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POPULATION, FAMILY PLANNING AND REPRODUCTIVE HEALTH POLICY HARMONIZATION IN BANGLADESH

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Abstract: Over the past 30 years, Bangladesh has achieved significant economic and human development progress, and demonstrated impressive policy as well as programmatic commitment to lowering the fertility level. However, its future socioeconomic prospects may be hampered by its population growth rate, depending on how quickly the fertility rates decline and at which point they stabilize.

Projections estimate that the total population of Bangladesh in 2051 could increase to 218.1 million under a laissez faire projection scenario and 201.3 million under an accelerated fertility transition (AFT) scenario. This difference would have significant impacts on public spending, public services, and job creation. An AFT scenario would enable the country to improve the dependency ratios – possibly resulting in economic benefits from harnessing the demographic dividend for several decades.

To accelerate the demographic transition, the government will need to revitalize high-level coordination to ensure multisectoral engagement in population policies, including increasing the age at marriage, and improving education, skills development, job creation, and social safety nets for the vulnerable population groups. In addition, a sustained decline in fertility through increased access and coverage of family planning (FP) services is crucial, mainly by focusing on lagging regions and hard-to-reach areas, and by expanding the supply and provision of FP long acting and permanent methods. Strengthening the synergy and coordination of service delivery between the Health and FP directorates by building capacity for systems strengthening; promoting cross-referral between programs; and efficient provisioning of FP and reproductive health services through community clinics need to remain at the forefront of the government's health improvement efforts in Bangladesh.

Keywords: Population projection; family planning; reproductive health policy; health policy; Bangladesh.

Disclaimer: The findings, interpretations and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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LIST OF ACRONYMS

AFT	Accelerated Fertility Transition
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BRAC	Bangladesh Rural Advancement Committee
CBR	Crude Birth Rate
CC	Community Clinic
CPR	Contraceptive Prevalence Rate
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DHS	Demographic and Health Survey
EPI	Expanded Program of Immunization
FP	Family Planning
FPAB	Family Planning Association of Bangladesh
FWA	Family Welfare Assistant
HFWC	Health and Family Welfare Center
HNP	Health, Nutrition, and Population
HNPSP	Health, Nutrition, and Population Sector Program
HPNSDP	Health, Population, and Nutrition Sector Development Program
HPSP	Health and Population Sector Program
IBAS	Integrated Budget and Accounting System
ICDDR,B	International Centre for Diarrheal Disease Research, Bangladesh
ICPD	International Conference on Population and Development
IDA	International Development Association
IEC	Information, Education, and Communication
IIASA	International Institute for Applied Systems Analysis
IMR	Infant Mortality Rate
IUD	Intrauterine Devices
JICA	Japan International Cooperation Agency
LAPM	Long-acting and permanent contraceptive method
LF	Laissez-faire
LMIS	Logistics Management Information System
MCH	Maternal and Child Health
MOHFW	Ministry of Health and Family Welfare
MR	Menstrual Regulation
NCD	Non-communicable Disease
NGO	Non-Governmental Organization
NIPORT	National Institute of Population Research and Training
NPC	National Population Council
NRR	Net Reproductive Rate
OP	Operation Plan
PIP	Program Implementation Plan

PNC	Postnatal care
PROMIS	Procurement Management Information System
RD	Rural Dispensary
RH	Reproductive Health
SBA	Skilled Birth Attendance
SMC	Social Marketing Company
STD	Sexually Transmitted Disease
SWAp	Sector Wide Approach
TFR	Total Fertility Rate
UESD	Utilization of Essential Service Delivery
UN	United Nations
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

The aim of this Policy Note is to analyze the population trends and impact and assess the family planning and reproductive health programs in order to provide options for policy harmonization across the three areas. Specifically, the Policy Note examines the demographic challenges and population projections as well as the fertility and family planning trends, describes the family planning and reproductive health programs, and assesses the institutional and implementation challenges facing these programs.

In recent years, Bangladesh has achieved significant economic gains. The last three-year trend in gross domestic product has showed economic growth above 6 percent a year, which is comparable to some of the best-performing economies in Asia. Bangladesh has also made remarkable progress in many areas of human development. Human development indicators trending upwards include increased life expectancy and levels of literacy, sustained child immunization rates above 80 percent, and a sharp decline in the maternal mortality ratio. Bangladesh has experienced profound demographic transformations as well, most notably a remarkable decline of its high levels of fertility. Nonetheless, the country's socioeconomic prospects are still hampered by rapid population growth, severe soil degradation (which is linked to climate change), and uncontrolled urbanization including the proliferation of slum areas. Moreover, 32 percent of the Bangladeshi population still lives below the poverty line and about 40 percent are underemployed. These challenges are poised to jeopardize ongoing efforts to foster economic growth and ensure full employment, which are both needed to reduce poverty levels.

The population of Bangladesh has quadrupled in the last hundred years. Such a large increase in Bangladesh's population, especially during the second half of the 20th century, was mainly due to a sharp mortality decline, which was made possible by major improvements in medical technology and vigorous public health measures. The 2011 Population & Housing census estimated the population at 149.8 million. This gives an annual population growth rate of 1.37 percent and a population density of 1,015 people per square kilometer. The population will continue to grow due to the phenomenon of population momentum, which is linked to the youthfulness of the demographic age structure.

Population momentum will be partially offset by the pace of continued fertility decline—especially if fertility decreases for a period of time *below* the replacement level of about 2.1 children per woman (i.e., the level enabling the replacement of generations). Therefore, accelerating the fertility decline appears to be a crucial step for Bangladesh to stabilize its growing population. A more rapid fertility decline has the potential to reduce population growth in absolute numbers by one-twelfth by the middle of the 21st century. The ultimate stabilization of the population will depend on how these two factors (i.e., population momentum and continued fertility decline) play out, but by 2050 it is expected that about 50 million more people will be added to the population. In 2051, the population of Bangladesh is estimated to be 218.1 million under a laissez-faire fertility assumption (LF scenario) and 201.3 million under an accelerated fertility transition (AFT) scenario.

Bangladesh population projections point also to the less-often discussed dimension of population aging. The impending significant expansion of the elderly group, estimated to constitute nearly one-sixth of the total population by mid-century, will have major implications for health and social security in the medium and long-term, especially as current elderly care services are not yet adequate. It is expected that health expenditures in Bangladesh will increase by 48 percent by 2020 due to population growth and population aging.

Fertility plays a key role in determining Bangladesh's future demographic outcomes. A sustained fertility decline through increased family planning coverage will be essential to accelerate the demographic transition. A faster fertility decline would enable the country to better address its youth bulge and improve its dependency ratio, which could help Bangladesh to reap the potential benefits of a demographic dividend. This would lead also to less pressure on public finance for infrastructure and services as well as enable the country to foster job creation through adequate educational and social policies conducive to increased employability. However, Bangladesh will not only have to bring down fertility levels to about half-a-child below replacement level, but also to keep them there for 30 years in order to stabilize the country's overall population at around 200 million.

Fertility decline is strongly linked to effective family planning services. Between 1975 and 2011, the total fertility rate (TFR) declined from 6.3 to 2.3 children per woman, while the contraceptive prevalence rate (CPR) increased from 7.7 percent to 61.2 percent (all methods). The family planning method mix has evolved over the past decade and a half. Coverage of modern family planning methods increased by almost 20 percentage points from 1993 to 2010, when the use of the pill almost doubled and the use of injectable contraceptives almost tripled. However, the use of other modern family planning methods, such as condoms and NORPLANT® raised more slowly or even fell as in the case of intrauterine devices and female and male sterilization. The use of traditional contraceptive methods also declined. The public sector remains the main provider of family planning services, although the private sector provision has increased over the years.

Despite its past successes, Bangladesh's family planning program faces several challenges. The current program's contraceptive method mix is still dominated by short-term methods, whereas long-term/clinical methods are needed to accelerate and complete the fertility transition. Moreover, the age at first birth has not changed much: a quarter of all teenage girls have at least one child. The usual pattern for couples in Bangladesh is early marriage, rapid childbearing, and then reliance on short-term (less effective) contraceptive methods to avoid subsequent pregnancies.

In addition, the TFRs and the CPRs show wide regional variations. The Western part of the country has already attained replacement-level fertility, as illustrated by the Rajshahi and Khulna divisions. In these divisions, five districts already experience below-replacement fertility levels: 1.8 to 2.0 children per woman. However, fertility levels in the Eastern part of the country are still one child on average above replacement-level. Unmet family planning need remains high at 13.5 percent of Bangladeshi women. Low-performing family planning divisions like Sylhet and Chittagong in the East have the highest unmet needs, while the high-performing divisions like Rajshahi and Khulna in the West have unmet need of about 10 percent each.

Similarly, there was great progress in the provision of Reproductive Health (RH) services, particularly those aimed at reducing maternal mortality, which has declined by almost 40 percent in the decade from 2000 to 2010. However, more focused efforts are needed to provide antenatal care to about half of the pregnant women not receiving it and increase access to skilled birth attendants to two third of pregnant women who are accessing these services as well as addressing the wide regional and socioeconomic disparities.

In addition, the FP and RH programs are faced with implementation and institutional challenges. Contraceptive suboptimal availability is a major bottleneck, which have led to high contraceptive discontinuation thus leading to unplanned pregnancies. Also, contraceptives are mostly funded by donors and the government needs to have a plan to secure their financing in the long-term. The fragmentation of FP and RH services across seven Operational Plans makes weakens the coordination between the two programs, which is further exacerbated by the acute shortage of human resources for health.

What needs to be done?

The government will need to improve coordination and strengthen the policies and programs related to population, FP and RH services.

The 2004 Bangladesh Population Policy was also updated with revised goals and implementation plans in order to attain replacement levels of fertility by 2015. This new policy was endorsed by the Cabinet in September 2012. Going forward, the MOHFW, through the National Population Council, should help to revitalize and strengthen high-level governmental coordination to ensure broad socio-economic policies and multi-sectoral engagement on population policies and programs. To accelerate the demographic transition, harness the economic benefits of the youth bulge, and capture a demographic dividend, the government must also pursue policies to expand education, particularly for women, increase the age at marriage and first birth, and invest in skills development for the unemployed and job creation for the new entrants to the job market, coupled with expanding the safety nets for the elderly and vulnerable populations. This would require stronger coordination within the public sector and between the public and private sectors. In particular, increasing the age at marriage is an important policy lever that could significantly reduce fertility levels.

A key driver of fertility decline is increased use of FP services. The MOHFW should improve access to, and coverage of, FP services through the following actions:

- Shift the FP program strategically and expand the supply of long-acting and permanent contraceptive methods, which are more reliable and less expensive.

- Adopt a strategy to address the contraception unmet need, which would rapidly reduce fertility levels.

- Expand FP coverage to hard-to-reach and lagging areas as a priority that will require policies to strengthen partnerships with other government entities, the NGOs and the private sector.

- Conduct ongoing stakeholder consultations to ensure contraceptive security and program financial sustainability.

- Strengthen the institutional and technical capacity of the DGFP to manage the procurement of FP commodities more effectively.

- Strengthen the "social marketing" program as it played a critical role in increasing access to contraceptives.

- The FP program should engage community leaders to influence behavior change at the local level.

The MOHFW will need to improve the synergy and coordination of service delivery between the DGHS and the DGFP through the following actions:

- Increase linkages of RH services, e.g., antenatal and postnatal care and institutional deliveries, to FP services, through cross-referral between programs, for example;

- Use efficient provisioning and integrated approach of FP and RH services at the level of Community Clinics as the first point of service delivery; and

- Address the acute shortage of health workers by increasing the use of trained community health workers to generate demand for FP and RH services, particularly in lagging regions.

- Harmonize the FP and RH indicators across the different OPs and strengthen the MOHFW's capacity to triangulate data collected from various household surveys and use the data more optimally for decision making.

- Integrate screening, prevention and low cost treatment of NCDs at the primary care level to address the health needs of the aging population in order to avoid future cost escalation.

In conclusion, harmonization between population policies and FP and RH programs will be necessary to accelerate the fertility transition and improve maternal and reproductive health outcomes in Bangladesh. It is the convergence of policies and programs that will enable Bangladesh to tackle its demographic, health and poverty reduction challenges and contribute to its economic growth.

1. INTRODUCTION

Over the past decade, Bangladesh has registered impressive progress in the economic sector. The gross domestic product, gross national income, and per capita income have risen markedly (World Bank 2013a). The three-year trend in gross domestic product has showed economic growth above 6 percent a year, on par with some of the best-performing economies in Asia. The per capita gross domestic product was estimated at US$838 and the per capita gross national income at US$923 in 2012-2013 (Government of Bangladesh 2013). Yet 32 percent of the Bangladeshi population still live below the poverty line and about 40 percent are underemployed (BBS 2010, 2012).

During this period, Bangladesh has made also remarkable progress in many human development areas. These include increasing life expectancy at birth as well as levels of literacy, sustaining child immunization above 80 percent, triggering a decline in infant and child mortality rates, and achieving a significant decline of the maternal mortality ratio (MMR). On health services delivery, antenatal care visits for pregnant women by medically trained providers increased from 33 percent in 1999-2000 to 55 percent in 2011, and delivery by medically trained providers from 12 to 32 percent over the same period (NIPORT et al. 2013: 122-123 & 130). This increase in skilled attendance delivery stemmed predominantly from a rise in facility deliveries, which rose from 8 to 29 percent over the same period (NIPORT et al. 2013: 128). The increase in skilled attendance delivery, coupled with reduced fertility, led to a 40 percent reduction in MMR from 322 per 100,000 live births in 2001 to 194 in 2010 (NIPORT et al. 2012: xx, Arifeen et al. 2014). Gradual improvement of basic health and nutrition services also generated a sharp fall in under-five mortality (from 94 deaths per 1,000 live births in 1999-2000 to 53 in 2011) (NIPORT et al. 2013: 114)—an achievement for which Bangladesh received the United Nations Millennium Development Goals Award in 2010.

In addition, Bangladesh has made great progress in accelerating its demographic transition through an impressive decline in fertility. The pivotal decades in this endeavor were the 1970s and 1980s. The fertility decline stalled between 1993 and 2002, but has since resumed. The 2011 Population and Housing Census estimated the Bangladesh population to be 149.8 million. Today, the total fertility rate (the average number of children per woman) is about 2.3 children per women on average, and 61.2 percent of couples use a contraceptive method (52.1 percent use a modern method) (NIPORT et al. 2013: 85).

The country also adopted a broader reproductive health agenda, which was agreed to at the International Conference on Population and Development (ICPD) in Cairo in September 1994. With support of development partners including the World Bank, Bangladesh has also implemented an ambitious health sector reform program, which should help enhance efforts in the area of family planning and reproductive health.

Population momentum[1] (due to the young age structure) points to continued rapid growth of the population. However, the population momentum will be partially offset by the pace of continued fertility decline—especially if fertility decreases for a period of time *below* the replacement level of about 2.1 children per woman (i.e., the level enabling the replacement of generations). The decline in fertility will hinge on the successful implementation of family planning and reproductive health programs, which will be enhanced by the health sector reform efforts. The ultimate stabilization of the population will depend on how these two factors (i.e., population momentum and continued fertility decline) play out, but by 2050 it is expected that about 50 million more people will be added to the population of Bangladesh. Finally, the capital Dhaka is one of the fastest-growing cities in Asia, and the country's other urban centers are also growing fast. Rapid urbanization and possible expansion of slum populations are therefore also set to become major issues.

Despite its initial successes, Bangladesh's family planning program faces several challenges. The current program's contraceptive method mix is dominated by short-term methods, whereas long-term/clinical methods will be needed to accelerate and complete the fertility transition. Moreover, age at marriage and first birth has not changed much: a quarter of the country's teenage girls (15-19) have at least one child (NIPORT et al. 2013: 72). The usual pattern for couples is early marriage, rapid childbearing, and then reliance on short-term (less effective) contraceptive methods to avoid subsequent pregnancies. As a result, post-abortion conditions appear to be an important issue, according to anecdotal information. Moreover, family planning activities and health services more broadly are not as well coordinated operationally as they should be.

