WHEN WILL BANGLADESH REACH REPLACEMENT-LEVEL FERTILITY? THE ROLE OF EDUCATION AND FAMILY PLANNING SERVICES*

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INTRODUCTION

The rapid decline of fertility, from over 6.5 births per woman to 3.3 births, in the last two decades in Bangladesh is, indeed, a historic record in demographic transition. The country is poor and has remained traditional and conservative. Although the extent and rapidity of the decrease in fertility have been very impressive by international standards, continued fertility decline is desirable, as population crowding, environmental deterioration, massive migration from rural areas to unplanned urban settings, and rapid depletion of resources are becoming acute. However, recent statistics suggest that, despite a continuing increase in contraceptive use, the fertility decline in Bangladesh has stalled: Three successive Demographic and Health Surveys show that the total fertility rates were 3.4, 3.3, and 3.3 in 1991-93, 1994-96, and 1997-99, respectively. Contraceptive prevalence increased over this same period, from 45 per cent in 1993-94 to 54 per cent in 1999-2000 (Mitra and others, 2001).

The purpose of this paper is to explore the possibility of further fertility decline in Bangladesh, with special attention to the role that might be played by further improvements in women's education and family planning services. In particular, we attempt to estimate how long, and under what conditions, it should take for Bangladesh to reach replacement-level fertility (2.1 children per woman). We begin with a brief review of the programmatic development, policy evolution, and social and economic transformation in Bangladesh that might have influenced couples' family-building strategies. We then describe the data and methods that we use. Next, we attempt to project a time frame of when fertility may reach the replacement level.

Finally, we discuss possible future challenges to further fertility decline. The medium-variant scenario of the United Nations projection indicates that Bangladesh will achieve replacement-level fertility around 2025 (United Nations, 2001). We assess whether our analysis yields a similar conclusion.

POSSIBLE REASONS BEHIND BANGLADESH'S FERTILITY DECLINE: SUPPLY VERSUS DEMAND FACTORS

The number of children that couples have can be viewed as the result of their demand for and the supply of fertility regulation. In this framework, the demand for fertility regulation derives from desired family size. Couples have a demand for fertility regulation if they wish to have fewer children, or have their births timed later or spaced further apart, than they would in the absence of any efforts (e.g., delay in or reduced frequency of sexual intercourse, use of contraception, abortion) to regulate their fertility. Desired family size and the desired timing and spacing of births are influenced by such factors as the

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value of children (both while young [e.g., work in the household or on the family farm] and as a source of old-age support for parents), the monetary costs of raising children (e.g., expenses for food, housing, clothing, school fees), and the time costs of children (the opportunity costs of parents' time).

It has been asserted that the main mechanism behind the fertility decline that has occurred in Bangladesh has been the increase in contraceptive use – from 7 per cent in 1975 to 54 per cent by 2000. It has been claimed that in addition to making contraception available to couples already interested in regulating their fertility, the Bangladesh family planning program helped both to bring ideational changes towards small families and to change couples' attitude about the use of modern contraceptives (Cleland and others, 1994). Supporting this line of argument, Carty and others (1993) have emphasized that Bangladesh has had a strong and sustained political commitment to an effective family planning program. All governments in power since the country's independence (in 1971) have placed high priority on reducing the country's high rate of population growth, which was 3 per cent per year during the 1970s. Since 1973, the government has received strong support from international donor agencies to intensify family planning program efforts.

There has been debate about the role that socioeconomic change has played in contributing to the fertility decline that has taken place in Bangladesh. Caldwell and others (1999) show that there have been considerable social and economic changes in the country and contend that these have changed couples' attitudes about family size in such a way as to lead to a decline in fertility. These changes include the following:

There has been a tremendous growth of urban infrastructure in the country including roads, commercial places, housing, and others.

The size of the urban population grew by 5 per cent annually compared to 1 per cent rural population growth. In 1997, 20 per cent of the population lived in urban areas, compared to 13 per cent in 1985.

Between 1976 and 1986 the number of electrified villages quadrupled, the number of doctors increased three times, and nurses five times.

The human development index[1] increased by 45 per cent between 1960s and 1990s.

Changes in agricultural structure have freed more children for schooling. The increase has been especially large for girls. Whereas only half of girls of primary-school age attended were enrolled in school in the 1980s, by the 1990s virtually all girls in this age group were enrolled in school.

More than one million of young women now work in garment factories in the country's two largest cities (Dhaka and Chittagong).

A large number of people of working age migrate to foreign countries, especially to the Middle East, and send back remittances that help the local economy.

Cleland and others (1994), however, contend that these changes in economic structure, urbanization, women's participation in economic activities, and education were sufficient but not necessary for the fertility transition that occurred in Bangladesh.

As mentioned above, fertility seems to have reached a plateau since 1992 in Bangladesh. The programmatic, social, and economic determinants of this plateau are not understood yet, although part of

the apparent plateau may be associated with measurement issues[2] (Islam and others, 2001). This plateau raises a debate about what further changes are needed for Bangladesh to reach replacement-level fertility.

