Demographic Transition and Policy Challenges

1. Introduction

Bangladesh has experienced a large growth of population in the past, but due to the success of family planning programmes, the level of total fertility rate has declined rapidly. However, the increased level of contraceptive prevalence does not have the expected outcome during the recent past rather the level of fertility has remained unchanged. Hence, attainment of replacement level fertility remains as a formidable challenge to the policymakers. Human capital accumulation factors have been emerging as very important determinants in shaping up both the future growth of population and development. Moreover, once the process of population momentum is initiated, the population will keep on increasing very rapidly during the next 40-50 years until it is eventually stabilised. The overall economic growth will be severely affected due to the population momentum, and without integrated policy measures, it would be difficult to face the emerging challenges. This paper examines the status of demographic transition, and the factors attributable to such transition as well as potential barriers, their potential impact and relevant policy options.

The dynamics of population deals with the determinants and consequences of changes in the structure, growth and distribution of population over time. The structure of population is the distribution of a given population by age and sex. The growth of population indicates change in the population size relative to a base population size. The growth of a population is measured by three components: births, deaths, and migration. The distribution of population refers to the spatial distribution of a given population, such as population distribution by rural and urban locations in a country. This is also measured by population density for different regions (Sirageldin, 1995).

Only certain characteristics of population have an effect on the economy. The basic characteristics are total size, growth rate, density, age, distribution, sex ratio, and regional distribution of population. These are subject to any change through fertility, mortality and migration and the process of such change is termed as population dynamics. In other words, any change in the measures of structure and distribution occur as a consequence of prior changes in the components of population growth. However, even after reaching replacement level, it may take quite a long time to attain a growth rate of zero due to the young age structure of a population. Due to the young age structure, the population continues to increase even after reaching replacement level, because a relatively larger proportion of girls continue to enter into the childbearing age groups until the age structure stabilises. This is known as population momentum. To explain the population momentum, age and sex are the two basic characteristics that need to be considered. These are integral parts of the larger social, economic and environmental system. In addition, however, two other basic components need to be considered, education and labour force participation. Although these variables are not demographic in strict sense, but these population characteristics have shown increasingly important role in explaining fertility, mortality and migration (Islam et al., 2002).

For decades, economists and social thinkers have debated on the issue of the nature of influence of population change on economic growth (Boserup, 1981; Simon, 1981; Ehrlich

and Ehrlich, 1990; Kelly and Schmidt, 1994; Coale, 1986; Barlow, 1994). According to them, population growth restricts, promotes, or is independent of economic growth. Proponents of each explanation can find evidence to support their cases. All of these explanations, however, focus on population size and growth. In recent years, however, the debate has under-emphasised a critical issue, the age structure of the population (that is, the way in which the population is distributed across different age groups), which can change dramatically as the population grows (Bloom and Williamson, 1998).

The economic behaviour of people varies at different ages of life, ranging from schooling at a young age, entering into labour force at an adult age (or even child labour in a country like Bangladesh), retirement at old age, additional expenses for health care at old age, etc. Similarly, male and female populations have different kind of economic characteristics at different ages that can be reflected in son preference, sex differential in infant and child mortality rates, differential pattern in schooling of boys and girls, discrimination towards women of all ages, childbearing of women during reproductive ages, healthcare facilities during pregnancy, etc. As the economic behaviour varies at different stages of life, changes in a country's age-sex structure can have significant effects on its economic performance. A country with a high proportion of children is expected to devote a high proportion of resources to their care, which tends to depress the pace of economic growth. On the other hand, an increased population in the working ages, the added productivity of this group can be utilised to accelerate the economic growth, assuming that policies to take advantage of this are in place. In fact, the combined effect of this large working-age population and health, family, labour, financial, and human capital policies can create virtuous cycles of wealth creation. And if a large proportion of a nation's population consists of the elderly, the effects can be similar to those of a very young population.

A country like Bangladesh, just being ready to initiate the process of population momentum, experiencing an overwhelming increase in the population size, initially at very young ages, then at working age groups, and finally elderly age groups, has the opportunity to capitalise on the bright side of the demographic transition. This demographic benefit is not, however, automatic. Given the right kind of policy environment, this demographic benefit can help to produce a sustained period of economic growth, as it did in several East Asian economies. The critical policy areas include: (i) public health, (ii) family planning, (iii) education, (iv) economic policies that promote labour-market flexibility, openness to trade, and savings.

With this backdrop, it is noteworthy that, policymakers have the opportunity to consider the means to maximise and capture this benefit by accelerating the demographic transition, and allowing extra labour to be absorbed productively in the market. Finally, policymakers must plan for the healthcare and quality education of the children as an investment and future health care and pension income needs of this baby boom generation when it ages as a security.

In the South Asian countries, both the levels of fertility and mortality were very high for a long period, and then fertility started to decline first in Sri Lanka since the early 1960s followed by India and Bangladesh in mid-70s. In Pakistan and Nepal, the decline in fertility was evident since the mid-80s. Among the South Asian countries, Sri Lanka has already achieved the replacement level fertility in 1993, but India and Bangladesh, expected to

achieve the replacement level by the years 2001 and 2005, respectively, are lagging behind. The targets for India and Bangladesh are now set for a later period.

In East Asia, the demographic success was accompanied by economic and social changes, a transformation in the socio-economic structure leading to a sharp rise in income and reduction in poverty, and as a result dependence on agriculture was reduced dramatically with an increased emphasis on industrial developments. The role of education, particularly the quality of basic education, was found to be instrumental in attaining these targets in the East Asian countries. It has been argued that the demographic transition contributed to the realisation of the East Asian miracle due to the very important role of education. The increased size of population, due to an increase in the young age population since the initiation of population momentum in those countries, could be employed in the increasingly expanding economic opportunities.

In South Asia, on the other hand, the emphasis was on national family planning programmes that led to the decline in the level of TFR to a certain extent, but except Sri Lanka, other countries are still lagging behind in achieving the replacement level fertility. The delay in the completion of the transitional phase of achieving replacement level fertility will result in a much higher size of the population after stabilisation. In Sri Lanka, like in East Asian countries, basic education was emphasised, but other South Asian countries are still far from ensuring adequate quality of basic education for all. In examining the relationship between growth of population and the growth of economic development, we need to consider the use of resources, savings and investment, education, urbanisation, renewable resource degradation, health, ageing, offsetting effect of economic growth attributable to growth of population, etc.

The onset of fertility decline was evident since the mid-seventies in Bangladesh. The decline occurred at a rapid pace during the period 1975 to 1993-94. The total fertility rate was 6.3 in 1975 and decreased to 3.4 in 1993-94. However, since 1993-94, the level of total fertility appears to be unchanged at a level of 3.3, as observed from the BDHS 1996-97 and 1999-2000 results. However, during the period from 1993-94 to 1999-2000, the contraceptive prevalence rate has increased substantially from 44.6 percent to 53.8 percent. The unchanged level of fertility despite a rapid increase in the level of contraceptive prevalence during the past 6 years, while the level of fertility still remains well above the level of replacement fertility, raised questions about the policy measures in order to complete the demographic transition.

The steep decline in fertility since 1975 has corresponded with the rise in CPR up to 1993-94 in Bangladesh. Using the relationship between TFR and CPR during this period to predict future fertility, researchers argued that a replacement level of fertility could be attained in Bangladesh by raising the CPR at a level of 70 percent. However, results of the last two BDHS in 1996-97 and 1999-2000 demonstrated that despite an increase in CPR over the period 1994-2000, the TFR has remained at the same level of 1993-94 (Mitra et al., 2001). Even in Matlab experimental area (a research station of ICDDR,B), which boasts of its intensive FP service delivery system resulting in a sharp increase in the level of the CPR to 70 percent, the TFR had remained at the vicinity of 3 births for the last several years (Bairagi 2001). This raises concern among researchers, policy makers and programme managers about the prospect of attaining the replacement level of fertility in Bangladesh in the near future.

