CPD
Centre for
Policy Dialogue

United Nations
Population Fund

Paper 8

PROJECTION OF POPULATION, ENROLMENT AND COSTS TO THE STATE OF PRIMARY, SECONDARY AND HIGHER SECONDARY EDUCATION IN BANGLADESH FOR THE PERIOD 2000-2020

Kazi Saleh Ahmed

Price Tk. 100.00

CENTRE FOR POLICY DIALOGUE

House No 40/C, Road No 11, Dhanmondi R/A, GPO Box 2129, Dhaka-1205, Bangladesh
Tel: 8124770, 017521580; E-mail: cpd@bdonline.com
Website: www.cpd-bangladesh.org
July, 2000

CPD-UNFPA Publication Series

It is now widely recognised that there is a need to take the scope of the population policy in Bangladesh beyond the confines of achieving population stabilisation through reduction of fertility. Although in recent years the approach to reduction of fertility has changed from narrow family planning to a broad based reproductive health approach, it is being increasingly felt that Bangladesh's population policy should encompass other equally important issues which have wide implications for the development process and the quality of life of people of Bangladesh. To address some of the related pertinent issues the Centre for Policy Dialogue has initiated a programme which aims at undertaking a series of studies covering the broad area of **Population and Sustainable Development.** The major objective of these studies is to enhance national capacity to formulate and implement population and development policies and programmes in Bangladesh, and through close interaction with the various stakeholder groups, to promote advocacy on critical related issues. The programme which is scheduled to be implemented by the CPD between 1999 and 2002 shall address, *inter alia,* such issues as population dynamics and population momentum and their implications for education and health services, the nexus between population correlates, poverty and environment, impacts of urbanisation and slummisation and migration, as well as human rights. The study has benefited from generous support provided by the United Nations Population Fund (UNFPA). The programme also envisages organisation of workshops and dialogues at divisional and national levels and also holding of international thematic conferences.

As part of the above mentioned CPD-UNFPA collaborative programme the CPD has planned to bring out a series of publications in order to facilitate wider dissemination of the findings of the various studies to be prepared under the aforementioned CPD-UNFPA programme. The present paper on the theme of ***Projection of Population, Enrolment and Costs to the State of Primary, Secondary and Higher Secondary Education in Bangladesh for the Period 2000-2010*** has been prepared by Professor Kazi Saleh Ahmed, Former Vice Chancellor, Jahangirnagar University.

Assistant Editor: *Ms Ayesha Banu*, Coordinator (Dialogue & Communication), CPD
Series Editor: *Professor Mustafizur Rahman*, Research Director, CPD

CONTENTS

ACRONYMS AND ABBREVIATION

ADB	:	Asian Development Bank
ADP	:	Annual Development Program
ATEO	:	Assistant Thana Education Officer
BANBEIS	:	Bangladesh Bureau of Educational Information and Statistics
BIDS	:	Bangladesh Institute of Development Studies
BBS	:	Bangladesh Bureau of Statistics
BISE	:	Board of Intermediate and Secondary Education
BOU	:	Bangladesh Open University
BRAC	:	Bangladesh Rural Advancement Committee
CBR	:	Crude Birth Rate
CDR	:	Crude Death Rate
CLA	:	Continuous Learning Achievement
CMWRA	:	Currently Married Women of Reproductive Ages
CPA	:	Continuous Pupil Assessment
CPE	:	Compulsory Primary Education
CPEIMU	:	Compulsory Primary Education Implementation Monitoring Unit
DNFE	:	Directorate of Non-Formal Education
DOS&HE	:	Directorate of Secondary and Higher Secondary Education
DPE	:	Directorate of Primary Education
DPEO	:	District Primary Education Officer
DSE	:	Directorate of Secondary Education
DSHE	:	Directorate of Secondary and Higher Secondary Education
ECCED	:	Early Childhood Care, Education and Development
ECD	:	Early Childhood Development
ECE	:	Early Childhood Education
EFA	:	Education for All
FFE	:	Food for Education
FFYP	:	Fourth Five Year Plan
FSSAP	:	Female Secondary School Assistance Program
FY	:	Fiscal Year
GDP	:	Gross Domestic Product
GEP	:	General Education Project
GER	:	Gross Enrolment Ratio
GNP	:	Gross National Product
GOB	:	Government of Bangladesh
HDI	:	Human Development Index
HSC	:	Higher Secondary Certificate
HSE	:	Higher Secondary Education
IDA	:	International Development Association
INFEP	:	Integrated Non-Formal Education Program
MEP	:	Mass Education Program
MOE	:	Ministry of Education
NAEM	:	National Academy for Educational Management
NANFE	:	National Academy for Non-Formal Education
NAPE	:	National Academy for Primary Education
NCTB	:	National Curriculum and Textbook Board
NFE	:	Non-Formal Education
NFPE	:	Non-Formal Primary Education

NGO	:	Non-Government Organization
NER	:	Norwegian Agency for Development
NPA	:	National Plan for Action
NRR	:	Net Reproduction Rate
PC	:	Planning Commission
PCU	:	Project Coordination Unit (GEP)
PMED	:	Primary and Mass Education Division
PTI	:	Primary Training Institute
SIDA	:	Swedish International Development Authority
SMC	:	School Management Committee
SSC	:	Secondary Education Certificate
TEO	:	Thana Education Officer
TFR	:	Total Fertility Rate
TNO	:	Thana Nirbahi Officer
UNDP	:	United National Development Program
UNESCO	:	United Nation Education, Scientific and Cultural Organization
UPE	:	Universal Primary Education
WB	:	World Bank
WCEFA	:	World Conference on Education for All
WID	:	Women in Development

EXECUTIVE SUMMARY
RECOMMENDATION AND POLICY IMPLICATION

INTRODUCTION

All the indicators reflecting socio-economic scenarios of Bangladesh reveal that Bangladesh ranks quite low compared with other countries of the world. The social indicators point to the importance of education particularly of female education since education has been unequivocally considered the most important investment in developing human resource and improving reproductive health of the population.

Bangladesh made remarkable success in education sector during the last two decades. Between 1980 and 1998 enrolment in primary education doubled from 8 million to 18 million, revealing the pressure for expansion of facilities. On the other hand Bangladesh has been approaching to the point of reaching replacement level fertility, hopefully on some date between 2005 and 2015. The trend in school age population in near future will change its direction and is expected to drop significantly by 2020, relieving the pressure for expansion. This indicates that the investment can be redirected towards improving the quality of primary education first and then of secondary and higher secondary education.

In the past secondary and higher secondary education received less investment compared to primary education. Because of higher completion rate at primary level and also higher transition rate from primary to secondary and secondary to higher secondary the two sectors are now under pressure for immediate expansion. But the available data on efficiency (continuation, dropout, repetition, pass percentage) reveal that wastage is highest in HSE, higher in SE and lower in primary education. Many factors are associated with colossal wastage. Teaching and evaluation systems are principal sources of wastage. These systems have virtually remained unchanged for more than 150 years, needing immediate reform.

Although expenditure on education has been increasing, it still lags behind most Asian countries. Expenditure on education must increase substantially to improve the internal efficiency and minimize colossal wastage in education sector.

BACKGROUND OF THE STUDY

Research study on education reveal that investment in human capital has much higher return and dividend than investment in capital or physical infrastructure.

Bangladesh has 130 million population and the vast majority of school and college age population constitute the potential seekers of learning places in the near future as the government is determined to bring all school age children to education. To tackle the multifarious problems with scarce resources educational system must be planned. They must be planned to serve the major economic and social objectives of the society. Planning needs examination of available data on school age population, enrolment, dropout, repetition, continuation, resources available and projection of needs and associated cost for primary, secondary and higher secondary levels in Bangladesh.

OBJECTIVES OF THE STUDY

The basic objective of the present study, as stated in the study proposal and inception report, is to establish linkage between future size of school age children and enrolment and based on the relationship assess the basic needs of primary, secondary and higher secondary education. The specific objectives of the study are:

i. To provide estimates of population for the period 2000-20.
ii. To make projection of school age children 6 to 17 years for the period 2000-20.
iii. To make projection of enrolment by primary, secondary and higher secondary education.
iv. To make an analysis of future trend of dropout and retention; and highlight the consequences of dropouts on the enrolment projection.
v. To assess the basic needs.
vi. To project the costs to the Government of Bangladesh.
vii. To provide policy implications related to future planning.

METHODOLOGY, SOURCES AND QUALITY OF DATA

The study has been implemented through trend analysis of important indicators: population size and structure, enrolment, efficiency parameters and public expenditures on education. Different methods were adopted to establish relationship between variables and for projecting the trend.

The required data were obtained from Bangladesh Bureau of Statistics, Planning Commission, Primary and Mass Education Division, Directorate of Primary Education, World Bank Reports, Bangladesh Bureau of Education Information Statistics (BANBEIS). Research Reports of various organizations were also used.

Detailed investigations of data published by different agencies reveal that reported data suffer from various types of errors. The magnitude of error is highest in higher secondary, higher in secondary and small in primary education sector. While substantial improvement is reported in the quality of data on various aspects of primary education, primary school data still vary from one source to another. Consequently, there still is a great concern about validity. For planning purposes, the problem manifests the need to fill up data gaps with plausible estimates.

INTERACTION BETWEEN POPULATION AND EDUCATION

The past trends in fertility and mortality have resulted in a bulge in the proportion of people in the prime reproductive ages. Although Bangladesh is expected to achieve the replacement level fertility within the next 10 years, the growth will continue due to population momentum. Currently 38% of population are children and 52% are in the reproductive ages. The size and structure of population will continue to change because of large size of women in the reproductive ages and population momentum. Consequently the size and structure of school age population will continue to change. These changes are shown in Table 2.1, 2.2 and 2.3. The trend of population size and its component served as useful input for projecting future demographic scenario.

POPULATION PROJECTION

Section 2.2 elaborately discussed different methods generally used for population projection. Different organizations made population projections under different assumptions on TFR and other parameters related to population dynamics. The future population size under different assumption by BBS, SMSHD, WB, UN and BANBEIS are given in Table 2.5. The paper made a critical review of the projections of different organization and argued that the projection provided by WB (first set) is more realistic and would serve our purpose better than any other projection. The WB projection shows that the population of Bangladesh would be 172.9 million in the year 2020.

The projection provided 5 year age group population. Using Sprague multipliers, we estimated single age population for age 6, 7, …, 18, 19 for 2000, 2005, 2010, 2015, 2020 (Table 2.7). The estimated school age population for primary, secondary and higher secondary are given in Table 2.8.

ENROLMENT PROJECTION

Population and education are interactive. The actually enrolled population depends on a number of interdependent factors. Age group population is the kingpin of all factors that determine the level of participation. The level of enrolment in primary and the efficiency of this subsector determine the level of pressure the post primary education sectors will have in future. Education itself influences the dynamics of demographic variables.

Section 2.4 provides elaborate discussion on how to arrive at the estimates of enrolment figure. The problem of using standard methods are also discussed. It enumerated type of data for arriving at most reliable estimates. PMED is yet to develop database facilitating the use of standard methods. It is often desirable to make several projections using different assumptions on the rates to derive the implications of future development of the parameters. The final projections selected for the plan is usually the one which is consistent with other projections.

On the basis of available data we made three projections: one under linear growth, the second under exponential growth and the third using the relationship between GER and NER given that the maximum value of NER = 100.

For primary education, three projections are made. The three projected enrolment series and the projection made by SHD of Planning Commission are given in Table 2.8. The paper provides justification for the selection of projection series based on GER. As regards gross and net enrolment of post primary education data quality is very poor. Being constrained only linear and exponential projections are made of enrolment at secondary and higher secondary levels for 2000-2020. Comparing our sets with projections made by Planning Commission we considered that the projection under linear growth model would be more realistic for secondary and higher secondary education enrolment. However, the assumptions, that the past pattern and behavior of the variables concerned will continue during the period, may be questionable.

Net enrolment ratio at primary level would be 100 for girls in 2010 and for boys in 2017. Thus enrolment at primary level is likely to cover all school age children in 2017. Enrolment at secondary level, is likely to cover 96 percent of all eligible children of age 11-15 years, while enrolment at higher secondary level is likely to remain low, nearly 40% of all eligible children of age 16-17 years.

It is thus clear that Bangladesh will achieve education for all primary school age children before 2017, and also that the school age children would remain static since 2020. The static situation of school age children for secondary education will be delayed by some more years, sometime after 2020 and that for higher secondary education after 2-3 years later.

EFFICIENCY IN PRIMARY, SECONDARY AND HIGHER SECONDARY EDUCATION

Primary Education

In 1998, there were 63534 institutions which imparted primary education to 18.36 million children of age 6-10 years. The teachers involved were 309593. Types of institutions which impart education is given in Table 3.1.

The growth of enrolment has been 5.2% per annum during 1991-98 period. The growth of girls enrolment has been spectacular, 6.1% per annum during 1991-98 period. Parallel growth has been observed in case of teachers and institutions during 1991-98 period. Bangladesh made significant progress in terms of enrolment. In 1998, the gross enrolment ratio was around 107 while net enrolment ratio was nearly 80 percent. The difference is expected to be reduced in future.

The available data on promotion rates by grade show that the performance has been improving over time, yet there is enough scope for improvement.

Comparing class-wise repetition rates of 1998 with those of 1990, we observe no improvement over time, this situation rather worsened for lower grades (I, II, III).

Commendable success has been observed in case of dropouts too. The dropout rate decreased from 59% in 1991 to 27% in 1998. If the process continues it is expected that dropout rate would come down to the minimum level.

Factors associated with the improvement in the primary subsectors are: (a) Introduction of compulsory primary education; (b) Introduction of Food for Education Program; (c) Supply of educational materials to students free of cost; (d) development of facility and (e) increase of demand for education.

Secondary Education

Junior secondary and secondary schools impart education consisting of grade 6-10. The available data show that number of institutions, enrolment, teachers have been increasing persistently during the last decade. The annual growth rate for institutions was 2.5%. 9.1% (13.6% for girls) for enrolment, 3.5% for teachers and 10.6% for gross enrolment ratio. As regards enrolment, the achievement has been remarkable. If the present trend continues, then secondary school institutions would be able to cover all children of age 11-15 in 2007. Compared to growth of enrolment, the growth of facility, teachers and institutions was negligible. This disproportionate growth has had adverse impact on the quality of education. Promotion rates by grades, as important parameters to measure efficiency, have been improving over the time (Table 3.7), currently 86% or more. If more efforts are provided it would be possible to achieve 100% promotion rates by 2005.

The SSC examination pass percentages reveal the presence of large scale wastage in secondary education. The average wastage is more than 50% every year.

Another progress area in SE is the repetition. Within 5 years, the repetition rates came down to only 5% in 1996. If the present trend continues, the repetition would not exist after 2002 AD.

Dropout was and still is a major source of wastage in secondary education sector. Cohort dropout rates (Table 3.9) show that the rates are still very high.

