

Studies in Population and Development

No.11-10
Birth Rate Trends in India: 1985-2007

Alok Ranjan Chaurasia

Birth Rate Trends in India: 1985-2007

A Decomposition Analysis

Alok Ranjan Chaurasia
'Shyam' Institute
Bhopal-462003
Madhya Pradesh, India

Abstract

Using the data available through the Sample Registration System, this paper analyses trends in the birth rate in India during 1985 through 2007 by using a decomposition methodology. The analysis reveals that the birth rate in India and in its states decreased almost monotonically throughout the period 1985 through 2007. However, the decrease in marital fertility stagnated after 1996 in the country as a whole and increased in a number of states. This stagnation and increase in the marital fertility has primarily been due to the increase in the fertility of married women below 25 years of age and is associated with the faltering of official family planning efforts after the introduction of the community needs assessment approach. In order to reinvigorate the official family planning efforts, there is a need to build up the planning and monitoring capacity at the local level and to evolve a couple based management information system that can help in addressing the family planning needs of the young married women.

Key words: India, birth rate, total fertility rate, total marital fertility rate, age specific marital fertility rate, age distribution of married females, contraceptive prevalence rate, couple protection rate.

Introduction

Reduction in the birth rate to curb population growth has been the prime policy concern in India since independence. This concern was instrumental for adopting a birth control policy and launching the first official birth limitation programme way back in 1950. It is difficult to say up to what extent official approach to reducing the birth rate has succeeded - government highlights achievements and success of the approach while critics number out shortcomings, failings and missed opportunities. It is however clear that the goals set for birth rate reduction could never be met. For example, a birth rate target of 25 live births per 1000 population was set in 1962 to be achieved in 1972. This target could be achieved 30 years later in 2002 only (Chaurasia and Gulati, 2008). An implication of the slow transition in birth rate in India is that the goal of population stabilisation remains elusive. Latest information suggests that the birth rate in India was more than 23 live births per 1000 population and the total fertility rate was 2.7 live births per woman of reproductive age in the year 2007 with wide rural urban gap and persistent inter-state differentials. A birth rate of around 23.1 live births per 1000 population per year along with a death rate of 7.4 deaths per 1000 population per year (Government of India, 2008) results in a rate of natural increase of 1.77 per cent per year which implies that the population of the country would double in a period of less than 40 years.

It is in the above context that we analyse, in this paper, the transition in fertility in India and in its constituent states during the 20 year period between 1985-87 through 2005-2007. The year 1985 marks the beginning of a gradual but significant shift in India's official approach towards birth control. This shift is characterised by increasing ascendancy of health concerns over demographic imperatives in planning and implementation of official birth reduction efforts. Prior to 1985, official efforts were specifically directed towards reducing birth rate, although there had been attempts to give a welfare orientation to these efforts way back in 1977. After 1985, issues related to the health of women and children started receiving a preference over issues related to birth control. Family planning, in this new wisdom, remained an integral component of child survival and safe motherhood strategies but its demographic rationale was relegated to a residual environment. This shift is clearly visible at least at the highest level of the policy. The Department of Family Welfare which was created within the Ministry of Health and Family Welfare of the Government of India way back in 1960s to specifically focus on the implementation of the birth control efforts has now been merged with the Department of Health while the National Family Welfare Programme is subsumed in the Reproductive and Child Health Programme and, now, is a part of the National Rural Health Mission launched in 2005 (Government of India, 2005).

Methodology

The methodology used in this analysis links fertility at the level of the population fertility to the individual fertility. At the level of the population, fertility is measured by the birth rate which in combination with the death rate determines the rate of natural increase. This implies that reduction in the birth rate has a direct impact on the rate of natural increase. Since, only women in the reproductive age group are biologically capable of producing births, the birth rate or the population fertility depends upon the fertility of individual women. The most commonly used measure of the individual fertility is the total fertility rate. In situations where births outside the institution of marriage are not socially recognised as is the case in India, total marital fertility rate is used as the measure of individual fertility in place of total fertility rate.

