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Population projection and fertility for Bangladesh, 2020

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Introduction

Bangladesh, with its characteristic high growth rate and population density, widespread poverty, and very low literacy and standard of living, has faced no greater problem than its ever-increasing population. Its size, composition and rate of growth of population is offsetting socio-economic development and is expected to have serious future consequences. As population increases rapidly, more development programs are needed in the socio-economic sectors of employment and manpower, health services and education.

In order to formulate effective population stabilization plans - both long term and short term - a knowledge of the current and expected future population sizes, their age-sex composition, as also the growth and distribution of the population is essential. In this context, population projections, if made accurately, can serve as a very good source of information of future population trends and can provide guidelines for planners, policy makers and researchers. The present study has been designed with this intention, and covers the period from 1990 to 2020.

Data and Methodology

The fertility of Bangladesh is quite high and is treated as the primary way in which the population receives new members. Hence, high, medium, and low variant projections were prepared which differ mainly with respect to the assumed future fertility rates, and the assumption that, during the projection period, there would be no wars, famines and epidemics and the net migration from the country would be nil.

The population projections for Bangladesh were based on the population and age structure as recorded in the UN *World Population Prospects, 1990.* [1]

The projections were made for each variant by sex, five-year age groups and at five-year intervals from 1990-2020 using the computer software package, "PEOPLE". The base year population by age and sex is presented in Table 1.

Table 1: Distribution of population by age and sex (in 000's), 1990

Age (years)	Males	Females	Combined
All ages	59.6	56.0	115.6
0-4	9.8	9.2	19.0
5-9	8.6	8.0	16.6
10-14	7.8	7.2	15.0
15-19	6.6	6.3	12.9
20-24	5.5	5.2	10.7
25-29	4.6	4.3	8.9
30-34	3.9	3.6	7.5
35-39	2.8	2.6	5.4
40-44	2.3	2.2	4.5
45-49	1.9	1.8	3.7
50-54	1.6	1.5	3.1
55-59	1.4	1.2	2.6
60-64	1.0	0.9	1.9
65-69	0.7	0.6	1.3
70-74	0.5	0.4	0.9
75-79	0.3	0.3	0.6
80 +	0.2	0.2	0.4

Source: UN 1991

Assumptions regarding fertility

1. High Variant

The high variant projection assumes that the total fertility rate (TFR) of 5.1 as estimated for 1990 would fall to 4.2 at the end of the projection period, that is by 2020. Sometimes, in high fertility countries, fertility is assumed to be constant throughout the projection period, [2] which seems to be rather unrealistic for Bangladesh where there are a number of intervention programs for fertility reduction. Given the prevailing socio-economic conditions and the government's population policy for the country, the high variant then, presents a hypothetical projection and is introduced only to show the maximum possible course of population growth if fertility changes very slowly.

2. Medium Variant

This variant assumes that the decline in the total fertility rate will follow at least the past pattern of fertility decline if not a faster one. In Bangladesh, as estimates of fertility were obtained using different methods and data, their consistency is limited and reliable past trends of fertility are not available for population projections. However, after a careful examination of the available estimates, it was found that the total fertility rate was 7.0 in 1970, 6.7 in 1975, and 6.2 in 1980. Here it is assumed that the total fertility- rate would decline from 5.1 in 1990 to 2.7 by the year 2020.

3. Low Variant

Though the fertility in Bangladesh declined in the past though not to the extent envisaged, there are significant trends in the recent program performance which indicate that the nation is on the threshold of a more dramatic decline in fertility in the near future. For example, contraceptive practice has steadily increased in the recent past from 29.8 per cent in 1985 to 35.5 in 1990. [3] This rising trend in the contraceptive use rate documented by independent surveys represents a turning point in the path of fertility decline in Bangladesh. Thus, the low variant assumes a more faster decline in fertility in the near future starting from 5.1 in 1990 to 2.1 by the year 2020.

The total fertility rates in the high, medium and low variants for each quinquennial year between 1990 and 2020 are presented in Table 2.

Table 2: Total Fertility Rate (TFR), 1990 - 2020

	1990	1995	2000	2005	2010	2015	2020
High variant TFR	5.1	5.0	4.9	4.7	4.6	4.4	4.3
Medium variant TFR	5.1	4.9	4.5	4.0	3.6	3.2	2.7
Low variant TFR	5.1	4.7	4.3	3.8	3.3	2.7	2.1

Assumption Regarding Mortality

Table 3 presents the mortality rates for males and females for each quinquennial year during the projection period 1990-2020 assuming that it would improve gradually throughout this period and following the South Asian pattern of mortality.

