

A STUDY ON PREVALENT SCHOOL PLANT PLANNING
SYSTEM OF BANGLADESH AND DEVELOPMENT
OF A NEW SYSTEM

Ph.D.

RUKSANA PERVIN
INSTITUTE OF EDUCATION AND RESEARCH
DHAKA UNIVERSITY

RB

THESIS SUBMITTED TO THE UNIVERSITY OF DHAKA
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

371.207
PES
c-1

DHAKA

AUGUST 2003

**A STUDY ON PREVALENT SCHOOL PLANT PLANNING SYSTEM
OF BANGLADESH AND DEVELOPMENT OF A NEW SYSTEM**

**RUKSANA PERVIN
INSTITUTE OF EDUCATION AND RESEARCH
DHAKA UNIVERSITY**



401340



**THESIS SUBMITTED TO THE UNIVERSITY OF DHAKA
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY**



DHAKA

AUGUST 2003

Siddiqur Rahman Ph D
Professor of Education



Institute of Education and Research
University of Dhaka
Dhaka-1000, Bangladesh

Res. 880-2-503757, Off. 880-2-9661925/6192, Fax: 880-2-865583, E Mail: duregstr@bangla.net

21 August 2003

To Whom It May Concern

This is to certify that **Mrs. Ruksana Pervin** a Ph.D research fellow of the Institute of Education and Research, University of Dhaka successfully completed her Ph.D thesis entitled, *A Study on Prevalent School Plant Planning System of Bangladesh and Development of a New System* under my supervision. This is her original research work.

S. Rahman

401340

Siddiqur Rahman

Dr. Siddiqur Rahman
Professor
Institute of Education & Research
University of Dhaka, Bangladesh



ABSTRACT

The present research work is a normative survey type study. The objectives of the study were (a) review and analysis of the existing rules and regulations with regard to School Plant Planning, (b) analysis of the practices followed in School Plant Planning, (c) identification of the strengths and weaknesses of the existing practices of School Plant Planning, (d) development of a new system of School Plant Planning for Bangladesh.

The methodologies followed in this study include, among others, analysis of criteria for establishing schools, development of instruments and collection and analysis of data. Data collection activities were accomplished through interview of heads of the schools, administrators and policy planners and direct observation of schools.

401340

Two proposed school plant plans, one for urban area and one for rural area, were given to administrators and policy planners for their compliance. All these collected data were analyzed following appropriate statistical methods. In this respect simple statistics like arithmetic mean, percentage distribution etc. were used.

Finally, recommendations along with proposed prototype plans have been presented.



ACKNOWLEDGEMENTS

The author wishes to thank Professor Dr. Md. Siddiqur Rahman for his supervision, guidance, encouragement and helpful discussions throughout the entire period of this research work. His initiatives, encouragement, patience and invaluable suggestions are gratefully acknowledged without which this work would have been difficult.

The author would like to express his gratitude to all the teachers and fellow students who helped to carry out the research work fruitfully. A number of persons of different agencies like World Bank, UNESCO, BANBEIS, Directorate of Primary Education, Ministry of Education, LGED, Education Engineering Department and Board of Intermediate and Secondary Education, Dhaka deserve special mention for their help and assistance during the field survey.

Thanks to Md. Mahfuzullah and Md. Rezaul Karim, ex-students of I.E.R, Dhaka University, Dhaka for their hard working cooperation without which the survey work could not be done properly.

The author wishes to thank the authority of Mirza Abbas Mahila Degree College, Shahjahanpur, Dhaka for giving the opportunity for higher studies.

Special gratitude is due to my husband for his patience, encouragement and hard work throughout the years of this research. Without his sincere co-operation and encouragement it would not have been possible for the author to complete the work. Special gratitude is also due to my daughters for their patience during the time of preparation of the thesis.

Finally, the author expresses her gratitude to many others who helped directly or indirectly to carry out this research work successfully.

CONTENTS

	<u>Page</u>
Abstract	ii
Acknowledgements	iii
Contents	iv
List of Tables	xi
List of Figures	xiii
Acronym	xv
<u>CHAPTER 1 : INTRODUCTION</u>	1
1.1 Introduction	1
1.2 Background	1
1.3 Meaning of School Plant Planning	2
1.4 Education in Bangladesh	4
1.5 Organization of Education	6
1.5.1 Primary Education	7
1.5.2 Secondary Education	8
1.5.2.1 Higher Secondary Education	10
1.5.3 Tertiary Education	10
1.5.3.1 Madrasah Education	11
1.5.3.2 Technical Professional Education	11
1.5.3.3 Business Education	11
1.5.3.4 Teacher Education	12
1.6 Significance of the Study	12
1.7 Objective of the Study	13
1.8 Scope of the Study	14
1.9 Research Questions	15
1.10 Hypothesis	16

1.11 Limitations of the Study	16
<u>CHAPTER 2 : REVIEW OF RELATED LITERATURES</u>	18
2.1 Research and Book Review	18
2.2 Prevalent School Plant Planning System of Bangladesh	28
2.2.1 Establishment of Facilities Department	29
2.2.2 The Role of Education Engineering Department	29
2.2.3 Selection Criteria of Schools of Education Engineering Department	30
2.2.4 The Projects of Education Engineering Department	31
2.2.4.1 Renovation and Development of Selected Non-Government High Schools	31
2.2.4.2 Development of selected secondary Schools	35
2.2.4.3 Development and Rehabilitation of Secondary Educational Institution (Government and Non-Government)	37
2.2.4.4 Development of Secondary and Higher Secondary Educational Institutions (Government and non-Government) of Dhaka Metropolitan Area	38
2.3 Role of LGED	39
2.3.1 For New Community Schools	39
2.3.2 Additional Classrooms in Existing Schools	45
2.3.3 Repairs and Renovation of Existing Schools	45
2.3.4 For Additional Toilets	45
2.3.5 For Additional Tube Wells	45
2.4 Criteria for Priority of New Community Schools, Additional Classrooms, and Repairs and Renovation of Schools, Construction of Toilets and Construction of Tube Wells	46
2.4.1 New Community School	46
2.4.2 Additional Class Rooms	46
2.4.3 Repair and Renovation	47
2.4.4 Additional Toilets	47

2.4.5 Additional Tube Wells	47
2.4.6 Reconstruction of Schools	48
2.4.7 Additional Blackboard	48
2.5 Rules for Establishing New Non-Government Secondary Schools in Bangladesh	49
2.6 School Plant Planning of Different Countries	50
2.6.1 School Plant Planning Policies of Five Countries	50
<u>CHAPTER 3 : METHODOLOGY</u>	66
3.1 Statistical Units	66
3.1.1 Unit for Collection of Data	66
3.1.2 Unit for Statistical Analysis and Interpretation	66
3.2 Sources of Data	66
3.3 Method of Data Collection	67
3.4 Procurement and Study of Related Materials and Documents	67
3.4.1 Board of Intermediate and Secondary Education	67
3.4.2 Education Engineering Department	68
3.4.3 LGED	68
3.5 Data Collection Instrument	68
3.6 Pilot Test	69
3.7 The Final Questionnaire	70
3.8 Selection of Policy Planners and Administrators	70
3.9 Sampling Procedure	71
3.10 Training of Field Investigators	72
3.11 Data Collection	72
3.12 Data Processing	73
<u>CHAPTER 4 : DATA PROCESSING AND ANALYSIS</u>	74
4.1 Introduction	74
4.2 Distance of Nearest School(s)	75

4.3 Catchment Area	80
4.4 Area of School Compound	81
4.5 Nature of School House	85
4.6 Classroom Space per Student	86
4.7 Sanitary Facilities	90
4.8 Potable Water	93
4.9 Boundary Walls	97
4.10 Playground	99
4.10.1 Rural Schools	99
4.10.2 Urban Schools	99
4.11 Laboratory and Library	101
4.12 Distance of Schools From Highway	104
4.13 Accessibility to the Schools	106
4.14 Fans in Classroom	109
4.15 Primary Schools in the Catchment Area	111
4.16 Fulfillment of Pre-requisite Conditions for Recognition	112
4.17 Proposed School Plants	113
4.18 Establishing and Designing of School Building and Role of Education Engineering Department	113
4.19 Remarks of Administrators	118

CHAPTER 5 : MAJOR FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction	119
5.2 Distance of Nearest school(s)	119
5.2.1 Findings	119
5.2.2 Conclusion	119
5.2.3 Recommendation	120
5.3 Catchment Area	120
5.3.1 Findings	120
5.3.2 Conclusion	120
5.3.3 Recommendation	120

5.4 Area of School Compound	120
5.4.1 Findings	120
5.4.2 Conclusion	121
5.4.3 Recommendation	121
5.5 Nature of School House	121
5.5.1 Findings	121
5.5.2 Conclusion	122
5.5.3 Recommendation	122
5.6 Classroom Space per Student	122
5.6.1 Findings	122
5.6.2 Conclusion	122
5.6.3 Recommendation	123
5.7 Potable Water	123
5.7.1 Findings	123
5.7.2 Conclusion	124
5.7.3 Recommendation	124
5.8 Sanitary Facility	124
5.8.1 Findings	124
5.8.2 Conclusion	125
5.8.3 Recommendation	125
5.9 Boundary Wall	125
5.9.1 Findings	125
5.9.2 Conclusion	125
5.9.3 recommendation	126
5.10 Playground	126
5.10.1 Findings	126
5.10.2 Conclusion	126
5.10.3 Recommendation	126
5.11 Library	127
5.11.1 Findings	127
5.11.2 Conclusion	127

5.11.3 Recommendation	127
5.12 Fans per Classroom	128
5.12.1 Findings	128
5.12.2 Conclusion	128
5.12.3 Recommendation	128
5.13 Laboratory	129
5.13.1 Findings	129
5.13.2 Conclusion	129
5.13.3 Recommendation	129
5.14 Condition of Connecting Roads	130
5.14.1 Findings	130
5.14.2 Conclusion	130
5.14.3 Recommendation	130
5.15 Natural Obstacle	131
5.15.1 Findings	131
5.15.2 Conclusion	131
5.15.3 Recommendation	131
5.16 Verification of Needed Conditions	131
5.16.1 Findings	131
5.16.2 Conclusion	132
5.16.3 Recommendation	132
5.17 Suitability of Proposed School Plant	132
5.17.1 Findings	132
5.17.2 Conclusion	132
5.17.3 Recommendation	133
5.18 General Conclusion	133
5.19 Summary of Recommendation	133
BIBLIOGRAPHY	141
APPENDIX A	145
APPENDIX B	147

APPENDIX C

153

APPENDIX D

156

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
1.5.1	Distribution of students in primary schools of Bangladesh	8
1.5.2	Distribution of students in secondary schools of Bangladesh	9
2.1	Height of desk and chair	21
2.2	The teaching accommodation at schools other than nursery schools and special schools	59
4.1.1	Location and sex-wise distribution of sample schools	75
4.2.1	Distance of nearest schools	77
4.2.2	Distance of nearest school(s) in urban areas	79
4.2.3	Distance of nearest school(s) in rural areas	80
4.4.1	Comments of the respondents who disagreed with the existing government rule	84
4.5.1	The condition of 109 school units of 40 sample schools	85
4.5.2	Condition of school units of the 40 non-government secondary schools	86
4.6.1	Location-wise availability of classroom space	89
4.7.1	Status of toilets	92
4.8.1	Availability of potable water	95
4.8.2	School location-wise availability of potable water	96
4.9.1	Status of boundary wall	98
4.10.1	Availability of playground	100
4.11.1	Location-wise laboratory facilities	101
4.11.2	Location-wise library facilities	103
4.12.1	Status of connecting road	105
4.13.1	School category and location-wise accessibility	107
4.14.1	Location-wise availability of electric fans	110
4.15.1	Number of primary schools in the catchment area	111
4.18.1	Mode of procurement of land	115

4.18.2	Selection of site	116
4.18.3	Preparation of architectural design for school building	116
4.18.4	Involvement of Education Engineering Department in school building construction	117

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
2.1	Prototype plan for renovation and development project	33
2.2	Plan for extension of the existing 3-class room building of renovation and development project	34
2.3	Prototype plan for development of selected secondary school project	36
2.4	Prototype plan for normal primary school	41
2.5	Prototype plan for normal primary school for hilly areas	42
2.6	Prototype plan of normal primary school (for cyclone resistance)	43
2.7	Prototype plan of normal primary school for cyclone and tidal resistance areas	44
4.2.1	Histogram representing the percentage of surrounding non-government secondary schools according to distance covered	78
4.2.2	Percentage polygon representing Non-government secondary schools in urban and rural areas	79
4.6.1	Histogram showing the space per student and space per classroom in the urban and rural non-government secondary schools	89
4.7.1	Histogram showing the construction type and supply of water in toilets in the selected non-government secondary schools	92
4.8.1	Histogram showing the facilities of potable water supply in the selected non-government secondary schools	89
4.8.2	Histogram showing the conditions of potable water facilities in the selected urban and rural non-government secondary schools	96
4.9.1	Histogram showing the condition of boundary of the urban and rural non-government secondary schools	98
4.10.1	Histogram showing the presence of playground in the urban and	

	rural non-government secondary schools	100
4.11.1	Histogram showing the presence of laboratories in the urban and rural non-government secondary schools	102
4.11.2	Histogram showing the presence of library in the urban and rural non-government secondary schools	103
4.12.1	Histogram showing the condition of the connecting roads of the selected urban and rural non-government secondary schools	106
4.13.1	Histogram showing the comparison of natural obstacles in case of urban and rural non-government secondary schools	108
4.14.1	Histogram showing the facilities of fans in classrooms of all sample non-government secondary schools and separately in urban and rural non-government secondary schools	110

ACRONYM

BANBEIS Bangladesh Bureau of Educational Information and Statistics

BOU Bangladesh Open University

B.Ed Bachelor of Education

B.B.A Bachelor of Business Administration

FSSAP Female Secondary Schools Assistance Project

H.S.C Higher Secondary Certificate Examination

IER Institute of Education and Research

LGED Local Government Engineering Department

M.Phil Master of Philosophy

N.G.O Non-government Organization

Ph.D Doctor of Philosophy

P.T.I Primary Training Institute

S.P.P School Plant Planning

S.S.C Secondary School Certificate

T.T.C Teachers Training College

U.K United Kingdom

U.S.A United States of America

V.T.I Vocational Training Institute

V.T.T.I Vocational Teachers Training Institute

CHAPTER 1

INTRODUCTION

1.1 Introduction

Education is the basic requirement for every people of a country and in wider sense for every citizen of this global village. So the environment of education should be proper and conducive for students. The school house which is the primer place for formal education should ensure proper environment. If a school is not located in a proper place and if the students do not get minimum facilities, which is required for making their learning process smooth and peaceful then it can be argued that the school is not properly planned. So properly planned school plant is necessary for good learning and also for good teaching.

The present research is a normative survey type work. In this study, the prevalent school plant planning system of Bangladesh for non-government secondary schools were observed carefully and a survey was made on sample schools to know whether the existing system was followed on school plant planning processes of Bangladesh. At the same time this research activity is an

attempt to know the facilities, which the non-government secondary schools should have for students and also to know the actual condition of those schools ^{possess} ^{on the basis of visits} whether the facilities are actually available and the condition of these facilities about needed facilities. In Bangladesh more than 97 per cent of the secondary schools are non-government which are managed and run by School Managing Committee following rules and regulations prescribed by the government.

1.2 Background

In the history of mankind there was no time when there was no education. It was present from the early global age. But the form of education was different at that

ment.

different
the of

time. At that time, early stage of mankind, education was informal. People used to achieve this type of education from his surrounding environment. The social institutions from which one can receive informal education are home, society, club, library, mosque etc. This type of informal education is not a process of normal learning or attending a formal institution. So there was no school at that time.

In course of time, people realize the importance of formal education and after that, school related education emerged. Formal education is the type of education, which is planned *and* arranged in the institutions for schooling and coaching. So for formal education an institution is needed which is called a school.

When people realized the need of *a* separate school house for education, the location of the school, its structure or buildings, furniture, equipment and other physical facilities also became important for them. In this way, school plant planning processes came into consideration to education oriented activities of the people.

1.3 Meaning of School Plant Planning

A school may be defined as an institution, which is situated in a house where an organized group of pupil receives education from one or more teachers. So to operate the formal educational activities, a house is needed for every school. But the word school plant does not mean only the school house. It means school house including library, laboratory, workshop, office, toilet, play ground, furniture and equipment.

To build a school plant, the factors which should be taken into consideration are as follows :

- where to build the school
- how to build the school
- what are the facilities the school needs to offer to the students

These are the main factors of school plant planning.

According to Macconell², the School Plant Planning includes the followings :

- selection of site for school
- population survey of the locality
- architectural design of school building
- design of furniture and equipment
- planning for physical facilities of the school

So School Plant Planning is the planning of site, building, furniture, equipment and other physical facilities of a school.

For planning a school plant there are some pre-steps. First of all a feasibility study is needed to determine whether there is any need for the school plant. From survey of the locality the need for particular school can be understood. The survey shows the situation of different schools of a locality, present condition of those schools, whether there is a need for new school plant. The catchment area of the schools and accessibility of the pupils are major considerations.

When the need for a school plant is understood, the nature of the plant and the facilities it needs to provide should be identified. For example, the educational program of primary school and that of vocational school will not be the same. There will be differences on number and size of classrooms, furniture, classroom facilities. In primary school, one-storied building is preferable but in vocational school, there is no such preference. The furniture of primary school should be low benches or small chair and table or desk. In vocational schools students work practically what they learn. So their classroom size should be big enough and there should have facilities for practical work. Workshops are important in

be
 vocational schools. But in primary schools there should have playground and facilities for indoor and outdoor games. The school plant should be designed to fit the desired needs. The program will be the main factor in determining the type of building, utilization of space, the size and shape of classrooms, different arrangements and equipment of the classrooms and utilization of other space. Following According to the educational planning of school program, the school building should be made. Then a written educational specification should be prepared according to the educational planning.

of site
 Next site selection, design of school building by architect, design of furniture and equipment and planning for physical facilities will be needed step by step. In these steps are followed systematically and sincerely then the planned educational institutions will serve the purpose well and facilitate in achieving the ultimate goals.

1.4 Education in Bangladesh

Bangladesh is one of the developing countries in the world¹. It is situated between the 20°34' and 26°38' North latitude and between 88°01' and 92°41' east longitude. It is a riverine country of 129.1 million people according to 2001 census¹ and has an area of 1,47,570 sq. km¹. It has an extensive border with India on the west, north and east sides and a link with a small strip of boundary with Myanmar at the south-east. In the south is the Bay of Bengal and to the north and north-east lies the broad mass of the Assam range and Shillong plateau.

The country as a whole is practically flat with an elevation of only 9 m (30 ft.) above sea level except for the tertiary folds, which branch off from the Himalayas at the north run to the south through southern part of Sylhet along the eastern border into Chittagong Hill Tracts and continue into Myanmar.

Bangladesh emerged as an independent country in 1971. So the history of education of Bangladesh is not very old, but it has an educational background inherited from its British and Pakistani rulers.

The British³ came in this subcontinent as merchants but ultimately they captured the political power and ruled this area nearly two hundred years. During that period they took several steps for developing educational program of this area. Several schools were established by British Missionaries and by East India Company. Though they took several steps but those were haphazard for differences of opinions among themselves. The diversifications of opinion lie regarding the purpose of educating the people of this subcontinent, about the medium of education, management of schools and way of expanding educational development of whole country. On this context to evaluate the steps taken by the British ruler, an educational despatch was prepared in 1854. It was known as Wood's Educational Despatch. This despatch played an important role on Indian education system. According to the recommendations of Wood's Despatch, several positive steps were taken. Establishment of educational department in every province, establishment of universities, supervision system, establishment of graded schools, grant-in-aid for private schools etc. were the major outcomes of Wood's Despatch. Though the British ruler ~~at that time~~ took initiative to ~~develop~~ ^{eradicate} the educational backwardness of India but their real motive was to educate Indians for helping the British during their regime.

In Bangladesh the present system of education is a continuation of the system introduced in this country by the British during their long rule in the subcontinent. The system of education prevalent in the subcontinent during the British rule was not suitable to the needs of an independent nation or of a growing economy. At that time the system of education was developed to fulfill the administrative and

political requirements of the rulers. After the end of British period in 1947, Bangladesh became a part of Pakistan up to 1971. During this time also the traditional system continued.

On the 16th December 1971, Bangladesh emerged as an independent country. Different steps were taken here by different governments for developing the educational system of this country. The Bangladesh National Commission Report on Education 1974⁴ gave emphasis on free and compulsory primary education in Bangladesh. The Bangladesh National Commission Report on Education 1988⁵ also recommended free and compulsory primary education for all up to 1995. The reports of the both commissions recommended that the primary level should be gradually extended from I – V to I – VIII. There were also recommendations for female education, mass education etc.

Now in Bangladesh primary education is free and compulsory. Government wants to achieve the goal of Education for All. To inspire female education Government^{6,7} has made tuition fee free up to class XII for girls students and they also get some money as stipend. Except metropolitan area, all girls students of Bangladesh get these facilities. Recently, in 25th May 2003 a decision was taken by Ministry of Education to give stipend for needy metropolitan area girls students also.

Bangla is the medium of instruction at all level of education. However, English is also taught as a compulsory subject up to class XII. Moreover, English is widely used at higher level.

1.5 Organization of Education

The whole education system of Bangladesh is divided into a hierarchy of education levels in order to facilitate education and to meet the demand of the country. The first being the primary education, which is offered for five years from grade I to grade V. The next higher level is the junior secondary level, which is offered from grade VI to VIII. The secondary level is ~~being~~ designed for two years

from grade IX to grade X. The 2-year higher secondary^{level} is the preparatory level for the students to get them admitted into the universities and other professional institutions for higher education. Out of this normal education, there are other special education such as, technical education, vocational education, teachers' training and other professional education. Religious education^{offer} through madrasah education has been considered as the separate stream of education in the country.

^{total} The span of education in Bangladesh generally extends to 16 academic years^{encompassing The Primary Education and Secondary Education and Higher education} that can be conveniently divided into three broad stages namely,

- i. Primary education
- ii. Secondary education
- iii. Higher education

Primary education covers a period of 5 years, secondary education 7 years and higher education generally 3 to 4 years.

1.5.1 Primary Education

The primary education is comprised of five grades from I to grade V. The academic year starts in January and ends in December. Primary schools are run in two staggered slots. Duration of first slot is from 9:30 A.M. to 12:00 noon and second slot from 12:00 noon to 4:15 P.M. But only in Dhaka and Chittagong metropolitan areas, the duration of first slot is from 7:30 A.M. to 10.00 A.M. and second slot from 10.00 A.M. to 2.15 P.M. During the first slot, classes of I and II are held and in the second slot classes of III, IV and V are taken.

^{years} The entry age is 6+ in primary education. Generally, children between 6 to 10 years of age are enrolled in primary education. The curriculum for the primary grades includes Bangla, Mathematics, English, Social Science, Science, Physical Education, Arts and Crafts etc. Promotion to the next higher grade at the primary

level is given on the basis of satisfactory results of the annual examination held at the end of each calendar year. Administration of the primary school lies ^{Control of} with the ^{with} control of the Directorate of Primary Education, Ministry of Primary and Mass Education. At present, there are 37,671 government¹, 21,399 non-government primary schools and 19,056 other primary level institutions in the country in which 17,65,9220 children are studying (Table 1.5.1)¹. Besides primary schools there are some pre-primary schools such as, nursery and kindergarten functioning mostly in urban areas and serve the interest of affluent income families. These institutions are privately managed and do not fall within the public education system.

TABLE 1.5.1

Distribution of students in government and non government primary schools in Bangladesh². 1

Govt. Primary Schools

No students

Number of government primary schools	Number of students in government primary schools	Number of non-government primary schools	Number of students in non-government primary schools	Number of other primary level institutions	Number of students in other primary level institutions
37,671	108,30,742	21,399	44,63,218	19,056	23,65,260

1.5.2 Secondary Education

After the primary stage, students enter secondary schools at the age of 10+.

The secondary education
It is of five years duration followed by two years of higher secondary education.

There are three stages of secondary education in the country, namely –

- junior secondary education
- secondary education

- higher secondary education

Junior secondary ^{education} comprises of classes VI to VIII, secondary from classes IX to X and higher secondary from classes XI to XII. Secondary education is offered in junior high schools and high schools. Higher secondary education is offered in the intermediate colleges, and the intermediate section ^{the} of degree colleges. There are a number of high schools that have also primary sections and offer teaching from class I to X. At present, there are 12,604 non-government secondary schools in the country (Table 1.5.2)¹.

TABLE 1.5.2

Distribution of students in government and non-government secondary schools of Bangladesh¹

Govt. secondary schools

Number of students and secondary schools in Bangladesh			
Number of government secondary schools	Number of students	Number of non-government secondary schools	Number of students
317	2,21,215	12,604	69,33,497

The overall student teacher ratio in Bangladesh at secondary level is 44 : 1.

There is no public examination up to class VIII. Up to this stage, class wise annual examinations are held and promotion to next higher class is given according to the qualifying marks of a student.

Streaming of students takes place after class VIII. One stream follows general education in high schools and the other follows vocational education in different trade schools, and the other follows Madrasah education.

There are three groups⁸ at the secondary level education, namely :

- humanities group
- science group
- business education group

At the end of class X, a public examination called Secondary School Certificate (S.S.C) is conducted by the Boards of Intermediate and Secondary Education every year.

1.5.2.1 Higher Secondary Education

After passing the S.S.C examination the Higher Secondary Education¹ for the students starts. This level is 2-year duration for the age group of 16 – 17 years.

There are six groups⁹ in Higher Secondary level of education, namely :

- Humanities group
- Science group
- Islamic Education group
- Music group
- Business Education group
- Home Economics group

The second public examination under the title “Higher Secondary Certificate examination” (H.S.C) is held in every year at the end of class XII.

1.5.3 Tertiary Education

After passing Higher Secondary Certificate (H.S.C) examination students can pursue in accordance with their ability or aptitude for higher education. Different courses of higher education are offered in universities and different types of degree colleges.

Tertiary education is of 3-year Pass course or 4-year Honours course. These first degree programs are offered by the public and private universities. Instructions are given mostly in degree colleges. There are 2-year Master Course for Pass course graduates and 1-year for Honours graduates. Higher degrees leading to M.Phil and Ph.D are also available in the universities. Duration of studies of Ph.D is minimum three years and for M.Phil degree minimum two years is required after Master's Degree.

1.5.3.1 Madrasah Education

There exists a different stream of education system, which is parallel to the main stream of formal education. It is Madrasah education system (Islamic education). There are 5 stages in Madrasah education system, these are 5-year Ebtedayee, 5-year Dakhil, 2-year Alim, 2-year Fazil and 2-year Kamil courses. To get government recognition and support the Madrasahs are required to adopt national curricula. Except Ebtedayee the students are required to appear at the Public Examination after completing courses of Dakhil, Alim, Fazil and Kamil.

1.5.3.2 Technical Professional Education

Vocational, technical and professional education like, Engineering, Medical, Agriculture etc. exist as separate streams. After completing the Junior Secondary level (Grade-8) students enter into Vocational Training Institute for 2-year S.S.C (Vocational)/S.S.C (Science) they enter into Vocational Training Institute (VTI), Polytechnic Institutes for 2-year H.S.C (vocational)/3-year Diploma-in-Engineering courses. After passing H.S.C (Science), students enter 4-year B.Sc Engineering / 5-year MBBS (Medical) / 4-year B.Sc (Agriculture) course offered by different colleges and universities.

1.5.3.3 Business Education¹⁰

There are 4-year course for Bachelor degree and 1-year course for Master degree, which are named respectively B.B.A and M.B.A. These courses are mainly for students who were in the Business education group in S.S.C and H.S.C. These courses are offered by different colleges and universities.

1.5.3.4 Teacher Education¹

For the teachers of different educational levels, different institutes offer different courses. There is 1-year Certificate-in-Education course for the teachers of Primary level offered in Primary Training Institute (PTI). For Secondary level teachers, Teachers Training Colleges (TTC) offer 1-year Bachelor of Education (B. Ed) course. Bangladesh Open University (BOU) also offers B. Ed course through distance education mode. The Institute of Education and Research (IER) of Dhaka University offers 4-year Bachelor of Education, one-year Master of Education, 2-year M. Phil and Ph. D programs. Some Teachers' Training Colleges also offer M. Ed course. Vocational Teachers Training Institute (VTTI) offers 1-year course for the teachers of Vocational Training Institutes and Technical Teachers Training Colleges offer training course for the teachers of Polytechnic Institutes.

1.6 Significance of the Study

Provision of educational facilities is the most pressing and immediate needs of a community. As education is the prime means of a country for ensuring human development, educational institutions play an important role in achieving the goals of education. An educational institution should ensure several needed conditions and facilities for proper teaching ^{and} learning atmosphere. Proper planning of an educational institution is necessary for development of educational facilities. Such an approach is important not only for educational reasons but for community needs.

Schools are important educational institutions from which the formal education of students begins. Every country has its own school plant planning system. The school plant planning process of a particular country proceeds on according to the norm or system of that country. So the system is very important in this context and it plays a vital role in the development of education in any country.

Like other countries, Bangladesh has its own norm or system. According to the existing system the school plant planning process operates by the related organizations. To facilitate education in general and particularly school plant planning process the norm or system should be re-examined and revised periodically, because systems are the main driving force of school plant planning process of any country.

The present study is an attempt to investigate the problems of school plant planning system for establishment and facilitate non-government secondary schools. According to the result of the present study the problems can be found out about the system. After finding out the problems, the needed steps should be taken.

So a study on school plant planning system of Bangladesh is significant not only for overcoming the drawbacks of it but also to enrich the whole educational process of the country.

1.7 Objective of the Study

Primary school is the ^{base} ground level of our common school system and high school is the secondary level of the same and is a systematic extension of primary school system. Generally, ^{which one?} it offers terminal education on preparation for college and should be planned in such a manner that will ensure its continuing usefulness for the welfare of the community.

There are first of all two types of high schools in Bangladesh. ^{These} They are government schools and non-government schools. These two types may be for boys or for girls. Some schools have co-education system also. These different types of high schools vary in courses offered and in management that controls ^{their} functioning and environment existing around. ^{the} On the point of distance criteria, ^{them} location factor and other physical facilities varies from urban to rural schools and also from one division to another.

There are some government rules or systems for planning of school plant in Bangladesh. The system itself may have some weaknesses, which should be removed for future progress of planning of schools.

The objectives of the present study are as follows.

- i. Review and analysis of the existing rules and regulations with regard to School Plant Planning.
- ii. Analysis of the practices followed in School Plant Planning.
- iii. Identification of the strengths and weaknesses of the existing practices of School Plant Planning.
- iv. Development of a new system of School Plant Planning for Bangladesh.

Therefore, the present research work is an attempt to accomplish the following activities.

- To collect and review existing rules and regulations on School Plant Planning and to collect information from non-government secondary schools about the practices they follow with regard to School Plant Planning. of
- To collect information about the existing physical facilities in the sample schools.
- To collect information about the strengths and weaknesses of the present system.

1.8 Scope of the Study

The present research work is an attempt to analyze the criteria related with the physical facilities of non-government secondary schools of Bangladesh. Among the secondary schools of the country more than 97% of schools² are non-

government. So, non-government schools have been considered for the present study.

The study covered seven factors. These are –

- distance of nearest school(s)
- catchment area
- area of school compound
- nature of school house
- classroom space per student
- sanitary facilities
- ^{availability of} potable water

The study also focuses on some interrelated physical facilities. These are :

- boundary walls
- playground
- laboratory and library facilities
- distance of schools from main roads
- accessibility of schools
- facilities of fans in classrooms

1.9 Research Questions

The present study is an attempt to investigate the answers of the following questions.