We attempt to shed some light on this issue in this paper by asking three questions:

Are there socioeconomic subgroups in Bangladesh that already have replacement-level fertility? If so, if in the future more of the population will be like the groups that already have replacement-level fertility, this change in population composition should lead to declines in fertility toward replacement level.

How does couples' "wanted fertility" compare to the number of children that they are likely to have? If couples desire to have fewer children than they are actually having, presumably better family planning services can help reduce unintended childbearing and lead to reductions in fertility.

How does fertility in an area with better family planning services compare to that in an otherwise-similar area with standard government services? This will demonstrate the extent to which, everything else the same, better family planning services can affect fertility.

DATA AND METHODS

We use data from two sources. To answer the first and second questions above, we use data from the 1999-2000 Bangladesh Demographic and Health Survey (BDHS), a nationally representative survey of 10,544 women of reproductive ages. We use these data to examine the relationship of education with actual and desired fertility and to look at trends in education in Bangladesh.

Education in the BDHS sample is grouped into four categories: no education, some primary education, primary completed, and secondary. The secondary education group consists of women with six or more years of schooling.

We also use data from Matlab Demographic Surveillance System (DSS). Matlab is a typical rural subdistrict in Bangladesh; the life style, social and economic circumstances, and the educational level of the Matlab population are similar to most rural parts of the country. The DSS, which is operated by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), has collected data on pregnancy outcomes in two otherwise-similar areas—the "treatment" and "comparison" areas—since 1966. The comparison area is typical of much of Bangladesh in contraceptive practice (ICDDR,B, 2002) and fertility (Mitra and others, 1994). In this paper we consider data on about 33,000 births that occurred among about 318,000 women-years in Matlab between 1995 and 2000. The DSS includes data on pregnancy outcomes (live births, stillbirths, miscarriages, and abortions), deaths, migration, and marital unions. The DSS also conducts censuses occasionally to collect socioeconomic information; the last census was conducted in 1996. In this paper we use data on education and household space from the 1996 Census.

The Matlab Maternal and Child Health and Family Planning (MCH-FP) Project provides an opportunity to shed light on the likely effect of improvements in the availability and quality of family planning services. Since 1977, the Maternal Child Health and Family Planning (MCH-FP) Project in the treatment area has provided more accessible and higher-quality family planning services than the standard government services provided in the otherwise-similar comparison area. Because of the experimental variation in family planning services, the Matlab data allow much stronger tests of the influence of family planning programs on fertility than analyses that compare less similar areas or different time periods. The DSS provides high-quality data on fertility for assessing such effects.

Married women in the comparison area were supposed to (but did not always) receive visits every two months from female welfare assistants of the government family planning program who provide counseling and supply pills and condoms. In the treatment, or MCH-FP, area, until 1997 female community health workers (CHW) visited married women of reproductive age every two weeks to provide counseling about family planning services and to deliver injectables, pills, and condoms at the doorstop. Between 1966 and 1997, female CHWs employed by the DSS visited each household every two weeks in both areas to record the pregnancy status of women and any pregnancy outcomes occurring since the previous visit. Since late 1997, workers have visited every household monthly to gather these data. Beginning in 1999, the Matlab project has shifted, in a phase-wise manner, from doorstep delivery of family planning services to fixed-site services. The female CHWs currently provide family planning services from their homes, where the village women gather to receive services. In the comparison area, services are delivered from fixed-site centers.

In addition to the standard government Health and Family Welfare Centres available in both areas, the treatment area also has ICDDR,B sub-centres that provide maternal and child health and family planning services. The MCH-FP area is characterized by greater contact among clients, workers, and supervisors as well as greater availability and a broader mix of contraceptive methods than is available in the comparison area. Women in the MCH-FP area reported greater accessibility and higher quality of family planning services than reported by women in the comparison area. MCH-FP-area women were more likely to report receiving family planning service visits, to spend more time with family planning workers on such visits, and to believe they would receive good care at a health or family planning clinic (Koenig and others, 1992).

The mean desired number of children in both areas has been similar and declined at similar rates, from about 4.5 in 1975 to 3.0 in 1990 (Koenig and others, 1992) to 2.5 in 2000 (Bairagi and Datta, 2001).

In the late 1970 contraceptive use was very low and similar in the two areas, whereas by the mid-1990s it was nearly 70 per cent in the treatment, or MCH-FP, area but below 50 per cent in the comparison area. Table 1 compares fertility rates in the two areas, and shows that fertility rates fell in both areas as contraceptive use increased. Since the 1980s fertility rates have been consistently and significantly lower in the treatment area – the area that has better family planning services and higher rates of contraceptive use. However, DSS data show that fertility rates in the MCH-FP area have stalled since 1991 and remained at the level of 3.0 children per woman. Despite intensive and relatively high quality MCH-FP services and high levels of contraceptive use, fertility is not declining further. (In the comparison area, fertility rates have stalled at around 3.6 since 1995.) Some (e.g., Bairagi and Datta, 2001) contend that without further social and economic development it is quite unlikely that Bangladesh will reach replacement-level fertility. Contraceptive use and the TFR in the MCH-FP area have stalled for almost for a decade. The project has not been able to design effective strategies that have led to further declines in fertility.