The relationship between population fertility (birth rate) and the individual fertility is not direct because population fertility is also influenced by the age structure of the population and patterns of marriage while fertility of married women is independent of these factors. As such, transition in population fertility may not be the same as the transition in the fertility of married women in the reproductive age group. This means that, while analysing fertility transition, transition in both population fertility (birth rate) and transition in individual fertility (total marital fertility rate) must be analysed. We follow this approach in this paper.

Let b denotes the birth rate, g denotes total marital fertility rate, f denotes general marital fertility rate and s denotes general fertility rate. Then, b may be written as

$$b = g * (f/g) * (s/f) * (b/s) \quad (1)$$

Notice that the ratio (b/s) is, by definition, equal to the proportion (p) of reproductive age women in the total population. Similarly, the ratio (s/f) is by definition the proportion (m) of married women among all women of reproductive ages. It remains to interpret the ratio (f/g) . To this end notice that g is the unweighted sum of the age specific marital fertility rates. If we divide g by 35, the reproductive life span then $a = g/35$ is the unweighted average age specific marital fertility rates, whereas f , by definition, is the weighted average of age specific marital fertility rates with weights equal to the number of married women in different ages of the reproductive period. Thus the two indicators g or, equivalently, a and f differ only by a weighing factor which reflects the age distribution of married females in the reproductive age group. The ratio f/g , or equivalently, f/a , therefore reflects the effect of the age distribution of married females in the reproductive age group on the birth rate. Since the ratios f/g and f/a differ only by a constant - the reproductive life span, we opt for the ratio f/a in place of the ratio f/g in equation (1) because the unit of measurement of all variables in the equation becomes the same. Thus

$$b = a * (f/a) * (s/f) * (b/s) \quad (2)$$

where $a = g/35$. Denoting (f/a) by d , (s/f) by m , and (b/s) , equation (2) can be written as

$$b = a * d * m * p \quad (3)$$

Following Kittagawa (1955) and Kim and Strobino (1984), change in the birth rate over time can now be decomposed as

$$\begin{aligned} \Delta b &= b_2 - b_1 \\ &= a_2 d_2 m_2 p_2 - a_1 d_1 m_1 p_1 \\ &= (a_2 - a_1) d_1 m_1 p_1 + (d_2 - d_1) a_1 m_1 p_1 + (m_2 - m_1) a_1 d_1 p_1 + (p_2 - p_1) a_1 d_1 m_1 + \\ &\quad (a_2 - a_1) (d_2 - d_1) m_1 p_1 + (a_2 - a_1) (m_2 - m_1) d_1 p_1 + (a_2 - a_1) (p_2 - p_1) d_1 m_1 + \\ &\quad (d_2 - d_1) (m_2 - m_1) a_1 p_1 + (d_2 - d_1) (p_2 - p_1) a_1 m_1 + (m_2 - m_1) (p_2 - p_1) a_1 d_1 + \\ &\quad (a_2 - a_1) (d_2 - d_1) (m_2 - m_1) p_1 + (a_2 - a_1) (d_2 - d_1) (p_2 - p_1) m_1 + \\ &\quad (d_2 - d_1) (m_2 - m_1) (p_2 - p_1) a_1 + (a_2 - a_1) (m_2 - m_1) (p_2 - p_1) d_1 + \\ &\quad (a_2 - a_1) (d_2 - d_1) (m_2 - m_1) (p_2 - p_1). \\ &= M_a + M_d + M_m + M_p + F_{ad} + F_{am} + F_{ap} + F_{dm} + F_{dp} + F_{mp} + \\ &\quad S_{adm} + S_{adp} + S_{dmp} + S_{amp} + T_{admp} \end{aligned} \quad (4)$$

where M stands for main effects and F, S and T stand respectively for first order, second order and third order interactions. Following the Goldfield's rule of "allocating interactions to various individual factors on the principle of equal distribution of all variables involved in each interaction" (Durand, 1948), the contribution of the change in the four components of the birth rate to the change in the birth rate can be estimated as