- i. What are the government rules and regulations regarding school plant?
- ii. What are the major strengths and weaknesses of the existing rules and regulations?
- iii. Do the schools of Bangladesh obey the rules of School Plant Planning?
- iv. What is the present status of the physical facilities of the non-government secondary schools of Bangladesh?

- v. How far the existing physical facilities ^{are} conducive for effective teacher-learning activities?
- vi. How to improve the existing system of school plant planning?

1.10 Hypothesis

The following are the hypotheses of the study on existing rules and regulations.

- i. The distance rule is not followed by most of the non-government secondary schools of Bangladesh, mainly by urban area schools.
- ii. During the time of establishment most of the non-government secondary schools followed the rule about total area of a school.
- iii. The rule about classroom space per student ^{is} followed by most of the non-government secondary schools.
- iv. Most of the schools do not supply potable water for students
- v. Most of the schools have toilets for students.
- vi. Facilities like playgrounds, libraries and ceiling fans are insufficient in most of the non-government secondary schools.

1.11 Limitations of the Study

In the present study the researcher faced several problems. Those are -

- Lack of sufficient published or unpublished materials related to the school plant planning of non-government secondary schools in Bangladesh.
- ^{Availability} For collection of reliable information about the existing school plant planning in Bangladesh is really difficult.
- Due to the above two facts, the whole work has to be based on actual field study.
- There are 12,604 non-government secondary schools¹ in Bangladesh. But due to resource and time constraints the present research work is limited ^{to} on forty schools only.

Study of

Facilities aspect for non-government secondary schools is of great importance in the present study, but there is no such existing important study in this respect. However, in order to find out some degree of proper kind of solution, the present study would provide an opportunity to investigate the problem in its real perspective.

REFERENCES

1. ✓ Statistical Profile on Education in Bangladesh "BANBEIS Publication No. 350, November 2002. 1, Sonargaon Road (Palashi-Nilkhet), Dhaka – 1205.
- ✓ 2. Macconell J. D., The Planning for School Building, Prentice Hall Inc., Englewood Cliffs, New York, 1957.
- ✓ 3. Ali M. Azhar, 'Shikhar Songkhipta Etahas', Bangla Academy, Dhaka, 1986.
- ✓ 4. Bangladesh Jatio Shikha Commission Report (Bengali), 1974, pp-293.
- ✓ 5. Bangladesh Jatio Shikha Commission Report (Bengali), 1988, pp-63.
- ✓ 6. Brochure of Female Secondary School Assistance Project, Directorate of Secondary & Higher Education, Ministry of Education, Government of Peoples' Republic of Bangladesh.
- ✓ 7. Brochure of Higher Secondary Female Stipend Project, Directorate of Secondary & Higher Education, Ministry of Education, Government of Peoples' Republic of Bangladesh.
8. Syllabus of Secondary School Certificate Examination for the Year 2005, National Curriculum and Textbook Board, Dhaka, Bangladesh – 2003.
9. Syllabus of Higher Secondary Certificate Examination for the Year 2004, National Curriculum and Textbook Board, Dhaka, Bangladesh – 2002.
10. Bachelor of Business Administration (BBA) Program, Institute of Business Administration, University of Dhaka, 2002 – 2003.

CHAPTER 2

REVIEW OF RELATED LITERATURES2.1 Research and Book Review

A survey was made of all available researches and books but no such study was found about secondary school plant planning system of Bangladesh. However, there were some related literatures, which were found useful. A brief survey of these literatures was carried out. The objective of the survey was to know about the modern outlooks and physical facilities for schools. Some of the related works are described as follows below.

Eusuf¹ carried out a study on the "Planning Primary Educational Facilities in Bangladesh, A Case Study of Tangail and Manikganj Pourashava". The study tried to develop optimum location criteria for primary schools considering educational facilities, accessibility factors and travel distance by the students. It was a case study on government primary schools of two selected pourashavas. It was found from the study that the distribution pattern of government primary schools in those two pourashavas were clustered over the space and not uniformly dispersed. Finally, two potential location criteria were identified. These are

- Lower level optima or residential location based on the distance.
- Top level optima or central location based on income.

It was found that high income families send their children at any distance and the lower and middle-income people cannot afford to send their children far from their residence.

As a part of the survey the physical facilities of the schools were also observed and it was found that the schools surveyed had minimum three classrooms. Seating arrangements, teacher room conditions, water and sanitary arrangements, learning materials etc. all were inadequate almost in every school of these two pourashavas.

About the quality of primary education in Bangladesh, Chowdhury, Haq and Ahmed² mentioned that the condition of 1.8% government primary schools were found in good conditions out of 36,651 schools and 11.8% needed minor repairs. So it can be said that about 76% primary schools needed either major renovation or complete reconstruction. About 50,000 more classrooms were needed if all children who were enrolled in primary schools were to be properly accommodated in classrooms. About the educational equipment and furniture the conditions were not up to the standard mark. About the sanitary latrines also the condition was same. It was found that 15% of urban schools and 58% of rural schools did not have any latrine. In 30% formal school, potable water was not available and only 10% formal schools had playgrounds.

Bangladesh National Education Commission Report³ emphasized on the design and construction of a school building for ensuring conducive atmosphere for learning. *It recommends that the* classrooms should be well ventilated. For this the windows and doors should be big enough and well placed. Colour of the classrooms should be selected in such a way that it *would* not be harmful on students' eyesight. Acoustic and safety matters of the students are also very important. *to be considered* So on planning the classroom floor, ceiling, wall and furniture *the above matters* these matters should be well addressed. *importance of*

The location of chalkboard in classrooms is an important aspect. It should be placed in a wall considering clear visibility of it for proper teaching *and learning* process. The angle of sunlight, the seat arrangement of students etc. are related *to* with the proper placement of chalkboard. So during the placement of chalkboard all these aspects should be taken into consideration.

A fixed norm is necessary about physical facilities, furniture and equipment during the planning and making school building. The materials, which are *already* available and durable, should be given preference *during* on construction of school building. *readily*

Akhter and Begum⁴ in their book "School Mapping and Plant Planning" mentioned about the necessity of healthy condition of classrooms of a school, proper planning of school building and also the furniture of classrooms.

The students spend a long hour of the day in schools. So healthy atmosphere should be present in the classrooms. Without the presence of proper sunlight and ventilation the total condition of the classrooms may adversely affect the health of the students as well as their attentiveness.

The design of school house should be made by experienced persons. On making design of school building the few English alphabets (E, H, L, I, T) type construction should be given preference because these types of school buildings were proved as proper for school purpose.

One storied building is preferable for school house because high rise buildings are risky for students, mainly for junior students. But in the urban areas due to limited space many of the school buildings are of three or four storied.

Besides this, during construction of a school building utility purpose and aesthetic purposes should be taken into consideration. As Bangladesh is a developing country, the limited economical capability also should be taken into account during designing and construction of a school building.

The classroom conditions affect the good teaching and learning activities. According to the need of specific classroom, furniture should also be selected. The Table 2.1 provides the height of desk, chair etc. of different classes.

TABLE 2.1 Height of desk and chair⁴

Class	Height of desk	Height of chair
KG	533.4mm (21 inch)	279.4 mm (11 inch)
I	558 mm (22 inch)	304.8 mm (12 inch)
II	609.6 mm (24 inch)	304.8 mm (12 inch)
III	609.6 mm (24 inch)	355.6 mm (14 inch)
IV – V	660.4 mm (26 inch)	381 mm (15 inch)
VI – VII	685.8 mm (27 inch)	406.4 mm (16 inch)
VIII – X	762 mm (30 inch)	457.2 mm (18 inch)

Every student should have separate seat^a in classrooms. The height of chairs or benches should be according to the average height of the students so that the legs of students can touch the floor. The perfect shape of chairs, tables and desks are important for their health and also for their attentiveness. ^{of the students}

In classrooms standard space per student should be 1.39 sq. m (15 sq. ft.) and in the laboratory 2.79 to 3.25 sq. m (30 to 35 sq. ft.). For 100 students there should be one latrine and for 25 students there should be one urinal.

Hossain and Karim⁵ in a proceeding, "~~The Educational System of Bangladesh~~" mentioned^{is} about the physical facilities of primary and secondary schools of the country. In that study, it was indicated that the secondary school houses of Bangladesh were mostly pucca and semi-pucca. But the physical facilities in primary schools were not up to the mark. In the urban areas most of the primary schools were pucca but in rural areas those were mostly semi-pucca and some of the schools were kutcha with earthen floor.

Regarding the furniture and equipment the total condition^{is} was also similar in the primary schools. For 70 to 80 students there were only 10 to 12 low and high

benches in most of the schools. So these insufficient sitting arrangements could not accommodate all the students. The rest of the students, who could not sit on the benches, used floor mats.

In secondary schools the students had at least sitting arrangements. But the condition of the facilities for learning was not up to the mark including the poor laboratory facilities.

Facadu Constantinos⁶ in a proceeding "Innovative Technology in the Construction of Primary Schools in Bangladesh" mentioned about the design and construction of a model primary school in Bangladesh. The climate in most of the areas of Bangladesh is hot and humid in the hot season and dry and cool in the cold season. To create a comfortable thermal environment cross ventilation was provided at seating level and at the ridge to dissipate the heat from the roof. The simple inexpensive bamboo mat ceiling, which gives a pleasing appearance to the interior of the building also insulates the heat from the roof and improves the acoustics of the building. The interior is illuminated by daylight coming through large windows and the white lime wash finish of internal walls. Removable internal partitions provide educational spaces both for small and large group instruction for office and room staff area and by removing all the partitions the building could be converted into an auditorium, recreation room or as a display area and for other school and community functions.

The most interesting and innovative technological aspect of the building is the use of bamboo reinforced concrete wall panels for external walling. The use of local materials in the construction of rural primary schools were significant as mentioned in the above proceeding. Bamboo grows in Bangladesh sufficiently. So it is always available in this country. At the same time it is comparatively less expensive. Using the local materials the construction cost will not become too high. Bamboo reinforced concrete panel was a very imaginative and useful

addition on school house. Though the design was made for rural primary schools but this imaginative design may be useful for secondary schools also.

Herrick, McLeary, Clapp and Bogner⁷ in their book "From School Program to School Plant" mentioned that "The best site from the standpoint of accessibility alone was the one, which permitted the greatest number of pupils to travel in comfort and safely over the shortest routes to and from school".

"The generally accepted limit for pupils in kindergarten⁷ through the sixth grade to walk to and from school is three-fourths of a mile each way. But there are many persons who advocated half a mile maximum. For junior high school age, the commonly accepted limit is one half miles, while for senior high school pupils this is extended to two miles. These limits must, of course, be adjusted in the light of any adverse conditions along the routes of travel. For example, even a quarter mile might be an excessive distance for a pupil to walk along a heavily traveled highway, where there are no side walk facilities. If transportation is provided, the distance of travel can be substantially extended. It seems to be generally agreed that 30 minutes is a satisfactory maximum time for elementary school pupils to be on a bus each morning or afternoon and that for secondary school pupils the time limit can be increased to one hour. If the population is sparse or if otherwise suitable sites are not available, these distance or travel times may have to be extended, but the goal should be to locate the sites so that the greatest possible number of pupils live within the suggested limits".

"For pupils who use public transport, there should be concern for safety in getting to and from the buses, for the number and nature of places of transfer, and for the possibility of avoiding travel at times, when large number of shoppers or workers are travelling in the same direction on the same bus routes".

Selection of site¹⁵ was an important aspect to establish a school. The author also mentioned that accessibility and environment was two major criteria for good

location of a school house. For ^{easy} and ^{safe} travelling to and from the school building for students and others, the first one was important. The second one was important for good surroundings. For accessibility to the proposed site, emphasis should be given on travel related factors. These factors are travel distance, method of travel and the condition of routes for travelling.

A school should be centrally located in the area of a community where most of the people live. The advantage of this type of location is that from any direction the pupils can reach the school easily.

Environment was another criterion, which was important for school location. For school site residential area should be selected and business or industrial area should be avoided because these areas remain busy and noisy most of the time. The school surroundings should be calm and quiet and free from smoke and contamination. It should be clean and attractive ^{to} in views too. A good surrounding and proper environment can make a permanent and effective good impression ⁱⁿ on students growing up mind for the future.

Macconnel⁸ in his book, "The Planning for School Building" mentioned that the image of school plant ^{is} was different now-a-days from the past. In the past years school plant ^{did} does not create any special attention to the planners or designers of the building. At that time schools were considered as the place where students came to get some instructions. But now-a-days, the previous idea ^{has} was changed. Now it is considered ^{The} now as the place where the students build themselves as a part of society according to their interest, ability, attitude and aptitude. So it is a place ^{for} of taking part in different activities for students, ^{for} on making each of them as the future dependable citizen and indispensable part of the country.

"Now school plants⁸ are conceived to be activity areas where all children and youth go to participate in exercises, resulting in understandings, attitudes, skills, ideals, and appreciation enabling them to live as intelligent social beings.

Educational experiences are real today where they were vicarious a few short years ago.

The process of extending education to all the children and youth of all the people at secondary as well as elementary levels has helped to develop a new concept of the school plant. Special outdoor spaces such as football fields, shops etc which allow for automobile and large machine repair, music rooms for large vocal and instrumental groups, science facilities which make possible the use of live specimens or the growing of plants and animals, food service areas for all who attend school and community service areas are but a few outgrowth of the new basic philosophy which has resulted in a different kind of school plant. Recognition of the importance of good lighting, adequate ventilation and proper sanitation, pleasant colour and proper placement of related building areas to the learning situation has also had a part in bringing about differences. The necessity of using different materials to hold costs within limits of the ability to pay and the development of new materials to better serve needs has also promoted the building of modern school plants".

"The modern school⁸ helps the instruction process by providing a clean, simple, light, colourful and beautiful place in which children and youth work with colourful, attractive, materials. Appreciation of beauty develops from living in and with it. The building and its furnishings encourage and help youth to do things. People in a community are encouraged through the young people; youth as a result of its school activity takes a simple aesthetic approach to living. Parents enthusiastically send their children to school. Schools have ceased to be institutions and have become homes of learning".

So the planning of modern school building was a complex work from the previous time. The planners of now-a-days should understand their responsibility and make plan for such institutions which will fulfill the requirements of both students

and teachers and should be helpful in growing up each student according to the need.

The image of education presently is different from the past. To keep consistency with modern dynamic outlooks emphasis should be given to think about newly arranged educational process. So A. K. Jain⁽⁹⁾ mentioned about modern creative education and the need of such school plant in which the related persons can operate their modernized educational activities. In his book⁹ "School Buildings, Planning Design and Management" he mentioned that *"In an epoch when education is forward looking, dynamic and under rapid transformation, the school building must allow adaptability and be flexible to absorb the changes in the education process. Technological and modern educational aids are being used increasingly for which imaginative design and careful planning become essential. The aim of education is to groom an individual to think and act for himself, so that he can make his fullest contribution to the society. The school is not a place just to cram knowledge down the throats of children, but is an institution, which helps them to become incorporated in the whole life of the society."*

This new vision of education implies that a school must be dedicated to an ideology and a purpose, if it is to achieve a character and a significance of its own. A great wind of change is blowing, for which schools have to prepare the children for a harmonious working partnership of the future.

Education is now seen as a continuing process from childhood to old age. The emphasis is to increasingly engage the students in activities, which may not be directly concerned with the curriculum. This is an important aspect of the educational process for which facilities need to be provided for its development. School building last a long time, and we cannot afford to design them on the basis of worn out educational ideas or obsolete patterns of human relationship. The schools build the future citizen of the country in body, mind and spirit.

Recent experimental designs for the school show fluid arrangement of space, where strict compartmentalization and discipline have been dismantled. Teachers, students and workers all intermingle, which forter the notion of a living school community, whose members understand each other and work together with a common purpose. In harmony with these ideas, a common tendency is to provide facilities, which invigorate the social life of the school and the community it serves. The modern child and youth have become more and more active, more and more inquiring and more and more inquisitive. The modern educational institutions are steadily providing opportunities to the students to explore the world of learning themselves and to give guidance, when there is a doubt, as to which road to take".

The author in the same book also mentioned about the planning of physical facilities of a modern school apart from the back dated ideas. He mentioned that, "The school as a building⁹ cannot be separated from considerations of the services, utilities, furniture, fittings and equipment which are part of the educational environment. The space should be linked with amenities designed for various activities. There has to be a compromise between anthropometric considerations and the varying needs of different age groups. Furniture and equipment design should permit easy rearrangement. Fixed equipment, which predetermine the layout of a room in a rigid pattern should be, as far as possible, avoided".

"The building in services⁹, furnishings and equipment should be planned as a whole. The implications of new aids are closely linked with the design of circulation space, lighting, cooling, ventilating, fire fighting and sound insulation, may require careful planning. A compact structure may be desirable and economical to reduce circulation area, and the length of electric, video audio circuits".

The author advised seven criteria for furniture design. Those are as follows⁹.

- A. Shod feet flat on floor.
- B. Clearance between back of legs and front edge of seat.
- C. No press at front of seat between seating surface and thighs.
- D. Clearance between thigh and under side of table for freedom of movement.
- E. Elbows approximate level with table top when upper arm vertical.
- F. Firm supports for back in lumbar region and below shoulder blades.
- G. Adequate clearance between back rest and seat to ensure free movement of buttocks".

For designing furniture the author⁹ mentioned that, "Each chair, desk and related table size must therefore be designed to suit maximum stature range rather than individual pupils. This in principle means satisfaction of 7 ergonomics criteria with clearance between top of chair seat and underside of table top.

The furniture for pupils should be comfortable, easy to maintain, free from sharp corners, nails etc. It should be tough and durable, scratch resistant and noise dampening".

2.2 Prevalent School Plant Planning System of Bangladesh

The school ^{planning} plant was not a new idea in this country. It was also present before liberation.

On the 16th March 1949 Pakistan Government¹⁰ set up the "East Bengal Educational System Reconstruction Committee" headed by Maulana Muhammad Akram Khan. The committee submitted a report on June 9, 1951. In that report the committee suggested a proper survey of schools at that time with a view to identifying inefficient or superfluous schools and also to establish new schools where there were no schools ^{earlier}.

At that pre-independent period there was an engineering unit under Education Department¹¹, which was responsible for establishment of educational institutions, maintenance and repair of those institutions.

which government
Government took the challenging step for expansion of educational activities through all over the country. To fulfill this need, it was necessary to establish more educational institutions where it was needed.

2.2.1 Establishment of Facilities Department

Formal education is provided in schools. Formal schools need well-planned school building. The school buildings, which were constructed formerly, need to be repaired after certain period of time. With the increase in the number of pupils, need for increasing the number of school buildings and their expansions are also needed.

are
So in 1986, Facilities Department¹² was established under the Ministry of Education. Establishment, maintenance and repairing of educational institutions were the main functions of this department. The present name of this department is "Education Engineering Department".

2.2.2 The Role of Education Engineering Department

15
Education Engineering Department ~~was~~ under Ministry of Education¹³. It worked *56* on project basis. Each project worked for a span of few years, mainly five years.

15 *13*
For each project an amount of money ~~was~~ allocated. It was also decided how many schools would be established under this project. Such decisions were *are* taken according to the amount of the allocation. Then the engineers of the department used to develop prototype plan. So there was a prototype design for

construction of each project separately. Each project would undertake a limited number of schools whether primary or secondary. The separate prototype design of a particular project was applicable for all of the schools under that project. Only the foundation of different schools would vary according to the report of soil test.

2.2.3 Selection Criteria of Schools of Education Engineering Department

The Education Engineering Department followed some principles in selecting the institutions for development. The following standard style was followed in stating the principles.

- i. How many institutions are needed for development, this number should be considered first.
- ii. To include in the developmental project of Education Engineering Department, government recognition is necessary for non-government secondary schools.
- iii. Those non-government secondary schools will get priority for development, which were neglected in the past.
- iv. An institution will not be included in the development program, which was already developed during the last five years.
- v. To bring an institution under developmental project the achievement of the students of that institution in the board examination should be satisfactory. *have to*
- vi. To have own land for an institution is necessary. *inclusion*
- vii. First, priority should be given to girls' schools for including in the developmental project.

2.2.4 The Project of Education Engineering Department

All the developmental works of Education Engineering Department were done on project basis. Each project used to complete its work within pre-specified time according to their nature of tasks.

For rural thanas, there were three projects for secondary institutions. These were:

- Renovation and Development of Selected Non-Government Secondary Schools
- Secondary Education Development Project
- Development and Rehabilitation of Secondary Educational Institution (Government and Non-Government)

There was another project for Dhaka Metropolitan area. This project was for development of secondary and higher secondary educational institutions (government and non-government) of Dhaka Metropolitan area.

Development of Secondary and Higher
The main features of these projects are as follows.

2.2.4.1 Renovation and Development of Selected Non-Government High Schools¹⁴

There were many non-government secondary schools, in which the conditions of school buildings were very poor due to their old age. For good teaching and learning process this condition was not helpful. So to improve and extend the physical facilities and to improve the quality of teaching and learning materials, Education Engineering Department adopted a project entitled as "Renovation and Development of Selected Non-Government High Schools". The main objectives of the project were as follows :

- i. Repair, renovation, development and extension of physical facilities of the

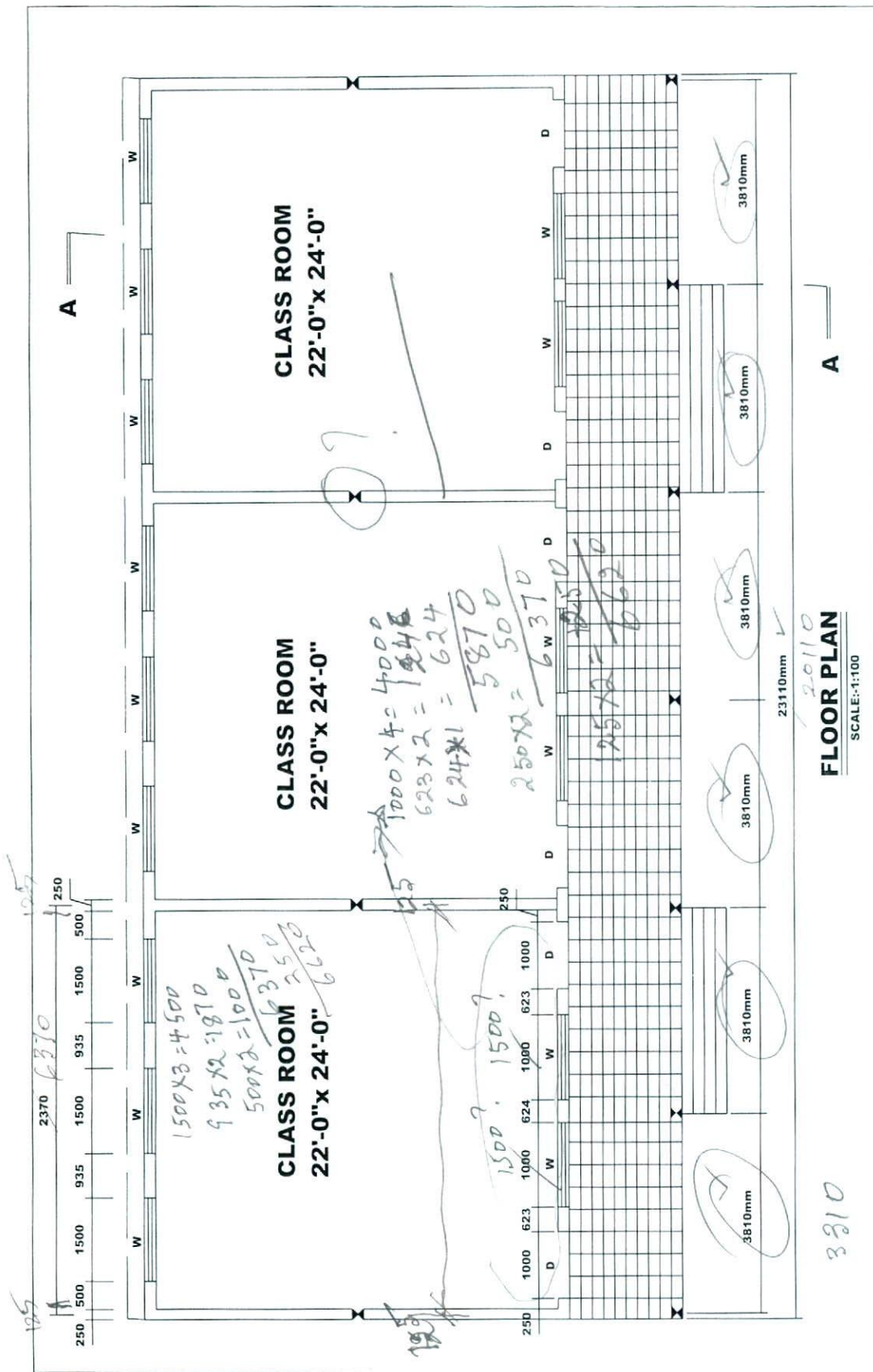
selected non-government secondary schools of Bangladesh.

- ii. Supply of furniture and other necessary equipment to those schools to improve teaching and learning processes.
- iii. To extend accommodation of students in the existing non-government secondary schools.

It was anticipated that the project would bring qualitative change in the secondary education and the flow of students from schools of rural areas to the schools in urban areas would come down. The prototype designs of the school buildings under the project ^{is} have been presented in Figure numbers 2.1 and 2.2.

Under this project, 2760 institutions were considered. It was a 7-year project i.e. (1992 to 1999). The plan of this project was prepared for three classrooms building (one storied building with two-storied foundation) as shown in Figures 2.1 and 2.2, and there were provision for two latrines and two tube-wells. There were also provisions for supply of books and scientific equipment to one third of the above institutions.

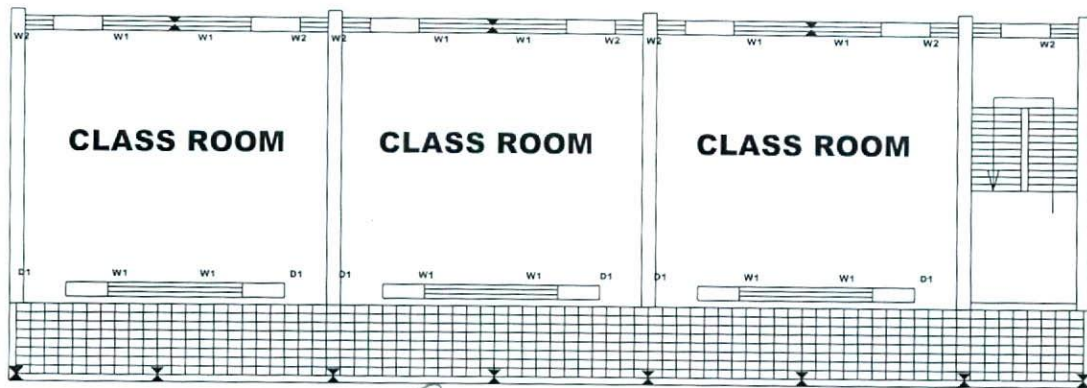
Explain Fig-2.2



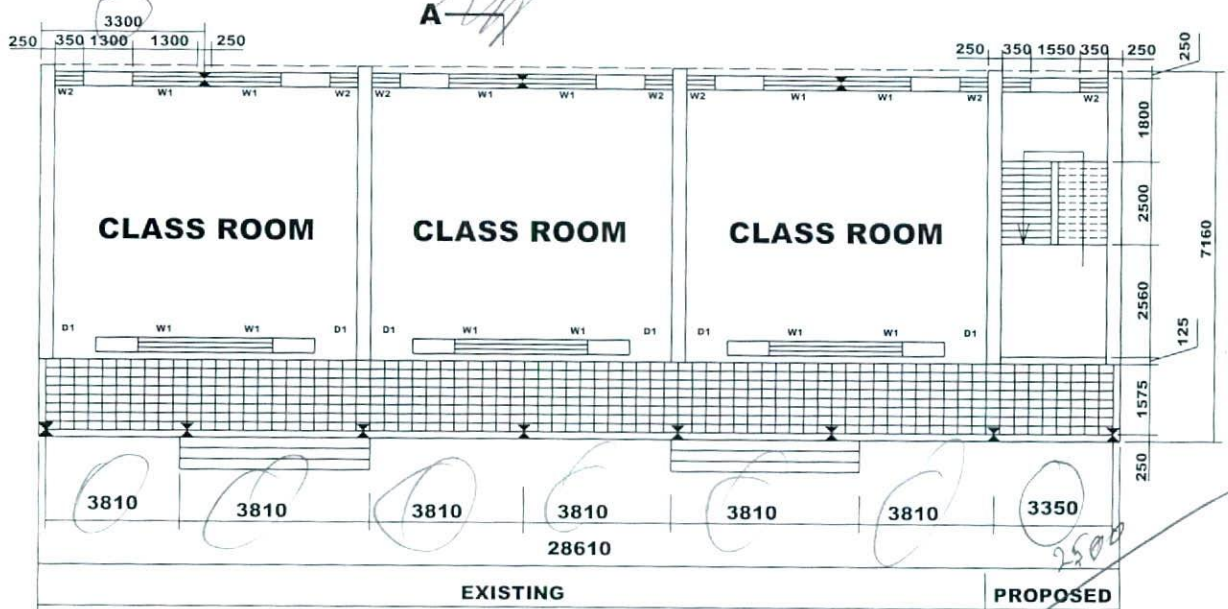
PROTOTYPE 3-CLASSROOM BUILDING FOR NON-GOVT. HIGH SCHOOL AT THANA LEVEL

Fig.- 2.1 Prototype Plan for Renovation and Development Project

PROTOTYPE DESIGN

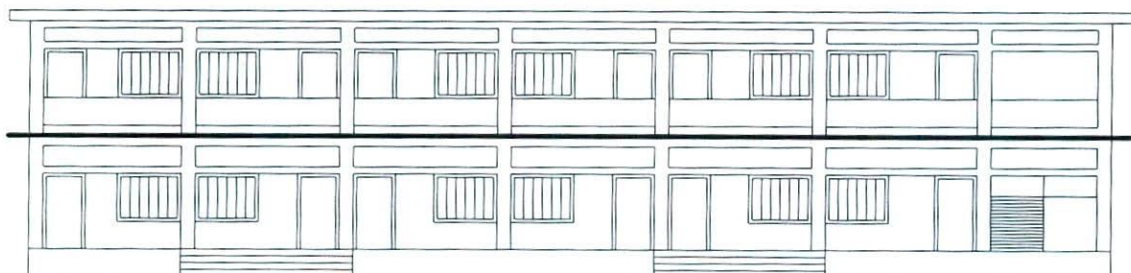


PROPOSED FIRST FLOOR PLAN



PROPOSED GROUND FLOOR PLAN

EXISTING



FRONT ELEVATION

Fig.- 2.2 Plan for Extension of the Existing 3-class room building of Renovation and Development Project

2.2.4.2 Development of Selected Secondary Schools¹⁵

To increase the literacy rate and create educated and skilled manpower in Bangladesh, the Government of Bangladesh undertook different development programs. These inspiring steps caused an increased number of students in primary and secondary levels day by day. To accommodate the additional students the existing physical facilities of the secondary educational institutions were not sufficient.

To overcome the above situation the government of Bangladesh has taken different projects for infrastructure expansion of secondary and higher secondary educational institutions. The project entitled "Development of Selected Secondary Schools (Government and Non-Government)" is one of them. It was a 6-year project i.e. (1998 – 2004).

The objectives of this project were as follows :

- a) Expansion of physical facilities of Secondary Schools (Government and Non-Government) in Bangladesh.
- b) Giving priority on development of rural secondary schools for reducing the pressure of students in the traditional secondary schools (Government and non-Government).
- c) The creation of educational opportunities at secondary level in order to ensure geographical educational equity in secondary education.
- d) Improvement of the quality of education at secondary level.