Higher Secondary Education

Boys and girls of age 17 and 18 constitute the students of grade 11 and 12 of higher secondary institutions: intermediate colleges and degree colleges. Gross enrolment rate has been very high compared net enrolment rate because boys and girls of 16, 19, 20, 21 also are the students of the colleges.

The performance of this subsector has been very poor in the past, pass percentage in HSC examination is about 40% on an average. The available data show that the institutions which offer HSE have been increasing over time. The annual growth rates were 14% for intermediate colleges and 5% for degree colleges. It is quite interesting that growth of institutions and teachers surpassed the growth of enrolment (Table 3.10). Irregular growth of enrolment has been due to large scale variation in the SSC pass rate. Growth of girls enrolment was faster (9.4%) than the growth of boys enrolment (4.9%).

The HSE enroll only 19% of boys and girls of age 17 and 18. If the current growth of GER and NER continues, it would take many years to cover all the eligible boys and girls. The success of this sector depends on the performance of secondary education also.

This subsector has been neglected for years. The base statistics in respect of enrolment, repetition, dropout, promotion are inadequate and incomplete and also less reliable. BANBEIS collects data on HSE regularly, but provided data on efficiency parameters only for 1993 and 1994.

There was a slight improvement in respect of promotion rate (Table 3.12). The variation of promotion rates between classes was quite significant. Class wise promotion and HSC performances are the two major areas of intervention for improving the efficiency of this subsector.

Repetition in both 11 and 12 classes, particularly in grade 12 is quite high, higher for girls of grade 12. Available data show no sign of improvement.

Dropout rates are highest in HSE institutions, nearly 38 percent in a span of only 2 years. The rate is alarming. Remedial interventions are urgently required.

NEED ASSESSMENT AND TOTAL GOVERNMENT COST

The government provides funds to meet the total cost of government institutions and part of the total cost of the private institutions through grant. The revenue budget of the government for the education sector includes expenditure on salaries and allowances of all staff of government institutions and salary support to the staff of non-government institutions. The paper provided projection of future requirement only of teachers, classrooms and the total cost of the government. The requirements are worked out on the basis of project enrolment and some related parameters estimated from other studies.

Teacher Requirements

The problems of using methods other than the teacher-student ratio have been discussed. While making projections two ratios: 1:40 and 1:50 were used in case of primary education. The observed teacher student ratio in 1997 was 1:57.

The projection of primary school teachers are shown in Table 4.1. In order to have R = 40, the total teachers requirement would be 422500 and with R = 50, total requirements would be 338000. During 2000-2020, total additional teacher requirement would be 126008.

In 1997, the observed teacher-student ratio for the secondary education was 1:39. While working out teacher requirement we used R = 30 (1:30). Accordingly the total teacher requirement in this sector would be 483333. The additional teacher requirement over actual 1997 figure comes at 326256.

The observed teacher student ratio was 1:20.4 in 1997 in higher secondary education. A constant teacher student ratio of 1:20 is assumed to estimate both observed and projected requirements. It is found that a total of 1235000 teachers would be required in HSE. This means that an additional 80076 teachers would be required over the number of 1997.

Classroom Requirement

The projections of classroom requirements are made only for primary and secondary education. The reasons for not making estimates for HSE are discussed. The algorithm of calculation has been elaborated.

In primary education subsector a total of 342000 classrooms would be required. The total classroom observed in 2000 is 184722. So a total of additional 157278 classrooms would be required in 2020 AD. It appears that a total of 60000 primary schools, each with 6 classrooms would be enough to meet the future requirement of primary education.

In case of secondary education the total additional classrooms requirement in 2020 would be 179600 (Table 4.5). The recommendation was to construct 2 additional classrooms in all existing schools and the remaining classrooms would be available by establishing 15200 new schools each with 10 classrooms.

GOVERNMENT EXPENDITURE ON PRIMARY, SECONDARY AND HIGHER SECONDARY EDUCATION

In Section 4.3, we have examined the fiscal aspect of the three subsectors in terms of public expenditure. Between 1991/92 and 1997/98 public expenditure for education has increased by 14% annually, hut in real terms the growth was about 9%.

The resource allocation to education in Bangladesh has been very low, only about 2.3% of GNP and lags behind the Asian average of 4.4%. The total revenue expenditure on education accounted for an average 12% of government total revenue expenditure and the total development budget also accounted for nearly 13% of the development expenditure during the six years between 1992 and 1998.

Primary education sector receives highest proportion of total budget for education sector. In the revenue budget the share of primary education and secondary education were 44 and 44% respectively in 1997/98. These shares in development budget in 1997/98 were 54% and 36% respectively.

Based on the annual growth rate of 5% and the cost per student Taka 1204 in 1997, the total government expenditure in primary education as estimated could be 21.05 billion in 2000 and 62.5 billion Taka in 2020 AD.

Based on the available data we estimated the cost per student in secondary and higher secondary for the year 1997, which was Taka 2382. This along with 5% inflation for each year beginning from 1997 served as basis for estimating total cost for secondary and higher secondary education sectors. The estimated total cost is 22.72 billion Taka for 2000 and is 168.41 billion Taka for 2020. The average annual growth would be 10.5%. This growth is the consequence of concurrent growth of per student cost (5%) and also growth of enrolment (5.2%).

RECOMMENDATION AND POLICY IMPLICATIONS

Our work was based on secondary data, drawn mostly from BBS, BANBEIS, Planning Commission and other organizations dealing with population and educational matters. While using them we faced enough problems. Data are not available in the form we wanted them to be or they were inadequate and inconsistent and partly available. Our recommendations are that: these organizations should provide special efforts to make their data more reliable; should enhance cooperation among them to see that the data produced by them are consistent.

One thing is clear that for projections and establishing relationship between indicators we also need primary data. In our opinion this is very important and we recommend that the relevant authorities give immediate attention to develop systems to collect primary data systematically.

The sooner appropriate measures are taken to remove these kinds of data gaps, the better will be the policy in terms of developing planning for the education sector of Bangladesh. We want to emphasize that a national data bank is urgently needed. This data bank can be developed by collecting comprehensive data through well-designed sample surveys on a national scale, separately for each level of education.

In order to monitor the changes over time, to up-date the data bank and to establish linkage between the subsectors there should be well-designed longitudinal surveys to be conducted at some regular interval (preferably at 2-3 years interval). The findings would be very useful for the appropriate policy matters. We want to reiterate that timely and appropriate data on a comprehensive basis can not have any substitute for proper planning in the education subsectors of the country.

In order to be able to use alternative methods for projections of enrolments for all grades, data on size of new entrants in grade 1, promotion, repetition, dropout rates by grades, transition rates from one subsector to another subsector disaggregated by urban-rural and types of institutions are very important. Unfortunately the available data do not cover all the areas. Our recommendation is that DPE and BANBEIS should work together to create database.

The impact of interventions for reducing fertility was evident. The TFR has been decreasing rapidly and is expected to reach the replacement level within 5-15 years. It is recommended that the present programmatic interventions should continue and for further success new interventions should be found out through operation research.

Analysis of past data reveal that the planning process in primary, secondary and higher secondary education subsectors was defective. Basic facility compared to enrolment was lacking not only at the institutional level but also at the national level. Government should develop mechanism to ensure that each institution has the minimum facility (teachers, space, teaching materials) for the stipulated number of students.

Promotion, dropout rates, repetition rates of primary education show that the efficiency of primary education has been increasing over time. Yet the situation has not reach the satisfaction level. In order to improve further it is recommended that the causes should be investigated and measures to minimize them are worked out.

In secondary and higher secondary education, the growth of girls enrolment surpassed that of boys enrolment. This is a good sign. The slow growth rate of boys should not be overlooked. It is time to think that boys do not fall far behind girls.

The internal efficiency parameters show that wastage due to high dropout, repetition, SSC and HSC results in secondary and higher secondary, have been reducing but still very high, particularly due to low pass percentage in SSC and HSC. Some measures, particularly reforms of teaching and evaluation methods should be worked out and implemented without further delay.

The paper made need assessment of the three subsectors for the period 2000-2020 AD. The assessment of requirements would be very useful for future planning of the three subsectors.

There is a hope against hope that Bangladesh will achieve replacement fertility by 2005. In that case the population will continue to grow another 30-35 years before stabilizing the population around 160-165 million. If NRR = 1 is delayed to 2010, as assumed in this paper, the growth of population will be higher. But in the long run, in 1950 or around the population will be around 160 million.

It is hoped that the replacement level fertility will be reached in 2010. This will be true if the present fertility decline continues. But if there are any lapses in the health, family planning and education interventions, the consequences would be severe. Thus if we fail to sustain the existing benefits of the programs, we will pile up problems for our children.

To achieve prevalence rate (CPR) required to reach the replacement level fertility, new programs to meet the unmet demand of CMWRA and also to create demand among CMWRA who have developed apathy to become users of contraceptives must be evolved through operation research. These probably will require basic structural change involving such matters as the educational status, empowerment of women, infant and child mortality reduction and improved economic condition (World Bank, 1992). Thus to achieve sustainable population growth it is imperative to reach NRR = 1 as early as possible. This implies that strengthening the operation research programs for reducing the population momentum should continue.

Besides, promoting female education beyond primary level should be given top-priority because investment in female education generates higher rate of return.

The rapid decrease in total fertility has had impact on the age structure of the population. The changes are taking place in favour of lower age group population. The lower size of population under 20 will continue to decline. This would imply lower social costs such as less expenditure on education, health and better living. This also suggest that in future the demand for higher education will be reduced.

The constant enrolment size of primary, secondary and higher secondary education after 15, 20, 22 years respectively will turn out as a boom. The education sector will be relieved from pressure of increasing enrolment. This will facilitate release of resources that could gainfully be utilized for improvement of quality education, internal efficiency and facility in the education sector.

The increase in enrolment, attendance and reduction in dropout, repetition and decline in percentage of fail in SSC and HSC will ultimately improve the efficiency of education sector as a whole resulting in the reduction of wastage in education.

The social effects of the improvement of efficiency would soon be visible. The gender disparity will disappear. It will increase the age at first marriage, age at the first pregnancy, the use of contraception. All these have direct impact on fertility.

Educated parents, particularly mothers, regardless of their socio-economic status would be able to take care of children better than before, able to help their children to prepare their home works and maintain a decent living.

PROJECTION OF POPULATION, ENROLMENT AND COSTS TO THE STATE OF PRIMARY, SECONDARY AND HIGHER SECONDARY EDUCATION IN BANGLADESH FOR THE PERIOD 2000-2020

1. Introduction, Objectives and Methodology

1.1 Introduction

Bangladesh is a very small country of 147570 square kilometer of deltaic low flat fertile land. The population of the country was estimated at 129.60 million with population growth rate 1.6 percent per annum, with sex ratio 106 males per 100 females and density of 878 persons per square kilometer. The country is predominantly rural (80 percent of her inhabitants live in the rural area). Bangladesh is one of the poor countries in the world, with a per capita income of about $ 272 (1997). Bangladesh economy is still agrarian as 32 percent of the GDP originates in the agricultural sector. The proportion of people living in hard core poverty has, however, been reduced from 26.9 percent in 1986 to 25.1 percent in 1996. Despite the above adverse situation, it has had one of the most successful population program in South Asia. The population growth rate and the TFR have been decreasing sharply and approaching the replacement level. The benefits can be seen in declining school age population projection. By 2020 there will be over 1.6 million fewer children in primary and secondary school age children (6-17 years) than in 2000. Still the population will continue to increase even after attainment of the replacement level fertility due to population momentum. The population will reach 170 million by 2020 leading to 1200 people per square kilometer – a 37 percent rise of the level of 1999. Bangladesh has been showing impressive progress in increasing child immunization rate from 10 percent to 70 percent in the 1990s. The infant mortality rate is still high, 78 per 1000 live births. Malnutrition among the children has been acute; currently about 70 percent of the children below age 5 are underweight and nearly 90 percent of all children suffer some degree of malnutrition. The maternal mortality rate (887 per 1000 live births) is one of the highest in the world. These social indicators point to the importance of education particularly of female education since education has been unequivocally considered as the most important investment in developing human resource and improving reproductive health of the population.

1.2 The Education Scenario

In 1971, when the country got her independence, the literacy rat was only 17.61 percent. Initially the progress was very slow. The adult literacy (population 15+) increased from 25.8 percent in 1974 to only 29.2 percent in 1981, 35.3 percent in 1990. The country made commendable progress during 1990s. The PMED estimate of adult literacy rate for 1998 was 56 percent (male 65, female 46) and gender parity index 71 percent. The number of adult illiterates were 42 million in 1990 and 33 million in 1998.

The latest official statistics of the number of institution, enrolments and teaching staff at various levels are given in Table 1.1.

Table 1.1: Number of Institutions, Enrolments and Teaching Staff at Different Levels in Bangladesh

Level of Education	Year	Number of Institutions	Enrolment			Teaching Staff		
			Male	Female	Total	Male	Female	Total
Primary	1998	63534	9576942	8783634	18360576	212907	96686	309593
Junior High Schools	1998	3517	341190	399478	740668	19490	2387	21884
Secondary Schools	1998	22093	2911536	2580578	5492114	117540	20228	137768
Intermediate	1998	1130	146077	109740	255817	15895	4068	19963
Cadet College	1998	10	2685	320	3005	235	37	272
Degree Colleges	1998	768	787468	325681	1113149	22724	4787	27511
Madrasha	1998	118	2107444	2317	2109761	94922	1691	96613
Universities	1998	27	51388	16419	67807	3400	615	4015
Public		11						
Private		16						

Source: For Primary Education – Primary and Mass Education Division, Education for All 1999
Bangladesh Bureau of Education Information and Statistics
Bangladesh Education Statistics at a glance

It is pointed out that junior high schools and high schools have in general attached primary schools. The total number of institutions providing higher secondary education was 1908 including cadet and degree colleges. Remarkable success has been observed in all levels, particularly in primary and secondary education, especially in terms of increased enrolment of girls and recruitment of female teachers. The gender parity index of enrolment is increasing and in junior high schools it has already surpassed one, meaning more girls than boys. Between 1980 and 1998, enrolment in primary education doubled from 8 million to 18 million, revealing the pressure for expansion of educational facilities. The school age population in near future will reverse the trend, and expected to drop significantly by 2020, relieving the pressure for expansion. This indicates that the investment can be redirected towards improving the quality of primary education first and later on of secondary education. In the last two decades the government efforts were mainly for primary education and it appears that the investment in primary education resulted in building a comprehensive network for sustained development. Secondary and higher secondary education is important complement to social productivity and human resource development objectives. Unfortunately this sector remained unattended, received less investment compared to primary education, but is under pressure because of high transition rate from primary to secondary and secondary to higher secondary.

All the available records highlight to the magnitude of high wastage in education. At the primary level, as per Campaign for Popular Education Report 1999, the cumulative dropout rates, repetition, grade to grade annual promotion rates are 27%, 8% and 87% respectively. The attendance rate of primary school students was 59% for all enrolled and 62% for all regular students (adjusted for dropouts).

