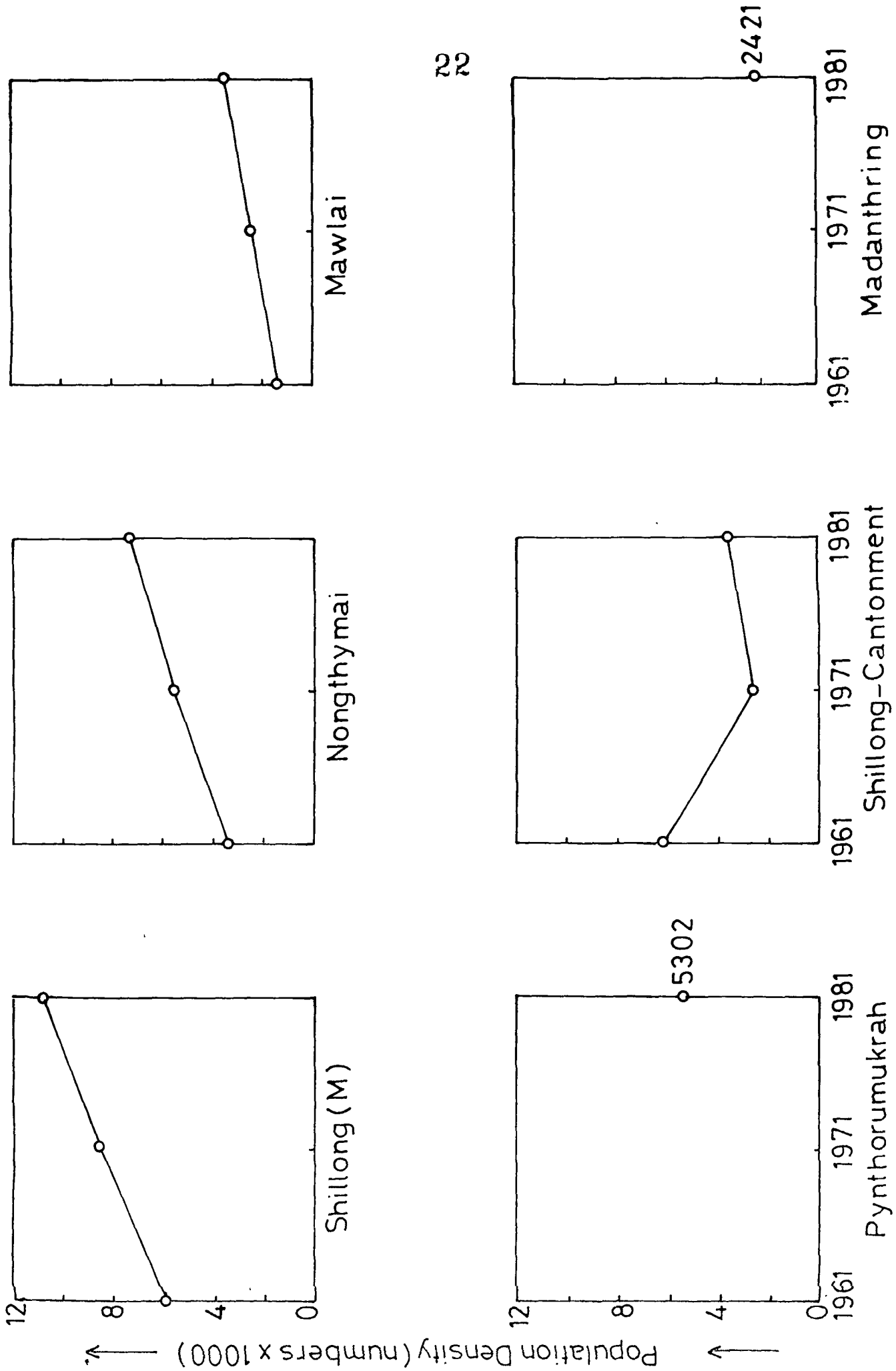


Fig. 2.1 Graph depicting the Spatial variation of Population density

TABLE II.4

DISTRIBUTION OF HOUSEHOLDS IN THE DIFFERENT AREAS OF SHILLONG

DIVISION OF AREAS	RURAL/ URBAN	AREA IN KM ²	OCCUPIED RESIDENTIAL	NUMBER OF HOUSE- HOLDS
SHILLONG URBAN(AGGI)	u	25.40	33,978	1,74,703
1. SHILL (M)	u	10.36	21,289	21,289
2. MAWLAI	u	6.14	3,593	3,593
3. NONGTHYMMAI	u	2.93	4,349	4,349
4. PYNTHORUM- KHRAH	u	2.11	2,244	2,244
5. MADANRTING	u	2.02	1,182	1,182
6. SHILL (C)	u	1.84	1,321	1,321

Load on Public Utilities in Shillong :

With the development of a town and concentration of population emerges a rapid expansion in the demand for public services and their utility assumes more importance. This poses a challenge and burden on the local bodies to meet the extra demand. This is because of the simple reason that population growth rate is faster than the growth of the existing machinery (specially in the developing economy). And secondly, because these public utility services are required to stand ready to serve whatever reasonable demands the consuming public have been placing upon them from time to time. As a matter of fact, these public utilities have to devote considerable

effort to study their markets and the direction and character of expected market growth thus increasing the obligation to these services to the public.

Let us examine the load on public utility services in Shillong under two heads.

1. That within a time span of ten years the rise of in population of Shillong town was by 62,994, about 39% or about 4% a year. The Urban Development Authority have projected the population growth to 4,27,500 by the year 2011 A.D. This fast rate of growth necessitates the supply for more water, more electric power etc. But the most prominent characteristic of the demand for public services is its wide periodic fluctuations, which follow daily, weekly and seasonal patterns throughout the year. The fluctuation is noticeable among water and electric services, where in the case of the former, the load is heavy during lean months and in the case of the latter, the load is more during winter months. The difficulty follows of course as a consequence of the non-store-ability of these utility services. Hence the load felt at a time is great.

2. (a) That with the growth of population and increase in the number of residential houses the demand for water supply for domestic and residential purposes has increased ten times the original demand. Water supply is very much insufficient and irregular in Shillong as a whole with the problem acute in some areas. With the awareness rising among the people regarding public health hazards, the demand

for pure drinking water has come into being necessitating the local bodies to implement proper storage facilities.

(b) The city of Shillong is expanding on all sides at a rapid pace, and the demand for electric power for lighting, heating, cooking, washing, etc has increased simultaneously including use of TV's, VCRs, etc. However, there has been frequent interruption in supply which has caused severe criticism and irritation among the public. However, no proper renovation of power station, modification of sub-stations, disposal of small hydro sets have been made. This has led to wide voltage fluctuation throughout the city and insufficient power supply. As such, in recent years the load on the existing capacity has increased and with it more responsibility for the M.S.E.B. (Meghalaya State Electricity Board) has been added.

(c) Health of the people is really the foundation upon which all the happiness and well-being depends. It is thus expected that health of the people should be the joint responsibility of the Central and the State Government. The existing medical facilities and conditions, though satisfactory, needs improvement in many areas. Improvement of health facilities in Shillong and proper guidance in this respect has fallen upon the level of administrative efficiency of the health authorities. These authorities need to implement various programmes, viz., education programmes in schools/colleges, medical relief, modernisation and extension of hospital facilities, increasing the number of beds. All these need to be implemented soon so as to cater to the immediate requirements of the people of Shillong.

(d) Shillong has fairly adequate city bus services. However, with the addition of new urban areas, viz., Pynthorumkhrah and Madanrting, it has been necessary on the part of the Meghalaya Transport Corporation to supply adequate buses in these areas. Increase in the number of buses, improving the sitting arrangements, removing over-crowding and looking into the comfort of the passengers have been the major motives for the authorities. Construction of parking facilities, widening of roads and creation of new routes to newly developed residential areas in Mawlai, Nongthymmai need adequate coverage. Terminal facilities need to be increased.

(e) Sewage and Drainage : There has been an unsatisfactory position of sewage and drainage position in all the areas of Shillong. The old sewer system laid out in some areas have not been replaced, expanded or improved subsequent to their installation to cater to the requirements of the increased population. The treatment and disposal of sewage followed crude methods, out-moded for current needs and modern conditions. The areas not provided for sewer system increased considerably and the existing sewer lines became over-loaded due to increase in population. Similarly, with growth of residential complex, buildings and commercial undertakings and in the absence of plan, drains are constructed in a haphazard fashion. Complaints pour in from local people and P.H.E. and Municipal Departments have realised the importance of setting up a proper network of drains and sewage system. The P.H.E. Department together with the Municipal

authorities have been loaded with programmes and schemes to be implemented soon.

In brief we can summarize the main findings under two heads:

- (a) That the load on public utilities are not the same throughout the year but characterized by periodic fluctuation.
- (b) That, pressure is felt more on utility services like water, electricity, sewage and drainage.

CHAPTER - II

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CHAPTER - III

RESPONSES FROM THE SAMPLE HOUSEHOLDS/RESPONDENTS AND
SPATIAL VARIATIONS

Responses from the Sample households/respondents and Spatial Variations :

The objective of the discussion in this chapter is two fold.

1. To analyse the availability and efficiency of public utility services to the people from studying the responses of the individuals.
2. To demarcate the areas lacking in the utility services.

Public utility are closely associated with our developing civilization, supplying wants so fundamental for commercial living that Government has at all times subjected them to some measure of control.

Public utilities may be classified into various group according to the generalized function which they perform in economic life. However, in our present study the following public services have been dealt with.

- (i) Services of Electricity
- (ii) Services of transportation (buses only)
- (iii) Services of water supply
- (iv) Services providing sanitation and drainage
- (v) Services of hospitals

Coverage of the Study :

The study covers Shillong urban agglomeration an area of 21.27 square kilometres with an estimated population of 2,05,875 in 1987. Shillong Urban Agglomeration comprises of the following

- (i) Shillong Municipality (ii) Nongthymmai (iii) Mawlai
 (iv) Pynthorumkhrah (v) Shillong Cantonment (iv) Madan-
 rting.

Sources of Data :

Data for the present study was collected with the help of a questionnaire formulated exclusively for the discourse in question. Besides using the questionnaire, individuals were interviewed and approached for information related with the study at different stages. Other information required have been obtained from the Meghalaya Central Census Office, District Census Handbook, Statistical Handbook of Meghalaya, Draft Document Plans, Urban Development Plan, Annual Finance Report of M.S.E.B., Report on Performance of M.S.E.B. and the booklets and useful documents on Shillong and Meghalaya as a whole.

The responses received from the respondents have been analysed taking each area separately. Though the questionnaire have been distributed personally to a wide cross section of people, many have left them incomplete or could not supply the required information. This contributed to certain limitations of the present study.