For this project 317 government and 1324 non-government secondary schools were selected. The estimated cost of this project was Tk. 30,00,000.00. A prototype plan for both government and non-government secondary schools were approved. That plan was for three classrooms with staircase on the basis of three-storied foundation for each institution as shown in Figure 2.3.

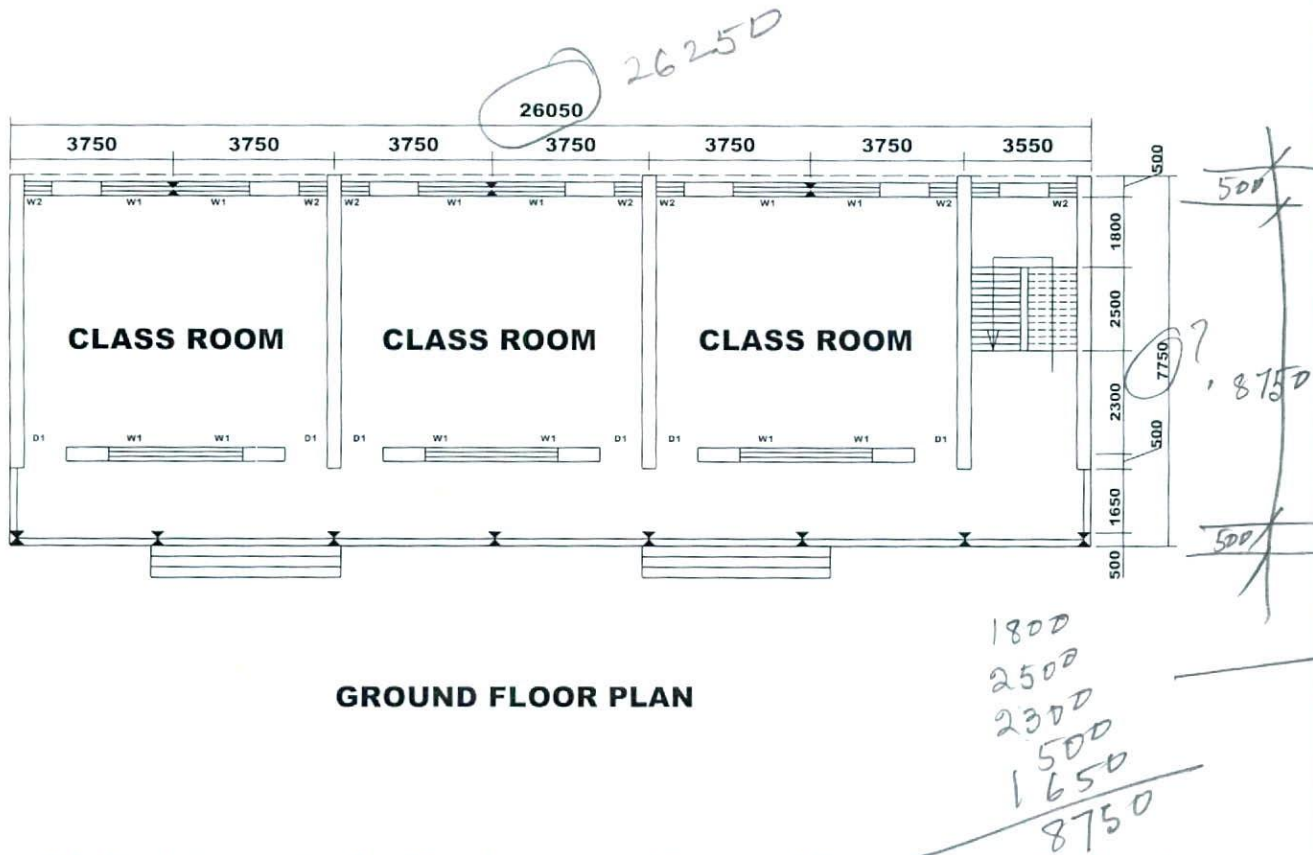


Fig.- 2.3 Prototype plan for Development of Selected Secondary school project

2.2.4.3 Development and Rehabilitation of Secondary Educational Institution (Government and Non-Government)¹⁶

The literacy rate is not up to the mark in Bangladesh. So to increase it and to create educated and skilled manpower the government of Bangladesh has taken different steps. These are compulsory primary education, food for education, stipend for female secondary school student etc. Due to introduction of these steps the primary level of ~~students~~ *enrolment of students in the* have increased. So automatically the students of secondary level schools *have* are also increased. But the condition of physical facilities of existing secondary schools and madrasahs are not extended. Moreover, *the condition of the schools deteriorated* ~~it was dilapidated~~ day by day for lack of proper maintenance. So to accommodate the additional number of students in the secondary schools and madrasahs, the physical facilities of those institutions needed to be expanded. Considering the above situation the Government of Bangladesh has taken this project. The span of time of this project was (1993 – 2001).

The objectives of the project were as follows :

- a) Repair, renovation and construction of physical facilities of 4,830 rural secondary schools to create educational opportunities for additional number of students.
- b) Improvement of educational program and management *of* on 4,830 institutions by providing furniture, books and science equipment.
- c) To enhance the quality of education at secondary level.

For this project 4,830 rural secondary educational institutions were considered. Among those, 3,220 institutions were selected first and 1,610 institutions were taken afterwards. A prototype plan of three classrooms will be followed for new construction. The span of time of this project was from 1996 to 2000.

2.2.4.4 Development of Secondary and Higher Secondary Educational Institutions (Government and Non-Government) of Dhaka Metropolitan Area¹⁷

- ^{number of} The secondary students have increased to a great extent due to Female Secondary Stipend Program in Bangladesh. The physical facilities of existing secondary and higher secondary educational institutions are not sufficient to accommodate the increasing number of students.

For the reason mentioned above the number of students of Dhaka Metropolitan Area schools were also increasing day by day. But the physical facilities of the educational institutions were not increasing as per requirement. So to accommodate the increasing number of students and to maintain the quality of teaching and learning situations, a project was taken by Education Engineering Department on behalf of Government of Bangladesh. The name of the project was “Development of Secondary and Higher Secondary Educational Institutions (Government and Non-Government) of Dhaka Metropolitan Area”. Duration of this project was from 1997 to 2001. For this project 296 educational institutions were selected.

The main objectives of the project were as follows :

- a) To fulfill the additional educational needs for the increasing number of students at secondary and higher secondary level in Dhaka Metropolitan area.
- b) To extend the needed physical facilities of the secondary and higher secondary educational institutions at Dhaka Metropolitan Area for accommodation of additional number of students.
- c) To arrange the supply of needed furniture to the educational institutions.

- d) To enhance the quality of educational at secondary and higher secondary stage.
- e) Repairing of the secondary and higher secondary educational institutions which were flood affected in 1998 and also properly maintain ~~of~~ those institutions.

2.3 Role of LGED

There is another ~~department~~ ^{the} entrusted with tasks of development activities of the schools. It is ^{the} Local Government Engineering Department (LGED). This department was first established in 1960. Different changes took place in its name and in 1992 it was renamed as LGED.

Education Engineering Department deals with the development work of urban primary and urban and rural secondary schools. The main task of LGED is to develop rural primary schools.

There were some pre-specified guidelines ^{Process} for selecting schools for the development by the LGED. In this selection, the collection and analysis of basic educational, demographic and institutional data of every thana/district concerned are needed. Selecting the schools for development program along with the thana sub-project the following guidelines ^{are} ~~should be~~ followed.

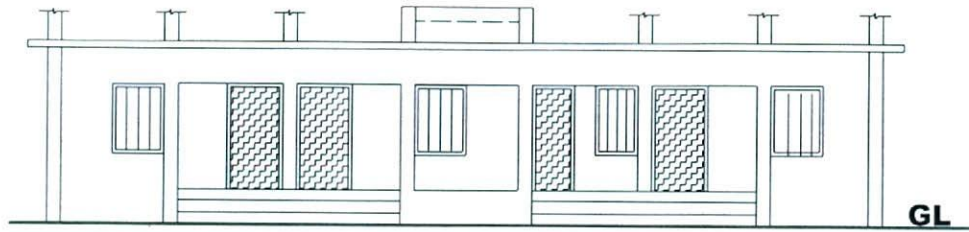
2.3.1 For New Community Schools¹⁸

- i. For this type of school there should be minimum 0.33 acre of land. For location of a school the land should be free from risk of flood. The environment of the area should be suitable for educational activities.
- ii. Within two kilometers there must have sufficient school going pupils. There should not have any other primary school in that area. These

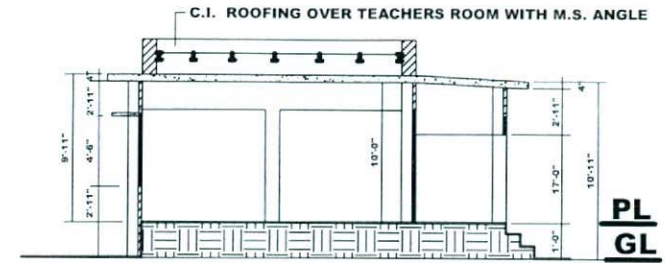
conditions may be relaxed if the area is densely populated or if there is any natural barriers.

- iii. In the catchment area of the proposed school there must have at least 150 students, especially girls students in grades I to V.
- iv. In the catchment area of the school the population should be at least 2,000.
- v. For establishing a new school the interest of the community and involvement of the same for the establishment is necessary.

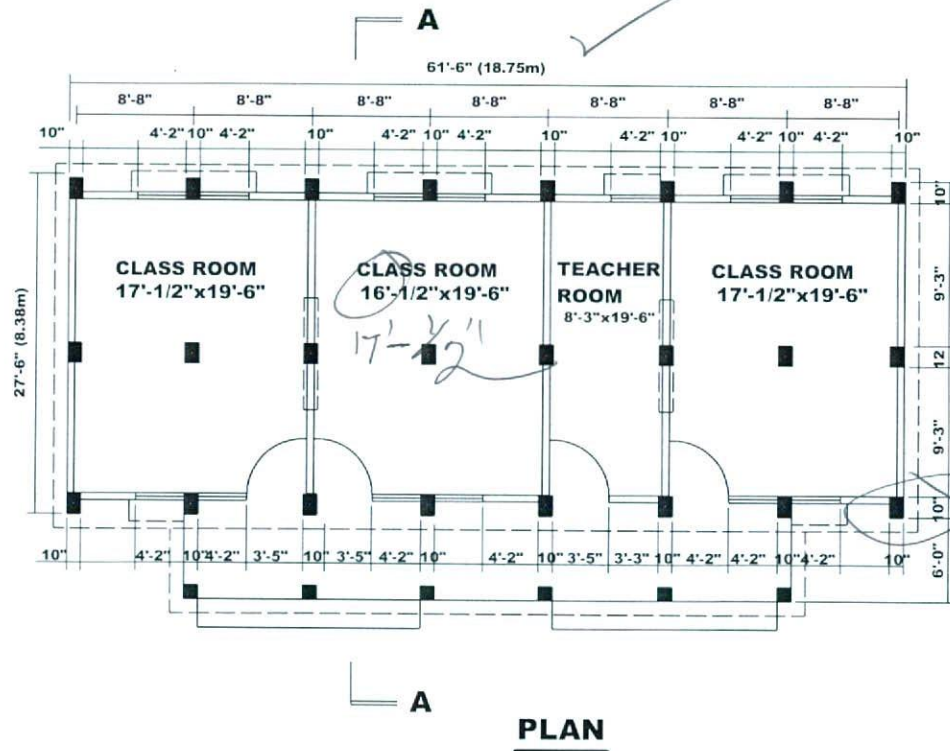
There were some prototype plans made by LGED for normal primary schools, normal primary schools of hilly areas, primary schools for cyclone resistance areas and primary schools for cyclone and tidal resistance areas. The prototype designs for these schools ~~have been~~ presented in Figures 2.4 to 2.7.



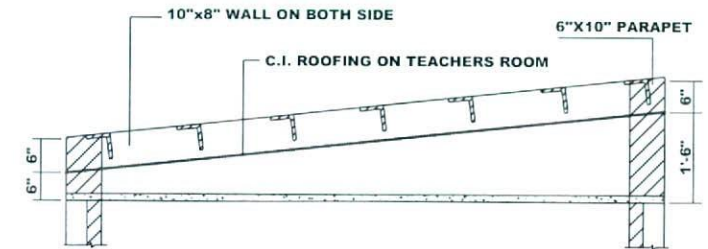
FRONT ELEVATION



SECTION A-A



PLAN

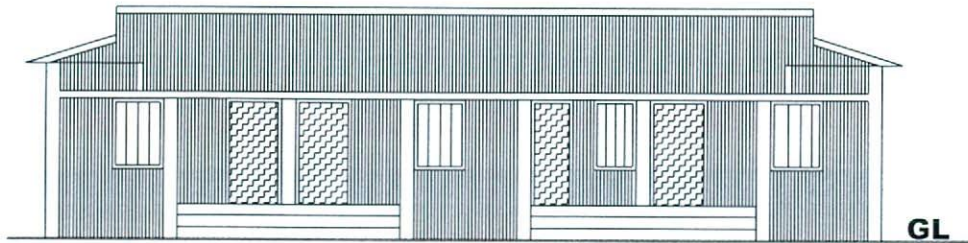


SEC. OF C.I. ROOFING

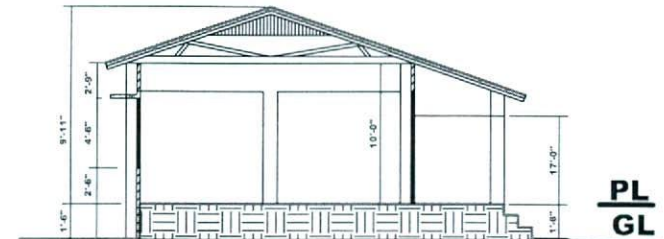
?? 15" in fig 2.5

$$\begin{array}{r}
 8'-8'' \\
 7 \\
 \hline
 60'-8'' \\
 10'' \\
 \hline
 61'-6'' \checkmark
 \end{array}$$

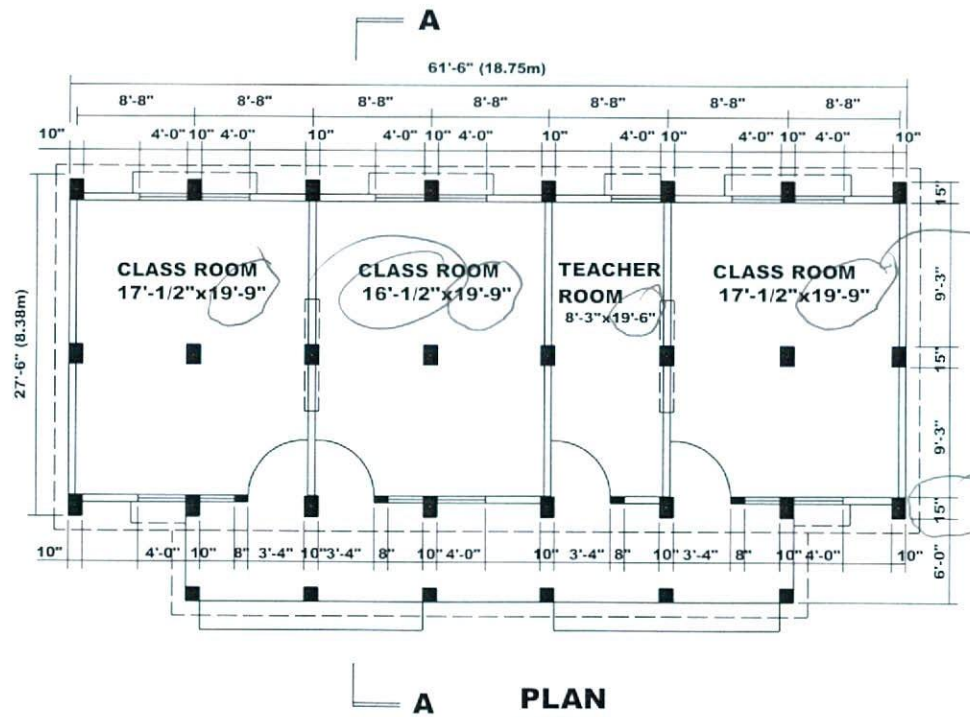
Fig. 2.4 Prototype Plan for Normal Primary School



FRONT ELEVATION



SECTION A-A

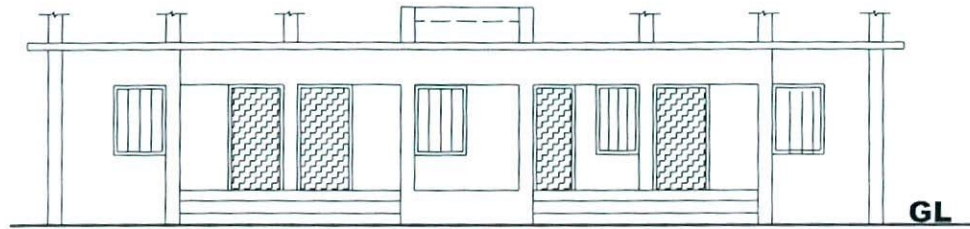


PLAN

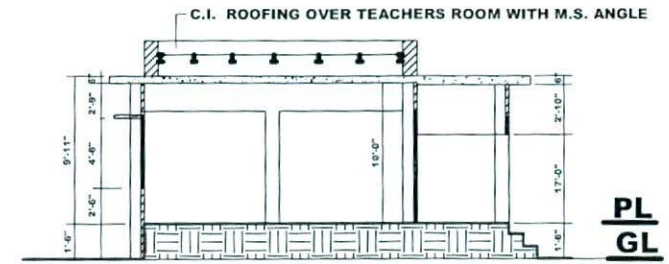
19'-6" in fig 2.4

27

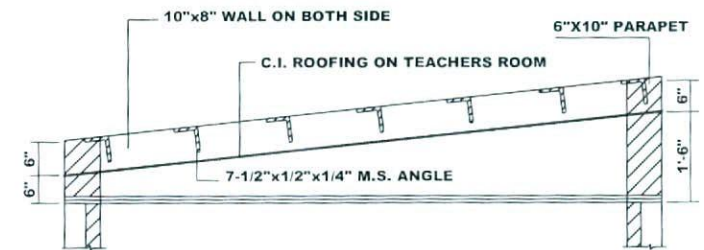
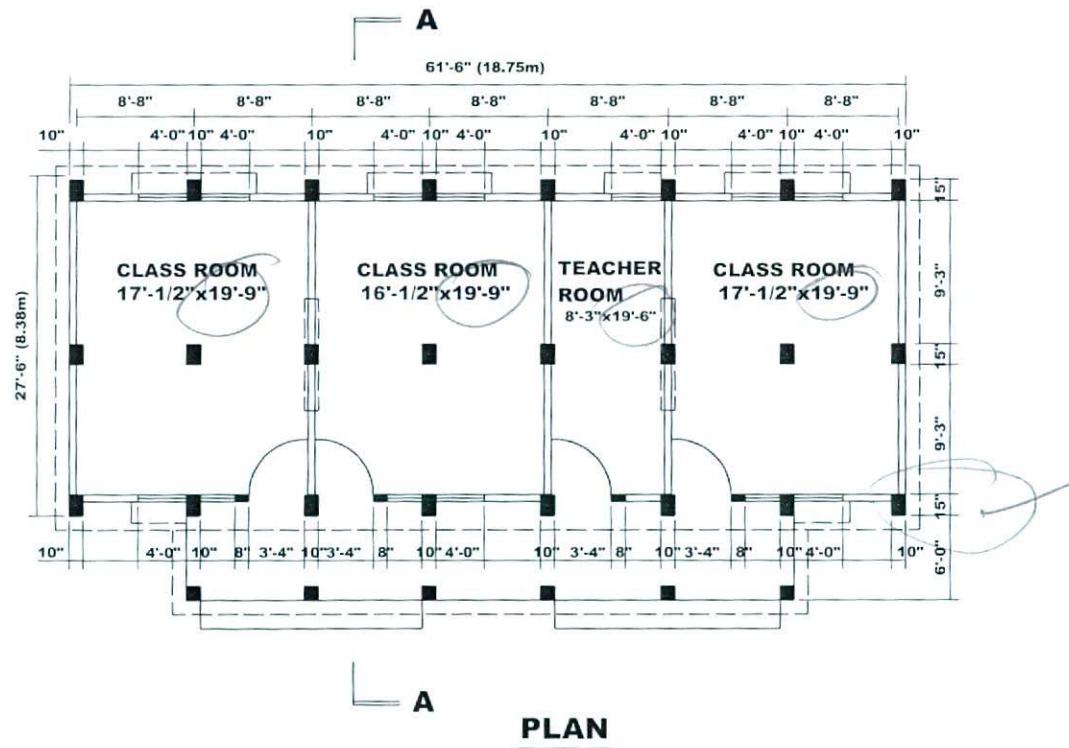
Fig. 2.5 Prototype Plan for Normal Primary School of Hilly Areas



FRONT ELEVATION

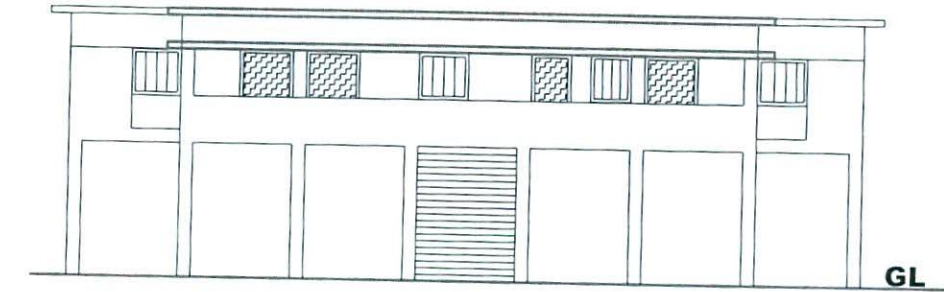


SECTION A-A

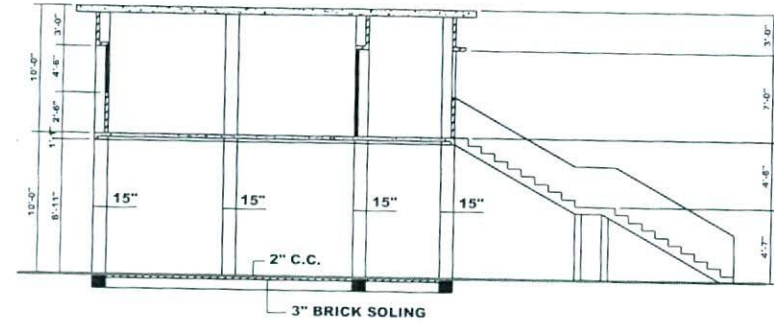


SEC. OF C.I. ROOFING

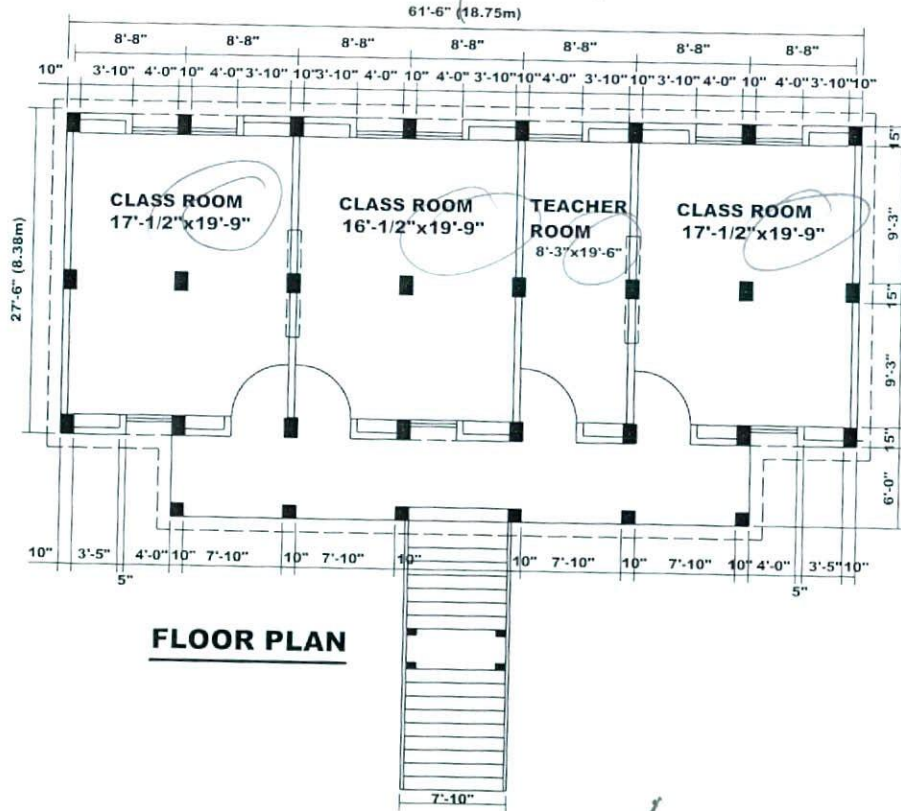
Fig. 2.6 Prototype Plan of Normal Primary School (for Cyclone Resistance)



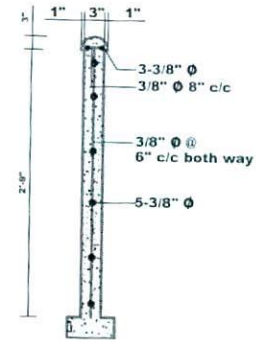
FRONT ELEVATION



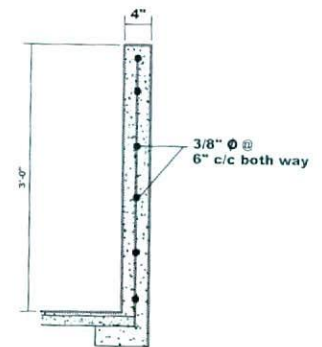
SECTION A-A



FLOOR PLAN



STAIR RAILING



VARANDAH RAILING

Fig. 2.7 Prototype Plan of Normal Primary School for Cyclone and Tidal Resistance Areas

2.3.2 For Additional Classrooms in Existing Schools

LGED not only established new primary schools but took initiative of establishing additional classrooms in existing schools. For this type of establishment the following pre-requisites were necessary.

- i. There should not be any feeder school with surplus capacity within a distance of one kilometer or any completed five years old primary school within a distance of two kilometers.
- ii. The size of future school should be consistent over the following three years according to the population profile projection of the catchment area.

2.3.3 Repairs and Renovation of Existing Schools

LGED also repaired and renovated existing schools when it was necessary. This type of repair and renovation is done only when the cost of repair was more than thirty percent (30%) but less than seventy five percent (75%) of the cost of a new building.

2.3.4 For Additional Toilets

LGED established additional toilets in existing schools where there were no toilet facilities or available toilets were unusable.

2.3.5. For Additional Tube Wells

LGED also constructed additional tube wells in schools where there was no tube well at all or *existing tube wells were* totally non-functioning or unusable *tube well.*

2.4 Criteria for Selection of New Community Schools, Additional Class Rooms and Repair and Renovation of Schools, Construction of Toilets and Construction of Tube Well

According to the previous criteria the selection was made for the construction activity of LGED about the new community schools, ~~schools~~ ^{by of} for additional classrooms and schools for repair and renovation, construction of toilets and ~~construction~~ ^{sinking} of tube wells.

2.4.1 New Community School

For new community schools the priority was given ^{to} on -

- School, which ^{we} is located in remote areas, compared to other schools.
- School located in an area, which is underdeveloped in comparison to other schools.
- School with low literacy rate of its surrounding areas compared to other areas of the thana.

2.4.2 Additional Classrooms

For additional classrooms ^{construction of additional classrooms in existing schools,} the priority was given ^{to} on those schools, which were ^{fulfilled} the following pre-requisites.

- The attendance of the students must be better comparing to other schools.
- Comparing ^{ed} to other schools there should be larger catchment area of children of school going age.
- Comparing ^{ed} to other schools there should be larger catchment area of girls of school going age.

- The schools which are better than other schools in respect of attendance, regularity and quality of teaching and learning.

2.4.3 Repair and Renovation

For repair and renovation of existing schools ^{priority was} priority were given to the following schools.

- Comparing to other schools of the thana ^{ed} most dilapidated but repairable school should be selected. ^{the}
- That school should be selected which ^{was} is constructed earlier compared to other schools of the thana. ^{should be selected which}
- The school is located in remote areas compared to other schools of a thana. ^{should be selected which}
- The school is located in underdeveloped area compared to other schools of the thana. ^{just school should be selected which has}
- A school having more attendance of students, comparing to other schools. ^{ed}

2.4.4 Additional Toilets

For establishing additional toilets in existing schools, priority was given to those schools, which fulfilled the following criteria.

- Comparing to other schools the number of girls students should be higher in the selected school. ^{ed}
- Comparing to other schools the number of students should be higher in the selected schools. ^{ed}

2.4.5 Additional Tube Wells

For establishing additional tube wells in any existing school priority were given to those schools, which fulfilled the following conditions.

- If the existing tube-well is arsenic affected.
- ^{Compared} On Comparing to other schools if the number of girls students is higher.
- In comparison to other schools if the total number of students is higher.
- There are some criteria for selection and ranking the schools in order of priority for "Schools for Reconstruction" and "Schools for Additional Blackboard".

What is this?

2.4.6 Reconstruction of Schools

^{for reconstruction}
For recommendation of a school the following points were considered.

- That school will get priority if the school building is dilapidated and it is beyond repair.
- If the selected school ^{under consideration} is the only one in the village where it is situated.
- If the proposed school is affected by flood.
- If that school ^{the proposed} is affected by cyclone.
- If that school is located in underdeveloped area compared to other school of a thana.
- If that school ^{the proposed} have minimum 150 students.

2.4.7 Additional Blackboard

^{For making priority list of schools}
~~Ranking the schools in order of priority for making additional blackboard the~~

following criteria were followed.

- If the blackboard of the proposed school is totally damaged.
- Compared to other schools of a thana, if the proposed school is located to remote areas.
- Compared to other schools, if the number of students of the proposed school is higher.

- Compared to other schools if the number of girls/students of the proposed school is higher.

2.5 Rules for Establishing New Non-Government Secondary Schools in Bangladesh^{19,20}

There are some rules for establishing non-Government secondary schools in Bangladesh. These are mentioned below.

- a) The distance from the existing secondary schools to the new one should be one kilometer in municipal or industrial area and four kilometers in rural area.
- b) The population of the locality of a new secondary school should be 10,000.
- c) In a new secondary school the minimum student should be 130 boys and 120 girls in urban areas and 100 boys and 80 girls in rural areas.
- d) The land for a new secondary school should be 0.25 acre in metropolitan area, 0.50 acre in municipal area and 0.75 acre in rural area.
- e) There should be pucca, semi-pucca or tin-shaded school building with 1 sq. m (10.76 sq. ft) space for each student in a new secondary school.
- f) For the library of a secondary school, there should be minimum 2000 books.
- g) A secondary school should have a reserve fund of Tk. 50,000/- and a general fund of Tk. 30,000/-.
- h) There should be sufficient furniture according to the number of students and teachers.
- i) If there are science subjects in the schools there should be laboratory for every subject and also should have proper equipment and furniture. *in addition to having*
- j) There should be separate toilet for boys/students, girls/students and also for teachers.

- k) Supply of potable water in the school must be available.
- l) Every school should have a playground, which may be used in all seasons. Annual sports, scouting/girls guide, cultural functions etc. should be arranged in every school.

2.6 School Plant Planning of Different Countries

Different countries have their own school plant planning policies. Policies of three developing and two developed countries have been discussed here. The countries are India, Nepal, Sri-Lanka, U.K and U.S.A.

2.6.1 School Plant Planning Policies of Five Countries

~~2.6.1.1 India~~ India

a) India²¹ occupies the greater part of South Asia. It is a federal republic consisting of 25 states. It is the second most populous country in the world after China and the seventh largest country in the world for its land area.