We use the DSS data to calculate TFRs by education and economic conditions. We group education into four categories: no education, one to five years of schooling, six to nine years of schooling, and 10 and more years of schooling. These groups are termed "non-literate," "primary," "lower secondary," and "upper secondary." Household space is taken as an indicator of the economic status of a household. We have classified households as economically low, medium, and high according to the amount of their household space.[3] Household space is likely to be positively associated with household income in Bangladesh, and numerous studies in Matlab find the association between demographic behaviors and household space (see, e.g., D'Souza and Bhuiya, 1982). The number of women-years between the ages of 15 and 49 years that are included in our analysis is shown in Appendix A for the

comparison area according to education and household space. We have fairly large samples except for the upper secondary-education group; cell sizes vary from 748 to 40,000 during the 1995-2000 period.

The Matlab comparison and treatment areas are comparable in terms of both education and economic conditions (LeGrand and Phillips, 1996). In 1995, 27 and 30 per cent women had some secondary education in the comparison and treatment areas, respectively. In both areas, nearly half and more than a quarter of women, respectively, are categorized as having low and high levels of economic condition. The category "low" economic status probably represents the poor in Bangladesh. Approximately half of the households in the country are landless, and they are the poorest section of the population.

We compare group-specific total fertility rates (TFR) to data on the same women's wanted (desired) fertility. The group-specific TFR refers to the number of children a group of women are predicted to have if at each age they experience the age-specific fertility rates of their group. The BDHS calculates the TFR using the births that occurred in the three years preceding the survey. For each of the births reported in the BDHS for the three years prior to the survey, the survey asked whether or not the birth was wanted then, wanted later, or not wanted at all. The total wanted fertility rate (TWFR) includes those births for which mothers said that they wanted to have the births then or later.[4]

ANALYSES

One of our approaches to understanding how long it will take for Bangladesh to achieve replacement-level fertility is to determine whether there is a group of women who have already achieved that level. Data from the 1999-2000 BDHS show that the TFR for women with at least five years of schooling was 2.4 (figure 1). Given the level of overall mortality in Bangladesh, a TFR of 2.4 children per woman is not far from replacement level.[5] By contrast, women with less than secondary education have fertility rates well above replacement level. Women with primary education and no education, on average, bear one child and two children more than those with at least five years of schooling.

Figure 1 also presents data on the same women's wanted (desired) fertility (TWFR). The figure shows that all educational groups of women, except those with no education, want to have around replacement-level fertility or lower. Women who have completed primary school report that they want to have 2.2 children, whereas those with some, but incomplete, primary want 2.1 children, and those with at least some secondary (more than five years of schooling) wanted to have only 1.8 children. The wanted fertility for women with no education, however, is about three children, meaning that non-literate women still have a desire for an above-replacement level of fertility.[6]

For all educational groups, the total fertility rate exceeds the total wanted fertility rate. The difference is greatest for the group with no education – the TFR exceeds the TWFR by 1.3 children -- and decreases with education to 0.6 children for the most educated group. If we can interpret this difference as unwanted fertility, we can conclude that enabling women to avoid unwanted fertility, e.g., through better family planning services, would lead to fertility rates around replacement level for all women except those with no education.[7] We should, however, exercise caution in interpreting the effect of education on fertility from these results primarily because there is a confounding effect of urbanization on the relationship between education and fertility. Educated women are more likely to be from urban areas and they may have lower fertility due to greater access to quality-family planning services and other modernization effects. The BDHS data are nationally representative and include urban as well as rural women. In 2000, about 25 per cent of the population of Bangladesh lived in urban areas.

The Matlab data also show a strong relationship between education and fertility in both the treatment and comparison areas. Figure 2 shows for the period 1995-2000 that women in the Matlab MCH-FP area with 10 or more years of education had achieved replacement-level fertility. In both areas, women with no education have more than one more birth than women with 10 or more years of education. In the MCH-FP area the TFRs are 2.6, 3.0, and 3.4, respectively, among women with 6-9 years of schooling, with 1-5 years of schooling, and with no schooling. Women in the comparison area with 10 or more years of education had a TFR of 2.8, whereas women with 6-9 years of schooling, 1-5 years of schooling, and no schooling had a TFRs of 3.1, 3.5, and 4.1, respectively. In all education groups, women in the MCH-FP area had significantly lower fertility than those in the comparison area. The extent of the difference does not vary much with education, though it is larger for the uneducated group (0.7 births).