The map of Shillong indicates the location of six areas (the subject matter) of our study (Fig. 3.1). Here we shall observe the response received from various households as regards the services of electricity, water supply, transport, hospital services and drainage and sewage services.

3.1. Responses from Sample Households & Spatial Variation :

Electricity :

Shillong Municipality records the highest consumption of electricity among the other areas of our study. Out of a total of 125 MW of electricity generated in the state, 20 MW are required for Shillong and it winter it grows to 22 MW.

In spite of the fact that 5 projects* have been installed in the State of Meghalaya, generated electricity, there is a wide complaint of voltage fluctuation in the urban areas of Shillong Table III.1 presents a clear picture of the responses received from individual households as regards the occurrence of fluctuation. It is clear from the observation that fluctuation is greatest at night as reported by more than 80% of the population. Frequency of fluctuation as reported by all the areas is only a slight. Unlike other towns and cities voltage fluctuation is not much of a problem in Shillong. Regular fluctuation is not a common feature in Shillong.

Projects

* 1. Umiam Stage I	Installed capacity = 36 MW
2. Umiam Stage II	Installed capacity = 18 MW
3. Umthru Stage III	Installed capacity = 60 MW
4. Umthru	Installed capacity = 11.2 MW
5. Umiam-Umthru Stage Iv	Installed capacity = 60 MW

TABLE - III. 1
 RESPONSES FROM SAMPLE HOUSEHOLDS (ELECTRICITY)

SUB - DIVISION	OCCURENCE	PERCENTAGE OF HOUSEHOLDS	FREQUENCY (ON AVERAGE)
SHILLONG (M)	DAY	9.2	Slight
	NIGHT	80	
	DAY/NIGHT	18.4	
NONGTHYMMAI	DAY	15	Substantial
	NIGHT	40	
	DAY/NIGHT	10	
MAWLAI	DAY	5	Slight
	NIGHT	60	
	DAY/NIGHT	5	
PYNTHORUMKHAH	DAY	25	Slight
	NIGHT	71	
	DAY/NIGHT	-	
SHILLONG (CANT.)	DAY	25	Slight
	NIGHT	25	
	DAY/NIGHT	-	
MADANRTING	DAY	25	Slight
	NIGHT	25	
	DAY/NIGHT	-	

While the problem of voltage fluctuation is not much acute in Shillong, checking of meter box and recording complaints is seldom done as reported by almost all households studied. In some areas like government quarters, and P.N.T. residential houses monthly checking is done during the time of recording electricity bill. Thus, while the problem has been understood measures may be taken to ameliorate the situation through better management and routine-based work.

Water Supply :

Among the three basic necessities of life, water is one of them. Shillong is fortunate in having an ample source of water. Shillong has an annual average rainfall of 250-400 cm. Among the other sources of water supply, there are water falls, wells and roadside taps and natural spring water.

In spite of the fact that there are various sources of water supply, there exists water-shortage problem in the urban areas of Shillong. The problem has increased in magnitude over the recent years.

Over 84.5 percent of the population have reported that water connection is available inside the residential complex. Around 28.18 percent of the population have water facility outside the house situated either at close proximity or sometimes at a distance a little off from the house. In houses where water is available inside the house there is not much a problem. However, in case where water is brought from outside the problem is worth-noting.

As large as 62.7 percent of the households have recorded their complaints regarding water-supply. Some have shown that availability of water gets acute during the dry season and during shortage. Sometimes, during the rainy season dirty water flows through pipes making difficult to get fresh drinking water. Some again have complained of the difficulty in bringing water from long distances either from spring or waterfalls. The study has shown that the water-supply problem is most prominent in Shillong Municipality area and Mawlai and Nongthymmai areas.

Most of the water sources of Shillong are dependent on surface water and this is facilitated by a fairly good amount of rainfall distributed throughout the year. From the above it is clear that acute water scarcity affects the populace during the dry period lasting for a duration of 2 to 3 months. Such a situation is understandable as no permanent provision for tapping the water resources on a long-term basis exists. The gravity of the situation can be appreciated by the response generated in the questionnaire where a section (30%) of the population reported incurring of expenditure amounting to even 120 Rs. per month for procuring water from outside sources

TABLE III. 2

RESPONSES FROM SAMPLE HOUSEHOLDS (WATER CITY)				
Percentage of population incurring Ex-	Class interval (Expenditure in Rs.)	No. of population	Percentage of Total population	Percentage of population incurring expenditure
30% (Approx.)	5 - 15	5	4.5	16.5
	15 - 25	9	8.18	30.0
	25 - 35	4	3.6	13.3
	35 - 45	-	-	-
	45 - 55	2	1.8	6.6
	55 - 65	3	2.7	10.0
	65 - 75	2	1.8	6.6
	75 - 85	1	.9	3.3
	85 - 95	-	-	-
	95 - 105	3	2.7	10.0
	105 - 115	1	-	-
	115 - 125	1	.9	3.3

About 37 percent households have reported that remedial measures have been undertaken by the Government whereas 61.8 percent reported that they know and experience nothing of this sort.

From the responses received it may be observed that prompt service of repair and fixation of pipes and water connections has been done in Shillong Municipality area and Shillong Cantonment. In the rest of the areas much reform needs to be done in this regard.

However, the Shillong Municipality has undertaken a Greater Shillong Water Supply Scheme to cover the city of Shillong. The project started in the early 80's, was to be completed in two phases. The first phase is complete and now provides community water facilities in certain urban localities. By virtue of this the figures depicted above (Table III.2) have been reduced from a situation which

was even more alarming. The second phase is yet to be completed which will further ease the situation.

Transportation :

Road transport plays an important role to subserve the economic as well as social objective of any region. Road connection in Shillong city consists mainly of Metalled Road and Black Topped road.

The type of buses that ply on Shillong city are mainly private buses charging Re.1/- per per persons. The other type consists of buses charging 50 paise per person. There are other buses run by Meghalaya Transport Corporation which operates only during specified period (in the morning carrying school children and MTC employees and in the afternoon doing the same).

Reports from the questionnaire have shown that 79% of the population have expressed satisfaction of the number of buses offering services to the residents of Shillong. 36% of the households have shown that the number of buses are quite few and do not cater to their needs. These reports have come from areas like Mawlai, Shillong Cantonment and Pynthorumkhras areas. Nine percent of households have left their columns blank and thus we have to derive any conclusion from about 81% of the sample household.

Through discussions with the households it has shown that there are areas such as Nongthymmai, Police Bazar, Bara Bazar and

Laban where the duration of bus stoppage is long causing much inconveniences to regular passengers. The buses do not move unless they are fully loaded.

About 56.3% of the households have reported that the amenities provided by these buses are good, while 23.6% reported that the amenities provided are bad and 3.6% have reported that the amenities provided are not very good.

Most of the households have complaint of high ticket fare of Re.1/- per person. They have shown that Shillong, unlike other towns, demands a low fare considering the distance covered. The duration of stoppage is sometimes very lengthy adding to the inconveniences of the people.

Shillong Cantonment and Pynthorumkhrah have reported that the frequency of bus service need to be improved in these areas. About 5 percent of the households in Nongthymmai area reported that the number of buses should be increased in this area, which shows that a very small percent supports the demand for more buses. The rest 13.63% of the households are satisfied with the frequency of bus service in this area.

In Shillong Municipality 30% reported that the number and frequency of bus services needs to be increased whereas 29% reported that the existing services are satisfactory and requires no immediate improvement.

Health :

Health is the primary concern of all individuals and people. State of health denotes the health of the people as a whole. Health of the citizens is the foremost concern of the government and therefore importance has been given to this aspect in the various plans formulated from time to time.

The hospitals in urban areas particularly in Shillong are so over-crowded that authorities are finding it increasingly difficult to cope with the situation. With the increase in states population, it is natural that the number of patients too would increase. But number of hospitals and their accomodating capacity remain the same.

In Nongthymmai area 9% of the household have reported that R.K. Mission lies at close proximity, 3.6 % reported of Umpling Dispensary. And only 5.45% of the household reported that there exists no public hospital in or around their locality.

In Shillong Municipality, the hospitals approached as reported by 56.3% of the households are Ramakrishna Hospital, Civil, army hospital and Umpling Dispensary.

Motinagar area complaints of no dispensaries or hospitals in the area resulting in great inconveniences for the people in this area.

Over 70% of the households in Mawlai area approach the Civil hospital at times of emergency.

In Shillong Cantonment area all the household reported that Army Hospital caters to their needs, and only in case of emergency or serious treatment other State Government hospitals are approached.

TABLE III.3

HOSPITALS APPROACHED AS REPORTED BY DIFFERENT PERCENTAGE OF HOUSEHOLDS

1. Ramkrishna Mission Dispensary	20%
2. Umpling Dispensary	8.1%
3. Civil Hospital	36.3%
4. Army Hospital	(Negligible)

It is only 37% of the households which reported that the distance from their homes to the hospital is close. Whereas around 50% of the households have complained of no hospital or dispensaries within a short range. But the hospitals referred to suffer from acute shortage of beds. So bed strength of these hospitals need to be increased.

Table III.4 provides the reason why 80% of the households prefer government hospitals as against 25% of the households preferring private hospitals.

TABLE - III.4

VARIED REASONS - SHOWING PREFERENCE OF PRIVATE HOSPITALS TO GOVERNMENT
HOSPITALS

Preference for Private hospitals as reported by of the households	1. They are clean, hygienic 2. They provide better medical facilities 3. They are better organised and properly maintained 4. Better discipline and better staff 5. More secure and safe.
Preference for Public hospitals as reported by of the households.	1. They are cheap and easily approachable by the common man.

TABLE - III.5

FACILITIES & CONDITIONS OF THE HOSPITALS/DISPENSARIES AS REPORTED
IN DIFFERENT AREAS

	NONGTHYMMAI		SHILLONG(M)		MAWLAI		MADANRTING		SHILLONG		PYNTHORUM-KHRAH	
	F	C	F	C	F	C	F	C	F	C	F	C
Good	30%	30	24.6	38.4	10	30	-	25	100	25	28.5	57.1
Satis- factory	55%	50	52.3	33.8	50	50	100	75	-	75	71.4	-
Unsatis- factory	-	-	7.6	4.6	20	-	-	-	-	-	-	42.8

F - Facilities

C - Conditions

Table III.5 reports the facilities provided by the hospitals and conditions of these hospitals as reported by the households for different areas.

On the whole, the facilities and conditions in the various hospitals of Shillong city are not very satisfactory. The number of hospitals, clinics and dispensaries need to be improved and increased for each area. The medical facilities provided are charged as reported by almost all the households studied. The rate of visit varying between Re.1/- to a maximum of Rs.25/- per doctor. However, it is the cost of medicines which takes a large chunk of one's income.