The total area of this country is 31,66,414 sq. km²¹. The total number of population of this country was 102,70,00,000²². The capital of this country is New Delhi.

Primary education²³ begins in this country at the age of 6 in primary schools and it continues up to the age ^{of} 11. Then the secondary education begins in junior secondary and high schools at the age of 11 and continues up to the age of 18 from class VI to class XII.

The total number of schools in India²² was about 9,71,054. Among those schools, the total number of secondary schools was about 1,26,047. The students having grades IX to XII were only considered. The total number of teachers was about 17,61,000 in this level. The total number of students in secondary level was about 2,76,00,000. So the ratio of student teacher was 15.7:1.

In India central government²⁴ has a significant role in education. The Constitutional Amendment of 1976 includes education in the concurrent list. But states also have some responsibilities about it. Planning, financing etc. are the main works of Central Government and implementation of the plans are the tasks of states. State governments control their own school systems with some assistance from the central government.

The main features of Indian school plant planning (SPP)²⁵ policy are discussed below :

- i. According to the policy, the site of a secondary school should have no objectionable surroundings.
- ii. The school house should be a pucca structure. The building should provide adequate accommodation for the purposes of the school. It should be well ventilated and for holding the classes there should be spacious rooms.
- iii. If pucca building is not possible for the school immediately, the floor of the building must be cemented.
- iv. In making the walls and roofs, inflammable materials should be used. If corrugated iron sheets are used to make the roofs, there should have ceiling with adequate space for ventilation.
- v. The building should have enough land attached to it, which can be used for a playground and for such outdoor activities of the pupils as gardening, walking etc.
- vi. In the school building each classroom must have a floor space of at least 37.18 sq. m (400 sq. ft.). Space per student in classroom should be 0.93 sq. m (10 sq. ft.). The Central Advisory Committee of India recommends 12 sq. ft. of space per student in class room, which is the minimum requirement per student. But at present the Board is not insisting on the floor space.

- vii. In every school proper sanitary facilities must be provided. Sufficient number of latrines and urinals must ~~have~~ ^{exist} in every school. For the teachers and students, separate arrangements should be made. Separate sanitary arrangements must be made for girls students and lady teachers in boys' schools.
- viii. In every school supply of potable water is needed. The water should be free from any risk of contamination.
- ix. Arrangements should be made for the students to get good food at reasonable price.
- x. There should have a well-equipped laboratory in every school for teaching science subjects.
- xi. In every school there should ~~have~~ ^{be} a suitable playing field with ~~all~~ playing facilities for drill, sports, games and athletics.
- xii. In every school there should ~~have~~ ^{be} a library with suitable collection of books on education and juvenile interest.
- xiii. There should ~~have~~ ^{be} system of periodic medical examination of each pupil in secondary schools. The school authority should maintain the periodic examination report. The guardians should be informed if any defect is found. The school authority should also advise the guardians about the necessary steps, which may be taken for the removal of these defects.

b) Nepal

b) Nepal is a small country between India and Tibet. The Country²⁶ has a constitutional monarchy. It lies on the southern slopes of the Himalayan mountain areas. On the eastern, southern and western sides of this country there is India and on the northern side there is Tibetan Autonomous Region of China. The capital of this country is Kathmandu. The total area of this country is 1,47,181 sq.

km. According to 2000 census²² the total number of population of this country was 2,25,00,000.

Pre-University education in Nepal²⁷ is divided into four steps. These are primary, Lower-Secondary, Secondary and Higher Secondary. Primary education (Classes I to V) is for pupils aged between 6 to 10 years. Lower-Secondary education (Classes VI to VIII) is for pupils aged between 11 to 13 years. Secondary education (Classes IX to X) is for pupils aged 14 and 15 years. Higher Secondary education (Classes XI to XII) is for two years. It is for pupils aged 16 and 17 years.

A radical positive change took place in Nepal²⁷ in educational administration, supervision and planning between 1950 and the early 1997. The literacy rate also rose from 5 percent to almost 53 percent in 1997.

The Ministry of Education and Culture was responsible for administration and supervision of all elementary and secondary education. The total number of schools, both primary and secondary in Nepal²⁸ was 26,036. Among those the number of secondary schools was 4,350. The schools having grade IX and X were considered. The number of students of secondary education was 3,72,914 and for these students there were 19,498 teachers. So the student teacher ratio was 19.1:1.

The main features of Nepal School Plant Planning²⁹ (SPP) policy are discussed below.

- i. There is no specific rule about site selection. The site of a school should be a generally accepted one.
- ii. The distance between the secondary schools whether it is junior or high schools should not be more than 4 miles.

- iii. In plain area or metropolitan area the number of student of a secondary school should not be less than 40. In mountain area the number of student should be 30 and in more remote place the student number should be 20.
- iv. Before establishing a school in a location it should be kept in mind that the population of that area should be benefited after the establishment of the school.

Sri Lanka

c) In the southeast coast of Indian peninsula the country Sri Lanka³⁰ is situated. It is an island in the Indian Ocean. It was named as Ceylon until 1972. It is a republican country and has a parliamentary form of government. The capital of Sri Lanka is Colombo. Education is free here from Kindergarten to University level. Between the age of 6 to 11 almost all children attend schools. A high proportion of students, continue their education until the age of 16 or 18.

The total area of this country³⁰ is 65,610 sq. km and the population³¹ was about 1,92,81,300. The total number of Government schools³² in Sri Lanka was about 9826. Among those schools the total number of secondary schools was about 4246. These schools comprise of grades VI to XI or I to XI. The total number of teachers of secondary level was about 66,007. The total number of students at this level was about 1,19,545. So the ratio of student and teacher at this level was 18.1:1. Besides these Government schools, there were few private schools. In 2001 the number of private schools were 78.

The main administrative units of Sri Lanka³³ consist of nine provinces. These nine provinces have been divided again into 25 administrative districts. In order to decentralize the administration the Ministry of Education has divided Sri Lanka into 25 educational regions, which correspond to the administrative districts. Each region is headed by a director of education.

Pre-university education in Sri Lanka is divided into four levels³³. These are -

- Primary level
- Junior Secondary level
- Senior Secondary level
- Collegiate level

Primary level is (class I to class V) for pupils aged between 5 to 10 years. Junior Secondary (class VI to VIII) is for pupil aged between 11 to 13 years. Senior Secondary (class IX to XI) is for pupils aged between 14 to 16 and College level XII and XIII classes are for pupils aged between 17 and 18.

The main criteria³³ for establishing new school plant are as follows.

The need for a new school should be assessed taking into consideration the needs of a school zone or the catchment area served by a school cluster.

A new secondary school may be established if there is no secondary school within a radius of 2 miles from the proposed location of the new school, which can increase its intake. An existing school may be shifted to a new site if :

- i. The new site is more conveniently located in relation to the students, and the new site permits future expansion and development.
- ii. The required infra-structural facilities can be provided on the new site.

So these two requirements for site selection are also important for the site of a new secondary school.

In Sri Lanka most of the school buildings³⁴ are constructed according to typical designs.

In classrooms of the school space per student should be 0.93 sq. m. (10 sq. ft.). On average there should be 40 students in a class. So for 40 students classroom size should be 37.18 sq. m. (400 sq. ft.).

Instead of permanent partition between classrooms, removable partitions are recommended here. Chalk board, tack board, locker units etc. are recommended here as partitions because these type has flexibility of accommodating different size of classes in a particular space.

In rural areas open ground floor buildings are made considering lower cost and availability of land for schools. Multistoried type buildings are designed for urban areas because land values are higher in that place.

The aim of designing educational building here ^{is} are to provide spaces for educational activities, which will need minimum construction cost and face minimum maintenance problems.

^{of the d)} ^{U.K} ^{the}
~~of~~ The country United Kingdom²¹ or U.K. is situated in the north western part of Europe. It is ^{on} the northern side of France and western side of Denmark and ^{the} the Netherlands. The total area of U.K. is 2,44,110 sq. km. The number of its population according to 2001 census³⁵ was 5,87,89,194. The capital of this country is London. In ^{the} U.K. the prime responsibility for managing ^{the} schools is in the hands of elected local education authorities. This authority has the power to establish and maintain primary and secondary schools. In ^{the} U.K the total number of primary and secondary schools³⁶ was 35,78,234. The number of secondary schools was 3560. The number of students and teachers were respectively 31,21,901 and 1,83,578. So the teacher student ratio at this stage was 17:1.

The primary education³⁷ in this country begins in infant schools at the age of 5 and it continues up to the age of 7. Education is compulsory from this age. Then from this infant school students go to junior school at the age of 7 and up to 11 years they stayed in this junior school. From 11 years the secondary stage of education begins and it continue up to 16 to 18 years.

The education act³⁸ of 1944 established free and compulsory secondary education from 11 to 15 years. In 1972 the school leaving age was raised to 16 years.

The rules about school plant planning of U.K. are as follows³⁹ :

- i. The site of land of the school where it is situated should have provision of buildings, recreation areas, playing fields and at the same time it should have provision of appropriate ancillary facilities, such as, by way of service roads, delivery bays and vehicle parks.
- ii. The buildings of a school should provide the purpose of education and it should have provision of following ancillary facilities.
 - a) The convenient passage of persons and movement of goods within the buildings.
 - b) The storage in or near the teaching accommodation of apparatus, equipment and materials used in teaching.
 - c) The storage of such things ^{as} those are not presently used in teaching or which are used for maintenance and for furniture.
 - d) The separate storage of any fuel required for the purposes of the school.
 - e) Storing and drying of pupils outdoor clothing and for storing of their other belongings.
 - f) The preparation of food and drinks and the washing of ^{Crockeries} crockery and other utensils.

The school building should have load bearing structure. The design and construction of the school building should have protection from weather. It ^{should} will provide reasonable resistance to penetration by rain, snow and wind and to moisture arising from the ground.

The school building should have safety protection. The structure and the materials used in the structure should be of such quality that ^{these} it must be fire proof. There should be means of escape in case of fire.

The acoustic ^{site} lighting and thermal environment of a school building should be accurate and comfortable for students.

- iii. A whole time water supply for domestic purposes should be ^{available} present in a school. There shall ^{be} have an adequate supply of cold water in washbasins, baths, showers, water closets and urinals. In the case of baths and showers there shall ^{be} have an adequate supply of warm water and the ^{of which} temperature will not exceed 43.5 degrees celcius.
- iv. The drainage system of a school should be adequate for disposal of waste water and surface water. The system should also be adequate for discharge of waste water into a public sewer.
- v. In the case of a school which is not a nursery or a special school, there shall be teaching accommodation of a total minimum net area which is the aggregate of the areas determined for each of the age groups specified in the ~~following table~~. ^{Table 2.2 below.}

TABLE 2.2

The teaching accommodation at schools other than nursery schools and special schools³⁹.

Relevant total number of pupils	Minimum area in square meters for each pupil				
	Pupils who have not attained the age of 9 years	Pupils who have attained the age of 9 but not that of 11 years	Pupils who have attained the age of 11 but not that of 13 years	Pupils who have attained the age of 13 but not that of 15 years	Pupils who have attained the age of 15 years (including pupils who have attained any higher age)
80 or less	1.80	1.80	3.72	4.65	5.20
81 to 120	2.77	3.13	3.72	4.65	5.20
121 to 150	2.61	2.89	3.72	4.65	5.20
151 to 180	2.54	2.77	3.72	4.65	5.20
181 to 300	2.38	2.58	3.62	4.55	5.11
301 to 450	2.24	2.43	3.62	4.55	5.11
451 to 520	2.21	2.38	3.62	4.55	5.11
521 to 700	2.19	2.34	3.53	4.46	5.02
701 to 800	-	2.31	3.48	4.41	4.97
801 to 900	-	-	3.39	4.32	4.88
901 to 1050	-	-	3.25	4.18	4.74
1051 to 1200	-	-	3.21	4.13	4.69
1201 to 1350	-	-	3.16	4.09	4.65
1351 to 1500	-	-	3.10	4.02	4.58
1501 to 1650	-	-	3.07	3.99	4.55
1651 to 1800	-	-	3.04	3.97	4.52
1801 to 1950	-	-	2.99	3.92	4.48
1951 & above	-	-	2.97	3.90	4.46

- vi. Recreational area or playing field space per student should be not less than 9 m^2 up to 600 pupils. If the number is more than 600, in that case 4.5 m^2 for each pupil is more needed for extra pupil.
- vii. There should have medical or dental examinations and treatment of pupils by doctors, dentists or nurses and for the care of pupils during school hours in every school.

e) U.S.A

e) ^{The} United States of America (USA)²¹ is one of the predominant country in the world for its economical development, quantity of land, number of population. It is a federal republic comprising 50 states. The capital of this country is Washington D.C. The total area of this country²¹ is 93,72,571 sq. km. The number of its population⁴⁰ was 29,13,91,694.

^{The} The constitution of U.S.A⁴¹ excluded education from the purview of the federal authority and handed over the responsibility to the states for their own educational system.

^{The} In some states of U.S.A. primary education⁴² is for eight years and it is in three stages. Primary grade (class I to class III), intermediate grade (class IV to class VI) and upper grade (class VII and VIII). In some states it is for 6 years from class I to class VI and the students get this education from elementary schools. Secondary education is divided into two stages, namely junior stage and senior stage. Students get Junior Secondary Education (class VII to class IX) in Junior High School and Senior Secondary Education (class X to class XII) in Senior High Schools.

The total number of schools⁴³ in U.S.A was about 1,15,000. In secondary⁴⁴ level the total number of teachers was about 10,79,197 and the number of students was about 2,09,19,328. From grade VII to grade XII ~~were~~ ^{has been} considered here. So the ratio of student ~~and~~ ^{to} teacher was 19.4:1.

The main features of school plant planning (SPP) policy of this country are discussed below⁴⁵.

- i. Considering the site, the school should provide adequate and appropriate space to accommodate the proposed instructional program and to provide program support services as necessary.
- ii. Facilities and fixed equipment shall conform to the safety and health requirement of city, country, state and federal agencies.
- iii. For approval of site of a school⁴⁶ the local superintendent shall ensure that the school be located on a sufficient acreage of land.
- iv. For elementary school a base of five acres of land plus one additional acre is needed for each 100 pupils enrolled or anticipated enrollment.
- v. For Junior high school a base of 10 acres of land plus one additional acre is needed for each 100 pupils enrolled or anticipated enrollment.
- vi. For existing high school a base of 15 acres of land plus one additional acre is needed for each 100 pupils enrolled or anticipated enrollment.
- vii. For proposed new high school a minimum of 30 acres of land plus one additional acre is needed for each 100 pupils anticipated enrollment.
- viii. For existing kg to 12 class schools 25 acres of land is needed.
- ix. For new kg to 12 class schools a base of 30 acres of land plus one additional acre is needed for each 100 pupils anticipated enrollment.
- x. For vocational school minimum 10 acres of land is needed.

The site⁴⁷ shall meet all standards for health and safety of the pupils.

All buildings of two or more storied, unless fire resistant must have fire escapes. Fire extinguishers must be provided as needed in the building and kept in working order. Regular checks for fire hazards must be made for removing the dangers.

REFERENCES

1. Eusuf M. A., Planning Primary Educational Facilities in Bangladesh: A Case Study of Tangail and Manikgonj Pourashava. MURP Thesis, Bangladesh University of Engineering and Technology, Dhaka, 1988.
2. Chowdhury A. M. R., Haq. M. N. and Ahmed Z., Universal Primary Education, Proceedings of the Conference, Dhaka and Rajendrapur, 6-10 August, 1996.
3. Bangladesh Jatio Shiksha Commission Report (Bengali), 1988, page-213.
4. Akter S. and Begum H.A., School Mapping and Plant Planning, Bangla Academy, Dhaka, 1994, pp 63-83.
5. Hossain M. A. and Karim M.R., Presentation of the Educational System of Bangladesh, Proceedings on Annual Training Programme in Educational Planning and Administration, 22-29 October, 1992, IIEP-UNESCO, Paris, Page-15.
6. Constantinos F., Innovative Technology in the Construction of Primary Schools in Bangladesh, Proceedings in Educational Facilities in the City; the Challenge in Asia and the Pacific, Bangkok, 14-17 February, 1983.
7. Herrick J.H., McLeary R. D., Clapp W.F. and Bogner W.F., From School Program to School Plant, Henry Holt Company, New York, 1936, pp 236-240.
8. Macconell J. D., The planning for School Building, Prentice Hall Inc., Englewood Cliffs, N.Y. 1957, pp 14.

9. Jain A. K., School Buildings Planning, Design and Management, Management Publishing Co. Dehradun 248001, India, 1998.
10. Bangladesh Jatio Shikha Commission Report (Bengali), 1988, pp 213-214.
11. Bangladesh Jatio Shikha Commission Report (Bengali), 1974, Chapter 36, page 293.
12. Islam S. Anwarul, Shikkha Babosthapon Sommondhio Bishoiadi, Shams Publication, Dhaka, 2002.
13. Prokalpa Saarpatra, Madhamik O Uchha Shikkha Prokalpa, Ministry of Education, Directorate of Secondary and Higher Education, Bangladesh, Dhaka, September, 1993.
14. "Revised Project Proforma (RPP)" for "Renovation and Development of Selected Non-Government High Schools", Directorate of Secondary and Higher Education (Planning and Development), Bangladesh, Dhaka, 1993.
15. Project Proforma (PP) for "Development of Selected Secondary Schools (Govt. & Non-Govt.)", Directorate of Secondary and Higher Education (Planning and Development Section), Bangladesh, Dhaka, July 1998.
16. Project Proforma for "Development and Rehabilitation of Secondary Educational Institutions (Government and Non-government, Revised)", Directorate of Secondary and Higher Education (Planning and Development), Bangladesh, Dhaka.
17. Project Proforma for "Development of Secondary and Higher Secondary Educational Institutions (Govt. and Non-Govt.) of Dhaka Metropolitan Area", Directorate of Secondary and Higher Education, Bangladesh, Dhaka.
18. Guidelines for Preparation/Appraisal of Subprojects for Educational Facilities. Local Government Engineering Department, Dhaka.
19. Regulations, Act and Government Orders, Board of Intermediate and Secondary Education, Dhaka, 1993.

- ✓ 20. Rules about Establishment, Starting and Recognition of Non-Government Secondary Schools, Ministry of Education, Dhaka, 1997.
- ✓ 21. Britannica Book of the Year, Encyclopaedia Britannica Inc., Chicago, 1994.
- ✓ 22. Education Statistics, Department of Education, Government of India, 2000-2001.
- ✓ 23. The New Encyclopaedia Britannica, Vol. 21, Encyclopaedia Britannica Inc., U.S.A., 1994.
- ✓ 24. Aggarwal J.C., Development and Planning of Modern Education, Fifth Edition, Vikas Publishing House Pvt. Ltd., 576, Masjid Road, Jangpur New Delhi 110014, 1995.
- ✓ 25. Chakravarty S. B., Headmaster's Manual, B.B. Kundu & Sons, 62/1, Mahatma Gandhi Road, Calcutta-700009. pp. 164-167, 1992.
- ✓ 26. The New Encyclopaedia Britannica (Vol.24), Encyclopaedia Britannica, Inc., U.S.A., 1994.
- ✓ 27. The State of Population, Nepal 2000, Chapter 5, Educational Status, Ministry of Population and Environment, Nepal.
- ✓ 28. Educational Statistics of Nepal, His Majesty's Government, Ministry of Education and Sports, Department of Education, Government of Nepal, 2003.
- ✓ 29. Information collected from Dr. Kedar N. Shrestha, Adviser Primary Teacher Education, UNESCO/UNDP, 1996.
- ✓ 30. The New Encyclopaedia Britannica (Vol.28), Encyclopaedia Britannica Inc., U.S.A., 1994.
- ✓ 31. Atlapedia Online, Latimer Clarke Corporation Pty Ltd. 1993 – 2003.
- ✓ 32. School Census 2002, Preliminary Report, Ministry of Human Resources Development, Education and Cultural Affairs, Sri Lanka.
- ✓ 33. A Descriptive Profile of Schools in Sri Lanka, Research Division, National Institute of Education, Maharagama, Sri Lanka, 1989.

- ✓ 34. Ratnayake W.M.B.S.L., Developments in Education Facilities in Sri Lanka, Proceedings in Educational Facilities in the City: The Challenge in Asia and the Pacific, Bangkok, 14 - 17th February 1983.
- ✓ 35. Press Release, UK Government, Tuesday 1st October 2002.
- ✓ 36. Statistics of Education – Schools in England, Department for Education and Skill, 1999 Edition.
- ✓ 37. U.K Educational System, British Council, UK, 2003.
- ✓ 38. Comparative Study of the Design and Management of Educational Buildings and Furniture in Europe and North America, UNESCO Publication, Paris, February 1986.
- ✓ 39. Education (school Premise) Regulation, UK, 1981.
- ✓ 40. U.S Census Bureau, Population Division, U.S POP Clock Projection, 2003.
- ✓ 41. Hans N., Comparative Education, Routledge & Kegan Paul Limited, London, 1967, page 273.
- ✓ 42. Khatun Sharifa, Tulonamulok Shikha Tatta (2nd Part), Bangla Academy, Dhaka, '983.
- ✓ 43. Schools in the USA.com
- ✓ 44. U.S Department of Education, Institute of Education Sciences, NCES-358.
- ✓ 45. Professional Service Rules of the State Board of Education, State Department of Education, Chapter 290-030-050, page 419.
- ✓ 46. State Board Resolution, Code of Alabama, U.S.A., 1975.
- ✓ 47. Barton M. and Baker C. E., Relocatable Classroom Units, 1975, page 76.

CHAPTER 3

METHODOLOGY

The methods and techniques followed in accomplishing different activities of this study have been presented in this chapter.

3.1 Statistical Units :

Statistical units are, in terms of which data have to be collected and also analyzed.

3.1.1 Units for Collection of Data :

The present research study was on the system of school plant planning process of Bangladesh. As the scope of the study was on the non-government secondary schools and for limitation aspect, forty schools were considered, the units for collection of data were forty non-government secondary schools of Bangladesh.

3.1.2 Units for Statistical Analysis and Interpretation :

Statistical data were hereby simplified and condensed through their proper classification and tabular presentation. From the data arithmetic mean, percentage distribution etc. were calculated. Based on their nature, data have been presented in tables and graphs followed by interpretation and analysis.

3.2 Sources of Data :

For data collection in this research study, primary source was used. The list of non-government secondary schools was collected from BANBEIS. The list was about the recognized/affiliated non-government junior and high schools of Bangladesh. From the list, 40 high schools were selected randomly.

3.3 Method of Data Collection :

Considering the scope and limitation of the study partial enumeration or sample method of data collection was used and in this sense, random sampling technique was chosen. For collecting primary data three sets of questionnaires were prepared. Two sets were filled up by the informants themselves and one set by the field investigator after investigating the actual condition.

After preparing the plan of data collection the next step was the actual work. In this step some related materials were collected.

3.4 Procurement and Study of Related Materials and Documents

To get information about the research some related theses, books and journals were collected and carefully studied. Besides this, documents were collected from Board of Intermediate and Secondary Education, Shikkha Bhaban, Education Engineering Department and LGED office.

A careful study was made on these related materials and documents to know about the present system of school plant planning of Bangladesh.

3.4.1 Board of Intermediate and Secondary Education

The rules and regulations of school plant planning were procured from the Board of Intermediate and Secondary Education, Dhaka. It was found that there were 16 rules for non-government secondary schools to get recognition as educational institution from the Board. Among those rules 12 rules were related to school plant planning. On the 23rd April 1997, few rules were modified. Those modified rules were also collected from the Board of Intermediate and Secondary Education, Dhaka.

3.4.2 Education Engineering Department :

From Education Engineering Department of Ministry of Education, information was collected regarding the work of this department for the planning of schools of Bangladesh. There was some prototype plans for planning of secondary as well as primary schools of this country. These plans were collected from this department to know about the participation of this department, on the planning of school plants of Bangladesh. An interview was taken of an executive engineer of this department. The aim of this interview was to get information about the different projects of Education Engineering Department. At the same time, prototype plans for primary and secondary schools were also collected from this department.

3.4.3 LGED

LGED ^{is} was also related on the planning and establishing schools of Bangladesh. So a document was collected from this department about its work. This department mainly played an important role on planning and establishing primary schools. Prototype plans were collected from this department. Though the research was about non-government secondary schools, yet the information about primary schools were collected from LGED as related materials.

3.5 Data Collection Instrument

To ~~execute the plan of~~ ^{For} data collection, ^{most important task} next work was to prepare a questionnaire. As questionnaire ^{is} was an important medium of communication between the investigator and the respondents, it was prepared with utmost care and caution by the researcher.

For data collection three sets of questionnaire were prepared. Number 1 set of questionnaire was prepared for heads of the schools. The purpose of this questionnaire was to know about the present practice with regard to school plant

planning. An attempt was ~~been~~ made to understand whether the rules and regulations of school plant planning (SPP) were followed on establishing schools.

Number 2 set of questionnaire was prepared for the use of the field investigators. It was an observation sheet. After investigating the real condition of the schools, the field investigators filled up the questionnaire. The purpose of this questionnaire was to know the physical facilities of the schools.

Number 3 set of questionnaire was for administrators and policy planners. The purpose of the questionnaire was to know whether they agreed with the government rules about site selection, preparing and selecting design and physical facilities of non-government secondary schools or whether there was any need for modification of rules.

The guidance of supervisor helped the researcher to construct the questionnaires. The researcher also consulted with some specialists in this field. According to their suggestions and guidance the questionnaires were prepared. Finally, the questions were checked very carefully and the unnecessary questions were excluded.

3.6 Pilot Test

A pilot test was made on number 1, number 2 and number 3 sets of questionnaires. Instrument no. 1 and 2 were piloted in three schools. Among those schools two were boys schools and one was girls school. Researcher personally went to those schools and collected data of number 1 set of questionnaire filled by the headmasters/headmistresses of those schools. At the same time by observing the real condition of those schools researcher filled up number 2 set of questionnaire afterwards.

A pilot test was also made on number 3 set of questionnaire on two administrators. They were Deputy Director, Female Secondary Schools

Assistance Project (FSSAP) and Deputy Inspector of Colleges, Secondary and Higher Secondary Education Board, Dhaka.

3.7 The Final Questionnaire

After the pilot test was made on the three sets of questionnaires the final sets were developed according to the information received from the pilot test.

According to ^{True} number 1 set of questionnaire, which was for headmasters/headmistresses consisted of 20 items. Among these items 7 items had 7 sub-items. So in total there were 27 questions.

The 2nd set of questionnaire, which was mainly an observation check list and it consisted of 15 items. In 7 items there were 12 sub-items. So in total there were 27 questions.

The 3rd set of questionnaire, which was for policy planners and administrators, consisted of 10 items. Among these items 5 items had 8 sub-items. So in total there were 18 questions.

So totally there were 72 questions in those three sets. ^{Most} The type of questions ~~was~~ ^{were} mainly open-ended and a few types were close-ended. After the final sets of questionnaire were prepared, these were then printed and made ready for administration.

3.8 Selection of Policy Planners and Administrators

The administrators who were related with making policies in the Ministry of Education, Planning Commission and the administrators who used to take important decisions on Boards of Intermediate and Secondary Education and Shikkha Bhaban were selected as the respondents of set number 3 questionnaire. For this purpose the following policy planners and administrators were selected.

- i. Chief of Planning, Ministry of Education
- ii. Senior Assistant Secretary, Ministry of Education
- iii. Joint Chief, Planning Commission
- iv. Superintendent Engineer, Education Engineering Department, Shikkha Bhaban
- v. Director General, Directorate of Secondary and Higher Secondary Education, Shikkha Bhaban
- vi. Director, Project and Development, Directorate of Secondary and Higher Secondary Education
- vii. Chairman, Board of Intermediate and Secondary Education, Dhaka
- viii. Chairman, Board of Intermediate and Secondary Education, Comilla
- ix. Chairman, Board of Intermediate and Secondary Education, Jessore
- x. Chairman, Board of Intermediate and Secondary Education, Rajshahi
- xi. Chairman, Board of Intermediate and Secondary Education, Chittagong

3.9 Sampling Procedure

The study was qualitative in nature. Therefore, instead of meeting the statistical requirement of sample size, in-depth investigation was done in a limited number of schools.

There are six divisions in Bangladesh. For selecting 40 schools, six schools were taken from each division and the rest four schools were taken from Dhaka metropolitan area by using Random Sampling procedure.

Primarily six districts were selected from six divisions by Random Sampling procedure. From each district one Upazila was selected from rural area and another Upazila was selected from town area by random sampling procedure. After that from each town area a boys school and a girls school were chosen. From each rural Upazila two boys and two girls schools were selected following the sampling procedure. For selecting the schools, the list supplied by BANBEIS was used. By using the same procedure one thana was selected from Dhaka

Metropolitan area. Next, using the same sampling procedure two boys and two girls schools were selected from this metropolitan area.

3.10 Training of Field Investigators

The success of survey depends upon the work of the field investigators. Therefore, the field investigators should be properly selected to see that the result is of high order. The field investigators should have patience, knack and pleasing habits at the field works and they should be intelligent, honest and hard working. Thus considering these factors two field investigators were selected for the present work. The field investigators were Master degree holders from Dhaka University. They also completed M. Ed degree from Institute of Education and Research, Dhaka University. Both of them had experience of data collection for few projects. They were given proper training as to the manner of collection of data. The questionnaires should be well understood by the field investigators. So the questionnaires were explained clearly to them beforehand.

The Director of Institute of Education and Research (IER), Dhaka University issued a letter to different headmasters/headmistresses of the sample schools, requesting them to cooperate with the field investigators regarding the collection of required data. The same letter was issued to different administrators and policy planners of Ministry of Education and chairmans of five Education Boards.

3.11 Data Collection

To collect data forty schools were selected from all over the country. So it was very difficult for the researcher to collect data from such a vast distance. For this reason, two field investigators were appointed to help the researcher on collecting data from different schools.

By taking number 1 set of questionnaire the field investigators collected data from headmasters/headmistresses of forty sample schools. At the same time

Number 3 set of questionnaire was for policy planners and administrators. In this respect chairman of five education boards and six administrators from Ministry of Education were selected. 1123

From five boards the field investigators filled up number 3 set of questionnaire by five chairmans of those boards. The researcher personally collected data by filling up the same questionnaire from the six administrators from the Ministry of Education.

3.12 Data Processing

After collecting data by three sets of questionnaires and considering the purpose and objective of the study a classification was made according to similarities and dissimilarities.

From the classification of raw data statistical series were prepared to present the collected and classified data in a properly arranged way. In this statistical series three consolidated data sheets were prepared. In those sheets the data were mentioned serially which were procured. Then the following statistical method was applied to analyze those collected data.

For data analysis percentage distribution, and measure of central tendency were used. In the measure of central tendency arithmetic mean was found out.

After analyzing the data according to the findings the report was written. ??

CHAPTER 4

DATA PROCESSING AND ANALYSIS

4.1 Introduction

The collected data and information for the present research work ~~has been~~ ^{are} presented in this section. Analysis, interpretation and explanation of ~~data were~~ ^{are} also described in this chapter.

Three sets of questionnaires were used for the collection of data. After the data have been collected, the processing of data was started. A thorough check-up ^{again} was done there. Classification and tabulation are important processes in statistical investigation. Through these processes, the collected data were summarized and put in a systematic order. The information was presented with the help of statistical techniques i.e. tables, diagrams, graphs etc.

The types of data primarily depend on the purpose and objectives of the inquiry. In the present analysis, geographical i.e divisionwise data were collected. Based on these types Table 4.1 has been prepared. From each division except Dhaka division, six secondary schools were taken into consideration. In Dhaka division, 4 more secondary schools were considered from metropolitan area, considering Dhaka as the capital city.

Check up
for what?