In recent years, population, family planning, and reproductive health issues have received less attention and this has not been conducive to decisive actions in this area. Moreover, the Bangladesh 2004 National Population Policy (Government of Bangladesh 2004), which did not include any costing figures, had not been implemented effectively. The National Population Council (NPC), headed by the Prime Minister, has rarely met and lack of clarity surrounds its mandate and role (the NPC last meeting was in September 2010, whereas it had convened almost every month during the period 1982 to 1990). It is also unclear which public body is in charge of implementing the population policy—in particular, the roles of the Directorates under the Ministry of Health and Family Welfare (MOHFW) are not well defined. The government has revised and updated the Bangladesh 2004 National Population Policy (a draft was prepared in 2009 and adopted by the Cabinet in September 2012). Although the new policy pays more attention to institutional arrangements and costing of activities, there is still a need to rekindle the efforts needed to accelerate the demographic transition through greater use of family planning services with the ultimate aim of stabilizing the population. Addressing the uncertainties regarding the National Population Council and resuscitating the MOHFW's role as the

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[1] This is characterized by the tendency for a population to continue to grow even after achieving replacement-level fertility rates due to a past high total fertility rate, which results in a relatively high concentration of young people in childbearing ages (see Glossary).

Secretariat of the NPC will address a major bottleneck to the implementation of National Population Policy in Bangladesh.

The aim of this Policy Note is to analyze the population trends and review the FP and RH programs to provide options for policy harmonization. Specifically, the Policy Note will examine the demographic challenges and population projections of Bangladesh as well as the fertility and family planning trends. The Note will present two scenarios of population projections until 2050 (a laissez-faire and an accelerated fertility transition), and discuss the changes in the age structure and dependency ratios (young and elderly) brought about by various paces of fertility decline. It will explain also why fertility and family planning are important for future population growth, analyze the proximate determinants of fertility (using the Bongaarts model), and examine cultural factors behind early marriage and first birth as well as high fertility outcomes. It will then look at the health sector to examine the family planning and reproductive health programs, analyzing their trends and barriers to the use of their services. The Note will also identify some of the key implementation and institutional challenges facing these programs. Finally, it will provide options for policy harmonization across the population, family planning and reproductive health programs in order to achieve better economic and social outcomes.

2. DEMOGRAPHIC PROJECTIONS AND CHALLENGES

This section focuses on the demographic challenges facing Bangladesh through mid-century and uses two major population projection scenarios, namely a laissez-faire (LF) scenario and an accelerated fertility transition (AFT) scenario. Accordingly, the section discusses the changes in the country's demographic patterns and trends, reviewing the issues of population growth, age structure, population momentum, youth bulge, and dependency ratios. The section also assesses the chances of Bangladesh of capturing the demographic dividend.

The population of Bangladesh, which was estimated in 2011 at 149.8 million people, has quadrupled in the last hundred years. Population censuses began in 1872, and the most recent census was conducted in 2011. The string of censuses show that the population increased from 29 million in 1901 to 129 million in 2001 and reached nearly 150 million in 2011 (Figure 1). After 1950, Bangladesh's population growth rate increased very sharply and reached a peak in the 1970s. Population annual growth began to decelerate in the 1990s and has stayed since 2006 at slightly under 1.4 percent a year. The population density is estimated at 1,015 people per square kilometer.

Figure 1. Numbers and Annual Growth Rate of Population, Bangladesh 1901-2011
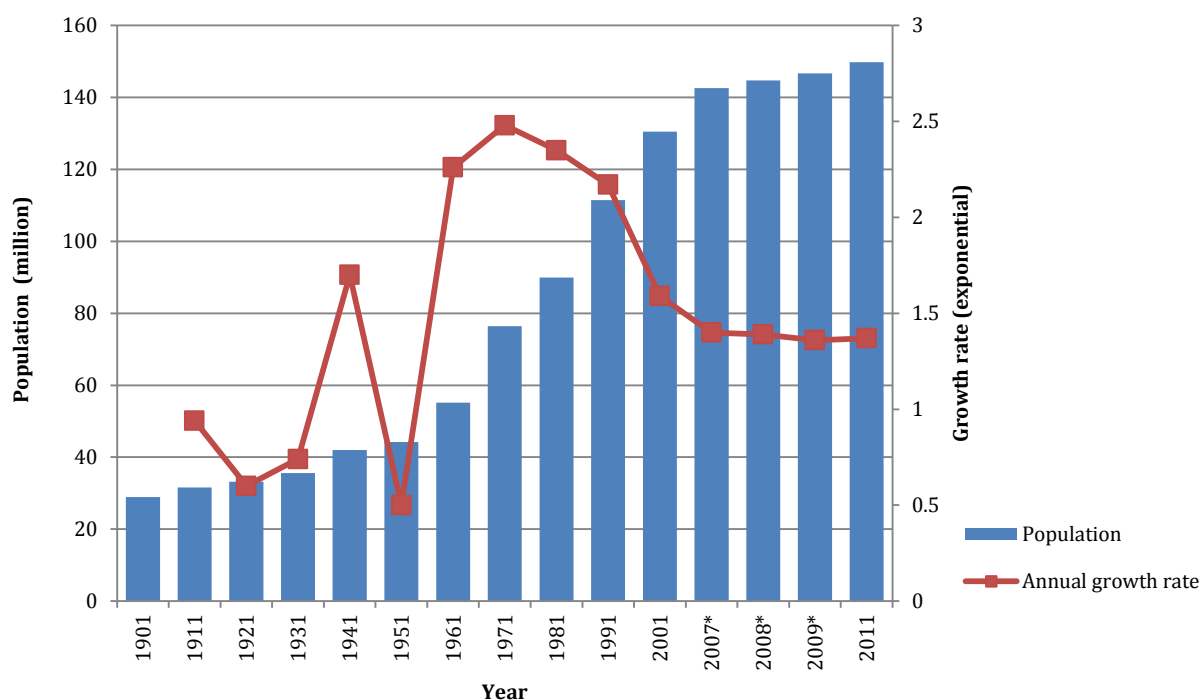
*Estimated from the Sample Vital Registration System; all other figures are taken from censuses.

Sources: BBS - Bangladesh Bureau of Statistics (2009). *Statistical Yearbook 2009.* Dhaka: Ministry of Planning; BBS - Bangladesh Bureau of Statistics (2011). *Sample Vital Registration System 2009.* Dhaka: Ministry of Planning; and Government of Bangladesh – Government of the People's Republic of Bangladesh (2011). *Population & Housing Census 2011. Preliminary Results.* Dhaka: Ministry of Planning, Bangladesh Bureau of Statistics, Statistics Division.

Such a large increase in Bangladesh's population, especially during the second half of the 20th century, was mainly due to a sharp mortality decline, made possible by major improvements in medical technology and vigorous public health measures. During that period, the country cut its high infant and under-five child mortality by 32 and 40 percent, respectively. This dramatic reduction in mortality contributed to the rapid population increase. However, the decline in the maternal mortality ratio (MMR) contributed to a lesser extent to the population growth.

The decline in infant and child mortality was followed by a decrease in the total fertility rate (TFR), although the fertility transition experienced some delay and two stalls. Despite the subsequent remarkable decline in the TFR (Figure 2), the total population continued increasing fast due to *population momentum*, which is caused by a young age structure. Nonetheless, since the beginning of the 21st century the population growth rate has continued to fall, to 1.37 percent a year. The acceleration of the fertility transition is one important demographic factor that will help the country stabilize its population.

Figure 2. Trend in Total Fertility Rate, Bangladesh 1971-2011
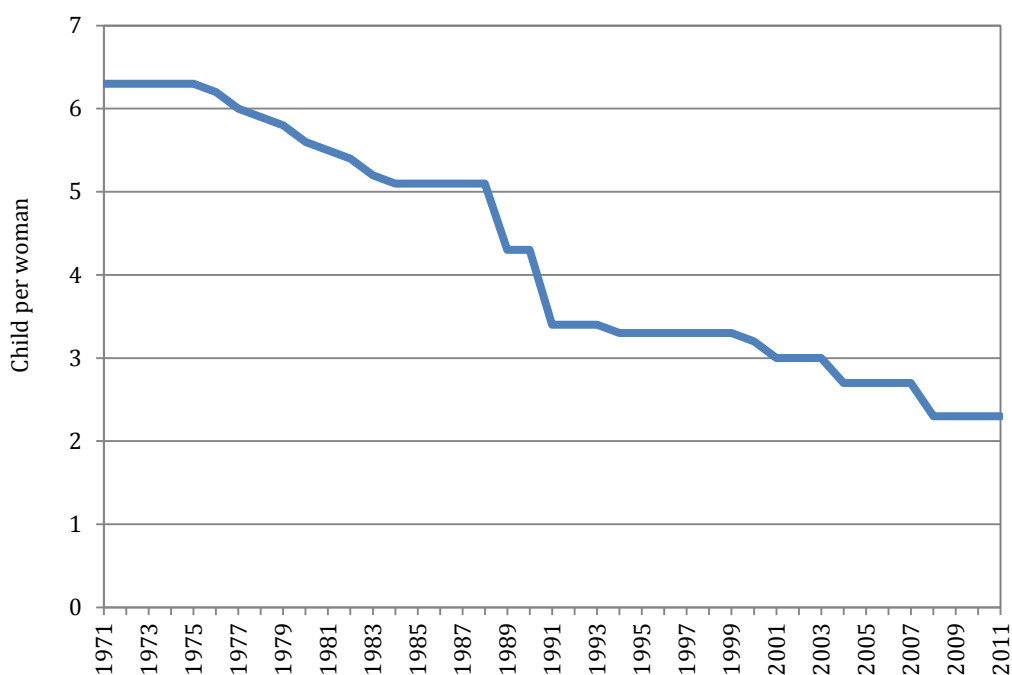
Sources: BDHS data, various years.

Accelerating the fertility decline has the potential to reduce population growth in absolute numbers by one-twelfth by the middle of this century. On the basis of existing trends of mortality, fertility, and international migration available from various national and international sources, the projected population for Bangladesh provides robust estimates of the future population up to 2051 (these estimates are deemed robust because most people who will live in 2051 are already born). The two population projection scenarios are:

- The TFR will reach 2.0 children per woman by 2016 and stay there (laissez-faire fertility or LF scenario);

- The TFR will reach 2.0 children per woman by 2016 and continue to decline to a below-replacement level of 1.7 (accelerated fertility transition or AFT scenario).

With the slow fertility decline in the LF scenario, the total population would increase to 218.1 million in 2051, but under the AFT scenario it would increase only to 201.3 million—a difference of 16.8 million people (Figure 3). This difference would have significant impacts on public spending, public services, and job creation. Fertility levels, the engine of future population growth, must therefore be a focus of current public health policies and programs.

Figure 3. Projected Population of Bangladesh, LF and AFT scenarios (in million), 2001-2051
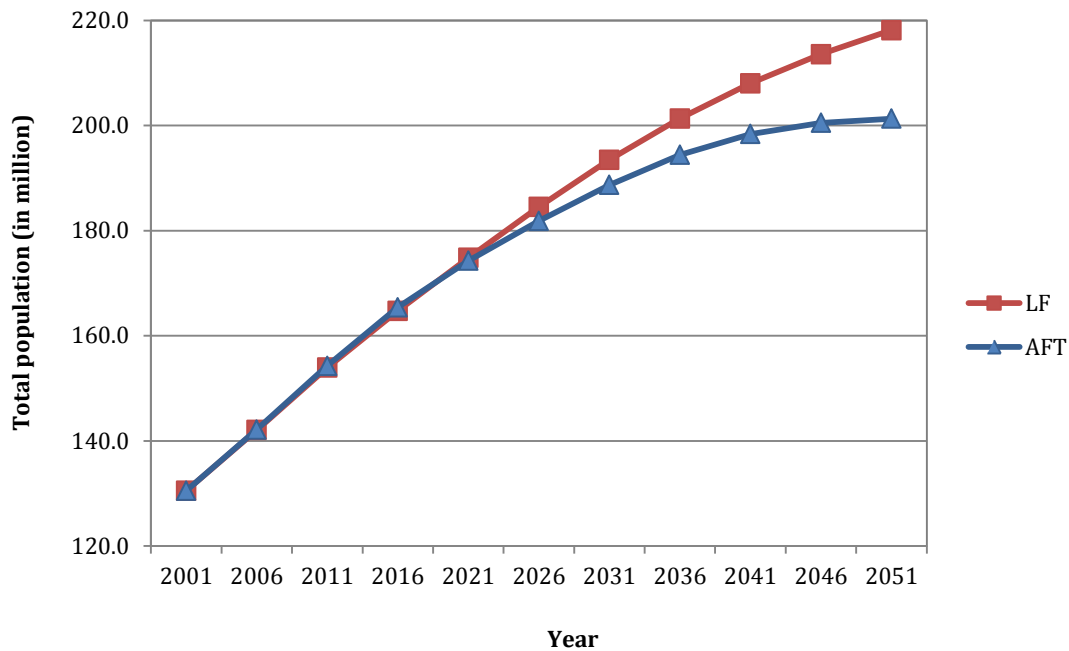
Source: Authors' calculations (Annex 1).

These population projections are different than estimates from other sources, either national or international. The results of the LF scenario are close to the Bangladesh Bureau of Statistics while the results of the AFT scenario are very close to the most recent World Bank and United Nations projections estimates (Table 1; Annex 1).

Table 1. Projected Population by 5-year Age-groups, Both Sexes, Bangladesh 2050 (thousands)

Age group	US Census Bureau [a]	UN [b], World Bank [c]	BBS [d]
0-4	15,791	11,213	14,530
5-9	15,797	11,631	14,190
10-14	16,014	12,075	13,820
15-19	16,074	12,450	13,920
20-24	15,861	12,865	14,600
25-29	15,565	13,379	15,110
30-34	15,329	13,705	14,840
35-39	15,401	13,842	13,550
40-44	16,140	13,694	13,310
45-49	16,806	14,341	14,820
50-54	15,965	14,238	15,690
55-59	14,527	13,512	16,180
60-64	12,851	12,273	14,520
65-69	10,575	10,722	10,030
70-74	9,094	8,531	7,930
75-79	6,273	6,066	6,080
80+	5,524	7,410	5,550
Total	**233,587**	**201,947**	**218,640**

Sources: a. US Census Bureau, International Data Base (2009), http://www.census.gov/ipc/www/idb, accessed on March 18, 2009; b. United Nations (2013). *World Population Prospects: The 2012 Revision*. New York: United Nations, Department of Economic and Social Affairs, Population Division (Medium variant, year 2050),http://esa.un.org/unpd/wpp/index.htm, accessed on February 21, 2014; c. World Bank (2014). Health Nutrition and Population Statistics database, http://datatopics.worldbank.org/hnp/, accessed on June 6, 2014; and d. BBS – Bangladesh Bureau of Statistics (2007). *Population Census 2001 –National Series*, Vol. 1, Dhaka: Ministry of Planning.

Due to the ongoing demographic transition, the population age structure will also change greatly. Once fertility declines to replacement level, the proportion of youth decreases gradually and the base of the population pyramid becomes narrower (Figure 4). Over the next 35 years, both projection scenarios show that the proportion of the population under 15 will fall heavily, while the proportion of the population between 15-64 years will stabilize, and the number over 65 will rise steadily (Figure 5).