Another important element in the level of fertility as mentioned by Freedman et al. (1994) and Bongaarts and Feeney (1998) is that births either postponed by marrying later or births occurring either earlier or later than the previous cohorts can make the conventional TFR misleading. Bongaarts and Feeney showed that the conventional TFR is comprised of two components attributable to quantum and tempo effects. It has been observed that delayed marriage can play an important role in reducing the level of fertility through reduction of childbearing span. However, the level of fertility appears to be a function of not only age at marriage, and hence of age at first birth, but on interval between subsequent births as well. It has been shown by Bongaarts and Feeney (1998) that upward or downward shift in age at childbirth for each birth order can distort the measure of fertility level, TFR, to a great extent, and thus the quantum effect cannot be estimated properly due to distortion caused by the tempo effect (change in mean age at births for each parity). This paper examines critically the role of quantum and tempo effects on the level of fertility.

It may be mentioned here that the gradual shift of the young age structure towards the childbearing period will result in an unprecedented growth in the size of population in the future. This population will continue to increase rapidly even after attainment of the replacement level fertility. The effect of momentum can be reduced and the level of fertility can be decreased substantially by delaying age at marriage as well as by widening the space between consecutive births (Bongaarts, 1996). A close examination of the role of these factors can provide useful indications about the future pattern of fertility decline.

The projected population of Bangladesh will be examined for different variants of assumptions in order to display the increase in the number of children under 5, women in childbearing ages, size of the projected population in the labour force, increase in the elderly population, etc. This paper will discuss critically the consequences of population growth, attributable to the trend in the emerging age-sex composition of population, on the growth of economy. The resultant impact of the population momentum will be discussed in the light of potential impact on the growth of the economy of Bangladesh.

Population ageing is a major by-product of the demographic transition which has occurred in most areas of the world. In the developed countries, where the demographic transition started earlier, the elderly population already forms a significant proportion of the total population. In the developing countries, ageing issues have only recently begun to emerge as a cause of concern. This is because ageing is a macro view of an entire population and the proportion and number of older persons in most of these countries are still quite low. However, in the coming decades, population ageing will occur over a large part of Asia and the Pacific. Unlike in the developed countries, population ageing will occur under less modernised and in under-developed economies in Asia. Also, in this region, a much larger number of families live under the poverty line or do not have adequate housing, healthcare and clothing, and the majority of the elderly population are in the rural areas where poverty is a serious problem. In Bangladesh, during the phase of population momentum, within the next forty to fifty years, the increase in the old age population will pose a formidable challenge to the policy makers if necessary measure to take care of the old age population is not considered with top priority.

2. Demographic Transition: Situation in Bangladesh

The demographic transition refers to changes in demographics (population parameters) that occur during the transition from an agricultural to an industrial society. These changes lead to population stabilisation. Specifically, the demographic transition refers to four stages that nations tend to go through as they develop. The transition is theoretical. The stages in the idealised transition are: (i) birth and death rates are both high; (ii) birth rate is high and death rate dropping; (iii) birth rate begins to decline, death rate is still low; and (iv) birth and death rates are both low, and in balance.

The world population increased greatly due to stage 2 of the demographic transition. During this stage due to low mortality and very high fertility, population increases at a very rapid pace. To minimise the impact of stage 2, stage 3 needs to be entered and completed at a short span of time. To achieve population stabilisation, stage 3 must be completed.

Due to advances in public health, childhood vaccines, food subsidies, etc. the decline in mortality could be materialised at a rapid pace. However, decline in birth rates requires changes in values which must then be translated into changes in behaviour. Decreasing birth rates is not simply a matter of providing access to contraceptives.

It seems that, as nations move through the demographic transition (usually with an accompanying shift from an agriculturally-based economy to an industrially-based economy), birth rates begin to decline for several related reasons, such as: (i) economic development, (ii) changes in the status of women and other social changes, particularly related to increased opportunities for education and social security, (iii) decreased infant and child mortality.

2.1 Current Status

2.1.1 *Population*

The population of Bangladesh was estimated around 14.5 millions in 1801 (Roy and Dasgupta, 1976; Islam, 1995). It took about 100 years to double the size of population in the year 1901. The population was growing at a modest rate of less than 0.7 percent per year during the most part of 1801-1901. In other words, the total population increased by 14.4 millions in 100 years. However, the same size of increase in population was observed during approximately the next fifty years. Since then, the increase in population was very rapid. During 1951-74 period, the population increased by about 29 million, in a period of only 23 years. However, it was more rapid during the next 27 years, an increase of about 60 millions was evident during 1974-2001. Table 2.1.1 shows the pace of growth of population since the independence of Bangladesh. The population growth rate is still very high although decreased from the previously recorded higher rate of above 2 during the 1974-91 period.

Table 2.1.1: Pre-censual Population Estimates and Census Enumerations of Population of Bangladesh, 1801-1991

Year	Population (millions)	Growth Rate (%)
1801	14.5	0.67
1811	15.5	0.63
1821	16.5	0.70
1831	17.7	0.66
1841	18.9	0.71
1851	20.3	0.67
1861	21.7	0.67
1871	23.2	0.67

1881	24.8	0.67
1891	26.9	0.81
1901	28.9	0.72
1911	31.6	0.89
1921	33.3	0.52
1931	35.6	0.67
1941	42.0	1.65
1951	41.9	-0.02
1961	50.8	1.93
1974	71.3	2.61
1981	89.9	2.35
1991	111.5	2.17
2001	129.3	1.47

Source: 1. Roy and Das Gupta, 1976,
2. BBS, 1994; 2001

2.1.2 *Declining Mortality*

The death rate was consistently high, around 45 per thousand population, until 1921. The mortality declined to about 40 per thousand during 1921-51 period. However, the onset of a fast decline in the level of mortality was observed in 1951-61 period to 30 per thousand population and further declined to 19.4 in 1961-74 and to 8.6 in 1994. According to the BBS estimates, the Crude Death Rate was 4.8 per thousand population in 1998 (BBS, 2002). This is somewhat underestimated but the declining trend in the level of mortality can be clearly indicated from the estimates.

In other words, the level of overall mortality has declined to a level, close to a potential minimum. The only important tasks in the reduction of mortality can be materialised through declines in the levels of infant and child mortality rates as well as in the level of maternal mortality rate. These rates are still very high compared to other countries that completed the Stage II of the demographic transition.

The infant mortality rate (IMR) was as high as 205 per thousand live births in 1911 and it was consistently above 150 per thousand live births until 1951. In 1971, it declined to 125 and then during the period 1971-99, the IMR decreased to 66 per thousand live births. Although the reduction in IMR seemed to be rapid compared to that of the rate prevailing prior to independence of Bangladesh, still the rate is considered as very high compared to the achievements made in the overall mortality as well as in the level of fertility. Without a further decline in the level of IMR, it would be difficult to further reduce the level of fertility.

Table 2.1.2 : Estimated Crude Birth and Death Rates for Bangladesh, 1881-1999

Period	CBR (per thousand)	CDR (per thousand)
1881-91	-	41.3
1891-01	-	44.4
1901-11	53.8	45.6
1911-21	52.9	47.3
1921-31	50.4	41.7
1931-41	52.7	37.8
1941-51	49.4	40.7
1951-61	51.3	29.7
1961-74	48.3	19.4
1976	47.0	-
1971-80	-	17.2
1986	38.9	11.9
1989	-	11.4
1994	27.8	8.6
1998	19.9	4.8

Source: 1. ESCAP, 1981
2. Cleland and Streatfield, 1993
3. BBS, 1994, 2000
4. Planning Commission, 1987

2.1.3 Declining Fertility

The onset of decline in the level of fertility was initiated in the mid-seventies (Islam, 1986; 1995; 2002). However, the Crude Birth Rate (CBR) was 50 or higher per thousand population until 1961. The CBR was 47 per thousand population in 1976 that declined to 38.9 in 1986 and 19.9 in 1998. Like CDR, the estimates provided by BBS for CBR, seems to be underestimated to some extent, however, the rapid decline in the level of fertility from 47 per thousand population in the mid-seventies can be easily traced.

