Social and Economic Implications of India's Population Growth under Alternative Policy Options, 2001-10

Abstract

This paper attempts to examine the social and economic implications of India's population growth under alternative policy options for a relatively shorter period i.e., 2001-10. The various policy options considered in the paper are mainly related to the National Population Policy, 2000 and 10th Five Year Plan, 2002-07. The analysis has been carried out under three alternative scenarios, namely, Reduction of unmet need by 1 percent till 2010 and the growth rate of GDP by 6.1 percent as experienced in 8th and 9th Five Year Plan (scenario 1), Achieving the TFR of 2.1 by 2010 and growth rate of GDP by 7.93 percent till 2007 and 9.3 percent thereafter (Scenario 2) and Achieving TFR of 2.1 by 2010 and growth rate of GDP by 6.1 percent from 2001-10 (Scenario 3). Along with social and economic implications, the family planning requirements are also assessed for the country.

The analysis showed that the demographic parameters are close under these three scenarios. The total population is likely to be between 1155-1164 million by 2010 with a young age structure. On economic front, it is found that the per capita GDP can be increased maximum of 77 percent (from Rs 11181 in 2001 to Rs 19, 757 by 2010 at 1993-94 prices) under the most favorable condition (Scenario 2) and may not be doubled as stated in 10th Plan document. It is also estimated that about 135 million employment creation is required to achieve the full employment by 2010. However, the dependency ratio is expected to decline during the period. On social front, it is found that the absolute number of children in the primary school age will decline and so the requirement of new schools. But the requirement of health professionals such as Doctors and Nurses is likely to be more for the coming years.

1. Introduction

The Tenth Five Year Plan (2002-07) aimed at achieving the GDP growth rate of 8 percent, doubling the per capita income and creation of 100 million of employment opportunities in next 10 years (Planning Commission 2002). These targets are formulated based on the past growth trends and the vision of making India as a developed country by 2020. In the last decade the country had experienced higher economic growth, reduction in poverty ratio, increase in the foreign exchange reserve and achieved price stability. The growth rate of Gross Domestic Product (GDP) was 5.6 percent in 1990s and the population below poverty line had declined from 39 percent in 1993-94 to 26 percent in 1999-2000 on a 30-day recall basis for the country. However, the goals of Tenth Five Year Plan are ambitious and the feasibility of these goals depends on demographic trends as well.

In this context the immediate and medium term objectives of National Population Policy 2000 are quite relevant. The National Population Policy (2000) aimed at meeting the unmet need for reproductive health and family planning as its immediate objective and achieving the replacement level of fertility by 2010 as its medium term objective. If these goals are achieved, the country may gain demographic bonus, which in turn will accelerate the economic development in the country. The demographic trends indicate that with the current schedule of fertility and mortality about 16 million populations are adding to the country annually. The Infant Mortality Rate remains at a plateau of about 70 per 1000 live births in 1990s and contraceptive prevalence rate continues to rise.

On examining the past trends of India's population, it may be observed that during the later half of the twentieth century, about 650 million populations were added to the country. Now the question is what will be the size of India's labour force, requirement of new jobs and GDP per capita if the targets of the Tenth Five Year Plan and National Population policy are possible to achieve? What will be the expected changes in the age and sex structure of the population? What will be the requirements for the health and educational infrastructure? And also what will be the family planning requirements by the year 2010? Any serious attempt to understand the future scenario of India around the year 2010 or any future year would have to confront these questions, and make a proper assessment of country's demographic prospectus.

2. Review of Literature

In 1950, Kingsley Davis made a mathematical projection and assumed that mortality and fertility will behave as during the period 1921-1941(i.e., high rate of natural increase will continue). The population of undivided India was estimated at 790 million in India and Pakisthan combinely for the year 2001. (Kingsley Davis, 1950).

Coale and Hoover (1958) had examined the economic significance of reduction in fertility under alternative assumptions for the period of 1956 to 1981. The alternative assumptions were (1) High fertility assumption - unchanged fertility (2) Low fertility assumption - a 50 percent decline in fertility between 1956 to1981, and (3) Medium fertility assumption - a 50 percent decline after 1966 and unchanged before. They had used the Harrod Domar growth model in which the investment is the key factor in determining the economic growth. They further converted the projected population to adult equivalent consumer and examined the relationship between per capita income and adult equivalent consumer. They found that the per capita income as well as total GDP is higher under the low fertility assumptions.

Since1971, various Expert Committees had been appointed by the Registrar General of India for population projection and for using the projected figures for various planning purposes. In 1971, the projected population was higher than the actual population, but in 1981, it was just the reverse. The projected population was very close to actual population in 1991 estimated by the standing committee for that census. For 2001 Census, there is a gap of projected and actual population by around 14 million. (Census of India, 2001, Provisional Population Totals).