Sewage and Drainage :

Impurities are spoken of as sewage and consists of the faeces and urine of human being. Sewage also includes dirty water from baths, from the washing of floors or of cooking utensils etc.

In India, there are various methods of sewage disposal. The Conservancy system, the privy or Middle system, the Water Carriage system etc.

However, the survey conducted reveals that in the urban areas of Shillong the Water Carriage System and Septic tank is mostly used for sewage disposal.

In Nongthymmai area more than 70% of the households have the lavatory located inside the house and only 30% households reported outside the house but at a close distance.

Similar is the case in Shillong Municipality area where 78.4% have latrines and drains inside the house. Whereas only 23% have them located outside.

In Mawlai, Madanrting, Shillong (Cantonment) and pynthorum-khrah the percentages are 70, 50, 50, 85.7 respectively who have lavatory inside the house. Whereas 30, 50, 50 and 14.2 percent have them located outside.

About 29 percent of the household in the urban area have reported that sewage is disposed off regularly whereas 79% reported that the disposal is irregular or not done regularly.

It is to be noted here that these 79% of the household consists of the population where the Septic Tank or water closet method is used for sewage disposal hence sewage is automatically washed away into a drain or tank connected with the water closet. However, among the 29% of the household some use the privy system where the excretions are thrown into a large pit which is later filled up with earth.

As regards cleaning methods adopted the report of the questionnaire have shown that 75.4 percent of the households have reported that no chemical methods are adopted by the municipal authorities to cleanse the surrounding from time to time. It is only a very negligible section of the population who reported that cleansing methods are sometimes used.

It is important that houses and dwelling sites must have proper drainage facilities.

In Nongthymmai area 50% of the households have complained of improper ventilation in the drainage system whereas 50% reported that drains and surroundings are well ventilated.

The problem of drainage however lies in areas like Shillong Municipality and Mawlai. This may be due to congestion and overcrowding of population in such areas leading to growth of residential house side by side. This leads to constructing of drains and waste-pipes within short range affecting proper ventilation. More than 69.2% of the household studied have complained of improper drainage and ventilation in Municipality area and 40 percent in Mawlai area.

However, the problem is not much acute in areas like Shillong Cantonment (which have mostly army quarters and are properly constructed) and Pynthorumkhrah and Madanrting. This again may be due to the fact that residential houses are properly spaced and over-crowding is not much prominent in such areas.

Taking the urban areas of Shillong as a whole, drainage and conservancy system are not very satisfactory as judged from the standard of modern living in cities of this size, they are extremely bad

Drains in most of the households of Shillong Urban Agglomeration lies either inside the house or are constructed outside the house.

CHAPTER - III

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It is only a few households (around 15%) scattered in all the areas studied have drains under the house. This however is a defect in the construction of drainage and as such drains which carry sewage if broken, gases and germs are likely to rise up into the house.

In most of the households (85%) drains are constructed side by side of the house or along the side of the road. This is a good system as repairs can be easily effected when required.

CHAPTER - IV

COMPARISON OF OFFICIAL REPORTS WITH SAMPLE RESPONSES.

Comparison of Official Reports with Sample Responses :

In this chapter our main objective is to review the situation regarding public services and utilities in the township of Shillong so far as it is reported in the official documents and has been obtained by personal interview of the officials.

Water :

The water scarcity in Shillong during lean months is a common phenomenon which happens every year. It is known that drinking water in the hill town of Shillong is a Nature Gift which absolutely depends on the vagaries of nature. In the years when rainfall is abundant, the scarcity of water during the dry season is less and in years when the condition is adverse, the scarcity of water becomes very acute and cannot be normalised with all efforts within human capacity and the problem remains practically unsolvable.

Water in Shillong is collected from the natural springs, underground sources replenished by showers. The springs are also gradually drying up due to deforestation of catchment areas.

All available sources within and outside Municipal area have been explored and put to use by the Municipality in collaboration with the P.H.E. The Government have also implemented some schemes to augment water supply from other sources but could not be satisfactorily done due to rapid growth of Shillong population.

Still all the combined efforts of the Municipality, P.H.E. and the Government has not been successful in solving the problem

Still all the combined efforts of the Municipality, P.H.E and the Government has not been successful in solving the problem of scarcity of water during dry months commencing from February and continuing upto beginning of May. however, with the incoming of rains the problem gradually lessens.

There is no river or lake in and around Shillong like other metropolitan towns and cities from which water can be drawn and pumped in by sophisticated method to make good the deficit during scarcity period.

The other important point, which cannot be overlooked is the constant growth of population in Shillong. Sometime after the Municipality was established the population of Shillong was 10,000. Since then the last census it rose to 87,658 and within 10 years thereafter the population has reached 450,000 in number. When the population is increasing by leaps and bounds including floating population, it cannot therefore be expected that the limited quality of water will be sufficient to meet all demands.

At the very outset, the Municipality had three sources from which water was supplied to 10,000 population. The sources are :

- (i) Wahjalynneh
- (ii) Wahrisa and
- (iii) Madan Laban.

Government through P.H.E. explored Umkhen and replenished the supply which also fell much below expectation and the position did not show any remarkable improvement.

The P.H.E. implemented two schemes, viz., :

- (i) Umjasai and
- (ii) Crinoline.

But still there was no perceptible improvement of water supply as the source gradually dry up during the dry months. And schemes from sericulture and crinoline has also been taken up to augment water supply to Mawkhar, Jaiaw, Jail Road, Police Bazar and Oxford Mission (Laban).

But inspite of all these complexities and constraints, the Municipality is not sparing anypains to distribute available quantity of water proportionately to the acute scarcity areas of the town. In dire necessity water is also supplied by Tank Wagons which draw water from the selected filling points constructed by the Municipality.

Assuming that the present population of Shillong Municipality area is 1,50,000 the requirement of water comes to 20,50,000 gallons taking into account the average requirement per head at 45 (standard adopted officially) gallons per day. The present daily out turn of water is given in Table- IV.a (according to official reports).

TABLE - IV.a

POSITION OF WATER SUPPLY IN SHILLONG (M)

Estimated requirement	: 22,50,000 gallons per day
At present available	: 7,00,000 from the Municipal sources
	+ 9,00,000 from Greater Shillong Water supply scheme
	+16,00,000 (P.H.E.)

SOURCE : OFFICIAL REPORTS OF MUNICIPALITY

There is however, a small percentage of wastage of water due to leakage from the old and rusty pipes.

The existing scheme for water supply was executed by the Municipality in the year 1931.

However, the overall situation in connection with water supply in Shillong town may be improved as and when 2nd phase of the Greater Shillong Water Supply Scheme is commissioned by the P.H.E. Department.

However, area wise classification and distribution of water supply is given in Table IV.b.

Mawlai :

The pumping scheme is applied for Mawlai area and 3 lakh gallons of water is pumped every day. 50 thousand gallons also comes from Greater supply source.

From Umkhen water is supplied through gravity scheme which flows partly to Shillong (M) and partly to sub-urbs supplying around 2.85 lakhs gallons of water. There is thus no complain in the area as reported by the P.H.E. (Department) and every problem is attended to.

Greater Shillong to Mawprem : - Water is supplied through two shifts - Morning shift 1 lakh 85 thousand gallons is pumped out and in the evening 2 lakhs 30 thousand gallons is pumped out.

In Bara Bazar and adjoining areas 2 lakhs 60 thousand gallons is distributed.

In Lachumiere tank, 4 lakhs 55 thousand gallons of water is pumped each day from where it again flows partly to Upland and New Colony areas.

In N.E.H.U. (Mayurbhanj Complex) 10 thousand gallons of water is supplied.

Nongthymmai : - In Nongthymmai and adjoining areas around 55 thousand gallons is supplied by the P.H.E. Department.

Pynthorumkhrah : - Water is pumped out through deep tube well constructed specifically for this purpose. 50 thousand gallons is pumped out every day benefitting 1,321 households.

Madanrting : - Water flows into this area supplying nearly 35-40 thousand gallons per day. However, water flows from spring controlled and maintained by the P.H.E. Department.

Shillong (C) : - 50 thousand gallons per day which comes from Umjasai stream again controlled by the P.H.E. Department.

TABLE IV.b.

THE DISTRIBUTION OF WATER

AREAS	Estimated Availability	Per household Availability	Per-person Availability
SHILL (M)	10001200 lit.	469.78 lit	91.56 lit.
MAWLAI	1591100 lit.	442.83 lit.	77.97 lit.
NONGTHYMMAI	250030 lit.	57.49 lit.	11.5 lit
PYNTHORUMKHRAH	227300 lit	101.29 lit.	21.22 lit.
MADANRTING	181840 lit.	153.8 lit.	29.49 lit.
SHILL (CANT.)	227300 lit.	172.06 lit.	34.33 lit.

An analysis of the response chart regarding water supply indicates that about 68% of the household have genuine water problem in the Municipality area and have to satisfy their water requirements from outside sources.

Although about 85% the households have water connections inside the house it is obvious that such connections are faulty and deficient. Thus a large proportion of the households (67.6%) have to resort to outside sources. In this regard only 49% of the populace reports positive remedial measures to have been taken. This is quite contrary to the reports of the Municipal sources that

adequate measures have been or are undertaken to solve the problem scarcity. It is a common sight in most places/areas of Shillong where families specially tenants queue up in a line and carry buckets/tins of water - daily. In the Municipal areas more than 50% still suffer from water difficulties.

The Municipality authorities claim a daily supply of 22,00,000 gallons of water from the various sources to Shillong (M) alone. This amounts to 469.78 litres per household and 91.56 litres per head. Thus, it is evident that the Municipality supply falls short of the standard requirement which amounts to 45 gallons of water per day. The situation is further aggravated by the following factors :

- (a) The households probably donot have enough storage facilities.
- (b) There is an appreciable amount of loss through leaking pipes and
- (c) The Community Tanks provided by the Municipality have no proper stop-cocks in the taps which lead to a great amount of loss when water sources are opened.

The standard requirement as reported by the official reports in 204.57 litres = 45 gallons. But all the areas in Shillong falls much behind as regards per person availability of water is concerned. On daily observation and reports of the household have shown that there are houses around 80% who get only 60 to 75 litres

of water daily. This accounts for the households who have their own storage tanks and facility. However, the majority reported that water scarcity is an acute phenomenon in Shillong as the table shows the per person availability of water in Shillong. This availability is inclusive of drinking water, washing, cooking and meeting other household requirements.

Thus though the authorities claim of ample distribution of water, the facts prove that it is not so. Carrying water in buckets - tins, from broken pipes, from overflowing roadside tanks is a common feature in Shillong. Another notable aspect in this regard is that water is not evenly distributed. Many areas of Laban, Shillong Municipality, part of Police Bazar have excess water - unrequired for.