Table 2.3: Infant Mortality Rates, 1911-94

Year	IMR (per thousand live births)
1911	205
1921	198
1931	179
1951	168
1961	144
1971	125
1981	128
1989	99
1994	82
1999	66

Sources: 1. ESCAP, 1981
2. BFS, 1989
3. BBS, 1995

Table 2.4 Total Fertility Rates, 1960-2000

Year, Source	TFR
1960-62, NIS	7.6
1963-65, NIS	7.0
1966-68, NIS	6.0
1975, BFS	6.3
1983, CPS	4.94
1985, CPS	4.61
1989, CPS	4.88
1991, CPS	4.26
1993-94, DHS	3.44
1994, HDS	3.67
1996-97 DHS	3.27
1999-00 DHS	3.3

Source: 1. Cleland et al., 1994
2. BBS, 1995
3. Islam et al., 2002

Table 2.4 displays that the total fertility rate declined from above 6 prior to 1971 to 5.4 in the mid-seventies. The level of fertility declined from 6.3 to 4.3 during the period1975-91 , however, the decline in TFR during the five year period 1991-96. The fertility declined by one child during this period. Among other reasons, without any debate, we can attribute this decline mostly as a result of continuous support for the family planning programmes. This has been examined critically by the present author (Islam, 1995, 1996, 1998) and others (Cleland et al., 1994). The cumulative impact of the family planning programmes since the independence of Bangladesh had a delayed impact in declining the level of fertility. Table 2.5

shows the increase in the level of contraceptive prevalence rate (CPR) during the same period. It is observed that CPR increased from 7.7 percent to 39.9 percent during the period 1975-91, and then to 49.2 percent in 1996. However, the level of fertility has been plateaued since then although there was a steady rise in the contraceptive prevalence during 1996-97 to 1999-00.

Table 2.5: Contraceptive Prevalence Rates in Bangladesh, 1975 to 1999- 2000

Year	1975	1989	1991	1993-94	1996-97	1999-2000
Measure	BFS	BFS	CPS	BDHS	BDHS	BDHS
CPR	7.7	30.8	39.9	44.6	49.2	53.8
Modern	5.0	23.2	31.2	36.2	41.6	43.4
Traditional	2.7	7.6	8.7	8.4	7.7	10.3

2.2 Age at Marriage

Age at marriage is one of the most important determinants, which provides the lower limit of effective time span for childbirth in a traditional setting like Bangladesh. If the effective time span is long then it is likely that women may have to give birth to more children, wanted or unwanted. It is likely that if marriage takes place at an early age then the first pregnancy also starts at an early age. The singulate mean age at marriage for females was very low in 1931, only 12.6 years. During the period from 1931 to 1974, the mean age at marriage increased by 3.3 years. Since 1974, the mean age at marriage increased to 20.2 years. This indicates that still a large proportion of women marry at ages below 20 years. This increases the risk for both mother and child and results in high infant mortality rate, as well as, high maternal mortality rates. Hence, a low age at marriage not only elongates the reproductive life span but also causes high risk for both mother and child due to high incidence of pregnancy related complications.

Table 2.6: Singulate Mean Age at Marriage for Females, 1931-1998

Year, Source	SMAM
1931, Census	12.6
1941, Census	13.7
1951, Census	14.4
1961, Census	13.9
1974, Census	15
1981, Census	17.8
1991, Census	17.9
1998, SVR	20.2

Source: BBS, 1994; 2002

2.3 Precondition for Attaining Mean Ideal Number of Children

To illustrate the preconditions for attaining the mean ideal number of children, the Demographic and Health Survey data are employed for different divisions. On the basis of trends in regional differentials as displayed in Table 2.7, the relationship between the decline in TFR and the mean ideal number of children for Bangladesh has been demonstrated in this section. Islam et al. (2002) displayed a brief account of such relationship for explaining the underlying reason for temporary plateauing of the fertility level in Bangladesh.

Fertility reached the lowest level in Khulna division in 1996-97, and since then although there was a slight increase in the level of CPR, the fertility level increased from 2.5 in 1996-97 to 2.7 in 1999-2000 (Table 2.6). Similar increase in TFR was evident in Rajshahi division from 2.8 to 3.0 during the same period. Interestingly, during the same period, all the low and

medium performing regions registered steady decline in the level of TFR. These declining trends in TFR seemed to be at par, with corresponding increase in the level of CPR, unlike the high performing region of Khulna. According to Islam et al. (2002), this increase was attributable to the relationship between child mortality, ideal number of children and TFR. This relationship is demonstrated below with an example for the Khulna division.

Table 2.7: Regional Differentials for Some Selected Characteristics

Characteristics/ Year	Division					
TFR	**Barisal**	**Chittagong**	**Dhaka**	**Khulna**	**Rajshahi**	**Sylhet**
1993-94	-	3.95	3.45	3.20	3.03	-
1996-97	3.31	4.06	3.18	2.52	2.78	4.20
1999-2000	3.26	3.96	3.21	2.70	3.02	4.08
Adolescent Pregnancy (%)						
1993-94	33.6	25.1	33.7	34.9	41.0	-
1996-97	33.5	31.1	35.3	36.1	43.8	24.1
1999-2000	30.8	26.4	35.0	41.6	42.9	22.2
CPR						
1996-97						
Any Method	49.4	37.2	49.8	61.9	58.6	20.1
Any Modern Method	41.0	30.8	42.1	51.0	51.0	16.0
% Modern	83.0	82.8	84.5	82.4	87.0	79.6
1999-2000						
Any Method	59.2	44.1	53.9	64.0	58.6	34.0
Any Modern Method	45.7	34.9	42.1	50.8	51.1	25.0
% Modern	77.2	79.1	78.1	79.4	87.2	73.5
Sterilisation Regrets						
1996-97	10.4	11.6	9.5	8.7	10.2	-
1999-2000	9.5	7.4	10.0	23.2	9.5	-
Unmet Need						
1996-97						
For Spacing	9.3	10.6	7.6	5.9	6.2	10.1
For Limiting	9.0	10.6	8.9	4.6	4.9	11.2
Total Demand for FP	69.2	60.4	67.2	73.7	72.1	42.3
% Demand Satisfied	73.6	64.9	75.4	85.6	84.5	49.6
1999-2000						
For Spacing	9.0	9.9	7.6	5.9	6.9	12.6
For Limiting	6.3	9.5	7.9	4.8	5.9	9.8
Total Demand for FP	76.0	65.2	71.3	76.4	73.1	57.5
% Demand Satisfied	79.8	70.2	78.2	86.0	82.5	61.0
Mean Ideal Children						
1996-97	2.5	2.8	2.4	2.3	2.3	2.9
1999-2000	2.5	2.8	2.4	2.3	2.5	3.0
Wanted Fertility Rate						
1996-97	2.0	2.6	2.0	1.8	1.8	2.9
1999-2000	2.1	2.6	2.2	1.9	2.1	2.9
Infant and Child Mortality						
1996-97						
Neonatal Mortality	53.1	42.0	52.0	51.8	64.3	85.2
Postneonatal Mortality	33.1	34.7	38.8	23.3	30.3	52.7
IMR	86.3	76.8	90.8	75.2	94.6	138.0
Child Mortality	36.4	59.0	43.8	12.5	34.9	47.8
Under 5 Mortality	119.5	131.3	130.7	86.8	126.2	179.1
1999-2000						
Neonatal Mortality	47.5	40.8	51.8	47.1	49.7	81.7
Post neonatal Mortality	28.2	28.6	32.1	17.2	26.6	45.2
IMR	75.7	69.4	83.9	64.3	76.2	126.9
Child Mortality	35.7	43.6	34.1	15.7	26.7	40.1
Under 5 Mortality	108.7	109.9	115.1	79.1	100.9	161.9
Prenatal Mortality	39.4	46.9	55.0	58.1	63.5	92.3

