

Demographic transition and the emerging windows of opportunities and challenges in Bangladesh

M. Mazharul Islam¹

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Abstract The aim of this paper is to examine the demographic transition and the emerging window of opportunities and challenges in Bangladesh. The study utilizes time series data from national level population surveys, censuses and the population projections and estimates produced by the United Nations Population Division. The ongoing demographic transition in Bangladesh leads to many changes in the size and age structure of the rapidly growing population of the country, giving rise to economic and social opportunities as well as policy challenges. The window of opportunity that has emerged since the 1990s will not last long and will not be repeated in the near future. It will reach its peak during the 2020s and will remain open until the 2030s. This demographic dividend needs to be managed efficiently in order to be transformed into better and sustainable economic growth. Understanding demographic challenges must therefore be a priority for the Government of Bangladesh, which must formulate policies to harvest the benefits of the demographic opportunities.

Keywords Demographic transition · Window of opportunity · Demographic bonus · Demographic dividend · Age structural transition · Bangladesh

Introduction

Demographic transition in a country, in general terms, occurs as the population of the country moves from high levels of mortality and fertility to low and stable levels of mortality and fertility (Kirk 1996; Lee 2003; Caldwell et al. 2006). Over the last few decades, as both fertility and mortality are declining in almost all countries of

✉ M. Mazharul Islam
mmazhar.islam@yahoo.com; mislam@squ.edu.om

¹ Department of Mathematics and Statistics, College of Science, Sultan Qaboos University, Al-Khoudh, P.O. Box 36, 123 Muscat, Sultanate of Oman

the world, many countries have already undergone and others are currently undergoing their demographic transition (United Nations 2007; Bongaarts 2008). During the process of demographic transition, many changes in the size and age composition of the population occur, which lead to many demographic, social and economic opportunities as well as many social and policy challenges (Bloom and Williamson 1998; Pool 2004; Pool et al. 2006; Gomez and deCos 2008a; Navaneetham and Dharmalingam 2012). Demographers have argued these opportunities as 'window of opportunities'. However, the demographic window of opportunity is transitional and does not automatically create a demographic dividend. Countries that take advantage of this window of opportunity by appropriately investing the savings in infrastructure and human resource development will reap the demographic dividend.

In course of demographic transition, populations pass through a period during which there is an increase in the working age population as children born during the previous high fertility period move into working age. Simultaneously there is a decline in the child dependency ratio due to a decline in fertility, so that fewer investments are needed for the health and education of children and the saved resources can be invested for economic development and family welfare (Bloom et al. 2003; Pool 2007; Mason 2007). For most countries, the demographic transition can be seen as a 'window of opportunity' as there are increased numbers of people in the working age groups relative to the economically dependent age groups, while ageing is still some way off.

The demographic dividend occurs through the increasing productivity of the larger labour force, the increasing number of taxable adults per dependant, reduced burdens on public schools and other services, improving health and longevity and reduced family size, so that families can invest more for their children's health, education and human capital development (Bloom and Williamson 1998; Bloom et al. 2003; Spoorenberg 2008). To harvest benefits from demographic transition, it is important to develop human capital. If countries can manage the situation arising from demographic transition, rapid economic growth and human development occur (Bloom and Williamson 1998; Foot and Gomez 2003; Lee et al. 1997; Pool 2004; Birdsall et al. 2001; Pool et al. 2006). However, it is not inevitable that the emergence of the demographic window of opportunity will automatically lead to economic development. If the prevailing social and economic conditions of a county are not conducive to economic development, and the country cannot transform the expanding working age population into human capital and utilize this capital properly, the increasing working age population can become a burden for the country that may lead to political and social unrest (Urdal 2004; Gomez and Lamb 2013). Some analysts have ascribed the rising 'youth bulges' in the Arab world as a major cause of the recent 'Arab Spring' and have drawn attention to the importance of demographic factors in development as well as politics (Pool 2012).

The demographic dividend also has an inevitable 'end-game' scenario when the relative size of the working age population begins to decline and the aged population increases at a certain point of time. A recent study argued that the reversal of the demographic window of opportunity and the ageing of the working age population are the important factors now contributing to economic stagnation or

recession in many industrialized countries including Japan, and this could happen in China within a very short period (Gomez and Lamb 2013).

Bangladesh is one of the South Asian countries that has achieved remarkable progress in both fertility and mortality decline over a short period of four decades, although it is a very challenging situation for a traditional agricultural society like Bangladesh with its limited resource base and poor infrastructure. The country is an illustrative example of demographic changes that occurred with very slow economic progress and in the midst of many unfavourable socio-economic, demographic and political situations including: a very low age at marriage for females (86 % are married by age 20 with median age at marriage 16 years), a young age structure due to previous high fertility, political unrest, corruption, a poor law and order situation, natural calamities like floods, a very low land-person ratio, and massive unemployment. It is one of the most densely populated countries and the eighth most populous country in the world. About 156 million people live within a small area of 147,570 square kilometres (United Nations 2014). The density of population in Bangladesh (1060 inhabitants/sq. km) is already five times that of any other 'mega' country (>100 million; Streatfield and Karar 2008). Its population density is three times higher than that of India and nearly five times that of Pakistan. Despite all these prevailing adverse socio-economic, political and natural conditions, the country has escaped the 'Malthusian trap' by accelerating food production, exporting human capital, employing female labour in productive sectors, slow but steady industrialization, particularly in the garment industry, reducing fertility and improving child survival. The country has already entered the club of the lower middle-income countries, as its per capita income rose to \$1314 in 2015, and set the goal of achieving the status of middle-income country by 2021.

Since its independence in 1971, the country has identified population size and growth as the number one national problem and has adopted a strong population control policy with a quantitative target of achieving replacement-level fertility, first by 2005 and then by the end of every 5-year plan period, but has still not achieved the target. According to the 2011 Bangladesh Demographic and Health Survey report, the total fertility rate in Bangladesh is 2.3 (NIPORT et al. 2013), which is not very far from a replacement-fertility level of 2.1, and at least two regions (administrative divisions), Khulna and Rajshahi, have already achieved replacement-level fertility. Bangladesh has made impressive progress in attaining many of the United Nations' Millenium Development Goal targets by 2015, including the reduction of poverty, improvement in maternal and child health, increasing enrolment at primary schools, attaining gender parity at primary and secondary education, improving immunization coverage and reducing the incidence of communicable diseases (Bangladesh Planning Commission 2015). It has made some commendable progress in the reduction of head count poverty and the poverty gap ratio from 70.2 and 17 % respectively in 1992 to 31.5 and 6.5 % respectively in 2010 (Bangladesh Planning Commission 2015).