The secondary education school age children's participation rate is only 30%. At secondary level the dropout rate is as high as 47%. The magnitude of wastage at secondary level is also high, only 8.3% of the total age group population graduate at secondary level. Gender disparity at the secondary level is most startling. Secondary education has been predominantly the privilege of urban sector and of socially advantaged class of people.

Although the participation of the 17 and 18 year old age group in HSE has been increasing rapidly, the wastage is even more higher in HSE. The transition rate of SSC graduates to HSE is about 80%. The dropout rate was 35% in 1995 and the survival rate was 93%.

Another major source of wastage in education is large scale failures in the public examination. The percentage of pass of the students taking part in the examinations held during 1988-98 ranges between as low as 24% to as high as 56%. It is evident that thousands of students fail at the examination, and many of them repeat the examination once or more. Table 1.2 gives the results of SSC and HSC examinations.

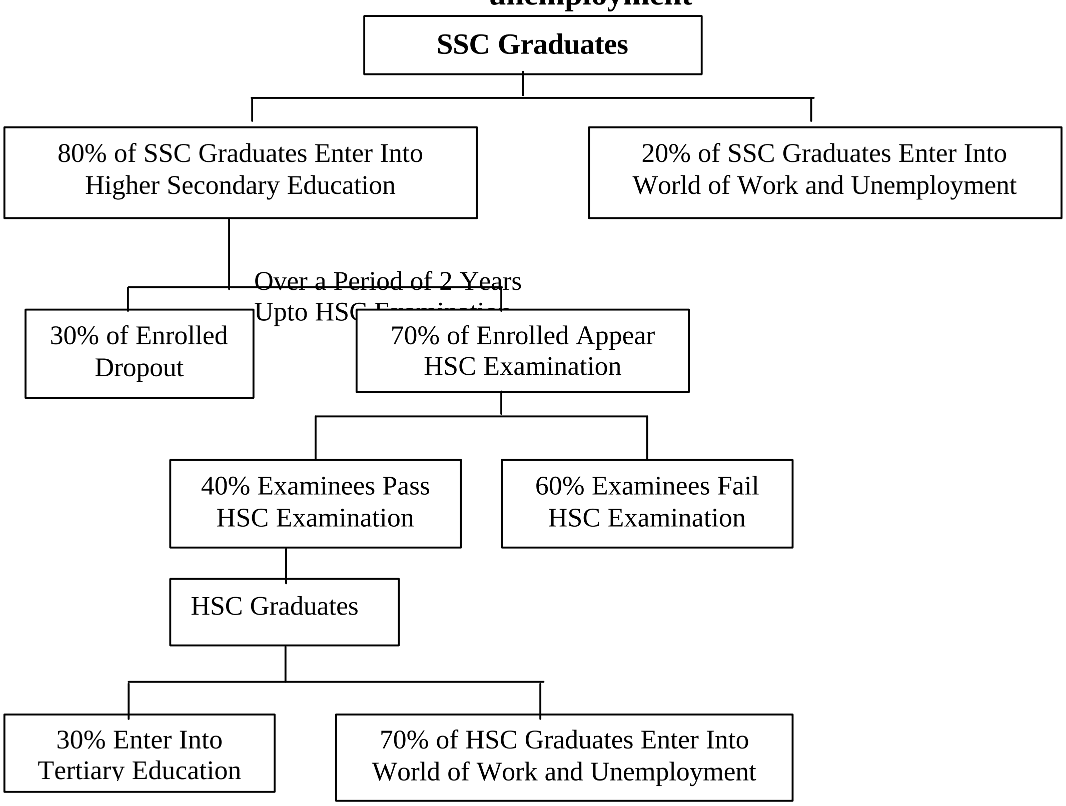
Table 1.2: SSC and HSC Examination Results

Year	**Percentage of Pass in**	
	SSC	HSC
1988	55	44
1989	43	25
1990	32	30
1998	48	46

Source: Boards of Intermediate and Secondary Education

The flow chart shows the flow of secondary school graduates (SSC pass) over a two year period.

Flow* of SSC graduates to higher secondary, tertiary education and world of work and unemployment



Source: NCTB, 1997.

* The flow chart provides average picture of last 5 years or so.

The average pass rate in the HSC examination has been very low in the past. The low rate is due to inadequate preparation of students at schools and is further exacerbated by the poor quality of teaching at the HSE level. Among HSC graduates only 30% enter into the tertiary education system and the vast majority (70%) try to enter into the world of work. They remain unemployed for a long time and then are absorbed in work for which the minimum education required is SSC or even lower. Many factors are associated with colossal wastage. It is now recognized that the teaching and the examination systems which have remained virtually unchanged for nearly 150 years need immediate reforms.

The government has made considerable efforts in the last decade to enhance expenditure on education. The proportion of capital budget allocated to education rose from 3.3% in 1991-92 to 12.8% in 1997-98. The recurrent budget has remained between 10-20%. The resource allocation to education in Bangladesh has been very low, only about 2.7% of GDP and 2.3% of GNP and lags behind the Asian average of 4.4%. One thing is however noticeable that expenditure on education, in absolute terms, has been increasing each year and must increase substantially if the policy of Education for All by the year 2000 and also quality of education at all level is to be materialized. Table 1.3 provides Government Budget on Education.

Table 1.3: Government Budget on Education 1991-92, 1995-96, 1996-97, 1997-98

(Million Taka)

Fiscal Year	Revenue	Development	Total	
			Amount	Percent of 1991-92
1991-92	13816	4368	18184	100
1995-96	21494	13705	35199	194
1996-97	22955	15515	38470	212
1997-98	23428	16505	39933	220

Source: BANBEIS, MOE, Bangladesh Educational Statistics (at a glance), 1999.

The total revenue expenditure on education accounted for 14%, 10%, 11% and 10% of the total revenue expenditure respectively in 1991-92, 1995-96, 1996-97, 1997-98. The development expenditure on education accounted for 8%, 13%, 13%, 13% of the development expenditure respectively in 1991-92, 1995-96, 1996-97, 1997-98.

The Government of Bangladesh has been giving top priority to the programs on human resource development. The GOB has taken a good number of measures towards this end. Bangladesh has introduced the program of Universal Primary Education, Compulsory Primary Education program from January 1992. In addition Compulsory Primary Education Implementation Monitoring Unit (CPEIMU) was also established. A vigorous programs of non-formal and continuing education has been carried out, and for efficient management, a separate Directorate of Non-Formal Education (DNFE) has been established.

Several programs such as Satellite Schools, Community Schools, Food for Education Program, introduction of new curricula, community involvement, Intensive District Approach to Education for All (IDEAL) and teacher's training academic supervision, social mobilization programs have

been taken up in the primary education sector to improve both internal and external efficiency of the primary education sector.
The government has also taken several programs for the improvement of Secondary and Higher Secondary education sector in general and increase of female enrolment in rural areas. Among them the important projects are FSSAP, FSSP, SEDP and FSP.

1.3 Background of the Study

Human resource development is crucial to any program of economic development. Economic development is directly related to the level of education and literacy of a country. All expenditure on education is now well recognized as high yielding investment. The fast economic development of South East Asian countries in the recent past is a clear proof of return from their high level investment in education: the psachropolous study of 32 countries revealed that investment in human capital has much higher return and dividend than investment in capital or physical infrastructure. Its return from investment on primary education is 17 to 32 percent, on secondary education 10 to 32 percent and on higher education 14 to 35 percent. In Bangladesh the issue of access and availability of school places is pre-eminent. Bangladesh has 130 million population and the vast majority of school age population constitute the potential seekers of school places in the near future as the government is determined to bring all school age children to education.

Demographic factors and development of education are interrelated in many ways. There are important causal links in both directions. Population dynamics have a direct bearing on the development of education while educational development affects populational growth and distribution.

Enrolment projection constitute the starting point for studying the effects of population growth and distribution on requirements, since pupil's learning constitute the principal output of educational system and because enrolments provide the basis for estimating the future supply of educated labour as well as the future needs for teachers, classrooms and other facilities. In short educational systems must be planned. They must be planned to serve the major economic and social objectives of the society: efficient economic development, demand for education, the pursuit of social justice, and a greater access to knowledge for its own sake.

With these considerations in mind, the main purpose of this study is to examine the use of past and existing demographic and educational data for planning the development of education, mainly at the primary, secondary and higher secondary levels in Bangladesh.

Once the projection of schools age children, enrolment, dropout and repetitions are made the second purpose would be to make the projection of needs for primary, secondary and higher secondary education and also projection of cost to the state to meet the basic needs.

The first part of the study would be devoted to the projection of population and establish the relationship with planning. The second part would be devoted to examining the projection of enrolment. These would include further analysis of the planning of the supply of teachers, and finally the financing of the educational system up to higher secondary level.

1.4 Objectives of the Study

The basic objective of the present study, as stated in the study proposal and inception report, is to establish linkage between future size of school age children and enrolment and based on the relationship to assess the basic needs of primary, secondary and higher secondary education. The specific objectives of the study are:

i. To provide estimates of population size for the period 2000-20.
ii. To make projection of school age children 6 to 17 years for the period 2000-20.
iii. To make projection of enrolment by primary, secondary and higher secondary education.
iv. To make an analysis of trend of dropout and retention, and highlight the consequences of dropouts.
v. To assess the basic needs.
vi. To project the costs to the Government of Bangladesh.
vii. To provide policy implications related to future planning.

1.5 Methodology

The study was implemented through trend analysis of available data on demographic variables, enrolment data and public expenditure on education. Different methods were adopted to establish relationship and then projecting the trend up to 2020.

1.6 Sources of Data

The required data were obtained from Bangladesh Bureau of Statistics, Planning Commission, the Primary and Mass Education Division, the Directorate of Primary Education, the World Bank Reports, the Bangladesh Bureau of Education Information Statistics (BANBEIS). Research Reports of various organizations were also used.

1.7 Quality of Data

The availability of data sets and their quality are important for any model to reach expected goals. Detailed investigation of the census data in general and of the 1991 census data in particular reveal that census data suffer from various types of errors. The age distribution of 1991 census data indicate that children under five years are over enumerated while women in the adolescent ages 10-14 are under enumerated.

More often than not inconsistencies in the reported data on various aspects of education system in Bangladesh between reporting agencies have been observed. While substantial increase is reported in the quality of data relating to primary school system, primary school data vary significantly from one sources to another. As regards secondary and higher secondary education the situation is even more alarming in respect of content, coverage and quality of data. Consequently there still is a general concern about reliability and validity of data. For projection and planning purposes the problem manifests the need to fill up data gaps with plausible estimates.

2. Interaction Between Population and Education

2.1 Introduction

Population of Bangladesh is estimated at 128.1 million during mid 1999, an increase over 57 million since independence in 1971. Both the size of the population and an average growth rate of more than 2% during the last 30 years served as important impediments to the human resource development. However, thanks to the success of the family planning program, the fertility has been declining faster since 1990s. This has no doubt released pressure on the demand on resource for human resource development.

The past trends in fertility and mortality in Bangladesh have shaped the population age structure in such a way that there is a tremendous inbuilt growth potential. Past high growth rates have resulted in a bulge in the proportion of people in the prime reproductive ages, and the observed improvements in the mortality conditions, particularly among aged population, are expected to accelerate the inbuilt growth. Fertility level in Bangladesh is currently well above replacement level and is expected to come down to the replacement level within 10-15 years. Even if the replacement level is reached within the next 10 years, there will be tremendous growth in absolute terms in the near future. This tendency in growth is termed as population momentum and is identified as the growth potential after reaching MRR = 1. This growth in number is attributed mainly to the large influx of persons in the reproductive age groups as a result of past high fertility rates.

Already, Bangladesh has a higher proportion of female population in the reproductive ages (51.8%) and 38.3% of the female population are children. Because of the large size of women of reproductive age group and consequent of population momentum, the size and structure of school age children will continue to change. The structural change will have direct bearings on the educational planning in Bangladesh.

2.2 The Population of Bangladesh and the Population Growth in Bangladesh

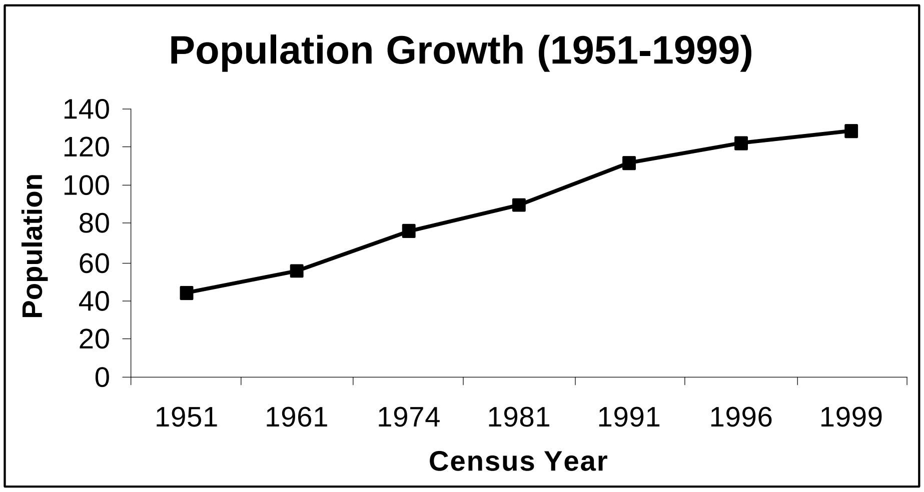
The main sources of information on population size are from censuses, vital registration systems and research reports of government and other research organizations. Census information of Bangladesh is available from the 1951, 1961 census of Pakistan and then the 1974, 1981, 1991 censuses of Bangladesh. Table 2.1 shows the population size and its average annual rate of growth over the period 1951-1999.

Table 2.1: Population Size and Growth Rate

Census Year	Population (Million)	Average Annual Rate of Growth Between Censuses
1951	44.1	
1961	55.2	2.27
1974	76.3	2.52
1981	89.9	2.37
1991	111.5	2.18
1996	122.1	1.83
1999	128.1	1.60

Source: BBS, Bangladesh Data Sheet 1999.

Table 2.1 shows over the 48 years (1951-1999) the population grew by 190%, at an average annual growth rate of 2.25%.



It is evident that the pace of growth has been sharply decreasing. There is tremendous growth potential built in to the age structure. The fertility rate has been decreasing rapidly which may be observed in Table 2.2.

Table 2.2: Crude Birth Rate (CBR), Crude Death Rate (CDR) and the Total Fertility Rate (TFR) 1992-1999

Year	1991	1996	1997	1998
CBR	31.60	25.60	21.03	19.97
CDR	11.20	8.10	5.51	4.81
TFR	4.24	3.41	3.10	2.98

Source: BBS Bangladesh Data Sheet 1999

The age sex composition of population (Table 2.3) by broad age group gives an up-to-date demographic scenario in Bangladesh.

Table 2.3: Age-Sex Composition of Population by Broad Age Group.