In an analysis not presented here, we compared educational differentials in fertility between the treatment and comparison areas and between time periods 1995-2000 and 1983-86. Like in 1995-2000, fertility was negatively associated with education during 1983-86 in both areas, though fertility levels were higher at each educational level. During 1983-86, educational differences in fertility were greater in the MCH-FP area than in the comparison area, meaning that educated women are the ones who took advantage of the newly introduced family planning services and achieved a low level of fertility before the other groups. By 1995-2000, as we observe, the educational differentials are similar for the two areas.

The better family planning services in the treatment area *are* associated with lower fertility rates for women with all levels of education. Therefore, the family planning program should focus on women regardless of their education in order to facilitate further reduction of their consistently high fertility.

The negative relationship between fertility and education is seen within each economic category as well. Data in table 2 show that, in the 1995-2000 period, women in the treatment area with 10 or more years of education had 2.5, 2.0, and 2.2 children, respectively, in the "low," "medium," and "high" economic groups (economic group being measured here by household space). In the comparison area, the comparable numbers are 2.9, 2.7, and 2.8—more than one-half of a birth over replacement level.

Fertility varies with economic group, though such variation is relatively small compared to educational variation of fertility. In the comparison area, there were 3.8, 3.2, and 3.1 births per woman for those in the low, medium, and high economic groups, respectively. In the MCH-FP area, the comparable rates were 3.1, 2.7, and 2.6. Once the woman's level of education is held constant, in both areas the relationship between economic status and fertility becomes very weak. The better family planning services in the treatment area of Matlab are associated with lower fertility rates within each economic category.

The data shown above indicate that women's education is likely to be an effective social intervention for sustainable fertility decline. We now examine the trend in education in Bangladesh to see roughly how long it will take for the country to attain universal education for women and thus a fertility level that is comparable to a replacement level.

TRENDS IN EDUCATION IN BANGLADESH

Bangladesh has also done extremely well in raising the educational level of its people, especially women. Given its limited resources, the government has put high priority on girls' education. Primary education has always been free for boys and girls in Bangladesh. Beginning in 1994, the government Food-for-Education project has delivered rice and wheat to poor families that have kept sending their children to primary school. In 1994, the government introduced free education of girls up to the highest level of secondary education on a pilot basis. Recently, the government introduced a program that

provides scholarships to girls up to secondary education to provide economic incentives for girls to continue higher education. It is expected that the scholarships will help poor families be in a better position to provide girls with required educational materials, clothes, and transportation.

Non-governmental organizations (NGOs) in Bangladesh, especially the Bangladesh Rural Advancement Committee (BRAC), have been famous for their non-formal primary education programs that run low-cost schools for the poor. Because poor children help in household economic activities, school timing is set in such a way that the poor can participate in both school and household economic activities. Non-formal schools emphasize girls' education by enrolling more girls than boys. Poor children are taught primary-equivalent education over a period of four years. After graduating from these non-formal schools, children can get into formal middle schools and avail themselves of opportunities for free education and scholarship programs.

In figure 3 we present trends in education in Bangladesh by years of birth for those born in the last 50 years, using data on education from the 1999-2000 BDHS. We show in figure 3a the percentage of individuals with at least one year of schooling. The education trends have several noteworthy features. First, there was a large difference between girls' and boys' education in the early days. Among those who were born in the 1940s, girls were one third as likely as boys to have some education. Second, although boys were more likely to have some education than girls, boys' education barely changed for the cohorts born in the decades of the 1940s, 1950s, and 1960s, while girls' education increased steadily for those who were born in during these decades. Girls' education has been increasing remarkably for those who were born since the late 1940s, and for those who were born in the recent decades since 1970, the extent of increase has been even greater. Since the early 1970s, the percentage of girls who have one or more years of education has increased by 10 percentage points in every five years. For the 1985-89 birth cohort, the most recent one that we consider, the percentage of girls with some education has surpassed the percentage for boys.

Figure 3b shows trends of six or more years of schooling. The percentage of the population with that level of education has increased dramatically in Bangladesh, especially for women, for whom the growth has been exponential. Only about 5 per cent of the cohort that were born in 1940-44 had six or more years of education. In contrast, over 50 per cent of women in the birth cohort of 1980-84 have six or more years of schooling. Men's education has improved over the period under study, but at a much slower pace—from over 30 per cent to nearly 55 per cent.

In what follows, we examine trends in women's education since we observe a strong and negative education-fertility relationship. Fertility will decline in the future due to increases in women's education. Also, according to BDHS data, when women have education beyond primary education level, they are likely to have replacement level-fertility. In the Matlab treatment area where contraceptive use is high due to greater accessibility and better quality of services, women with higher secondary education have achieved replacement-level fertility. An understanding of educational improvement is likely to help policy formulation for social development and fertility reduction. Since accessibility to education is associated with households' economic status, we examine education trends by economic status.[8] In the next two figures, we show how the education of women aged 15-49 improved for those in the Matlab comparison area who were born over the period 1945-79. The reader should be reminded that the two Matlab areas are comparable in terms of education and economic conditions. As we noted earlier, 27 and 30 per cent of study women have more than primary education in the MCH-FP and Comparison areas, respectively. Similarly, 48 and 43 per cent of women are in poor economic group, respectively, in these areas.