The objective of this paper is to analyze the demographic transition in Bangladesh and examine its effects on the age structure of the future population. The paper also focuses on the emerging window of opportunities and challenges due

to the age structural transition and discusses the policy options that could best capitalize on these opportunities in Bangladesh.

Data and methodology

The paper uses time series data from Bangladesh population censuses and other national level surveys to describe the demographic transition in Bangladesh that has been caused primarily by fertility and mortality decline. Then it looks at what will eventuate between now and 2050 in Bangladesh due to the age structural transition of the population. The country-specific population projection data from the *World Population Prospects 2012 Revision* published by the United Nations have been used to describe the different aspects and consequences of past and future demographic transition in Bangladesh (United Nations 2014). Bangladesh has its own population projections produced by the Bangladesh Bureau of Statistics. To my knowledge, these projections are back-dated and were prepared on the basis of 2001 population census data and did not take into account the most recent demographic evidence on fertility, mortality and other parameters. Besides, most of these projections are short-term in nature with narrow scope. In this respect the UN population projections, with updated information and wide coverage of past and future aspects of demographic transition in Bangladesh, are a better choice.

The 2012 Revision of the United Nations population estimates and projections covers a 150-year time period, starting from 1950 to 2100, which is subdivided into past estimates (1950–2010) and future projections (2010–2100). In this study, a time frame of 100 years (i.e. 1950–2050) has been used for most of the demographic variables. Thus the present study considered estimates for the past 60 years (1950–2010) and medium variant projections for the next 40 years (2010–2050), which corresponds to the median course for each component of a country's projected population.

Results

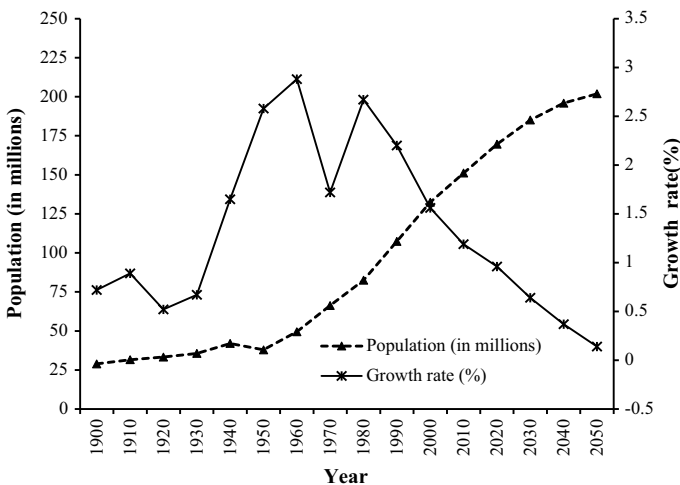
Demographic transition in Bangladesh

At the beginning of the 20th century, the total population of Bangladesh was less than 30 million. The annual growth rate of the population was less than 1 % until 1931 when the size of the population reached 35.3 million. After 1931, the population doubled in size every 40 years (Table 1). At the beginning of the current millennium, the population of the country stood at about 130 million. According to the latest population census of 2011, the total population of Bangladesh was enumerated as 150 million in 2011, which is exactly double its size in 1971 when the country achieved independence after a 9-month long liberation war with Pakistan. Thus, with a growth rate of 1.37 % per annum, approximately 2.0 million people are being added to the total population every year.

Table 1 Population size, CBR, CDR, natural growth rate and annual growth rate in Bangladesh, 1901–2011. *Source: Statistical Year Book 2012, Bangladesh Bureau of Statistics (BBS) (2013a)*

Census year	Population size (millions)	Crude birth rate (CBR)	Crude death rate (CDR)	Natural growth rate
1901	28.93	–	44.4	–
1911	31.56	53.8	45.6	8.2
1921	33.25	52.9	47.3	5.6
1931	35.60	50.4	41.7	8.7
1941	41.99	52.7	37.8	14.9
1951	44.16	49.4	40.7	8.7
1961	55.22	51.3	29.7	21.6
1974	76.40	47.4	19.4	28.0
1981	89.91	34.6	11.5	23.1
1991	111.46	31.6	11.2	20.4
2001	130.52	27.8	8.6	19.2
2011	149.77	22.6	6.6	16.0

The population growth rate reached an all-time high in the 1950s and 1960s (Table 1; Fig. 1). During the 1970s, the growth rate temporarily fell due to many natural calamities such as a cyclone in 1970 and famine in 1974, as well as the liberation war in 1971 that killed three million people (Razzaque et al. 1990; Roy and Dasgupta 1976). The population growth rate continued to be over 2 % until the 1990s and then started declining in the 2000s and reached close to 1 % in the 2010s (Fig. 1). The main driving force behind the declining population growth rates of the

**Fig. 1** Total population (in millions) and population growth rate (%), 1900–2050. *Source: Bangladesh Bureau of Statistics, 2011; UN (2014)*

1990s onward was the rapid decline in fertility and slow but steady decline in mortality. In the absence of major improvement in the socio-economic conditions in the country over the period, most researchers believed that an effective family planning programme played a major role in the rapid decline of fertility in Bangladesh (Lapham and Mauldin 1984; Cleland et al. 1994). Despite a continued decline in the growth rate, the in-built population momentum due to the young age structure of the population will keep forcing its number to increase in the coming years.

The total fertility rate (TFR) of the country also declined remarkably from 6.3 births per woman in the mid-1970s to 3.3 births in the early 1990s (NIPORT et al. 2013), a huge decline of three births per woman (i.e. a decline of 48 % in the TFR) within a short period of two decades. However, the TFR was static at around 3.3 births per woman during the 1990s, despite the steady increase in contraceptive use (Fig. 2). After a decade-long stagnation (Islam et al. 2004), the TFR started to decrease again at the beginning of 2000s, reaching 2.7 births per woman in 2007 and 2.3 births in 2011 (NIPORT et al. 2013). On the other hand, the infant mortality rate has declined from 87 infant deaths per 1000 live births in 1993–1994 to 43 in 2011 (NIPORT et al. 2013). All other mortality indicators such as the child mortality rate, under-five mortality rate and crude death rate also showed declining trends. Consequently, life expectancy at birth has also improved from 55 years in 1981 to 68 years in 2011 (Bangladesh Bureau of Statistics 2013a). The population growth rates also declined from 2.5 % in 1974 to 1.4 % in 2011.