The Technical Group on Population Projections constituted by the planning commission in 1996 based on the results of 1991 census had estimated probable year by which the replacement level TFR of 2.1 will be achieved, if the recent pace of decline in TFR (observed during 1981-1993) continues in the future years. It was estimated that the country would achieve the replacement level of fertility by the year 2026. (Report of the Technical Committee on Population constituted by Planning Commission 1996, RGI, India).

Prior to formulation of 10^{th} plan a full-scale projection made by Technical Group on Population Projection for the time period of 1997 to 2012. Department of Family Welfare made the necessary adjustment for the higher actual population in the base year of 1997. According to this the population of India was estimated at 1129 million by 2007 and 1214 million by 2012.

Natarajan and Jayachandran also made the population projection in 2000, taking the 1996 population (934.2 million) as the base year population and assuming the life expectancy of birth as 62.9 tears for male

and 64.9 for females in 2001 and projected TFR as 3.1 in 2001. They estimated that India's population would be 1012 million by 2001. (Natarajan and Jayachandran, 2000).

According to Bhat (2001), the population of India is expected to be around 1.4 billion in 2025, assuming whether India attains the goals of the National population Policy, 2000 for 2010 or not. By 2025 India's population would still be growing at a rate of one percent per annum, even though the level of fertility required for long run population stabilization would have been achieved by that time. He also estimated that by 2025 India would have begun to come out of the "demographic bonus" phase (this phase is expected to grow during 2000-2020).

Assuming the fertility goals of the National Population Policy 2000, Srinivasan and Shastri (2001) projected that India's population will reach a size of 1330 million by the year 2026 and will continue to increase thereafter until 2046, when it reaches the peak of 1417 million. It will decline to 1416 million by the year 2051 and continuing its downward trend thereafter.

Dyson and Hanchate also made an attempt to estimate India's population by taking the same base year population as Natarajan and Jayachandran.They assumed Crude Birth Rate (CBR) as 24.8 and Crude Death Rate (CDR) as 8.9 in 2001with the annual growth rate of population as 1.59 percent. Accoreding to their estimation India's population would be 1011 million by 2001. (Tim Dyson and Amresh Hanchate, 2000).

In the recent projection, Dyson et al (2004) estimated that the population of India is likely to be of 1.4 billion by 2026 and 1.6 billion by the year 2051. These projections are done by taking optimistic assumptions, such as the TFR will fall to around 2.1 births per woman by 2016-21, when life expectation will be approximately 67 years for males and 70 for females. The working age population will be approximately 1.5 times as large in 2026 as it was in 2001.If woman's participation increase, there will be an average annual addition of 8 million population to the labour force annually between 2001 and 2026. If recent trends in economic growth and employment intensity continue until 2026, there will be a significant increase in the level of unemployment. Even an annual economic growth rate of 8 percent up to 2026 will not avoid future increase in unemployment level (Dyson et al., 2004).

3. Need of the Study

The population projection is a useful tool to demonstrate the magnitude of current problem and likely to estimate the future magnitude of the problem. The social and economic implications of population growth is useful for national planning as well as for policy formulation for sectors such as labour force, education, health, urbanization, agriculture etc.

The economic projection for the sectors such as labour force will apprise the likely magnitude of supply of labour, employment as well as unemployment trends. Similarly, the GDP percapita will enable us to understand the economic progress of the country. On education, the projection of school going children, requirement of new schools as well as other infrastructure helps us to make the educational planning of the country. Similarly the health requirement with respect to the requirements of health professionals enables us to formulate the health sector planning. Finally, the family planning requirements such as sterilization and spacing methods by sources enable the government for formulating the policy in streamlining the contraceptive requirement.

In this paper it is attempted to understand the economic and social significance of population growth under alternative policy goals. It also attempts to project the population of India till 2010 and the likely implications for food production, socio-economic development, and infrastructure development and family planning requirements.

4. Objectives

The broad objective of the paper is to understand the social and economic implications of population growth till 2010.

However the specific objectives are

1. To project India's population under alternative goals of replacement level of fertility and reduced demand for unmet need
2. To examine the economic significance of population growth with respect to labour force and GDP per capita.
3. To assess the family planning, educational, health requirement under alternative assumptions

5. Data Sources

The data for demographic, economic and social parameters are collected for the national level. The base year refers to the period of 2001 or the latest available period. The detailed source and base year along with future assumptions is given in appendix 1. However, the following are the main data source for this paper –

1. Economic Survey, Government of India, 2002-03, 2001-02
2. National family Health Survey 2, 1998-99
3. Selected Educational Statistics, 2000-2001
4. Sample Registration System, 1998-99
5. Census of India, 2001
6. Manpower Profile, 2001
7. Tenth Five Year Plan, 2002-2007.