Age group	1991		1998	
	Male	Female	Male	Female
0-4	15.7	16.0	10.7	11.2
5-9	16.7	16.5	14.4	14.5
10-14	12.8	11.7	13.4	12.6
15-19	8.5	8.7	7.3	7.1
20-24	7.6	9.4	7.7	9.8
25-29	6.9	3.2	8.8	10.7
30-34	6.3	6.2	7.8	8.5
35-39	5.9	5.3	7.5	6.9
40-44	4.4	4.1	6.5	5.4
45-49	3.5	3.1	4.6	3.4
50-54	3.0	2.9	3.5	2.9
55-59	2.0	1.7	2.2	1.8
60-64	2.2	2.2	2.0	2.0
65-69	1.3	1.2	1.2	1.2
70-74	1.0	0.8	1.0	0.8
75+	1.1	1.0	1.4	1.2

Total	100.0	100.0	100.0	100.0

Source: BBS, Bangladesh Data Sheet 1999.

The statistics given in brief in the foregoing sections provide an up-to-date account of the demographic scenario of Bangladesh. These data would serve as useful input for projecting future demographic scenario.

2.3 Population Projection

Population projections are based on specific assumptions about future changes in birth, death, migration rates. Estimates of the size of the future changes on the vital rates rest on the evidences derived from analysis of past and current trends. These assumptions about the change in the parameters are then applied to the present population structure. Population projections thus show the prospects for the future size and structure of the population, given the present size, and structure and their trends over time.

The trends of population size is often affected by the exogenous factors such s changes in the technology, social behaviour and values, government policies. These changes always exert influences and as a result the trend line shifts the direction.

The analytical report, September 1994, published by BBS illustrates the methodology of the population projection and provided population projection for the period 1991-2021 using 1991 census data.

The methods are: (a) Component method using balance equation; (b) Age-sex cohort component method.

Component Method

The population projection is arrived at by using the following balance equation

$$P_{b+1} = P_b + B_{b+1} - D_{b+1} + M_{b+1}$$

The equation has four components: the base year population P_b, the total births during the interval t (difference between project year and base year), the total deaths during the interval t, and net migration to the country during the interval t. Independent estimate of each component is first arrived at and the population of the projection year is worked out with the help of the balancing equation. The BBS projection data are given in Table 2.4.

Table 2.4: Projection Population of Bangladesh for the Period 1992-2015 Using Component Method

(In millions)

Year	1992	1995	2000	2005	2010	2015	2016
Population	113.1	119.7	129.6	139.1	148.1	156.7	158.3

Source: BBS, Bangladesh Population Census 1991, Volume 1 Analytical Report page 201.

Cohort Component Method

Age-sex cohort component method depends upon the assumptions on the dynamics of the population parameters: dynamics of fertility, mortality, expectation of life, survivorship ratio, migration etc. In the computation process separate projections are made for males and females in the 5 year age bands for each five year interval of the projection period. The number of persons of a given sex and five year age group five years after the base year is obtained by multiplying the base population by age-sex specific survivorship ratios. Algebraically:

$$P_{x+5}^{t+5} = P_x^t . S_{xtox+5}^{t+2.5} + NM_{x+5}^{ttot+5}$$

Where P is the number of persons of a given sex at mid year t in 5 year age group x, S represents the sex specific survivorship ratio of a given sex and NM is the net number of in-migrants during the five year interval.

This method is the standard method for population projection. BBS, WB, PMED, DPE, UNESCO, UN-organizations and Planning Commission use this method for population projection. The projected value depends on the assumptions on population dynamics and it has been observed that different agencies used different assumptions.

Projecting Fertility Schedules

Age specific fertility schedules, which when added up equals TFR, is used for the year when NRR = 1. The total fertility that provides replacement level (TFR = 2.1) is approximated by the quadratic formula.

$$TFR = 6.702 - .1107 e_f + .0006592 e_f^2$$

Age specific fertility for Bangladesh in percent of TFR

Age	15-19	20-24	25-29	30-34	35-40	40-44	45-49
ASFR (%)	7	28	29	22	10	4	1

For a given year when NRR = 1, e_f the life expectancy of females is worked out and age specific fertility rates are worked out by using the distribution.

Life expectancy is projected using a logistic function of the form

$$e_t = (K_o + K)/[1 + \exp\{\log it(e_o) + rt\}]$$

BBS also estimated linear regression line to determine TFR. The estimated equation is

$TFR_t = 5.263631 - .099091t$ where t = 0, for 1980.

The estimation is based on TFR data for the period 1980-1991.

The series of age specific and total fertility rates as obtained from different sources like BBS, BFS, CPS and ICDDR,B surveillance system show that Bangladesh has been experiencing the transition stage of fertility with annual change of TFR as 0.078 points.

Different organizations made population projections under different assumptions on the TFR and other parameters related to population dynamics. In this paper the projections made by different organizations like BBS, the World Bank, United Nation, SHD project of Planning Commission and BANBEIS were examined. The projection of population by different organizations are given in Table 2.5.

Table 2.5 presents two sets of World Bank population projections for NRR = 1 by 2010. The difference in the projections arise different because of different assumptions on the birth rates, expectation of life, IMR CDR, net migration rates etc. These assumptions are well elaborated in the respective chapters of the sources given below the Table.

Table 2.5: Population Size of Bangladesh Under Different Assumption on NRR

(In million)

Year	**BBS**		**SMSHD Planning Commission**		**WB**		**UN Estimate**	**BANBEIS**
	NRR by		NRR by		NRR by			
	2011	2016	2010	2015	2010	2010	NRR by 2005	NRR by 2015
2000			129.2	129.2	132.4	129.1	129.3	132.7
2001	127.9	131.3						
2002								
2005			139.0	139.7	143.4	139.3	138.3	144.4
2006	136.0	141.1						
2007								
2010			147.23	149.6	153.4	149.8	145.1	156.1
2011	144.2	150.6						
2012								
2015			153.38	157.2	163.2	160.5	151.9	167.8
2016		159.7						
2017								
2020			158.74	162.9	172.9	170.4	157.6	180.4 (extrapolated)
2021								
2022								

Source: BBS Analytical Report, 1994
M. Kabir et al. Support for Monitoring Sustainable Human Development, January 1998
World Bank, World Population Projection, John Hopkins University Press, 1994-95

The population size of Table 2.5 reveal that there are substantial differences in the size of the population under different demographic scenario. It has been observed that the fertility decline is quite fast and there is every likelihood that NRR will be achieved by 2010. SMSHD estimates are very much on the lower side. While the BANBEIS estimates are on the upper side. The two WB estimates are in the mid-way of other estimates, and also very close. However, the WB provided estimates (first set) by year ending with 0 or 5 from 2000 to 2050. The paper, in hand, deals with the education sector, and the projections of school age population would be possible from the set. For this reason it has been decided to use for our study the first set of the WB projection of Bangladesh population.

2.3.1 Projected Age Group Population

For the purpose of the present study, the age group population of primary, secondary and higher secondary education are required. The students of primary, secondary and higher secondary thus, constitute a sub-set of population aged 6-17. The WB projected the population by 5 year age groups at 5 yearly intervals (Table 2.6).

Table 2.6: Population Projection of Bangladesh by 5 Year Age Group Up to 20-24, for the Period 2000-2020 AD.

(in thousand)

Age group	**Gender**	**Year**				
		2000	2005	2010	2015	2020
0-4	Boys	8282	8180	7779	7778	7990
	Girls	8017	7906	7508	7497	7692
	Both	16299	16086	15287	15275	15682
5-9	Boys	7960	8086	8034	7654	7668
	Girls	7738	7848	7785	7405	7406
	Both	15698	15934	15829	15059	15074
10-14	Boys	8006	7889	8027	7980	7609
	Girls	7774	7670	7796	7738	7366
	Both	15780	15559	15823	15718	14975
15-19	Boys	8059	7918	7814	7958	7919
	Girls	7652	7687	7601	7732	7683
	Both	15711	15605	15415	15690	15602
20-24	Boys	7234	7917	7795	7704	7857
	Girls	6738	7516	7574	7562	7644
	Both	13972	15433	15369	15266	15501

Source: Edward Bos et al. World Population Projections 1994-95 edition, WB, London.

For projections of enrolment it would be necessary to convert 5 yearly population into single year figures. Although there exist many mathematical equations that can be used in the interpolation process only a few have been commonly employed: Sprague's fifth difference equation, Karupking's third difference equation and Beer's six term formulas. In education Sprague's multipliers are commonly used. In this paper, Sprague's method has been selected. The worked out single year age population are shown in Table 2.7.

Table 2.7: Projected Single Year Age Population of Bangladesh Obtained from 5 Yearly Age Group Population Using Sprague Multiplier

Age group	Gender	Year				
		2000	2005	2010	2015	2020
6	B	1593	1626	1603	1519	1541
	G	1547	1579	1557	1475	1497
	T	3140	3205	3160	2994	3038
7	B	1589	1618	1609	1527	1531
	G	1545	1573	1564	1485	1488
	T	3134	3191	3173	3012	3019
8	B	1588	1609	1612	1539	1524
	G	1545	1565	1568	1497	1483
	T	3133	3174	3180	3036	3007
9	B	1589	1600	1614	1554	1519
	G	1547	1558	1571	1513	1479
	T	3137	3158	3185	3067	2998
10	B	1591	1590	1614	1571	1515
	G	1550	1549	1572	1531	1476
	T	3141	3139	3186	3102	2991
11	B	1592	1579	1613	1590	1511
	G	1552	1539	1572	1550	1473
	T	3144	3118	3185	3140	2984
12	B	1598	1572	1609	1604	1513
	G	1555	1530	1566	1561	1472
	T	3153	3102	3175	3165	2985
13	B	1607	1572	1601	1608	1525
	G	1558	1524	1552	1559	1478
	T	3165	3096	3153	3167	2993
14	B	1617	1576	1590	1605	1544
	G	1559	1519	1533	1547	1489
	T	3176	3095	3123	3152	3033
15	B	1625	1578	1578	1603	1562
	G	1559	1514	1514	1538	1498
	T	3184	3092	3092	3141	3060
16	B	1633	1578	1566	1601	1580
	G	1558	1506	1495	1528	1508
	T	3191	3084	3061	3129	3088
17	B	1628	1580	1557	1597	1592
	G	1545	1499	1478	1516	1511
	T	3173	3079	3035	3113	3103
18	B	1605	1587	1555	1586	1595
	G	1516	1499	1469	1498	1506
	T	3121	3086	3024	3084	3101
19	B	1568	1595	1557	1573	1590
	G	1474	1499	1463	1479	1495
	T	3042	3094	3020	3052	3085

Source: Table 2.6

The school age population for primary education and higher secondary education are presented in Table 2.8.

Table 2.8: Population Projection of Bangladesh for Primary, Secondary and Higher Secondary School Education Age Group

(In thousand)

Age group	Year				
	2000	2005	2010	2015	2020
6-10	15685	15867	15884	15211	15053
11-15	15822	15503	15728	15765	15055
16-17	6364	6163	6096	6242	6191
Total	37871	37533	37708	37218	36299

Source: Table 2.7

2.4 Population Factors in Educational Planning

It is quite evident that level of enrolment in the educational system and demographic factors are interrelated in many ways. It has been shown earlier that, because of high fertility and consequently high growth rate in the past, more than 40% were children and were expected to be students of schools. The effect of high growth was always a burden on the population of working age. The resource constraint was so acute that the government failed to provide minimum facility to all school age children. Because of this realization, all the Government of Bangladesh, regardless of their political ideology have assigned top priority to the population control. Thanks to their endeavour, Bangladesh made a commendable success in family planning and health program and the country is expected to attain replacement level fertility within the next decade. With the change in the demographic scenario there will be corresponding change in the demand for education at all levels. The actually enrolled population depends on a number of inter dependent factors. Clearly the ultimate determinant is the population of school age. The level of enrolment in primary education determines the level of pressure the post primary educational institutions will have in the future.

Education itself influences the dynamics of demographic variables. The causal relationship between education and fertility, mortality, expectation of life, morbidity is very clear. Education directly as well indirectly have positive impact on demographic variables.

2.5 Enrolment Projection

Projections of the future number of pupils enrolled at any level constitute the starting point of educational planning, as they provide the basis of estimating the future needs of schools, classrooms, teachers and other facilities. Enrolment projections inform us about how many would be enrolled at some future time, assuming changes or no changes in the educational system, with past trends continuing unchanged or changed as per educational future plan. The objective of projection would be to develop a basic frame of reference for the future. The projections are determined on many parameters such as growth of school age children, the intake ratio, promotion, repetition, and dropouts rates. Thus any change in the assumptions on the future value of the parameters generally give different projections. In practice projections are carried out both through the extrapolation of trends of the parameters and assuming particular changes in one or more of the others. This simulation process allows the planners explicitly to take into account changes in the educational policy during the period. Hence enrolment projections are best understood as conditional forecasts of new entrants, continuers, repeaters, dropouts, as well as of the future structure of the educational system. Thus, it is evident that four factors: (a) population of admission age; (b) the admission rate to the first grade; (c) the repetition rates at different grades; (d) the promotion rates at different grades are important for projection. The fifth factor, the dropout rate is not independent of other factors, since promotion rate + repetition rate + dropout rate = 1. Thus the validity of enrolment projections depend on how accurately the projections of the four factors mentioned above are made.

In the last section, we provided the projection of school age population separately for the boys and girls for the period 2000-2020 AD. The next step is to project the admission rate of school entry age population. An accurate projection of the new entrants is of crucial importance as this will effect the enrolment in all subsequent grades in the following years. The accurate estimate of promotion, dropout and repetition estimate for the future date are generally based on current trends and government policies on these parameters.

Methods of Projecting New Entrants

As stated earlier the size of new entrant in grade 1 is very important, as this influences the enrolment in all subsequent grades in the following years. Data on new entrants are generally not available. Enrolment data are generally available and in that situation

New Entrants = Enrolment in grade 1 – repeaters in grade 1.

In case of Bangladesh, as new entrants are also function of repeaters, repetition data for grade 1 are indispensable for reliable and consistent projections of new entrants.

If all the new entrants in grade 1 start school at the age of 6 years, then

New Entrants $N_6^t = p_6^t * e_6^t$

New Entrants = Children of age $6(P_6^t) *$ Proportion of children age 6 entering in grade 1 (e_6^t)

But in reality, new entrants of grade 1 constitute children of age 5, 6, 7 and 8.

In that case $N^t = P_5^t * e_5^t + P_6^t * e_6^t + P_7^t * e_7^t + P_8^t * e_8^t$

In case of Bangladesh, new entrants in grade 1 are dawn from age 5 to 8 years. According to PMED eligible primary school population (potential school age population) is estimated by considering all 6 years old children, 10 percent of all 5 years and 7 years children and 5 percent of 8 years children. So it is suggested that the most appropriate approach would be

Number of New Entrants $N^t = \sum_{i=5}^{8} e_i^t p_i^t$

Projection using this formula requires time series data on new entrants by single years of age. However, PMED is yet to develop database facilitating the use of the above formula. Under the given constraints the common approach is the use of the formula

$N^t = P_6^t * e_6^t$ Where $e^t =$ Proportion of new entrants to all population of age 6.