Let us denote the following:

Mean Ideal Number of Children = I;

Mean Number of Children Born to a Woman = B;
Probability of Dying for Reaching the 5th Birthday = ${}_5q_0$;
Probability of Surviving until the 5th Birthday = 1 - ${}_5q_0$ = ${}_5p_0$;
Mean Number of Births Surviving their 5th Birthday = B . (1 - ${}_5q_0$)= B . ${}_5p_0$;
Mean Number of Children Dying Before Reaching 5th Birthday = B . ${}_5q_0$.

Hence, naturally, TFR ceases to decline if

$$B.(1-{}_5q_0) \le I$$

or,
$$B \le \frac{I}{(1-{}_5q_0)}$$

This indicates the fact that the mean ideal number of children is equivalent to the mean number of surviving children from birth until their 5th birthday.

For the Khulna division, let us examine this rule. The data are taken from Table 2.7
Let us consider that B=TFR for the year 1996-97.
Mean number of children born to a woman in the Khulna division: B = 2.7;
Mean ideal number of children in the Khulna division in 1996-97: I = 2.3;
Under 5 mortality as obtained from 1996-97 data which is employed here to estimate (approximately) the probability of dying before reaching 5th birthday: ${}_5q_0 = 0.087$.

Hence using the inequality shown above, we observe for Khulna:

$$B \le \frac{2.3}{(1-0.087)} = \frac{2.3}{0.913}$$

or,
$$B \le 2.5$$

This shows that the mean number of surviving children was exactly 2.5 when TFR reached the minimum level in Khulna for given under 5 mortality. So when under 5 mortality is still high, it is almost an impossible task to attain replacement level, unless women desire for even a lower mean number of ideal children. It may be noted here that to attain replacement level fertility, the mean number of ideal children should be around 2.1-2.2. Hence, attainment of mean number of ideal children does not ensure attainment of replacement level fertility, but it requires a further push in the behavioural and cultural contexts of a society. These changes occurred in the developed countries through an irreversible process in the societies, in response to the needs of industrial revolution. Hence, without a rapid transformation in the growth of the economy, the behavioural and cultural changes are difficult to achieve. It can be shown from the above inequality that TFR=2.1 can be obtained under given under 5 mortality only if mean ideal number of children reduces to 1.9.

2.4 Attainment of Replacement Level Fertility

Table 2.7 displays very important roles of both child survival and mean ideal number of children in determining TFR. It clearly indicates that the fertility will always be higher than the mean ideal number of children. The mean ideal number of children can be hypothesised to represent the mean surviving number of children among the mean number of births a woman would have experienced in her reproductive life.

Table 2.6 shows that the mean ideal number of children is the lowest in Khulna, which is 2.3. The highest mean ideal number of children are observed in the low performing regions, Chittagong and Khulna divisions, 2.8 and 3.0 respectively. There is no change in the mean number of ideal children during 1996-97 to 1999-2000 period, hence, it does not depend on the increase in contraceptive prevalence, rather, the rise in CPR may be considered to have an upper limit determined by the mean ideal number of children.

From the above discussion, the possibility of attainment of the replacement level fertility seems to be a daunting task, if socio-economic conditions are not improved very rapidly. In this case, the two most important factors that can have the role of catalyst is the universal quality education beyond primary level, with emphasis on the technical skill. The education factor can be thought of as a key in transforming a largely uneducated population from unskilled labour to skilled personnel who can be involved in income generating activities at a rapid pace. The utilisation of a large number of population in working ages for productive purposes, through adequate and appropriate education, can play the most vital role in increasing the average per capita income, as well as, in accelerating the level of fertility. This was proved as instrumental in the realisation of the East Asian Miracle.

There is a negative association between mean ideal number of children and education, similarly between TFR and education of women in reproductive ages. Table 2.8 shows that the mean ideal number of children is highest for women with no schooling (2.7) in 1999-2000 and lowest for women with secondary or higher level of education (2.3). There is no substantial variation in the mean ideal number of children in 1996-97 and 1999-2000. Similar observation can be made for TFR by education of women. However, the desired fertility rate has already reached the replacement level or even lower for the women having primary or higher level of education. On the other hand, the level of TFR is already close to the replacement level for women with secondary or higher level of education. All these figures indicate that education above primary level for the girls can accelerate the process of attaining replacement level at a rapid pace. Similarly, on the basis of regional variations, we observe that estimates for wanted fertility indicates that replacement level fertility is favoured in Khulna, Rajshahi, Barisal and Dhaka. By contrast, the wanted fertility in Chittagong and Sylhet are still very high, 2.6 and 2.9 respectively. In other words, except in Chittagong and Sylhet, a rapid decline in under 5 mortality may accelerate the attainment of replacement level fertility rapidly as well.

Table 2.8: Mean Ideal Number of Children, Wanted Fertility and Total Fertility by Level of Education of Respondents, 1996-97 and 1999-2000

	Level of Education of Respondents			
	No Education	**Primary**	**Secondary or Above**	**Total**
Mean Ideal Number of Children				
1996-97	2.6	2.4	2.2	2.5
1999-00	2.7	2.5	2.3	2.5
Wanted Fertility				
1996-97	2.5	2.1	1.6	2.1
1999-00	2.8	2.2	1.8	2.2
Total Fertility Rate				
1996-97	3.9	3.2	2.1	3.3
1999-00	4.1	3.3	2.4	3.3

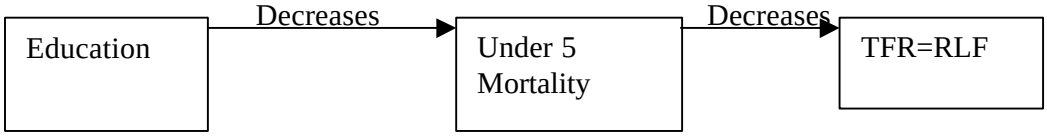
To attain replacement level fertility, education of women can be instrumental for another reason. We observe from Table 2.9 that under 5 mortality is negatively associated with level of mothers' education.

Table 2.9: Under 5 Mortality in Bangladesh by Level of Mothers Education, 1993-94 to 1999-2000

	Highest Educational Level of Mother			
Survey	**No Education**	**Primary**	**Secondary or Higher**	**Total**
BDHS 1993/94	170.6	124.6	90.2	149.7
BDHS 1996/97	144.6	112.0	78.4	127.8
BDHS 1999/2000	130.4	99.9	67.5	110.0

Table 2.9 is based on data from ten years preceding the date of survey. However, a clear trend emerges from this table. During 1993-2000, the under 5 mortality declined for all the education categories. In all these surveys, the strong negative association between level of education and level of under 5 mortality is pronounced. There is a decline in under 5 mortality, but it is not as fast as the decline in overall mortality. For mothers with primary or no schooling, the under 5 mortality remains at a very high level of 100 or more deaths per thousand live births. By contrast, the mothers having secondary or higher level of education, the under 5 mortality is much lower, 68 per thousand live births according to the BDHS 1999-2000 survey, as compared to that of 130 per thousand live births for no education and 100 per thousand live births for primary level education of mothers. Hence, universal education as well as increased level of education can accelerate the process of demographic transition faster.