6. Methodology

The paper uses the SPECTRUM package of Future Group International for projection over a period of 10 years from 2001 to 2010. Spectrum has designed to produce information that is useful for policy formulation and dialogue within a framework easy to use computer programs. The focus is on the generation of the information useful for policy and planning process. Spectrum is a integration package. The integration is based on DEMPROJ, which is used to create the population projections that support many of the calculations in the other components- FAMPLAN, RAPID, AIMS. **FAMPLAN** is used to project family planning requirements of the consumers' and/ or nations to reach their goals of contraceptive practice or desired fertility. **RAPID** is used to project the social and economic consequences of high fertility and rapid population growth for sectors such as labor force, education, health, urbanization and agriculture. These two modules (FAMPLAN and RAPID) are used in this paper.

A number of assumptions are made for above projection with respect to economy, education, health and family planning. The brief description on assumptions on economic and educational variables is given below.

6.1. Assumptions on Economic Parameters:

1. GDP growth rate of 6.1 percent from 2001 and till 2010. This is the actual growth rate of the economy during 8th and 9th Five year plan
2. GDP growth rate of 7.93 percent till 2007 and 9.3 percent thereafter as stated in 10th plan document
3. Labour force participation of females (15-64) will increase from 25 to 30 percent during 2001 and 2010 while that of males will remain the same.
4. Labour force participation for 10-14 will remain the same.

6.2. Assumptions on Education and Health:

1. The school attendance rate of children for the age group 6-10 from NFHS 2 is taken rather than enrolment statistics. It is assumed that school attendance will reach 100 percent by 2010.
2. The secondary school enrolment will increase from 49 percent to 60 percent by 2010.
3. All other parameters are assumed to be constant

6.3. Assumptions on Demography & Family Planning:

1. Reduction of unmet need by 1 percent by the year 2010
2. Replacement level of fertility i. e., TFR will be 2.1 by 2010
3. The method mix (relative distribution of various methods) of condom will increase from current level of 7 percent to 10 percent, male sterilisation will increase from 4 percent to 7 percent, female sterilization will decline from 80 percent to 70 percent and pills will increase from 5 percent to 9 percent by 2010.
4. The life expectancy at birth is 62.9 years for males and 64.9 years for females and it is assumed as 66.9 and 69.9 years for males and females respectively by 2010 (the average annual increase in life expectancy has 0.4 years for males and 0.5 years for females during 1991-97)[SRS, 1997].

6.4. Projection of selected parameters as in built in the package is given below.

For labour force projection

$$\text{Labour Force}_t = \sum_s (Pop_{15\text{-}64,\,t,\,s} * LFPR_{15\text{-}64,t,s}) + (Pop_{10\text{-}14,t,s} * LFPR_{10\text{-}14,\,t,\,s})$$

where, Labour Force $_t$ =Size of the labour force at time t

$Pop_{15\text{-}64,\,t,\,s}$ and $Pop_{10\text{-}14,\,t,\,s}$ = Population of sex s aged 15-64 and 10-14 at time t

$LFPR_{15\text{-}64,\,t,\,s}$ and $LFPR_{10\text{-}14,\,t,\,s}$ = Labour force participation rate for population of sex s aged 15-64 and 10-14 at time t

For Child Dependants

$$\text{Child Dependants} = Pop_{0\text{-}9,\,t} + [Pop_{10\text{-}14,\,t} * (1 - LFPR_{10\text{-}14,\,t})]$$

where, Child dependants = Children of below 10 years old plus children aged 10-14 years who are not in the labour force at time t

$Pop_{0\text{-}9,\,t}$ and $Pop_{10\text{-}14,\,t}$ = Population aged 0-9 and 10-14 at time t

$LFPR_{10\text{-}14,\,t}$ = Labour force participation rate of population aged 10-14 at time t

For New jobs requirement,

$$\text{New jobs}_t = \text{Labour Force}_t - \text{Labour Force}_{t-1}$$

where, Labour Force$_t$ and Labour Force $_{t-1}$ = Size of the labour force at time t

For GDP projection,

$$GDP_t = GDP_{t-1} * (1 + \text{Annual GDP growth}_t)$$

where, GDP_t and GDP_{t-1}= GDP at time t and t-1

Annual GDP growth$_t$= Annual growth rate of GDP at time t.

For children of Primary school age,

$$\text{Children Prim Age}_t = \sum_{\alpha=BPA}^{BPA=YrsPrimSchool-1} Pop_{\alpha,\,t}$$

where, Children Prim Age_t = Children of prim school age at time t

$\sum_{\alpha=BPA}^{BPA=YrsPrimSchool-1} Pop_{\alpha, t}$ = Population at the beginning of primary school age (BPA) to population at ending age

YrsPrimSchool = Number of years of primary school

Similarly, children of secondary school age can also be calculated.

For projection of number of Doctors required,

$$Doctors_t = Total\ Pop_t / PopPerDoctor_t$$

where, $Doctors_t$ =Numbers of doctors in time t

Total Pop_t =Total population in time t.

$PopPerDoctor_t$ =Number of persons per doctor in time t.