Figure 4. Current and Projected Population Pyramids (LF and AFT), Bangladesh 2001-2051
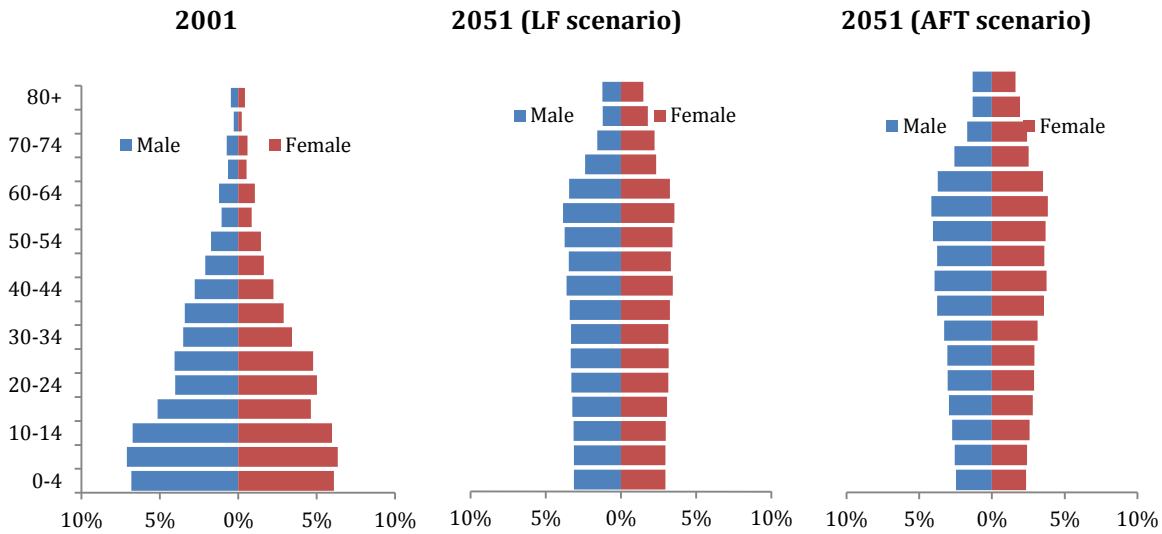
Source: Authors' calculations.

Figure 5. Age Structure of Baseline and Projected Population, Bangladesh 2001-2051
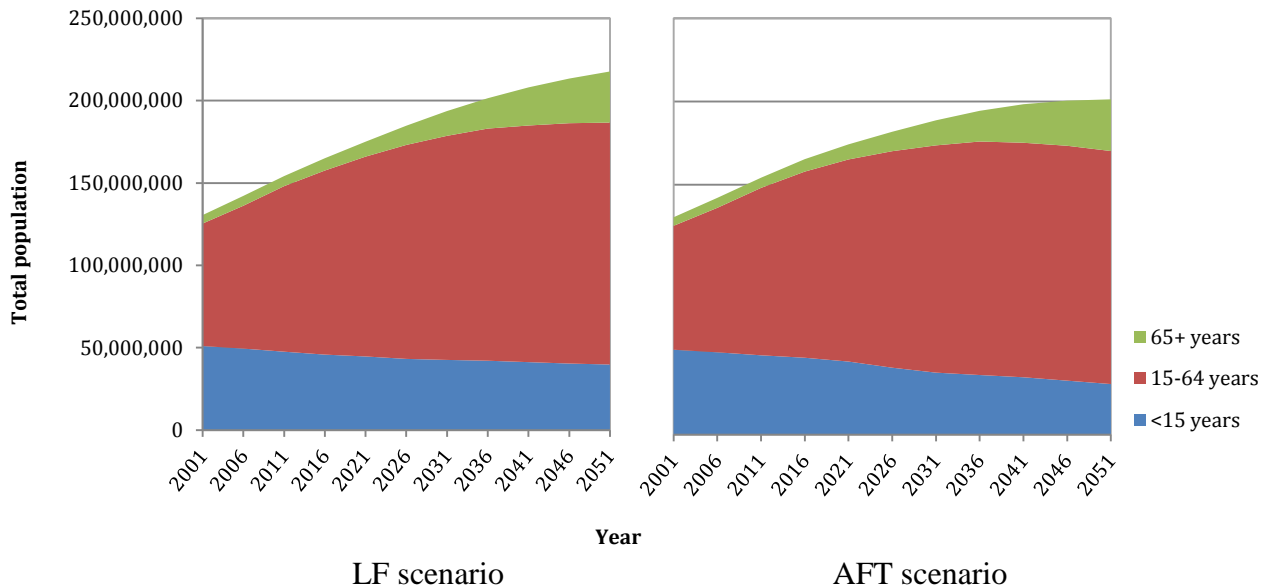
Source: Authors' calculations (Annex 1).

Despite the population momentum, an accelerated fertility reduction would stabilize the population as early as 2026. The phenomenon of population momentum introduces a lag between achieving replacement levels of fertility and the leveling off of the rate of natural increase. Table 2 presents the momentum factors during the projection period. Calculations are based on the life expectancy rates from the UN World Population Prospects: The 2010 Revision (United Nations 2011) as well as the crude birth rates (CBRs) estimated from the projections. This table indicates that even if the replacement level TFR is achieved before 2016, the population will continue to increase due to the age structure. The momentum factor would approach 1 (meaning that natural increase is not contributing to population growth) around 2041 under the LF scenario but around 2026 under the AFT scenario.

Table 2. Crude Birth Rates (CBR) and Momentum Factors (MF), Bangladesh 2001-2051

Year	CBR (LF)	CBR (AFT)	e_0*	MF (LF)	MF (AFT)
2001	26.5	26.5	62.0	1.64300	1.64300
2006	24.3	24.3	63.6	1.54548	1.54548
2011	22.3	22.5	65.7	1.46511	1.47825
2016	18.5	19.0	67.7	1.25245	1.28630
2021	17.5	15.0	69.3	1.21275	1.03950
2026	16.4	14.2	70.9	1.16276	1.00678
2031	15.2	13.4	72.2	1.09744	0.96748
2036	14.2	12.3	73.4	1.04228	0.90282
2041	13.4	11.0	74.3	0.99562	0.81730
2046	12.9	10.2	75.2	0.97008	0.76704
2051	12.5	9.8	76.5	0.95625	0.74970

* Life expectancy at birth (future values estimated from population projections).
Source: Authors' calculations (Annex 1).

Although existing trends of the TFR decline indicate that Bangladesh will achieve replacement level fertility (TFR of 2.1) before 2016, population growth will continue during several decades. All population projections that are prepared for Bangladesh usually focus on the year of achieving replacement level fertility and assume that fertility levels will remain constant thereafter. Nonetheless, even when fertility declines to replacement level, the population continues to grow considerably before stabilizing due to the population momentum. The National Population Policy could be therefore complemented with a target for reaching a net reproduction rate (NRR) of 1 before 2016. The NRR is the number of daughters a woman would bear during her life time, assuming fixed age-specific fertility and mortality rates. A NRR of 1

indicates that the existing generation of women is exactly reproducing itself, thus stabilizing population growth.

An accelerated fertility reduction would reduce the youth bulge in the coming decades. A young population in a low-income country and a labor market saturated with soaring under- and unemployment often implies high dependency ratios (see below). This lack of economic opportunity can generate frustration, potential conflict, and social and political instability under some circumstances (May 2012, Sciubba 2011). Under the LF scenario, the proportion of population under 30 would decline from 61 percent in 2011 to 38 percent in 2051—or to 33 percent under the AFT scenario. The result is a reduction of about 6.3 million youths (15- 29 years) by mid-century (Figure 6).

Figure 6. Population age 15-29 years (in million), Bangladesh 2001-2051
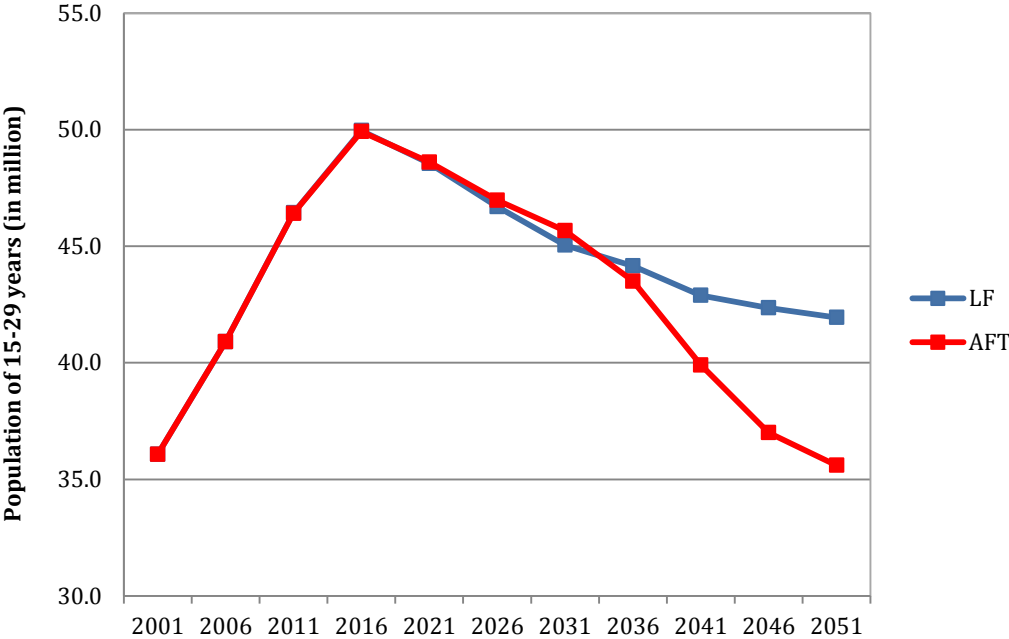
Source: Authors' calculations (Annex 1).

An accelerated fertility reduction substantially increases the window of opportunity to capture the demographic dividend. The demographic dividend presents itself when lower fertility levels increase the share of working age people along with declining dependency ratios (dependents are people below age 15 plus people above age 65). During this demographic window of opportunity, the ratio of workers to dependents improves thus facilitating the formation of human capital (e.g., education and health) among dependents and resulting in a steady rise in output per capita. One of the commonly used criteria for determining the occurrence of the demographic dividend is whether the value of the total dependency ratio reaches less than 0.5, i.e., two workers for one dependent (Cheung et al. 2004). Bangladesh will reach that situation by 2016 (Table 3). It should be noted that the AFT model provides a more favorable demographic window of opportunity until 2051. The government must be aware of the opportunity it has for capturing the demographic dividend. Provided that economic and social

policies – such as health, education, and labor and job creation – enable a harnessing of the economic power of the youth bulge, Bangladesh would have the chance to improve its economic standing significantly.

Table 3. Dependency Ratios, Bangladesh 2001-2051 (LF and AFT scenarios)

Year	Dependency Ratio	
	LF	AFT
2001	0.75	0.75
2006	0.64	0.64
2011	0.53	0.54
2016	0.47	0.48
2021	0.44	0.44
2026	0.42	0.40
2031	0.42	0.38
2036	0.43	0.39
2041	0.45	0.41
2046	0.47	0.42
2051	0.49	0.44

Source: Authors' calculations (Annex 1).

The population projections also bring attention to the less widely discussed dimension of population aging and its implications. As fertility decreases and life expectancy increases due to modern medical innovations and/or socioeconomic improvements, the significant increase of the elderly (aged 65+ years) will present further challenges of managing care. With 4 percent of the population in 2001, the 65+ year age group will constitute 14 and 15 percent of the population by 2051 in the LF scenario and AFT scenario, respectively. This will have major implications for health and social security during this century particularly that the elderly care services in Bangladesh remain quite inadequate for the current proportion of elderly in the population (Hossain et al. 2006). Also, population aging and continuing socioeconomic development will further accelerate the shift from infectious to non-communicable diseases (NCDs) as the major cause of morbidity and mortality, which, together with population growth, may cause health expenditures to increase by 48 percent in 2020 (El-Saharty et al. 2013). Issues relating to the economic burden of an aging population and elderly care will require the government's special attention to avoid cost escalation in public spending.

Population growth and aging will further strain the limited social assistance programs and contributory pension schemes. The main forms of social assistance in Bangladesh are the widow's allowance and the old age allowance or *Boishka Bhata*. The widow's allowance covers around 0.69 million poor/destitute women who are widowed, abandoned, divorced, or separated from their husbands. The old age allowance is a means-tested pension program, introduced in 1998, covering 1.8 million people 65 years and older. Under both schemes, an allowance of 250 Taka (USD $3.60) a month is paid to the recipients (O'Neill 2009). However, the program has been criticized for limited coverage – it has been estimated that at least 1.6 million older people living below the poverty line receive no allowance (O'Neill 2009).

Bangladesh faces also a very challenging situation with respect to uncontrolled urbanization and the proliferation of slum areas. With a population density of 44,000 per square kilometer, the capital city Dhaka is by far the most densely populated urban area in the world. Furthermore, the rapid soil degradation fuels the phenomenon of "environmental refugees" (rural people leaving their land because of environmental stress) and jeopardizes socioeconomic prospects (Streatfield & Ahsan 2008).

Poverty reduction is closely tied to demographic factors. According to a poverty assessment study (World Bank 2013b), changes in the demographic composition between 2000 and 2010, in particular with respect to the dependency ratios, have been an important driver of poverty reduction during this decade. The lower youth-dependency ratio was largely driven by a reduction in fertility. A decomposition analysis of the determinants of the poverty decline reveals that demographic factors, particularly age, gender, and the regional composition of the workforce contributed to at least 25 percent of the observed decline of poverty during the decade (World Bank 2013b: xxiv & 47-59).

To sum up, it appears that it will be more favorable for Bangladesh to adopt an accelerated fertility transition scenario policy. However, in order to capture the benefits of this scenario, Bangladesh will need to adopt a number of socioeconomic policies. Capturing the demographic dividend will not only contribute to economic growth but will also facilitate poverty reduction.

3. FERTILITY AND FAMILY PLANNING

This section focuses on the importance of fertility rates for the future growth of the population of Bangladesh. It describes the current family planning (FP) situation at national and provincial (division) levels, with an emphasis on the geographic and socioeconomic inequalities in FP and reproductive health (RH) outcomes. The section concludes with an analysis of the proximate determinants of fertility (using the Bongaarts model), and shows the importance of FP – especially a shift to long-acting and permanent contraceptive methods (LAPMs) – in determining future levels of fertility in Bangladesh.

Fertility is paramount in shaping future demographic outcomes. As seen, fertility levels largely determine the rate of population growth, age structure, and dependency ratios, as well as the relative size of the labor force. Indeed, the future population growth of Bangladesh and the total population in the country hinges on the current and future levels of the TFR, and on mortality and migration patterns and trends.

Fertility is strongly linked to the use of family planning (FP). Since 1975, the contraceptive prevalence rate (CPR) and the TFR have passed through three distinct phases (Figure 7). First, until the mid-1990s, the TFR has declined rapidly largely due to steady increase in use of FP services. This increase in FP practices and subsequent decline in fertility was motivated by a strong political commitment, increased method mix, introduction of Menstrual Regulation (MR), increased outreach, and demand-generating activities. A functional integration of maternal and child health (MCH) and FP services at the *upazila* (sub-district) level and below, strong community and NGO involvement, and introduction of financial incentives to have less children were also impetus in this first phase.

MR services were introduced in Bangladesh in 1974 on a small scale to assess feasibility of a national scale up. A training program in MR was initiated in seven medical college hospitals and two district hospitals in 1979 and MR has been available free of charge in the government's family planning program as a public health measure since then. The draft Bangladesh National Population Policy of 1996 proposed liberalization of the law on abortion, and proposed MR performed by a qualified medical practitioner within 12 weeks of pregnancy (instead of 8 weeks practiced earlier) would to be permissible as an interim method for ensuring non-pregnancy. As of 2011, about 10,600 doctors and 7,200 paramedics trained in MR were posted in government clinics at national, district, *upazila* and union levels (Akhter 2001, Vlassoff et al. 2012). The second phase, through the early 2000s, saw a slower decline in TFR mainly due to a fall in the use of LAPMs – despite an increase in CPR; low contraceptive use among young married women; high contraceptive discontinuation rates; a shift from outreach/domiciliary service delivery to clinic-based service delivery; and weak coordination between the Directorate General of Health Services (DGHS)—especially its MCH component—and the Directorate General of Family Planning (DGFP). The third phase around 2004, showed a decline of fertility services, particularly due to the increased role of non-state providers and the share of LAPMs.