Figure 4 presents data for women similar to that in figure 3, but separately for our three categories of household space, for five-year birth cohorts beginning with those born between 1945 and 1949. Figure 4 shows that the percentage of women with at least one year of education has increased over time (i.e., is higher for those born more recently) for all three economic groups. For each birth cohort, the percentage of women with at least one year of education is highest for those with the most household space and lowest for those with the least household space. The increases in percentage of women with at least one year of education have been greatest for those with the least household space and, as a result, the differences among the economic groups have shrunk over time. For example, for those born between 1945 and 1949, 57 per cent of those with highest economic group had at least one year of schooling compared with 42 per cent of those in the medium group and only 18 per cent of those in the low group. For the 1975-79 birth cohort the comparable percentages are 93 per cent, 90 per cent, and 72 per cent (which is four times the percentage 30 years earlier for this group). The two higher economic groups had nearly reached parity for the youngest birth cohort that we consider.

Figure 5 shows that the percentage of women with at least some secondary education also increased considerably for all three economic groups. For the highest economic group, the percentage of women with at least some secondary education increased to a level for the 1975-79 birth cohort that was 3-1/2 times that for the 1945-49 birth cohort. The difference between these two birth cohorts was around 10 times for the lowest economic group. However, for this measure, substantial economic disparities remain. Over 70 per cent of the youngest cohort of high economic group has more than five years of education, while only 28 per cent of the low economic group have achieved such a level of education. On average, about 45 per cent of the youngest cohort has secondary education. It is likely that it will take a while for women of all economic groups to achieve a secondary-level education. The "free education for girls" and "scholarship for secondary education of girls" programs of the government will reduce the economic disparity of educational achievements of girls, but this will take time.

We wanted to see how long it will take for all Bangladeshi women of reproductive age to have six or more years of education. We use the rate of change in the educational experience of the cohorts of women who comprise our Matlab sample. The projection implies that all women aged 15-49 will have more than primary education in 2025. Under the assumption that women with six or more years of education will have replacement-level fertility, as was the case in the 1999-2000 BDHS, it may be possible that Bangladesh will have the replacement-level fertility by 2025. However, Matlab experience, shows that among rural women, only those with 10 years of education and with good-quality family planning services, as has been the case in Matlab MCH-FP area, currently have the replacement-level fertility. Under such a scenario, it may take a longer time.

DISCUSSION

In this paper, we have investigated whether there are particular socioeconomic groups that have already achieved replacement- or nearly replacement-level fertility in Bangladesh. Using national data, we find that women who have more than five years of education have almost achieved this level of fertility. We also find that female education is increasing rapidly in Bangladesh. According to our projection based on Matlab experience of educational improvement, virtually all women of reproductive age in Bangladesh will have at least some secondary education by 2025. By this time the country should reach replacement-level fertility. However, Matlab experience suggests that it may not be the case unless there is an improvement in family planning services that will lead to higher and efficient use of contraception. Therefore, our study indicates that improvements in both education and family planning services should receive priorities in policies. Education is important for reducing fertility and (and also infant and child mortality), as well as in its own right for improving the human capital (and economic

potential) of the population. Family planning services can help women avoid unintended pregnancies and the abortions that sometimes follow them (Rahman and others, 2001).

We find that there is a substantial amount of fertility that is excess of desired fertility. Excess fertility is higher among women with no or little education. Family planning programs can play a crucial role, especially among the women with no or little education, in reducing the gap between desired and actual fertility. Fertility among the educated could reach below replacement level if family planning programs would be stronger; in the late 1990s educated women desired below-replacement fertility and wanted to have about half of a birth less than they actually had.

We observe that women in the area of Matlab with more accessible and better-quality family planning services had lower fertility than those in the otherwise-similar area with standard family planning services. However, fertility in the former area has stabilized at a TFR of 3.0 children per woman. This suggests that replacement-level fertility cannot be reached through a "supply" approach alone (or at least not the approach currently being used in the MCH-FP area). The family planning programs' challenges lie in effectively addressing the disadvantaged (i.e., less educated) group of couples who have a large extent of undesired fertility rates.

Bangladesh's health and family planning programs are improving steadily, but there is room for further improvements in the accessibility and quality of services. There are many low-performing subdistricts where simply greater access to services should increase contraceptive use (and reduce fertility). The effectiveness of contraceptive use can be improved both by changing the method mix toward more effective methods and by reducing discontinuation rates. The pill is the dominant method used in Bangladesh, followed by the injectable. However, continuation of these methods and other temporary methods is low. About half of pill or injectable users discontinue use of their methods within 12 months of beginning (Mitra and others, 2001). About one-fifth of users use traditional methods, which have high failure rates. In addition, the use of permanent methods of contraception is on the decline. During 1999-2000, 7.2 per cent of couples were using permanent methods, while the comparable figure in 1991 was 10.3 per cent. Carefully designed strategies with better counseling and supervision should lead to increases in contraceptive adoption and continuation and hence should further reduce fertility.