Thus e^t is the apparent intake rate in year t.

In applying the above formula, adjustment must be allowed for repeaters.

Projecting Enrolment by Grade Using the Grade Transition Model

In this model the enrolment in any grade at time t equals the number of students promoted to the grade plus the number of repeaters in the same grade.

Enrolment in grade i in year t

$E_i^t =$ (Enrolment in grade i – 1 in year t – 1)* (Promotion rate of grade i-1 in year t-1)+
(Repeaters of grade i in year t-1)

$E_{i-1}^{t-1} * P_{i-1}^{t-1} + E_i^{t-1} * r_i^{t-1}$

and also

$E_{i-1}^{t-1} = E_{i-1}^{t-1} * P_{i-1}^{t-1} + E_{i-1}^{t-1} * r_{i-1}^{t-1} + E_{i-1}^{t-1} * d_{i-1}^{t-1}$

= (Promoted + repeated + dropout) students of grade i-1 in t-1 year.

It implies for projecting enrolment for any grade we need enrolment data, promotion data of immediate lower grade and also enrolment and repetition rate of the grade for all the years up to the projection year.

Projection of promotion and repetition rates for all the years under consideration is generally not possible due to non-availability of data. In general the following approaches are applied.

i. Using constant rates
ii. Extrapolation of rates

iii. Targets for the future development

It is often desirable to make several projections using different assumptions on the rates to derive the implications of future development of the transition parameters. The final projection selected for the plan is usually the mixture of the three approaches discussed, depending on the data set available to make the projection.

2.6 Projections of Enrolment of Primary, Secondary and Higher Secondary Education in Bangladesh (for the period 2000-2020 AD)

We have elaborately discussed various aspects of enrolment projections in the previous chapter. To be able to use flow models we need to have projected value of entry rates, promotion rates and repetition rates for every grade for all the years of projection. But review of available publications of PMED and DPE reveal that data available for projecting entry rate, grade-wise promotion and repetition rates are either incomplete or lack consistency.

In the previous chapter we have made projection of school age children up to 2020 AD. In this section we would provide enrolment projections up to 2020. The enrolment projection would tell us how many students would be enrolled at a given level of education at points in time subsequent from 2000. Here the basic assumption would be that there would be no change in the system and that the past trends would continue unchanged up to the projection time which is 2020 AD.

The trend in enrolment shows that the growth of enrolment has been faster in recent years than that in 1980s. It indicates that the growth followed exponential during 1990s and before that it followed linear growth. However, due to sharp decrease of school age children after attaining replacement level of fertility, the exponential growth would discontinue. Rather the growth will take a turn to decreasing with the decline in the school age children.

A survey conducted by PMED shows that there is a close relation between Gross Enrolment Rate (GER) and Net Enrolment Rate (NER). Since the maximum value of NER is 100, we can find projection by using the relationship as well as estimating maximum GER when NER = 100.

We made three projections: One under linear growth, the second under exponential growth and the third using the relationship between GER and NER and constant growth of NER from 1999.

The projections under linear growth present conservative estimates, while the projection under exponential growth will give high values given that the population growth eventually will be stopped. The estimates using trend values of NER and GER are expected to give projections very close to what will be the observed sets in future.

The mathematical equations are

A: Linear growth: $E_t = b_0 + b_1 t$

B: Exponential growth: $E_t = a_0 (a_1)^t$

C: GER-NER relationship: $GER_t = b_0 + b_1 NER_t$

and $NER_t = b_0 + b_1 t$

and that max of $NER_t = 100$.

In case of primary, all the projections are worked out, while for secondary and higher secondary, the first two models are used for projections. Lack of reliable data on GER and NER restricted the use of third model for post primary education. Earlier, the population projections at single year interval and for age group 6-10, 11-15, 16-17 were provided in Chapter 2.

2.6.1 Database

In this paper data from Bangladesh Bureau of Statistics (BBS), Primary and Mass Education Division (PMED), Directorate of Primary Education (DPE), Bangladesh Bureau of Educational Information Statistics (BANBEIS), Sustainable Human Development Project (SHD) of Planning Commission, special survey conducted by PMED and other published reports are used. The population projection presented in Chapter 2 provides information on school age cohorts.

While surveying the sources for needed data, we faced enough problems. Sometimes data were not available in the form we wanted them to be or these were inadequate, inconsistent and partly available. It has been observed that data vary significantly from one source to another. Consequently there still is a general concern about reliability and validity of data. Scarcity of the needed data worked as a serious constraint to use grade transition flow models for projections. However, one thing that was crystal clear was the need of primary data. In our opinion, this is a very important finding and merits serious and immediate attention from the relevant authority. The sooner appropriate measures are taken to improve data quality and develop broad database the better will be the estimates essential for preparing development plants for the education sector.

2.6.2 Projections and Their Limitations

A cohort analysis method could have been used. Detailed single age specific cohort data for the past years are required for the method. In the absence of such detailed database we could not use the method. The projections are based primarily using time series data. It is based upon various assumptions that the past pattern and behaviour of a variable will continue in the future. It is also assumed that the education system and management will remain unchanged. But unfortunately, with change of technology and development the situation do not remain static, they change over time. Consequently, all projections however done, are subject to errors. Beyond a few years into the future the uncertainties become so considerable that modern techniques tend to lose their credibility. So one should proceed with adequate care and thought in placing confidence in the projected figures, especially beyond 2005 AD.

2.6.3 Projections of Primary Enrolment

These projections are made for primary enrolment at 5 years interval from 2000-2020 AD. The estimated equations are given below:

A: Linear growth: $E_t^b = 5.607818182 + 0.3717272 * t$

$E_t^g = 4.177818182 + 0.43673 * t$

B: Exponential growth: $E_t^b = 5.828 * 1.04586)^t$

$$E_t^g = 4.509(1.06694)^t$$

C: Linear growth of GER: $GER_t^b = 7.7088 + 1.075217 * NER_t^b$

Adjusted $r^2 = 0.511028$

$GER_t^g = 23.1950 + 0.8594 * NER_t^8$

Adjusted $r^2 = 0.5143$

Annual growth rate of boys, $NER^b (Const) = 1.13993$

Annual growth rate of girls, $NER^g (Const) = 1.16490$

The three project enrolment series and also the projection made by SHD of Planning Commission are given in Table 2.9.

Table 2.9: Projection of Primary Enrolment

(In millions)

Year	Linear			Exponential			Based on GER			SHD (PC)	
	Boys	**Girls**	**Total**	**Boys**	**|Girls**	**Total**	**Boys**	**Girls**	**Total**	**High**	**Low**
2000	10.4	9.8	20.2	10.8	10.4	21.2	7.6	7.5	15.1	14.0	12.7
2005	12.3	12.0	24.3	13.7	14.5	28.2	8.2	8.1	16.3	15.5	11.7
2010	14.2	14.2	28.4	17.3	20.0	37.3	8.6	8.5	17.1	17.3	12.8
2015	16.0	16.4	32.4	21.9	27.7	49.6	8.7	8.2	16.9	19.2	14.2
2020	17.8	18.6	36.3	27.9	38.3	66.2	8.8	8.1	16.9		

Our third projected enrolment data are in between the low and high variant of SHD estimates. The other two estimates linear and exponential do not provide estimates close to real situation, as these did not take account for the rapid reduction of fertility in the 1990s. Comparing our estimates with SHD estimates, we think that the projections based on trend values of NER and GER would be very close to the future scenario.

2.6.4 Projection of Secondary and Higher Secondary Enrolment

Two projections are made for secondary and higher secondary enrolment at 5 years interval from 2000-2020. The estimated equations are:

Secondary Education

A: Linear growth: $E_t^b = 1.5884 + 0.141418182 * t$

$$E_t^g = 0.4246667 + 0.23989697 * t$$

B: Exponential growth: $E_t^b = 1.69359(0.1059748)^t$

$$E_t^g = 0.727276(0.1154185)^t$$

Higher Secondary Education

A: Linear growth: $E_t^b = 0.2778 + 0.0368182 * t$

$$E_t^g = 0.08913 + 0.027048 * t$$

B: Exponential growth: $E_t^b = 0.30775(0.10781^t$

$$E_t^g = 0.120667(0.11184)^t$$

In case of secondary education, projections under linear and exponential growth models and also two projections of SHD (PC), and in case of higher secondary education two projections are given in Table 2.10 and Table 2.11 respectively.

Table 2.10: Projection of Secondary School Enrolment

(In millions)

Year	Linear			Exponential			SHD low			SHD high		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
2000	3.4	3.5	6.9	3.6	4.7	8.3	3.8	2.4	6.3	3.9	2.5	6.4
2005	4.1	4.7	8.8	4.8	9.6	14.4	3.3	2.0	5.3	3.9	2.6	6.5
2010	4.8	5.9	10.7	6.4	19.6	26.0	3.0	1.9	4.9	4.2	3.1	7.3
2015	5.5	7.1	12.6	8.6	40.3	48.9	3.2	2.0	5.2	4.7	3.6	8.3
2020	6.2	8.3	14.5	11.5	82.6	94.1						

Comparison of the four series and considering the rapid increase of primary enrolment particularly of girls resulting in pressure on secondary education and rapid expansion of schools in both rural and urban areas, it may be said that projection under linear growth model would be more realistic for 2000-2020 AD.

Table 2.11: Projection of Higher Secondary Enrolment

(In million)

Year	Linear			Exponential		
	Boys	Girls	Total	Boys	Girls	Total
2000	0.76	0.44	1.20	0.82	0.52	1.34
2005	0.94	0.58	1.52	1.19	0.90	2.09
2010	1.12	0.71	1.83	1.74	1.58	3.32
2015	1.31	0.85	2.16	2.53	2.77	5.30
2020	1.49	0.98	2.47	3.68	4.84	8.52

In case of higher secondary, the linear projection are on the lower side while those of exponential are on the upper side. The scenario to a great extent will depend on the continuation rates in secondary education, pass percentage in SSC examination and transition rates. Considering the slow progress of indicators relating to efficiency and decreasing trend of HSE population, it may be said that linear model would be more realistic.

3. Efficiency in Primary, Secondary and Higher Secondary Education

3.1 Primary Education

3.1.1 Introduction

In Bangladesh, primary education is of five years duration. The official entry age for grade 1 has been fixed at age 6. The children of age 6-10 are supposed to be the students of primary schools. But this is not rigidly followed. According to PMED the gross enrolment rate is higher than the net enrolment rate by more than 20%. Children of age 5, 11 and 13 are also found as students of primary schools. However with the sharp rise of enrolment the difference has been decreasing over time. The Government of Bangladesh has been mobilizing all available resources to attain universal primary education by the year 2000, and to this effect has taken several programs.

The institutions which impart primary education are the government Primary schools, Private schools, Ebtedayee Madrashas, Kindergartens, and NGO operated schools. Table 3.1 shows the number of institutions, teachers and enrolment for 1998.

Table 3.1: Primary Level Institutions with Enrolment and Teachers (1998)

Type of Institution	Number of institution	Enrolment (million)	Teachers
Government primary	37709	11.70	153247
Non-Government Primary	22835	4.56	85942
Ebtedayee and Madrashas and others	2990	2.10	70404
Total	63534	18.36	309593

Source: PMED and DPE official records

3.1.2 Growth of Primary Education

In 1947, there were about 19000 primary schools in the region of Bangladesh. The number rose steadily to 29000 in 1971. The growth rate was 1.77% per annum. After the emergence of Bangladesh the growth was faster. The yearly growth rate was 7.7% during 1972-76. The growth of schools was very slow during 1981-90. The growth rate was 0.85%. The growth rate, however, accelerated and rose to 6.1% during 1991-98.

The growth of primary school enrolment was much faster then the growth of schools. The growth rate of enrolment was 4.6% and 5.2% respectively during 1981-91 and 1991-98 period. The growth of girls enrolment was spectacular. The annual growth rates of boys and girls enrolment were respectively 4.4% and 6.1% during 1991-98.

The growth of teachers showed different trends during 1981-91 and 1991-98 period. During 1991-98, the growth rate was 5.9% while it was only 1.5% during 1981-91 period.

3.1.3 Gross and Net Enrolment in Primary Education

Table 3.2 shows the growth of Gross Enrolment Ratios. The GER for boys grew from 81.2% in 1991 to 98.4% in 1998, with annual growth rate 2.78%. The growth rate for girls was 4.4%.

Table 3.2: Number of Primary Schools, Students, Teachers and Gross Enrolment Ratios

Year	Schools	Enrolment (million)	Teachers	GER Boys	GER Girls	GER Total
1988	45383	11.29	186592			74.8
1989	45707	11.56	189032			72.8
1990	47241	11.94	200056			74.6
1991	49539	12.87	206848	81.2	69.8	75.6
1992	50314	13.22	230380	80.8	71.3	76.2
1993	52886	13.69	257764	81.7	73.4	77.6
1994	56165	15.18	286322	83.1	76.2	79.7
1995	59894	17.28	319097	94.5	89.6	91.9
1996	62769	17.58	324803	91.5	87.7	89.6
1997	63534	18.03	316483	93.5	90.9	92.3
1998	74835	18.36	309593	98.4	94.3	96.5

Source: PMED official data

The growth of GERs during 1990s was spectacular. The survey conducted by CAMPE – “Hope Not Complacency” reveal that the GRE is higher than the DPE estimates. The survey estimates of GER were 104 for boys, 109 for girls and 107 for boys and girls.

The “Education for All 2000” provided estimates on Net Enrolment Ratios. The PMED and CAMPE estimates for 1998 are given below:

Source	**NER**		
	Boys	Girls	Boys and Girls
PMED	80.0	82.9	81.4
CAMPE	76.0	79.0	77.0

It is quite evident that within 5 years, NER will be around 90% and GER to the maximum 110%. Currently GER may be taken around 100% and NER around 80%. The above findings are also consistent with findings of SHD project of Planning Commission. If projections are made using the two values of GER (100 and 110) the projections will provide upper and lower boundary of actual value.

If the present growth continues, then NER for primary school age children will be 100 percent in the year 2017 and GER in 2017 will reach 115%. It has been observed that the growth rate of girls enrolment has been faster, and consequently in 2010 the NER for girls will be 100. The maximum level of GER for girls has been estimated at 109%.

3.1.4 Promotion, Repetition and Dropout in Primary Education

The growth in enrolment, gross enrolment and net enrolment reveal that access to primary education and 100% participation of school age children in education will be achieved in the next 15 years. In this chapter the trend in promotion, dropout and completion rates are examined.

Promotion

The available data on promotion rates by grade show that the performance has been improving over time. Table 3.3 shows that in 1990, the promotion rates varied in the range from 75% to 83%, the highest was for class II students and lowest for class I students. In 1998, the range was 82-90%, the highest was for class II and the lowest was for class I students.