TABLE 4.1.1

Location and Sex-wise Distribution of Sample Schools

Name of division	Urban area		Rural area		Total	
	Number of boys schools	Number of girls schools	Number of boys schools	Number of girls schools	Number of boys schools	Number of girls schools
Barisal	1	1	2	2	3	3
Chittagong	1	1	2	2	3	3
Dhaka	3	3	2	2	5	5
Khulna	1	1	2	2	3	3
Rajshahi	1	1	2	2	3	3
Sylhet	1	1	2	2	3	3

The variables considered in the present study were -

- distance of nearest school(s)
- catchment area
- area of school compound
- nature of school house
- classroom space per student
- sanitary facilities
- potable water

First of all an attempt has been taken to define and evaluate these variables and to find out their importance on the whole process of school plant planing. The different factors considered have been described here systematically.

4.2 Distance of Nearest School(s)

To establish a school it is necessary to maintain a certain distance between the new school and the already established one.

In a certain locality a limited number of people live. A part of that population is always school going people. There should be a school in that locality which will fulfill the need of that school going people. However, number of schools depends on the density of population. In rural area density of population was less than urban area. In urban areas density of population was much higher than that in rural areas. So in urban areas the distance between two schools should be less. From this observation the need for schools is also more in urban areas. In Bangladesh the general rule is that the distance between the two non-government secondary schools will be one kilometer for urban areas and four kilometer for rural areas.

If more surrounding schools are located very closed to each other then they suffer from various problems. Shortage of students, lack of financial resources etc. are two important problems. Schools with poor financial resources cannot provide required facilities of teachers and students, which in turn adversely affect the teaching learning environment of the school. So the distance rules need to be followed in case of school plant planning.

To know the opinion of administrators and policy planners about the distance rule and also the actual condition in Bangladesh, data about distance of secondary schools were collected by three sets of questionnaires. The respondents were administrators or headmaster/headmistress, the administrators and policy planners who were related with making rules and the field investigators who collected data from particular schools. In the set no. 1 questionnaire, the question number 12 was about the distance of surrounding schools from the sample 40 schools. From this question, it was possible to know whether these 40 sample schools and those surrounding schools maintained the distance rule or not. After collecting data it was found that 120 schools were present in the surrounding areas of the 40 sample schools.

TABLE 4.2.1

Distance of Nearest Schools

Distance (km)	Mid point value (km)	Number of urban schools (frequency)	Number of rural schools (frequency)	Total number of schools (frequency)	Percentage	
					Urban areas	Rural areas
0-1	0.5	25	10	35	20.84	8.33
1-2	1.5	13	15	28	10.83	12.50
2-3	2.5	7	9	16	5.83	7.50
3-4	3.5	4	18	22	3.33	15.00
4-5	4.5	5	14	19	4.17	11.67
Total		54 (45%)	66 (55%)	120 (100%)	45	55

The distance of these 120 schools from the sample 40 schools was collected. Among these 40 non-government secondary schools, 24 schools were from rural areas and 16 schools were from urban areas.

After analyzing data it was found that of the 24 schools, distance rule was not followed in the cases of 20 schools i.e. in rural areas 83.33% sample schools did not follow the existing rule. There were 52 schools, which were there in the surrounding areas of these 20 sample schools. The distance of those 52 schools from these 20 sample schools was less than 4 km. According to the existing rule in case of rural areas, the minimum distance between the secondary schools should be four kilometers.

In urban areas, of the 16 urban schools the distance of 9 schools from the nearby schools was less than one kilometer i.e. in urban areas 56.25% sample schools did not follow this rule. According to the existing rule the distance between two secondary schools should be one kilometer. But it was found from data analysis

that there were 25 schools, which were located within one kilometer of these 9 sample schools.

Out of 40 headmasters/headmistress, 21 respondents agreed with the distance rule and 19 disagreed with it. So in terms of percentage regarding the opinions of the administrators,

- 52.5% agreed with the government rule about distance between two secondary schools.
- 47.5% disagreed with the same rule.

Again, it was found that among 11 administrators and policy planners, 7 respondents agreed with it and 4 respondents disagreed with it. So in the case of opinions of the policy planners,

- 63.64% agree with the government rule about the distance between two secondary schools.
- 36.36% disagree with the same rule.

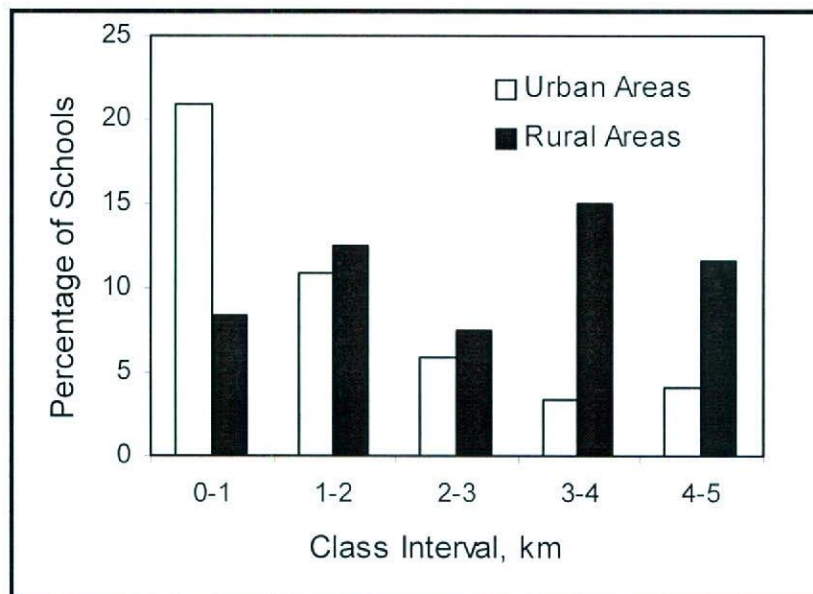


Figure 4.2.1 : Histogram representing the percentage of surrounding non-government secondary schools according to distance covered.

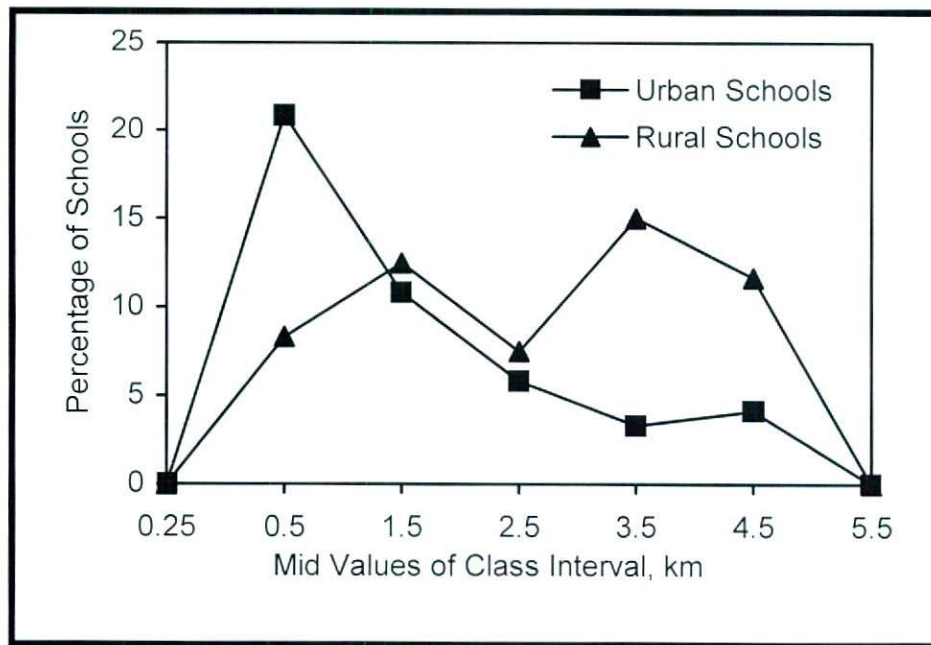


Figure 4.2.2 : Percentage polygon² representing non-government secondary schools in urban and rural areas.

TABLE 4.2.2

Distance of Nearest School(s) in Urban Areas

Class Interval km	Number of urban schools f	Mid value X km	fX	Arithmetic mean $\bar{x} = \frac{\sum fX}{n}$ km
0-1	25	0.5	12.5	1.59
1-2	13	1.5	19.5	
2-3	7	2.5	17.5	
3-4	4	3.5	14	
4-5	5	4.5	22.5	
Total	n = 54		86	

From Figure 4.2.1, it was found that most of the urban secondary schools were within 2 km distance, whereas for rural secondary schools most of them were

within 2 to 5 km distance. This is also evident from Figure 4.2.2, which is plotted considering the middle values of class intervals versus the ^{old} number of secondary schools. As the distance increases, the number of secondary schools of urban areas decreases. But this nature is opposite in case of rural secondary schools. The arithmetic mean value of distance is presented in Table 4.2.2 and Table 4.2.3 for urban and rural non-government secondary schools.

TABLE 4.2.3

Distance of Nearest School(s) in Rural Areas

Class Interval km	Number of rural schools f	Mid value X km	fX	Arithmetic mean $\bar{x} = \frac{\sum fX}{n}$ km
0-1	10	0.5	5	2.69
1-2	15	1.5	22.5	
2-3	9	2.5	22.5	
3-4	18	3.5	63	
4-5	14	4.5	63	
Total	n = 66		176	

4.3 Catchment Area

Planners ^{for} on planning a school plant should be aware about the catchment area to estimate the students and also to select the location.

In set no.1 questionnaire there was a question (question no.13) to know about the catchment area of 40 sample schools. In this question there were five alternatives regarding the area. Those were 1 sq. km, 2 sq. km, 3 sq. km, 4 sq. km and more.

From the analyzed data the catchment areas of the 40 sample schools were found as follows :

- 14 schools more than 4 sq. km
- 10 schools of 4 sq. km
- 6 schools of 3 sq. km
- 8 schools of 2 sq. km
- 2 schools of 1 sq. km

From the above analysis, it was found that among 40 sample schools the catchment area of 26 schools were within 4 sq. km and 14 schools were more than 4 sq. km. So in terms of percentage area of 65% schools were within 4 sq. km. The rest 35% schools were more than 4 sq. km.

From the analysis of this question about rural and urban basis it was found that 14 schools were from urban area and 12 schools were from rural area considering the total 26 schools whose catchment area was within 4 sq. km. This indicates that 53.85% schools were from urban area and 46.15% schools were from rural area. *Situation of the total 26 schools considered, had catchment area within 4 sq. km.*

The schools having catchment area more than 4 sq. km were 14. Among these schools 2 schools were from urban areas and 12 schools were from rural areas.

This indicates that 14.3% schools were from urban areas and 85.71% schools were from rural areas. *had catchment area in excess of 4 sq. km.* So from the above analysis it was found that the catchment area of most of the sample schools were within 4 sq. km and more rural area students come to schools from more than 4 sq. km catchment area in comparison to urban area students.

4.4 Area of School Compound

In a school there should be classrooms and laboratories to fulfill the need of effective teaching learning process. For the students there must be open space and

playground to fulfill the need of cocurricular activities and also canteens or cafeteria for refreshments.

So for the construction of a school house, the various requirements of students as well as teachers are to be addressed. At the same time the planners should also consider the financial limitation of school authority. Besides this, location is also an important factor ^{to be taken} into consideration. In rural areas there are more open lands than urban areas. So in rural areas, it is possible to use more open land space for construction of a school house than in urban areas. During school plant planning, ^{use} using of proper land space plays an important role, ~~for consideration~~. In Bangladesh, there are existing government rules and regulations about the requirement of total land area of schools in metropolitan, municipal and rural areas. According to this rule a school should have a minimum of 0.25 acre of land in metropolitan area, 0.50 acre of land in municipal area and 0.75 acre of land in rural areas. To know the opinion of administrators about the rule, data were collected from administrators of 40 schools by set no.1 questionnaire and 11 administrators and policy planners by set no.3 questionnaire. After analyzing the data it was found that among 40 respondents of set no.1 questionnaire, 26 respondents agreed with the rule and 14 respondents disagreed with it. These respondents were administrators or headmasters/headmistresses of 40 schools.

So in terms of percentage among the school administrators -

- 65% agreed with the existing government rule
 - 35% disagreed with the same rule
- regarding area occupied by a school*

Only 6 out of 14 respondents, who disagreed expressed their opinions about the area of a school.

According to those six respondents -

- the non-government secondary schools of metropolitan area should have 0.50 acre of land per school

- the non-government secondary schools of municipal area should have 0.75 acre of land per school
- the non-government secondary schools of rural area should have 1.00 acre of land per school.

Besides these remarks, other 4 respondents mentioned their opinions about the rule of non-government secondary schools of metropolitan area and 2 respondents mentioned their opinions about rural area.

- According to 4 respondents the non-government secondary schools of metropolitan area should have 1.00 acre of land.
- According to 2 respondents the non-government secondary schools of rural area should have 2.00 acres of land.

Among the remaining two respondents who disagreed with the government rule regarding the total area of non-government secondary schools, only one respondent gave his personal opinion. According to him -

- the non-government secondary schools of metropolitan area should have 0.35 acre of land
- the non-government secondary schools of municipal area should have 0.75 acre of land
- the non-government secondary schools of rural area should have 3.0 acres of land

After analyzing the data of no.3 questionnaire, it was found that among 11 policy planners, 8 respondents agreed to the existing rule and 3 respondents disagreed with it. So in terms of percentage -

- 72.73% policy planners agreed with the existing rule
- 27.27% policy planners disagreed with it

The three respondents who disagreed gave their opinions about the area of a secondary school of metropolitan, municipal and rural areas, which are mentioned in Table 4.4.1.

TABLE 4.4.1

Comments of the respondents who disagreed with the existing government rule

Respondents	Metropolitan area schools (acres)	Municipals area schools (acres)	Rural area schools (acres)
Respondent 1	0.66	1.00	1.00
Respondent 2	0.17	0.33	0.66
Respondent 3	0.50	0.50	0.50

To know the actual condition, whether the rule was followed during establishing the schools, data were collected with the set no.2 questionnaire. It was found that among 16 schools of urban areas, 8 schools were situated in the metropolitan areas and the remaining 8 schools were situated in the municipal areas. It was noticed that one school in metropolitan area was found below the standard level and its area was 0.07 acres. From municipal areas all 8 schools followed the government rule and the areas of those schools were 0.50 acre or more, but not below the standard level. Of 24 schools of rural areas, only one school was below standard level. This one school has the land area of 0.19 acre

It is evident from the present analysis that out of the 40 schools, only 2 schools were below the standard level. It can be said that 95% schools followed the government rule in establishing schools and only 5% schools did not consider the government rule with regard to total space requirement for a school.

Finally, it can be concluded that most of the schools followed the government rule of total space requirement during establishing a school.

4.5 Nature of School House

As regards the nature and condition of school house data were collected from sample schools. The purpose of this investigation was to know whether the existing school house was pucca, semi-pucca or not pucca. At the same time data were also collected to know about the usability of the existing school houses i.e. whether they are repairable or not repairable. The conditions of the unusable school houses were also investigated.

From the analyzed data it was found that among 40 sample school compounds there were 109 school units. Among these 109 school units -

- 71 school units were pucca
- 26 school units were semi-pucca
- 12 school units were not pucca

The following table shows the different conditions of 109 school units

TABLE 4.5.1

The condition of 109 school units of 40 sample schools

Total school units of 40 sample schools	School units with pucca structure	School units with semi-pucca structure	School units with not-pucca structure
109 (100%)	71 (65.14%)	26 (23.65%)	12 (11.01%)

From the Table 4.5.1, it was found that in the compound of 40 sample schools, pucca structure units were comparatively more than other type of units.

Information was collected regarding the usable pucca, semi-pucca and not pucca, school units. Data were also collected about the unusable condition of pucca, semi-pucca school units and their condition of repairability.

Considering the 71 pucca school buildings, it was found that 56 school buildings were usable i.e. it was ~~78.87%~~ ^(78.87%) and 15 buildings were unusable i.e. it was ~~21.13%~~ ^(21.13%)

21.13%. Among the 15 unusable school buildings 14 were repairable and 1 was not in repairable condition.

Among the 26 semi-pucca school units, 20 school units were found usable i.e. it was 76.92% and 6 school units were repairable i.e. it was 23.08%.

Regarding the condition of 12 not pucca school units, 8 school units were found usable i.e. it was 66.67% and 3 school units were repairable i.e. it was 25% and 1 school unit was not repairable i.e. it was 8.33%.

All the collected data were presented in the tabulated form as below. in Table 4.5.2

TABLE 4.5.2

Condition of school units of the 40 non-government secondary schools.

Total school units of 40 sample schools	The condition of 71 (100%) pucca school units			The condition of 26 (100%) semi-pucca school units			The condition of 12 (100%) not pucca school units		
	Usable	Repairable	Not repairable	Usable	Repairable	Not repairable	Usable	Repairable	Not repairable
109	56 (100%)	14 (19.72%)	1 (1.41%)	20 (76.92%)	6 (23.08%)	-	8 (66.67%)	3 (25%)	1 (8.33%)

From the Table 4.5.2, it was found that usable school units were comparatively more in number in the sample schools but there were also a significant number of repairable and not repairable school units.

4.6 Classroom Space per Student

In a secondary school, every student occupies a certain amount of space for his educational and recreational activities. So the planners should take into consideration about this factor i.e. the space requirement per student in

classrooms, laboratories and playground. For designing of a school the number of students should be the primary factor. Next, calculation of the size and number of classrooms, size of laboratories, area of playground etc. should be included.

In Bangladesh, there was a rule regarding space requirement for students in school classrooms. It was equal to 10.76 sq. ft. per student. Big class size in a small classroom creates congestion, which in turn adversely effects on the whole teaching and learning processes. So classroom space per student is an important factor for school plant planning process.

For the present research data were collected by set no.1 and set no.3 questionnaires to justify the existing government rule. In these two questionnaires opinions were taken from 40 school administrators and 11 policy planners.

After analyzing the data of set no.1 questionnaire it was found that among 40 school administrators 35^(87.5%) respondents agreed with the government rule. Only 5^(12.5%) respondents disagreed with it. So in terms of percentage -

- 87.5% respondents agreed with the existing government rule
- 12.5% respondents disagreed with the same rule

Of the 40 respondents, 24 respondents were from rural schools and 16 respondents were from urban schools. Those who disagreed all were from rural areas. The requirement of classroom space per student according to disagreed 5 respondents were as below:

who disagree with the Government rule

- According to respondent 1 classroom space per student should be 15 sq. ft.
- According to respondent 2 classroom space per student should be 10 sq. ft.
- According to respondent 3 classroom space per student should be 8.5 sq. ft.
- According to respondent 4 classroom space per student should be 8 sq. ft.
- According to respondent 5 classroom space per student should be 6.5 sq. ft.

Analyzing the above opinions of disagreed respondents, it may be said that only 1 respondent mentioned more space per student in classroom than the existing rule. Other 4 respondents mentioned less space than the existing government rule.

From the data of set no.3 questionnaire it was found that all of the 11 respondents agreed with the existing government rule that the classroom space per student should be 10.76 sq. ft. So in this set of questionnaire 100% policy planners agreed with the existing rule.

To know the actual condition of schools of Bangladesh data were collected through set no. 2 questionnaire. After analyzing the data of this questionnaire it was found that of the 40 schools, available classroom space per student in 32 schools was below the standard level. Only in 8 schools classroom space per student was up to the standard or above it. So only in 20% schools the rule about space per student was followed while in 80% schools the rule was not followed. (80%)

Among 40 non-government secondary schools, 24 schools were rural and 16 schools were urban. In the 24 rural schools, the total number of classrooms was 188. Total space occupied by these 188 classrooms was 1,03,296 sq. ft. and the grand total of students in those schools was 12,249. So in the rural areas, the average space per class was 549.45 sq. ft. and average number of students per classroom was 65.15. So average space occupied by per student was 8.43 sq. ft.

In the 16 non-government schools of urban areas, the total number of classrooms was 167. ^{and the total} Total space occupied by these 167 classrooms was 86,927 sq. ft. and the grand total of students in those schools was 13,124. So in the urban areas, the average space per classroom was 520 sq. ft. and average number of students per classroom was 78.59 sq. ft. Therefore, average space occupied by per student stood at 6.62 sq. ft. The results have been summarized in Table 4.6.1.

TABLE 4.6.1

Location-wise Availability of Classroom Space

Total number of schools	Urban Schools			Rural Schools		
	Number of schools	Space per classroom (Sq. ft.)	Classroom space per student (Sq. ft.)	Number of schools	Space per classroom (Sq. ft.)	Classroom space per student (Sq. ft.)
40	16	520.52	6.62	24	549.45	8.43

From the above analysis it was found that per student available classroom space was less in urban schools than that in rural areas schools. This is also evident from the Figure 4.6.1. However, in both cases classroom space per student was less than the requirement as mentioned in the existing government rule.

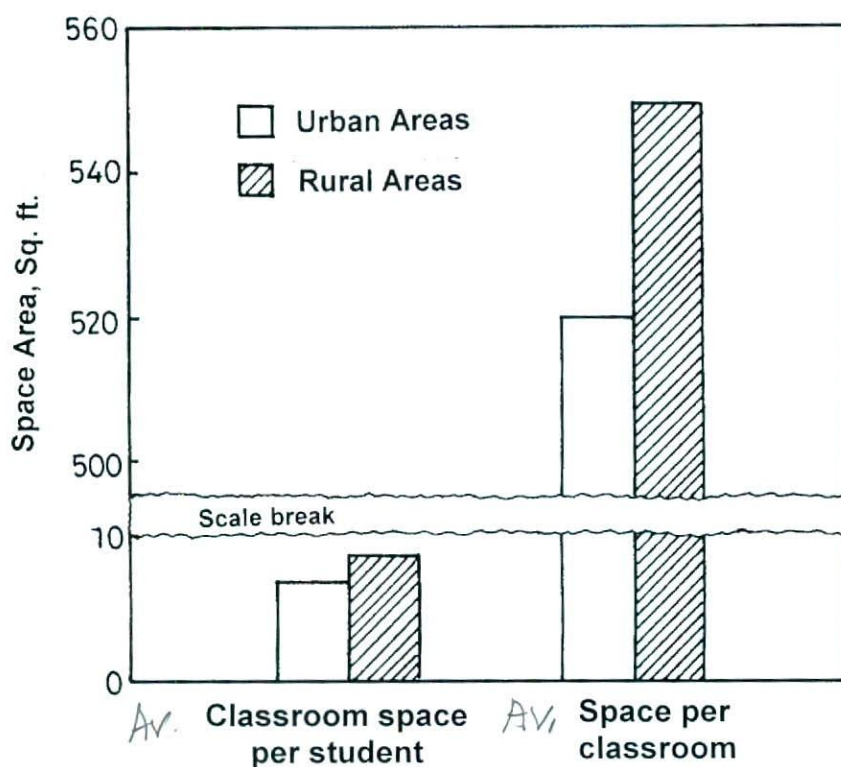


Figure 4.6.1 : Histogram showing the space per student and space per classroom in the urban and rural non-government secondary schools.

4.7 Sanitary Facilities

Sanitary facility is one of the basic needs for the students. Cleaned toilet with sufficient supply of water and properly washed drains are necessary for maintaining healthy atmosphere of a school. Absence of sanitary facilities creates a bad effect on students' mind as well as on the health.

There ^{exists} existed a government rule regarding the ^{availability and type of} sanitary facilities. According to that rule it was ^{required} mentioned that there should be separate toilet for boys students, girls students and for the teachers. In the co-education schools the boys and girls students should have separate toilets. The teachers should have also separate toilets in the co-education schools.

Data were collected by set no. 1 and set no.3 questionnaires from school administrators and policy planners.

After analyzing the data of set no.1 questionnaire it was found that among 40 administrators, 37 ^(92.5%) respondents agreed with the government rule and only 3 ^(7.5%) respondents disagreed with it. So in terms of percentage -

- 92.5% administrators agreed with the existing government rule.
- 7.5% administrators disagreed with the same rule.

Among the 3 disagreed respondents, 2 were from rural areas and 1 from urban area.

The disagreed respondents mentioned their opinions about the sanitary facilities. According to all of them there should be a ratio between the number of toilets and students. Three disagreed respondents mentioned toilet student ratio, which are mentioned here.

- According to first administrator there should be 1 toilet for 120 students
- According to second administrator there should be 1 toilet for 50 students
- According to third administrator there should be 1 toilet for 200 students

The third respondent also mentioned that there should be 1 toilet for teachers and for co-education schools there should be separate toilets for boys, girls and for the teachers.

After analyzing the set no.3 questionnaire it was found that of the 11 policy planners, 5^(44.45%) agreed with the existing government rule and 6^(54.54%) respondents disagreed with it. In terms of percentage -

- 44.45% policy planners agreed with the existing rule
- 54.54% policy planners disagreed with the same rule

From analyzing the real condition the field investigators filled up the set no.2 questionnaire. They also put their remarks where it was necessary. From analyzing the data sheets it was found that of the 40 schools, the toilets of 27^(67.5%) schools were of pucca construction and the toilets of 13^(32.5%) schools were of semi-pucca construction. So in terms of percentage 67.5% toilets were pucca and 32.5% toilets were semi-pucca. The condition of toilets in tabulated form are shown in Table 4.7.1.

Again, regarding the arrangement of water supply in toilets, 28 schools had water supply arrangements in toilets and the remaining 12^(30%) schools had no arrangements of water supply in toilets. In terms of percentage 70% schools had water supply arrangements in toilets and 30% schools had no arrangements of water supply in toilets. About the condition of toilets the field investigators recorded their remarks about 12 schools. Those were :

- a) The toilets were not clean.
- b) The drainage system was not good. Problems of bad smell and water logging in the toilets.
- c) No arrangement of reserve tanks.
- d) In one case the toilet was far from the school.

TABLE 4.7.1

Status of Toilets

Total number of secondary schools	Conditions of toilets in selected secondary schools			
	Type of toilets		Supply of water in toilets	
	Pucca	Semi-pucca	Toilets with water supply	Toilets without water supply
40 (100%)	27 (67.5%)	13 (32.5%)	28 (70%)	12 (30%)

From the Figure 4.7.1 it was found that some toilets had no water supply at all and considerable number of toilets were of semi-pucca construction. The toilet condition was better where there was water supply arrangement in toilets than those toilets where there was no water supply at all.

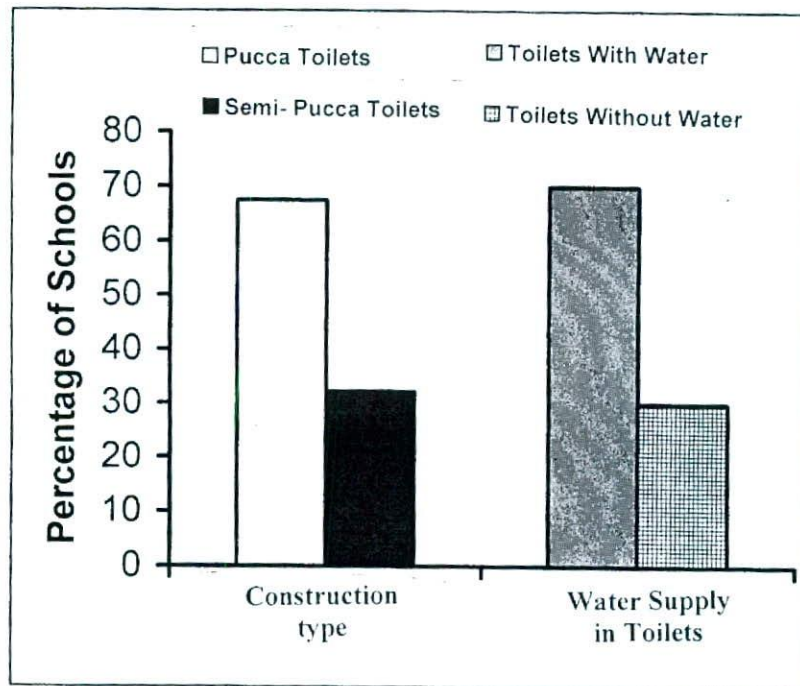


Figure 4.7.1 : Histogram showing the construction type and supply of water in toilets in the selected non-government secondary schools.

Regarding the opinions of the policy planners about the facilities of toilets, 45.45% agreed and 54.54% disagreed with the existing government rule. All the disagreed respondents gave their opinions about the toilet student ratio. The opinions of 6 respondents who did not agree were -

- According to 3 policy planners, toilet student ratio should be 1:100
- According to 2 policy planners toilet student ratio should be 1:50
- According to 1 policy planner toilet student ratio should be 1:25

So it can be concluded that the rule about toilet of secondary schools was not specific. There should be a definite ratio of number of toilet and number of student.

4.8 Potable Water

Potable water facility is another basic need for students. It is also a basic need for every human being. In every school there should be supply of potable water. It is necessary for maintaining good health. Different diseases such as, cholera, dysentery, diarrhea, typhoid etc. may break out for want of potable water. Every school authority should ensure healthy atmosphere in the school campus, because maintaining good health is a pre-condition for good learning and good teaching system. Students stay in a school for a long time. During this time, the school authority should ensure supply of potable water for every student. It is an important aspect for school plant planning process. The government rule regarding this aspect was that there should have arrangement for supply of potable water to the pupils for secondary schools.

401340

Analysis of
From analyzing the set no. 1 and set no.3 questionnaires, which were filled up by school administrators and policy planners it was found that in set no.1 questionnaire among 40 respondents, only 12 respondents agreed with the government rule and 28 respondents disagree with it. In terms of percentage -

- 30% administrators agreed with the existing government rule
- 70% administrators disagreed with the same rule



The respondents who disagreed gave their opinions, which ^{are} were mentioned below:

- According to 15 respondents there should be deep tube well for potable water.
- According to 12 respondents there should be tube well for potable water.
- According to one respondent there should be water supply from the government organizations like Public Health, WASA etc.

So majority of the respondents gave their suggestions for installation of deep tube well.

Considering the set no. 3 questionnaire it was found that all the 11 respondents gave their opinions that a tube well should be the source of potable water in rural areas. So according to 100% policy planners the source of potable water of rural area should be tube-well. But about urban areas ^(54.5%) 6 respondents suggested about the installation of tube well and ^(45.4%) 5 respondents suggested about the supply of water from government organization. So about urban areas –

- 54.55% policy planners were in favour of installation of tube-well
- 45.45% policy planners wanted supply of water from government organization

After analyzing the set no.2 questionnaire the actual condition of 40 schools were found out. In ^(82.5%) 33 schools there were tube well facilities i.e. it was 82.5%. Whereas in ^(12.5%) 5 schools there were arrangement of tap water i.e. it was 12.5%. In ^(5%) 2 schools there were no arrangement of water, which was 5%. The condition of potable water supply in the secondary schools in tabulated form has been presented in Table 4.8.1.