Therefore what is required in this regard is a planned programme meeting the requirements individually for different areas. It is only a few who enjoy the benefits of protected water supply. Wholesome water free from poisonous substances, free from excessive amount of mineral and organic matter must be looked into by the authorities.

Sewage and Drainage :

As regards sewage and drainage facilities in Shillong, reports of the Municipal authorities and P.H.E. department have revealed that the Municipal authorities do not have any concrete

programme for sewage disposal and drainage. This is amply reflected in the questionnaire response where about 35% of the households still resort to service latrines and 27% even adopted the age-old privy system in such an urban area. Although the authorities claim employment of scavengers and cleaners for undertaking regular sewage and rubbish disposal 80% of the populace report regular sewage disposal and 50% report bad drainage facilities. It is thus evident that the present government man-power is incompetent to undertake and ensure proper sewerage and drainage facilities rather as all these measures are of a temporary nature. A permanent plan measure should be undertaken and implemented in the whole of Shillong area probably as a first phase and this should be extended to other semi-urban and rural areas. More than half of the respondents have reported that chemical treatment of sewage and waste matters are not done. As such the problem remains as it is without any necessary measures being undertaken by the government. According to the Municipal Corporation Act it is necessary to provide a closed drain in substitution of an open drain. However, the chart (Table IV.c) shows that in all the areas of Shillong Urban Agglomeration except Shillong (Municipality) open surface drain exists

TABLE - IV.c

1981 CENSUS

AREAS	SEWAGE DISPOSAL FACILITIES			NO. OF LATRINES		OTHERS
	OPEN SURFACE DRAIN (OSD/BELOW SURFACE DRAIN (BSD))	WATER BORNE		SERVICE		
SHILLONG URBAN AGGLOMERATION	OSD BSD	1,990		4,695	13	
1. MADANRTING	OSD	-	-	-	-	
2. MAWLAI	OSD	-	-	-	- Not available	
3. NONGTHYMAI	OSD	-	-	-	-	
4. PYNTHORUMKRAH	OSD	-	-	-	-	
5. SHILLONG (CANT.)	OSD	-	-	-	-	
6. SHILLONG (MUNICIPALITY)	OSD BSD	1,990		4,695	13	

SOURCE : DISTRICT CENSUS REPORT

Thus it is evident from the discussions that only a few areas in Shillong are enjoying the benefits of the water carriage system of sewage. The method of disposal are unsatisfactory as regards the modern trends in sewage disposal. The sewage has to be treated as a good deal it contains a good deal of organic matter which is harmful to human and aquatic life if it enters the system before it is liquefied and made harmless.

In order to have successful washing and upto date planning it is essential to divide the city including further extensions into blocks so that each block may be self-contained and effectively served.

Similarly all the surface drains in the jurisdiction of the municipal bodies will be under the control of the municipal committee or the corporation as the case may be. The town can get better sanitary environments if all the drains and houses are connected with underground sewer mains.

Electricity :

Electricity is generated from the Umiam Power House where the power is received at the receiving end sub-station at Mawlai. Therefrom it is distributed to 3 main areas :

1. Nongthymmai
2. Meter Factory area
3. Bidon Fall area.

In all the three areas it comes at 33 KVA.

From 33 KVA it is distributed in 11 KVA through 152 distribution sub-stations having a total capacity of 38000 KVA's.

This system caters the need of 33 thousand consumers. There is surplus power in the stall so according to the Electricity Department there is no difficulty to provide service to the people due to abundance of availability.

However, previously the electricity department was operated and controlled by private organisation. In 1977, the board took over the supply. Shillong was having only about 10,000 consumers. From 1977-89 the total number of consumers as per record has gone up by 20,000. it is anticipated that it will rise by 40,000 in the coming years.

Scheme to modernise the power system of Shillong has been implemented through the process of implementation of "Shillong Improvement Scheme". When it is fully implemented the present difficulty like low voltage, inadequate supply shall be fully solved and the power supply of Shillong will be much more reliable.

In the meantime, detection squad now operates for detection of theft of electricity or unauthorised consumption of power. So in this process improvement is being made for the revenue of the board and also improve the power supply to the genuine consumers. All these process are continuous and time-taking.

Per capita consumption in Shillong is 9.0 million units per year.

Now given the following chart showing the zone-wise division of transformers and their total K.V.A we can find out using the official report regarding the consumption of electricity per year for the following defferent areas of study.

1. Shillong (M)
2. Mawlai
3. Nongthymmai
4. Madanrting
5. Pynthorumkhrah

The consumption per household have been derived from the different areas in terms of units. This has been converted to K.V.A. so as to make consumption with the official reports much easier.

Table IV.d shows the total capacity of Kilowatts in each household, the number of connections and total population supply of electricity (according to official reports) in K.V.A. and average per capita consumption of electricity for different areas.

TABLE - IV.d.

ELECTRICITY SUPPLY

AREA	TOTAL POPULATION	RESIDENTIAL NO. OF CONNECTIONS	CAPACITY OF KILO-WATTS IN EACH HOUSEHOLD VARIES BETWEEN	PER CAPITA SUPPLY OF ELECTRICITY	AVERAGE PER CAPITA CONSUMPTION OF ELECTRICITY IN KVA
NONGTHYMMAI	21,558	850	1 to 4 KW	.569 KVA	4.07 KVA
MAWLAI	20,405	511	1 to 4 KW	1.040 KVA	.03 KVA
PYNTHORUMKRAH	10,711	850	1 to 5 KW	1.930 KVA	.09 KVA
MADANRTING	6,165	339	1 to 4 KW	.486 KVA	.720 KVA
SHILL (MUNICIPALITY)	109,224	9,001	1 to 5 KW	.768 KVA	.085 KVA
SHILLONG CANTONMENT	6,620	537	1 to 4 KW	NA	-

SOURCE : DISTRICT CENSUS REPORT

It is thus evident from the analysis of the Table IV.d that the per capita supply of electricity in the different areas of Shillong is much in excess of the average per capita consumption of electricity in all the areas.

It is only in Madanrting that the consumption is greater than what is supplied. This may be accounted for the fact that Madanrting being a newly developed town the growing population is gradually shifting towards this direction creating excess demand.

However the questionnaire response revealed that a good percentage of the household have reported of voltage fluctuation which occurs at day as well as night. The duration varies from a minimum of about 30 minutes to 4 hours. Therefore the question arises, is there is excess supply of electricity as reported why such problems creep in; though the frequency of fluctuation as reported by almost 90% of the household is minimum.

Here certain limitations of the research exercise may be accounted for :

(i) The observation has been collected for a particular month. It is however during the winter months when there is excess demand that the consumption increases.

(ii) Every transformers have a minimum capacity holding power. So the transformers are thus loaded with their minimum capacity.

On the question on voltage fluctuation it may be explained by the following plausible reasons :

- (i) Due to mal-practices, e.g. consumption of electricity officially accounted for.
- (ii) Theft of energy.
- (iii) Wasteful use of energy.
- (iv) Interruption of lines caused by factors beyond the control of authorities, viz., natural calamities like lightning, cyclones, falling of trees etc.

In urban areas the utility of electricity is so great that leaving aside its private benefits for domestic use the public at large is also affected with its consumption in various ways. The authorities should see to the public lighting system in Shillong. many areas of Mawlai, Nongthymmai, Pynthorumkhrah have not proper street lights and bye-lanes should also be properly provided with lighting facilities. The points if replaced by mercury light will give a more pleasant look and light for the pedestrian and the passer-by.

It will be seen from the Table IV.e that Shillong(M) is the only town in the district and hence the state as a whole having the largest number of medical facilities. In 1971 the number of beds for Shill (c) was 10 (for 1000 population). The only hospital in Shillong (c) is strictly for Military personnel. This time no information is available for the number of beds in the hospital and therefore it has been regarded as not available. Shillong (M) has increased the number of beds from 8 to 10.29 per 1000 population. Madanrting, Mawlai, Pynthorumkhrah and Nongthymmai have no hospital within their jurisdiction.

According to the official reports the conditions and facilities provided in these hospitals are satisfactory and their overall performance is good. However the present study analysis of the questionnaire have revealed that there exists a number of inconveniences and complaints as regards the efficiency of these hospitals are concerned.

It is clear from Table IV.e that there exists no hospital in Mawlai, Madanrting, Pynthorumkhrah and Nongthymmai. The public have to cover a distance of about 1 to 4 kms to approach the nearest hospital. It is only 36.3% of the household of the total area studied approach the Civil hospital. It has been argued in the course of the study that even in large cities like Delhi, Calcutta there exists no hospital for each area. So such a proposition cannot be thought

TABLE IV.e

MEDICAL FACILITIES
1981

DISTRICT/CITY/TOWN	POPULATION	HOSPITAL/DISPENSARIES	NO OF BEDS IN MEDICAL INSTITUTION IN TOWN PER 1000 POPULATION
SHILLONG URBAN AGGLOMERATION	174,703	HOSPITAL (7) DISPENSARIES (9)	-
1. MADANRTING	6,165	NONGTHYMMAI (3 Kms)	-
2. MAWLAI	20,405	DISPENSARIES (1)	-
3. NONGTHYMMAI	21,558	DISPENSARIES (1)	-
4. PYNTHORUMKHAH	10,711	SHILL (M) 1 Km	-
5. SHILLONG (C)	6,620	HOSPITAL (2) D (1)	N.A.
6. SHILONG (M)	109,224	HOSPITAL (5) D(6)	SHILL(M) - 10.27

of for a town like Shillong. Yet what needs to be implemented at this level is increase the number of dispensaries and clinics. In Mawlai and Nongthymmai with a population of 20,405 and 21,558 population there exist only 1 dispensary. At this point with growing population it is important to cater the basic necessity of every individual. therefore establishment of more dispensaries and clinics is essential. Similarly, Madanrting and Pynthorumkhrah have no dispensaries and have to cover a distance of about 1 to 2 kms to avail the facility of the nearest medical institution. Therefore dispensaries and medical institution needs to be set up in this region also.

Shillong Municipality however is self-sufficient with 5 hospital and 6 dispensary.

Another requirement which is felt by the general public is that the facilities provided by these hospitals should be extended and modernised. A good number of these facilities should be extended to the dispensaries as well. Covering the entire population, especially the unserved and the under-served and providing health services in an integrated form are other elements which need to be taken care of.

Special programmes, seminars, immunization, child care programme need to be implemented from time to time so as to make aware the general public of their responsibilities.

Thus in formulating plans for health services it is desirable to keep in view the objectives that are required to be achieved for providing basic amenities to the people living in cities. Following are some of the obligations ;

(i) The services should make adequate provision for the medical care of the individual in the curative and preventive fields and for the active promotion of positive health.

(ii) The health organisation should provide the widest possible basic co-operation between the health personnel and the people.

(iii) The services should be placed as close to the people in the different areas of Shillong in order to ensure their maximum use by the community which they are meant to serve.