Table 3.3: Promotion Rates by Grade in Primary Education

Year	Grade				
	I	II	III	IV	V
1990	75.3	82.7	77.1	78.6	82.1
1992	77.5	87.5	79.8	86.4	86.1
1994	84.4	85.9	82.2	87.6	91.6
1998	86.9	90.0	82.0	85.0	89.7

Source: PMED and DPE official data for 1990-94
CAMPE – "Hope Not Complacency", 1990 for 1998

This increase in the promotion rates implies decrease in the wastage and rise in the efficiency of the sector.

Repetition

Comparing class wise repetition rates of 1998 with those of 1990 we find that there has been virtually no significant change over the period. The situation worsened in grade I, II, III while improved in IV and V. In order to improve the efficiency of the sector it is recommended that the causes of repetition should be investigated and measures to minimize it should be worked out.

Table 3.4: Repetition Data in Primary Institution

Year	Grades/Sex																	
	I			II			III			IV			V			Average		
	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T
1990	5.7	5.1	5.4	5.2	5.3	5.2	7.3	7.4	7.3	6.8	7.8	7.2	6.8	6.9	6.8	6.4	6.5	6.4
1998	7.0	6.2	6.6	5.9	5.3	5.6	7.0	8.7	8.0	7.3	6.0	6.7	5.9	4.3	5.4	6.6	6.2	6.5

Source: BANBEIS, Education Statistics, 1991 and DPE official records.

Dropout in Primary Education

Table 3.5 provides the trend of dropouts in the primary education sector over the period 1990-98.

Table 3.5: Dropout Rates by Class, Sex, Primary Education, 1990-98

Year	**Grades/Sex**																	
	I			**II**			**III**			**IV**			**V**			**Average**		
	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T
1990	18	21	19	11	13	12	16	15	16	18	8	14	11	11	11	16	14	15
1992			19			8			14			7			8			12
1994			12			10			12			7			3			9
1998	6	5	6	4	5	5	7	7	7	7	6	7	5	5	5	6	6	6
Decrease during the period (in %)	67	76	68	67	64	58	56	53	56	61	25	50	55	55	55	63	57	60

Source: Education Statistics BANBEIS 1991
Education for All 1999, MOE 1999
Hope Not complacency CAMPE, 1999

In 1990, class wise variation was quite prominent. The average dropout rate was about 15% in each grade. Since 1990, the dropout rate started decreasing. In 1998, average class dropout was only 6%, indicating that during 8 years the dropout rate decreased by about 60%. The rate of decrease was maximum in grade I. Another important observation is that variation between grades was minimum in 1998. If the process continues, it is expected that the dropout would continue to decrease in the coming years too.

Cohort dropout rates provided a better picture of how effectively the process works in the sector. It is seen that in 1991, out of 100 students admitted in grade I, 59 was dropped out before completion of grade V.

Table 3.6: Average Grade I-V Dropouts (Cohort)

Year	1991	1992	1994	1998
Cohort dropout	59	47	39	27

Source: Education for All 1999, PMED 1999
Hope Not Complacency, CAMPE 1999

Table 3.6 shows that the cohort dropout rate has decreased from 59% in 1991 to 39% in 1994 and further to 27% in 1998. This is more than the expectation.

Analysis of the trend of the efficiency parameters it can be concluded that a massive improvement has taken place in qualitative and quantitative terms in primary education. The cause of improvements can be attributed to:

a. Introduction of compulsory primary education
b. Supply of text books free of cost
c. Introduction of FFE program
d. Development of facility and
e. Increase of demand for education.

3.2 Secondary Education

3.2.1 Introduction

The secondary level education consists of grades 6 to 10, generally divided into two sub sectors viz., “junior secondary” consisting of grades 6 – 8 and “secondary” consisting of grades 9-10. The Education Commission, set up for reforms of primary education recommended that primary education should consist of grade 1-8, and secondary education of grade 9-12. The relevant official age group for secondary education is 11-15 years. Primary school graduates are eligible for admission in grade 6. Although primary school graduates of age 11 are supposed to be the students of grade 6, it has been observed that age of students of grade 6, ranges from 9 to 14 years. This diverse composition is due to early and late entry in primary schools, repetition in primary school, failure to pass SSC examination in the first chance. However, with the improvement of the efficiency of the primary education, growth of school age children, higher transition rates of primary graduates to secondary education have had resulted in the expansion of secondary education in the last decade. The increasingly higher pressure on secondary education will continue till the growth of primary school graduates stabilizes as a result of the attainment of the replacement level of fertility, in 2010 AD or before.

The institutions which impart secondary education are the private junior and high schools, the Government Junior and High schools, Cadet colleges, Madrashas and English medium schools.

3.2.2 Growth of Secondary Education

In 1985, there were 2248 junior secondary schools and 7196 secondary schools. These numbers grew steadily to 3002 junior secondary and 10776 secondary schools in 1997. The annual growth rate during the 1985-97 was 2.4% for junior secondary school and 2.6% for secondary schools. During 1991-93, most junior schools were up-graded to secondary schools.

The school enrolment (grade 6-10) was 2.8 million in 1988. This number rose to 6.1 million in 1997. The increase was 118%, the annual growth rate was 9.05%. The growth during the first period was, therefore faster than the primary school enrolment growth. Because of increasingly high transition rates this higher growth continued and is expected to continue in the future also. The most distinct feature was that girls enrolment grew faster than that of boys. The annual growth rate of girls enrolment was 13.6% while that of boys enrolment was only 6.1%.

Table 3.7: Number of Institutions, Number of Teachers and Enrolment in Grade 6-10

Year	Number of Institutions		Enrolment in VI-X (000)			Number of Teachers		GER
	Junior	Secondary	Boys	Girls	Total	Junior	Secondary	
1988	2267	7890	1879	928	2807	14001	102834	13 (1965)
1989	2330	7890	1929	972	2901	18676	103794	17
1990	2311	8137	1978	1016	2994	18669	103227	
1991	2000	8715	2086	1070	3156	16989	112627	
1992	1962	9038	2149	1599	3748	12819	113399	
1993	1905	9190	2284	1857	4141	12435	114259	
1994	2136	9352	2446	2079	4525	13581	121596	
1995	2349	9663	2686	2373	5059	15109	124950	
1996	2687	10291	2959	2627	5086	1729	127892	38
1997	3002	10776	3204	2920	6124	19309	137786	
Annual growth rate (%)	2.4	2.6	6.1	13.6	9.1	3.6	3.3	10.6

Source: Bangladesh Education Statistics, 1991, 1995, 1996, 1997

The growth of enrolment surpassed the growth of schools and teachers as well. During this period when enrolment increased by 118%, the junior and secondary schools together increased by only 35.7% and number of teachers by only 34.5%. It indicates that the growth of facility lagged far behind the growth of enrolment. Consequently, it adversely affected on the quality of education. Between junior and secondary schools, the growth of junior school teachers was faster than that of secondary schools. The annual growth rate of junior school teachers during 1988-97 was 3.6% while that of secondary school teachers was 3.3%. The rapid growth of enrolment has had positive impact on gross enrolment at the secondary level. The gross enrolment ratio (GER) was 13% in 1965, 17% in 1989 and 38% in 1997. The achievement during the 1990s is remarkable, although we need to go a long sway to bring all children of 11-15 years age to school. If the present trend continues GER will be 76% in2004 and 100% in 2007. Compared to the spectacular growth of enrolment the growth of facility (teacher, institution) was negligible. This disproportionate growth has had adverse impact on the quality of education.

3.2.3 Promotion, Repetition and Dropout in Secondary Education

Promotion rate, repetition rate and dropout rate are important parameters used to measure the efficiency of the system. This chapter provides in brief the trend in these parameters.

Promotion

Data on promotion rates (Table 3.8) show that the performance has been improving over time. The average promotion rate was 75% in 1990, increased to 81% in 1993 and further to 86% in 1996. The similar trend has been observed in case of both boys and girls promotion rates.

Table 3.8: Promotion Rates by Sex and Classes in Secondary Education

Year	Grades/Sex																	
	VI			VII			VIII			IX			X			Average		
	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T
1990	85	89	87	79	84	81	74	64	71	72	75	73	65	66	65	75	76	75
1993	87	87	87	87	89	88	85	77	83	84	82	83	71	53	64	83	77	81
1996	92	93	93	92	90	91	87	78	83	86	84	85	78	84	85	87	84	86

Source: Bangladesh Education Statistics 1992, 1995, 1997, BANBEIS

The promotion rates were relatively higher in grades 6 and 7 and lower in grades 8, 9 and 10. An analysis of the promotion rates show that there has been a consistent improvement, and if more efforts are put, it would be possible to achieve 100% promotion rats by the year 2005.

Results of SSC Examination

A major source of wastage in secondary education sector is the large scale failure in the SSC examination, a public examination conducted at the end of grade 10. Data of Table 1.2 reveal that the wastage is more than 50% every year and in 1990, it was more than68%. This is one of the major areas which should be a major concern for the government. Not only that, the way the public examinations are now held allowing mass scale copying and if remedial measures are not taken then the sector and the degree it offers would lose its credibility in no time.

Repetition in Secondary Education

Repetition has been in existence from time immemorial and has been a major source of wastage in education sector. However, Table 3.9 shows that there has been a gradual improvement during 1990-96. In 1990, the repetition rate was lowest in grade 9 and highest in grade 10, but in 1996 it was lowest in grade 9 but was highest in grade 8. However, the difference between highest and lowest was small.

Table 3.9: Repetition Rates in Secondary Education

Year	Grades/Sex																	
	6			7			8			9			10			Average		
	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T
1990	11	7	8	11	6	9	12	6	10	10	6	9	14	11	13	11	7	10
1993	10	8	9	6	5	6	6	8	7	7	7	7	5	5	5	7	7	7
1996	5	4	5	5	5	5	5	6	5	4	4	4	4	4	4	5	5	5

Source: Bangladesh Education Statistics 1991, 1994, 1997, BANBEIS 1992, 1995, 1998

Data of Table 3.9 are very encouraging. If the present trend continues, the repletion rate would cease to exist by the year 2002 AD.

Dropout in Secondary Education

Dropout rate is being considered an important parameter used to measure the efficiency of any system. Data of Table 3.10 shows that dropout was and still is a major source of wastage in secondary education sector.

Table 3.10: Dropout Rates in Secondary Education

Year	**Grade/Sex**																				
	6			**7**			**8**			**9**			**10**			**Average**			**Cohort**		
	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T
1990	4	4	4	10	10	10	14	30	19	18	20	19	22	24	22	14	17	15	58	66	61
1993	3	5	5	6	6	6	9	15	12	10	12	10	24	42	31	10	16	10	43	64	52
1996	3	3	3	4	5	5	8	16	12	10	12	11	18	21	19	8	11	9	38	48	43
																(-) 8.9	(-) 6.9	(-) 8.1	(-) 6.8	(-) 5.2	(-) 5.7

Source: Bangladesh Education Statistics 1991, 1994, 1997, BANBEIS 1992, 1995, 1998

Dropout rates were low in grade 6 and 7 and were very high in grade 9 and 10 for 1990, 1993 and 1996. It has been higher for girls. However, the trend shows that the dropout rate has been decreasing at the rate 8% per annum. The rate of decrease has been slow since 1993. If additional efforts are added, then it would be possible to arrive at the stage of no dropout before 2005. The cohort dropout rates show that the level of wastage was very high even in the year 1996.The analysis shows that although efficiency of secondary education sector has been improving, special programs would be required to reduce dropout and improve pass percentage of SSC examination.

3.3 Higher Secondary Education

3.3.1 Introduction

Higher secondary (grade 11 and 12) is an important sub sector in Bangladesh. Boys and girls of age 17 and 18 constitute the majority of all students of grade 11 and 12. But boys and girls of 16, 19, 20 even of 21 years also are found to study in grade 11 and 12. Students who pass the SSC examination are eligible for entry to a 2 year higher secondary (or intermediate) course leading to HSC examination at the end of grade 12. The HSC course are offered by intermediate colleges, degree and some higher secondary schools. English and Bengali are compulsory subjects for all students and there are six additional subject or groups.

The performance of HSE sector was very poor in the past. The annual pass rate in the HSC has been very low in the past on an average about 40%. This low rate has been due to the inadequate preparation of students at secondary level and has been further exacerbated by the poor quality of teaching at the HSE level.

Among HSC graduates only 30% proceed to tertiary education system and the remaining 70% enter the world of work. They remain unemployed for a long time and then are absorbed in work for which the minimum education required is SSC or even lower.

In the next section we will examine the performance of this sub sector in respect of facility, access, promotion, repletion and dropouts. The output of the analysis would throw light on what would be the most probable scenario of HSE in the beginning of new millennium.

3.3.2 Growth of Higher Secondary Education

The available data show that both input and output parameters have been changing over time. In 1985, there were only 205 intermediate colleges and 403 degree colleges. The number of these institutions rose to 1130 and 768 respectively in 1998. The annual growth rate was 14% and 5.1% respectively. The growth rate of combined intermediate and degree college was only 9.2%.

Table 3.11: Number of Intermediate and Degree Colleges, Number of Teachers and Enrolment in Higher Secondary Education, 1988-1998

Year	Institutions		Enrolment in 11-12 grades (000)			Teachers	
	Intermediate College	Degree College	Boys	Girls	Total	Intermediate College	Degree College
1988	359	458	387	149	536	5373	12144
1989	359	458	318	163	544	5373	12144
1990	367	481	396	169	556	5493	12783
1991	323	547	416	164	580	4533	15417
1992	363	598	420	183	603	4799	16530
1993	384	603	410	209	619	5780	18685
1994	464	611	489	251	740	7449	20262
1995	603	671	703	402	1105	10638	24244
1996	654	717	668	354	1022	14907	24895
1997	901	768	596	335	931	15913	27511
1998	1130	768				19963	27511
Annual growth rate (%)	12.0	5.3	4.9	9.4	6.3	14.0	8.5

Source: Bangladesh Education Statistics 1991, 1995, 1997, BBS 1992, 1996, 1998

It is seen that the rates of growth of both institutions and teachers were higher than the enrolment growth. The growth of enrolment was constrained by low pass percentage in SSC examination. We also observe irregularity in the growth of enrolment. This was due mainly to low percentage of pass in SSC examination in the previous years. Another important characteristic was the higher growth of girls enrolment 9.4% as against 4.9% annual growth rate of boys.

3.3.3 Gross Enrolment Ratio

Boys and girls of age 17-18 constitute the HSE age group population. The GER was less than 10% in 1980s, 13% in 1990. After 1990, the enrolment, particularly enrolment of girls has been accelerated, consequently GER rose to 18% in 1995 and further to 19% in 1997.