As can be seen in Fig. 3, the demographic transition in Bangladesh has followed a typical pattern of decline in mortality followed by decline in fertility. However, there is a time lag between the two causes of population change in Bangladesh that has accelerated population growth. Data in Table 1 indicate that the pre-transitional

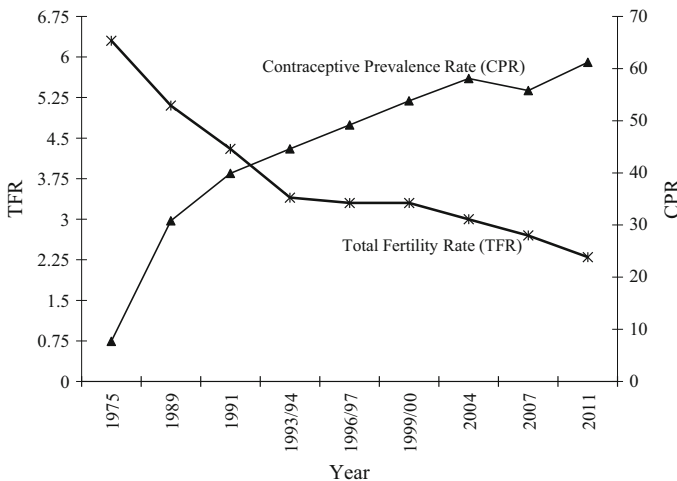


Fig. 2 Contraceptive prevalence rate (CPR) and total fertility rate (TFR) in Bangladesh, 1975–2011. *Source:* NIPORT et al. 2013

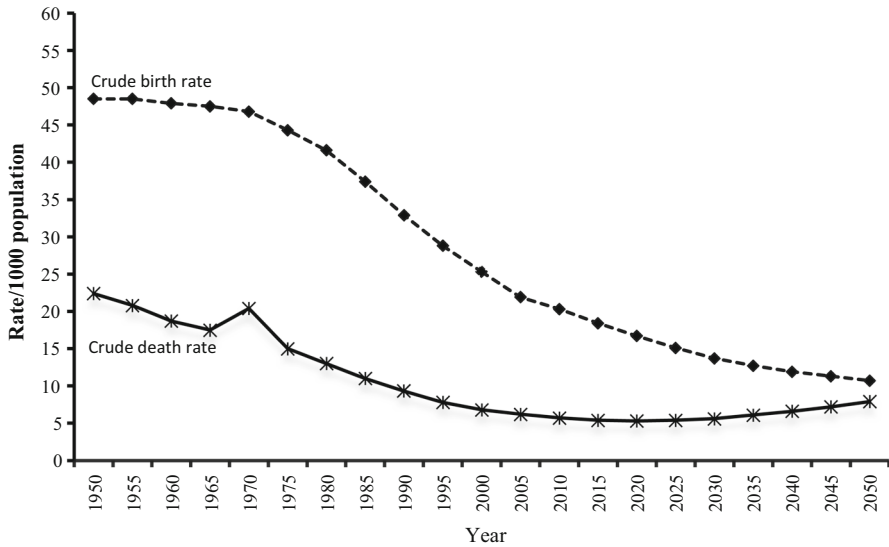


Fig. 3 Trends in the crude death rate (CDR) and crude birth rate (CBR) in Bangladesh, 1950–2050. *Source:* UN (2014)

phase of demographic transition in Bangladesh continued until the 1960s. Bangladesh entered into the first phase of demographic transition in the 1960s with a sharp decline in mortality while birth rates showed a slow decline until the 1980s. The second phase of demographic transition in Bangladesh began around

Table 2 Estimates and projections (medium variant) of total population (in millions), women of reproductive age (in millions), and percentage of population by age group. *Source:* UN (2014)

Year	Total population (million)	Women of age 15–49 (million)	% of population by broad age group				
			0–14	15–24	25–59	15–59	60+
1950	37.9	8.4	41.2	18.8	34.2	53	5.8
1960	49.5	10.8	43	18.1	33.5	51.6	5.4
1970	66.3	14.	44.7	17.9	31.9	49.8	5.5
1980	82.5	17.6	44.4	19.1	30.8	49.9	5.7
1990	107.4	24.0	42.1	20.3	31.9	52.2	5.7
2000	132.4	32.6	37	20.9	35.9	56.8	6.2
2010	151.1	41.6	31.7	20.3	41.2	61.5	6.8
2020	169.6	48.1	26.5	18.7	46.7	65.4	8.1
2030	185.1	50.9	23.0	15.9	49.3	65.2	11.7
2040	195.9	50.2	19.5	14.3	49.7	64	16.5
2050	201.9	47.2	17.3	12.5	47.9	60.4	22.3