Bangladesh society is undergoing phenomenal changes. The perceived utility of children is changing, and there is little doubt about the impact of parents' education on this. The medium-variant scenario of the United Nations projection of fertility indicates that Bangladesh will achieve replacement-level fertility around 2025 (United Nations, 2001). This does seem to be a likely scenario for Bangladesh. Our rough projection, based on the projection of women's education, also indicates that this may be the case.

Our projection assumes that levels of education will change, but that education-specific fertility rates will not. However, education-specific fertility rates have declined in Bangladesh and, in the future, other factors may also help to accelerate further decline in fertility by reducing fertility rates within education groups. Bangladesh already has very high population density, and high population growth will continue for years to come because of momentum. Rapid urban growth, shifts in agricultural structure, economic improvement, women's employment, and many other social and economic changes may accelerate the transition, meaning that replacement-level fertility may be reached before the time period we project. It may also, for example, be possible that women with secondary education will begin to have below replacement-level fertility, as indicated in their wanted fertility. In the future, more and more women will be in the secondary-education category. This process may shorten the time required to achieve replacement-level fertility. According to the United Nations low variant, replacement-level fertility may occur about ten years earlier than the time frame the United Nations medium variant (and we) projects. That may indeed be the case if social, economic, or other changes drastically affect the

value or cost of children and reduce fertility rates within women's education groups. Improvement in family planning programs may hasten the transition to replacement level as well.

TABLE 1. TOTAL FERTILITY RATES (TFR) AND CONTRACEPTIVE PREVALENCE RATES (CPR), BY CALENDAR YEAR IN THE MATLAB COMPARISON AND MCH-FP AREAS AND IN BANGLADESH

	Comparison area		*MCH-FP AREA*		*BANGLADESH*	
Calendar year	*TFR*	*CPR*	*TFR*	*CPR*	*TFR*	*CPR*
1987	5.4		4.2	51.3	4.8	
1988	5.4		3.8	52.5		
1989	4.9		3.4	58.8		30.8
1990	5.0	27.9	3.4	60.6	4.3	
1991	4.3		3.0	61.1		39.9
1992	4.0	30.3	3.0	61.1	3.4	
1993	3.8		2.9	62.7		44.6
1994	3.8		3.0	65.6		
1995	3.6		2.9	68.6	3.3	
1996	3.5	46.9	2.7	68.1		49.2
1997	3.4		2.8	67.4		
1998	3.6		3.0	68.8	3.3	53.8

Sources: Matlab data are taken from the DSS; and Bangladesh data from the 1999-2000 BDHS (Mitra and others., 2001).

TABLE 2. TOTAL FERTILITY RATES IN THE MATLAB COMPARISON (C) AND MCH-FP (M) AREAS, BY EDUCATION AND ECONOMIC GROUP, 1995-2000

Economic group	*No schooling*			*1-5 years of schooling*			*6-9 years of schooling*			*10 years + schooling*			*All*		
	C	*M*	*C-M*	*C*	*M*	*C-M*	*C*	*M*	*C-M*	*C*	*M*	*C-M*	*C*	*M*	*C-M*
Low	4.2	3.4	0.8	3.8	3.2	0.6	3.3	2.6	0.7	2.9	2.5	0.4	3.8	3.1	0.7
Medium	4.0	3.5	0.5	3.3	3.2	0.1	3.1	2.5	0.6	2.7	2.0	0.7	3.2	2.7	0.6
High	4.0	3.3	0.7	3.3	3.0	0.3	3.0	2.6	0.4	2.9	2.2	0.6	3.1	2.6	0.5
All	4.1	3.4	0.7	3.5	3.0	0.5	3.1	2.6	0.5	2.8	2.2	0.6	3.5	2.9	0.6

Source: Matlab DSS.

Figure 1. Total wanted (TWFR) and actual total fertility rates (TFR) by women's education, Bangladesh, 1999-2000