Table 3.12: Gross Enrolment Ratios in HSE 1980-97

Year	1980	1985	1990	1995	1996
GRE	7	8	13	18	19

Source: Analytical Report 1991, BBS 1994
Bangladesh Education Statistics, 1991
Higher Secondary Education Project, MOE 1997

If the current growth of GER and population continues, it would take many years to improve GER to satisfactory level. It has been observed earlier that the population of 16-17 will reach to is maximum in 2015 and then it will continue decreasing. Thus, if present growth of enrolment continues, then GER would show higher growth after 2015.

3.3.4 Promotion, Repetition and Dropout in Higher Secondary Education

It has been observed that as high as 70% higher secondary school graduates enter the job market and only 30% go to tertiary education. Some get admission in degree colleges which are now controlled by National University, and some go to degree colleges which are controlled by different Boards, and other goes to technical education etc. The base statistics in respect of enrolment, promotion, repetition are inadequate and also less reliable. Only BANBEIS collects data on higher secondary education regularly. As regard efficiency rates, BANBEIS publication provided data for only two years, viz., 1993 and 1994. Because of this constraint, our analysis has been confined to data of these two years only.

Promotion

Table 3.13 presents data on promotion, repetition and dropout rates.

Table 3.13: Promotion, Repetition and Dropout Rates

Rates	**Year**	**Rates by grade and sex**											
		11			**12**			**Average**			**Cohort**		
		B	G	T	B	G	T	B	G	T	B	G	T
Promotion	1993	85	86	85	51	54	52	68	70	69			
	1994	89	86	88	60	60	60	75	73	74			
Repetition	1993	3.6	6.2	4.4	11.0	12.8	11.6	7.3	9.5	8.0			
	1994	4.3	5.2	4.6	9.2	15.9	11.5	6.8	10.5	8.0			
Dropout	1993	11.6	7.5	10.2	38.7	33.1	36.8	25.2	20.3	23.5	51	43	48
	1994	6.7	8.7	7.4	31.0	24.5	28.8	18.9	16.5	18.2	39	36	38

Source: Bangladesh Education Statistics 1995, BANBEIS 1996

The promotion rate in grade 11 was 85% in 1993 and 88% in 1994. The improvement was due to increase in the promotion rates of boys. The promotion rates in grade 12 were less than 60% reflecting higher wastage in HSE. In 1994 promotion rates of boys and girls in grade 12 were equal. The analysis shows that although promotion rate improved in 1994 over 1993, more efforts should be put to reduce the wastage due to failure in examinations at the end of 11 grade and 12 grade examination. This is not all. When we examine the percentage of pass in HSC examinations (Table 1.2) we observe that more than 60% examinees fail and only about 40% pass HSC examination. If the promotion (or failure) rates of grade 11 and 12 are also taken into consideration then the wastage comes about 70% on this account alone.

Repetition

Data of Table 3.13 show that nearly 8% of higher secondary students repeat in either 11 or 12 class. The repetition is higher in grade 12 and highest for girls of grade 12 (16%), almost double of average repetition rate (8%). The table shows that, on the average there is no improvement in 1994 over the level of 1993.

Dropout

Dropout rates in HSE were higher than those in secondary and primary education. Maximum dropouts take place (Table 3.12) in grade 12, where nearly 30% dropout. If the dropout rates of grade 12 can be brought down to the level of grade 11, and which is easily possible, then it would be possible to reduce wastage and increase efficiency of this sub sector.

The cohort dropout rates show that in 1993, nearly 50% of all students admitted in grade 11 dropped out before completion of their HSE. However, this rate was 38% in 1994. Although this was an improvement, yet the rate was alarmingly high.

4. Need Assessment and Total Government Cost

4.1 Introduction

In education sector the major areas of investment are identified as:

- Establishment of new schools and construction of class rooms,
- Construction of new class rooms for existing schools,
- Repair and reconstruction of existing class rooms,
- Construction of new facility or reconstruction of existing facilities like toilet, drinking water facility, playground etc.
- Purchase of school furniture, equipment,
- Purchase of teaching aids,
- Provision of additional teachers,
- Cost incurred for supply of free text books for pupils,
- Cost associated with improvement of quality of teachers.

The government provides fund to meet the total cost of government institutions and part of the total cost of private institutions through grant. These costs are met from development budget allocations.

The revenue budget of the government for the education sector includes expenditures on salaries and allowances of all staff of government institutions, salary support to the staff of non-government institutions, maintenance costs and incidental costs.

Among the items mentioned above the most important are the classroom requirements, teacher requirements and the total cost of the government in the development and revenue budget. In this paper an attempt has been made to make projection of teacher requirements, class room requirements and total government cost to primary, secondary and higher secondary education. The projection of other requirements, although very important could not be carried out due mainly to the lack of relevant and reliable statistics on these items.

The need for the items mentioned above is generally determined on the basis of project enrolment. In Chapter 2 we provided the projected number of pupils enrolled in future years (2000-2020 AD). In this chapter we shall project the requirements to sustain the projected enrolment.

4.2 Projection of Teacher Requirement

After having projected the number of students in the future years, the next task is to project the teachers required to sustain this enrolment. In education sector in general and primary and secondary education in particular, the number of teacher is by far the most important resource, accounting generally 80-90 percent of total revenue budget. Several methods are used for obtaining projected number of teachers. Among them the following three are important.

a. Method based on the enrolment and the teacher student ratio.
b. Method based on the enrolment and contact hours.
c. Method based on the demand for new teachers.

The last two methods need elaborate data on grade-wise contact hours, number of teaching hours, mortality, morbidity, replacement of unqualified teachers, transfer rates and mobility from and to the institutions. We have yet to develop a data system that would enable one to use the last two methods. Consequently, we are left with the first method, and this method has been used to determine the teacher requirement.

Method based on the number of students and teacher-student ratio

Teachers required is obtained by the following formula:

Teacher required (T) = E/R
Where T = Teacher required
E = Projected enrolment
R = Desired teacher-student ratio i.e. number of students per teacher

Quite understandably, T will assume different value for different R. In our projection we would use two values of R for primary education and one each for secondary and higher secondary education sectors.

R = 40 and 50 for primary education
R = 30 for secondary education
R = 20 for higher secondary education

Observed Teacher

Observed teacher in any year is obtained by using the formula:

Observed Teachers $= E / R_{1997}$
Where $R_{1997} =$ observed teacher-student ratio in 1997.

Since 1997 a constant teacher-student ratio R_{1997} is assumed to estimate the observed teachers.

Additional Teachers

Additional teachers for a given year is determined by formula

Additional teachers = Teachers required – Observed teachers
$= E / R - E / R_{1997}$

4.2.1 Projections of Teachers Required and Requirement of Additional Teachers

The projected enrolments of primary schools based on gross enrolment ratio is presented in Table 2.9. Two sets of required teachers were obtained by using R = 50 and R = 40. R_{1997} was 57 students per one teacher. The projections of teachers are presented in Table 4.1. If linear projection is used, we would get another set of projected teachers. Table 4.1 also gives the estimated additional teachers. The estimated additional female teachers equal 60% of total additional teachers (as per government policy from 2000 onwards).

Table 4.1: Projected Teachers Requirement in Primary Education

Year	Projected enrolment (Million)	Observed Teachers	Required Teachers	Required Teachers	Additional Teachers	Additional Teachers
		R = 57	R = 40	R = 50	R = 40	R = 50
2000	15.1	264912	377500	302000	112588	37088
2005	16.3	285965	407500	316000	121535	40035
2010	17.1	300000	427500	342000	127500	42000
2015	16.9	296492	422500	338000	126008	41508
2020	16.9	296492	422500	338000	126008	41508

Source: Table 2.9

Secondary Education Institutions

The estimated enrolment in secondary education institutions (linear growth model) is given in Table 2.10. Total teachers in 1997 were 157077 giving teacher-student ratio 39.0. In case of secondary schools we will use desired teacher-student ratio 1:30. The projected teachers are given in Table 4.2.

Table 4.2: Projected Teacher Requirement in Secondary Education

Year	Projected Enrolment (Million)	Observed Teachers	Required Teachers	Additional Teachers	Additional Teachers
		R_{1997}	R = 30	R = 30	Over 157077
2000	6.9	176923	230000	53077	72923
2005	8.8	225641	293333	67692	136256
2010	10.7	274359	356667	82308	199590
2015	12.6	323077	420000	96923	262923
2020	14.5	371795	483333	111539	326256

Source: Table 2.10, Total Teachers in 1997 = 157077

The additional requirement over the level of 1997 comes at 326256 teachers. This means that the growth of teachers should be at the rate of 3.2%.

Higher Secondary Institutions

The requirement of teachers in the higher secondary institutions was estimated by using the observed information as well as the target teacher-student ratio. As stated earlier higher secondary institutions include intermediate colleges and degree colleges. It is difficult to find out the number of degree college teachers involved in teaching students of HSE. As such all the degree college teachers and intermediate college teachers were taken together to mean teachers of higher secondary education.

In 1997 the total enrolment in HSE were 931000 and the total teachers were 43424. The observed teacher-student ratio was 21.4 in 1997. A constant teacher-student ratio of 1:20 is assumed to estimate the observed teachers as well as target teachers for the project period 2000-2020 AD. The estimates are shown in Table 4.3.

Table 4.3: Projected Enrolment, Teachers and Additional Requirement in HSE 2000-2020

Year	Projected Enrolment (Million)	Observed Teachers	Target Teachers	Additional Teachers	Additional Teachers
		R = 20	R = 20	Over 1997 level	Over last projected period
2000	1.20	60000	60000	16576	16576
2005	1.52	76000	76000	32576	16000
2010	1.83	91500	91500	48076	15500
2015	2.16	108000	108000	64576	16500
2020	2.47	123500	123500	80076	15500

Source: Table 2.11

In order to maintain the current teacher-student ratio 1:20 during 2000-2020, the total teacher requirement would be 123500 in 2020 AD. Total additional teacher requirement would be 80076. This implies that to maintain teacher-student ratio 1:20, it would be required to recruit 3200 teachers every year.

4.3 Projection of Classroom Requirement

Classroom facility is one of the first requirements to impart education. After having enrolment data for the projected year the next task is generally to project the classroom requirements.

Several methods are used for deriving the projections. The method choice depends upon the data available. For reasonable good estimate the data on enrolment, total number of classrooms available at the base period, their seating capacity, number of shift etc. are required. Review of available literature reveals lack of distribution of schools by classroom and seating capacity. Even we could not find statistics on total classroom available in educational institutions of primary, secondary and higher secondary education. However, we could avail average number of classroom per primary and secondary schools. We could not collect any statistics for higher secondary institutions. Moreover, HSE is imparted at intermediate and degree colleges. In degree college, one classroom is generally used for both HSE and degree education.

The algorithm of calculation is shown below:

Total classroom (C) = Total school (S)* Average number of classroom per school (C/S)
Total school (S) = Enrolment (E)/Average enrolment per school (E/S)
Total classroom in the base year = $C_b = S_0 (C/S)_b$
Total classroom in the project year = $C_t = S_t (C/S)_t$
Additional classroom requirement = $C_t - C_b = S_t (C/S)_t - S_0 (C/S)_b$
Total schools in the base year = $S_b = E_b /(E/S)_b$
Total schools in the projected year = $S_t = E_t /(E/S)_t$

Thus for projection we need data on enrolment (E), average number of classroom per school (C/S) and average enrolment per school (E/S) for both base year and projection year. In the projection, the projection years are 2000, 2005, 2010, 2015, 2020 and the base year is 1997. Under the circumstances, an attempt has been made to project classroom requirements only for primary and secondary education.

For projection we resort to simplest method. This simplest method is based upon assumptions or targets for the future.

a. average number of classroom of an institution
b. average size of a classroom
c. average enrolment of an institution
d. number of grades to be covered
e. number of shifts
f. maximum enrolment in a school.

Based on the available data, first of all total classrooms available at the base year would be worked out. The projected seats would be worked out using targets for the future projection year. The difference would show additional requirements for each projection year.

Classroom Requirements in Primary Education

The projection parameters used are:

> Average number of classrooms per school in the base year = 3.67 classrooms. This estimate was reported by PMED, which is based upon a study conducted under GEP, a project of PMED.
>
> Average number of classrooms for the projection years = 6 rooms per school. The technical committee formed by SEID of Planning Commission recommended 6 classrooms per school from 1997.
>
> Target number of students per school = 300.

The projection of requirements is shown in Table 4.4.

Table 4.4: Classroom Requirements and Additional Classroom Requirement, 2000-2020, Primary Education

Year	Enrolment (millions)	Projected schools	Classroom observed	Classroom requirement	Additional requirement of classrooms	Expansion of old schools 2.33 rooms more	New classrooms in new schools
2000	15.1	50333	184722	302000	117278		
2005	16.3	54333	302000	325998	23998		
2010	17.1	57000	325998	342000	16002		
2015	16.9	57000	342000	342000			
2020	16.9	57000	342000	342000			
Additional required					157278	117276	40002

Source: Table 2.9

The projection takes into account sharp fertility decline and desired level of teacher-student ratio. The assumption of 300 students per school and 6 classrooms seem to be more realistic. The government needs to take steps to abolish those schools which are not good schools and also located near to the good schools. Construction of 2.33 new classrooms (average) will be enough to offer primary education. It appears that a total of 60000 primary schools, each with 6 classrooms would be most appropriate policy direction for

1. It would help to introduce a baby class in each school
2. Teacher student ratio would be 1:50, much less than the present one
3. More resources could be mobilized towards improving the quality of primary education.

Classroom Requirement in Secondary Education

The parameters used in the projection are:

Average number of classrooms available up to 2000 is 8 classrooms. This estimate was reported by BBS (unpublished). BBS provided population and enrolment projection and future requirement in secondary education.

Average number of classrooms = 10 from 2000 and onward.

Average classroom size = 50 students.

Average students per school = 500.

The projection of classroom requirements is shown in Table 4.5.

Table 4.5: Classroom Requirements and Additional Classroom Requirement, 2000-2020, Secondary Education

Year	Enrolment (millions)	Projected schools	Classroom observed	Classroom requirement	Additional requirement of classrooms	Expansion of old schools 2.33 rooms more	New classrooms in new schools
2000	6.9	13800	110400	138000	27600		
2005	8.8	17600	138000	176000	38000		
2010	10.7	21400	176000	214000	38000		
2015	12.6	25200	214000	252000	38000		
2020	14.5	29000	252000	290000	38000		
Additional required					179600	27600	152000

Source: Table 2.7 and 2.10

The total additional class requirement in 2020 would be 179600. This total additional classroom requirement is arrived at by constructing 2 more rooms to each of 138000 schools in 2000 AD. The remaining 152000 new classrooms would come from constructing 15200 new schools during 2000-2020 AD period. This means that a total of 760 schools would be constructed every year during the projection period.