7. Findings

The analysis is carried out for a relatively smaller period, i.e., till 2010. The base year of all the projection is 2001 and the output are given for two period, i.e., 2005 and 2010. The socio economic and family planning projections are carried out under three alternative scenario. The alternative scenarios are given below.

Scenario 1: Reduction of unmet need by 1 percent till 2010 and the growth rate of GDP by 6.1 percent. The growth rate of GDP is based on actual performance of 8th and 9th five year plan.

Scenario 2: Achieving TFR of 2.1 by 2010 and growth rate of GDP by 7.93 percent per annum in Tenth Plan and 9.3 percent thereafter as envisaged in Tenth Five Year Plan document

Scenario 3: Achieving TFR of 2.1 by 2010 and growth rate of GDP of 6.1 percent as experienced in 8th and 9th Five year plan.

It may be mentioned that the emphasis is more on economic and demographic assumption though the education and health aspect is also explored. The results are discussed in three sections. Section 1 discusses the demographic projections under these three alternative scenario. Section 2 discusses the social and economic implications while the section 3 discusses the family planning requirements for the country.

7.1. Population Projection under alternative assumptions: Summary of demographic indicators

The total population of the country is projected to be 1155 million under the goal option of reduction of unmet need by one percent per year (from current level of 15.8 percent) till 2010, while it is projected to be 1164 million under goal option of replacement level of fertility (TFR 2.1). It is also found that the demographic projection under Scenario 2 (TFR 2.1 in 2010 and GDP of 7.93 up to 2007 and 9.3 percent there after) and Scenario 3 (TFR 2.1 in 2010 and GDP growth rate of 6.1 percent) is same (table 2). The age distribution of population suggest that about 8.79 percent population will be in age group of 0-4 years, 19.7 percent in age group of 5-14 years and 66 percent will come under age group of 15-64 years by the year 2010 under Scenario 1 while it will be 8.19 percent, 19.77 percent and 66.97 respectively under Scenario 2 and scenario 3. The median age of the population is estimated as 26 years under scenario 1 while it is 25 years under scenario 2 and scenario 3.

It is estimated that the IMR will be 56 per 1000 live births by the year 2010 while under five-mortality rate will be around 77 under all the three alternative Scenarios. The birthrate is estimated at 16 per 1000 population by 2010 from the current level of 26 under Scenario 1; while in Scenario 2 and 3 it is estimated to be 18 by 2010.Similarly the death rate per 1000 will decline from 8 to around 7 in all the alternative Scenarios. If we see in absolute figure, the total number of births also likely to decline from about 26 millions in 2001 to about 18 million in Scenario 1 and 21 millions in scenario 2 and 3 by 2010.Annual growth rate of population will be around 1.1 percent in all the alternative Scenarios. The GRR and NRR will decline from about 1.56 and 1.36 in 2001 to .91 and .83 respectively in Scenario 1 and 1.02 and .94 in both Scenario 2 and 3 respectively by 2010. It will take 40 years to double the population at the current rate of growth while it will be double after 75 years in 2010 under scenario 1.

From the above estimates it is observed that the population of India will be around 1155-1169 million under any of the policy goals by 2010. However, the demographic estimate under scenario 2 is marginally higher than that of scenario 1.

7.2. Economic Implications

Population growth and its relation to economic development has been a matter of debate over a century. For the developing country like India, population growth is likely to impede economic growth resulting in reduction of per capita income and resources. In addition to this the growth of labor force adds to the unemployment trends. In this section it is attempted to project the economic parameters with respect to labor force, GDP per capita, new job requirements as well as production of major corps for the country.

It is estimated that the total labor force will increase from 337 million in 2001 to 436 million by 2010 under the each of the three alternative scenarios. In other words there will be 29 percent increase in labour

force by the year 2010 in all the three scenarios (table 3). The annual requirement of new job will be approximately 10 million till 2010. Given the backlog of unemployment of 35 million by 2001, additional creation of 100 million employments is needed till 2010 for the country to achieve the full employment situation. This is probably the biggest challenge for the country, given the slow growth rate in employment generation in last decade.

Dependency ratio (both young and old) is likely to reduce from 0.59 to 0.42 under Scenario 1, while it will be 0.43 under Scenario 2 and 3 by 2010. Total number of child dependants is also projected to decline from 357 million in 2001 to 315 million under Scenario 1 and 324 million under Scenario 2 and 3 by the year 2010.