On the basis of our discussion in this section, the relationship between education and attainment of replacement level fertility (RLF) can be demonstrated by the following flow diagram.



Flow Diagram 2.1 Relationship Between Education and Fertility

In the above diagram, it is emphasised on the basis of our discussion that if we provide universal education to every one, including the girls, and increase the mean years of schooling, then the obvious impact will be a steady decline in the level of under 5 mortality. As a result of a decline in under 5 mortality, the TFR will also decrease, and the rate of decrease will be faster if the mean years of schooling can be improved to secondary or higher level. If the under 5 mortality is reduced to an extent discussed in the relationship between TFR and mean ideal number of children, then the TFR approaches replacement level fertility. The pace of attaining replacement level fertility depends on the pace at which the changes in the necessary inputs such as education and under 5 mortality are implemented.

2.5 Exploring the Reasons for Plateauing of Fertility

As mentioned in the previous section, although CPR increased steadily during 1996-97 to 1999-2000, the resultant impact was not evident on TFR. Islam, Chakraborty and Islam (2002) examined this issue from various perspectives and concluded that the decline in fertility slows down when the fertility approaches replacement level, if the infant and child mortality remain

high. In other words, the level of fertility remains higher than the replacement level and taking account of the survival of children, the fertility level does not decline below the survived number of ideal children. In the high performing regions of Bangladesh (Khulna and Rajshahi divisions), all the indications were there in 1996-97 that TFR was approaching replacement level, and expected to attain replacement level fertility by 2000 as observed from the past trend, showed an unexpected upward bounce in TFR.

Islam et al. (2002) observed the following reasons for plateauing of TFR:

A. Share of Total Fertility-Inhibiting Effects:

1. Share of total fertility-inhibiting effect of Marriage: Share of fertility-inhibiting effect of marriage increased from 12 percent in 1993 to 14 percent in 1999-2000.
2. Share of contraception: Share of contraception increased from 49 percent in 1993 to 58 percent in 1999-2000.
3. Share of postpartum infecundability: Share of postpartum infecundability declined from 39 percent in 1993 to 28 percent in 1999-2000.

Hence, the role of contraception remains increasingly important as the major component in the share of total fertility-inhibiting effects.

B. Decomposition of Change in TFR During 1975-1993 and 1993-99:

1. Marriage contributed a decline of 0.18 births during 1975-93 and 0.14 births during 1993-99 period.
2. Contraception contributed a decline of 2.42 births during 1975-93 and 0.48 births during 1993-99.
3. Postpartum infecundability contributed an increase of 0.39 births during 1975-93 and 0.41 births during 1993-99.

These findings show that effects of marriage and contraception are offset to a large extent by the effect of postpartum infecundability.

C. Birth Intervals:

Mean birth interval increased by 10 months from 37.8 months in 1989 to 47.8 months in 1993, but it remained almost unchanged during 1993-99 period. This indicates that birth interval did not contribute to the decline in the level of fertility during 1993-99 period.

D. Tempo and Quantum Effect of TFR:

There is an increasing trend in the shifting of mean age at childbirth in Bangladesh. Adjusted TFRs were computed by Islam, Islam and Chakraborty (2002) following the technique suggested by Bongaarts and Feeney (1998). Adjusted TFRs for the periods 1994-96, 1997-99 are 3.76 and 3.91 respectively. This shows that, in the absence of tempo effect, the level of TFR would be higher by 0.5 child in 1993-94 compared to 0.6 child in 1999-2000. This demonstrates an increased effort to widen the spacing of births could effectively reduce the level of fertility in the future.

E. Reversal of Impact of Various Factors During 1993-96 and 1996-99:

During the 1993-96 period age at marriage and age at first birth decreased but continuation of contraception increased, however, these were just the reverse during 1996-99 period. Hence, this reversal of impact on level of fertility might have attributed to a temporary plateauing in TFR.

3. Population Momentum and Economic Growth

During the period of decline in fertility from high to low, the population increases with a great pace, attributing to a sharp increase in the size of population, and more importantly in the size of women population at childbearing ages. Thus the population start to reproduce at much higher numbers even if the level of fertility have been reduced eventually. In other words, the base population size increases to an extent that even with a relatively lower level of fertility, the population size increases at a much higher number even after attaining replacement level fertility.

The population reaches replacement level if the number of women in their reproductive life, is replaced by the same number of the daughters. This measure is based on the number of girls per woman during a reproductive span. However, this measure is based on a stationary population where the birth and death rates are assumed to be constant and equal and the population age composition does not change over time. In reality, though, even if the population attains replacement level fertility, due to relatively heavy young age composition, the population still continues to grow at a fast pace. Hence the absolute number increases even after attaining replacement level of fertility. This process is known as the population momentum. This may be called as an echo effect of a high level fertility. The population momentum is phased off after the young age population becomes stable and is not subject to year to year variation in the number of births, in other words, the total number of births is matched with the total number of deaths in a year and the age composition does not change with time any more. The impact of population is reduced if the level of fertility drops much below the replacement level at a fast pace.

The population momentum results in three distinct phases in terms of the age composition: (i) first phase experiences a rapid growth in absolute number of young people, (ii) second phase of momentum rapidly increases the working age population, and (iii) third phase experiences a rapid increase in the number of elderly population. Bloom and Williamson (1998) showed that the dramatic demographic transition in East Asian countries, which is considered as the most rapid than in any region or historical period, has contributed substantially to the Economic Miracle of East Asia. According to them, the miracle occurred in part because East Asia's demographic transition resulted in its working age population growing at a much faster rate than its dependent population during 1965-90 period. As a result, the per capita productive capacity of East Asian economies enhanced to a great extent. Bloom and Williamson further observed that this virtuous effect was not inevitable rather the prevailing social, economic and political institutions and policies had the flexibility to realise the growth potential created by transition. However, this benefit created by the demographic transition is also transitional in nature, and eventually the demographic change will tend to depress growth rates. Hence, any economy with a very timely economic policy and its proper implementation, can utilise the benefit of demographic transition to the extent that the depressing effect of the future can also be minimised during the transition to ageing. This process begins and ends in such a diversified fashion in a period of 50 years or so that policies need proper adaptation during different stages as mentioned below:

(i) investment during the first phase to develop human resources for the economic growth,

(ii) creation of jobs and economic activities for increasingly large populations entering into the job market every year, and

(iii) investment for increasingly large elderly population every year during the third stage in order to provide social security and health care.

This implies that the economic policies for responding to the issues emerge during demographic transition needs to take account of long-term strategies with short-term modifications at each stage. In other words, the economic policies need to take account of this dynamic process in economic policies so that long-term goals can be achieved through short-term modifications at each stage.

In the past, population pessimists (Coale and Hoover, 1958; Ehrlich, 1968) thought of the negative impact of the population growth, population optimists (Boserup, 1981; Kuznets, 1967; and Simon, 1981) believed in the promotion of technological innovations as a result of population growth, and another group (Bloom and Freeman, 1986; Kelly, 1988) observed that population growth is unrelated to economic growth. However, according to Bloom and Williamson (1998), it was observed that components of population growth, birth and deaths, need to be taken into account because these components shape up the age composition. In other words, population growth affects economic growth through the ratio of working age population to dependent population. For instance, an increased number of elderly population would have an immediate negative impact on economic growth.

At this backdrop, this paper examines the role of age composition in the future as the demographic transition progresses. Islam (2000) discussed this issue on the basis of a set of projections for the period 1991-2051. As the Census data for 2001 are still not available, the projections proposed by Islam (2000) are employed in this paper, in order to highlight the features of transitional age composition of Bangladesh during the period 1991-2051.