4.4 Government Expenditure in Primary, Secondary and Higher Secondary Education

4.4.1 Introduction

Public expenditure in education sector is incurred annually through budgetary mechanism. The national budget is composed of two parts, namely (i) Revenue Budget and (ii) Development Budget. Expenditure under the revenue budget is incurred normally to meet current expenditures of continuous nature, whereas expenditure under the development budget is incurred normally as one time investment for maximum utilization of existing resources and for creation of new resources. Development budget is linked up with annual development programs. Table 1.3

provided government budget on education. The total revenue expenditure in 1991-92 was 13816 million Taka which rose to 23428 million Taka in 1997-98. The annual growth rate of development budget during the same period was 24.8%. The total annual budget increased annually at the rate of 14%.

Primary education sector receives highest proportion of total budget for the education sector. In 1990-91 in the revenue budget on education the share of primary and secondary and higher secondary sector accounted for 45.6% and 39.8% respectively. These percentages were 43.9% and 43.2% respectively in 1997-98. In development budget of education sector the share of primary education and secondary education in 1990-91 was respectively 61.2% and 13.6%. These shares were in 1997-98 respectively 53.7% and 35.9%. It is seen that the share of primary education decreased while that of secondary and higher secondary education increased during 1990-98 period.

4.4.2 Government Expenditure on Primary Education

The total government expenditure on primary education and the per student cost for 1991-97 were worked out and shown in the appendix. Based on the annual growth rate of 5% and the cost per student of Taka 1204 in 1997, the total government expenditure in primary education has been worked out and presented in Table 4.6.

Table 4.6: Total Government Cost in Primary Education

(In billion)

Year	2000	2005	2010	2015	2020	Growth	Annual growth
Per student cost (Taka)	1394	1779	2270	2898	3699	165.35%	5.0%
Total cost	21.05	29.00	38.80	48.98	62.50	196.90%	5.6%

The total government cost in primary education is estimated at 21.05 billion Taka in 2000 AD. The cost grew annually at the rate of 5.6% and the estimated cost 62.50 billion Taka in 2020, 197% higher than the level in 2000 AD.

Given the fact that enrolment would decline with sharp fall of fertility level, the increased allocation, it is hoped, would generate more resources which could be used for the improvement of quality of education, which in recent years became the concern of all.

4.4.3 Government Expenditure on Secondary and Higher Secondary Education

Secondary and higher secondary education has been second, next to primary, in the priority list as per as its allocation of funds to different sub-sectors of education sector. Government revenue, development and total expenditure on secondary and higher secondary education and its share in the total budget of education is shown in Appendix 5.

It is worth to mention that the government publications provide the budget of secondary and higher secondary together. Separate allocation for secondary and higher secondary could not be traced out. Given this constraint, we projected the total expenditure of the two sub sectors together.

The total cost associated with various programs for secondary and higher secondary are worked out from 2000-2020 with 5 years interval. The method of estimating per student cost and the growth rate are shown in the appendix.

The estimates of the cost per student were obtained using per student cost of 1997 as the base (Taka 2382) along with 5 percent inflation for each year beginning from 1997. The total cost for each year was obtained by multiplying per student cost by enrolment figure of the corresponding year. The estimates are given in Table 4.7.

The estimated cost per secondary and higher secondary student was Taka 2757 in 2000. The projected estimate for 2020 is 7316. This figure is 165% higher than that of the estimate for 2000 AD. The annual growth rate has been assumed to be 5% during the period.

Table 4.7: Total Government Cost in Secondary and Higher Secondary Education 2000-2020 AD

(In billion)

Year	**2000**	**2005**	**2010**	**2015**	**2020**	**Growth**	**Annual growth**
Per student cost (Taka)	2757	3519	4491	5732	7316	165	5.00%
Total cost	22.72	38.32	62.96	102.60	168.41	641	10.5%

Source: Table 2.7 and 2.11

The total government cost in secondary and higher secondary education is estimated at 22.72 billion Taka in 2000. This amount would increase every year at the rate of 10.5% up to 2020 AD and consequently the total cost for the government would be 168.41 billion Taka in 2020. The higher growth (10.5% per annum) is due to concurrent growth of per student cost (5% per annum) and also the growth of enrolment (5.2% per annum). It is clear that if the fund available would exceed the projected amount, it would be possible to mobilize resources for the improvement of the quality of education in the post primary education. Any amount less than the projected amount would have adverse effect on the existing quality of education.

APPENDIX 1

Projection of NER, GER and Enrolment

$t =$	**2000**	**2005**	**2010**	**2015**	**2017**	**2020**
For Boys: $NER_b^t = N^t$	82.43	87.23	92.30	97.70	100.00	100.00
Growth: (1+r)=1.0113931 $GER_b^t = 7.71 + 1.075\ N^t$	96.32	101.50	106.90	112.70	115.20	115.20
For Girls: $NER_g^t = N^t$	85.39	94.19	100.00	100.00	100.00	100.00
Growth: (1+r)=1.016494 $GER_g^t = 23.1949 + .8594\ N^t$	96.57	104.15	109.13	109.13	109.13	109.13

Projection of Enrolment in Primary Education (in thousand)

Year	2000	2005	2010	2015	2020
Boys	7657	8163	8607	8689	8790
Girls	7470	8149	8547	8186	8101
Total	15127	16312	17154	16875	16891

APPENDIX 2

Projection of Enrolment: Linear and Exponential Model

ENROLMENT DATA PRIMARY (Million)				
Year	**t**	**Boys**	**Girls**	**Total**
1988	1	6.35	4.94	11.29
1989	2	6.39	5.17	11.56
1990	3	6.57	5.37	11.94
1991	4	7.07	5.80	12.87
1992	5	7.18	6.04	13.22
1993	6	7.36	6.33	13.69
1994	7	8.05	7.13	15.18
1995	8	9.09	8.19	17.28
1996	9	9.22	8.36	17.58
1997	10	9.36	8.67	18.03
1998	11	9.58	8.78	18.36

Source: DPE (GOB) Office Document Education for All December 1999

Equation (form): $y = b_0 + b_1 * t$

In case of boys, $b_0 = 5.607818182$ and $b_1 = 0.3717272727$

In case of girls, $b_0 = 4.177818182$ and $b_1 = 0.4367272727$

ENROLMENT PROJECTION PRIMARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	10.44027	9.855273	20.29555
2005	18	12.29891	12.03891	24.33782
2010	23	14.15755	14.22255	28.38009
2015	28	16.01618	16.40618	32.42236
2020	33	17.87482	18.58982	36.46464

Equation (form): $y = a_0 * (a_1)^t$

In case of boys, $a_0 = 5.827962361$ and $a_1 = 1.048565584$

In case of girls, $a_0 = 4.509966317$ and $a_1 = 1.066940284$

ENROLMENT PROJECTION PRIMARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	10.7959167691444	10.4711593316620	21.2670761008065
2005	18	13.6847706627710	14.4775586577687	28.1623293205396
2010	23	17.3466461530972	20.0168575465525	37.3635036996497
2015	28	21.9883942651205	27.6755629530103	49.6639572181307
2020	33	27.8722168015203	38.2645868855649	66.1368036870852

APPENDIX 3

Projection of Enrolment in Secondary Education

ENROLMENT DATA SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
1988	1	1.94	0.928	2.868
1989	2	1.93	0.972	2.902
1990	3	1.978	1.016	2.994
1991	4	2.086	1.07	3.158
1992	5	2.149	1.599	3.748
1993	6	2.284	1.857	4.141
1994	7	2.446	2.079	4.525
1995	8	2.686	2.373	5.059
1996	9	2.959	2.627	5.586
1997	10	3.204	2.92	6.124

Source: DPE (GOB) Office Document Education for All December 1999

Equation (form): $y = b_0 + b_1 * t$

In case of boys, $b_0 = 1.5884$ and $b_1 = 0.1414181818$

In case of girls, $b_0 = 0.4246666667$ and $b_1 = 0.2398968687$

ENROLMENT PROJECTION SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	3.426836363	3.543327273	6.970163636
2005	18	4.133927272	4.742812121	8.876739394
2010	23	4.841018181	5.942296970	10.783315151
2015	28	5.548109090	7.141781818	12.689890909
2020	33	6.255199999	8.341266667	14.596466666

Equation (form): $y = a_0 * (a_1)^t$

In case of boys, $a_0 = 1.693594223$ and $a_1 = 1.059747784$

In case of girls, $a_0 = 0.727275877$ and $a_1 = 1.154185338$

ENROLMENT PROJECTION SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	3.601157254	4.691172176	8.292329430
2005	18	4.813430128	9.608578404	14.422008532
2010	23	6.433795574	19.68053516	26.114330731
2015	28	8.599631528	40.31017366	48.909805186
2020	33	11.49456205	82.56432497	94.058887020

APPENDIX 4

Projection of Enrolment in Higher Secondary Education

ENROLMENT DATA HIGHER SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
1988	1	0.387	0.149	0.536
1989	2	0.318	0.163	0.481
1990	3	0.396	0.169	0.565
1991	4	0.416	0.164	0.58
1992	5	0.42	0.183	0.603
1993	6	0.41	0.209	0.619
1994	7	0.489	0.251	0.74
1995	8	0.703	0.402	1.105
1996	9	0.668	0.354	1.022
1997	10	0.596	0.335	0.931

Source: DPE (GOB) Office Document Education for All December 1999

Equation (form): $y = b_0 + b_1 * t$

In case of boys, $b_0 = 0.2778$ and $b_1 = 0.036818182$

In case of girls, $b_0 = 0.089133333$ and $b_1 = 0.027048485$

ENROLMENT PROJECTION HIGHER SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	0.756436364	0.440763636	1.197200000
2005	18	0.940527273	0.576006061	1.516533333
2010	23	1.124618182	0.711248485	1.835866667
2015	28	1.308709091	0.846490909	2.155200000
2020	33	1.492800000	0.981733333	2.474533333

Equation (form): $y = a_0 * (a_1)^t$

In case of boys, $a_0 = 0.307774879$ and $a_1 = 1.078130125$

In case of girls, $a_0 = 0.120666773$ and $a_1 = 1.118396674$

ENROLMENT PROJECTION HIGHER SECONDARY (million)				
Year	**t**	**Boys**	**Girls**	**Total**
2000	13	0.818386628	0.516813637	1.335200265
2005	18	1.192104783	0.904301598	2.096406382
2010	23	1.736482203	1.58231386	3.318796062
2015	28	2.529450836	2.768674914	5.298125750
2020	33	3.684530437	4.844526093	8.529056530

APPENDIX 5

Table: Total Expenditure and Per Student Cost in Primary Education 1997-98

(million Taka)

Year	1991	1992	1993	1994	1995	1996	1997	Annual growth rate (1991-97)
Total Cost	8768	13453	15051	18339	20869	20874	21717	16.3%
Per student Cost (Taka)	681	1018	1099	1208	1208	1187	1204	9.9% 3.4% (1992-97)

The annual growth rate per student cost has been 3.4% during 1992-97. Assuming that the government will give more emphasis on the quality of education and thereby increase allocation on primary education, a yearly 5% rise of per student cost is assumed for projection of total cost in primary education.

Table: Total Expenditure (Revenue and Development) on Secondary and Higher Secondary Education and on Education sector, 1992/93-1997/98

(million Taka)

Financial Year	1991-92	1993-94	1994-95	1995-96	1996-97	1997-98	Annual growth rate (%)
Total expenditure on Education	19045	27058	35257	35245	38469	39933	13.1
Total expenditure on SE and HSE	5357	9666	13989	14016	15291	15954	19.9
SE and HSE Budget as % of Education Budget	28.0	35.7	39.7	39.8	39.7	40.0	6.1
Per SE and HSE Student expenditure	1434	2031	2657	2274	2503	2261	7.9 2.7 (1994-98)

The growth rate of per capita expenditure fluctuated mainly due to fluctuation of development expenditure. The average of 1996-97 and 1997-98 was taken as per capita expenditure for the year 1997, which was estimated at Taka 2382. A 5% growth for each year beginning from 1997 was assumed to estimate the per student cost for the successive projection years.

REFERFENCES

Ahmed, K.S. 1997. "Models for Projecting Population, School Age Population for Planning NFE".

ADB, 1990. Report and Recommendation of the President to the Board of Directors, Unpublished.

BANBEIS, 1998, 1996, 1995, 1992. Bangladesh Educational Statistics, 1997, 1995, 1994, 1991, Ministry of Education.

BBS, 1995. Annual Report of Sample Vital Registration System 1993 and 1994, Statistical Division, Ministry of Planning.

BBS, 1997. Annual Report of Sample Vital Registration System 1995 and 1997, Statistical Division, Ministry of Planning.

BBS, 1999. Bangladesh Data Sheet 1999, Statistical Division, Ministry of Planning.

DHSH, MOE, 1992. Secondary Education in Bangladesh: A Subsector Study BGD (90/003) UNESO, UNDP and GOB Project.

DHSH, MOE, 1997. Population and Enrolment Projection and Future Requirement of Secondary Education (Working Paper).

Kabir, M. et al. 1997. Population Model for Planning Base Model, Bangladesh SHD Modelling System. Support for Monitoring Sustainable Human Development in Bangladesh, BGD/93/008 (Unpublished).

Kabir, M. et al. 1998. Planning for Primary and Secondary Education: Implication for the Future, Bangladesh SHD Modelling System. Support for Monitoring Sustainable Human Development in Bangladesh. BGD/93/008 (Unpublished).

Ministry of Planning, 1991. Report of the Task Force on Bangladesh Development Strategies of the 1990s. Ministry of Planning.

Mitra and Associates, 1998. Demographic and Health Survey 1996-97: NIPORT and Macro International Inc. USA.

Munir Ahmed, 1996. Draft Outline of Policy Frame Work for Secondary Education and Capacity Building of DSHE, SEDP, ADB 1268-BAN (Unpublished).

National Curriculum and Text-Book Board, 1997. The Preparation and Employment of Higher Secondary Graduates, Seminar Papers.

PMED, 1997. Report of the National Primary Education Commission, 1997.
PMED, 1999. Education for All. The Year 2000 Assessment, The Primary and Mass Education Division.

PMED, 1995. Education for All: National Plan of Action, 1995.

Socio-Economic Infrastructure Division, PC 1996. Population and Enrolment Projections and Recruitment of Additional Primary School Teachers by 2001, Ministry of Planning.

UNESCO, 1992. Educational Management Information System, Bangkok, 1992.

UNESCO, 1993. Trends and Projections of Enrolments by Level of Education by Age and by Sex 1960-2025.

UNESCO, 1980. Statistical Analysis of Demographic and Education Data for Projecting School Enrolment in Bangladesh, Paris, 1980.

UNICOLSULTANT International Limited, 1993. A Financing Plan for the Education Sector. Final Report (Unpublished). World Bank Credit No. 2118-BD.

UNO, 1995. World Population Prospects: The 1994 Revision, New York.

The University Press Limited, 1999. Hope Not Complacency: State of Primary Education in Bangladesh 1999. CAMPE.

World Bank, 1994. World Population Projection 1994-95. Estimate and Related Demographic Statistics. The John Hopkins University Press.

World Bank, 1997. Bangladesh Annual Economic Update 1997. Economic Performance Policy Issues and Priority Reform, Report on South Asia Region. The World Bank.