(iv) The need for the fullest co-operation between the health staff and the people so that the health programmes may be educative and effective.

Similarly, the health authorities have to take into consideration the proper maintenance of other services which directly or indirectly affect the public health. These are the following:

1. Drains and sewage
2. Regulation of offensive and dangerous trades
3. Street maintainance
4. Provision of open surface for pure air
5. Supply of fresh drinking water.

TABLE - IV.f.

FACILITIES IN THE MEDICAL CENTRES

NAME OF HOSPITAL	NUMBER OF BEDS		NO. OF		FACILITIES PROVIDED	CONDITIONS
			DOCTORS	NURSES		
1. SHILLONG CIVIL HOSPITAL	400		32	72	Medicine, Surgery, Plastic Surgery, E.N.T. Eye, Physio-therapy, Orthopaedics, Radiology, Dentistry, Dermatology, S.T.D.	Good
2. GANESH DAS	400		30	60	Paediatrics, Medicine, Surgery	Satisfactory
3. RED CROSS	217		22	30	Medical, General	Good
4. EYE HOSPITAL	25		06	15	Eye Treatment, Surgery	Satisfactory
5. GOVT. MILITARY HOSPITAL	Restricted		15	20	General Medicine	Good
6. B.S.F. HOSPITAL	Restricted		15	30	General	Satisfactory
7. ASSAM RIFLES	Restricted		06	-	General	Satisfactory

SOURCE : OFFICIAL REPORTS

An analysis of the questionnaire supports the fact that the bus service in the city of Shillong is very much satisfactory. According to the official reports there are 82 city buses and 59 mini buses (express) plying over the urban areas of Shillong benefiting a total of about 174,703 population.

More than half of the sampled household have expressed their satisfaction over the bus services in Shillong. These buses make a continuous movement in the city operating for around 15 hours a day. Over 25 buses operate from Bara Bazar area, 20-22 from Police Bazar area, 18 from Nongthymmai, 15 from Laitumkhrah and adjoining areas. Around 20 operates from Madanrting, Mawlai and Pynthorumkhrah areas. However, some of these buses follow sub-routes and serve the adjoining areas which do not fall under the Municipal jurisdiction.

The supply of buses according to official reports as well as from the response received is very much satisfactory. However, around 40% of the sampled households have expressed their dissatisfaction.

This may be accounted for the following factors :

1. Due to the topography of the region buses cannot reach the nook and corners of the city thus leading the public to walk for long distances to avail of bus facility

2. With the increasing cost of fuel and fare the demand for other means of conveyance (taxi) has lessened leading to greater demand for bus services. This in turn leads to greater rush in buses causing inconveniences for the public.

3. The method of collecting fares from the public is not very pleasing - more at times when there is heavy rush leading to discomfort and inconveniences to the standing passengers.

4. The buses are narrow and not spacious to allow free movement.

5. Greater difficulty is faced during peak hours, e.g. school going hours, office hours and between 3 to 5 p.m. when it is time for their return. It has been expressed by the general public that greater frequency of buses during such a period will cause greater benefit to the people.

However, there are areas like Mawlai, Madanrting, Pynthor-umkhrah, Shillong Cantonment and Laban areas where the frequency of bus services needs to be improved. Sometimes during peak hours buses arrive at an interval of 10-20 minutes making the position difficult for the hurrying public.

Though the official sources claim that the rate charged (Re.1) per passenger is reasonable, a good section of the population however have expressed their dis-satisfaction compared to the distance covered.

Thus as far as the number of buses are concerned they are satisfactory. But the frequency of services in some areas need to be improved. It is not only the quantity but the quality of the services should be taken care of.

The rise in population and modernisation has increased a trend in vehicle ownership. The private cars have increased by over 70% and taxis by over 80% during the past five years. The total road length in the Shillong urban agglomeration is 224,10 (Kms). But less than 50% of the total road length is utilised for bus services. The bus services transportation is getting worse due to the continuance of urbanization along the lines of communication.

Thus, the solution to the problem of bus services in Shillong does not merely depend on measures designed to provide additional buses but it depends on the ability to develop urban communities in which the service can cater more attention to the neglected areas.

CHAPTER - IV

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CHAPTER - V

CONSTRUCTION OF INDEX OF OVERALL EFFICACY OF PUBLIC
UTILITIES IN VARIOUS AREAL UNITS OF SHILLONG

Construction of Index of overall Efficacy of Public Utilities in various areal units of Shillong :

The objective of this chapter is to construct an index of overall efficacy of public services/utilities in Shillong. This index may be useful for classifying the different areal units in Shillong according to the criterion of the degree of overall efficacy of public utilities and services. This classification would immediately suggest as to which areas come in the priority list for immediate improvement in the situation.

For constructing such a methodology the weightage method is applied. Suitable weights have subjectively been decided to be assigned to various public facilities/utilities functioning at various levels of efficiency and efficacy. These weights have been used to construct the overall index by the weighted aggregation of responses of the people on the existing situation and condition of public utilities.

Construction of the Index :

The utilities undertaken for the present investigation have been analysed by questionnaires in which different responses from the population have been listed in attempting to construct an overall index. It is necessary to allocate weights to the different responses so that they could be further calculated for arriving at definite conclusions.

Weightages : Although the numerical weightage given to the various response of each utility system has been subjective, it is very important to exercise caution in allocating the numerical values according to the importance value of the particular response. In general, a response which is directly related to the utility in question has been assigned higher value than those which have an inverse relation. The Table shows the detailed weightages allocated to the responses of the various utilities analysed.

Indices : The index values have been determined at two levels i.e., (a) at the level of each response where the percentage response has been determined and the value multiplied by the respective weightage and (b) at the level of each locality where the individual response indices have been summated to arrive at an overall index for a particular utility of a particular locality. Table V.1 represents the overall, while Tables V.2, to V.6 present the individual indices. From Tables V.1 to V.5 the following observations are made regarding the indices for the various utilities.

Water : The overall index value ranges between 1925 for the Madanrting area and 1384.36 for the Pynthorumkhrah area. However, the Nongthymmai and Municipality areas have similar index values (1750 for the former and 1747.84 for the latter). The exceptionally high value for Madanrting could be attributed to a cent percent response to the water availability inside the house. However, the sample from this locality

has not been very high, and probably is not a true representation of the entire populace. On the other extreme, Pynthorumkhrah area registered the lowest value of overall index because no response has been available for expenditure incurred in availing water. Barring these two extremes there has not been any marked difference in the individual index values of the different localities.

Hospitals : Here the highest index value is 2907.09 and the lowest is 1328.55. Municipality records the highest value and pynthorumkhrah the lowest. However, Nongthymmai area and Mawlai area has not much difference between their index value ranging between 1790 and 1860 respectively. The high index value for the Municipality area could be explained by the fact that the responses regarding the availability and approachability to hospitals is higher than Pynthorumkhrah as well as for other areas. Responses regarding other amenities available do not represent much noticeable difference worth mentioning. A low index value for Madanrting could be explained by the fact that almost cent percent of the sample households have reported of non-availability of hospitals nearby. [It is to be noted that Nazareth Hospital is the nearest hospital from the areas. However, as availability of hospital in their locality have been questioned, the response was negative]. Shillong Cantonment records a high index value of 2200. This may be accounted for a reasonably high index value in both conditions and facilities available in Army Hospitals.

Sewage and Drainage : Here the index values ranges between a highest of 2540.2 (Pynthorumkhrah) area and 1900 (Nongthymmai) area. Nongthymmai and Mawlai have an index value with only a minor difference 1900 and 1910 respectively. The reasonably high index value in pynthorumkhrah area could be explained by the fact that a high response index regarding location of lavatory and regularity of disposal of sewage is available in the area. A low index value in Mawlai area (1910) is due to a low response index regarding methods adopted such as disinfectants, chemicals for cleaning and purification purposes. A significantly high difference index values between Municipality area and Shillong (c) is due to the responses regarding proper sewage facilities which is reasonably high in Shillong (c) and low in Municipality.

Electricity : An overall index value for the different areas show that Municipality records the highest index value 221.95 and Shillong (C) records the lowest value of 1590. As compared to Shillong (c) and Madantring voltage fluctuation in Municipality area have reported a high index value at night time. However, the regularity of checking is seldom done as reported by almost 76.9% of the households which could possibly explain for a high index value. There occurs not much essential difference in the index value between Municipality area, Mawlai and Pynthorumkhrah area. This is mainly due to the similar response regarding frequency of voltage fluctuation in all the areas showing a minimum frequency index value of 615.3, 700 and 571 respectively. Essential difference between the index values of Mawlai areas, Pynthorumkhrah (2200 and 2161) could be attributed to a single important factor response, viz., frequency of fluctuation.

Buses : The highest and lowest index range between 2256.7 and 1675. Pynthorumkhrach accounts for the highest index value and Madanrting for the lowest. The difference is due mainly to two important reasons, viz., high response index in good amenities available in Pynthorumkhrach (500) and only (125) in Madanrting for the same question. Similarly, Pynthorumkhrach recorded a high index value of 599.9 regarding regularity of bus services for which there was nil response for the corresponding Madanrting area. The difference in the index values of Nongthymmai (2070) and Mawlai (2030) could be explained due to the availability of bus services in the areas. Bus services as reported by cent percent of the households in Nongthymmai is satisfactory. (Index value = 500) and 20% and 10% of the sample households in Mawlai area have reported of few and very few services available in the area (Index value = 80; 20 respectively). Differences in the index values of Shillong (c) and Madanrting may be accounted for a difference in the index value of availability of bus services in the two different areas and regarding the regularity of bus services available.