GDP per capita is usually taken as summary indicator of economic development of a country. It is found that the GDP per capita will increase from Rs 11,181 to Rs 16,935 under constant growth trend and reduction of unmet need of 1% (Scenario 1). On the other hand it will be Rs 19,757 under Scenario 2 (where the assumption is that the TFR will be at replacement level i.e., 2.1 and GDP growth rate will be 7.93 percent till 2007 and 9.3 percent thereafter), while it will be Rs, 16,802 under Scenario 3 (i.e., under the assumption of TFR of 2.1 and GDP growth rate will follow the growth trend of 8^{th} and 9^{th} plan). The projected figures are given at 1993-94 prices to make it comparable over the years. The essence of the findings is that even under the most favorable assessment i.e., TFR of 2.1 and growth rate of GDP of 7.93 percent till 2007 and 9.3 percent thereafter, the per capita GDP will increase by only 77 percent by the year 2010 whereas it is projected to increase by 51 percent under scenario 1 and by 50 per cent under scenario 3.Thus, the per capita income cannot be doubled even with the most favorable condition. This is in contrast to the estimates of planning commission where it was estimated that percapita income would double by 2010.

However, the production of major crops are likely to increase from 195.9 thousand metric tons in 2001 to 323 thousand metric tons by the year 2010, while arable land per capita continue to decline from .12 hector in 2001 it will become .1 hector in 2010 in all the three alternative Scenarios.

7.3. Education and Health

The education and health are two critical and key component of human development. For this reason the variables like the school attendance rate, health infrastructures are important for all national and regional planning. For the projection of education most of the parameters are assumed to be constant. However, we have only assumed increase in school attendance rate for primary and secondary school. For primary school the school attendance rate at the age group of 6-10 years (NFHS 2) is used instead of enrolment statistics. Similarly for the secondary school, school attendance of children in the age group of 15-17 years

is used. It is preferred to use school attendance statistics rather than enrolment statistics because of its unreliability.

It is projected that the children of Primary school age will decline from 124 million in 2001 to 112 million in Scenario 1 and 113 million in Scenario 2 and 3 in 2010. But the total number of projected student in Primary school will be increased from 102 million to 112 million in Scenario 1 and 113 million in Scenario 2 and 3 in 2010. It is projected that the requirement of primary schools will be about 629 thousand under Scenario 1 and 633 under Scenario 2 and 3 in 2010 from 571 thousand in 2001 if school attendance of 100 percent to be achieved.

On the other hand the children of secondary school age will increase from 87 million to 98 million in 2010 under all the alternative Scenarios. Similarly total secondary student will also increase from 43 million to 59 million in 2010 in all the alternative assumptions. The requirement of secondary schools will be 269 thousand and required teachers will be 1839 thousands in 2010 from 195 thousands and 1334 thousands respectively in 2001, in all the alternative Scenarios.

With respect to the health projection it can be seen that about 603 thousands doctors will be required under Scenario 1 and 608 thousand under Scenario 2 and 3. Also there will be more requirements of nurses from 762 thousand to 857 thousand under scenario 1 and to 864 thousand under scenario 2 by 2010. More health centers will be required, approximately 190-191 thousand in all the Scenarios.

7.4. Family Planning

Prior assessment on family planning requirement will help for effective programme implementation. Table 6 gives the estimated number of married women in reproductive age group, total number of contraceptive users by methods and growth rate of each methods under alternative scenarios.

It is estimated that total number of married women will increase from 143 million in 2001 to 145 million by 2005 but further decline to 141 million by 2010 under all the scenarios. The number of users of contraceptive methods is estimated as 61 million in 2001, which is likely to be 61 million under scenario 1 and 56 million under scenario 2 and 3 by 2010.

The users of family planning by source (public, private and others) are shown in table 7. It is found that the total number of condom users will increase from 4.41 million in 2001 to 6.07 million by 2010 under scenario 1 while it will increase to 5.56 million under scenario 2 and 3. This is derived under the assumption that the method mix of condom use will increase from 7.2 percent to 10 percent for. Similar estimate is also provided for public and private sector. The users of condom from public source is .67 million in 2001and it is estimated to be decline to .61 million under scenario 1 and .56 million under

Scenario 2 and 3 by the year 2010.But the users of private sources estimated to be higher from 1.91 million in 2001 to 3.03 million under Scenario 1 and 2.78 million under Scenario 2 and Scenario 3 by 2010.

With respect to sterilization, the female sterilization is likely to decrease from 49 million in 2001 to 42 million by 2010 under scenario 1 and 39 million under scenario 2 and 3 by the year 2010. This is estimated under the assumption that the method mix of female sterilization will decrease from 79.7 percent to 70 percent by between 2001 and 2010.But the male sterilization users are likely to increase from around 3 million in 2001 to approximately 4 million by 2010 under all the alternative Scenarios. This is also derived under the assumption of method mix that the male sterilization use will be increase from 4.4 percent to 7 percent. There will be an increase in male sterilization in each source also. In case of female sterilization the number of users of private and others show an increasing trend instead of total decline in the female sterilization use, while, the users of public source show the decreasing trend.

The total IUD users will remain almost same with a small marginal change from 2.26 million to 2.06 million. This projection is done under the assumption of method mix that the IUD users will remain same at 3.7 percent between 2001 to 2010.Total number of pill user is estimated to be almost doubled from around 3 million in 2001 to 6 million under Scenario 1 and around 5 million under Scenario 2 and Scenario 3 by the year 2010.This estimation is based on the assumption of method mix that the pill use will be increased from 4.9 percent in 2001 to 9.3 percent by 2010.It is observed that in case of each method, whether the number of users increased or decreased, the number of users of private source and others show tendency to increase between 2001 and 2010.