TABLE 4.8.1

Availability of Potable Water

Total number of secondary schools	Schools having potable water facilities		Schools with no potable water facilities
	Tube-well water	Tap water supply	
40 (100%)	33 (82.5%)	5 (12.5%)	2 (5%)

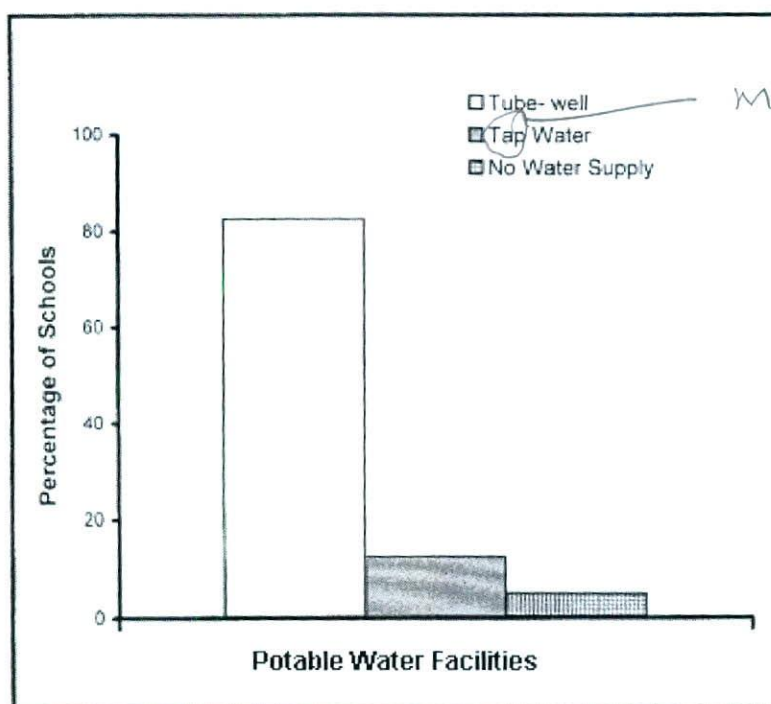


Figure 4.8.1 : Histogram showing the facilities of potable water supply in the selected non-government secondary schools.

Of the 24 rural schools, 22 schools had tube wells i.e. it was 91.67%. In the rest 2 schools there was no arrangement of supply of potable water. Out of 16 urban schools 11 schools had tube wells i.e. it was 68.75%. For the rest 5 schools, there was supply of tap water, which was 6.25%. From the Figure 4.8.1 it was

found that most of the secondary schools had potable water supply from tube-wells. Comparison of data for potable water facilities for rural and urban secondary schools was presented in the Table 4.8.2.

TABLE 4.8.2

School Location-wise Availability of Potable Water

Total number of schools	Urban schools			Rural schools			Total	
	Number of schools	Schools with tube-well	Schools with tap water facility	Number of schools	Schools with tube-well	Schools with no potable water facility	Schools having potable water	Schools with no potable water
40	16 (100%)	11 (68.75%)	5 (31.25%)	24 (100%)	22 (91.67%)	2 (8.33%)	38 (95%)	2 (5%)

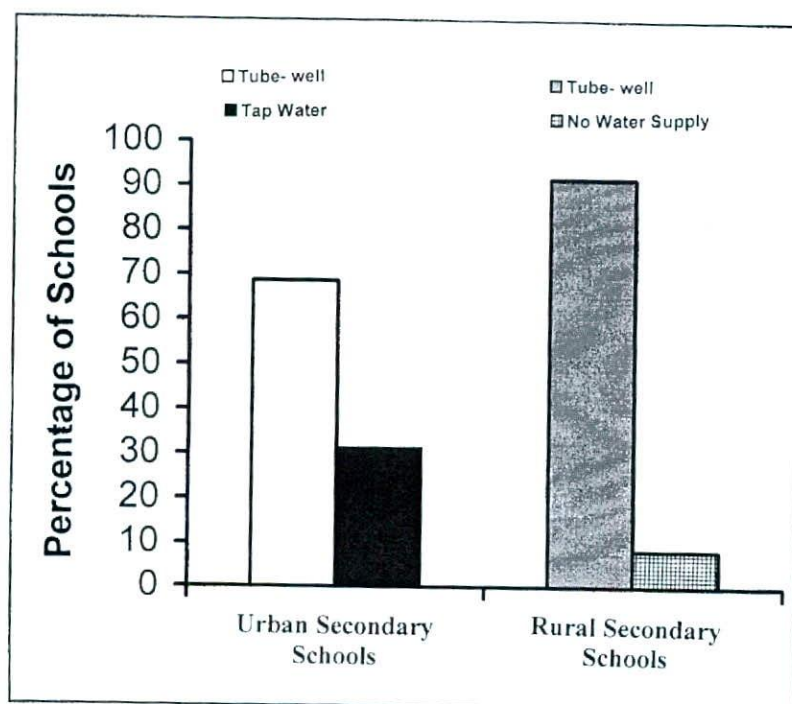


Figure 4.8.2 : Histogram showing the conditions of potable water facilities in the selected urban and rural non-government secondary schools.

From Figure 4.8.2 it is found that the urban secondary schools had more potable water facilities than the rural secondary schools.

Besides these seven variables, there are others, which need to be considered in school plant planning process. ^{these} Those are boundary walls in a school, playground, library, laboratory facilities, distance of the school from highway, facilities of ceiling fans in classrooms etc.

Data were collected by set no. 3 questionnaire ^{these parameters.} about ~~boundary walls, playground and distance of the schools from highway.~~ The data regarding library, laboratory, presence of fans in classrooms etc. were collected by set no.1 questionnaire.

4.9 Boundary Walls

Regarding the ^{availability of} ~~information about~~ the boundary walls it was found from the data analysis that among the 40 secondary schools, 27 schools had boundary walls and 13 schools had no such walls. So in terms of percentage 67.5% schools had boundary walls and 32.5% schools had no walls at all. Of the 16 urban schools, 11 schools had pucca boundary walls, 1 school had corrugated iron sheet fence and 4 schools had no boundary walls at all. In case of 24 rural schools, 10 schools had pucca boundary walls and 5 schools had boundary fence. Among these 5 schools, 2 had corrugated iron sheet fence and 3 schools had bamboo fence. Rest 9 schools were without any boundary walls. Comparison of data for boundary walls of rural and urban secondary schools in terms of percentage is presented in the Table 4.9.1.

TABLE 4.9.1
Status of Boundary Wall

Total number of schools	Secondary schools of urban areas				Secondary schools of rural areas				Total	
	Number of schools	With pucca boundary wall	With fence	Without any boundary	Number of schools	With pucca boundary wall	With Fence	Without any boundary	With boundary	Without boundary
40	16 (100%)	11 (68.75 %)	1 (6.25%)	4 (25%)	24 (100%)	10 (41.67%)	5 (20.83 %)	9 (37.50%)	27 (75%)	13 (32.5 %)

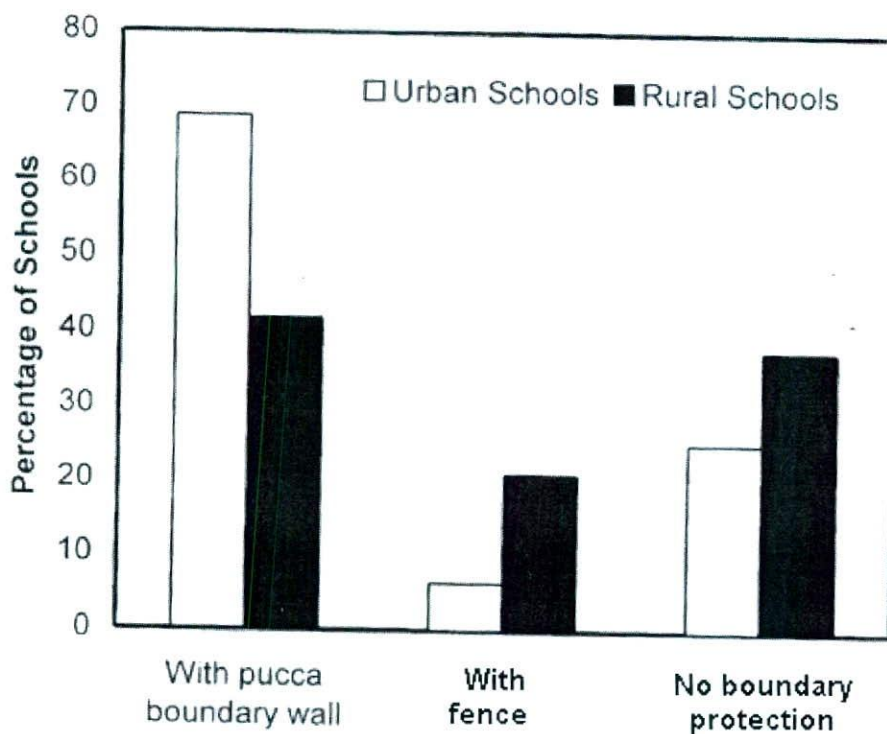


Figure 4.9.1 : Histogram showing the conditions of boundary of the urban and rural non-government secondary schools.

Considering the Figure 4.9.1 the urban non-government secondary schools had more pucca boundary walls than the rural non-government secondary schools. Also more rural non-government secondary schools were without boundary walls in comparison to urban non-government secondary schools.

4.10 Playground

An attempt was made to know the information regarding the existence of playground in urban and rural schools

Analysis of
From analyzing the data it was found that of the 40 non-government secondary schools, 38 secondary schools had playground and 2 secondary schools had no such playground. So in terms of percentage 95% schools had playground and 5% schools had no playground. *of the available playgrounds* As regards of the playground of 38 schools, it was found that only 26 playgrounds were usable percentage being 68.42%.

According to rural and urban area basis the data were analyzed as follows.

4.10.1 Rural Schools

Among 24 rural sample schools -

- 23 secondary schools had playground
- 1 secondary school had no playground

Among the playground of 23 secondary schools,

- 16 playgrounds were found in usable condition
- rest 7 had playground which were not usable

It revealed that one-third schools had no playground.

4.10.2 Urban Schools

Out of 16 non-government secondary schools of urban areas -

- 15 secondary schools had playground
- only 1 secondary school had no playground

Among the playground of 15 secondary schools,

- 10 playgrounds were usable
- 5 playgrounds were not in usable condition

Like rural schools one-third urban schools had no playground. Comparison of data of playgrounds for non-government secondary schools of urban and rural area basis is shown in the Table 4.10.1

TABLE 4.10.1**Availability of playground**

Secondary schools of urban area				Secondary schools of rural area				Total			
Total number of schools	Usable playground	Unusable playground	Without playground	Total number of schools	Usable playground	Unusable playground	Without playground	Schools	Having usable playground	Having unus-aable playground	Without playground
16 (100%)	10 (62.50%)	5 (31.25%)	1 (6.25%)	24 (100%)	16 (66.67%)	7 (29.17%)	1 (4.17%)	40 (100%)	26 (65%)	12 (30%)	2 (5%)

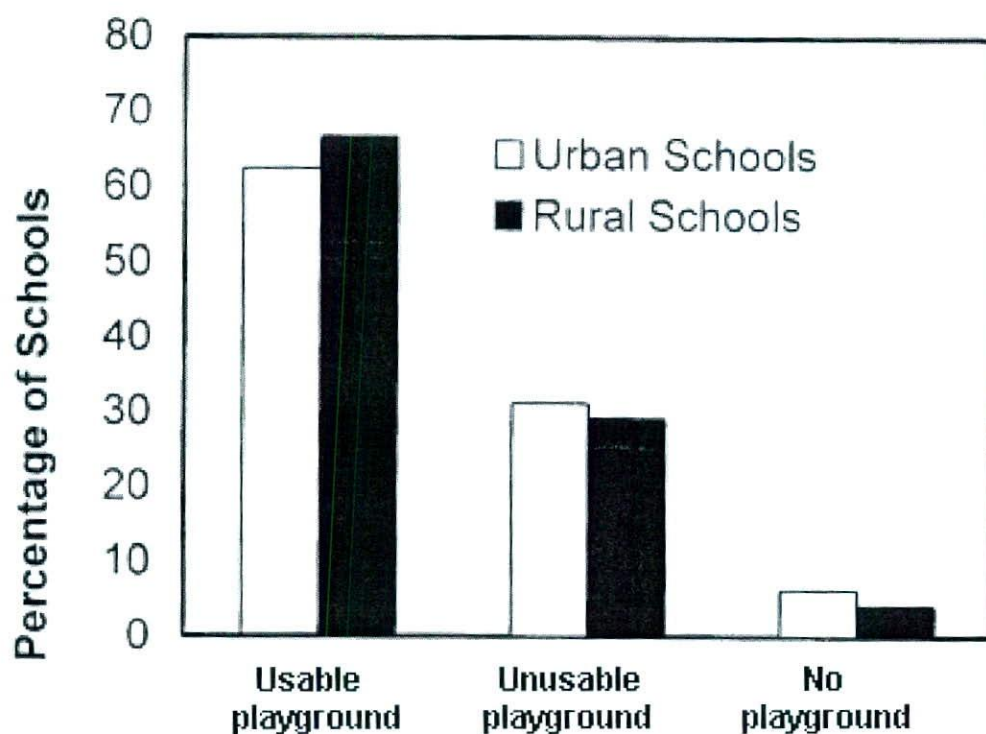


Figure 4.10.1 : Histogram showing the presence of playground in the urban and rural non-government secondary schools.

The Figure 4.10.1 shows the conditions and presence of playground in the selected urban and rural non-government secondary schools.

4.11 Laboratory and Library

The laboratory and library are very important for a school. These are conducive for effective learning.

Regarding the presence of laboratory it was found that among the 40 schools, there were laboratories in the 35 schools. Among the 35 schools, 20 schools were from rural areas and 15 schools were from urban areas. In total, 35 schools had laboratory facilities i.e. it was 87.50%. For rural schools this percentage was 83.33% and for urban schools this value was 93.75%. The comparison of the presence of laboratory in the urban and rural secondary schools is shown in the tabulated form in Table 4.11.1.

TABLE 4.11.1

Location-wise Laboratory Facilities

Total number of schools	Urban secondary schools			Rural secondary schools			Total	
	Number of schools	With laboratory	Without laboratory	Number of schools	With laboratory	Without laboratory	With laboratory	Without laboratory
40	16 (100%)	15 (93.75%)	1 (6.25%)	24 (100%)	20 (83.33%)	4 (16.67%)	35 (87.5%)	5 (12.5%)

Now it can be concluded from the present analysis that there are more laboratories in urban non-government secondary schools, than those in the rural non-government secondary schools.

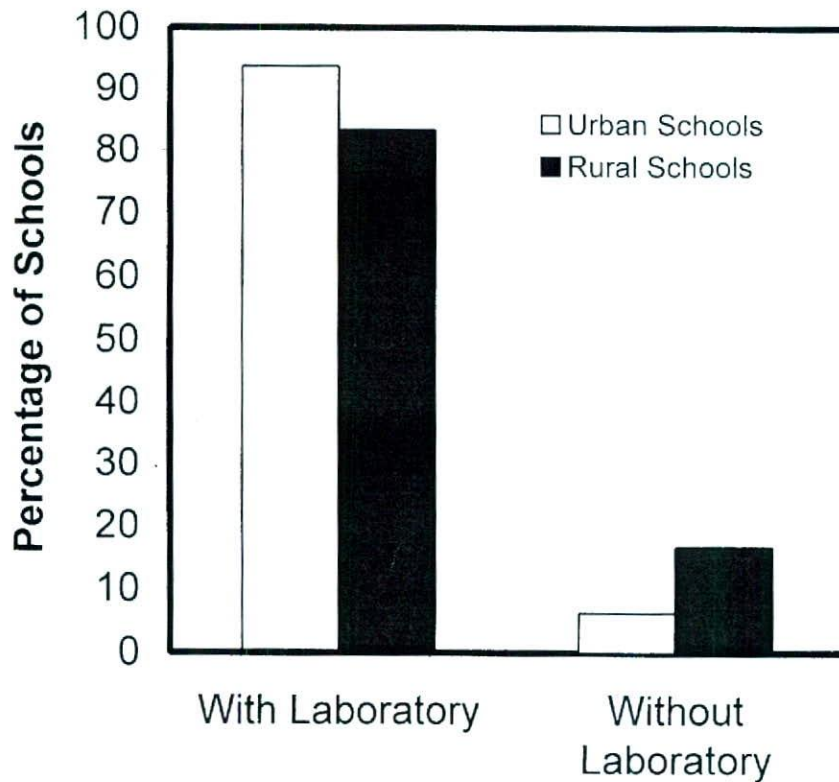


Figure 4.11.1 : Histogram showing the presence of laboratories, in the urban and rural non-government secondary schools

availability of
 About the library facilities, it was found that among 40 non-government secondary schools there were libraries in 27 secondary schools. Among these 27 secondary schools, 14 secondary schools were from rural areas and 13 secondary schools were from urban areas. In total, 67.50% secondary schools had library facilities. For rural secondary schools this value was 58.33% and for urban secondary schools this value was 81.25%. The results are summarized in

tabular form as follows in Table 4.11.2

TABLE 4.11.2

Location-wise Library Facilities

Total number of schools	Urban secondary schools			Rural secondary schools			Total	
	Number of schools	With library	Without library	Number of schools	With library	Without library	With library	Without library
40	16 (100%)	13 (81.25%)	3 (18.75%)	24 (100%)	14 (58.33%)	10 (41.67%)	27 (67.5%)	13 (32.5%)

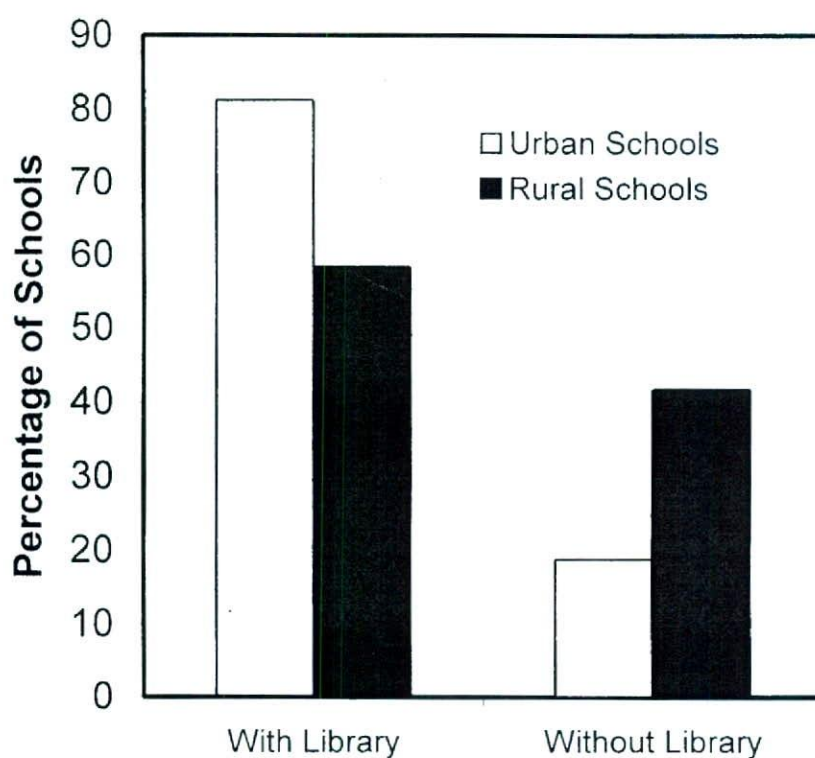


Figure 4.11.2 : Histogram showing the presence of library in the urban and rural non-government secondary schools.

The Figures 4.11.1 and 4.11.2, show the comparison of the presence of laboratory and library in the selected urban and rural non-government secondary schools. From both the figures, it was evident that the urban non-government

secondary schools had more laboratory and library facilities than the rural non-government secondary schools.

4.12 Distance of Schools From Highway

Schools located near the public places like highway, market, railway station etc. are disturbed by the noises, which will hamper the teaching learning atmosphere. Close vicinity of schools to highway is also a risky factor for students from the view point of accident. So location of schools adjacent to these public places should be avoided.

To know the condition of schools of Bangladesh regarding the distance from the highway, information was collected by set no. 2 questionnaire. After analyzing the data it was found that there were seven schools which were attached to the highway. Among these 7 secondary schools 5 were from urban areas and 2 from rural areas.

Another 15 secondary schools were also nearly attached to the highway. The distance of these secondary schools from highway varied from 3m to 100 m. Among these 15 secondary schools 9 were from rural areas and 6 from urban areas. So it may be said that among the 40 non-government secondary schools 22 secondary schools were close or nearly close to the highway and among these 22 secondary schools 11 were from urban areas and the rest 11 from rural areas. It can be explained that 55% secondary schools were attached or nearly attached to the highway. Among these secondary schools 50% schools were from urban areas and 50% schools were from rural areas. The distance of other 18 secondary schools from the highway varied from 1 km to 5 km.

analysis of the
From analyzing data it was found that 7 secondary schools were almost attached to the highway. Though these schools were attached to the highway still there were side roads for students to come to the school. But for the other 33 secondary schools, connecting roads were essential which would serve as a link between highway and schools. To know whether those roads were pucca or not

data were collected by set no. 2 questionnaire. After analyzing those data it was found that among 40 non-government secondary schools, the connecting roads of 28 secondary schools were pucca and for the remaining 12 secondary schools, connecting roads were not pucca. So among the 40 non-government secondary schools 70% secondary schools had pucca connecting roads and 30% secondary schools had kutcha connecting roads.

Of the 28 secondary schools having pucca connecting roads, 15 secondary schools were from rural areas and 13 secondary schools from urban areas. Again, among the 12 secondary schools, which had not any pucca connecting roads, 9 were from rural areas and 3 from urban areas. Among 28 secondary schools having pucca connecting roads, 46.43% secondary schools were from urban areas and 53.57% secondary schools were from rural areas.

Again among 12 secondary schools, which were not any pucca connecting roads, 37.50% secondary schools were from rural areas and 18.75% secondary schools were from urban areas. Comparison of this data for urban and rural area basis is shown in the Table 4.12.1.

TABLE 4.12.1**Status of Connecting Road**

Total number of schools	Urban secondary schools			Rural secondary schools			Total	
	Number of schools	With pucca connecting road	With kutcha connecting road	Number of schools	With pucca connecting road	With kutcha connecting road	With pucca connecting road	With kutcha connecting road
40	16 (100%)	13 (81.25%)	3 (18.75%)	24 (100%)	15 (62.50%)	9 (37.50%)	28 (70%)	12 (30%)

So it can be said that more connecting roads of urban non-government secondary schools were pucca than the connecting roads of rural area non-

government secondary schools. As a result, the students of rural area secondary schools faced more difficulties, than the students of urban secondary schools, in this context.

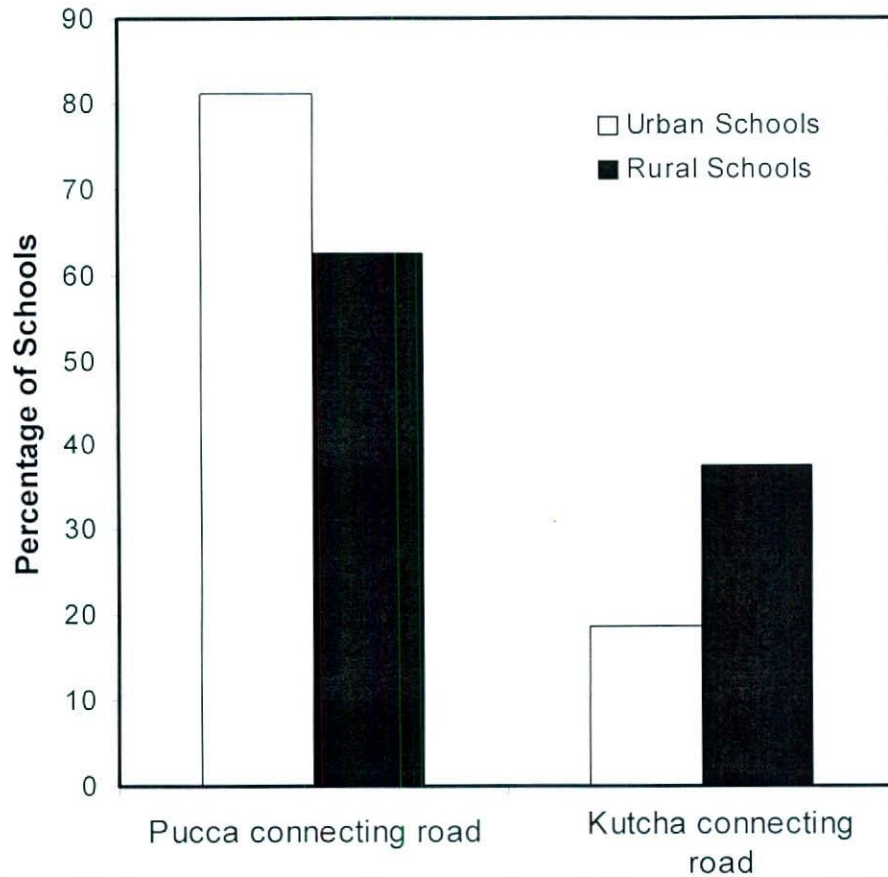


Figure 4.12.1 : Histogram showing the conditions of the connecting roads of the selected urban and rural non-government secondary schools.

From the Figure 4.12.1, it was found that the urban non-government secondary schools had more pucca connecting roads than the rural non-government secondary schools.

4.13 Accessibility to the Schools

Accessibility factor is very important for proper school plant planning. The travel route through which the students come to the school should be ^{free from} natural obstacles.

free, safe and easily accessible. If the students face any natural obstacle like river, 'shako', canal etc. then directly it causes loss of time and indirectly it creates ^{harmful} bad effects on their energy and attentiveness. The whole situation will not be helpful for good teaching and learning conditions. To know whether the students of non-government secondary schools faced any natural obstacle data were collected from 40 secondary schools. After analyzing the data it was found that among ~~40~~ ^{The surveyed} secondary schools, the students of 17 secondary schools were needed to cross natural obstacles to come to the schools. So in terms of percentage the students of 42.5% secondary schools faced natural obstacles on their ways to the schools.

The details of these obstacles are given as follows -

- ⁱⁿ for 6 cases the obstacle ^{were} was river
- in 5 cases the obstacle was 'shako'
- ⁱⁿ for 5 cases the obstacles were both river and 'shako'
- in 1 case the obstacle was flood during the rainy season

TABLE 4.13.1

School Category and Location-wise Accessibility

Total Number of schools	Urban non-government secondary schools			Rural non-government secondary schools			Total	
	Number of schools	Travel route with natural obstacles	Travel route without natural obstacles	Number of schools	Travel route with natural obstacles	Travel route without natural obstacles	Travel route with natural obstacles	Travel route without natural obstacles
40	16 (100%)	6 (37.50%)	10 (62.50%)	24 (100%)	11 (45.83%)	13 (54.16%)	17 (42.5%)	23 (57.5%)

Bangladesh is a riverain country. So the main natural obstacles, which create problems for students to come to the schools, are rivers and canals. This is evident from the analysis of the Table 4.13.1.

*The table 4.13.1
does not show
that.*

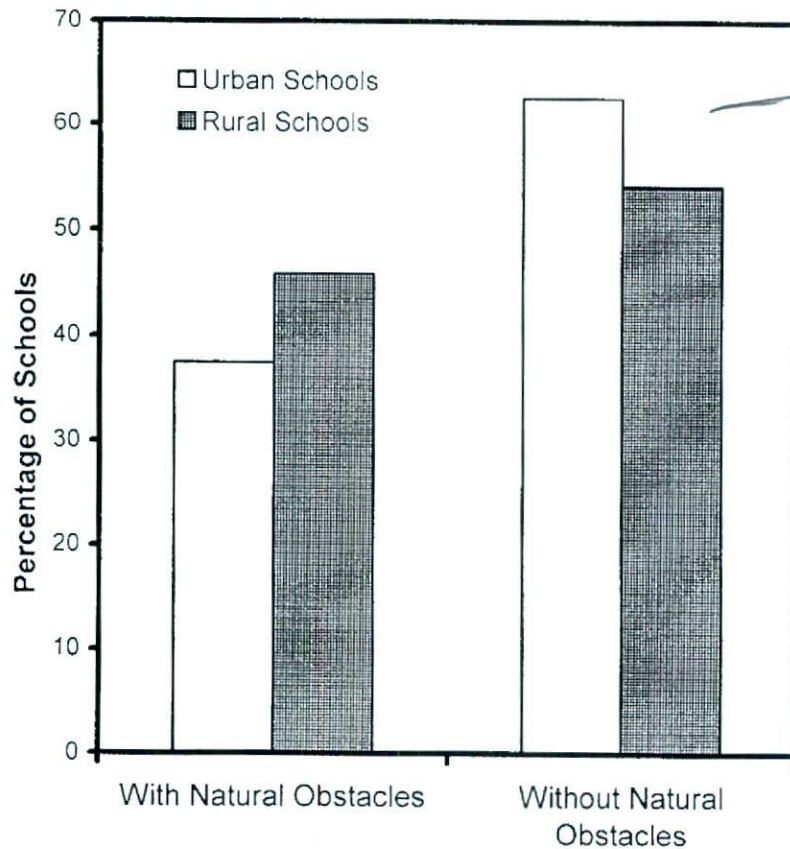


Figure 4.13.1 : Histogram showing the comparison of natural obstacles in case of urban and rural non-government secondary schools.

From the Figure 4.13.1, it was found that the urban secondary schools had less natural obstacles than the rural secondary schools.

4.14 Fans in Classrooms

Presence of ceiling fans in classrooms is necessary for creating better facilities of students. For teaching and learning situation the presence of fans in classrooms is essential. If this minimum facility is absent in any classroom, the students could not be attentive during the time of learning and at the same time the teachers will not be able to teach attentively. So the authority should ensure the facility of fans in every classroom during the time of school plant planning.

Data were collected to know the condition of this facility in the schools of Bangladesh by set no. 1 questionnaire.

After analyzing the data it was found that total number of fans in 40 secondary schools with 355 classrooms were 321. Among those fans, 233 fans were fitted in classrooms. Other 88 fans were fitted in headmasters/headmistresses rooms and in offices.

In the present analysis ~~24 secondary schools were selected from rural areas for data collection.~~ In these ^{the rural} 24 schools, there were in total 188 classrooms and only 92 fans were present in these classrooms. So in rural area schools, the ratio of fans per classroom was 0.49.

In this analysis, ~~16 schools were considered from urban areas for data collection.~~ Of these ^{urban} 16 schools, there were 167 classrooms and 141 fans were present in these classrooms. So in urban area schools, the ratio of fans per classroom was 0.84.

TABLE 4.14.1

Location-wise Availability of Electric Fans

Number of schools	Urban secondary schools			Rural secondary schools			Total		
	Number of class-rooms	Number of fans	Fans per class-room	Number of class-rooms	Number of fans	Fans per class-room	class room s	Fans	Fans per class room
40	167	141	0.84	188	92	0.49	355	233	0.66

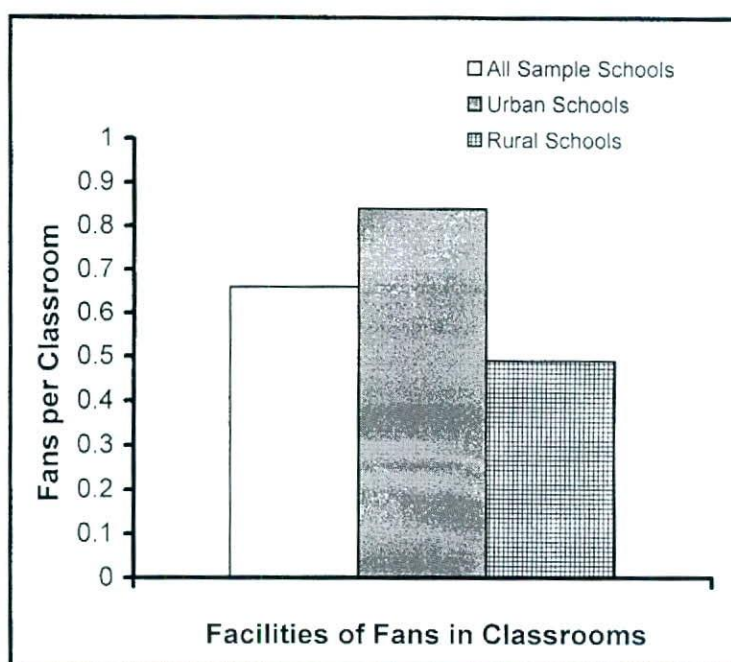


Figure 4.14.1 : Histogram showing the facilities of fans in classrooms of all sample non-government secondary schools and separately in urban and rural non-government secondary schools.