Table 3: Mortality based on expectation of life at birth, 1990 - 2020

Year	1990	2005	2010	2005	2010	2015	2020
Male	53.1	54.1	56.1	58.1	60.2	62.2	64.2
Female	52.6	53.7	55.9	58.2	60.5	62.7	65.0

The expectation of life at birth for 1990 has been estimated by the UN as 53.1 years for the male and 52.6 years for the female. According to the UN report: [5] "A population would achieve a quinquennial gain in life expectancy at birth of 60 years and then reduces gradually by 0.5 years. For the female, the quinquennial gain would also be 2.5 years until life expectancy reaches 65 years and then reduces by 0.4 years". It is worth noting that though female life expectancy in the developed world has been found to be higher than that of the male, the situation appears to be reversed in Bangladesh; a situation which is usually caused by the higher rates of female child mortality and

maternal mortality in developing as opposed to developed countries. But, as life expectancy increases infant mortality and maternal mortality will decline, thus favoring females, whose life expectancy should become higher than that of males.

Results and Discussion

Table 4 summarizes the population estimates and the annual growth rates of Bangladesh over the 30-year projection period. The population of Bangladesh which was 115.6 millions in 1990 is expected to grow to 243.9, 212.0, 204.2 millions in the year 2020 according to the high, medium and low variant projections respectively. The high variant projection indicates that the population is likely too more than double (+ 111 per cent) over the period with an average growth rate of 2.4 per cent.

Table 4: Reported and projected population, *annual growth rate and crude birth rate, Bangladesh, 1990 - 2020

Year	High variant			Medium variant			Low variant		
	Pop.	GR	CBR	Pop.	GR	CBR	Pop.	GR	CBR
Reported									
1990	115.6	2.4#	-	115.6	2.4	-	115.6	2.4	-
Projected									
1995	130.7	2.4	36.9	130.0	2.4	36.0	130.0	2.3	35.7
2000	148.5	2.6	36.8	146.1	2.3	34.1	145.5	2.3	33.5
2050	169.0	2.6	36.0	163.0	2.2	31.8	161.6	2.1	30.8
2010	191.8	2.5	34.5	180.2	2.0	29.0	177.4	1.9	27.5
2015	216.8	2.4	32.7	196.8	1.8	25.7	192.0	1.6	23.8
2020	243.9	2.3	31.0	212.0	1.5	22.3	204.2	1.2	20.0

Source: Derived from projected figures.

*In millions.

The high variant population estimate then should be considered as an upper limit. In the medium variant, the annual growth rate would gradually decline to 1.5 per cent in 2020, but the population would still nearly double across this period. If, however, fertility were to decline as fast as assumed in the low variant, Bangladesh would experience a substantial decline in its population growth rate to reach 1.2 in 2020, but the population would be 71 per cent larger than in 1990 due to a high growth momentum of the young age population resulting from past high fertility.

Table 4 also shows the crude birth rate (CBR) during the projection period. A gradual decline in the CBR appears to persist over the projection period 1990-2020 in all the three variants of projection. It is evident from the table that at the end of the projection period, the CBR would drop from 36.9 to 31.0 in the high variant, from 36.0 to 22.3 in the medium variant, and from 35.7 to 20.0 in the low variant. One reasonable explanation for this gradual decline is changing age-sex structure of the population.

The age structure of the population, which influences current and future fertility, mortality and migration, has important social and economic implications. Although, the age structure can be expressed in a number of ways, only the distribution of the population by broad age groups and the dependency ratio are discussed here. Table 5 demonstrate that the proportion of total population under 15 years of age decreased gradually, basically due to the decrease in fertility.

Table 5: Percentage distribution of population estimates by age and dependency ratio in high, medium and low variant projections, 1990 - 2020

Age (years)	1995	2000	2005	2010	2015	2020
HIGH variant						
< 15	41.9	40.7	39.9	39.6	38.8	37.7
15 - 64	55.2	56.4	57.1	57.3	58.0	59.0
64 +	2.9	2.9	2.9	3.0	3.1	3.3
Dependency ratio	0.81	0.77	0.75	0.74	0.72	0.69

MEDIUM variant						
< 15	41.7	39.7	37.7	36.0	33.8	31.1
15 - 64	55.5	57.3	59.2	60.7	62.7	65.1
64 +	2.9	2.9	3.1	3.2	3.4	3.8
Dependency ratio	0.80	0.74	0.68	0.64	0.59	0.53
LOW variant						
< 15	41.6	39.5	37.2	35.1	32.4	29.1
15 - 64	55.5	57.6	59.7	61.6	64.0	66.9
64 +	2.9	2.9	3.1	3.3	3.5	3.9
Dependency ratio	0.80	0.73	0.67	0.62	0.56	0.49

Source : Derived from projected figures.

In the high variant projection, the population under 15 years of age will exceed 37.7 per cent of the total population by the end of 2020; this represents a small shift from 43.9 per cent in 1990. But the age group 15-64, which reflects the potential labor force available in the country, will increase from 53.2 per cent of the population in 1990 to 59.0, per cent in 2020 in the high variant projection, and to 65.1 per cent and 66.9 per cent of the population in the medium and low variant projections respectively during the same period. This is due to the young age structure of the population resulting from the country's previous high fertility. The percentage of the elderly population (65 + years) is likely to increase under the high, medium and low variants because a decline in mortality would lead to an increase in the proportion of the elderly.