Bangladesh, 1950–2050

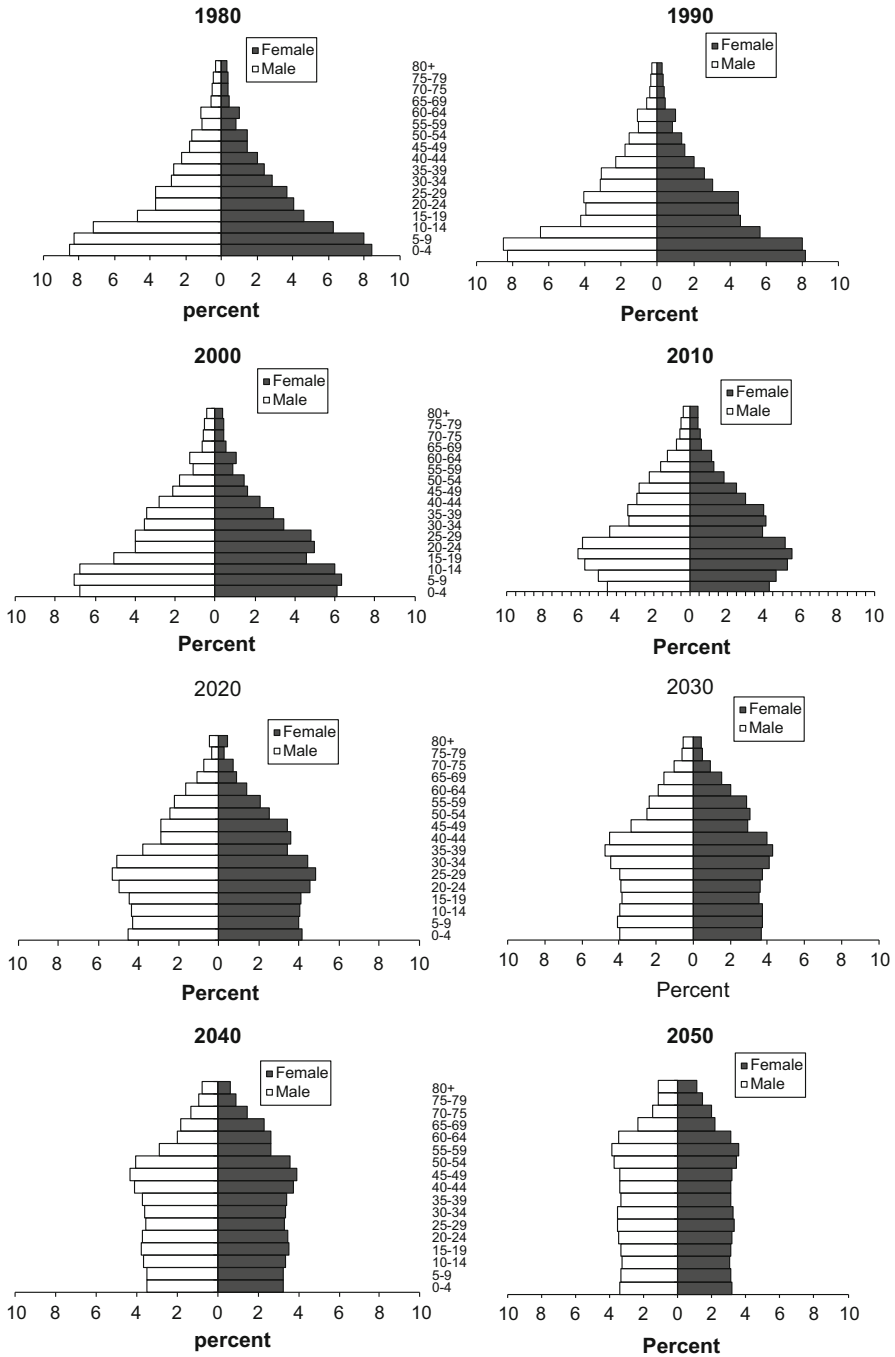


Fig. 4 Population pyramids, Bangladesh, 1980–2050

1980 when the decline in fertility became more rapid. Bangladesh is now at the beginning of a third phase of its population transition.

It is evident from Table 1 and Fig. 1 that the population growth rate in Bangladesh was much lower during the pre-transition period (until the 1950s) than it is now. This does not mean that the fertility rate at that time was lower than it is now (Fig. 1). In fact the population growth rate was much lower than 1 % until 1931 because of high mortality as well as high fertility during the period. The population growth rate was considerably higher after 1950 as a result of impressive decline in the mortality rate, when fertility rate also declined but at a slower rate.

Further decline in fertility and mortality will further reshape the age structure of the Bangladesh population, until fertility reaches replacement level (i.e. the TFR reaches 2.1 births per woman). At the same time, if the mortality rate continues to fall and reaches a level closer to the level of fertility, and then both the fertility and mortality rates remain constant for a longer period, the Bangladesh population will attain a stationary condition.

Results of the UN medium-variant population projection indicate that the total population of Bangladesh will cross the 200 million mark in 2050, even if it achieves replacement-level fertility within the first quarter of the current millennium (Table 2). This will mean a huge number of people within a small area of 147,570 sq. km, with 1355 people per sq. km. With such a huge number of people, Bangladesh is likely to exceed the limits of its ecological footprint and bio-capacity. Its person-to-land ratio will be virtually saturated as the country has limited agricultural land, leaving very limited capacity to expand food production (Streatfield and Karar 2008). However, the population growth rate will continue to come down to a very low level (e.g. 0.14 % in 2050) and the population is likely to stabilize at around 250 million in 2080 (United Nations 2014).

Age structural transition in Bangladesh

The changes in age structure, or age-structural transition (AST), are an essential consequence of demographic transition. A population pyramid is an efficient and widely-used method of graphically depicting the age-sex structure of a population. Figure 4 presents the population pyramids of Bangladesh for the period 1980–2050. The age pyramids in Fig. 4 reveal that a number of changes have occurred in the age structure and that this will continue due to the various phases of demographic transition in Bangladesh. A pyramid with a very broad base that tapers rapidly towards the older age groups suggests a typical population in an early stage of demographic development with relatively high birth and death rates and a youthful population. The broad-based triangular-shaped population pyramids of Bangladesh for the period 1980–2000 indicate such a typical age structure. The reduction in mortality and steadily-declining fertility caused a rapid transformation in the age structure between 2000 and 2010. The sharp fall in fertility during this period produced a reduction in the number of children under age 5 years, which is reflected in the narrowed base of the pyramids. The proportion of children under age five decreased from over 16 % in 1980 to about 8 % in 2010. Similarly, the population

of age groups 5–9 and 10–14 also dropped during this period (Fig. 4). The projection results indicate that the intensity of this process will further increase in the next four decades. During this period the base of the population pyramid will be slimming both in relative terms and in absolute numbers. As a result, the age structure will lose its pyramidal shape and will emerge as a beehive or barrel shape. Such a pyramid is typical of a population having low birth and death rates and a large proportion of the population surviving to older ages. In such a situation, the working age (15–59 years) population will increase due to the momentum of the past rapid population growth and later the old age (60 years and above) population will also increase.

The age structure of a population can broadly be classified into four life-cycle stages with their distinct economic implications. The four life cycle stages are young (age 0–14), young working age (15–24), mature working age (25–59) and elderly (60+). The young population of age group 0–14 years is an economic burden to the family as children depend on the adult working population for their food, health care, education and other social needs. The young working age population (15–24) also incurs expenses, but its needs are different from the young population of age 0–14 years. The mature working age population (25–59) is likely to earn more and have a higher saving rate. On the other hand, most of the elderly population depend on others for their health care, food and other social needs, and thus become an economic burden to the family.

Table 2 shows the age structural changes in terms of the above-mentioned four life cycle stages from 1950 to 2050 in Bangladesh. Due to fertility decline that started in the early 1980s in Bangladesh, the proportionate share of the population under 15 years of age began to decline from 44 % in 1980 to 32 % in 2010. According to UN projection results, the proportionate share of the child population under age 15 will continue to decline further and will fall to 17 % in 2050. Such decline in the dependent population will reduce the potential economic burden on families and increase opportunity to improve human capital and quality child care services in Bangladesh.

Since 1980, Bangladesh has been experiencing a youth (age 15–24 years) bulge with a 20 % share of the total population. This is expected to continue until 2020, and after that the youth share of the population is expected to decline. However, the absolute size of the youth population will continue to increase until it stabilizes. Bangladesh is currently facing and will continue to face many challenges in meeting the needs and services of this huge youth bulge.

In Bangladesh, the relative share of the prime working age population of age 25–59 years declined to 31 % in 1980. Since then it has been increasing and this is expected to continue until 2040, when almost half of the total population will be of effective working age. As since 1980, the size and share of the old age population (60+) will continue to increase in Bangladesh at a slow but steady pace. However, the increase will be rapid and large after 2020 due to increases in life expectancy. The share of the old age population will increase from 5.7 % in 1980 to 8.1 % in 2020 and to 22.3 % in 2050.