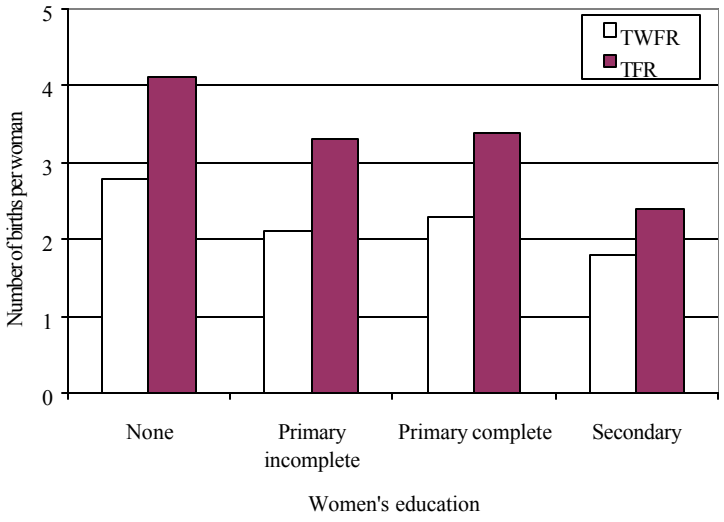


Figure 2. TFR by women's education and area, Matlab, 1995-2000

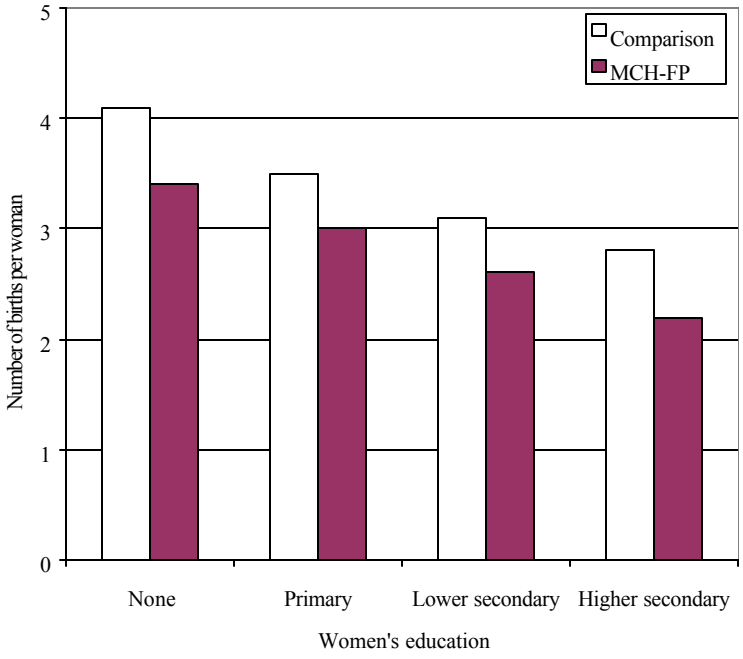


Figure 3a. Percent of people who have one or more year of education, by gender and year of birth, Bangladesh, 1999-2000

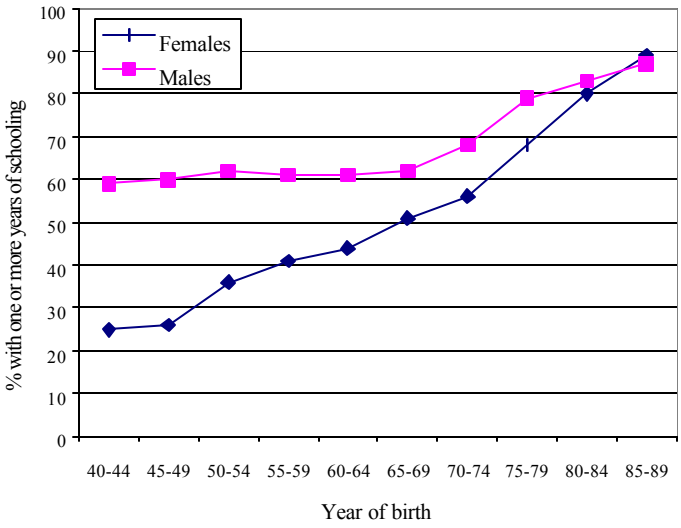


Figure 3b. Percent of people who have six or more years of education, by gender and year of birth, Bangladesh, 1999-2000

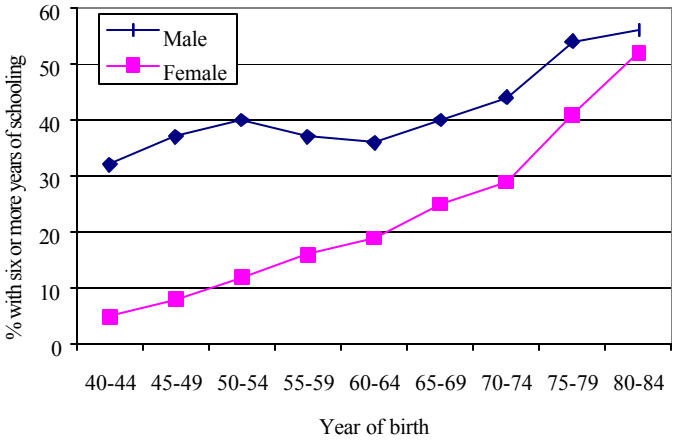


Figure 4. Percent of women who have one or more year of education by year of birth and economic group, Matlab Comparison Area, 1995