Figure 7. TFR, CPR and proportion of LAPMs, Bangladesh 1975 to 2011
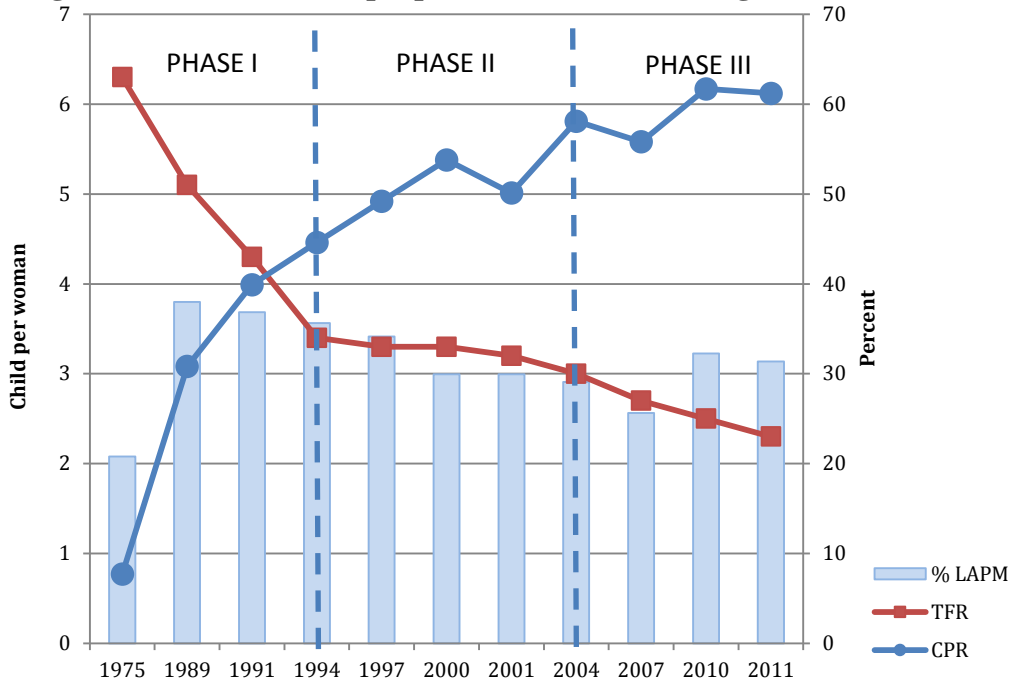
Source: BDHS 2011 (NIPORT et al. 2013).

The TFRs and CPRs show wide regional variations. The Western part of the country has already attained replacement-level fertility, as illustrated by the Rajshahi and Khulna divisions; in these divisions, five districts already experience below-replacement levels (1.8 to 2.0 children per woman). However, the Eastern part of Bangladesh, under the Sylhet and Chittagong divisions, is experiencing fertility levels of one child (on average) above replacement-level (Figure 8). These variations correspond with the geographic use of modern methods of contraceptives, which is lower in the majority of Eastern districts. Geographic variations in the TFRs and the CPRs are shown in Figure 9.

Figure 8. Geographic Distribution of TFR and CPR, Bangladesh 2011
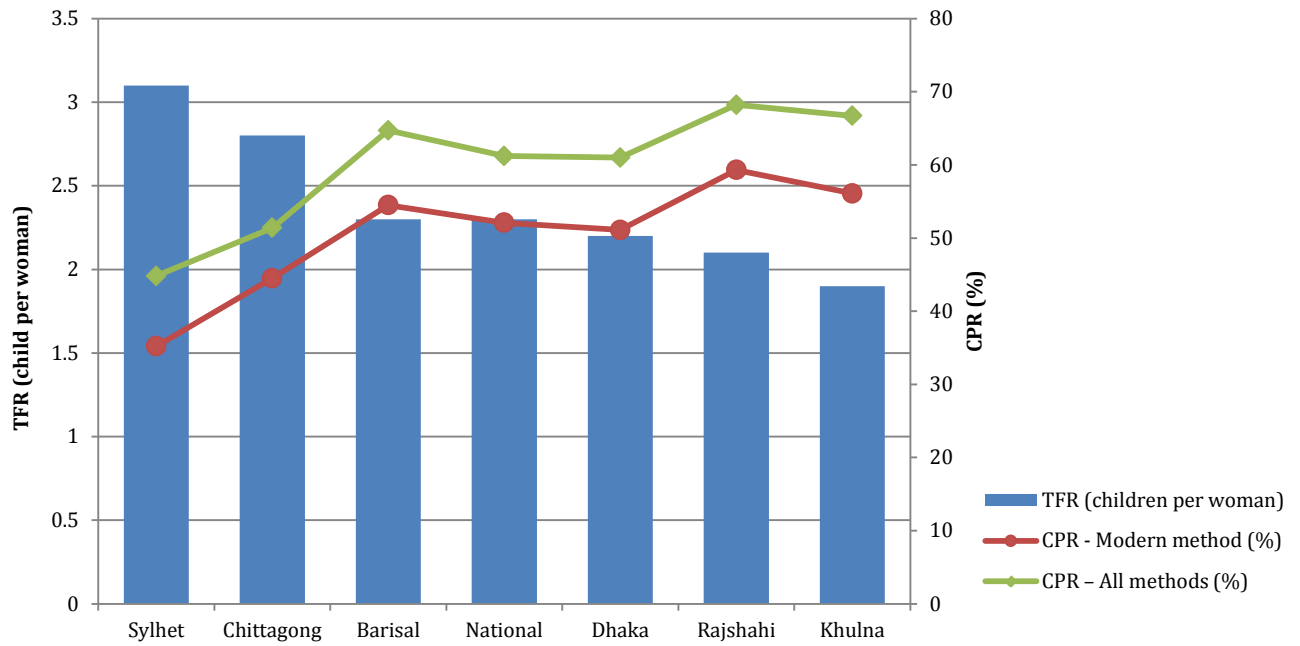
Source: BDHS 2011 (NIPORT et al. 2013).

Figure 9. Geographic Distribution of TFR and CPR, Bangladesh 2011
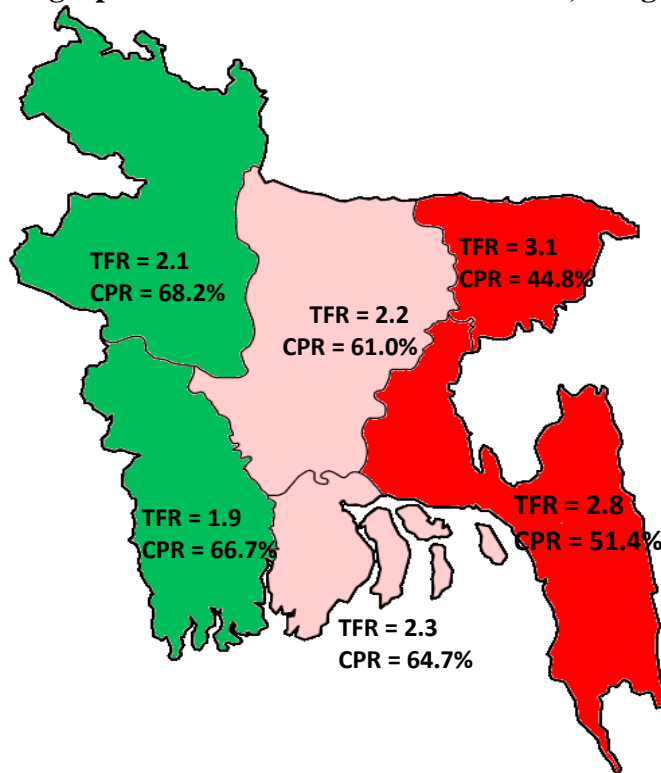
Source: BDHS 2011 (NIPORT et al. 2013).

Moreover, the TFRs and CPRs vary widely by socioeconomic characteristic. The 2011 round of the BDHS showed that uneducated women bear, on average, one child more than those who have completed a secondary or higher level of education (2.9 and 1.9 children, respectively). Also, women from the poorest wealth quintile bear 1.2 children more than women from the richest quintile (3.1 and 1.9 children, respectively) (NIPORT et al. 2013: 62). However, with respect to the CPR (modern methods), coverage is less inequitable: among women with no education it is only 3 percentage points lower than among those with secondary or higher education (50.2 and 53.2 percent, respectively). In fact, women from the poorest wealth quintile have 1.8 percentage point *higher* contraceptive coverage than women from the richest quintile (52.9 versus 51.1 percent, respectively) (NIPORT et al. 2013: 85).

The family planning method-mix has evolved over the past 15 years. Use of the pill and injectable contraceptives has increased greatly, while other modern and/or LAPMs have increased slowly or even decreased. Use of modern family planning methods increased by almost 20 percentage points in 1993–2010, when users of the pill almost doubled and users of injectable contraceptives almost tripled (Figure 10). Users of other modern methods rose more slowly (e.g., condoms and NORPLANT®) or even fell (e.g., IUD and female and male sterilization). The use of traditional methods also registered a decline.

Figure 10. CPR Method Mix, Bangladesh 1993-2013
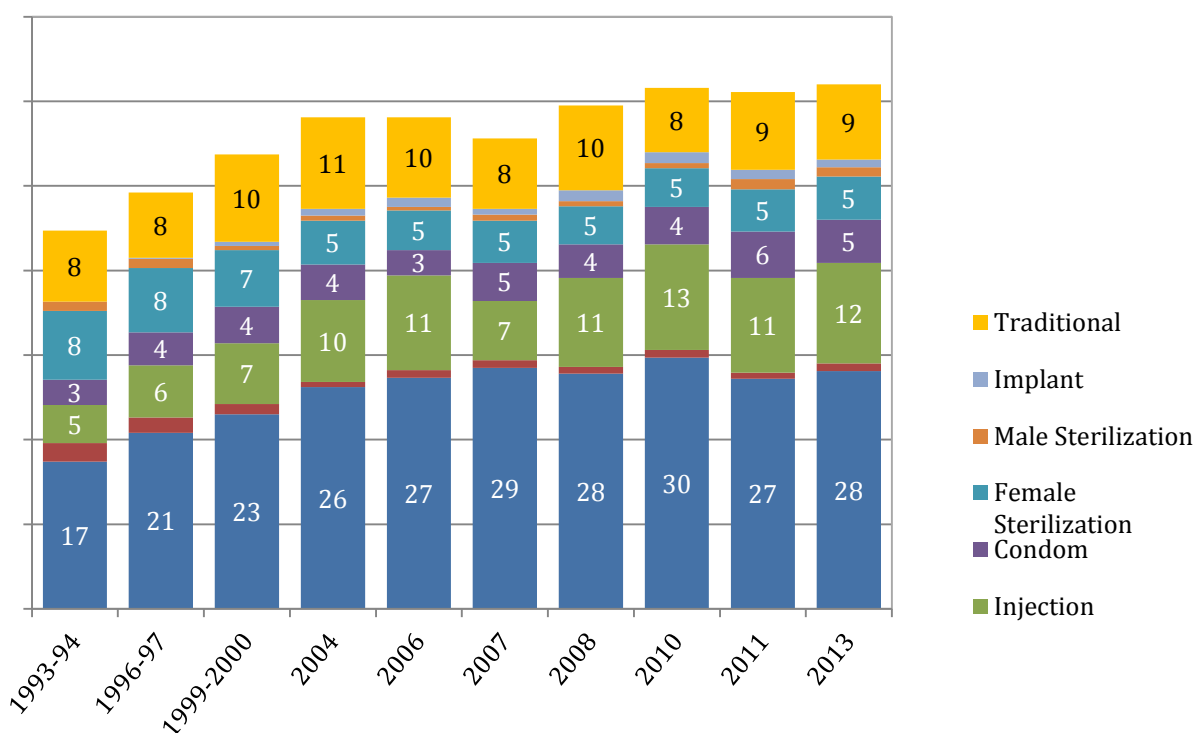
Sources: BDHS and UESD Surveys, various years.

The unmet need for contraception has been estimated in 2011 at 13.5 percent of Bangladeshi women. Unmet need for contraception are defined as "the proportion of women not using contraception who either want to cease further childbearing (unmet need for limiting)

or who want to postpone the next birth at least two more years (unmet need for spacing)" (Westoff 2006, World Bank 2010b). According to the 2011 Bangladesh Demographic and Health Survey (BDHS), among the Bangladeshi women who expressed an unmet need for family planning, 8.1 percent expressed an unmet need for birth limiting, and 5.4 percent expressed an unmet need for birth spacing (NIPORT et al. 2013: 99). The total demand for family planning is 74.7 percent (it is the sum of unmet need plus total contraceptive use) and 82 percent of this total demand is currently satisfied (NIPORT et al. 2013: 99). While the unmet need for contraception had been gradually increasing – from 15 percent in 1999-2000 to 16 percent in 2004 and 17 percent in 2007 (Ashford 2003, Haque 2010) – the rate fell to 13.5 percent in 2011 (NIPORT et al. 2013: 99). However, a recent small-scale study, which was conducted in a rural sub-district, indicated that the unmet need for contraception could be as high as 22 percent in specific locations (Ferdousi et al. 2010).

There is wide variation in the unmet need for contraception across divisions and regions. Low-performing FP coverage divisions (like Sylhet and Chittagong) have the highest unmet needs at 17.3 and 20.7 percent, respectively (Figure 11). The high-performing divisions (like Khulna and Rajshahi) have unmet need for family planning of about 10 percent each. Before the data collection from the field for BDHS 2007 (conducted around November-December 2006), there has been a widespread stock-out of injectable contraceptives across the country, along with supply problems for implants due to the government's decision to switch from the five-rod NORPLANT® to the single rod IMPLANON® (NIPORT et al. 2009: 220, Dickens 2008: 28). This was reflected in the increased contraceptive discontinuation and levels of unmet need for contraception in 2007 (NIPORT et al. 2009: 69).

Figure 11. Unmet Need for Family Planning Among Currently Married Women of Age 15-49, Bangladesh 2004-2011
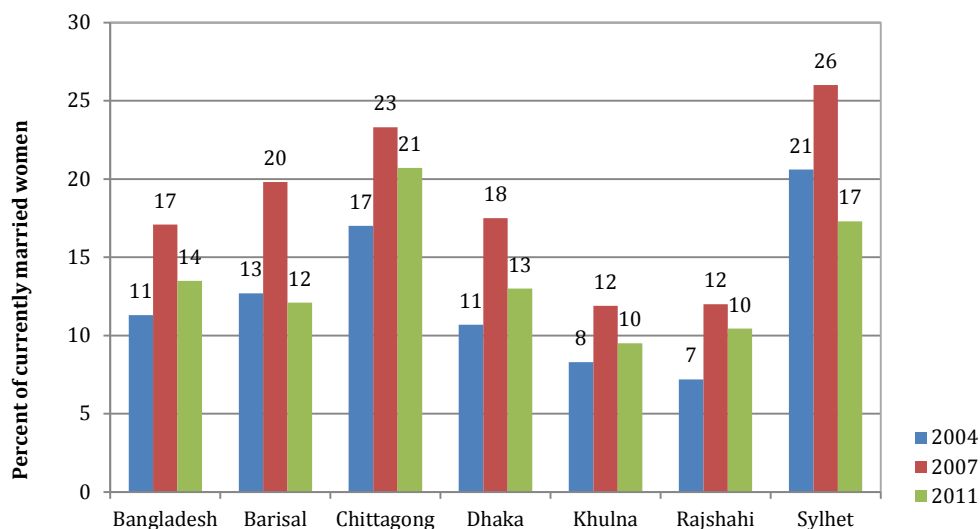
Sources: BDHS, various years.

Bangladesh's fertility patterns are chiefly characterized by early age at marriage and first birth. Outside sub-Saharan Africa, Bangladesh has one of the highest proportions in the world of girls married early. According to the 2007 BDHS, 32.3 percent of girls aged 20-24 were married before age 15. This proportion rises to 66.2 percent for marriage before age 18, and 79.2

percent of girls aged 20-24 were married before age 20 (NIPORT et al. 2009: 78). With respect to first birth, 48.2 percent of girls in the age group 20-49 have given birth by age 18, and 68.6 percent have by age 20 (NIPORT et al. 2009: 55).