The scenarios taken into consideration in this paper are: (i) high fertility variant (HFV) with no change in mortality, and (ii) low fertility variant (LFV) and reduction in mortality. The FAMPLAN model (Chao, 1993) is employed in these projections due to the fact that the success of family planning programmes will be detrimental in the reduction of level of fertility in the future, like the past.

3.1 Projected Population of Bangladesh

The population size of Bangladesh of 1991 will be doubled in forty-eight years in the year 2039 as obtained by high fertility variant. However, if the level of effective CPR is increased and the proportion of never married is assumed to have increased during the period, as evident from surveys, then the population will not be doubled even in 2051. The total population will remain below 200 millions (192.3 millions) in 2051 according to low fertility variant. The size of population will be around 243.9 millions in 2051 as per HFV. Hence an increased level of effective CPR will reduce the size of population by 51.6 millions. The population will grow at a rate of 1.3 percent per year for HFV and 0.91 percent per year for LFV projections. According to Bongaarts (1996) the population size of Bangladesh will be 239 millions in 1950 as compared to that of 242 millions obtained by HFV assumptions.

Recently, a more refined set of projections for the population of Bangladesh was displayed in Islam and Chakraborty (2002), taking account of recent plateauing of the level of fertility by incorporating the fertility rates from 1999-2000. However, these projections cover only a period of 25 years from 1991 to 2015. According to the projections of Islam and Chakraborty

(2002), the total population of Bangladesh will be even higher than that of the HFV numbers due to current plateauing of fertility level.

The projected total population in years 2001, 2011 and 2015 are expected to be 134.9, 170.3 and 183.7 millions respectively. Hence, the policymakers do not have enough time left in order to accelerate the completion of stage 3 of the demographic transition. A further delay in attaining the replacement level fertility may result in a much larger base population that will keep on increasing until the population is stabilised. To reduce the impact of population momentum, the policymakers need to take account of the following strategies: (i) reduction of TFR to below replacement level at a very short span of time, (ii) delay in age at marriage, and (iii) widening space between births.

Table 3.1: Projected Total Population of Bangladesh (in Millions) , 1991-2051

Year	HFV	LFV
1991	111.5	111.5
1996	122.6	121.7
2001	133.2	130.4
2006	145.6	138.9
2011	159.4	148.6
2016	173.1	159.3
2021	185.2	169.1
2026	195.7	176.9
2031	205.9	182.3
2036	216.6	185.5
2041	227.2	188.4
2046	236.3	191.0
2051	243.9	192.3

The projected population and percentage projected population by broad age groups (0-14, 15-64, 65+) are shown in Tables 3.2 and 3.3 for HFV and LFV respectively.

3.2 Young Age Population

High fertility variant projection shows that the young age population follows periods of decrement and increment since 1991. The young age population was 50.6 millions in 1991. The young age population initially declines since 1991 but then will increase to 56 millions in 2051 under high fertility variant projection. However, low fertility variant projection shows that the young age population will decrease to about 35 millions in 2051. Hence, depending on the fertility variant, the size of the young age population may vary to an extent of approximately 20 millions in the year 2051. Under HFV, the young age population will grow at an annual rate of 0.17 percent during 1991-2051, while LFV shows a decline in young age

Table 3.2: Projected Population (in Millions) by Broad Age Groups, 1991-2051

Year	High Fertility Variant Projection			Low Fertility Variant Projection		
	Age Group			Age Group		
	0-14	15-64	65+	0-14	15-64	65+
1991	50.6	57.3	3.7	50.6	57.3	3.7
2001	45.3	83.4	4.5	42.5	83.4	4.5
2011	46.1	107.2	6.2	36.2	106.3	6.2
2021	51.7	124.0	9.6	42.0	117.6	9.6
2031	49.2	141.9	14.8	38.9	128.6	14.8
2041	53.4	154.8	19.0	33.1	136.2	19.0

2051	56.0	158.0	29.9	34.8	127.6	29.9

population during the same period at a rate of 0.62 percent. In other words, the young age population will decline substantially if LFV is followed. However, this is unlikely to happen, due to the plateauing of fertility during the 1993-99 period. From the past trend and taking account of the plateauing of TFR, it is more likely that the population growth will follow HFV projections.

Table 3.3: Percentage Projected Population (in Millions) in Broad Age Groups, 1991-2051

Year	High Fertility Variant Projection			Low Variant Projection		
	Age Group			Age Group		
	0-14	15-64	65+	0-14	15-64	65+
1991	45.3	51.4	3.3	45.3	51.4	3.3
2001	34.0	62.6	3.4	32.6	64.0	3.4
2011	28.9	67.2	3.9	24.3	71.5	4.2
2021	27.9	66.9	5.2	24.8	69.5	5.6
2031	23.9	68.9	7.2	21.5	70.5	8.1
2041	23.5	68.1	8.4	17.6	72.3	10.1
2051	23.0	64.8	12.3	18.0	66.4	15.6

3.3 Women in Reproductive Ages

In the process of population momentum, the number of women in reproductive ages will increase at a fast pace. The number of women in the reproductive ages will continue to increase and as a result the number of births will be higher than expected after attaining the replacement level fertility.

Table 3.4: Females in Reproductive Ages (in Millions) for High and Low Fertility Variants

Year	HFV	LFV
1991	24.59	24.59
2001	35.56	35.56
2011	44.64	44.24
2021	48.45	45.32
2031	54.26	47.76
2041	52.74	43.79
2051	56.29	42.77

Table 3.4 shows the remarkable increase of the women in reproductive ages during 1991-2051. The number of women will increase by 129 percent during the reference period if HFV is considered. The increase for LFV, during the same period, will be about three-fourths of the total number of women in reproductive ages in 1991. In terms of absolute number of women in reproductive span, the difference between HFV and LFV is 13.52 millions. The women population in reproductive ages will increase at a rate of 1.38 percent per year for HFV and 0.92 percent for LFV projections. In the long run, the growth of female population in reproductive ages appears to be slightly higher than the growth of overall population. It is noteworthy though that the growth of females in reproductive ages is relatively very high during 1991-2011. Hence, policymakers have to pay serious attention to the policies related to family planning, maternal morbidity, antenatal care, delivery and postnatal care, etc. for a rapidly growing female population in reproductive ages.

3.4 Population in Working Ages

In 2051, the working age population of Bangladesh will be around 158 millions as compared to that of 57 millions in 1991. So the increase in the number of working age people will be more than 100 millions in 2051 according to HFV. Similarly, LFV projections show that there will be 70 million more people in working ages in 2051.

In 2001, 26 million more people have already joined the working ages to that of 1991, and another 24 million additional people will join the working ages in 2011 as demonstrated by HFV projections. The working age population will grow at a much faster pace than that of the growth of total population for both HFV and LFV. For HFV assumptions, the long-term growth during 1991-2051 will be at a rate of 1.69 percent per year as compared to that of 1.33 percent for LFV during the same period. The growth rate of working age population during 1991-2001 and 2001-2011 are 3.8 percent and 2.5 percent respectively. This indicates that the population age composition of Bangladesh has been going through a rapid transition and already started to add huge numbers to its working ages. This growth will continue to add more people in the working ages, but without an appropriate and timely policy for this potential work force, the country will not be able to utilise this opportunity to transform the demographic transition into an economic transition as well. The increase in working age population in such a large number can be transformed into a productive force in order to accelerate growth of the economy at a much faster rate.

Table 3.3 displays the percentage of population in young, old and working age groups. The percentage of the working age population steadily increases from 51 percent in 1991 to 69 percent in 2031 and then decreases to 65 percent in 2051 as observed from HFV projections. The low fertility variant projection indicates that the working age population will increase to 72 percent in 2041 but then decrease sharply to 66 percent in 2051. This decline in proportion of working age population in 2051 is attributable to a relatively speedy increase in the share of elderly population during 2041-51 period.