The emerging window of opportunities in Bangladesh

The analysis of AST in terms of the share of the four life cycle stages (<15, 15–24, 25–59 and 60+ years) as presented in the foregoing section, along with the dependency ratio (DR) and the ageing index, is important for understanding the “window of opportunities” for a country. The decline in the dependency ratio and increase in the prime working age population during the AST create a “demographic bonus or dividend”.

Table 3 presents the total dependency ratio (TDR) and its components: the child dependency ratio (CDR) and elderly dependency ratio (EDR), the relative shares of CDR and EDR to TDR, the potential support ratio (PSR) and the index of ageing for the period 1950–2050. The TDR and its components explain the relationship between the economically dependent and working age populations. The potential support ratio (PSR) represents “the extent that persons of working age (15–59) can be seen as supporting the older population (60 years or older), and is the ratio between the two” (United Nations 2001). The PSR value indicates the number of working age persons in the population to support every one older person in the population. The ageing index indicates the velocity of the ageing process in a population.

Table 3 Dependency ratios, relative distribution of young and elderly population and ageing index in Bangladesh, 1950–2050. *Source:* UN (2014)

Period	Dependency						Potential support ratio (d)	Ageing index (%) (e)
	Ratio (%)			Relative distribution				
	TDR (a)	CDR (b)	EDR (c)	Child (0–14)	Elderly (60+)	Total		
1950	82	75	7	91.5	8.5	100	9.13	14.07
1960	87	80	6	91.9	8.1	100	9.60	12.49
1970	93	86	7	92.5	7.5	100	9.08	12.29
1980	92	85	7	92.4	7.6	100	8.77	12.84
1990	85	78	7	91.8	8.2	100	9.15	13.57
2000	70	63	7	90.0	10.0	100	9.16	16.77
2010	57	50	7	87.7	12.3	100	9.07	21.43
2020	47	39	8	83.0	17.0	100	8.12	30.35
2030	44	33	11	75.0	25.0	100	5.58	51.39
2040	45	28	16	62.2	35.6	100	3.88	84.62
2050	50	26	24	52.0	48.0	100	2.71	128.88

(a) Children dependency ratio (CDR) = population aged less than 15/population aged 15–59

(b) Elderly dependency ratio (EDR) = population aged 60 or more/population aged 15–59

(c) Total dependency ratio (TDR) = CDR + EDR

(d) Potential support ratio = number of persons aged 15–59/persons aged 60 or more

(e) Ageing Index = population aged 60 or more/population aged less than 15

The results in Table 3 reveal that the burden on the economically productive population continued to be high during 1950–1990 (more than 80 %) in Bangladesh, mainly due to high fertility. During that period more than half of the total population was dependent (under age 15 or over 60) and more than 90 % of this dependent population were children under age 15 years. Until 2010 the EDR continued to be low at about 7 %. However, the decline in TDR started from 1990 due to the decrease in the under-15 population and it is expected that the TDR will continue to decline until 2030, after which it will again start to increase mainly due to increase in the elderly population (Fig. 5). Thus the change in TDR is a result of two opposite trends: the decrease in the absolute size of the population below age 15 and the increase in the elderly population.

Like the EDR, the PSR also remained almost constant in the vicinity of 9 % until 2010 and after that it started decreasing, due to the increase in the elderly population that surpassed the growth of the economically-active population. The ageing index, defined as the ratio of the elderly dependent population (aged 60+) and child dependent population of age 0–14 years, shows a sharp increase since 2010. In 2000 the ageing index was 16.8 and the projection results show that it will increase to 129 in 2050, indicating that the number of elderly people will be close to the number of children under age 15 years (Table 3).

The demographic dividend in a population occurs through a mechanism of supply of labour force and human capital. Reduction in fertility and mortality has a direct and immediate impact on human capital formation. It brings opportunities for families to invest more in the education, nutrition and health of their children, contributing to a better quality of human capital in the future.

The demographic transition affects labour supply by increasing the working age population and lowering the dependency ratio. It also enhances women's participation in labour force, as family size become smaller. The demographic dividend resulting from an increase in the proportion of working age people will have a significant effect on the economy. A higher proportion of workers, especially at prime working age, will result in greater capital accumulation, because, according

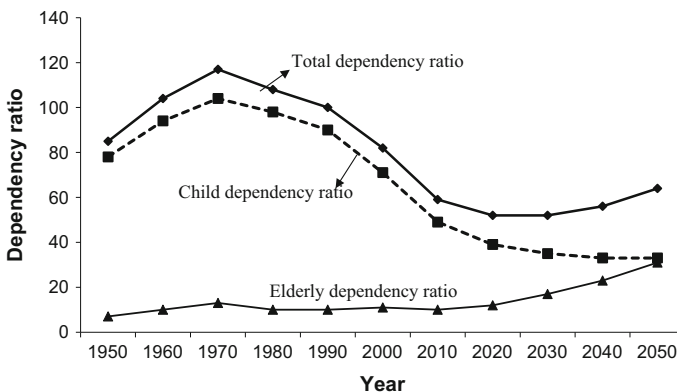


Fig. 5 Total, child and elderly dependency ratios in Bangladesh, 1950–2050. Source: UN (2014)

to the consumer behaviour model, older workers tend to save more, while younger workers tend to consume and borrow (Guiso et al. 2002; Miligan 2005). Prime age workers are also more likely to be earning higher incomes and theoretically they are more productive relative to younger workers (Gomez and de Cos 2008b). It is expected that the demographic transition in Bangladesh will encourage the growth of savings, thus improving the country's prospects for investment and growth. Since the working age population is increasing rapidly in Bangladesh, we may expect improvement in savings if appropriate policy is in place.

It can be shown by a simple algebraic identity that per capita income and GDP growth will increase when the growth rate of workers exceeds the growth rate of the total population, even if the output per worker does not change (Bloom and Williamson 1998; Navaneetham and Dharmalingam 2012). The identity links per capita income (Y/N) to income per worker (Y/L) and the number of workers per capita (L/N) as follows:

$$\frac{Y}{N} = \frac{Y}{L} \times \frac{L}{N},$$

where Y is the income, N is the total population and L is the total number of workers. By taking the natural log on both sides and then differentiating with respect to time, this expression can be converted to growth rates as follows:

$$g_y = g_x + (g_w - g_p),$$

where g_y is the growth rate of per capita income, g_x is the growth rate of income per worker, g_w is the growth of labour force and g_p is the growth rate of the total population.