8. Conclusion

This exercise gives us an insight of economic and social implications of population growth under alternative policy perspectives. It may be viewed as an approximation of selected economic and social indicators for recent future. The estimates are also available on yearly basis.

It is found that the demographic, social and economic projections are close under each alternative scenario. Barring economic indicators, the parameters for demographic and social indicators are same under scenario 2 and 3. The total population of the country will not be less than 1155 million by 2010 and with continue to be young age structure. The per capita GDP can increase by 77 percent under most favorable assumption but cannot be doubled by 2010. It is required to create 135 million additional employment (35 million backlog and 100 million new) for achieving full employment of the country.

In general, it can be said that the challenge before India is it has to invest more and more on social overhead capital (SOC) i.e., on health and education to improve the quality of the people of the

country. Focus should also be given towards full and proper coverage of Maternal and health services, Reproductive and Child Health services, on contraceptive care, Gynecological problems and the quality of services should be improved. So it can be helpful in a way or another to accelerate demographic transition and achieve population stabilization. Efforts should be given for providing adequate inputs and to utilize the available abundant human resource to accelerate economic growth and overall development. It will give a better picture of the country as a whole if state level projection can be done simultaneously.

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Table 1: Demographic and economic policy options for alternative projections

Demographic goals	Economic goal	Possible Combinations
a. Replacement level of TFR by 2010	**c.** Achieving GDP growth rate of 7.93 percent till 2007 and 9.3 percent thereafter	**1.** Reducing unmet need of 1 percent and same growth trend **(Scenario 1)**
b. Reducing the unmet need of family planning by 1 percent till 2010	**d.** Same growth trend of 8th and 9th plan continues	**2.** TFR of 2.1 and 7.93 percent growth rate of GDP till 2007 and 9.3 percent thereafter- **(Scenario 2)**
		3. TFR of 2.1 and growth trend of 8th and 9th plan **(Scenario 3)**

Table2: Projected summary demographic Indicators of India under alternative assumptions, 2005 & 2010

Demographic Indicators	Base year	2005		2010	
	2001	Scenario1	Scenario2	Scenario1	Scenario2
Total Population in million	1027	1092	1093	1155	1164
Percentage of population 0-4	11.51	10.18	10.30	8.19	8.79
Percentage of pop 5-14	24.06	22.24	22.21	19.77	19.74
Percentage of pop 15-64	60.29	62.89	62.81	66.97	66.44
Percentage of female 15-49	51.25	53.54	53.47	56.12	55.67
Percentage of pop 65+	4.14	4.69	4.69	5.07	5.03
Median age	22	24	24	26	25
Sex Ratio (M/F)	107.81	107.27	107.27	106.66	106.64
Birth Rate per 1000	25.6	21.3	22	16	17.8
Death rate per 1000	8.2	7.4	7.5	6.7	6.8
Infant Mortality rate	74.8	66.4	66.4	56.4	56.4
Under 5 mortality rate	107.4	93.5	93.5	77.2	77.2
Annual growth rate (%)	1.74	1.39	1.45	.93	1.10
Doubling Time in years	40.2	50.2	48	75	63.1
No of birth in millions	26.25	23.28	24.06	18.46	20.78
No of deaths in millions	8.37	8.10	8.16	7.74	7.91
GRR	1.56	1.28	1.32	.91	1.02
NRR	1.36	1.14	1.18	.83	.94
Mean Age of child bearing	28.2	27.7	27.8	27.2	27.3
Child-woman ratio	.47	.39	.40	.30	.33

*** All the demographic parameters under scenario 2 and 3 are same*

Table 3: Projected population by Age and Sex in India by 2010 under alternative Assumptions (in millions)

Age group	Base year 2001			Scenario 1 2010			Scenario2 2010		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	62.16	56.02	118.18	48.34	46.25	94.59	52.31	50.05	102.36
5-9	64.29	59	123.29	56.5	53.07	109.57	57.24	53.78	111.02
10-14	65.35	58.5	123.85	62.12	56.71	118.83	62.12	56.71	118.83
15-19	54.72	47.59	102.31	64.35	58.93	123.28	64.35	58.94	123.29
20-24	48.35	46.1	94.45	63.43	56.38	119.81	63.43	56.38	119.81
25-29	44.1	42.14	86.24	52.47	46.23	98.7	52.47	46.23	98.7
30-34	38.78	38.67	77.45	46.88	45.13	92.01	46.88	45.13	92.01
35-39	34	31.23	65.23	42.43	40.97	83.4	42.43	40.97	83.4
40-44	29.22	27.27	56.49	36.88	36.7	73.58	36.88	36.7	73.58
45-49	23.38	20.32	43.7	31.84	29.44	61.28	31.84	29.44	61.28
50-54	19.66	18-Jan	38.5	26.35	24.88	51.23	26.35	24.88	51.23
55-59	14.34	13.88	28.22	20.33	18.34	38.67	20.33	18.34	38.67
60-64	13.28	13.39	26.67	15.82	16.1	31.92	15.82	16.1	31.92
65-69	9.03	9.42	18.45	10.8	11.11	21.91	10.81	11.11	21.92
70-74	6.38	6.45	12.83	8.74	9.47	18.21	8.74	9.47	18.21
75-79	3.19	2.97	6.16	4.89	5.4	10.29	4.88	5.39	10.27
80+	2.66	2.48	5.14	4.13	4.09	8.22	4.13	4.09	8.22
Total	532.89	494.27	1027.16	596.3	559.2	1155.5	601.01	563.71	1164.72