TABLE - V.1

CONSTRUCTION OF OVERALL INDEX PUBLIC-UTILITIES (SHILLONG)

	WATER SUPPLY	HOSPITALS	BUS SERVICES	SEWAGE & DRAINAGE	ELECTRICITY
INDEX	1750	1790	2070	1900	1940
INDEX	1384.36	1328.55	2256.7	2540.2	2161
INDEX	1925	1430	1675	2275	1915
INDEX	1575	2200	1950	2425	1590
INDEX	1580	1860	2030	1910	2200
INDEX	1747.84	2907.09	1819.65	2046.13	2221.95

TABLE - V.2

WATER SUPPLY

	Availability of water		Reasons for preferences					Expenditure		Remedial Measures if taken		Total
	Inside	out	a	b	c	d	e	Exp.	No Exp.	Yes	No	
No.	12	8	3	2	5	3	7	5	75	8	12	Nongthy-
%	60	40	15	10	25	15	35	25	75	40	60	mai
Index	480	160	30	40	100	45	105	25	225	240	300	1750
	3	4	2	1	2	1	1	0	0	0	7	Pynthor
	42.85	57.14	28.5	14.2	28.5	14.2	14.2	0	0	0	100	umkhrah
	342.8	228.56	57	56.8	114	42.6	42.6	0	0	0	500	1384.36
	4	0	0	3	0	0	1	1	3	0	4	Madan-
	100	0	0	75	0	0	25	25	75		100	rting
	800	0	0	300	0	0	75	25	225	0	500	1925
	1	3	0	0	3	1	0	2	2	0	4	Shill(C)
	25	75	0	0	75	25		50	50	0	100	
	200	300	0	0	300	75		50	150	0	500	1575
	5	5	0	4	4	0	2	7	3	4	6	Mawlai
	50	50	0	40	40		20	70	30	40	60	
	400	100	0	160	160		60	70	90	240	300	1580
	53	17	13	15	22	5	11	14	41	25	32	Munici-
	81.53	26.15	20	23.0	33.8	8.6	16.9	21.5	63.0	38.4	49.2	pality
	652.24	68	40	92	135.2	22.8	50.7	21.5	189	230.4	246	1747.84

TABLE - V.3
HOSPITALS

1. No. %	2. No. %	3. No. %	4. No. %	5. No. %	6. No. %	HOSPITALS										Municipality									
						a	b	c	d	e	f	g	h	i	j		k	l							
11 55 165	0 0 0	0 0 0	0 0 0	5 25 75	4 20 80	0 0 0	0 0 0	3 75 75	1 14.2 71	5 71.4 214.2	0 0 0	14.2 71 71	8 40 200	11 55 165	0 0 0	1 5 20	19 95 285	11 55 165	5 25 125	4 20 60	0 0 0	18 90 90	2 10 30	Nongchhymai 1790	
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	4 20 80	0 0 0	0 0 0	4 100 100	0 0 0	2 50 150	0 0 0	28.5 142.5 85.5	1 5 25	6 30 150	0 0 0	0 0 0	7 100 300	2 10 30	2 10 30	2 10 30	0 0 0	7 100 100	0 0 0	Pyinthorun- Khrak 1328.55	
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	4 100 100	0 0 0	2 50 150	0 0 0	50 250 750	1 5 25	3 15 75	0 0 0	1 5 25	4 20 100	2 10 50	1 5 25	1 5 25	0 0 0	2 10 50	2 10 50	0 0 0	Medanrtling 1430
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	4 20 100	2 10 50	1 5 25	1 5 25	0 0 0	2 10 50	2 10 50	0 0 0	Shill (c) 2200
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	4 40 40	2 20 100	6 60 180	2 20 200	4 40 400	6 60 180	0 0 0	0 0 0	10 100 300	7 70 210	1 10 30	1 10 30	1 10 30	0 0 0	10 100 100	0 0 0	Mawjai 1860	
16 24.6 73.8	11 16.9 101.4	12 18.4 92	8 12.3 36.9	16 24.6 98.4	2 3.07 3.07	20 30.7 153.5	34 52.3 156.9	12 18.4 18.4	30 46.15 230.7	32 49.2 147.6	5 7.6 23.0	15 23.0 76.9	50 76.9 230.7	32 49.23 147.6	44 67.59 369.2	48 73.84 110.7	24 36.9 295.3	48 73.84 295.3	61 93.8 93.8	9 13.84 41.52	9 13.84 2907.09	0 0 0	61 93.8 93.8	9 13.84 41.52	Municipality 2907.09

G-good

S-satisfactory

B-bad

TABLE - V.4

BUS SERVICES

	S,	F,	Vf.	Good	Bad	Reg.	Irreg.	Yes	No	Total
Nos	20	0	0	17	2	18	2	6	14	Nongthym-
%	100	0	0	85	15	90	10	30	70	mai
Index	500	0	0	425	15	630	40	180	280	2070
Nos	7	0	0	7	0	6	1	7	0	Pynthor-
%	100	0	0	100	0	85.7	19.2	100	0	umkhrah
Index	500	0	0	500	0	599.9	56.8	600	0	2256.7
Nos	3	1	0	1	3	0	4	4	0	Madanrting
%	75	25	0	25	75	0	100	100	0	
Index	375	100	0	125	75	0	400	600	0	.675
Nos	4	0	0	2	2	2	2	4	0	Shillong
%	100	0	0	50	50	50	50	100	0	(c)
Index	500	0	0	250	50	350	200	600	0	1950
Nos	7	2	1	8	2	8	2	6	4	Mawlai
%	70	20	10	80	20	80	20	60	40	
Index	350	80	20	400	20	560	80	360	160	2030
Nos	42	12	11	27	39	43	22	44	19	Shill(M)
%	64.61	18.46		41.53	60	66.15	33.84	67.69	29.2	
Index	323.05	73.8		207.65	60	463.05	135.36	406.14	116.8	1819.65

S- satisfactory

F- few

Vf- very few

TABLE - V.5
SEWAGE AND DISPOSAL

	Inside	Outside	Reg.	Irreg.	Yes	No	Yes	Some	No	
No's	15	5	3	17	10	10	0	4	12	Nong
%	75	25	15	85	50	50	0	20	60	
Index	450	100	120	510	300	200	0	100	120	1900
No's	6	1	6	1	6	1	6	0	1	Pynthor
%	85.7	14.2	85.7	14.2	85.7	14.2	85.7	0	14.2	
Index	514.2	56.8	685.6	85.2	514.2	56.8	599	0	28.4	2540.2
No's	3	0	2	2	3	1	3	0	1	Madan
%	75	0	50	50	75	25	15	0	25	
Index	450	0	400	300	450	100	525	0	50	2275
No's	2	2	4	0	3	1	3	0	1	Shill(c
%	50	50	100	0	75	25	75	0	25	2425
Index	300	200	800	0	450	100	525	0	50	
No's	6	4	3	7	4	6	1	0	9	Mawlai
%	60	40	30	70	40	60	10	0	90	
Index	360	160	240	420	240	240	70	0	180	1910
No's	45	20	8	57	22	39	6	2	51	M.
%	69.23	30.7	12.30	87.69	33.84	60	92.3	3.07	78.46	
Index	37.38	122.8	98.4	526.14	203.04	240	646.1	115.35	156.92	2046.1

TABLE V.6

ELECTRICITY

	Night	Day	N.R.	Max.	Av.	Min.	Monthly	Sold	Nev.	Total
No	15	2	3	0	14	6	2	16	2	Nong.
%	75	10	15	0	70	28.5	10	80	10	
Index	600	20	15	0	420	285	80	480	40	1940
No	6	1	1	0	3	4	3	4	0	Pynthor
%	85.7	14.2	14.2	0	42.8	57.1	42.8	57.1	0	
Index	605,6	28.4	14.2	0	256.8	571	342.4	342.6	0	2161
No	2	2		0	1	3	1	3v	0	Madan
%	50	50	0	0	25	75	25	75		
Index	400	100	0	0	150	750	200	450	0	1915
No	1	1	2	0	0	4	1	3	0	Shill(c)
%	25	25	50	0	0	100	25	75	0	
Index	200	50	50	0	0	1000	200	90	0	1590
No	7	1	2	0	3	7	6	4	0	Mawlai
%	70	10	20	0	30	70	60	40	0	
Index	560	20	20	0	180	700	480	240	0	2200
No	58	16	1	11	14	40	15	50	0	Shill(M)
%	89.23	24.6	1.53	16.92	21.5	61.53	23.0	76.9	0	
Index	713.84	49.2	1.53	67.68	129	615.3	184	461.4	0	2221.95

Demarcation of Deficient Areas :

The demarcation of areas is done at two significant levels:

- (a) Considering the overall utility service available to each area.
- (b) Taking each utility services separately available for each area.

At the level of overall utility services available, three areas particularly shows considerable deficiency, viz., Nongthymmai, Pynthorumkhrach and Madanrting. In general, these areas are deficient in services like water, electricity and drainage.

Other areas, viz., Shillong (c) Mawlai, Municipality though not self-sufficient, yet are comparatively better off than other areas as regards availability of public utility services.

Now taking each services available for different areas, it is to be observed that difficulty of water supply is felt in almost all the areas of Shillong. However, the problem is acute mostly in areas like Pynthorumkhrach, Nongthymmai, Shillong (c) and Mawlai areas. The difficulty is mainly due to insufficient water supply in these areas.

As regards, the availability of hospitals, accessibility to hospitals and lack of proper medical facilities is prominent in areas of Pynthorumkhrach and Madanrting. In both those areas hospitals are situated a far off distance leading to difficulty in obtaining timely medical facilities.

Bus services are more or less satisfactory in all the areas of Shillong city. The frequency of bus services need to be improved in Mawlai and Pynthorumkhrah areas and number of buses be increased in Shillong (C) area.

Sewage and Drainage is neither organised nor planned in a systematic manner in Shillong. Almost the entire Shillong city is deficient in this service with particular attention given to Mawlai and Municipality area.

Supply of electricity (power) though fairly distributed to all the areas, problem of voltage fluctuation and failure of power supply is prominent in Nongthymmai and Madanrting areas.

CHAPTER - V

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CHAPTER XVI

PROPOSED PLAN FOR IMPROVEMENT OF DEFICIENT AREAS

In this chapter we devise a plan proposal to remove the existing deficiencies and improve the over-all situation.

The city of Shillong is one of the oldest and fastest growing hill towns in the country. Shillong is not only fast growing but it has already grown in its magnitude and size which invites the immediate attention of planners. Shillong today faces a multitude of problems. Being a hilly area and with the absence of proper planning legislation, development has taken place in a very haphazard fashion. Increasing population and activity have again resulted in increasing demand for space leading to congested growth and overburdened available public utility services and related degradation.

VI.1. Plan Proposal : INTRODUCTION

The plan proposal as prepared does not give a detailed projection of future but gives broad proposals of development with the following aims and objectives in mind.

1. Compact development as land is limited.
2. Efficient and judicious integration of various utility services.
3. Harmonious relationship of various activities.

The proposal indicates potential of growth, successful implementation of various public services as outlined in the plan. Growth of Shillong in future is likely to be influenced by the location of administrative, constitutional and commercial activities. The town is expected to grow towards the north and south east and

with it the demand for more public utility services. the plan proposes to provide guidelines to improve the conditions of public utility services specially in the deficient areas.

Plan proposal :

In view of the present situation and considering the immediate need of the people of Shillong it is essential for us to formulate/propose a plan adequate for the area and suitable to the existing conditions. Since land available for accomodating the increasing demand for all the utility services may not be sufficient, attempt must be made to utilise most optimally the small panels of land already available for the purpose. At the central area level since land is scarce for construction of health facilities, hospitals, laying out water connections, sewage tanks, construction of roads for buses, the problem can be better tackled by going for schemes to modernise and improving the present available services and and working in an organised manner.

Considering the fact that the situation is already bad and it can turn to be acute, schemes must be taken up and implemented on a priority basis.