Every demographic transition is accompanied by an extended period during which the labour force grows more rapidly than the total population growth. At the early stage of demographic transition, both rates are high and $g_w - g_p$ approaches zero. But as the demographic transition advances, the population growth rate (g_p) declines more rapidly than the growth rate of the labour force and the difference $g_w - g_p$ becomes positive. If the difference is positive, the growth rate of per capita income increases even if the growth rate of income per worker does not change. A country will acquire a demographic dividend during this period if the large supply of labour can be absorbed into the productive sectors. It is to be noted that for any population, a demographic dividend does not last forever. It is available for one time only and its period is determined by the speed of demographic transition.

The extent of the period of demographic dividend can be estimated from the difference $g_w - g_p$. Since the population of prime working age (25–59 years) consumes less and produces more (Ogawa and Chawla 2009; Navaneetham and Dharmalingam 2012) we have considered this age group for estimating the demographic dividend and the results are presented in Fig. 6.

The results depicted in Fig. 6 reveal that Bangladesh entered a demographic window of opportunity from the early 1980s with declining TDR and increasing working age population, and the window will remain open for the first time and for a limited period of time until the late 2030s, a period of about 40 years. The highest

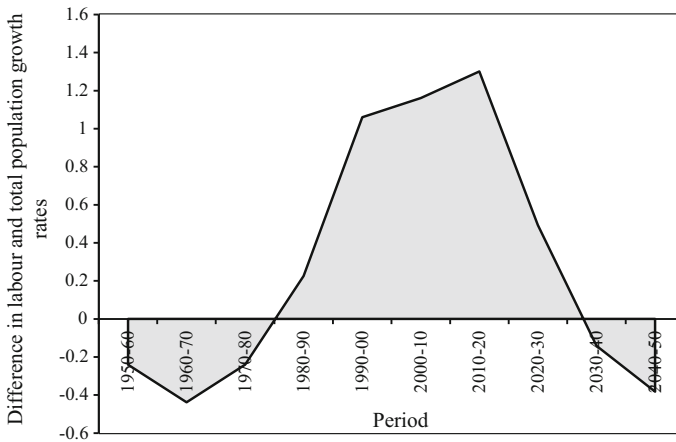


Fig. 6 Estimated period of demographic dividend in Bangladesh

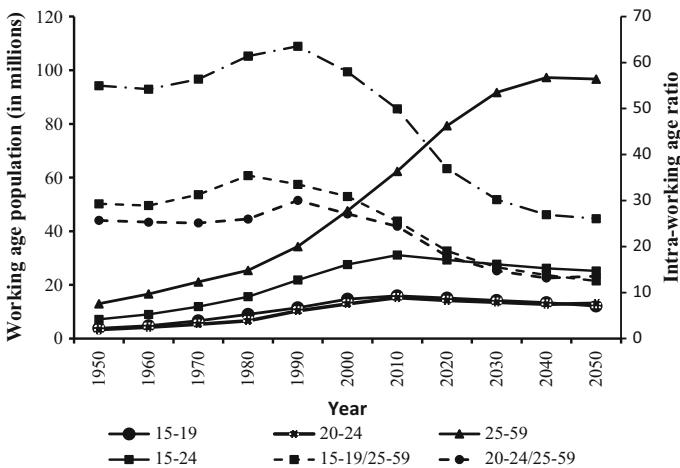
dividend (around 1.4 %) is expected to occur during the period 2010–2020 as the supply of prime age workers during this period will be higher. Of the per capita rate of growth in income, 1.4 % is likely to be contributed by the labour supply alone during this period. After 2030, it is expected that the dependency ratio will again start to increase and will reach about 50 per 100 working population in 2050. Nearly half of the contribution to this dependency ratio will be due to an increase in the elderly population of age 60+. However, this ageing population may create a *second demographic dividend* by increasing wealth accumulation and investment (Mason and Kinugasa 2008; Mason and Lee 2006). The demographic transition is followed by an increase in life expectancy, which is expected to encourage wealth accumulation during people's working years. If this wealth can be invested productively, a second demographic dividend will occur in Bangladesh during the ageing of its population. The second demographic dividend is expected to occur in Bangladesh in 2030–2040, when the support ratio is expected to be at a very low level. The second demographic dividend is expected to be larger than the first demographic dividend arising from the increase in labour supply only.

The emerging challenges for Bangladesh

The huge increase in the proportion of working age people has been a prominent feature of challenges in Bangladesh. Although Bangladesh has achieved considerable success in fertility reduction, projection results indicate that the population of the country would be close to 200 million by the middle of the current century even if it had achieved replacement level fertility in 2015. In Bangladesh, the working age population (15–59 years) was 41.2 million in 1980 and has increased to 93.0 million in 2010. By 2050 there will be an additional 29 million workers, with the total reaching 122 million (Table 4). The projection results presented in Table 4 also show that during the period 2010–2050 the total population will increase by

Table 4 Population of working age, under 15 and 60 years and above (in millions), Bangladesh, 1950–2050. *Source:* UN (2014)

Year	Population aged <15	Working age population (age 15–59)			60 years and above	Total
		Total	Male	Female		
1950	15.6	20.1	10.6	9.5	2.2	37.9
1960	21.3	25.6	13.5	12.1	2.6	49.5
1970	29.6	33.0	17.1	15.9	3.7	66.3
1980	36.6	41.2	21.4	19.8	4.7	82.5
1990	45.2	56.1	29.3	26.8	6.1	107.4
2000	49.1	75.2	38.9	36.3	8.1	132.4
2010	47.9	93.0	46.9	46.1	10.2	151.1
2020	45.0	110.9	55.2	55.7	13.7	169.6
2030	42.2	121.1	59.9	61.2	21.8	185.1
2040	38.2	125.4	62.1	63.3	32.3	195.9
2050	34.9	122.0	60.5	61.5	45.0	201.9

**Fig. 7** Population aged 15–19, 20–24, 25–59 and three intra-working age ratios (15–19/25–59; 20–24/25–59 and 15–24/25–59), Bangladesh, 1950–2050. *Source:* UN (2014)

33.6 % (or 50.8 million), while the working age population will increase by 31.2 % (or 29.0 million) over the same period. This huge increase of about 29 million people in the labour force between 2010 and 2050 will create heavy pressure on the country's job markets. In order to take advantage of the opportunities that have already opened up due to the demographic transition in Bangladesh, this expanding workforce will need to be trained and employed productively.

Figure 7 shows the transition of the working age population in Bangladesh by three sub-groups: junior age (15–19), young adult age (20–24) and prime working

age (25–59), and the intra-working age ratios (in %). Among the sub-groups of the working population, the junior group (aged 15–19) and the young adult group (aged 20–24) increase until 2010, then slightly decline until 2030 and stabilize after that. On the other hand, the prime group (aged 25–59) shows monotonic increase. The ratio of the junior to the prime labour force is an indicator of the pressure for the generation of employment. In the case of Bangladesh, the ratio shows a downward trend since 1990 due to the negative growth rate of the population under age 15 (Fig. 7). Clearly, the challenge is to create employment opportunities for the huge number of working age people in Bangladesh with its limited resources.