$$\Delta b = \Delta a + \Delta d + \Delta m + \Delta p \quad (5)$$

where

$$\Delta a = M_a + (F_{ad} + F_{am} + F_{ap})/2 + (S_{adm} + S_{adp} + S_{amp})/3 + T_{admp}/4 \quad (6)$$

$$\Delta d = M_d + (F_{ad} + F_{dm} + F_{dp})/2 + (S_{adm} + S_{adp} + S_{dmp})/3 + T_{admp}/4 \quad (7)$$

$$\Delta m = M_m + (F_{am} + F_{dm} + F_{mp})/2 + (S_{adm} + S_{amp} + S_{dmp})/3 + T_{admp}/4 \quad (8)$$

$$\Delta p = M_p + (F_{pd} + F_{pam} + F_{ap})/2 + (S_{adp} + S_{amp} + S_{dmp})/3 + T_{admp}/4 \quad (9)$$

Implicit in the above formulation is the assumption that the proportion of births outside the institution of marriage is too small to have any impact on the fertility of women. This is particularly the case in India as nearly all births in India are within the institution of marriage. In fact, marriage in India signals the beginning of socially recognised, sexually active, reproductive life. Sexual activity outside the institution of marriage is widely regarded as social taboo in the country and births outside the institution of marriage are termed as illegitimate births. However, in situations where births outside the institution of marriage are substantial, average fertility of married women needs to be replaced by average fertility of all women. Using fertility of all women, however, camouflages fertility impact of marriage which is important in the Indian context.

Data

The analysis is built upon annual estimates of different fertility indicators available through the Sample Registration System. Sample Registration System is the only source which provides annual estimates of different fertility indicators for India and for its major states since 1970. Estimates of fertility are also available through the National Family Health Survey carried out in 1992-93, 1998-99 and 2005-06 and have also been derived from children ever born data collected during the decennial population census using the indirect techniques. However, estimates based on the information available through the population census and through the National Family Health Survey are not available on an annual basis. Sample Registration System is the only source of information for estimating different indicators of fertility on an annual basis.

Estimates available through the Sample Registration System are generally believed to be quite accurate, although there is some under reporting of vital events under the system which varies from state to state. An investigation carried out in 1980-81 about the reliability of different demographic indicators derived through the Sample Registration System suggested an omission rate of 3.1 per cent for births at the all India level (Government of India, 1983). Another enquiry conducted in 1985 suggested that omission rate had decreased to 1.8 per cent for births, although omission rates varied from state to state (Government of India, 1988). Recently, Mari Bhat has estimated that the Sample Registration System has missed about 7 per cent of the births through the application of an indirect approach. Mari Bhat has also concluded that there has been no substantial change in the completeness of the reporting of births under the System, although some improvements in the accuracy of data appears to have taken place in some states of the country (Mari Bhat, 2002). These improvements might have resulted in a slight underestimation of the pace of fertility decline at the national level. However, the extent of improvement in birth reporting appears to be too small to have any significant impact on the medium term trend in the birth rate.

Estimates of demographic indicators available through the system are known to be associated with year-to-year fluctuations primarily due to non-sampling errors of unknown origin. Any analysis of the trend in demographic indicators available through the System, therefore, requires elimination of these year-to-year random fluctuations. The normal practice that is used to minimise these annual random fluctuations of unknown origin is to use three-year moving averages, centred at the middle year of the three-year period, instead of annual estimates. The same practice has been adopted in this paper too. For example, the estimate of birth rate for the year 1986 is actually the un-weighted average of birth rates for the years 1985, 1986 and 1987.

Fertility Transition in India

The latest information available through the Sample Registration System suggests that the population fertility (birth rate) in India was 23 live births per 1000 population around the year 2006 (2005-07) while the individual fertility (total marital fertility) was around 4.4 live births per married woman (Government of India, 2008a). This means that married couples, in India, still have, on average, more than 4 live births during their entire reproductive period. An implication of high individual fertility is that the total fertility rate in India still remains well above the replacement level (Table 1).