Table 4: Dependency ratio, GDP and selected agricultural statistics for the country, 2005 & 2010

Economic Indicators	Base year	2005			2010		
	2001	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Labor force (million)	337	380.13	380.13	380.13	436.07	436.07	436.07
% Change in labour force		13	13	13	29	29	29
Dependency ratio	.59	.52	.52	.52	.42	.43	.43
New job required	10.28	11.28	11.28	11.28	10.85	10.85	10.85
Child dependants in million	357	345.87	347.34	347.34	315.05	324.25	324.25
GDP in trillion	11.48	14.55	15.32	14.55	19.57	23.01	19.57
GDP per capita in Rs (1993-94 prices)	11181	13321	14003	13303	16935	19757	16802
% change in GDP per capita		19	25	19	51	77	50
Arable land per capita in hectare.	.12	.11	.11	.11	0.1	0.1	0.1
Production of major crop (MT) Thousands	195.9	244.5	244.53	244.53	322.63	322.63	322.63

Table 5: Projected primary and secondary school age population and requirement of teachers & schools in 2005 &2010

Educational Indicators	Base year	2005		2010	
	2001	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Children of Primary School Age (millions)	124.1	121	120.51	112	112.74
Primary Students (million)	101.64	108.46	108.39	111.87	112.74
Primary Schools (’000)	570.99	609.31	608.92	628.51	633.36
Primary Teachers (’000)	2364	2522	2521	2602	2622
Children of Secondary School Age (million)	86.6	98.9	98.9	98.09	98.06
Secondary students (million)	42.69	53.46	53.47	58.86	58.84
Secondary Schools (’000)	194.94	244.12	244.14	268.75	268.66
Secondary Teachers (’000)	1334	1671	1671	1839	1839

** *All the educational parameters are same in scenario 2 and 3*

Table 6: Requirement of Health infrastructure in India by 2005 & 2010

Health Indicators in 000s	Base year	2005		2010	
	2001	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Doctors	536.08	570.19	570.96	603.04	607.84
Nurse	761.96	18.45	811.54	857.13	863.96
Health Centers	168.71	179.45	179.69	189.79	191.3
Hospitals	48.33	51.4	51.47	54.36	54.8

** *All the health parameters are same in scenario 2 and 3*

Table 7: Family Planning projections for India, 2005 & 2010

Family Planning Indicators	Base year	2005		2010	
	2001	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Average Effectiveness	.98	.98	.98	.97	.97
Prevalence	42.54	42.80	41.49	42.96	39.40
Women of reproductive age (million)	253.32	282.19	282.19	313.77	313.77
Married women of reproductive age (million)	143.13	145.02	145.02	141.20	141.20
Users (million)	60.88	62.06	60.16	60.66	55.63
Commodities					
Condom	529.28	631.26	611.93	727.86	667.51
Female Sterilization	4.91	4.36	3.78	3.55	2.80
IUD	.78	.77	.72	.73	.64
Male sterilization	.48	.55	.50	.60	.50
Pill	43.54	62.89	60.96	84.61	77.60
Growth rates					
Condom	12.42	7.54	4.43	2.13	-1.48
Female Sterilization	.59	-5.16	-10.59	3.85	.19
IUD	13.51	4.36	.65	3.88	.24
Male sterilization	24.80	15.31	10.56	20.85	17
Pill	35.21	21.89	18.64	11.33	7.61