Table 3.5 shows the dependency ratio of young and old populations as compared to working age population. The dependency ratio of young population was very high in 1991, 0.88, as compared to 0.06 for elderly population. The overall dependency ratio was close to 1 in 1991. However, ten years later, due to rapid change in the age composition, dependency ratio for young population reduced to 0.54, without any change in the ratio for elderly population. Dependency ratio for young population under LFV seems to be little lower because the level of fertility assumed to decline at a more rapid pace. Then we observe a steady decline in the dependency ratio of young population to 0.35 for HFV in 2031 and thereafter remain unchanged. For LFV, on the other hand, young age dependency reduces further to 0.24 in 2041.

The dependency ratio for elderly population increases gradually to 10 percent in 2031 for HFV and 12 percent for LFV projections. However, during 2031-51 there is a more rapid increase in the elderly population. The dependency ratio for the elderly increases from 0.06 in 1991 to 0.19 in 2051 under HFV projection as compared to that of 0.23 under LFV projection.

For HFV, the combined dependency ratio seems to be lowest (0.45) in 2031 and then gradually it increases to 0.54 in 2051. Similarly, the lowest dependency ratio for LFV is observed in 2041 (0.38) and then increases to 0.50 in 2051. Hence, for the policy makers,

there is opportunity to utilise the favourable per capita productivity until 2031-41, so that per capita income can be increased largely through involving increasingly large population in gainful employments. This situation provides extra leverage to the economy due to decreasing dependency ratio.

Table 3.5: Projected Trend in Dependency Ratio, 1991-2051

	High Variant Projection		Low Variant Projection	
Year	**Young**	**Old**	**Young**	**Old**
1991	0.88	0.06	0.88	0.06
2001	0.54	0.05	0.51	0.05
2011	0.43	0.06	0.34	0.06
2021	0.42	0.08	0.36	0.08
2031	0.35	0.10	0.30	0.12
2041	0.35	0.12	0.24	0.14
2051	0.35	0.19	0.27	0.23

3.5 Population Momentum and Ageing

The population momentum initiates the process of ageing with the decrease in the level of fertility. After the replacement fertility level is achieved, the population continues to get older with the younger population over time. In other words, the declining fertility attributes less share for the younger age groups due to smaller number of births and the share of older age groups increase until the age composition stabilises. This process continues for decades after achieving the replacement level fertility.

Table 3.2 shows that the process of ageing will pose a formidable difficulty in the near future in Bangladesh, irrespective of high or low fertility variant projections. The number of elderly people will increase from 3.7 millions in 1991 to 29.9 millions in 2051. The elderly population will increase at a rate of 3.5 percent per year. This has serious policy implications because, with such a speedy change in the age composition, the policy makers need to focus on the increasingly growing elderly population. Sri Lanka achieved the replacement level fertility in 1993 well ahead of the target (De Silva, 1994). Currently, Sri Lanka is on the way to experience South Asia's most rapid population ageing (Abeykoon, 1996). According to Abeykoon, the rapid process of ageing will demand for a higher proportion of financial resources to be allocated for health care services. This increased allocation is necessary in part due to change in disease patterns as well as to developments in medical technology. In addition, the fast increasing elderly population will demand for increased human care and social security. Hence, it is important to note that such a sharp increase in the elderly population will cause additional pressure not only on the economy of the country but also on social and health aspects of the country as a whole.

4. A Comparative Overview of Population Dynamics and Economic Growth in South Asian Countries

In this section, an overview of population dynamics of South Asian countries is discussed along with some measures of growth output in different sectors. Table 4.1shows that among the South Asian countries, the growth of population in Sri Lanka was the lowest during 1980-2000 (1.4 percent) and it is expected that the growth will decrease to 1.1 percent during 2000-2015. The highest growth rate was observed in Pakistan during 1980-2000 (2.6 percent) and the growth rate will continue to be highest in Pakistan among South Asian countries.

Population growth in Nepal has been close to that of Pakistan. The population growth in Bangladesh and India are seemed to be at par during 1980-2000, and both countries were expecting to attain replacement level fertility by 2005. In the future, the population growth in Bangladesh may remain higher in Bangladesh than that in India. However, the Bangladesh Population Census, 2001 figures show a lower population growth rate.

The young age population appears to be largest in Pakistan (42 percent) and lowest in Sri Lanka (26 percent). On the other hand, the working age population is already very high in Sri Lanka (67 percent) as compared to other South Asian countries, while the lowest is observed in Pakistan (55 percent). Similarly, the proportion of elderly population in Sri Lanka is 6.3 percent as compared to that of 3.1 percent in Bangladesh.

The combined dependency ratio is highest in Pakistan (0.84) and Nepal (0.81) and lowest in Sri Lanka (0.48). In Bangladesh and India, the dependency ratio is in between these extremes. Hence, Sri Lanka has the advantageous economic benefits from low dependency ratio than that of other South Asian countries. Bangladesh and India are approaching to that stage very rapidly.

Crude death rate in all the South Asian countries is 10 per thousand population or lower. Sri Lanka approached to the lowest level, 6 per 1000 population in 2000. However, crude death rate varies from 18 per thousand population in Sri Lanka to 33-34 per thousand population in Pakistan and Nepal.

Two distinct features from Table 4.1 explain the underlying reason for Sri Lanka to become the pioneer in attaining replacement level fertility well ahead of target. The difference between Sri Lanka and other South Asian countries are quite apparent from the indicators of under 5 mortality and adult illiteracy. Sri Lanka reduced the under 5 mortality to 48 per thousand live births in 1980 and further reduced to 19 in 1996. The next lowest under 5 mortality rate was 85 achieved in India in 1996. This indicates that one of the most important barriers of achieving replacement level fertility, under 5 mortality, was reduced substantially by 1980 in Sri Lanka. The adult illiteracy rate for both males and females were very low, 7 percent and 13 percent, in Sri Lanka. This is also quite contrasting to other South Asian countries. India has the lowest adult illiteracy rates for males and females in the rest of South Asian countries, 35 percent and 62 percent, respectively.

Table 4.1: Population Dynamics in South Asian Countries

Indicators	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Total Population (in millions)					
1980	85.4	687.3	14.6	82.7	14.7
2000	131.1	1015.9	23.0	138.1	19.4
2015	167.7	1227.9	31.1	192.8	23.0
Average Annual Population Growth Rate (%)					
1980-2000	2.1	2.0	2.3	2.6	1.4
2000-2015	1.6	1.3	2.0	2.2	1.1
Population Age Composition, 2000 (%)					
0-14	38.7	33.5	41.0	41.8	26.3
15-64	58.2	61.5	55.2	54.5	67.4
65+	3.1	5.0	3.7	3.7	6.3

Dependency Ratio, 2000					
Young	0.66	0.54	0.74	0.77	0.39
Old	0.05	0.08	0.07	0.07	0.09
Crude Death Rate Per 1000 People					
2000	9	9	10	8	6
Crude Birth Rate Per 1000 People					
2000	28	25	33	34	18
Under 5 Mortality Rate Per 1000					
1980	207	173	179	161	48
1996	112	85	116	123	19
Adult Illiteracy Rate (15+), 1996 (%)					
Males	51	35	59	50	7
Females	74	62	86	76	13

Source: World Bank, World Development Report, 1998/99; 2002

The economic performance in South Asian countries is displayed in Table 4.2. Average annual growth in GDP for the periods 1980-90 and 1990-2000 are compared. In addition, average annual growths in agriculture, industry, manufacturing and service sectors are also shown. The average annual growth of GDP in Sri Lanka increased from 4 percent during 1980-90 to 5.3 percent during 1990-2000. However, India maintained a higher average during these periods, 5.8 percent in 1980-90 and 6 percent in 1990-2000. Pakistan suffered a set back, where average annual growth decreased from 6.3 percent in 1980-90 to 3.7 percent in 1990-2000. Bangladesh and Nepal maintained a modest average annual growth rate 4.3 and 4.6, respectively, in 1980-90 and 4.8 and 4.9 respectively in 1990-2000.