As mentioned earlier there is an inevitable demographic dividend reversal as has happened in Japan and is now befalling many Western industrialized countries, where the working age population begins to shrink or has already shrunk relative to the older population (Gomez and Lamb 2013). Bangladesh is yet far away from this pattern, but the existing fertility decline aided by effective fertility control brings the danger that 25 years from now (during the 2040s and beyond) a demographic dividend reversal will occur. Unless Bangladesh can capitalize on the demographic dividend arising from the demographic transition, it will not bring any benefit for the country if it begins to lose working age individuals before development has truly taken place.

Demographic transition in Bangladesh also brings a window of opportunity for women to enter the labour force as the size of the female labour force also increases due to the reduction in family size. It is also expected that the labour force participation among females will increase due to the likely improvement in level of education and the reduction in reproductive years. There are many social barriers to participation of women in development in Bangladesh, being a traditional society with limited resources, which need to be removed. The country will have an added demographic bonus by increasing female participation in education and labour force.

Demographic transition also stimulates both internal (rural to urban) and international migration due to the increase in population pressure. In recent years most of the cities in Bangladesh have experienced rapid population growth. The most remarkable characteristic of the increase of city populations is the mushrooming growth of slums and squatters with the increased migration of rural poor in search of employment and income (Afsar 2000). While the annual population growth rate is 1.5 % per annum at the national level, it is more than 5 % in most of the big cities, and it is expected that more than 50 % of the population of Bangladesh will live in urban areas by the year 2025 (World Bank 1999). According to the 2011 population census in Bangladesh, nearly a quarter (23 %) of the total population was living in urban areas. However, the projection results indicate that the urban proportion of the population will increase to about 44 % in 2030 and 60 % in 2050 (data not shown). Thus the urban population is increasing rapidly with the increase in the working-age population and Bangladesh must face the challenge of rapid urbanization. Appropriate policy measures should be taken to meet the pressures of urbanization in the next decades.

The growing size and share of the population of age 60 years and above due to the age-structural transition will be another serious challenge for the Bangladesh

economy. At present, a small proportion of about 7 % of the total population comprises elderly persons. The elderly population of Bangladesh will increase from 10.2 million in 2010 to 21.8 million in 2030 and to 45 million by 2050 (Table 4). By then, their share will represent 12 % and almost 22 % of the total population, respectively (Table 2). Bangladesh is likely to face the challenges and complexity of an aged society by 2050. This will have serious consequences for the overall socio-economic development of the country. In terms of policy programme, the country will need to allocate resources to address the fundamental needs of an elderly population, which include social security, health and participation in income-generating activities.

Due to improvements in health and survival, the age at retirement must be increased to increase the number of older workers. Recently, the country has increased the retirement age from 57 to 59 years in the public service (Miyan 2005). The retirement issue mostly relates to those who are in jobs, but considering the size of the total population, the absolute size of the elderly population will be quite significant. Thus the Government of Bangladesh will face another big challenge in coming years to serve the large proportion of elderly people through the old age allowance, with limited resources.

Discussions and policy implications

Following the theoretical demographic transition model, Bangladesh has entered into the third stage of the demographic transition. The population transition in Bangladesh has been following nearly the same pattern that Europe and many East Asian countries experienced. This transition has created many important changes in population age structure and opened the window of opportunity for Bangladesh. Many of the opportunities are apparent today but will be even more apparent in the future. If these opportunities are realized in a timely way and managed properly, they will bring a considerable bonus for the nation. However, as mentioned earlier, the bonus is not inevitable, because the opportunities are not realized automatically and the window is limited and unique. For Bangladesh, the window of opportunity opened in the early 1980s and is expected to remain open until the late 2030s. The window of opportunity can be utilized by employing the huge workforce productively, mobilizing the accumulated wealth and savings into productive investments in infrastructure development, industries and service sectors, and making appropriate investment in quality education, vocational training and skill development training for generating high quality human capital. Recently, it has been observed from the experience of many East Asian countries that demographic transition can be utilized in a very effective manner in achieving accelerated economic growth. As Bloom and Williamson (1998) observe, demographic transition contributed substantially to East Asia's so-called 'economic miracle' and such a miracle occurred because "East Asian countries had social, economic, and political institutions and policies that allowed them to realize the growth potential created by transition."

The demographic transition gives rise to different opportunities as well as challenges across life stages. In Bangladesh, the size and relative share of the child population under age 15 is declining and will continue to decline in the future. On the other hand, the size and share of the youth population (age 15–24) is increasing. This creates an opportunity to improve human capital through public policy measures aimed at improving nutrition, education and healthcare. The age-structural transition provides the opportunity to improve the coverage and quality of education. As the current cohorts of children and youth are the future labour force, an investment in their nutrition, education and health will improve the quality of human capital.

Bangladesh has been experiencing a ‘youth bulge’ and this is expected to continue for the next 15–20 years. This has increased, and will continue to put pressure on, the demand for higher education, healthcare, housing and employment opportunities. Bangladesh could benefit from its rapid workforce growth by speedily increasing employment opportunities to match the growth in labour supply. Failure to do so will bring many negative consequences such as increased unemployment and crime, and social and political unrest.

During the window of opportunity, the size and share of the female labour force also increases. Demographic transition does not only affect family size but also the reproductive lifespan of women and their social status. It reduces the number of children per woman, increases her reproduction-free years and provides the opportunity to improve her level of education. As a result, more women become able and often more willing to participate in the workforce to earn money, and are more likely to invest additional income in the education and health of their children. Bangladesh has already been receiving economic benefits by employing large numbers of female workers who are mostly illiterate and unskilled in the growing ready-made garment (RMG) industry. Since the 1990s, the RMG sector is playing a vital role in Bangladesh’s economy in terms of employment, foreign exchange earnings and its contribution to Gross Domestic Product (GDP). It provides employment to more than 4 million people of whom 90 % are female workers. It contributes more than 10 % to the country’s GDP and 78 % of the national export earnings (Mahmud 2012). Bangladesh would likely to have added demographic dividend by creating employment for women, and increasing female labour force participation in both the service and manufacturing sectors.

The size and share of the elderly population will increase in Bangladesh due to the demographic transition and the increase in life expectancy. As a result, Bangladesh will have to face the challenges of health care, retirement benefits and social services for a huge number of elderly people. To meet the challenges, Bangladesh needs to develop appropriate policies and programmes. As this will occur during the period of the second demographic dividend, policies aimed at providing incentives to save and accumulate wealth during this phase are important components to optimize this opportunity.