In Bangladesh, newly married couples continue to have children at the same rate and the control of fertility tends to be practiced only later in marriage. Delayed marriage can play an important role in reducing fertility through reduction of the time-span of childbearing, although fertility appears to be a function not only of age at marriage, but also of age at first birth and of birth spacing, the latter being key in determining the TFR. It is estimated that 65 percent of the population growth between 2000 and 2025 will be attributable to the young age structure (Islam & Mahmud 1996). Accordingly, as seen from data gathered in several surveys in the Khulna and Rajshahi divisions, the three most feasible approaches to reduce the impact of population momentum are: delayed age at marriage, delayed age at first birth, and especially wider spacing of successive births. To delay the age of marriage would require long-term changes in socioeconomic behavior and practice in order to end the tradition of early proof of marital fertility. However, wider birth spacing can be achieved through improving the service delivery system of existing family planning programs, especially through information, education, and communication (IEC) campaigns.

4. REPRODUCTIVE HEALTH SERVICES

This section analyzes the situation of reproductive health services in Bangladesh and its evolution over the past decades. It focuses on the specific interventions (antenatal care, skilled birth attendance, and postnatal care) aimed at improving reproductive and maternal health outcomes. The section describes also the geographical and socioeconomic disparities in the coverage of those interventions.

Reproductive health (RH) services, including family planning, are a key component of health services in the public sector in Bangladesh. Within the package of essential services (viz. child health services, family planning, reproductive health care, limited curative health care, control of communicable diseases, and programs of behavioral change), reproductive health takes roughly 33 percent of the total health services financing (Government of Bangladesh 2012). Although the proportion of private sector provision has been steadily increasing over the years, the public sector still remains the main provider of the majority of family planning and reproductive health services (Figure 12).

Figure 12. Source of Selected RH Services, Bangladesh 2011
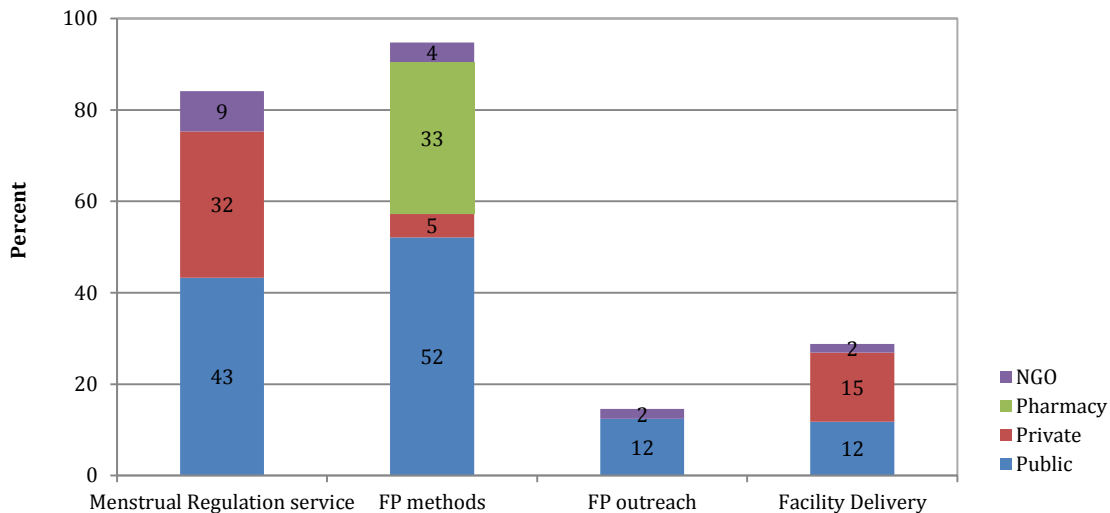
Source: BDHS 2011 (NIPORT et al. 2013).

Over the past two and a half decades, Bangladesh has made great progress in the provision of reproductive health services, particularly those aimed at reducing maternal mortality. The maternal mortality ratio (MMR) has declined from more than 550 deaths per 100,000 live births in 1990 to about 170 (projection) in 2013 (Figure 13). In total, the MMR has declined by almost 40 percent in the decade from 2000 to 2010.

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Figure 13. Trend in Maternal Mortality Ratio, Bangladesh 1987-2013
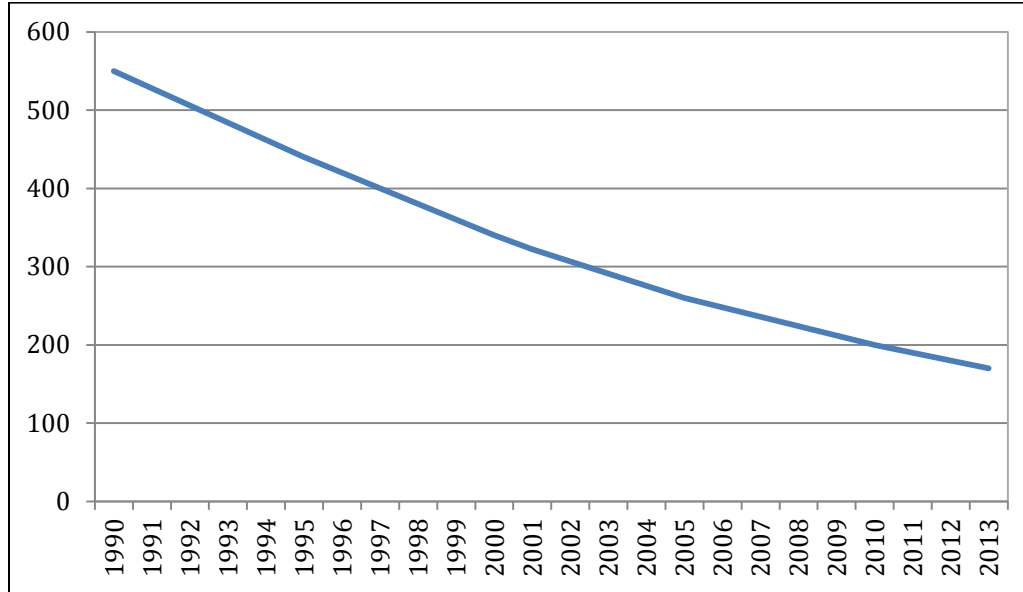
Source: World Bank (2013a). *World Development Indicators 2013*. Washington, DC: The World Bank; figures for years 2000-2010 have been smoothed.

Progress in reproductive health and maternal mortality outcomes has been achieved through three main interventions, namely antenatal care, skilled birth attendance, and postnatal care.

- **Antenatal care (ANC):** As of early 2011, 54.5 percent of Bangladeshi women sought ANC from a medically qualified provider, but only 25.5 percent of women received the recommended four or more ANC visits. Tetanus toxoid injection is a vaccination given as part of ANC: 41.7 percent of mothers received two or more injections during their last pregnancy and 89.9 percent had their last birth protected against neonatal tetanus (NIPORT et al. 2013: 127).

- **Skilled birth attendance (SBA):** SBA by a medically trained provider increased from 9.5 percent in 1994 to 32 percent in 2011 (NIPORT et al. 2013: 132). The majority of births are delivered at home with institutional delivery accounting for only 28.8 percent of all births (15.1 percent in private sector facilities, 11.8 percent in public sector facilities, and 1.9 percent in NGO facilities) (NIPORT et al. 2013: 129). However, according to the *Utilization of Essential Service Delivery Survey 2013*, 32.8 percent of live births were delivered in a health facility in the three years preceding the survey (NIPORT 2014: Table 3.1.2a).

- **Postnatal care (PNC):** In 2011, only 27.1 percent of women obtained this type of care within the first two days of delivery from a qualified provider (i.e., a medically trained provider) (NIPORT et al. 2013: 133).

While utilization of antenatal care, skilled birth attendance, and postnatal care has been increasing steadily in Bangladesh over the past decades, wide geographical disparities remain. For instance, women in urban areas were more likely to seek antenatal care (74.3 percent) from a qualified professional than their rural counterparts (48.7 percent) (NIPORT et al. 2013: 123).

Disparities in reproductive health services between divisions and regions mirror those found in family planning services coverage. With respect to family planning, the divisions of Sylhet and Chittagong have been lagging behind better performing divisions, such as Khulna and Rajshahi. Similar differences are observed when it comes to maternal and newborn health, and the differences can be significant. For instance, as far as antenatal care from medically trained provider is concerned, the widest gap is observed between the divisions of Sylhet and Khulna, where 46.7 percent and 65.4 percent of women benefit from such services, respectively (NIPORT et al. 2013: 123).

Finally, there is also a large gap between wealth quintiles in receiving services, such as ANC. In the richest quintile, 87.4 percent of women received ANC from a qualified professional; the proportion was only 30.4 percent of women in the poorest quintile (NIPORT et al. 2013: 123).

5. PROGRAM IMPLEMENTATION CHALLENGES

This section describes some of the key implementation and institutional challenges related to the FP and RH programs.

Contraceptive availability is a major bottleneck in FP services. One constraint to the expansion of contraceptive use stems from less than optimal availability of certain commodities (Table 5). When Community Clinics and NGO/private facilities are excluded, 55 percent of facilities had all four contraceptive methods in stock in 2011 (i.e., condoms, oral tablets, injectable contraceptives, and IUDs), which is actually lower than the 2009 estimate of 58 percent. However, the situation has improved in recent years. In one instance, there were shortfalls of 247 million condoms from February-March, 2008, 614,000 IUDs from May-June, 2007, and 20 million injectable doses from November-December, 2006 (USAID | DELIVER Project 2008). Gaps like these have exposed women to unnecessary health risks and have led to high contraceptive discontinuation, thus leading to unplanned pregnancies.

Table 4. Bangladesh Health Facility Survey (BHFS) Estimates on Availability of FP Supplies in Health Facilities, 2009 and 2011

Facility Type	Percent of facilities having the items on a regular basis			
	Condom	Oral tablet	Injectable contra-ceptives	IUD
2009				
District Hospitals	23	23	23	23
Upazila Health Complexes	92	91	76	91
Maternal and Child Welfare Centres	96	90	77	94
Union Health and Family Welfare Centres	92	88	72	91
UnHFWC upgraded	97	92	73	93
Union sub-centers/Rural Dispensaries	51	46	36	48
Rural clinic	0.0	54	54	0.0
All	81	77	62	79
2011				
District Hospitals	27	27	27	25
Upazila Health Complexes	94	90	67	85
Maternal and Child Welfare Centres	100	94	71	96
Union Health and Family Welfare Centres	97	91	68	87
Union sub-centres	55	52	41	45
Community Clinics	72	60	31	28
All	76	67	40	42

Sources: World Bank (2010a). *Bangladesh Health Facility Survey 2009.* Dhaka: The World Bank & World Bank (2012). *Bangladesh Health Facility Survey 2011.* Dhaka: The World Bank.

Improvements in the procurement process and the installation of the Logistics Management Information System need to be sustained. There have been procurement delays in the past, which were mostly attributed to technical capacity limitations at the MOHFW and DGFP. Procurement of contraceptives can be complex and has led in the past to delays in distribution and stock-outs. In addition, high turnover of management and staff trained in procurement have led to knowledge and experience gaps. However, the Logistics Management Information System, introduced in 2007, has been expanded in recent years to cover stock status up to the service delivery points and take the necessary corrective actions.

Resource allocation to contraceptives supply and management will need to be re-assessed. The Clinical Contraception Services Delivery and FP Field Services Delivery operational plans are allocated 6.1 percent and 7.3 percent of the total budget, respectively. On the other hand, the Procurement, Storage, and Supplies Management OP that ensures management and a steady supply of FP commodities, receives only 0.4 percent of the budget. A thorough assessment of resource allocation is required in order to guarantee that FP methods are available at the divisional and below level facilities.

Bangladesh relies on the public and private sector, NGOs, and the Social Marketing Company (SMC) to meet its contraceptive supply needs. Responsibility for procurement of contraceptives for the Bangladesh family planning programs was assigned mainly to the DGFP. However, wide gaps of qualified public, NGO, and for-profit facilities for providing LAPMs have remained in rural areas, and most importantly, there is no supply of LAPM/injectable products for for-profit providers outside SMC and the governmental supply chain (Rahaim et al. 2011).

Contraceptives are mostly funded by external donors, which would require stronger stakeholder coordination to ensure contraceptive security. The DGFP has established the Logistics Coordination Forum, which is to meet quarterly to review contraceptive stock, consumption, and procurement. However, the Forum had not met on a regular basis, until recently when it was revived by the Family Planning Association of Bangladesh (FPAB). The 9th quarterly Forum was held in October, 2011 with representatives from DGFP and from different national and international organizations (USAID, World Bank, UNFPA, *Kreditanstalt für Wiederaufbau*, SMC, FPAB, and JICA). The Forum members should take necessary steps to meet regularly to review and update contraceptives requirements, consumption trends, stock status, manufacturing requirements[2], pipeline positions, and procurement issues. More importantly, the Forum should also plan for securing the long-term funding of contraceptives from government funds.

There is suboptimal coordination between RH and FP programs. The Health, Population, and Nutrition Sector Development Program (HPNSDP) 2011-2016 has two overlapping

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[2] Greater emphasis should be given to the local production of contraceptives. Currently, there are only two manufactures of condoms in Bangladesh: Bangla-German Latex Company Limited and another in the public sector run by Essential Drugs Company Limited.

Operations Plans (OPs), which were designed more for institutional than substantive reasons. These OPs are Maternal Neonatal Child and Adolescent Health, under the purview of the DGHS, and Maternal Child Reproductive and Adolescent Health, being implemented by the DGFP. A key observation is that "adolescent health" is overlapping in both plans. Also, the lack of optimal coordination between the two programs can lead to missed opportunities to provide integrated services at the service delivery level or at least establishing systematic cross-referral between programs.

RH and FP services and their support systems are fragmented across several Operational Plans. The third Health, Population, and Nutrition Sector Development Program (HPNSDP) 2011-2016 has been prepared along with its Program Implementation Plan (PIP) and 32 Operations Plans (OPs), including 7 OPs designed to strengthen the delivery of FP and RH services, as well as five additional "supportive OPs." Among the 32 OPs, 7 are specifically designed to strengthen the delivery of family planning and reproductive health services. These OPs cover the following areas: maternal, child, reproductive, and adolescent health; clinical contraception service delivery; family planning field services delivery; planning, monitoring, and evaluation; management information systems; information, education, and communication (IEC); and procurement, storage, and supply management. However, among the remaining 25 OPs, at least 12 might also support the FP/RH efforts, at least indirectly. The most important areas of these 12 supporting OPs are: essential services delivery; community-based health care; AIDS/STDs; hospital service management; in-service training; procurement, logistics, and management; and human resources management.

There are acute shortages of health workers to provide RH and FP services. For example, the DGFP currently experiences shortages of fieldworkers and other categories of health workers. Similarly, the DGHS is facing shortages of nurses and midwives. There is a need therefore to expand the mandate of existing health workers, who should be trained at multi-tasking, to provide a wider range of integrated RH and FP, which can be introduced at the level of community clinics as the first point of service delivery.

The Program Implementation Plan presents a Results Framework for HPNSDP 2011-2016 and each OP also comes with its own set of indicators. These indicators cover not only the total fertility rate, the contraceptive prevalence rate, and the unmet need for FP, but also address exclusive breastfeeding of infants up to six months and stock-outs of contraceptives. One indicator (use of modern contraception) is also focused on the two lowest performing divisions of Chittagong and Sylhet, where the use of modern of modern contraception may be linked to particular cultural and religious factors. With respect to FP and RH services, it will be important to harmonize the various indicators of the 7 specific OPs pertaining to FP/RH against those of the Results Framework. It will be also necessary to examine the FP and RH indicators of the 12 other OPs that could support FP/RH activities.

6. TOWARDS POLICY HARMONIZATION

This section charts the path towards policy harmonization with respect to the population policy and FP and RH programs in Bangladesh. Reaching policy harmonization on these three fronts will be necessary to help the country address its demographic challenges, accelerate the fertility decline, and further strengthen its maternal and RH outcomes.

The MOHFW, through the National Population Council, should help revitalize/strengthen high-level coordination mechanisms to ensure broader socio-economic policies and multi-sectoral engagement in the population sector. The 2004 Bangladesh Population Policy was updated with revised goals and implementation plans in order to attain replacement levels of fertility by 2015. This new policy was endorsed by the Cabinet in September 2012. Going forward, the MOHFW should help to revitalize high-level governmental coordination through the National Population Council, to ensure multi-sectoral engagement on population policies and programs. To accelerate the demographic transition, harness the economic benefits of the youth bulge, and capture a demographic dividend, the government must pursue policies to expand education, particularly for women, increase the age at marriage and first birth, and invest in skills development for the under- and unemployed and job creation for the new entrants to the job market, coupled with expanding the safety nets for the elderly and vulnerable populations. This would require stronger coordination within the public sector and between the public and private sectors.