The predominant role of the agriculture sector has been diminished in the growth of the economy during the recent past. The growth of the agriculture sector appears to be the lowest as compared to that of industry, manufacturing and service sectors. Both Pakistan and Nepal seemed to have the highest rate of growth in agriculture sector, 4.3 percent in 1980-90 and 4.4 percent during 1990-2000. In Bangladesh, the growth in agriculture sector was less than 3 percent, 2.7 percent in 1980-90 and 2.9 percent in 1990-2000. On the other hand, Sri Lanka demonstrated the lowest growth in agriculture, 2.2 percent in 1980-90 and 1.9 percent in 1990-2000.

Bangladesh has registered a remarkable increase in the growth of the industrial sector from 4.9 percent in 1980-90 to 7.3 percent in 1990-2000 similar to that of Sri Lanka. However, Pakistan, Nepal and India demonstrated a decline in the growth of the industrial sector. For Pakistan, the decline in growth was from 7.3 percent in 1980-90 to 3.9 percent in 1990-2000. Both Bangladesh and Sri Lanka showed steady increase in the manufacturing sector from 3 percent and 6.3 percent to 7.2 percent and 8.1 percent respectively. In Pakistan, the growth of manufacturing sector reduced substantially from 7.7 percent during 1980-90 to 3.5 percent during 1990-2000. In manufacturing sector, India and Nepal retained their high growth rates of 7 percent and 9 percent, respectively. India maintained the highest growth in service sectors in both 1980-90 (7 percent) and 1990-2000 (8 percent). Sri Lanka showed an increase in the growth of the service sector from 4.7 percent to 6 percent, however, the growth of the service sector in Bangladesh remains the same (4.4-4.5 percent) during 1980-2000.

Among the South Asian countries, only Sri Lanka achieved the replacement level fertility well ahead of target. Bangladesh and India are behind Sri Lanka, expected to attain replacement level fertility by 2005 but current fertility level indicates that there will be delay in attaining the target. The working age population in Sri Lanka has increased rapidly and the dependency ratio decreased to a great extent. This provides Sri Lanka an opportunity to utilise the additional workforce in order to improve the economic performance at a very rapid pace. During this stage, a low dependency ratio will be crucial in increasing the per capita income. However, the growing elderly population will soon have a depressing impact on the growth of economy of Sri Lanka. In Bangladesh and India, if the process of attaining replacement level fertility is delayed further, then the base population size will be much larger implying a much higher growth of absolute population during population momentum.

Table 4.2: Average Annual Growth of GDP and Its Components In South Asian Countries During 1980-90 and 1990-2000

Average Annual Per cent Growth										
Country	**GDP**		**Agriculture**		**Industry**		**Manufacturing**		**Services**	
	1980-90	**1990-00**	**1980-90**	**1990-00**	**1980-90**	**1990-00**	**1980-90**	**1990-00**	**1980-90**	**1990-00**
Bangladesh	4.3	4.8	2.7	2.9	4.9	7.3	3.0	7.2	4.4	4.5
India	5.8	6.0	3.1	3.0	6.9	6.4	7.4	7.0	7.0	8.0
Nepal	4.6	4.9	4.0	2.5	8.7	7.2	9.3	9.2	3.9	6.2
Pakistan	6.3	3.7	4.3	4.4	7.3	3.9	7.7	3.5	6.8	4.4
Sri Lanka	4.0	5.3	2.2	1.9	4.6	7.0	6.3	8.1	4.7	6.0

5. Conclusion

This paper examined the current status of demographic transition in Bangladesh and highlighted the major policy concerns stemming from the dynamics of population. In the past, due to failure in recognising the role of dynamics of age composition on the economic growth, the relationship between economic and population growth could not be revealed. Recently, it has been observed from the experience of East Asian Miracle that demographic transition can be utilised in a very useful manner, in order to accelerate the growth of economy at a rapid pace. This is possible because demographic transition produces an increasingly large population in working ages and thus decreasing the dependency ratio. This benefit of demographic transition is not obvious because it requires careful plan and implementation in order to improve the quality and level of human capital. In other words, the gain from demographic transition relies heavily on the policymakers and implementers.

The current status of demographic transition in Bangladesh reveals that the level of mortality has declined to a great extent, the level of fertility declined at a moderate pace to 3.3 and then plateaued during the recent past, and the use of family planning methods has been increasing steadily. It has been displayed in this paper that due to a high under 5 mortality rate, it would be difficult to decrease the level of fertility further, because the number of surviving children decreases below the average ideal number of children. Hence, the fertility level bounces back to a higher level while approaching replacement level fertility. It has been shown in this paper that universal education with increased mean years of schooling can reduce under 5 mortality thereby reducing the fertility to replacement level.

The impact of population momentum can be reduced through some deliberate efforts. The policy strategies are instrumental in order to complete stage 3 of the demographic transition in Bangladesh. Bangladesh needs to complete stage 3 of the demographic transition, at the shortest

possible span of time, so that the base population remains relatively small. Three possible means to keep the impact of population momentum relatively small are:

(i) to achieve replacement level fertility soon and, if possible, to reduce the level of fertility further below replacement level,

(ii) to increase mean age at marriage particularly through increased support towards universal primary education, and through increasing secondary or higher level of schooling for all, especially for girls (in order to reduce the current gap between males and females), and

(iii) to encourage further widening space between births.

The population dynamics for the future as well as potential impacts of the change in age structure on the economy are highlighted in this paper. It is observed that the working age population of Bangladesh will increase rapidly as compared to the young age and elderly populations until 2031-41, depending on the high or low fertility variant of projections. During this period, the dependency ratio will decrease substantially, and thus create opportunity to increase per capita income through proper involvement of working age population in productive activities.

The problem of ageing will have an increasingly depressing impact on the economy in the future. Benefits of decreasing dependency ratio can be transformed into economic growth, and thus increased allocation for health care and social security for the elderly can be materialised. During the transitional phase, from the attainment of replacement level fertility to stabilisation of age-sex structure, adjustments in policies will be required in order to take account of the change in age structure. Without a long-term plan with provision for short-term adjustments, it would be difficult to achieve the targets of integrating a rapidly growing working age population into the economic activities for a sustained economic growth at a great pace within a short span of time.

For accelerating the demographic transition, as well as, to prepare the rapidly growing working age population for economic activities, improved and higher level of education with scope for skill development through vocational and technical education in response to demands, appears to be the single most important factor. Leete and Alam (1999) observed that the rapid decline in infant and child mortality helped to promote and desire for small families in achieving Asia's demographic miracle in some Asian countries. According to them, the major contributing factor that affected the demand for children was undoubtedly the spread and upgrading of schooling that resulted in decline in illiteracy of females of reproductive ages. Leete and Alam (1999) further noted that the late 1960s onwards, governments throughout eastern and south-eastern Asia made major investments in education, particularly in primary education, as well as in health, especially in rural health, safe water and sanitation programmes. Although these facts are known by now, but still there are lack of coordinated efforts to improve the level and quality of schooling in South Asian countries, other than Sri Lanka. Haq (1997) gave glowing examples of quality of education in the rest of the South Asian countries. Currently, Bangladesh spends about 2 percent of the GDP for education, which is grossly inadequate to face the challenges of the ongoing demographic transition in Bangladesh. Hence, there is a need to review the current status of economic policies in the light of future challenges so that the inevitable and irreversible process of demographic transition can be transformed into a process of economic growth.

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