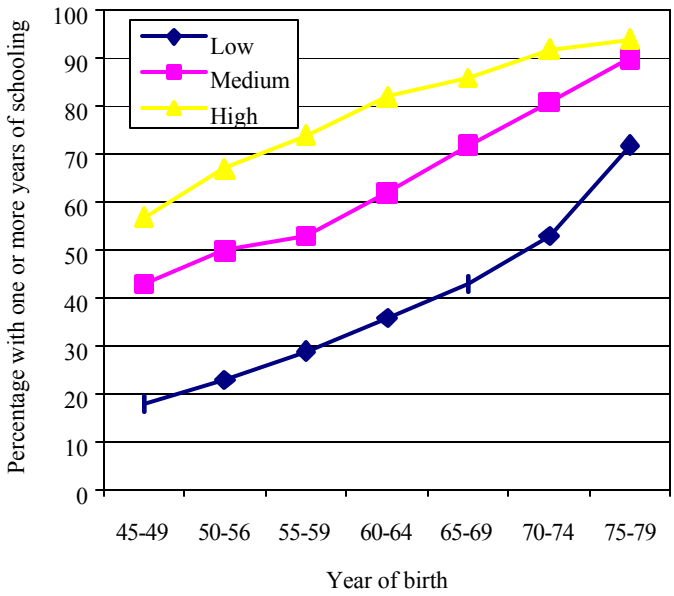
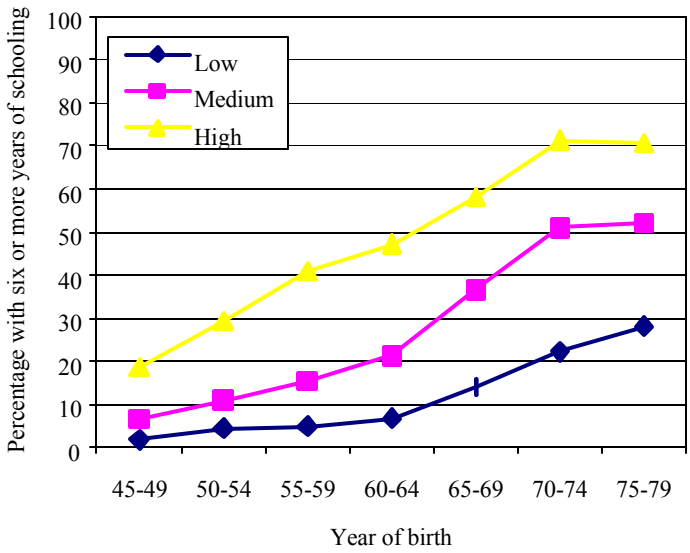


Figure 5. Percent of women who have six or more year of education by year of birth and economic group, Matlab Comparison Area, 1995



APPENDIX A. DISTRIBUTION OF MATLAB COMPARISON-AREA WOMEN-YEARS BY EDUCATION AND ECONOMIC GROUP, 1995-2000

Economic group	*No schooling*	*1-5 years of schooling*	*6-9 years of schooling*	*10 years + schooling*	*All*
Low	40 164	20 746	6 278	748	67 936
Medium	12 451	13 771	8 038	2 109	36 369
High	8 109	12 792	11 689	4 564	37 154
All	60 724	47 309	26 005	7 421	141 459

Source: Matlab DSS.

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NOTES

[1] HDI, a commonly used index, is calculated on the basis of life expectancy, literacy rate, and real GDP per capita.

[2] In Bangladesh, both fertility and mean age of childbearing are declining. The period measure of the total fertility rate (TFR) that is obtained from a survey like the Bangladesh Demographic and Health Survey (BDHS) is unlikely to give the true picture of fertility decline because of both pace and tempo effect of fertility decline. The period TFR is likely to provide an underestimation of cohort TFR for recent years when fertility has been declining. Therefore, in Bangladesh situation, it seems that actual cohort fertility is likely to be higher that it has been estimated.

[3] "Low" represents a household space below 250 square meters, "medium" 250-349 square meters, and "high" 350 square meters or more.

[4] The total wanted fertility rate may be an overestimate of the number of children women really wanted to have, since respondents have a tendency after the fact to report children as "wanted" whose pregnancies may have been unintended at the time.

The BDHS also collects data on ideal family size, which come from answers to the hypothetical question "If you could go back to the beginning of your reproductive life, how many children would you have wanted?" We chose to focus on the TWFR in our analysis because it refers to a real-life situation.

[5] About 90 per cent of newborn girls are likely to reach the mean age of childbearing in Bangladesh. This means that about 2.2 children out of 2.4 children born among educated women will reach the mean childbearing age. However, the survival rate is probably higher than 90 per cent for women with secondary education.

[6] Mean ideal family size, another measure of desired fertility, also indicates that educated women want to have a family size that is compatible with replacement-level fertility. In the 1999-2000 BDHS, average ideal family size is just 2.5 for all women in Bangladesh, and it is 2.3-2.4 for women below 25 years of age. For women younger than age 25, it is 2.2 for those women who have more than primary education and 2.4-2.5 for other women.

[7] In 2000 40 per cent of women between 15 and 49 years of age did not have any education.

[8] We consider the woman's household space at the time of the 1996 Census. This is not necessarily the household-space group that was pertinent for the woman at the time when she was attending school.