Increasing the age at marriage is an important policy lever that could significantly reduce fertility levels. Significant investments in female income generating activities and education are proven actions that delay a woman's age at marriage – at least among the poorer population, which in turn would contribute to accelerate the fertility decline (Streatfield & Ahsan 2008). In addition to creating opportunities for young women, an explicit change in the legal age at marriage would, at least, be a positive political policy to demonstrate support for women's reproductive, educational, and health rights. Though it may not change cultural practices right away, such political commitment would be a supportive intervention for women of reproductive age.

The MOHFW will need to shift the FP program strategically to long-term methods, which are more reliable and less expensive. Among the long-acting and permanent contraceptive methods (LAPMs), it is recommended to expand intrauterine devices (IUD) promotion and use, as this method lasts for up to 7 years with the ever-present option of removal if a woman so desires. The procedure for insertion and removal is relatively simple and safe, and can be performed by well-trained health workers other than doctors. In this respect, an intensive training program for nurses and midwives would be necessary and the MOHFW would need to allow for trained staff to perform the procedure. Additionally, it will be important to ensure adequate and continued supply of IUDs. More importantly, it will be critical to have an IEC campaign to dispel myths about IUDs and other long-term and permanent contraceptive methods. This should be coupled with adequate training of providers to offer adequate counseling and manage the potential side-effects effectively. Furthermore, various incentive packages should be designed and implemented to increase use of long-term methods. Finally,

LAPMs should be provided for free or at low costs through the public sector to encourage their uptake.

A strategy to address the contraception unmet need would rapidly reduce fertility levels. Targeted and well-executed family planning programs would result in attaining below-replacement level fertility by 2020 by increasing birth spacing and limiting childbearing. It is worth noting that the total "wanted" fertility rate in urban and rural areas of Bangladesh are 1.5 and 1.6 children per woman, respectively (NIPORT et al. 2013: 80). If these levels of desired fertility are attained, it would bring down the total fertility rate (TFR) at the level of about 1.8 children per woman, i.e., *below* replacement-level. Thus the overall unmet need of contraception of 13.5 percent (NIPORT et al. 2013: 99) provides an opportunity to increase the CPR and contributes to attaining the fertility replacement level.

The expansion of FP coverage to hard-to-reach settings should be a priority and will require policies to strengthen partnerships with other government entities, the NGOs and the private sector. Rural, urban, and slum areas need to be covered systematically with a focus attention to the specific demands of that particular environment. This will entail an effort to coordinate interventions from the various governmental agencies active in the various settings, e.g., urban areas. Studies conducted in Bangladesh have found that strong public sector programs can eliminate inequality in prevalence rates of modern contraceptives because users switch to highly subsidized methods available through the private sector (Agha & Do 2008). Adopting region-specific service approaches – such as emphasizing a greater role of NGOs and private sector providers for servicing the rural areas, urban slum dwellers and hard-to-reach areas through outreaches and satellite clinics to extend availability of services and address unmet need could be implemented through contracting out NGOs and private sector providers using development partners' mechanisms.

Conduct ongoing stakeholder consultations to ensure contraceptive security and program financial sustainability. The DGFP will need to ensure the active role of the Logistics Coordination Forum, which meets quarterly to review contraceptive stock, consumption, and procurement needs, and expand its role to discuss and plan the long-term funding of contraceptives from government funds to ensure the sustainability of contraceptives supply beyond donor funding.

Strengthen the institutional and technical capacity of the DGFP to manage the procurement of FP commodities more effectively. In recent years, the DGFP has been successfully implementing a number of automated systems to track and manage procurement and supply chains. Improving the coverage of the Warehousing, Supply, and Distribution System will ensure availability of long-term methods. Continued strengthening of the institutional and technical capacity of DGFP to manage the procurement of FP commodities and their supply chain management is critical to sustain this critical aspect of the program.

Social marketing played a critical role in increasing access to contraceptives, which needs to be further strengthened to expand FP coverage. In this respect, the Social Marketing Company in Bangladesh has proven to be most efficient and could possibly be expanded further. Enhancing collaboration with major players, particularly in the private sector, could be explored as a way to obtain concrete, time-bound, and measurable results. In terms of IEC activities,

alternative mechanisms such as the use of mobile phones could also be tested for effectiveness. Bangladesh has made impressive progress to foster the connectivity of its people, and this could be harnessed for the benefit of the FP/RH programs. Finally, a FP market segmentation study would help chart the role of the private sector vis-à-vis the public sector in expanding family planning coverage.

The FP program should engage community leaders to influence behavior change. Community leaders can play a significant role in paradigm shifts with respect to changing cultural and behavioral norms regarding age at marriage and first birth, breastfeeding, and the use of modern and long-lasting and permanent contraceptive methods. With respect to the family planning movement in Bangladesh, one of the keys to success in the 1970s was the involvement of community and religious leaders – they were very much involved in discussions with the government and played an explicit role at the community level as well. If current supporters can take a more active and visible role, this could have a substantial impact on the population's ideas about family norms and priorities (Hasan et al. 2012: 31-34).

There is a need to improve coordination between the FP and RH programs at the service delivery level and consolidate many of the fragmented OPs. A first step is to establish a systematic cross-referral system between the two programs so that women attending RH services can be referred to FP clinics and vice versa. It is also critical to assess annually the HNPSDP strategic approach, namely the linkage between the HPNSDP goals and the FP and RH objectives, the potential for efficient implementation and reduction of overlap, if any, between the specific OPs that pertain to FP and RH, on the one hand, and the 12 other OPs that might support FP/RH services, on the other. Finally, while the MOHFW has reduced the number of OPs from 36 under the previous five-year program to 32 OPs under the HPNSDP, there is a need for further consolidation of some OPs that support FP and RH programs to increase efficiency and effectiveness in implementation. On the other hand, some critical OPs need to be further strengthened such as the Information, Education, and Communication; and Procurement, Storage and Supplies Management OPs.

The expansion of Community Clinics should be an opportunity to provide integrated FP and RH services as the first point of service delivery. Community Clinics, acting as the lowest tier of the service delivery system in the public sector, should provide integrated FP and RH services. As the Family Welfare Assistants and Health Welfare Assistants are required to spend 50 percent of their working hours in a Community Clinic and the rest in the community, efforts should be made for both Assistants to provide a wider range of integrated services. Adequate training of CC staff on multi-tasking and a constant and reliable supply of FP and RH commodities must be ensured under the Revitalization of Community Health Care Initiative in Bangladesh (RCHCIB) 2011-2014.

Address the acute shortage of health workers by increasing the use of trained community health workers to generate demand for FP and RH services, particularly in lagging regions. The use of trained community health workers can effectively address shortage of health workers and establish the link between the service delivery system and the communities, particularly in lagging regions. There is a need to expand the training and recruitment of community health workers as they can provide adequate information and influence behavior as well as distribute contraceptive commodities, particularly in rural and remote areas.

The MOHFW should also strengthen its capacity to harmonize various data collected in household surveys, harmonize the FP and RH indicators across different OPs, and make better use of these data more optimally for decision making. Thanks to a series of fertility and household surveys (e.g., Bangladesh Demographic and Health Surveys) that have taken place over the past 30 years, information on fertility, family planning, and reproductive health is available and most reliable. Although these data are available, some of them have yet to be fully analyzed. Moreover, data on mortality and migration are less reliable and need to be improved through better mechanisms for data collection and analysis. Collecting data frequently, analyzing them thoroughly, and using them efficiently to improve ongoing programs is key to monitoring and evaluating progress in the country. Finally, there is a need to harmonize the FP and RH indicators across the different OPs and strengthen the MOHFW's capacity to triangulate data collected from various household surveys and use the data more optimally for decision making.

Finally, in reconfiguring the health system, Bangladesh will need also to address the future challenge of an aging population. The rise in NCDs will require the MOHFW to expand the preventive services for screening and early diagnosis of the most prevalent NCDs and low cost treatment in primary health care facilities to avoid the cost escalation due to treatment of advanced cases and their complications.

In conclusion, harmonization between population policies and FP and RH programs will be necessary to accelerate the fertility transition and improve maternal and reproductive health outcomes in Bangladesh. This will mean that the government improves the coordination within the public sector, but also among the public and the private sectors, in the areas of policy formulation and service delivery. It is the convergence of policies and programs that will enable Bangladesh to tackle its demographic, health and poverty reduction challenges and contribute to its economic growth.

GLOSSARY

Contraceptive Prevalence Rate: percentage of users of contraceptive methods (either all methods or modern methods only), among women of reproductive ages, aged 15 to 49 (can be all women or married women only).

Demographic dividend: situation in which working age groups expand relative to dependents (with more favorable dependency ratios). It is an opportunity for faster economic growth and development, provided adequate economic and social policies are implemented. The window to capture the benefits of the demographic dividend is limited in time.

Demographic transition: change (through different phases) from a traditional demographic regime characterized by high mortality and high fertility, to a modern demographic regime with low mortality and low fertility.

Dependency ratio: ratio of the number of dependent people (younger than 15 years and older than 65 years) to the number of economically active people (aged 15-64).

Health Sector Reform (also called *Sector Wide Approach* or *SWAp*): major undertaking to improve the health sector in a country, through enhanced coordination of stakeholders' activities, harmonized donors' inputs, strengthened health human resources, as well as improved resources mobilization and procurement procedures.

Millennium Development Goals (MDGs): set of eight development goals that were approved by the United Nations Millennium Summit in September 2000. The MDGs encompass a broad range of development endeavors, with eight specific aims, namely: eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other diseases; ensure environmental sustainability; and develop a global partnership for development.

Operational Plans (OPs): 32 implementation plans of the Health, Population, and Nutrition Sector Development Program (HPNSDP) 2011-2016 of Bangladesh, which outline the specific interventions and service modalities to be undertaken during the HPNSDP ; among the 32 OPs, 7 are devoted to family planning and reproductive health.

Population momentum (also called *demographic momentum*): additional population growth resulting from the age structure. It can be positive if the age structure is young and there are disproportionate numbers of women in childbearing age groups (because of past high fertility). Alternatively, it can be negative when the age structure is old (due to past sub-replacement fertility).

Population policy: actions taken explicitly or implicitly by public authorities in order to prevent, delay, or address imbalances between demographic changes, on the one hand, and social, economic, and political goals, on the other.

Population projections: use of demographic analysis methodology to estimate future populations by age and sex, based on estimates and assumptions of birth, death, and migration rates.

Proximate Determinants of Fertility: behavioral and biological determinants (such as entry into sexual union, postpartum infecundability linked to breastfeeding, contraceptive use, abortion, sterility, etc.) that affect fertility level directly; by contrast, the intermediate determinants of fertility are essentially socioeconomic in nature (such as mortality, education, employment, income, urbanization, and the status of women).

Replacement-level fertility: fertility level at which a population is reproducing itself, given the sex ratio at birth and the mortality conditions. A fertility rate of 2.1 children per woman is considered replacement level in developed countries.

Sub-replacement fertility: fertility level below the replacement level of 2.1 children per woman; see *Replacement-level fertility*.

Total fertility rate: the average number of children (live births) that would be born to a woman by the time she ended childbearing, if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year.

Unmet Needs for Family Planning: the proportion of women not using contraception who express either wanting to cease further childbearing (unmet need for limiting), or who want to postpone the next birth at least two more years (unmet need for spacing).

Youth bulge: situation in which a high proportion (40 percent or more) of the population is 15-29 years old, relative to the adult population (above age 15); however, other definitions are being used as well, e.g., proportion of youth (either 15-24 or 15-29) to the labor force population (15-64).

ANNEX 1: OLD AND NEW POPULATION PROJECTIONS

The earliest population projections for Bangladesh date back to Revelle et al. (1973), who projected Bangladesh's population for the period 1972 to 2003. It was based on demographic data available for the 1960s and assumed that fertility rate would drop to a net reproduction rate (NRR) of 1 by the year 2003. It also estimated that, with a relatively modest improvement in economic conditions and barring major catastrophes, the crude death rate would decline to 7 per 1,000 people by the end of the 20th century. Their projected medium variant figure for Bangladesh's population in the year 2003 was 170 million people.

Later on, Rabbani and Hossain (1981) projected the population of Bangladesh for the period 1975-2025 using the cohort-component method, also using the assumption of a closed population (no migration). The population projections figures calculated by Rabbani and Hossain under their Medium Variant (NRR = 1 during the period 1995-2000) were quite similar to the subsequent census counts. They projected that in 2025, the population of Bangladesh would be 178 million.

Biswas and Paul (1996) projected Bangladesh's population using data from UN World Population Prospects 1990. The Medium variant assumes that the total fertility rate (TFR) would decline from 5.1 in 1990 to 2.7 children per woman by 2020, mortality would follow the South Asian pattern, and the life expectancy at birth would rise steadily. From the base population of 115.6 million in 1990, Biswas and Paul forecasted that Bangladesh's population would reach 212 million for the Medium variant in 2020. They also postulated that Bangladesh should pursue below replacement fertility level in order to reduce the estimated size of the population in 2020.

In a study on the population momentum in Bangladesh, Islam (2000) investigated the change in the age-sex structure, fertility levels, as well as the impact of population momentum in Bangladesh for the period 1991-2051. The study projected that, assuming the contraceptive prevalence rate (CPR) would increase to 63 percent and infant mortality rate (IMR) would decrease by 50 percent during the period 1991-2021, Bangladesh's population would reach 192.3 million by 2051.

As the national source of population statistics, the Bangladesh Bureau of Statistics (BBS) routinely conducted population projections after each population census, using a balancing equation and the age-sex cohort component method. The latest population projection prepared by BBS is available on the basis of 2001 Population Census data (BBS 2007). As per the principles of the government's national population policy, BBS projected that Bangladesh's population would be 228 million in 2050 if replacement level fertility (NRR = 1) could be attained in 2011.

Between 1951 and 2007, the United Nations Population Division has produced more than 20 sets of estimates and projections covering all countries and areas of the world. These projections, published in the *World Population Prospects* series (for instance, see United Nations 2013), use the general cohort-component method and include four scenarios on the basis of different fertility assumptions. The UN Population Division also prepared a set of population projections to the year 2300 for each country of the world, all scenarios of which shared assumptions about

the steady decline of mortality until 2050 and consequent increase in life expectancy, and assumed international migration to be zero after 2050. Other notable sources of population projections, where projected figures for Bangladesh can be found, are the World Bank, the US Census Bureau, the Population Reference Bureau, and the International Institute for Applied Systems Analysis (IIASA).

As far as this Policy Note is concerned, the demographic data used to calculate the population projections come from different sources including the Bangladesh Bureau of Statistics (BBS), Bangladesh Demographic and Health Surveys (BDHS), and the United Nations Population Division. The adjusted population by age, sex, and locality, which was taken from the Bangladesh Population Census of 2001, was used as the baseline for the population projections (BBS 2007).

The population projections of this Policy Note are based on a traditional cohort-component model with assumptions based on existing and future trends in mortality, fertility, and migration. The assumptions were made on the basis of existing trends in the aforementioned components, rather than arbitrarily setting different milestones and composing several possible scenarios. In setting the demographic trends, simple logarithmic or exponential models were fitted on data from multiple sources and the most appropriate future scenarios were used for the projections.

In order to analyze the data and carry out the population projections, a computer modeling application designed by the Futures Group International, named SPECTRUM (Version 4), was used. Out of the available SPECTRUM models, the DemProj (demographic projection abbreviated) module was used for projecting Bangladesh population by age and sex, and by area (rural/urban) for the period 2001-2051. Developed in 1980, the DemProj module requires information on the number of people by age and sex in the base year, as well as current year data and future assumptions about the life expectancy at birth by sex, the most appropriate model life-table, the total fertility rate (TFR), the age distribution of fertility (the age-specific fertility rates), and the magnitude and pattern of international migration. This information is needed to project the size of the future population by age and sex into the future (Stover & Kirmeyer 2005).