The plan has been prepared for a period of three years 1989-1990, 1990-1991, 1991-1992.

Augmentation of Water Supply in Shillong : (emphasis on areas Pynthor-
umkhrah, Nongthymmai, Shillong (C) and Mawlai).

It is proposed to fix up the source of water supply, which would be capable of being developed in stages to meet the ultimate demand of consumers for each area and the town as a whole. It is also essential as per COPP recommendation that 40-50 gallons (180-225 litres) per head is available for domestic use only. Similarly, it is also necessary to ensure a continuous water supply minimum 135 litres/head/day for residential premises as recommended by the National Building Code. In Shillong in areas such as Nongthymmai, Madanrting, Pynthorumkhrah, carrying of water from streams, falls is a common sight. It is a necessary that such water should be chemically treated before used for domestic purposes. In areas like Nongthymmai and Pynthorumkhrah storage reservoir should be located. All the houses should have inside water connections and authorities should ensure that water is available inside the house. As regards distribution system - In Shillong water is distributed mainly through multiple narrow pipes. It is proposed that wherever possible (i.e. where flat terrain is available) water could be distributed through single large pipes which would then be distributed to individual pipes. This would solve the problem of broken and leaking pipes. Further, the distribution system should appropriately be designed together to the ultimate population and for $1\frac{1}{2}$ to 2 times the average demand with continuous supply. It is also proposed to set up a Water Management Body to look into the distribution system which could be done on a monthly or quarterly basis.

Health and Hospitals :

The importance of adequate provision of health and medical services in upgrading the urban quality of life needs no elaboration. It is proposed that hospital services be placed more close to the people by setting up of more medical dispensaries, clinics in areas like Pynthorumkhrach and Madanrting. It is proposed to set up another six hospitals to meet the demands of the future population by the year 2011. It is necessary for every hospital to increase their bed strength to 2.5 on average for every hospital serving 1000 persons. This is essential for Military (Army Hospital) S (c) area and Ganesh Das Hospital. Specialised medical check up facilities needs to be provided and an emergency unit with 4 to 6 beds needs to be constructed in each of the existing hospitals in different areas. Another 320 beds are to be added to the six existing hospitals. Addition of hospitals will be developed on the south west, south east and north.

Bus Services :

As reported, bus services are more or less satisfactory in all the areas of Shillong city. However the plan proposal indicates

- (a) an increase in the number of buses in Shillong (C) and Mawlai areas 4 to 6 numbers.

The National Highway which connects Shillong and Cachar through Nongthymmai has no by pass therefore all the traffic has

to use the heavily congested highway passing through the commercial areas of the town - Mawlai and Nongthymmai. (b) Therefore it is proposed an alternate route be constructed so as to ease smooth traffic.

In Nongthymmai, Mawlai areas the bus terminies in marked by insufficient space, absence of turning, manoevering and parking spaces. Thus there is (c) need to over-haul and redesign the entire bus terminus with their parking and shed facilities.

There exist only one city bus terminus witha capacity of 24 buses at Barabazar area. The plan proposes creation of 2 more bus terminus one at Nongthymmai and Mawlai.

Sewage and Drainage :

As regards basic facilities like sewage and drainage are also inadequate. As water problem, sewage and drainage problem exists throughout Shillong city. As such the plan proposal is suggestive for the entire town with particular attention be given to Nongthymmai and Mawlai areas.

Water pollution in Shillong is mainly due to the existence of many service latrines. There is a scheme to provide underground sewage within Municipal area but it is proposed that this scheme be extended beyond Municipal area. It is also essential to check pollution of water by replacing the existing service latrines (at some places at Mawlai, Shillong (M), Nongthymmai area) by sanitary

latrines or community digestors may be constructed. Service latrines in Cantonment areas, Harijan colony needs to be improved through proper schemes and in a phased manner. It is also proposed to set up a sewage treatment plant located on the outskirts of the town.

The following recommendations for construction of drains shall adequately meet the requirement and may be followed for Shillong town.

- (a) Properly designed enclosures and drains at suitable places in the town must be provided.
- (b) Drains carrying sewage which run under the house should be replaced by constructing drains by the side of the house or along the side of the road.
- (c) Drains ought to be joined with each other at a sloping or oblique angle.

Electricity :

The sample report have shown that there exists wide complaints of village fluctuation in Nongthymmai and Madanrting areas. To ease this problem of irregular power supply it is proposed to

1. Find load centre and increase the number of sub-stations and increase the capacity of existing sub-stations or renovation or re-locate the existing sub-station.
2. To change conductor by higher size conductor.
3. To decrease LT*¹ length and increase HT*² line which decreases loss of power.

4. To develop a system improvement scheme to look into the complaints and for check-up from time to time.
5. To improve power factor to overcome the problem LT line = Distribution line (440 V; 230 V) HT line = 11 KV; 33 KV.

VI. 2. Implementation and enforcement of Plan Proposal :

The plan proposal will require statutory backing and creation of suitable development agencies for enforcement and implementation of plan proposal. pending enactment of legislation, the entire area taken for development purposes may be declared as controlled area for development purposes so that all development takes place as per the plan. A development authority should be immediately constituted to enforce and implement the plan proposal. The schemes may be implemented by a local authority, P.W.D. or any other state government Departments and the implementing agencies will necessarily have to carry out the function of

- (a) Construction, maintainance and management of these services.
- (b) Ensuring that the services are properly utilised and not mis-utilised.

Enforcement of the proposal relating to the development of the public utility services will be governed by zoning regulation which will specify a particular use permissable in a particular area.

The above proposal have been given with the primary objectives of clearing all the major deficiencies so as to ensure a smooth

and efficient level of services in Shillong. However, for the above to succeed, it becomes extremely necessary that two steps be taken simultaneously. First, it would be the formulation and strict enforcement of public utility regulation to ensure that the services are utilised considering the societies welfare at large and secondly, widening of the services with the active co-operation and participation of the consumers. The above proposal it is assumed, will go a long way, if not totally eliminating the public utility service problems of Shillong city.

VI. 3. Cost Estimates :

Now we deal with the costing of different services covered in the study including those that are eligible for central assistance.

The estimates are calculated based on the standard cost as laid down by the Town and Country planning Department (Govt. of Meghalaya). the schedule of Rates (1980-81) Govt. of Meghalaya duly updated as per current market rates have also been duly considered to calculate cost.

Out of the 7.03 hectares of land available for development, it is proposed to take up a piece of land of about 2.73 hectares for the purpose of setting up of additional hospitals, water storage facilities, a plant for sewage treatment and the like purposes for the betterment of public utility services. The developmental works also include water supply distribution, sewerage and drainage, easing the problem of irregular power failure and voltage fluctuation.

TABLE VI.1

Cost Estimates

I. Area of land	= 2.73 hectares
II. Saleable area	= 1.35 hectares

	<u>Rs. in lakhs</u>
i) Cost of land acquisition @ Rs.58600/- per hectare	1.60
ii) Cost of water supply distribution @ Rs.60000/- hect.	1.63
iii) Cost of repair and maintainance of water problem	.56
iv) Cost of sewerage services @ Rs.75000/- hect.	2.05
v) Cost of construction of drainage system @ Rs.25000/- per hectare	0.68
	<hr/> TOTAL = 6.52

	<u>Rs. in Thousand</u>
Cost of development of power supply.	
i) Cost of construction and renovation of of sub-stations between 16 KVA to 250 KVA	53916.60
ii) Cost of conductor	3660.00
iii) Cost of laying LT line per km.	75000.00
iv) Cost of HT line per km cost varying between rabbit conductor to recoon conductor	78500.00
	<hr/> TOTAL : 211076.60

	<u>(RCC*)</u>
Development cost of Hospital (inclusive of labour + material cost).	7000 sq. ft.
i) Construction of ground floor per square ft.	Rs. 250

.....contd.....

ii) 1st floor construction per sq.ft.	Rs. 180
iii) 2nd floor construction per sq.ft.	Rs. 120
iv) 3rd floor construction per sq.ft.	Rs. 100

*RCC - Reinforced Cement Concrete.

	<u>Rs. in lakhs</u>
Cost of supplying additional buses	1.50

VI. 4. Resource Management and Funding :

An analysis of the plan proposal indicates that for successful implementation and efficient development of these utility services must be backed by enough financial resources.

The Need for Finance :

It is on account of the physical and economic characteristics of the activities of these utility services that large amount of finance is required. Two important reason can be cited here.

1. A basic characteristic of these utility services is that it is a heavy capital using industry. Hence large amount of capital are required.
2. These utilities create a service rather than a commodity. Hence, 24 hours service should be geared by enough financial support.

Various sources for financing the project :

The financial implication involved may be high, but the schemes envisaged will be self-financing and therefore repayment of loans will be possible. Funds for the above purpose which can

be either in the form of grants or loans can be sought from the following sources :

1. State plan budget of development departments like Public Works Department, Town and Country Planning Department and Municipal Administration Department.
2. Financial Assistance from HUDCO and loans from banks such as LIC, IDBI, N.E.C. and Urban Co-operative banks.
3. Central Assistance can be drawn directly for public health services under various schemes.
4. Assistance from voluntary agencies like Rotary Club, Lions Club, Chamber of Commerce etc.

The major sources of finance for the local bodies are :

- (a) Tax and Non-Tax Revenue (own self-generated) and
- (b) External assistance including assigned taxes as well as grants and loans from higher levels of government.

TABLE - VI.2

Project Cost Summary

Project Component eligible for State and Central Assistance	Implementing Agency	Cost of Completion of the Project	Outlay for 1988-89 Total Cost
		Rs.in Lakh	Rs. in Lakh
<u>Water - Supply</u>			
1. Cost of water supply Distribution	Municipal P.H.E.	1.63	
2. Cost of Repair and Maintainance of Water Supply	- do -	.56	2.19

Contd.....