4.15 Primary Schools in the Catchment Area

After observing the location of primary schools in the catchment area of secondary schools the future students of secondary schools can be estimated. This estimation is necessary for planning a school plant, because depending on the number of future students the size of schools, furniture and other physical facilities will vary. In set no. 1 questionnaire, the question number 14 was regarding the number of primary schools and Ebtedayee Madrasahs in the catchment area of 40 sample schools. There are four alternatives in this question, which are mentioned below.

- (i) Government Primary School
- (ii) Non-government Primary School
- (iii) Ebtedayee Madrasah
- (iv) N.G.O. School

Analyzing this question it was found that in the catchment area of 40 samples there were 427 primary schools of different types. Category-wise number of primary schools were as follows :

TABLE 4.15.1

Number of Primary Schools in the Catchment Area

Number of high schools	Number of government primary schools	Number of non-government primary schools	Number of N.G.O. schools	Number of Ebtedayee madrasahs	Total	Average number of primary school per high school
40	227	87	60	53	427	10.67

From the Table 4.15.1 it was found that the number of government primary schools were more than the other types of primary schools in the catchment area of the 40 sample schools. The lowest number was Ebtedayee Madrasah. On an average there were 10.67 primary level institutions in the catchment area of each

school. Most of the students of these 10.67 primary schools ^{are} were likely to be ^{enroll} enrolled in the secondary schools.

4.16 Fulfillment of Pre-requisite Conditions for Recognition

An attempt was made to know whether the schools, which already received recognition had fulfilled the conditions, ~~which were~~ required for it. This question ^{have} had three alternative answers. ~~Those were~~ ^{These are}

- in all cases The pre-requisites ~~were~~ fulfilled in all cases
- in some cases the pre-requisites ^{are} not " in all cases
- not at all The pre-requisites are not fulfilled at all

It was found that among 11 respondents, 7 respondents mentioned that in all cases the authority verified the needed conditions. ^{to ascertain or verify} On the other hand 4 respondents mentioned that in some cases the authority verified. So in terms of percentage 63.64% respondents mentioned that in all cases the authority verified the fulfillment of required conditions of new secondary schools before giving recognition. According to 36.36% respondents, the authority verified this requirement in some cases.

In set no. 3 questionnaire there was a question about the recognition of new schools. This question is whether the authority relaxed the required conditions for recognition of new secondary schools due to unavoidable external pressure or not. This question had three alternative answers. ^{There are} ~~Those were~~ –

- in most cases The authority relaxed conditions
- in some cases " " " "
- not at all In no case, the authority relaxed conditions

It was found that 1 ^(9.1%) respondent put tick mark on "In most cases", 7 ^(63.64%) respondents put tick mark on "In some cases" and 3 ^(27.27%) respondents put tick mark on "Not at all" options. So in terms of percentage 9.1% respondents mentioned that in most cases the authority relaxed the required conditions to give recognition to new

schools. Again, according to 63.64% respondents the authority relaxed the required conditions in some cases and according to 27.27% respondents the authority did not relax any condition.

From analyzing the data it was found that according to the opinion of most of the administrators and policy planners the authority verified the needed conditions of new school ^{that} which the school was supposed to fulfill before recognition. But at the same time most of the administrators and policy planners believed that in some cases the authority relaxed the required conditions due to unavoidable external pressure.

4.17 Proposed School Plants

Two school plant plans, one for urban and one for rural area were given to the policy planners and administrators. They were asked to give opinion about the suitability of the plans for the high schools of Bangladesh.

Of 11 administrators and policy planners, 8 ^(72.3%) mentioned those plans as appropriate, 2 ^(18.2%) respondents wanted some modifications of the prototype plans. So 91 percent respondents considered the new plans as acceptable. Only ~~one~~ 1 ^(9.1%) respondent expressed opinion against prescribing any prototype.

So it may be said that most of the administrators and policy planners wanted prototype of school plants and approved the proposed ones.

4.18 Establishing and Designing of School Building and Role of Education Engineering Department

In set no. 1 questionnaire, there were 6 questions to know the following information about establishment of the schools.

- mode of getting ^{the} of its land
- site selection

- pre-condition by government (if any) for construction
- making design of school building by person or by authority
- role of Education Engineering Department ^{with} in regard to construction of school building *establishment of*

About the ~~establishing~~ ^(67.5%) year of 40 non-government secondary schools, it was found that 27 [^] secondary schools were established before 1971. The rest 13 ^(32.5%) secondary schools were established after the independence of Bangladesh. So it may be concluded that –

- 67.5% sample non-government secondary schools were established before the independence of Bangladesh
- 32.5% sample non-government secondary schools were established after the independence of Bangladesh

About the mode of getting lands of sample secondary schools, from the analysis of data it was found that among 40 non-government secondary schools local community donated the land of 15 secondary schools. In case of 3 secondary schools, lands were procured jointly by community and school authority. For 15 secondary schools lands were received from individual persons who were interested about education. Another 3 secondary schools procured land jointly by individual person and school. Only in case of 4 secondary schools, the school authorities purchased the land. This information is presented here in the tabulated form.

TABLE 4.18.1

Mode of Procurement of Land

Total number of schools	<i>Donated</i> Land purchased by local community	Land purchased jointly by local community and school authority	<i>donated</i> Land purchased by individual person	Land purchased jointly by individual person and school authority	Land purchased by school authority
40 (100%)	15 (37.5%)	3 (7.5%)	15 (37.5%)	3 (7.5%)	4 (10%)

From Table 4.18.1 it was found that most of the secondary schools received their lands donated by the local community (37.5%) and the local community and school authority jointly procured the land for 7.5% schools. Individual persons donated lands for 37.5% secondary schools. In case of 7.5% secondary schools, individual persons and school authority jointly procured land. For 10% schools, the school authorities purchased the land. So from the analysis it was found that the land of most of the sample secondary schools were received from local community and individual persons who were interested about education.

In the case of site selection local community also played the main role in most of the sample schools. Among the 40 sample secondary schools local community selected the site of 21 schools and the school committee selected the site of 9 secondary schools. Individual persons selected the sites for 10 schools. The categories of the 10 individual persons were 6 donors, 3 political persons and 1 government official. The above analysis can be summarized in the following table.

TABLE 4.18.2

Selection of Site

Total number of schools	Site selected by local community	Site selected by school committee	Site selected by individual person
40 (100%)	21 (52.5%)	9 (22.5%)	10 (25%)

identify whether were imposed by the
 In an attempt to the pre-conditions of government with regard to construction of school building, it was found that there was no such pre-condition set by government. From all 40 samples non-government secondary schools the same answers were *received* collected. So in terms of percentage from 100% sample schools the information *indicated that* was collected that there was no pre-condition set by government for construction of non-government secondary schools.

identify the mechanism of
 To know about the design of school building data were collected from 40 sample non-government secondary schools. From the data it was found that the design of most of the sample schools was made by engineers, who were related with construction works. The design of 24 secondary schools were done by engineers. Managing committee designed 8 secondary schools. In case of 5 schools no design was made and for 3 schools the respondents did not know about the designers. The above information is summarized in the following table.

TABLE 4.18.3

Preparation of Architectural Design for School Building

Total number of schools	Design made by engineers	Design made by managing committee	No design was done	Not known
40 (100%)	24 (60%)	8 (20%)	5 (12.5%)	3 (7.5%)

From the Table 4.18.3 it was found that 60%, non-government sample secondary schools were designed by engineers and managing committee designed 20% schools. In case of 12.5% schools no design was made and for 7.5% schools the respondents did not know about the designer.

Information was collected about the role of Education Engineering Department regarding the construction of school buildings of 40 sample secondary schools. After analyzing the data it was found that in case of 29 sample secondary schools the involvement of Education Engineering Department regarding construction was noticed. For 9 sample secondary schools no such involvement of this Department was found. In case of remaining 2 sample secondary schools Education Engineering Department allocated some money for reconstruction of old building. The following table gives the summary of this investigation.

TABLE 4.18.4

Involvement of Education Engineering Department in School Building Construction

Total number of schools	Involvement of Education Engineering Department in constructing new school buildings	No involvement of Education Engineering Department	Involvement of Education Engineering Department for reconstruction of old buildings
40 (100%)	29 (72.5%)	9 (22.5%)	2 (5%)

From Table 4.18.4 it was found that in 72.5% sample schools, Education Engineering Department took part in constructing new school buildings and for 22.55% schools this Department did not have any role regarding the construction of school buildings. In case of 5% sample schools Education Engineering

Department allocated some money for reconstruction. Information was collected to know about the types of construction made by this Department for 29 sample schools. From the collected data it was found that one storied building with 3 rooms were constructed in case of 22 sample schools. In case of one school only, a two storied building with 6 rooms was constructed. For 2 schools the old one storied building was reconstructed into two storied building. In case of remaining 4 schools the Education Engineering Department only constructed the science laboratory.

4.19 Remarks of Administrators

In the set no. 1 questionnaire, the question no. 20 was an open ended one. The respondents were administrators of non-government secondary schools. *In The* ~~The~~ *question, the* respondents were asked to record their remarks or suggestions, if any, with regard to school plant planning.

Two administrators put their remarks in this open-ended question. They mentioned that government rule should not be rigid and according to necessity it should be relaxed. If it is necessary more schools should be established after relaxation of distance rule. Depending on the increasing number of students the area of school house may also be extended by relaxing the existing government rule.

REFERENCES

1. Pillai, R.S.N. and Bagavathi, V., Statistics, S. Chandra & Company Ltd., Ram Nagar, New Delhi-110055, 2001.
2. Mian, M.A. and Miyan, M.A., An Introduction to Statistics, Second Edition, Ideal Library, Dhaka, 1971.
3. National Education Survey (Post-Primary) 1999, First Report, Ministry of Education, Government of the Peoples' Republic of Bangladesh.

CHAPTER 5

Major Findings, Conclusion and Recommendation

5.1 Introduction

The major findings of the study and the conclusions drawn on the basis of the findings followed by recommendations have been presented in this chapter. The research hythesis have also been tested in this chapter.

5.2 Distance of Nearest School(s)

5.2.1 Findings

The respondents both administrators and policy planners considered the existing government rule about distance of non-government secondary schools from nearby schools as appropriate.

But it was found that in most of the schools of both rural and urban areas, the rule was not followed.

5.2.1.1 The hypothesis number 1, "The distance rule is not followed by most of the non-government secondary schools of Bangladesh, mainly by urban area schools" is therefore accepted.

5.2.2 Conclusion

The distance from nearby school, which is an important condition of school plant planning, was not followed by most of the non-government secondary schools of Bangladesh. By ignoring the rule, several schools were established in the catchment areas of sample schools.

5.2.3 Recommendation

During the time of establishing new schools the related authority should follow the distance rule. Otherwise it would be difficult to maintain school-student ratio. At the same time the authority should take into consideration the number of school going population of the locality. New schools should be established and accorded registration on the basis of the findings of School Mapping Exercise.

5.3 Catchment Area

5.3.1 Findings

From the analyzed data it was found that the catchment area of most of the schools was 4 sq. km. Urban school had smaller catchment area than that of rural school.

5.3.2 Conclusion

In Bangladesh, rural students needed to travel longer distance from their urban counterpart with regard to attending schools.

5.3.3 Recommendation

School Mapping Exercise should be done and distance rule should be followed in establishing new schools. Based on this findings of School Mapping Exercise new schools should be established in under-served areas.

5.4 Area of School Compound

5.4.1 Findings

From the analysis of data it was found that majority of the school administrators considered the rule regarding total area of a school as appropriate. ~~Vast~~ ^{Most} majority of the policy planners also supported it. Survey findings revealed that during establishing schools, this rule was followed in most of the cases.

5.4.1.1 The hypothesis number 2, "During the time of establishment most of the non-government secondary schools followed the rule about total area of a school" is therefore accepted.

5.4.2 Conclusion

Most of the non-government schools had required areas of land.

5.4.3 Recommendation

The world of education is changing constantly, and there arises modern outlooks, new methods, new tools etc. Education is now-a-days creative rather than primitive type. Schools should be established on ^{consideration of} considering these aspects. Giving up primitive ideas, a modern school should have classrooms, administrative areas, gymnasiums, workshops, cafeterias, laboratories, libraries, music/art/debate room, computer room, students' common room, playground and badminton or volleyball court.

To fit these modern advantages, the present rule about total area of non-government secondary school should be changed. Land area in the new rule should be 0.55 acre for metropolitan area, 0.75 acre for municipal area and 1.00 acre for rural area. *etc.*

5.5 Nature of School House

5.5.1 Findings

As regards nature of school house the field level findings indicated that most of the schools had pucca school buildings. At the same time it was found that among those pucca buildings, more than one-fourth were unusable. One-fourth of the semi-pucca and not pucca school units were also found unusable.

5.5.2 Conclusion

In Bangladesh most of the non-government secondary schools had pucca school buildings, but among those units, a considerable ^{part} number of school units were unusable.

5.5.3 Recommendation

The school house with pucca buildings is preferable for proper teaching learning. If it appears as a problem in rural areas then tin ^{shed} shaded school house with pucca wall and pucca floor should be constructed. The ceiling should be made of bamboo mat. This will be economic and helpful for reducing excessive heat coming from sun during the summer season. The unusable school units should be repaired. In this way seating capacity may be increased and more students may be accommodated. The increased spaces may be used in modern and effective teaching-learning activities, which will be conducive for students.

5.6 Classroom Space per Student

5.6.1 Findings

About classroom space per student it was found that majority of the school administrators and all the policy planners considered the government rule as adequate. But after analyzing data it was found that in urban and rural non-government secondary schools the rule was not followed widely. In urban schools the condition was ~~more worsen~~ ^{worse}.

5.6.1.1 Hypothesis number 3, "The rule about classroom space per student followed by most of the non-government secondary schools" is therefore not accepted.

5.6.2 Conclusion

In non-government secondary schools of Bangladesh the classroom space per student was less than the requirement, as mentioned in the existing government rule.

5.6.3 Recommendation

For planning and establishing new schools the rule about space per student in classroom should be ensured. To accord recognition of new schools, related authority should be strict about the fulfillment of the rule.

There should be a supervising team to monitor whether the schools follow the rule. So a ratio should be maintained in every classroom. For increasing number of students the authority may manage more sections.

Besides classroom, there should ^{be} also rules for space per student for laboratories. More space is needed in laboratories for a student than in classrooms for experimental works. So space per student for laboratories should be 20 sq. ft. Fulfillment of these conditions may create effective teaching-learning environment in a school.

5.7 Potable Water

5.7.1 Findings

The government rule about potable water is not specific and there is no indication about the source of potable water. Analyzed data indicated that majority of the school administrators disagreed with the government rule. At the same time all of the policy planners mentioned about the source of potable water. It revealed that they gave due importance ^{to} on source of potable water. They all indicated arsenic free tube well as the source.

From the analyzed data it was found that most of the schools had potable water facilities and tube well was the source of potable water.

5.7.1.1 Hypothesis number 4, "Most of the schools do not supply potable water for students" is therefore not accepted.

5.7.2 Conclusion

Most of the non-government secondary schools of Bangladesh had potable water facilities. Tube well was the main source of potable water in most of the urban and rural schools.

5.7.3 Recommendation

In the existing government rule there must be indication of source of potable water. The fulfillment of the rule should be ensured by the related authority. The installation of tube wells in all schools should be given priority. In urban area, tap water may be supplied but there should also be provision of tube wells.

Above all, whether the area is rural or urban and whether the source of potable water is tube well or tap, it should be arsenic free.

5.8 Sanitary Facility

5.8.1 Findings

After analyzing the data it was found that majority of the school administrators agreed with the government rule about sanitary facility. But according to policy planners, more than half of the respondents disagreed with it and wanted specific mention of student-toilet ratio in the rule.

Through field level findings it was found that most of the schools had toilet facilities. But regarding the condition of toilet it was found that one third of the toilets were not pucca and another one-third toilets had no water supply arrangements. Water logging, bad smell and defective drainage system were also found in several toilets.

5.8.1.1 Hypothesis number 5 “Most of the schools have toilet for students” is therefore accepted.

5.8.2 Conclusion

Healthy atmosphere in toilets is important for good health, fresh mind and attentiveness. Though most of the schools had toilet facilities yet the condition of those toilets were not good. Maintenance of toilets was very poor. There was no toilet-student ratio in the rule.

5.8.3 Recommendation

Government rule about sanitary facility should be specific and the rule should indicate the ratio of toilet and students. For latrines and urinals there should be different ratios. The number of urinals should be more than latrines in a school. The ratio should be for 50 students 1 urinal, and for 100 students, 1 latrine. In co-education schools there should be separate toilets for boys and girls students. There should be separate toilet for teachers also. Besides these, the total condition of toilet should be clean. Government authority should ensure that every secondary school must follow the existing rule. Maintenance of toilet should be included as a monitoring indicator.

5.9 Boundary Wall

5.9.1 Findings

About boundary walls the collected data indicated that most of the sample schools had boundary walls. ^{Both} According to urban and rural area basis analysis, the field level information indicated that more urban schools had pucca boundary walls than rural schools.

5.9.2 Conclusion

Most of the non-government secondary schools had boundary walls. The conditions of boundary walls of urban area schools were better than the rural area schools.

5.9.3 Recommendation

During planning and establishing schools, the planners should give importance on boundary walls. For privacy and safety matters every school should have it. If possible, a pucca boundary wall should be constructed or at least a surrounding made by corrugated iron sheet should be provided. Before according recognition the authority should ensure that the school was planned, considering the provision of boundary wall.

5.10 Playground

5.10.1 Findings

After analyzing data it was found that most of the schools had playgrounds but nearly one third of these playgrounds were unusable. Urban and rural area basis analysis also indicated that one-third playgrounds of both were unusable.

The government rule regarding the playground is not specific. There is no indication about the size of playground.

5.10.2 Conclusion

In Bangladesh one third of the non-government secondary schools had no playground facility. *Surveyed*

5.10.3 Recommendation

Playgrounds provide scope to run programs on physical exercise, games, sports and other related activities. These are conducive for overall development of the students. The government rule regarding playground should be specific and it should also indicate the minimum size and *requirement of* ~~usable~~ *usability condition*. In Sri Lanka there are provision of mini-football which needs a field of 40 meters long and 20 meters wide i.e. total area is 8606.72 sq. ft. It is *suitable for* a six-a-side game *football match* field. In U.K and USA, there are also provisions for mini-football. But the fields of U.K and USA are bigger than that of SRI Lanka. In Bangladesh for scarcity of land the size of playground may be of minimum 9000 sq. ft., where students can

play mini-football like Sri Lankan. This is the minimum size of the playground. However, if more land is available then the size of the playground may be bigger. It is always desirable to have a usable playground in every school.

5.11 Library

5.11.1 Findings

From analyzed data it was found that one third of the sample schools did not have any library facilities. ^{Regarding} About urban and rural stratification ^{school scenario} it was found that most of the urban sample schools had library facilities but more than one third rural sample schools did not have such facilities.

5.11.2 Conclusion

A significant number of non-government secondary schools of Bangladesh ^{Surveyed} did not have any library facilities and the conditions of rural schools were ^{worse} worst than the urban schools.

5.11.3 Recommendation

The government authority should be strict about the presence of library in non-government secondary schools. During the time of according recognition care should be taken to verify the presence of library in the schools. Availability of relevant ^{adequate} number of books should be made as a condition for recognition.

The library should be located in a pleasant position, quiet and central in relation to all parts of the school. The library room should be located in a single large space with space for book storage, general reading space for at least a full class at a time and space for carrels for serious study for the examinees of the school. These elements should be arranged in a manner, which will ensure maximum openness for better supervision.

The furniture arrangement should provide the flexibility for long use of the space and for the use of one or more purposes at a time. Closed shelving in glass

cases is proved to be satisfactory for security reason. Those book shelving should have easy access. The reading and reference areas, book shelves, carrels etc. should be placed within a close proximity of the circulation desk so that one library employee may have the direct visual central movement of the users. There should not be more than one entrance to the library room.

One small room for storage of magazines, books, reference files, indexes etc. is desirable in addition to the library itself. Such a room would also serve for the librarian's workroom.

5.12 Fans in Classrooms

5.12.1 Findings

The findings from analyzed data showed that in several rural school classrooms, and a significant number of urban school classrooms, there was no presence of fans.

5.12.1.1 Hypothesis number 5, "Facilities about playground, libraries and ceiling fans are insufficient in most of the non-government secondary schools" is therefore accepted.

5.12.2 Conclusion

The facility about presence of fans per classroom is inadequate in Bangladesh. Both in urban and rural area the facility is below standard level.

*in The Schools
Surveyed*

5.12.3 Recommendation

Favourable physical facilities are conducive for creating better teaching-learning atmosphere. As the facility of fans per classroom in Bangladesh is not sufficient, steps should be taken to improve the condition.

The school authority should ensure this minimum facility for the students. In every classroom minimum two fans are necessary. The concerned authority before giving permission for recognition should be aware of the presence of this

facility in the school. Now-a days, electricity is available in most rural areas. The schools located in such areas should provide fans in each classroom.

5.13 Laboratory

5.13.1 Findings

Analyzed data showed that majority of the sample schools had laboratory facilities. The specific analysis of urban and rural area indicated that more urban area schools had laboratory facility *compared to* rural schools.

5.13.2 Conclusion

the 60 survey In Bangladesh *it was found that* most of the schools had laboratory facilities. In a few schools this facilities was not available. For science subjects, laboratory facility is essential.

5.13.3 Recommendation

The government authority should ensure that there should *be* have laboratory in all non-government secondary schools where there is science group. Science group is operated in the secondary schools at class IX and X levels. Laboratories are required for the science subjects for performing practical experiments. Laboratories are also used to teach science subjects through demonstration method.

Each school should have three separate laboratories for practical work i.e for physics, chemistry and biology. All the laboratories should have facilities with water supply and drainage in the floor, gas supply and electricity. Therefore, the location of the laboratories should be carefully selected, so that all the services can easily be provided.

For the safety point of view at least two doors must be provided in each laboratory. Gas and electricity are needed in the laboratory tables and these tables should have drawers, storage space and cupboards. The drainage of the sinks in the laboratory tables should be carefully considered in designing the laboratories in order that they may be accessible at all point. Wastes from the

laboratories should be led away ^{in through} on easily accessible channel without interruption. The laboratories should be evenly lighted and ventilated. The laboratories used for individual subjects like physics, chemistry and biology may require special facilities and services.

There should have ^{for} supervising team from government to ensure these facilities in every non-government secondary school, ^{with} where there are science subjects. ^{The presence of}

5.14 Condition of Connecting Roads

5.14.1 Findings

From the field level information it was found that majority of the sample schools had pucca connecting roads. According to urban and rural area basis analysis it was found that more urban area connecting roads were pucca, than rural area connecting roads.

5.14.2 Conclusion

From highway to schools, connecting roads are the main link. In Bangladesh ^{in the surveys indicated that} a vast majority of the schools had pucca connecting roads. The number of urban area schools were more in this context.

5.14.3 Recommendation

For non-government secondary school the concerned authority should select such a location which will not be attached to the highway and also not to be too far. The authority should also give stress on the condition of connecting roads, which will be the link between schools and highways. These connecting roads should preferably be pucca. If it is not possible to have pucca connecting road, then the kutchra connecting roads should be well maintained. The authority should take extra care of it, specially, in the rainy season. During this time there is a tendency of the connecting roads to become muddy or damaged.

5.15 Natural Obstacle

5.15.1 Findings

According to analyzed data it was found that nearly half of the sample school students faced natural obstacles on their travel route. According to urban and rural area basis analysis it was found that nearly on third of the urban area students and nearly half of the rural area students in their travel route faced natural obstacle. The river was found as the main obstacle.

5.15.2 Conclusion

Easy accessibility, obstacle free travel route is necessary for students. But in Bangladesh travel route of a considerable number of students was not obstacle free. The condition of rural area was more worsen.

urban scenario.

compared to the

5.15.3 Recommendation

To make travel route obstacle free, improved infrastructure is needed. The whole communication system should be developed to make easy accessibility for the students. For this purpose more emphasis should be given on rural area because the students of these area face more obstacles.

5.16 Verification of Needed Conditions

5.16.1 Findings

According to most of the policy planners, the authority verified the needed conditions of a new school, which should be fulfilled before ^{according} accord recognition. But in some cases the authority relaxed the conditions due to unavoidable external pressure.

5.16.2 Conclusion

In Bangladesh, the conditions needed for a school plant were relaxed in some cases by the related authority, who verified those conditions. Unavoidable external pressure was the main reason behind it.

5.16.3 Recommendation

The school plant should be established according to the norms to facilitate education. Verification by the related authority is necessary. Further investigation is also necessary to know whether the needed facilities are present in school plants. In all cases the authority should verify those conditions. If any school is found without proper facilities, the authority should take quick action.

5.17 Suitability of the Proposed School Plant

5.17.1 Findings

The proposed School Plants – one for urban schools and the other for rural schools, were found acceptable to majority of the administrators and policy planners. Some modifications were made in the draft of the proposed school Plants to make them acceptable to the experts.

5.17.2 Conclusion

The proposed School Plants were considered suitable in the context of Bangladesh.

5.17.3 Recommendation

The proposed School Plants should be considered as models and guides in developing new School Plants in Bangladesh. These may be considered as models. These should, in no way, be considered as comprehensive or be made mandatory.

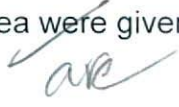
5.18 General Conclusion

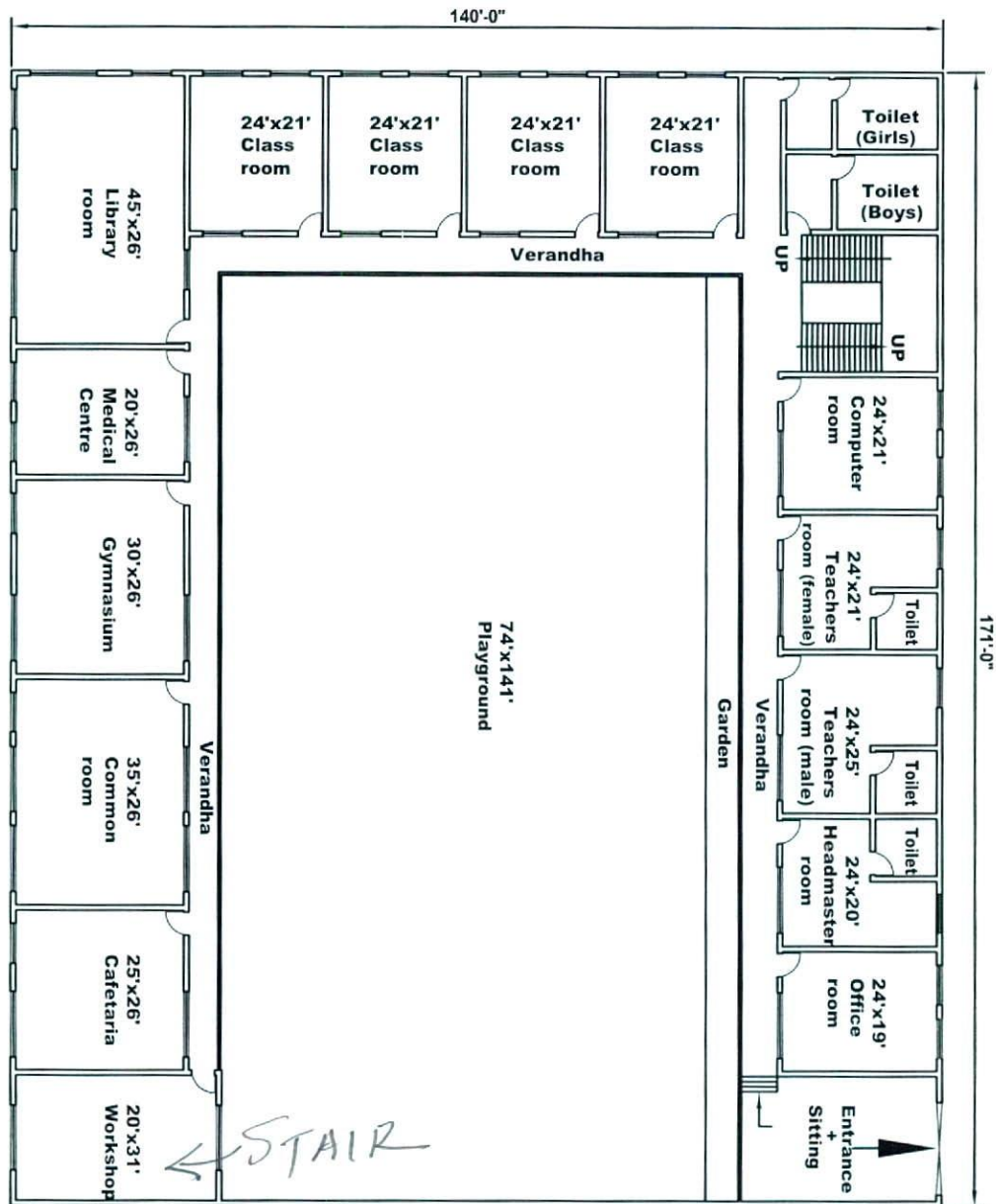
School Mapping and School Plant Planning are very weak areas in the education system of Bangladesh. In most cases these exercises are not done in establishing schools and constructing school buildings.

5.19 Summary of Recommendation

On the basis of findings of the study, it may be concluded that the systems of school plant planning of Bangladesh are not followed widely. Considering the opinions of different administrators and policy planners it was also found that the system itself had some drawbacks. Now to improve the teaching learning atmosphere, an overall recommendations are summarized which are mentioned below.

1. The present rule regarding the total area of a school should be modified into 0.55 acre for metropolitan area, 0.75 acre for municipal area and 1.00 acre for rural area. The proposed school plant plans – one for urban area and one for rural area were given in the Figures 5.1, 5.2, 5.3 and 5.4 respectively.