Assumption on Life Expectancy at Birth and Mortality Patterns

Estimates of life expectancy at birth (e_0) in the population projections of the Bangladesh Bureau of Statistics (BBS) are underestimated (projected life expectancy for 2051 using data for 1981-2006 is around 66.5 years and 70 years when using data for 1991-2006) compared to ICDDR,B's Matlab Government service area (73 years) and United Nations estimates (76 years). For the population projections used in this Policy Note, the UN World Population Prospects: 2010 Revision's estimates are used to estimate levels of life expectancy at birth (United Nations 2011).

Following the United Nations' 1955 set of model life-tables (United Nations 1955), new age-sex mortality patterns were based on reliably documented developing country data (United Nations 1982). These reflect systematic differences from the Coale and Demeny set of Regional Model Life Tables (Coale & Demeny 1966). Among the United Nations 1982 models, the South Asian Model Life-Table corresponds well to the mortality situation of Bangladesh. Hence this model has been used for the population projections of this Policy Note.

Assumption on Fertility

The total fertility rate (TFR) data for 1971-2007 (data sources are: Bangladesh Fertility Survey 1975 and 1989, Contraceptive Prevalence Survey 1991, BDHS 1993/94, 1996/97, 1999/2000, 2004, and 2007), demonstrate that from the level of 6.2 children per woman, fertility in Bangladesh declined rapidly (by 45 percent) during 1975-1991, and reached a plateau of around 3.3 children for nearly a decade. After 2001, fertility started to fall again and now remains at the level of 2.7 children per woman. Despite the plateau, the exponential trend fitted well to Bangladesh's TFR ($y = 7.1959e^{-0.028x}$ and $R^2 = 0.95$). The fitted exponential model forecasts that Bangladesh will attain the level of 2.0 children per woman by 2016, and will continue to go beyond to reach TFR = 1.7 by 2021. For projecting Bangladesh population in this Policy Note, the assumption on the TFR is made on the basis of the exponential model's forecasts.

Age-specific fertility data from surveys over the years demonstrate that the decline in fertility in the last two decades occurred mostly among older women (NIPORT 2009), and hence the contribution of younger age-groups to fertility is increasing over time. In 1971, only 32 percent of existing fertility level was attributable to mothers 25 years of age, which increased to 55 percent in 2007. Separate linear models for each of the age groups forecast that by 2051, only young mothers under 30 years of age will bear children. The normalized contribution to fertility by age-groups in 2051 will be 39 percent for 15-19, 38 percent for 20-24, 20 percent for 25-29, and the remaining 3 percent for 30-34.

Figure A. 1. Projection of Total Fertility Rate (TFR), Bangladesh 1971-2051
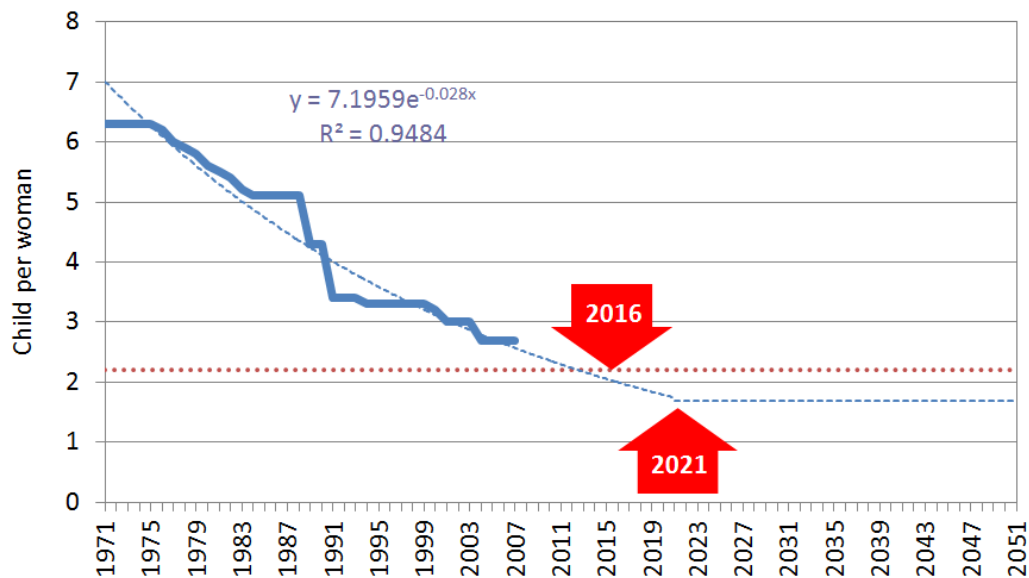
Source: Authors' calculations.

Assumption on Sex Ratio at Birth

The available information on the sex ratio for Bangladesh is for the entire population, rather than the sex ratio at birth (BBS 2003). However, other sources like CIA World Factbook indicate that

the sex-ratio at birth in Bangladesh during 2000-2008 is 106 males per 100 females. As in Bangladesh sex-selective abortion is much less acceptable and available (Hesketh & Xing 2006), and improved health care and conditions for women have led to lower sex ratios (Klasen & Wink 2002), the sex ratio at birth is kept constant at this level for the entire projection period.

Assumption on International Migration

Reliable estimates of net migration rate are not available in Bangladesh. The CIA World Factbook data on net migration rate for males in Bangladesh during 2000-2011 are used for projecting future migration scenarios. Due to the unavailability of robust trend data, a linear model was not fitted to net migration data, and the projected net migration rate for 2050-51 was set using the UN's World Population Prospects: The 2010 Revision (Medium Variant) (United Nations 2011).

Population Projections Results

Table A.1 presents the results of the two population projection LF and AFT scenarios, for male, female, and total population at five years intervals between 2001 and 2051.

Table A.1: Population Projections for Bangladesh, 2001-2051, According to LF and AFT Scenarios

LF scenario			AFT scenario		
Total population	**Male**	**Female**	**Total population**	**Male**	**Female**
130,521,000	67,731,000	62,790,000	130,521,000	67,731,000	62,790,000
142,051,428	73,425,419	68,626,009	142,167,628	73,523,002	68,644,626
153,943,173	79,283,024	74,660,149	154,264,010	79,523,808	74,740,202
164,753,838	84,557,828	80,196,010	165,404,414	85,004,594	80,399,821
174,830,158	89,425,996	85,404,162	174,286,661	89,293,374	84,993,287
184,528,108	94,070,631	90,457,477	181,846,480	92,872,945	88,973,536
193,468,813	98,300,202	95,168,612	188,714,942	96,070,644	92,644,298
201,328,875	101,963,077	99,365,798	194,418,331	98,656,843	95,761,488
208,038,698	105,052,274	102,986,424	198,373,825	100,369,863	98,003,962
213,582,175	107,593,197	105,988,978	200,523,726	101,222,428	99,301,298
218,143,679	109,682,633	108,461,046	201,311,627	101,451,593	99,860,035

Source: Authors' calculations.

ANNEX 2: PROXIMATE DETERMINANTS OF FERTILITY

Fertility levels are determined by intermediate and proximate determinants. Intermediate determinants are essentially socioeconomic in nature, such as mortality, education, employment, income, urbanization, and the status of women. They influence fertility but do not control fertility directly. The proximate determinants, however, impact fertility levels directly and are behavioral and biological. These determinants are the exposure to the risk of conceiving (in other words, the choice to be in union or not), the postpartum infecundability (i.e., the temporary infertility associated with breastfeeding and/or postpartum abstinence), abortion (which is usually induced), the sterility index (when women are unable to conceive), and, finally, contraception (both modern and traditional methods).

The relationship between the proximate determinants and the total fertility rate (TFR) has been modeled by Bongaarts and Potter (1983), in what is commonly called the Bongaarts model (Bongaarts 1978, 1982). Overall, the Bongaarts model is a useful tool to design fertility reduction and family planning programs. In particular, it enables policymakers to chart the progress of contraceptive coverage in terms of annual percentage point increases, keeping in mind other parameters that affect fertility directly, such as marriage.

In a very simple formula, the Bongaarts model captures how the inhibiting effect of the various proximate determinants of fertility decreases the natural fecundity rate (the biological maximum) estimated at 15.3 children on average. The formula is as follows:

$$TFR = Cm * Ci * Ca * Cs * Cc * Fn.$$

In this formula, *Cm* is the marriage index, *Ci* is the postpartum infecundability index (temporary infertility associated with breastfeeding and/or postpartum abstinence), *Ca* is the abortion index (usually induced abortion), *Cs* is the sterility index (women unable to conceive), *Cc* is the contraception index (both modern and traditional), and *Fn* is the natural fecundity. Each proximate determinant index varies between 1 (maximum value) and 0 (minimum value). If the value of an index is 1, there is no inhibiting effect of that determinant on the natural fecundity. If all C indicators are equal to 1, then the TFR will be equal to *Fn*, because there are no inhibiting effects whatsoever. However, if the value of only one determinant is 0, that determinant has a complete inhibiting effect on fertility and then the TFR is equal to zero.

According to the model, the index of marriage, *Cm*, is based on the average age of marriage and the number of years spent in union. The index of postpartum infecundity, *Ci*, is defined as the fraction of fertility potential lost due to the contraceptive effect of breastfeeding as well as the added impact of culturally motivated abstinence (e.g., postpartum abstinence). The index of abortion, *Ca*, is defined as the number of induced abortions and the fraction of a woman's reproductive potential that is lost as a result of the procedure. The index of contraceptives is defined as the reducing effect (on reproduction) of contraceptive methods, as well as the effectiveness of the different forms of birth control available. An updated set of equations for the model has been developed by John Stover (1998).

The TFR can be expected to go down when the incidence of marriage decreases (for instance, when age at marriage increases) and levels of breastfeeding, abortion, postpartum infertility, and contraceptive use increase as well. The model also shows that some population policy interventions, such as family planning programs can have an important effect on the TFR. A study of Pakistan showed that education for women played the greatest role in influencing the marriage index (Sathar and Casterline 1998: 773). Other studies for the same country show that educated women are more likely to be employed, to live in urban settings, and to marry later in life, and less likely to enter into consanguineous unions. These factors reduce the risk of pregnancy and therefore contribute to a lower TFR (Aziz 1994: 730).

For Bangladesh, an analysis of the Bongaarts model using the data of the BDHS in 2011, shows that the percentage of women in union (i.e., married) is 78 percent, the postpartum infecundability or amenorrhea is 5.8 months, the sterility index (i.e., the percentage of all women aged 45-49 with no children) is 3.4 percent, and the contraceptive prevalence rate for modern methods is 47.5 percent (it is 55.8 percent for all methods). One assumes that the total abortion rate (a measure akin to the total fertility rate) is 0.5.

When modeling the Bongaarts indices of the proximate determinants of fertility, one sees that contraceptive coverage may still increase and this would decrease fertility further. For example, an increase of the contraceptive prevalence rate (CPR) for modern methods of 25 percentage points (from 47.5 to 72.5 percent) would decrease the total fertility rate by one child, assuming that all other proximate determinants remain constant. A shift to long-term contraceptive methods would also increase the effectiveness of the current contraceptive coverage and probably reduce the TFR. The other proximate determinant of fertility that policymakers could possibly modify is the percentage of women in union, and this could be achieved by increasing the age at marriage (which has been increasing gradually in Bangladesh over the past three decades). This would also increase the age at first birth. Assuming that the number of women married in the age group 15-19 is cut in half (decreasing from 45.6 percent in 2007 to 22.8 percent), the overall proportion of women in union would then decrease from 78 to 72.7 percent. However, this would decrease the total fertility rate by only a fifth of a child, assuming again that all other proximate determinants remain constant. Finally, it is not expected that the length of postpartum infecundability will increase in the future (on the contrary, it might still decrease). Therefore, the evolution of that proximate determinant is conducive to bring dramatic change neither to the postpartum infecundability index nor to the TFR.

ANNEX 3: EARLY MARRIAGE AND FIRST BIRTH

Early marriage and early age at first birth (i.e., commencement of childbearing) among women are identified as causes of morbidity and mortality during pregnancy as well as rapid population growth (Human Rights Watch 1995, Liskin 1992, UNICEF 2001). Despite this fact, most of Asia was characterized by early and universal marriage during the 20th century. South Asia has always had especially high levels of adolescent female marriages, with the percentage of "ever-married" among those aged 15-19 exceeding 70 percent in several countries, including Bangladesh (NIPORT et al. 2005, Singh & Samara 1996). Though the female singulate mean age at marriage (SMAM) in Bangladesh has been rising since the 1960s (13.9 years, 15.9 years, 16.4 years, and 18.1 years in the 1961, 1974, 1981, and 1991 censuses, respectively), early marriage remains pervasive among the rural communities (Caldwell 2005). BDHS surveys show a persistent trend of very early age at marriage and very early age at first birth. Globally only two countries (Chad and Niger) have earlier age at marriage (www.measuredhs.com).

Previous studies indicate that raising the age at marriage among young women reduces the reproductive span of women and hence brings down the birth rate. In order to substantially reduce the fertility rate, along with increasing contraceptive prevalence, prevention of unwanted births, and improved family planning services, raising the age at marriage and first birth also plays a crucial role (Yadav & Badari 1997, McDonald et al., 1981, Caldwell et al. 1988).

In developing countries, three specific modernization factors emerge as determinants of delayed age of female marriage: urbanization, duration of schooling, and pre-marital work pertaining to modern occupation rather than traditional occupations like agriculture. Of course, traditional factors (e.g., family systems, ethnicity, and religion) usually counteract these modernization factors. Among numerous studies on factors affecting age at marriage, female education shows up consistently as a powerful determinant (Bongaarts & Cohen 1998). Studies carried out in Bangladesh (Martin 1987), Indonesia, Nepal (Choe et al. 2005), Egypt (Mensch et al. 1998), Peru, and Colombia (Heaton et al. 2002) found that though the impact of years of schooling on delay in marriage is not linear, secondary schooling has a stronger impact on age at marriage than primary schooling (Caldwell 2005). Studies also indicate that formal sector employment like the ready-made garments sector (Amin et al. 1998), membership in micro-credit organizations (Steele et al. 1998), as well as local interventions to raise awareness of adolescents about the benefits of delaying marriage also results in delayed age at marriage for young women in Bangladesh. In the context of Bangladesh, the significant factors of early marriage are found to be female education and husband's occupation (Islam & Mahmud 1996, Shaikh 1997). Region of residence (urban/rural), woman's work status, and husband's education are also found to be important predictors of early marriage (Islam & Mahmud 1996).

A qualitative study carried out in two rural districts of Bangladesh (Schuler et al. 2005) found that though attitudes regarding early marriage and early childbearing are changing, further interventions are required to close the gap between attitudes and practice by positive reinforcements like access to education and increasing employment opportunities, especially to the poorest segment of the society.

Historically, Bangladesh has had relatively low levels of female education (and high levels of female illiteracy). In recent years, however, there have been major investments in female primary and secondary education in Bangladesh. These investments include making primary school free for girls up to grade 8, and the introduction of a national Female Secondary Schooling Scheme (FSSS) where the Government paid poor parents to keep their daughters in secondary school. If the girl marries, the stipend is terminated (Arends-Kuenning & Amin 2000). According to demographic theory and global experience, such mass education campaigns would normally result in delays in age at female marriage and first birth, but no impact has yet been seen in Bangladesh either on either age at marriage or on initiation of childbearing.