Because of its limited resources, Bangladesh cannot make adequate investment for quality human capital formation and also cannot generate adequate employment in organized sectors for its huge labour force. As a result, a huge number of workers are settling into low paid informal sectors both at home and abroad. The

Government should formulate appropriate policy to meet these challenges successfully.

Considering its limited resources and employment opportunities, skilled labour export could be an important and viable livelihood option for Bangladesh, although this would create a “brain drain” in the country as the best and brightest would go abroad in search of better economic prospects. “Brain drain” due to migration of the skilled work force is often cited as a serious human capital concern for most developing countries, yet migrant labour is an important factor in the development of many countries, as it creates economic gains derived from remittances. Given the huge demand for skilled labour in oil-rich and industrialized countries, Bangladesh could avail this opportunity by exporting its working age people through skill development. This will not only contribute to reducing pressure on the domestic economy and the unemployment rate, it will help earn remittances, boost socio-economic development at the national, community and individual levels and reduce the population pressure. Remittances have already played a major part in the development of Bangladesh’s economy and society. According to the World Bank, Bangladesh is one of the top 10 remittance recipient countries (World Bank 2014). World Bank estimates suggest that currently more than 7 million Bangladeshis are living abroad and most of them are unskilled. However, this contribution of the Bangladeshi workforce to the international market is still small compared to the country’s population size and demand for jobs. Bangladesh should give more emphasis to the export of skilled manpower. The employability of its growing workforce could be increased by providing training and through the educational curriculum to take the advantage of the needs of the international labour market.

It is important to note that the window of opportunity that has already emerged in Bangladesh will not last long and will not be repeated in the short term. The Bangladesh Government must carefully capitalize on the various opportunities created by demographic transition. Policymakers should act soon to formulate and implement appropriate policies to accelerate the demographic transition and to reap the economic benefits from the window of opportunity provided by the age-structural transition. The Government of Bangladesh should invest more in education and skill development that is relevant for employment at home and abroad. Investment in health is also important to ensure that the working population is healthy and productive. Relevant population policy that favours fertility reduction and can potentially influence economic growth by providing optimal demographic conditions for sustainable economic growth is also vital for Bangladesh. By realizing the demographic dividend and adopting appropriate policies, Bangladesh has the potential to emerge as a prosperous country. A failure to act properly could have a damaging effect on future prospects in turning the country to face a “Malthusian trap”.

To reap the demographic dividend through effective management of the demographic window of opportunity, Bangladesh needs to focus on quality education, job creation and employment of the increased working age population, health care development and policies for the development of infrastructure for socio-economic development. It has already been proved by the East Asian countries that the effective management of the window of opportunity can convert a

population explosion to a population bonus and can thus contribute to rapid economic growth and development.

Education is the only cost-effective means of increasing human capital, reducing poverty and achieving sustainable economic growth and development. It enhances the productive capacities of individuals and the aggregate level of economic growth (Riddell 2006; International Institute of Applied Systems Analysis [IIASA] 2008). Improvement in health and survival is also very important for the socio-economic development of a country.

Since its independence in 1971, the Government of Bangladesh has demonstrated strong commitment to the educational development of its citizens by adopting free and compulsory primary education and 'education for all' policies. Bangladesh has achieved remarkable success in increasing the net enrolment rate in primary schools which is close to universal (94 % in 2010) and has achieved gender parity in school enrolment (BBS 2013b). However, the overall enrolment ratios still remain low at the secondary (under 50 % of the relevant age group) and university level (about 5 %; Ahmed et al. 2007; Ahmed 2013). The education sector in Bangladesh is facing the challenges of a high rate of attrition from school and a low rate of adult literacy. The education statistics from the Bangladesh Bureau of Educational Information and Statistics (BANBEIS) show that around 30 % students dropped out of their studies in different grades from I to V during the period 2008–2010 (BANBEIS 2011). The literacy rate among the adult population (15+ years) was estimated to be 59.8 % in 2010 (BBS 2013b), indicating a huge number (about 45 million) of illiterate people in the country. The education sector faces challenges due to high attrition from schools because of poverty, management problems and inadequate budget allocation for the education sector. Currently, Bangladesh spends about 2 % of the GDP on education, which is grossly inadequate and needs to be revised in the interests of developing human capital through quality education.

Steady economic growth has created a growing demand for higher education in Bangladesh and the number of both public and private universities has also increased manifold within last four decades. While there were only six public universities and no private university in the early 1970s in Bangladesh, there are now 37 public and more than 70 private universities in the country. Despite positive employment growth and higher university participation, there is a paradox of high graduate unemployment, often significantly higher than total unemployment. According to a recent report on graduate unemployment in South Asia prepared by the Economist Intelligence Unit (2013), 47 % of graduates in Bangladesh are unemployed although the overall unemployment rate is around 5 % in Bangladesh. The report partly attributes the graduate unemployment problem to the country's rapidly expanding but poor quality private education sector and the use of outdated curricula in public universities. Despite the large number of graduates in various subjects from both public and private universities, there is a shortage of skilled labour with certain specializations. Graduate unemployment remains high despite a labour market desperately looking for skilled workers. This apparent paradox can be explained in part by the fact that the country's secondary and higher education systems are not producing graduates with the skills needed by the labour market.

With a growing population and relatively small economy, employment generation is a challenging task for Bangladesh. The economy of the country has undergone structural change since its independence. It has gradually moved from an agrarian to a more industry- and services-based economy. However, the growth of the economy has not been accompanied by adequate employment creation and the number of unemployed people has increased over the years.

Bangladesh need to give more attention to the development of infrastructure for the health and survival of both children and adults as this is important to human capital formation, capital savings and economic growth. In a recent study, Jorgensen (2010) demonstrated that an increase in child survival not only reduces the fertility rate and altruistic intergenerational transfers, but also increases the savings rate and the productivity growth rate. On the other hand, higher adult survival can also have incentive effects on capital savings and act as a proxy for experience, leading to higher worker productivity and economic growth (Weil 2007; Finlay 2006; Bloom et al. 2004; Zhang and Zhang 2005; Chakraborty 2004).

Bangladesh's strength is its huge human capital. Considering the human potential in the country, development policies should be focused on a population that is currently ready to participate in the labour market and economic activities. It also requires the establishment and strengthening of an appropriate institutional framework and socio-political environment, and the introduction of timely and appropriate policy to address the current needs of the population. Indeed, population policymakers must consider the interrelationships between population structure and potential opportunities for economic growth and development.

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