** *All the family planning parameters are same in scenario 2 and 3*

Table 8: Family Planning users by source for India, 2005 & 2010

Users (million)	Base Year	2005		2010	
	2001	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Condom					
Public	.67	.68	.66	.61	.56
Private	1.90	2.43	2.35	3.03	2.78
Others	1.83	2.15	2.09	2.43	2.23
Total	4.41	5.26	5.10	6.07	5.56
Female sterilization					
Public	41.65	37.91	36.75	31.84	29.20
Private	6.40	7.59	7.36	8.49	7.79
Others	.59	1.36	1.32	2.12	1.95
Total	48.63	46.86	45.42	42.46	38.94
I U D					
Public	1.23	1.10	1.07	.90	.82
Private	.98	1.06	1.03	1.12	1.03
Others	.06	.13	.13	.22	.21
Total	2.26	2.30	2.23	2.24	2.06
Male sterilization					
Public	2.39	2.93	2.84	3.40	3.12
Private	.24	.40	.39	.64	.58
Others	.05	.12	.11	.21	.19
Total	2.68	3.45	3.35	4.25	3.89
Pills					
Public	.62	1.06	1.03	1.69	1.55
Private	1.22	1.91	1.85	2.82	2.59
Others	1.07	1.22	1.18	1.13	1.03
Total	2.90	4.19	4.06	5.62	5.17

***Projected number of users in scenario 2 and 3 are same.*

Appendix 1:Assunptions on economic indicators for 2010

Indicators	Year & Source	Base year Value	Assumption for 2010
1.The LF participation rate (males 10-14)	NFHS II, 1998-99	7.6	Remains constant
2.The LF participation rate (males15-64)	NFHS II, 1998-99	78.9	Remains constant
3. The LF participation rate (Females10-14)	NFHS II, 1998-99	5.7	Remains constant
4.The LF participation rate (females15-64)	NFHS II, 1998-99	25.5	30 (Increased by 20 percent based on past trend
Base Year GDP in crore (93-94 prices)	Economic survey, 2001-02	Rs 1148400	Not Applicable
6.Annual growth rate of GDP	10th Five year plan 2002-07	6.1	1. 6.1 (average of 8th and 9th plan) 2. 7.93 percent till 2007 and 9.3 percent till 2010

Appendix 2:Assumptions on Agriculture indicators for 2010

Indicators	Year and Source	Base Year Value	Assumption for 2010
1.Arable land (MH)	Report of the Ministry of Agriculture, GOI, 2002	121.05	Remains constant
2. Base year production of major crops (Thousand MT)	Do	195.9	Not Applicable
3. Annual growth in production of major crop (%)	Do	5.7	Remains constant
4.Annual per capita consumption of major crop (KG)	Do	417	Remains constant

Appendix 3:Assumptions on Educational Indicators for 2010

Indicators	Year & Source	Base year Value	Assumption for 2010
1.Age of entry into primary school	Economic survey, 2001-02	6	Remains constant
2. Number of years of primary schooling	Do	5	Remains constant
3. Primary school attendance rate (%)	NFHS II, 1998-99	81.9	100
4. Students per primary teacher	Selected Educational Statistics, 2001	43	Remains constant
5. Students per primary school	Do	178	Remains constant
6. Recurrent expenditure per primary school student	Manpower Profile, 2001	614 (93-94 prices)	Remains constant
7. Age of entry into secondary school	Economic survey, 2001-02	14	Remains constant
8.Number of years of secondary schooling	Do	4	Remains constant
9. Secondary school attendance Rate (%)	NFHS II, 1998-99	49.3	60
10. Students per secondary school teacher	Selected educational statistics, 2001	32	Remains constant
11. Students per secondary school	Do	219	Remains constant
12. Recurrent expenditure per secondary school student	Manpower Profile, 2001	1418(93-94 prices)	Remains constant

Appendix 4: Assumptions on Health Indicators for 2010

Indicators	Year & Source	Base year Value	Assumption for 2010
1. Population per doctor	Health Information of India1997-98, July 2000	1916	Remains constant
2. Population per nurse	Do	1348*	Remains constant
3. Population per health center	Do	6088*	Remains constant
4. Population per hospital	Do	21253*	Remains constant
5. Population per hospital bed	Do	1451*	Remains constant
6. Annual health expenditure per person	Do	900	Remains constant

**Computed values*

Appendix 5: Assumptions on Family Planning Indicators for 2010

Indicators	Year and Source	Base Year Value	Assumption for 2010
Proximate Determinants	NFHS II 1998-99		
Percent of women 15-49 in union		56.5	45.0
Postpartum insusceptibility (months)		8.6	8.0
Unwanted pregnancy terminated/ induced abortion		1.7	3.0
Sterility (%)		3.8	3.0
Method Mix	NFHS II 1998-99		
Condom		7.2	10.0
Female sterilization		79.7	70.0
IUD		3.7	3.7
Male sterilization		4.4	7.0
Pill		4.9	9.3
Source Mix	NFHS II 1998-99		
Condom	NFHS II 1998-99		
Public		15.3	10.0
Private		43.1	50.0
Others		41.6	40.0
Female sterilization	NFHS II 1998-99		
Public		85.3	75.0
Private		13.1	20.0
Others		1.2	5.0
IUD	NFHS II 1998-99		
Public		54.1	40.0
Private		43.1	50.0
Others		2.5	10.0
Male sterilization	NFHS II 1998-99		
Public		88.6	80.0
Private		8.9	15.0
Others		2.0	5.0