Project Cost Summary (Continued)

1	2	3	4
<u>Sewage and Drainage</u>		Rs.in Lakh	
1. Cost of construction and improvement of sewerage services	Municipal P.H.E.	2.05	
			2.73
2. Cost of construction of drainage system	- do -	.68	
<u>Electricity Service</u>		Rs.in Thousand	
1. Cost of construction and renovation of sub-stations.	M.S.E.B.	53916.6	
2. Cost of conductor	- do -	3660.00	211076.60
3. Cost of laying LT line	- do -	75000.00	2 lakh, 11 th.
4. Cost of laying HT line	- do -	78500.00	
<u>Hospital</u>			
1. Construction of ground floor	STATE & CENTRAL GOVT.	Rs.250	
2. Construction of 1st floor		Rs.180	Rs. 650/- sq.ft.
3. Construction of 2nd floor		Rs.120	= 45.5000,00
4. Construction of 3rd floor		Rs.100	45 lks. 50 th.
<u>Bus Services</u>		Rs.in Lakh	
1. Cost of supplying additional buses (4 to 5 buses)	D.T.O.	1.50	1.50 lakhs

TABLE - VI. 3

CENTRAL GOVT. ASSISTANCE

Assistance for 3 years				
PROJECT	TOTAL COST (IN LAKHS)	1989 - 90	1990 - 91	1991 - 92
A	7.00 lks.	.50	.50	-
B	1.73 lks	1.00	.73	-
C	11 th	.11	-	-
D	30.00 lks	10.00	12.0	8.0
TOTAL		11.61	24.3	8.0

(IN LAKHS)

TABLE - VI.4

STATE GOVT. ASSISTANCE

Assistance for 3 years				
PROJECT	TOTAL COST (IN LAKHS)	1989-90	1990-91	1991-92
A	1.19 lks	.50 lks	.50 lks	.19
B	1.00 lks	.50 lks	.50 lks	-
C	2.00 ths	1.00 th	1.00 th	-
D	15.00 lks	5.00 lks	7.00 lks	3.00
TOTAL		6.1	8.1	3.09

(IN LAKHS)

Aid from Central Government :

Direct central aid as far as public utility services of Meghalaya are concerned are limited only to certain services such as Public Health Services, Urban Water Development and Sewerage and Drainage.

Central Assistance for the above utility services can be had from the various schemes sponsored by the Government of India (as listed below).

1. Allocation of an amount of Rs. 1.00 lakh for urban water agglomeration (for areas under urban agglomeration).
2. Allocation of an amount of Rs. 1.5 lakhs for investigation unit for Monitoring Cell.
3. In view of the glaring deficiency of proper sewerage and drainage facilities in Shillong, the Centre is expected to provide a major share for clearing the Shillong Sewerage Scheme costing Rs.2.73 lakhs.
4. Funds for the construction of hospitals (new) can be had from government funds. Funds for general improvement of the existing hospital, addition of bed capacity can be provided under the various schemes such as
 - (a) Hospitals and Dispensaries
 - (b) Medical Training Programmes (for improvement of staff)
 - (c) Supply of drugs
 - (d) Supply of material and equipment.

5. Allocation of funds for supply of power through subsidy and grants-in-aid and loans.

Allocation by the State Government :

1. Funds could be allocated for development of water and sewage, drainage system through loans under its various schemes such as Urban Water Distribution, Urban Sewage and Drainage.
2. Funds for proposed development purposes can be allocated by the State Government under its various schemes such as
 - (i) Minimum Needs Programme.*1
 - (ii) Hospitals and Dispensaries and *2
 - (iii) Training Programme.
3. Allocation of funds for caring the problem of power could be had either in the form of loan, borrowing or subsidy

Allocation of funds for improvement of bus services, i.e. increasing the number of buses shall be met by the D.T.O.(District Transport Office) through its internal funds. This shall be done in the form of imposing taxes, fines, fees and surcharge on private buses.

*1 Funds for improvement of hospitals, beds and general facilities.

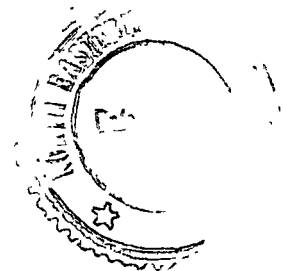
*2 For the general improvement of hospitals and dispensaries.

VI. 5. Exploration of other Possibilities :

Apart from funds allocated by the government and State Government there are other agencies from where funds could be obtained for financing the project.

- (i) Market borrowing
- (ii) L.I.C. Loan
- (iii) R.E.C. loan (for services of electricity)
- (iv) Loans from N.E.C.
- (v) Taxes, duties, tolls and fees assigned to or appropriated by the Municipalities.
- (vi) World Bank (for Urban Development Projects).

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CHAPTER - VI

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CHAPTER - VII

CONCLUDING REMARKS

Conclusion :

With the foregoing background, an overview of the study prompted us to arrive at the following conclusions. In Chapter I, we have introduced the problem taken up by us for investigation. It has been to study why the question of efficacy of public utilities assumes importance in a town ship, how these public utility services are relevant for an urbanized society. Secondly, how these services have a direct impact on the welfare of the society at large. It has been shown that the utility services function with the main objective of social betterment. We did discuss as to how the public utility services have a direct bearing on the productivity aspects as well as that with urbanization and social change, there emerges a similar change in the demand and supply patterns of these public-utility services. The study has also shown the characteristic features of the type of demand with social change and growth.

In Chapter II we presented an overall situation of the population growth since the British times to the present day. The population growth-density and spatial pattern of the distribution of population have been depicted with the help of numerical figures, maps and graph. The study has shown that population has been growing at an disproportionate rate. The spatial pattern of the distribution of population of Shillong town have shown that Shillong Municipality records the highest density of population growth followed by Nongthymmai, Pynthorumkhrah, Mawlai and Madanrting respectively. The population growth and development of Shillong town has led to increased

urbanization on a large scale. The study has revealed the load on the existing public utility services as a result of increased urbanization on a large scale. We have shown that his increasing demand for public utility services have created a burden as well as posed a challenge on the local authorities to cater the extra demand.

In the third and the fourth chapters we have clearly stated the five different utility services and the 6 different spatial units that have been undertaken for our study. These areas come under the main head of Shillong Urban Agglomeration. The households where questionnaires were distributed numbered 110. In this chapter we have systematically analysed the responses from the sample households and compared the responses with official reports to arrive at some definite findings.

1. That the load on public utilities are not the same throughout the year, but characterised by periodic fluctuation, for e.g. the load on water and electricity services are particularly great during the winter season.

2. That the pressure is felt more on utility services like water, electricity, sewage and drainage.

The study have further revealed that the problem of water shortage, irregular supply of power, voltage fluctuation and sewage and drainage problem are felt almost in all the urban areas of Shillong town. We are of the opinion that for services like electricity, the problem could be rectified or eased through proper renovation

and modernisation of the existing schemes. Similar is the case with hospitals and bus services which are more or less satisfactory. Almost 85.4% of the sampled households have reported of water shortage in their area and falls much behind the standard requirement as suggested by the Municipal authorities and COPP.(45 gallons) per household. As regards sewage and drainage facilities in Shillong, reports of the Municipal authorities and P.H.E. departments have shown that they do not have any concrete implementation programme for these services and has to be implemented. This has been amply reflected in the questionnaire response where almost 62% of the households still resort to out-dated methods of sewage disposal.

In the Vth chapter demarcation of deficient areas have been made possible through allocation of weights and construction of an overall index.

The demarcation of areas has been done at two levels :

- (a) Considering the overall utility services available to each area.
- (b) Taking each utility service separately available for each area.

We have found that at the level of overall utility services available, three areas particularly have shown considerable deficiency, viz., Nongthymmai, Pynthorumkhrah and Madanrting. /

Some Policy suggestions :

The findings in Chapter IV are suggestions of certain improvements that need to be made to (suggesting a period of 3 years for implementation and completion).

1. Augmentation of water supply in Shillong.
2. Setting up of another 6 hospitals and improvement of the existing conditions in the existing hospitals.
3. Number and frequency of bus services to be improved in Mawlai, Pynthorumkhrah and Shillong (c). And diversion of traffic from the more congested areas such as Nongthymmai and Mawlai.
4. The whole system of sewage and drainage be handled in a phased manner and certain guidelines to be followed for construction of drains.
5. To check village fluctuation and irregular power failure specially in Nongthymmai and Madanrting areas.

In Chapter VI, first the cost estimates have been prepared for the five major services considering a period of 3 years.

In the next section of Chapter VI we have explored the major sources of financing the project so as to carry out the policy suggestions in a phased manner. The expenditure incurred has been distributed between the state and the Central Government. Besides, other forms of institutions have also been highlighted so as to finance the plan proposal.

In conclusion, it might be mentioned that though an ambitious attempt was made initially, the study was considerably restricted by numerous unforeseen factors and constraints and the total outcome should be treated purely as an academic exercise with numerous avenues of research still left exposed and open.

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APPENDIX

QUESTIONNAIRE USED FOR THE STUDY

1. Name of the Locality.....
2. Occupation of the Respondent.....
3. Number of members in the family.....

Serial no.of members with their occupation	Level of Education
a.	
b.	
c.	
d.	
e.	

- I. a. Are there any voltage fluctuation in the locality ? If so,
indicate when the fluctuation is greatest ?
Day..... period from..... a.m. to.....p.m.
Night.....period from.....p.m.to.....p.m.
- b. Frequency of power failures :
Minimum..... Maximum..... Average.....
- c. Regularity of checking :
Monthly.....Yearly.....Seldom.....
- II. a. Details of availability of water supply. If available,(say
Yes or No)

- i) In the house _____
- ii) Is brought/carried from outside taps _____
- iii) Is brought from nearby springs or water supply _____
- iv) Is brought from water carriers _____
- v) Is filled from leaked pipes _____
- vi) Other sources if any _____

- b. Expenditure on water (monthly) Rs.....
- c. Preference for which source.....
- d. Difficulties faced in water supply.....
- e. If remedial measures have been undertaken by a local authorities ?

III. a. Available of buses in the locality :

Very few.....Few.....Satisfactory.....

- b. Does the buses suit your necessary requirement ?

Yes..... No.....

- c. Are the amenities provided ?

Good..... Bad..... Not very good.....

- d. Should the number of buses be increased ?

Yes..... No.....

- e. Are the busus

Regular..... Irregular.....

IV. a. Name any public hospital in your locality :

a.

b.

c.

d.

b. Facilities provided, Are they

Good..... Satisfactory..... Unsatisfactory.....

c. Should the number of buses be increased ?

Yes..... No.....

d. Are the buses

Regular..... Irregular.....

V. a. Name any Public Hospital in your locality

a.

b.

b. Facilities provided, Are they

Good.....Satisfactor.....Unsatisfactory.....

c. Conditions in the hospital. Are they

Good.....Satisfactory.....Unsatisfactory.....

d. Are medical facilities provided

Free of cost..... or charged.....

e. Rate of visit per doctor if any.....

f. Do you prefer Govt. hospitals or private hospitals

.....

g. Provide reasons for your preference

.....

h. How far is the nearest Govt. hospitals from your Residence

a) Approx. distance.....

b) Time required.....

i. Should the number of hospitals be increased ?

Yes..... No.....

VI. Location and condition of the lavatory.

a. Is it inside the house.....

or outside the house.....

b. Is the sewage disposed off regularly ?

Yes..... No.....

c. Are the sewers and drains well constructed and ventilated
(to ensure proper drainage)

Yes..... No.....

d. Are chemicals or scientific method adopted by the local authorities to cleanse the locality

yes..... No.....

e. Are drains constructed under the house or joined at an oblique
or sloping angle ?

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