Total area :- 23940 sq. ft. (.55 acre)

Fig : 5.1 Plan of Groundfloor (Urban area secondary school)

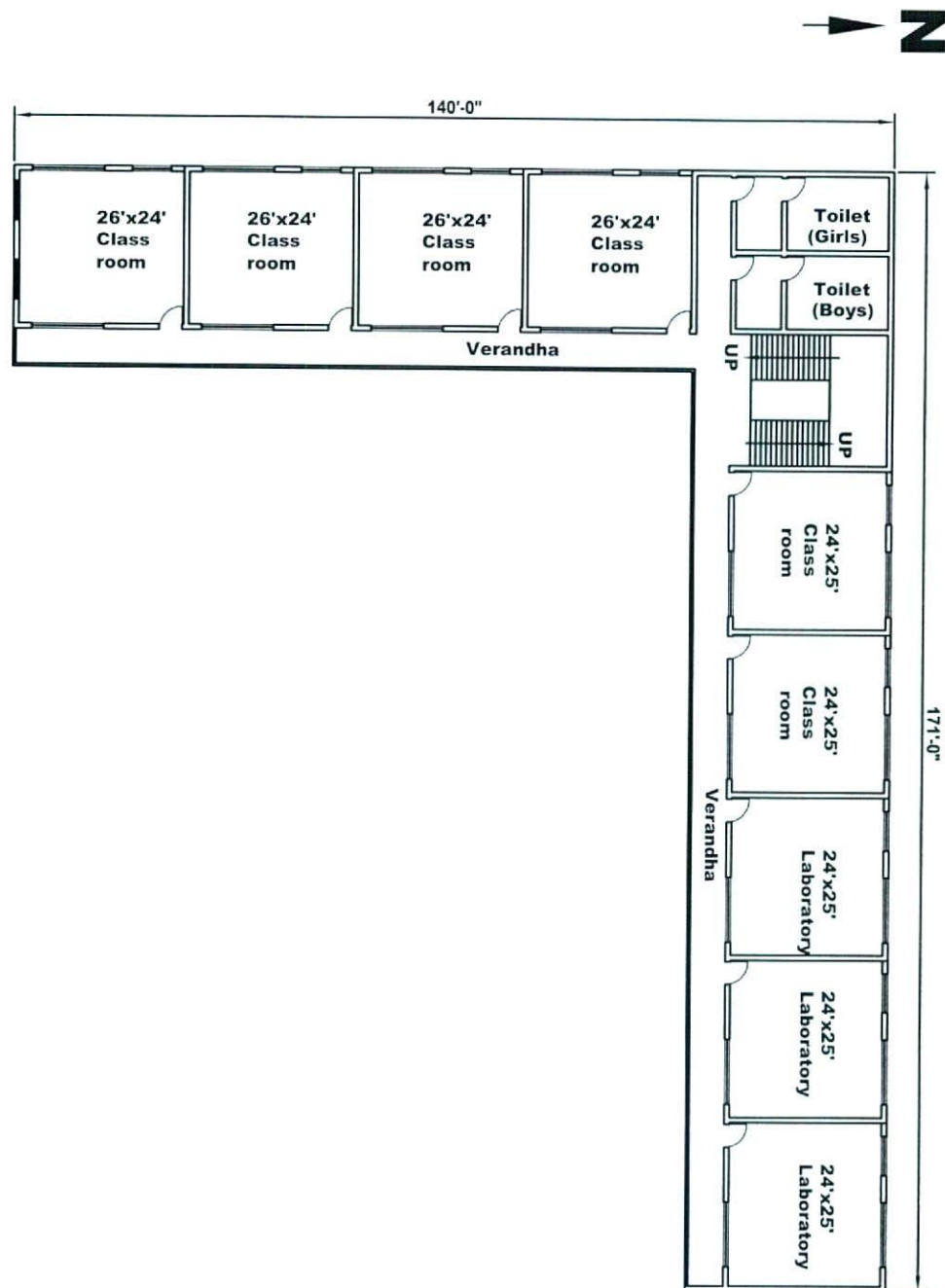
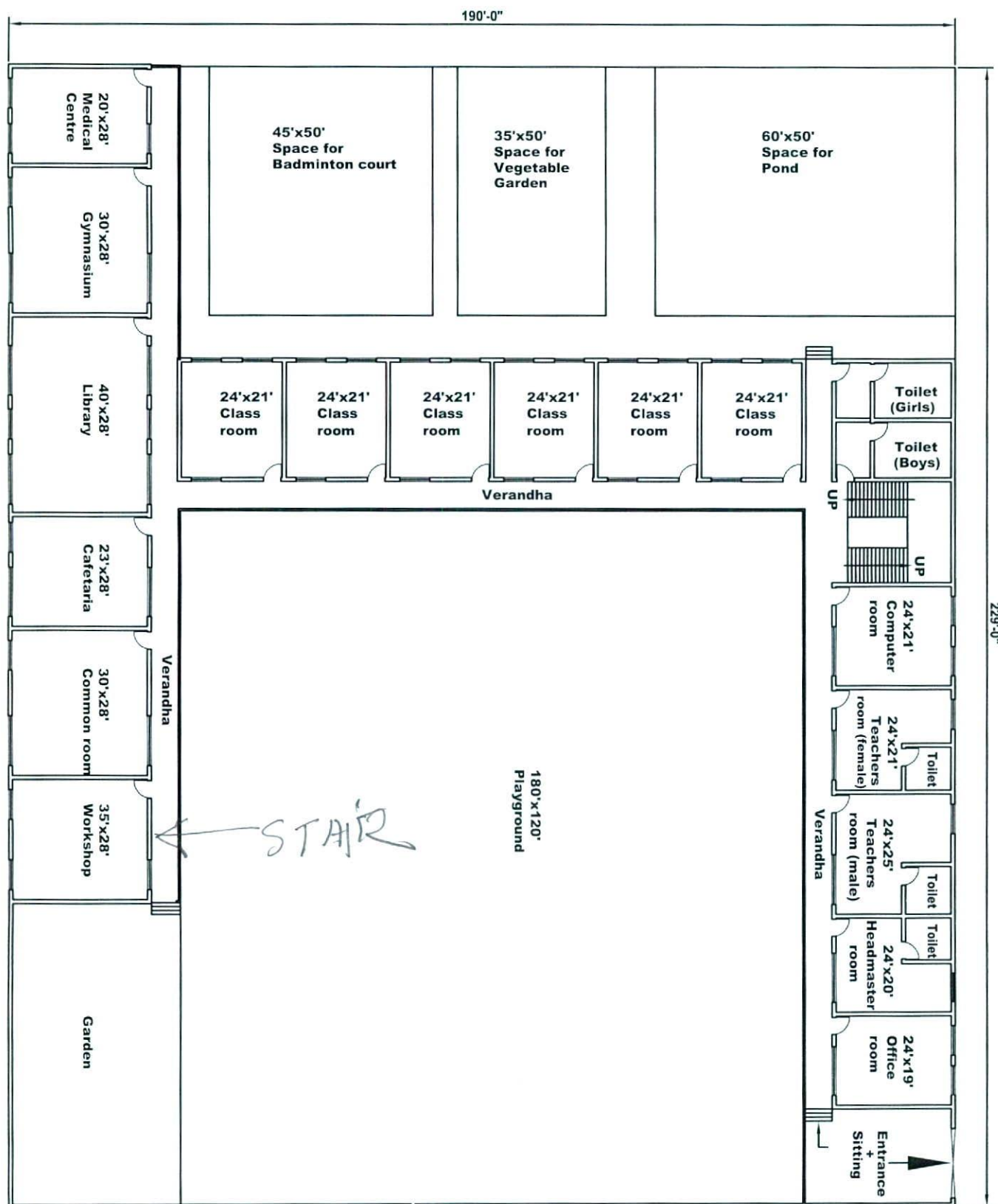


Fig : 5.2 First floor Plan (Urban secondary school)



Total area :- 43500 sq. ft. (1 acre)

Fig : 5.3 Plan of Groundfloor (Rural area secondary school)

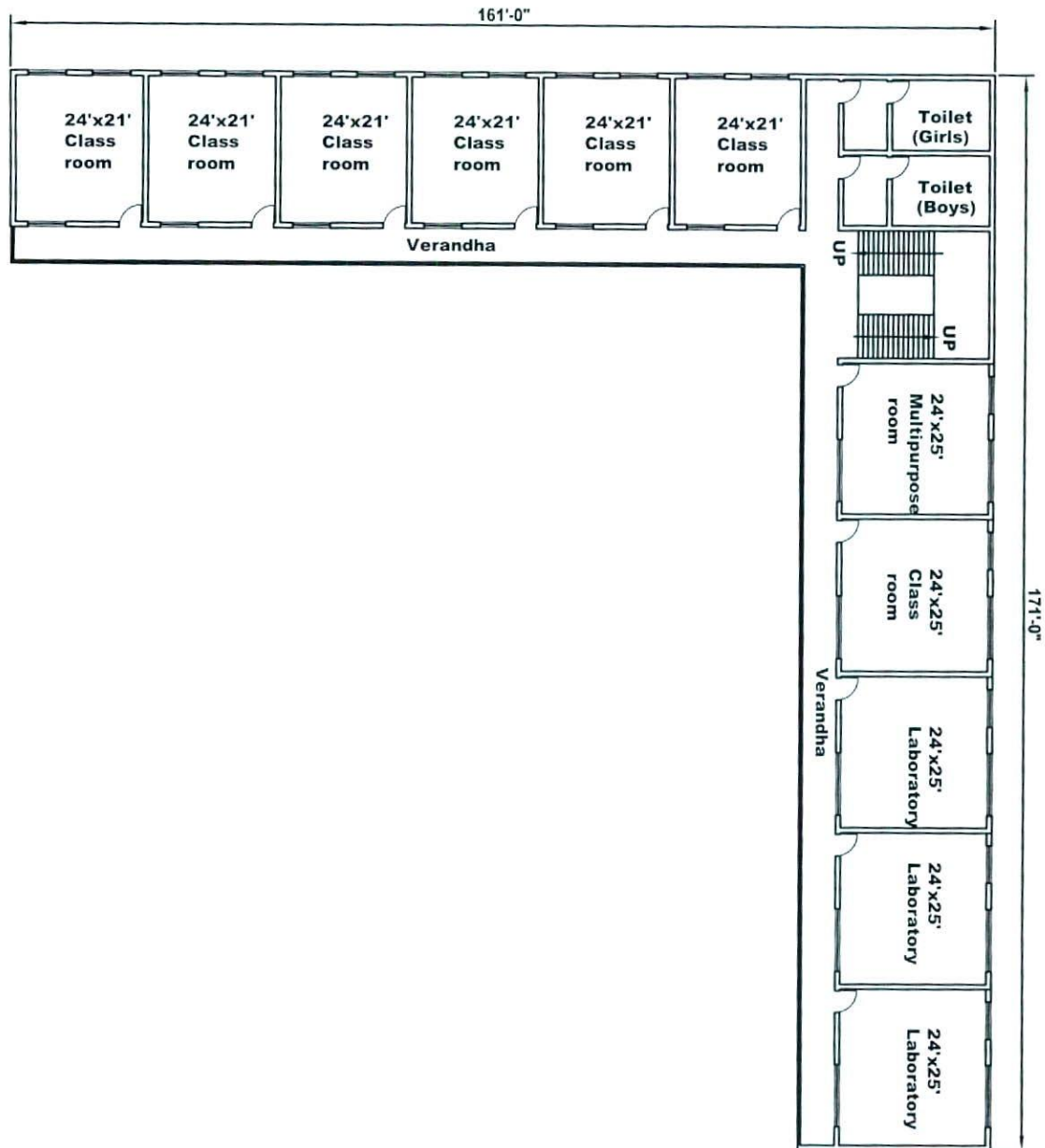


Fig : 5.4 First floor Plan (Rural secondary school)

2. The authority should be strict about the fulfillment of the classroom space per student rule in the schools before according recognition. There should also be rules of space per student in laboratories and it should be 20 sq. ft. per student. The supervising team should ensure the fulfillment of these rules.
3. The school house with pucca building is needed to ensure proper teaching learning condition. In rural area if it is not possible to construct pucca building, then tin ^{shed} shaded school house with pucca wall and pucca floor should be constructed.
4. The government regulation regarding the sanitary facility should be specific. The rule should indicate the ratio of toilet and student. There should be 1 urinal for 50 students and 1 latrine for 100 students. Water supply and sewage disposal system should be provided for ~~the consideration~~ of proper sanitation.
5. Regarding the source of potable water the rule should be specific. For rural area the source may be ^{hand tube well} deep tube well and for urban area the source may be ^{hand tubewell} ~~deep tube well~~ or tap water. However, the potable water must be free from arsenic.
 ^{Water Supplied by water supply authorities.}
6. There must be provision of playground in the non-government secondary schools. It is desirable to have a usable playground of minimum 9000 sq. ft in every non-government secondary school.
7. During establishing a school the distance rule should be taken into account. The population structure and population growth rate of the locality should be considered first. According to the number of population of a certain locality if more schools are needed in a catchment area then flexibility of the rule may be considered.
8. Selection of the site of a school must be considered carefully. During the selection, market place and industrial area attached to the highway should be avoided. School sites should be flat and above flood level.

9. In the school there must be provision ^{for} of easy access for the children, ~~and carefully designed school building for desired educational program.~~
10. A school should be established in such a place so that the students need to cross a minimum number of highways in travelling to and from their residences. If possible, the school should be centrally located in the catchment area.
11. The main entrance of the school should not be on highway. This is ^a ~~necessary~~ ^{necessity} considering the safety of the students. The attached side roads should be pucca and maintained carefully so that the students do not suffer during the rainy season.
12. The design of the school building should be pleasant and the landscape may be made attractive with trees, ponds etc. The school building should provide maximum shade in summer and adequate heat gain during winter. Green trees should be planted around and within the buildings. ~~These areas will~~ ^{to} provide shade and cool air.
13. During planning of the schools care should also be taken regarding safety matters. Fireproof materials must be used during construction of the school buildings. ~~There should have emergency escape ways during fire.~~ ^{routes should be provided} The school building should be resistant to penetration by rain or moisture coming from ground. ^{for escape during fire and other natural hazards}
14. ~~In every non-government secondary school there should have a laboratory with needed and suitable equipment.~~ ^{be}
15. There should ^{be} have a library with needed books in every non-government secondary school. Quiet and centrally located place should be selected for library. The collection of books should be rich with text, reference and other various types of general knowledge books.
16. The travel route of non-government secondary schools should be obstacle free as far as possible. ^{For the} In this purpose for easy accessibility infrastructure, bridges etc. should be made by the concerned authority.

17. The availability of services like electricity, water supply, sewage, disposal etc. should be given very special attention during the time of planning a school plant.
18. While according recognition the authority should ensure the presence of lights and fans in the classrooms, laboratories and other needed places. The water supply in toilets, sinks ⁱⁿ and laboratories should also be ensured.
19. The school area should be demarcated by the boundaries. The boundary wall, if possible, should be pucca. The total environment of a school must be beautiful, pleasant and comfortable for the students.
20. There should be periodical medical check-up system for students. This check-up should be mainly for eyes and teeth. There should be a medical centre in the school premises. An appointed doctor should be available there for the students. For emergency purpose use, there should be a stock of needed medicines. Referral system should be introduced in schools.
21. In all cases before accord ^{of} recognition, the related authority should verify whether the needed conditions for teaching and learning are present in new school plant. At the same time regular monitoring is also essential for all school plants to know about the presence of needed facilities.
22. For non-government secondary schools both in urban and rural areas there ~~should be~~ transport services. ^{should be available} To provide the transport service for those students who come from a long distance ~~is a needed facility~~.
23. There should be some models of School Plants available to the stakeholders. These will help the schools and the local engineering departments to develop School Plants.

BIBLIOGRAPHY

1. A Descriptive Profile of Schools in Sri Lanka, Research Division, National Institute of Education, Maharagama, Sri Lanka, 1989.
2. Aggarwal J. C., Development and Planning of Modern Education, Fifth Edition, Vikas Publishing House Pvt. Ltd., 576, Masjid Road, Jangpur New Delhi 110014, 1995.
3. Akhter S. and Begum H. A., School Mapping and Plant Planning, Bangla , Academy, Dhaka, 1994.
4. Ali M. A., Shikhar Songkhipta Etihias, Bangla Academy, Dhaka, 1986.
5. Atlapedia Online, Lalimer Clarke Corporation Pty. Ltd., 1993 – 2003.
6. Bachelor of Business Administration (BBA) Program, Institute of Business Administration, University of Dhaka, 2002 – 2003.
7. Barton M. and Baker, C. E., Relocatable Classroom Units, 1975.
8. Bangladesh Jatio Shikha Commission Report (Bengali), 1974.
9. Bangladesh Jatio Shikha Commission Report (Bengali), 1988
10. Britannica Book of the Year, Encyclopaedia Britannica Inc., Chicago, 1994.
11. Brochure of Female Secondary School Assistance Project, Directorate of Secondary & Higher Education, Ministry of Education, Government of Peoples' Republic of Bangladesh.
12. Brochure of Higher Secondary Female Stipend Project, Directorate of Secondary & Higher Education, Ministry of Education, Government of Peoples' Republic of Bangladesh.
13. Chakravarty S. B., Headmaster's Manual, B. B. Kundu & Sons, 62/1, Mahatama Gandhi Road, Calcutta 700009, 1992.
14. Chowdhury A. M. R., Haq M. N. and Ahmed Z., Universal Primary Education, Proceedings of the Conference, Dhaka and Rajendrapur, 6 – 10 August, 1996.

15. Comparative Study of the Design and Management of Education Buildings and Furniture in Europe and North America, UNESCO Publication, Paris, February, 1986.
16. Constantinos F., Innovative Technology in the Construction of Primary Schools in Bangladesh, Proceedings in Educational Facilities in the City, the Challenge in Asia and the Pacific, Bangkok, 14 – 17 February, 1983.
17. Education (School Premise) Regulations, U.K, 1981.
18. Education Statistics, Department of Education, Government of India, 2000 – 2001.
19. Educational Statistics of Nepal, His Majesty's Government, Ministry of Education and Sports, Department of Education, Government of Nepal, 2003.
20. Eusuf M. A., Planning Primary Educational Facilities in Bangladesh, A Case Study of Tangail and Manikgonj Pourashava, MURP Thesis, Bangladesh University of Engineering and Technology, Dhaka, 1988.
21. Guidelines for Preparation/Appraisal of Subprojects for Educational Facilities, Local Government Engineering Department, Dhaka.
22. Hans N., Comparative Education, Routledge & Kegan Paul Limited, London, 1967.
23. Herrick J. H., McLeary R. D., Clapp W. F. and Bogner W. F., From School Program to School Plant, Henry Holf Company, New York, 1936.
24. Hossain M. A. and Karim M. R., Presentation of the Educational System of Bangladesh, Proceedings on Annual Training Programme in Educational Planning and Administration, 22- 29 October, 1992, IIEP – UNESCO, Paris.
25. Islam S. Anwarul, Shikkha Babosthapon Sommondhio Bishoiadi, Shams Publication, Dhaka, 2002.
26. Jain A. K., School Building Planning, Design and Management, Management Publishing Co. Dehradun 248001, India, 1998.

27. Khatun Sharifa, Tulonamulok Shikha Tatta (2nd Part) Bangla Academy, Dhaka, 1983.
28. Macconell J. D., The Planning for School Building, Prentice Hall Inc., Englewood Cliffs, New York, 1957.
29. Mian M. A. and Miyan M. A., An Introduction to Statistics, Second Edition, Ideal Library, Dhaka, 1971.
30. National Education Survey (Post-Primary) 1999, First Report, Ministry of Education, Government of the Peoples' Republic of Bangladesh.
31. Pillai, R. S. N. and Bagavathi V., Statistics, S. Chandra & Company Ltd., Ram Nagar, New Delhi-110055, 2001.
32. Professional Service Rules of the State Board of Education, State department of Education, Chapter 290-030-050.
33. Project Proforma for "Development and Rehabilitation of Secondary Educational Institutions (Government and Non-Government, Revised)", Directorate of Secondary and Higher Education (Planning and Development), Dhaka, Bangladesh.
34. Project Proforma for "Development of Secondary and Higher Secondary Educational Institutions (Govt. and Non-Govt.) of Dhaka Metropolitan area", Directorate of Secondary and Higher Education, Dhaka, Bangladesh.
35. Project Proforma (PP) for "Development of Selected Secondary Schools (Govt. & Non-Govt.)", Directorate of Secondary and Higher Education (Planning and Development Section), Dhaka, Bangladesh, July 1998.
36. Prokolpa Saar patra, Madhamik O Uchha Shikka Prokalpa, Ministry of Education, Directorate of Secondary and Higher education, Dhaka, Bangladesh, September, 1993.
37. Ratnayke W. M. B. S. L., Developments in Education Facilities in Sri Lanka, Proceedings in Educational Facilities in the City : The Challenge in Asia and the Pacific, Bangkok, 14th – 17th February, 1983.

38. Regulations, Act and Government Orders, Board of Intermediate and Secondary Education, Dhaka, 1993.
39. Rules About Establishment, Starting and Recognition of Non-Government Secondary Schools, Ministry of Education, Dhaka, 1997.
40. Revised Project Proforma (RPP) for "Renovation and Development of Selected Non-Government High Schools", Directorate of Secondary and Higher Education (Planning and Development), Dhaka, Bangladesh, 1993.
41. School Census 2002, Preliminary Report, Ministry of Human Resources Development, Education and Cultural Affairs, Sri Lanka.
42. State Board Resolution, Code of Alabama, U.S.A, 1975.
43. Statistics of Education – Schools in England, Department for Education and Skill, 1999 edition.
44. Statistical Profile on Education in Bangladesh, BANBEIS Publication No. 350, November 2002, 1 Sonargaon Road.
45. Syllabus of Higher Secondary Certificate Examination for the Year 2004, National Curriculum and Text Book Board, Dhaka, Bangladesh, 2002.
46. Syllabus of Secondary School Certificate Examination for the Year 2005, National Curriculum and Text Book Board, Dhaka, Bangladesh, 2003.
47. The New Encyclopaedia Britannica, Vol. 21, Encyclopaedia Britannica Inc., U.S.A., 1994.
48. The New Encyclopaedia Britannica, Vol. 24, Encyclopaedia Britannica Inc., U.S.A., 1994.
49. The New Encyclopaedia Britannica, Vol. 28, Encyclopaedia Britannica Inc., U.S.A., 1994.
50. The State of Population, Nepal 2000, Chapter 5, Educational Status, Ministry of Population and Environment, Nepal.
51. U. K Educational System, British Council, U. K, 2003.
52. U. S Census Bureau, Population Division, U.S Pop. Clock projection 2003.
53. U.S Department of Education, Institute of Education Sciences, NCES-358.

APPENDIX A

List of Selective Non-Government Secondary Schools

Dhaka Division

1. Siddeswari Boys High School, Ramna, Dhaka
2. T & T High School, Ramna, Dhaka
3. Magh Bazar Balika Biddalaya, Ramna, Dhaka
4. Ispahani Balika Biddalaya, Ramna, Dhaka
5. Narsingdi Pilot High School, Narsingdi
6. Madhabdi Girls High School, Narsingdi
7. Palash High School, Polash, Narsingdi
8. Tauhid Memorial High School, Palash, Narsingdi
9. Chanla Girls High School, Palash, Narsingdi
10. Charsindur Girls High School, Palash, Narsingdi

Barisal Division

11. Nabagram Model High School, Nabagram, Jhalokati
12. S. S. L. Girls High School, Satadaskati, Jhalokati
13. Islampur High School, Hadua, Nalcity, Jhalokati
14. Nalcity Merchants High School, Nalcity, Jhalokati
15. S. J. K. Girls High School, Chachoir, Nalcity, Jhalokati
16. Timirkati Girls High School, Timirkati, Jhalokati

Chittagong Division

17. Tulabaria High School, Feni
18. Feni Balika Bidya Niketon, Feni
19. Pathannagar High School, Chagalnaiya, Feni
20. Radhanagar High School, Chagalnaiya, Feni

21. Chagalnaiya P. Girls High School, Chagalnaiya, Feni
22. Anwara B. Adarsha Girls High School, Chagalnaiya, Feni

Khulna Division

23. Saint Joseph S. High School, Khulna
24. A. P. C. Girls High School, Khulna
25. Nabarun High School, Daulatpur, Khulna
26. Khalispur, High School, Daulatpur, Khulna
27. Daulatpur Mohsin Secondary Girls School, Daulatpur, Khulna
28. Pallimangal Girls High School, Daulatpur, Khulna

Rajshahi Division

29. Maharaja J. N. High School, Natore
30. Banalata Girls High School, Natore
31. Kalam High School, Singra, Rajshahi
32. Singra D. Pilot High School, Singra, Rajshahi
33. Barasoil Girls High School, Singra, Rajshahi
34. Hatiandaha Girls High School, Singra, Rajshahi

Sylhet Division

35. Lalabazar Bilat High School, Kotwali, Sylhet
36. Mainunnessa Girls High School, Kotwali, Sylhet
37. Bairagi Bazar High School, Bianibazar, Sylhet
38. Mullapur Union High School, Bianibazar, Sylhet
39. Ghungadia Barodesh Girls High School, Bianibazar, Sylhet
40. Mathura Girls High School, Bianibazar, Sylhet

APPENDIX B

A Study on Prevalent School Plant Planning System of Bangladesh

Questionnaire No. 1

For headmasters/headmistress of some selected secondary schools

Name of school :	
Location of school :	
Name of interviewee :	
Duration of service of the interviewee in the present school :	
Year :	Month :

1. What is the Year of establishment of the school?
2. Location of school :
 - (a) Metropolitan area
 - (b) Municipal area
 - (c) Thana sadar
 - (d) Rural area
3. How the land was procured?
 - (a) Donated by the community
 - (b) Donated by individual (person interested in education)
 - (c) Donated by political person

Name : _____ designation : _____

(Such as M. P, chairman of municipality or union parishad)

- (d) Government khash land
 - (e) Purchased by school authority
 - (f) Others
4. By whom the school site was selected?
- (a) By government official
 - (b) By school committee
 - (c) By elected public representative
 - (d) By local community
 - (e) Others (please mention)
 - (f) Not known
- 5.(i) Is there any pre-condition set by the government for construction of school building?
- Yes/No
- 5(ii). If there is any pre-condition please attach the papers (photocopy) with this questionnaire.
6. In case the school house is pucca, the design of the building was made by
- (a) Architect
 - (b) Engineer
 - (c) Managing committee
 - (d) Any other people (please mention)
 - (e) No design was made
 - (f) Not known
7. What was the role (if any) of Education Engineering Department with regard to construction of school building? Please mention?

8. Total area of the school (acre)
9. Total area of the school building (including all buildings if there are more than one) (sq. ft.)
10. Floor space versus number of students as on date
(If there are sections in a class then the number of total students and floor space of those sections in a class)

Rooms & others	No. of sections in the class	No. of students	Floor area (in sq. ft.)
VI			
VII			
VIII			
IX			
X			
Laboratory			
Library			
Play ground			
Office			

11. If there is any Junior/high school in five (5) kilometer distance from school then fill up the following.

Name of junior school	Distance (km)	Direction
Name of high school	Distance (km)	Direction

12(i) Do the students cross any natural obstacle to come to the school?

Yes/No

12(ii) If they cross any natural obstacle then it is a

(a) River (b) Mountain (c) Bridge (d) Others (please mention)

13. The approximate catchment area of the school is around

(a) One sq. km. (b) Two sq. km. (c) Three sq. km.
(d) Four sq. km. (e) More (please mention)

14. Number of primary schools and Ebtedayee Madrasah in the catchment area

(a) Number of government primary school _____
(b) Number of non-government primary school _____
(c) Number of Ebtedayee Madrasah _____
(d) Number of N.G.O school _____

15(i) According to government rule the distance between two secondary schools should be 1 km in urban area and 4 km in rural area. Do you agree with it?

Yes/No

15(ii) If you do not agree with the above question then what should be the distance according to you?

16(i) In government rule the total area of a secondary school should be 0.25 acre in metropolitan area, 0.50 acre in municipal area and 0.75 acre in rural area. Do you agree with the rule?

Yes/No

16(ii) If you do not agree with the above rule then please mention what should be the minimum land (in acre) a secondary school should be?

Metropolitan

Municipal

Rural

- 17(i) According to government rule space per student in class room of a secondary school should be 10.76 sq. ft. Do you agree with the rule?

Yes/No

- 17(ii) If you do not agree with the above rule then please mention what should be the minimum space (in sq. ft.) available per student?

- 18(i) Government rule states that the sanitary facilities attached to the school should be adequate and kept in good order. There should be separate toilet for girls and boys students and teachers. Do you think this rule is specific?

Yes/No

- 18(ii) If no, then what should be the number of students per toilet?

- 19(i) As regards to potable water it is mentioned in the rule that there should have arrangements for supply of potable water in the school. But there is nothing about sources of potable water. Do you agree with the rule?

Yes/No

- 19(ii) If you do not agree with the rule then what should be the source of potable water?

20. If the interviewee has any comments/suggestions.

Signature of Interviewer
Date :

Signature of Interviewee
Date :

APPENDIX C**A Study on Prevalent School Plant Planning System of
Bangladesh****Questionnaire No. 2** (To be filled by data collector)1. Location and condition of surrounding area of school

The school house is situated in :

- (a) Market area (b) Residential area (c) Industrial area
 (d) Beside main road (e) Rail station/Steamer ghat (h) Remote area

2. Condition of school house and its number :

<u>Condition of school house</u>	<u>Number of house</u> (Write number)	<u>Whether usable</u> (Put tick mark)	<u>Required repair</u> (Put tick mark)	<u>Not repairable/Need to be demolished</u> (Put tick mark)
(a) Pucca				
(b) Semi-pucca				
(c) Not-pucca				

3. Condition of toilets ;

- (a) Not pucca (b) Semi-pucca (c) Sanitary with pucca structure

4.1 Provision of supply of water. Yes/No

4.2 Sources of supply water.

- (a) Tap water (b) Stored water in a tank

4.3 If there is arrangement of tap water in the toilet, whether the tap is usable?

Yes/No

4.4 If there is no supply of water in the toilets, how the students manage water?

Please mention.

5.1 Is there any water flushing system in the toilets?

Yes/No

5.2 If water flushing system exist, whether it is usable or not?

Yes/No

6.1 Is the overall condition of the toilet healthy? Yes/No

6.2 If the conditions are not suitable, mention the difficulties.

7.1 Is there any arrangement of potable water for the students? Yes/No

7.2 Sources of potable water.

(a) Tube well (b) tap water (c) Others (mention)

8.1 Whether the land area of the school is under the control of school authority?

Yes/No

8.2 If not, mention the land area which is under the control of illegal occupier.

8.3 Mention the name and address of illegal occupier.

9. Condition of boundary wall (if any) :

(a) Pucca (b) Not pucca

10.1 Are there sufficient trees in the school? Yes/No

10.2 If not, whether positive approach has been taken? Yes/No

10.3 If any positive approach has already been taken please mention it.

11.1 Is there any playground in the school? Yes/No

11.2 If playground exist, whether it is usable or not. Yes/No

11.3 If the playground is not usable, mention the reasons.

12. Mention the distance of highway from the school.

13. Condition of link road from the school to the highway.

(a) Pucca

(b) Not pucca

14. Special physical condition of school if any : (please mention)

(a)

(b)

(c)

15. Whether present condition of school house creates any problem/difficulties in school activities (For example, classroom facility, library, indoor games facilities etc.)? (Please mention one by one)

Signature of data collector

Date :

APPENDIX D

A Study on Prevalent School Plant Planning System of Bangladesh

Questionnaire No. 3 (To be filled by policy planners and administrators)

<u>Particulars of interviewee</u>
Name :
Designation :

- 1.1 There is a government rule that the distance between two secondary schools should be 1 km in urban area and 4 km in rural area. Do you think that the rule is justified?

Yes / No

- 1.2 If not, why?

- 1.3 Please mention what should be the minimum distance between two secondary schools.

2.1 In government rule the total area of a secondary school should be 0.25 acre in metropolitan area, 0.50 acre in municipal area and in rural area 0.75 acre. Do you agree with the rule?

Yes / No

2.2 If not, why?

2.3 If you do not agree with the above rule then please mention what should be the minimum land (in acre) a secondary school should have?

Metropolitan area	Municipal area	Rural area

3.1 According to government rule classroom space per student of a secondary school should be 10.76 sq. ft. do you agree with the rule?

Yes / No

3.2 If not why? Mention the reasons.

3.3 If you disagree with the above rule then please mention what should be the minimum space (in sq. ft.) available per student?

In urban school	In rural school

- 4.1 Government rule states that the sanitary facilities attached to the school should be adequate and kept in good order. There should be separate toilet for girls and boys students, and teachers. This rule is not specific. Do you think that toilet-student ratio should be specified?

Yes / No

- 4.2 If yes, according to you what should be the number of students per toilet?

5. As regards potable water it is mentioned that there should have arrangements for supply of potable water in the school. But there is nothing about sources of potable water. According to you what should be the source(s) of potable water?

Urban area	Rural area

6. Before according recognition does the authority verify whether the schools have fulfilled the required conditions?

In all cases	In some cases	Not at all
--------------	---------------	------------

7. Do you think that the authority accords recognition to the school, relaxing conditions due to unavoidable external pressure?

In most cases	In some cases	Not at all
---------------	---------------	------------

8. What measures you suggest to get the conditions fulfilled before, according recognition?

9. Enclosed, please find two proposed School Plans – one for rural and the other for urban schools. Do you consider them appropriate for schools of Bangladesh?

Yes / No

10.1. Do you suggest any modification in the proposed plans?

Yes / No

10.2. If yes, please give your suggestions.

Signature of interviewer

Date ;

Signature of interviewee

Date :