An increasing trend in the dependency ratio has been observed in the high variant projection during 1990-2005, probably due to an increase in the young age population. However, a significant reduction in the dependency ratio can be seen in the medium and low variants. Table 6 provides an overview of the projected age and sex distribution of Bangladesh in the year 2020.

Table 6: Projected mid- year population (millions) by age and sex, 2020

Age (years)	High variant			Medium variant			Low variant		
	M	F	T	M	F	T	M	F	T
0-4	17.3	16.3	33.6	11.0	10.4	21.4	9.5	9.0	18.5
5-9	15.8	14.8	30.6	11.4	10.8	22.2	10.4	9.8	19.2
10-14	14.4	13.5	27.9	11.5	10.8	22.3	10.8	10.1	19.9
15-19	12.8	12.1	24.9	11.1	10.4	21.5	10.6	10.0	18.6
20-24	11.3	10.5	21.8	10.4	9.6	20.0	10.1	9.4	18.5
25-29	9.6	8.9	18.5	9.3	8.7	18.0	9.3	8.6	17.9
30-34	8.9	8.2	17.1	8.9	8.2	17.1	8.9	8.2	16.1
35-39	7.9	7.3	15.2	7.9	7.3	15.2	7.9	7.3	15.2
40-44	7.0	6.4	13.4	7.0	6.4	13.4	7.0	6.4	13.4
45-49	5.8	5.5	11.3	5.8	5.5	11.3	5.8	5.5	11.3
50-54	4.6	4.4	9.0	4.6	4.4	9.0	4.6	4.4	9.0
55-59	3.6	3.5	8.1	3.6	3.5	7.1	3.6	3.5	7.1
60-64	2.8	2.7	5.5	2.8	2.7	5.5	2.8	2.7	5.5
65-69	1.7	1.7	3.4	1.7	1.7	3.4	1.7	1.7	3.4
70-74	1.1	1.2	2.3	1.1	1.2	2.3	1.1	1.2	2.3
75-79	0.6	0.7	1.3	0.6	0.7	1.3	0.6	0.7	1.3
80 +	0.4	0.5	0.9	0.4	0.5	0.9	0.4	0.5	0.9
All	125.6	118.3	243.9	109.1	102.8	211.9	105.1	99.1	198.2

M =Males; F = Females; T = Total.

Source: Derived from projected figures.

From the projected figures it is clear that the population growth rate cannot be reduced with a very slow decline in fertility as assumed in the high and medium variant projections. The long-term goal of the Bangladesh government is to reduce the birth rate of 2.1 as assumed in the low variant. But, the low variant projection yields a population of 198.2 millions which is a 71 per cent increase over 1990. Therefore, in order to avoid this rapid population growth, a policy of below replacement level fertility is suggested.

Policy Implications and Conclusion

Bangladesh is a country which attempts to achieve socio-economic development through its national development plans. In such a situation, the results of our population projections have major policy implications. Bangladesh will be unable to support a growth in its numbers without deterioration in the average standard of living. Hence, there is an urgent need for deliberate efforts - typically governmental - in funding and administration, to provide birth control information and means on a voluntary basis. The effectiveness of such a policy will serve a long-term purpose by gradually creating awareness of birth control, which is assumed to be of crucial importance in the future.

The large proportion of young age (below 15 years) population at the end of the projection period in the high variant indicates that the momentum of the high population growth rate will still be evident in 2020. This calls for government policy aiming to slow down the rapid population growth, now. The high proportion of population under age 15 also has important implications for the education planning authorities. There will be a crucial need for continuous expansion of educational facilities even to maintain the present low level of literacy. The proportion of persons in the working age group 15-64 years as seen in all projections, would crease at the end of the projection period and also has policy implications for creating productive employment. Failure to do this would further aggravate the present unemployment situation and consequently, the socio-economic problems of the country.

The results of the population projections therefore indicate that it is extremely important for the government to fully realize the effects of rapid population growth rate. It is also important to formulate an effective population policy and to incorporate it within the overall national development plans for the mere survival of the nation.

References

1. United Nations: *World Population Prospects, 1990,* United Nations, New York, 1991

2. Overseas Development Administration: PEOPLE, version 3.0, User Manual, Overseas Development Administration, U.K., 1992.

3. Krishnamoorthy, S.: "Fertility policy for India: Constant number of births, replacement level or below replacement level fertility?", *The Journal of Family Welfare,* 40(4): 45-50 (1994).

4. Government of Bangladesh: *The Fourth Five Year Plan:* 1990-1995, Planning Commission, Ministry of Planning, Government of Bangladesh, Dhaka, 1990.

5. United Nations: *The Sex and Age Distribution of Population of 1990,* United Nations, New York, 1991.

6. United Nations: "Mortality and health issues. Analysis of mortality trends and patterns in Bangladesh", *Asian Population Studies Series,* No. 72, United Nations, New York, 1986.