While the overall median age at marriage (for women aged 20-24 at survey time) is very early in Bangladesh, there is considerable regional variation, with a range varying from 15.7 years in Khulna and 15.8 in Rajshahi and Barisal in Western Bangladesh, up to 17.4 in Chittagong and 18.3 in Sylhet in the Eastern side of the country. Paradoxically, fertility is lowest in the divisions where age at marriage is lowest – this is a pattern that would not be expected in most countries. A recent study in Matlab (Streatfield et al. 2009) indicated that the national picture from BDHS data for early marriage and commencement of childbearing did not match with the accurate data coming from the ICDDR,B's Matlab Health and Demographic Surveillance System (HDSS) field site, which exhibits significantly later marriage and initiation of childbearing. The study highlighted that there exists systematic under-reporting of age of female respondents – current age was misreported by 58 percent, age at first marriage by 63 percent, and age at first birth by 72 percent. Up to 45 percent of reported "teenage" births were actually to women aged 20 years or older. This under-reporting inflated teenage (15-19 year olds) fertility rates by 35 percent and these findings have implications for the perception of Bangladesh as having persistent early marriage and early childbearing. The qualitative component of the study, which attempted to throw light on socio-economic forces that might influence decisions on marriage, revealed that formal sector employment (e.g., ready-made garments sector) is one of the factors influencing marriage for village girls and young women by exemplifying the social changes happening in rural environments.

REFERENCES

Agha, S. & M. Do. 2008. "Does an Expansion in Private Sector Contraceptive Supply Increase Inequality in Modern Ccontraceptive Use?" *Health Policy and Planning 23*: 465-475.

Akhter, H. 2001. *Midlevel Provider in Menstrual Tegulation, Bangladesh Experience*. Paper presented at the Conference Expanding Access: Advancing the Roles of Midlevel Providers in Menstrual Regulation and Elective Abortion Care, South Africa, December 2–6, 2001; see http://www.tingsene.se/expacc/reports/BanglCR.html.

Amin S., I. Diamond, R.T. Naved, and M. Newby. 1998. 'Transition to Adulthood of Female Garment Factory Workers in Bangladesh". *Studies in Family Planning 29*(2): 185-200.

Arends-Kuenning, M. and S. Amin. 2000. *The Effects of Schooling Incentive Programs on Household Resource Allocation in Bangladesh.* Research Division Working Paper No. 133, New York: Population Council.

Arifeen, S.E., K. Hill, K.Z. Ahsan, K. Jamil, Q. Nahar, and P.K. Streatfield. 2014. "Maternal Mortality in Bangladesh: A Countdown to 2015 Country Case Study." *The Lancet* (forthcoming).

Ashford, L. 2003. *Unmet Need for Family Planning: Recent Trends and their Iimplications for Programs*. MEASURE Communication Policy Brief, Washington, DC: Population Reference Bureau.

Aziz, A. 1994. "Proximate Determinants of Fertility in Pakistan." *The Pakistan Development Review 33*(4, Part II): 727–742.

BBS - Bangladesh Bureau of Statistics. 2003. *Population Census 2001 - National Report (Provisional).* Dhaka: Ministry of Planning.

_____. 2007. *Population Census 2001 - National Series*, Vol. 1, Dhaka: Ministry of Planning.

_____. 2009. *Statistical Yearbook 2009.* Dhaka: Ministry of Planning.

_____. 2010. *Report on Monitoring of Employment Survey 2009.* Dhaka: Ministry of Planning.

_____. 2011. *Sample Vital Registration System 2009.* Dhaka: Ministry of Planning.

_____. 2012. *Report of the Household Income and Expenditure Survey 2010.* Dhaka: Ministry of Planning.

Biswas, S.C. and J.C. Paul. 1996. "Population Projection and Fertility for Bangladesh 2020". *Journal of Family Welfare 42*(4): 45-50.

Bongaarts, J. 1978. "A Framework for Analyzing the Proximate Determinants of Fertility." *Population and Development Review 4*(1): 105-132.

_____. 1982. "The Fertility-Inhibiting Effects of the Intermediate Fertility Variables." *Studies in Family Planning 13*(6/7): 179-189.

Bongaarts J. and B. Cohen. 1998. "Adolescent Reproductive Behavior in the Developing World. Introduction and Overview". *Studies in Family Planning 29*(2): 99-105.

Bongaarts, J. and G.R. Potter. 1983. Fertility, Biology and Behavior: An Analysis of the Proximate Determinants. New York: Academic Press.

Caldwell, B.K. 2005. "Factors Affecting Female Age at Marriage in South Asia: Contrasts between Sri Lanka and Bangladesh." *Asian Population Studies 1*(3): 283-301.

Caldwell, J.C., A.C. Hill, and V. Hull. 1988. *Micro Approaches to Demographic Research*. London: Paul Keagan International.

Campbell, M., N.N. Sahin-Hodoglugil, and M. Potts. 2006. "Barriers to Fertility Regulation: A Review of the Literature." *Studies in Family Planning 37*(2): 87-98.

Cheung, S.L.K., P. Yip, I. Chi, A. Golini, and J.M. Robine. 2004. "Change in Demographic Window in Low Fertility Countries". Paper presented at the International Seminar on Demographic Window and Healthy Aging: Socioeconomic Challenges and Opportunities, organized by the IUSSP Committee on Longevity and Health and the Asian MetaCentre in collaboration with Peking University, and the Center for Healthy Aging and Family Studies. Beijing, China, 10–11 May, 2004.

Choe, M.K., S. Thapa, and V. Mishra. 2005. "Early Marriage and Early Motherhood in Nepal". *Journal of Biosocial Science 37*(2): 143-162.

Coale, A.J. and P. Demeny. 1966. *Regional Model Life Tables and Stable Populations.* New York: Academic Press.

Dickens, T. 2008. Bangladesh: Government of Bangladesh Contraceptive Procurement Bottleneck Study, Full Report. Arlington: USAID | DELIVER PROJECT, Task Order 1.

El-Saharty, S., K.Z. Ahsan, T.L.P. Koehlmoos, and M.M. Engelgau. 2013. *Tackling Noncommunicable Diseases in Bangladesh: Now Is the Time.* Directions in Development Series, Washington, DC, World Bank.

Daugherty, H.G. and K.C.W. Kammeyer. 1995. *An Introduction to Population*. New York: The Guilford Press.

DGFP to fill vacancies by May. 2011. *The Daily Star.* Retrieved from http://www.thedailystar.net/newDesign/news-details.php?nid=175984

Dixon-Mueller, R. 2008. "How Young is "Too Young"? Comparative Perspectives on Adolescents, Sexual, Marital and Reproductive Transitions. *Studies in Family Planning 39*(4): 247-261.

Ferdousi, S.K., M.A. Jabbar, R.R. Hoque, S.R. Karim, A.R. Mahmood, R. Ara, and N.R. Khan. 2010. "Unmet Need of Family Planning Among Rural Women in Bangladesh." *Journal of Dhaka Medical College 19*(1): 11-15.

Government of Bangladesh - Government of the People's Republic of Bangladesh. 2004. *Bangladesh Population Policy*. Dhaka: Ministry of Health and Family Welfare.

_____. 2011. *Population and Housing Census 2011. Preliminary Results*. Dhaka: Ministry of Planning, Bangladesh Bureau of Statistics, Statistics Division.

_____. 2012. *Annual Program Implementation Report. 2012*. Dhaka: Planning Wing, Ministry of Health and Family Welfare.

_____. 2013. *Bangladesh Economic Review 2013*. Dhaka: Ministry of Finance, Finance Division.

Haque, M.N. 2010. "Unmet Need for Contraceptive: The Case of Married Adolescent Women in Bangladesh." *International Journal of Current Research 9*: 29-35.

Hasan, R., M. Reich, and G. Fink. 2012. *Agenda-Setting of Population in Bangladesh and West Bengal and Impact on Fertility.* Paper submitted to the 2012 Annual Meeting of the Population Association of America, San Francisco, May 3-5, 2012.

Heaton, T.B., R. Forste, and S.M. Otterstrom. 2002. "Family Transitions in Latin America: First Intercourse, First Union, and First Birth". *International Journal of Population Geography 8*:1–15.

Hesketh, T. and Z.W. Xing. 2006. "Abnormal Sex Ratios in Human Populations: Causes and Consequences." *Proceedings of the National Academy of Sciences USA 103*: 13271–13275.

Heilig, G.K. 1996. World Population Prospects: Analyzing the 1996 UN Population Projections. Laxenburg, Austria (IIASA Electronic Document and Working Paper WP-96-146). Available at: http://www.iiasa.ac.at/Research/LUC/Papers/gkh1/

Hossain, M.I., T. Akhtar, and M.T. Uddin. 2006. "The Elderly Care Services and their Current Situation in Bangladesh: An Understanding from Theoretical Perspective". *Journal of Medical Sciences 6*(2): 131-138.

Human Rights Watch. 1995. "General Recommendations to Governments", *The Human Rights Watch Global Report on Women's Human Rights*, New York: Human Rights Watch.

Islam, M.A. 2000. *Population Momentum in Bangladesh.* CPD-UNFPA Publication Series #7. Dhaka: Centre for Policy Dialogue.

Islam, M.M. Mahmud. 1996. "Marriage Patterns and Some Related Issues of Adolescent Marriage in Bangladesh". *Asia-Pacific Population Journal 11*(3): 27-42.

Klasen, S. and C. Wink. 2002. "A Turning Point in Gender Bias in Mortality? An Update on the Number of Missing Women." *Population and Development Review 28*(2): 285-312.

Liskin, L.S. 1992. "Maternal Mortality in Developing Countries: A Review and Comments". *International Journal of Gynecology and Obstetrics 37*(2): 77-87.

Martin, L.G. 1987. "Female Education and Fertility in Bangladesh". *Asian and Pacific Population Forum 1*(3): 1-7.

May, J.F. 2012. World Population Policies: Their Origin, Evolution, and Impact. New York: Springer.

McDonald, P.F., D.T. Ruzicka, and J.C. Caldwell. 1981. "Interrelations Between Nuptiality and Fertility: The Evidence from the World Fertility Survey", World Fertility Survey Conference, London: International Statistical Institute 2: 77-126.

Mensch, B.S., J. Bruce, and M.E. Greene. 1998. *The Uncharted Passage: Girls' Adolescence in the Developing World*. New York: Population Council.

NIPORT - National Institute of Population Research and Training, Mitra and Associates, and ORC Macro. 2005. *Bangladesh Demographic and Health Survey 2004*. Dhaka & Calverton: NIPORT, Mitra and Associates, & ORC Macro.

NIPORT - National Institute of Population Research and Training, Mitra and Associates, & Macro International. 2009. *Bangladesh Demographic and Health Survey 2007*. Dhaka & Calverton: NIPORT, Mitra and Associates, & Macro International.

NIPORT - National Institute of Population Research and Training, MEASURE Evaluation, and icddr,b. 2012. *Bangladesh Maternal Mortality and Health Care Survey 2010.* Dhaka: NIPORT, MEASURE Evaluation, & icddr,b.

NIPORT - National Institute of Population Research and Training, Mitra and Associates, and ICF International. 2013. *Bangladesh Demographic and Health Survey 2011,* Dhaka and Calverton: NIPORT, Mitra and Associates, & ICF International.

NIPORT - National Institute of Population Research and Training. 2014. *Utilization of Essential Service Delivery Survey 2013. Provisional Report.* Dhaka: NIPORT.

O'Neill, K. (Edit). 2009. Working for Life: Making Decent Work and Pensions a Reality for Older People. London: HelpAge International.

Rabbani A.K.M.G. and M.S. Hossain. 1981. Population Projection of Bangladesh (1975-2025): Under Assumptions of Decreasing Fertility and Decreasing Mortality (df-dm) and Constant Fertility and Decreasing Mortality (cf-dm). Dhaka: Bangladesh Bureau of Statistics.

Rahaim S., J. Ahmed, M. Smith, and H. Li. 2011. *Bangladesh Private Sector Assessment of Long Acting and Permanent Family Planning Methods and Injectable Contraceptives.*

Strengthening Health Outcomes through the Private Sector. Bethesda: Abt Associates Inc.

Revelle R., H. Thomas, R. Tabors, and F. Benford. 1973. Population Projections for Bangladesh 1973-2003: Some Extracts**.** In T. Hossain, J.U. Ahmed & N.I. Khan (Edits). Proceedings of the Seminar on Family Planning, November 21-25, 1972. Dhaka, Ministry of Health and Family Planning: 753-758.

Sathar, Z.A. and J.B. Casterline. 1998. *The Onset of Fertility Transition in Pakistan*. New York: The Population Council.

Schuler S.R., L.M. Bates, F. Islam, and M.K. Islam. 2005. "The Timing of Marriage and Childbearing Among Rural Families in Bangladesh: Choosing between Competing Risks". *Social Science & Medicine 62*(11): 2826-2837.

Sciubba, J.D. 2010. The Future Faces of War: Population and National Security. Santa Barbara: Praeger.

Shaikh, K. 1997. "Recent Changes in Marriage Patterns in Rural Bangladesh". *Asia-Pacific Population Journal 12*(3): 31-48.

Singh, S. and R. Samara. 1996. "Early Marriage Among Women in developing Countries." *International Family Planning Perspectives 22*: 148-157.

Steele, F., S. Amin, and R.T. Naved. 1998. The Impact of an Integrated Micro-credit Program on Women's Empowerment and Fertility Behavior in Rural Bangladesh, Population Council Working Paper 115. New York: Population Council.

Stover, J. 1998. "Revising the Proximate Determinants of Fertility Framework: What Have We Learned in the Past 20 Years?" *Studies in Family Planning 29*(3): 255-267.

Stover, J. and S. Kirmeyer. 2005. *DemProj Version 4: A Computer Program for Making Population Projections*. Washington, DC: Futures Group International.

Streatfield, P.K., K.Z. Ahsan, R. Khan, Q. Nahar, and A. Bhuiya. 2009. *Early Marriage in Bangladesh: Not as Early as it Seems.*. & K.Z. Ahsan (2008). "Population Challenges for Bangladesh in the Coming Decades." *Journal of Health, Population and Nutrition 26*(3): 261-272.Report Commissioned by USAID. Dhaka, ICDDR,B.

UNICEF. 2001. "Early Marriage: Child Spouses", *Innocenti Digest* 7. Florence: UNICEF.

United Nations. 1955. *Age and Sex Patterns of Mortality: Model Life-tables for Under-Developed Countries.* Population Studies No. 22. New York: United Nations, Department of Social Affairs, Population Branch.

_____. 1982. *Model Life Tables for Developing Countries*. Population Studies No. 77. New York: Department of International Economic and Social Affairs.

_____. 2011. *World Population Prospects: The 2010 Revision*. New York: United Nations, Department of Economic and Social Affairs, Population Division.

_____. 2013. *World Population Prospects: The 2012 Revision*. New York: United Nations, Department of Economic and Social Affairs, Population Division.

USAID | DELIVER Project. 2008. Bangladesh: Government of Bangladesh Contraceptive Procurement Bottleneck Study—Full Report. Arlington: John Snow Inc.

USAID 2011; see: deliver.jsi.com/dlvr_content/resources/allpubs/logisticsbriefs/BD_InnovReciAward.pdf).

Vlassoff, M., A. Hossain, I. Maddow-Zimet, S. Singh, and H.U. Bhuiyan. 2012. Menstrual Regulation and Postabortion Care in Bangladesh: Factors Associated with Access to and Quality of Services. New York: Guttmacher Institute.

Westoff, C.F. 2006. *New Estimates of Unmet Need and the Demand for Family Planning.* DHS Comparative Reports 14. Calverton: Macro International Inc.

World Bank. 2010a. *Bangladesh Health Facility Survey 2009.* Dhaka: The World Bank.

_____. 2010b. *Unmet Need for Contraception at a Glance*. Washington, DC: The World Bank.

_____. 2012. *Bangladesh Health Facility Survey 2011*. Dhaka: The World Bank.

_____. 2013a. *2013 World Development Indicators*. Washington, DC: The World Bank.

_____. 2013b. *Bangladesh Poverty Assessment: Assessing a Decade of Progress in Reducing Poverty, 2000-2010.* Bangladesh Development Series Paper No. 31. Washington, DC: The World Bank.

Yadav S.S. and V.S. Badari. 1997. "Age at Effective Marriage and Fertility: An Analysis of Data from North Kanara". *Journal of Family Welfare 43*(3): 61-66.

This paper provides two population projections scenarios and suggests that an Accelerated Fertility Transition scenario would enable Bangladesh to substantially harness the demographic dividend, and thus reap the economic benefits for several decades. To achieve this transition, the government needs to focus on strengthening the synergy and coordination of service delivery to ensure sustained decline in fertility through increased access and coverage of family planning services.

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