Within country variations in population fertility and individual fertility are remarkable. Population fertility (birth rate) varies from a high of 30 per 1000 population in Uttar Pradesh to a low of less than 15 per 1000 population in Kerala. Similarly, the total fertility rate varies from a high of 4.1 live births per woman in Uttar Pradesh to 1.7 live births per woman in Kerala and Tamil Nadu. There are four states - Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh - where birth rate is still more than 28 live births per 1000 population while the total fertility rate is 3.5 live births per woman and above. Although, 6 states of India appear to have achieved the goal of replacement fertility by the year 2006, yet in none of the states, the total marital fertility rate has been found to be less than 3.5 live births per woman. Obviously the goal of *Hum Do Hamare Do* coined to promote fertility regulation under the National Family Programme remains a distant dream and the official family planning efforts have only a limited impact on fertility behaviour of couples, on average.

In order to analyse the transition in fertility in India, we have analysed the trend in population fertility (crude birth rate) as well as in individual fertility (total marital fertility rate or, equivalently, unweighted average marital fertility rate). The trend analysis has been carried out through the application of the piecewise linear regression analysis technique (Gujarati, 1988). The piecewise regression model allows for changes in slope, with the restriction that the line being estimated be continuous; that is, it consists of two or more straight line segments. For analysing the transition in the crude birth rate and in the total marital fertility rate or, equivalently, unweighted average marital fertility rate, we have divided the twenty-year period 1986 through 2006 into four sub-periods: 1986-1991, 1991-1996, 1996-2001, and 2001-2006.

The results of the analysis are summarised in table 1 for the country as a whole as well as separately for the rural and urban areas. Two observations can be made from the table. First, the rate of decrease in population fertility (measured in terms of b) appears to have slowed down over time for India as a whole as well as for its rural and urban areas as the decline in population fertility (b) has been most rapid during the period 1986-91. Second, and more revealing, observation is that the decrease in the total marital fertility rate or,

equivalently, unweighted average marital fertility rate appears to have reversed during the period 1996-2001, after the discontinuation of the target-based approach of the implementation of the official family planning programme and introduction of the target free or community needs assessment-based approach of programme implementation (Figure 1). It was only after 2001, that the total marital fertility rate or, equivalently, unweighted average marital fertility rate in the country started decreasing again.

It may also be seen from table 1 that during the period 1986-1991 and the period 2001-2006, the rate of decrease in population fertility (*b*) was faster than the rate of decrease in individual fertility (*g* or, equivalently, *a*). However, during the period 1991-96 the decrease in individual fertility was more rapid than the decrease in population fertility. This means that during the period 1986-1991 and the period 2001-2006, changes in the age structure of the population and changes in the matters of marriage contributed towards accelerating the decrease in population fertility at the given level of individual fertility. However, during the period 1991 through 2001, changes in these factors contributed towards retarding the decrease in population fertility at a given level of individual fertility. Changes in the age structure of the population, especially, age distribution of married females in the reproductive age group is the result of transition in fertility in the past. On the other hand, changes in patterns of marriage are primarily induced by changes in the levels of social and economic development.

Among the major states of India, the transition in population fertility has been different from the transition in individual fertility. The most revealing observation, however, is that in 11 of the 15 states of India, individual fertility, married in terms of total marital fertility rate or, equivalently, unweighted average marital fertility rate increased after the introduction of the target free or community needs assessment approach of the implementation of the official family welfare programme. The four states where the total fertility rate continued to decrease even after the introduction of the community needs assessment approach are Kerala, Maharashtra, Orissa and Rajasthan, although, in Rajasthan the decrease slowed down considerably (Table 2). It is also evident from the table that there had been little congruence in the trend in the population fertility (*b*) as compared to the trend in the individual fertility (*g* or, equivalently *a*). This shows that the impact of age structure and marriage patterns on population fertility at a given level of individual fertility has varied across the states. This is expected because different states of the country are at different stages of fertility transition as well as at different levels of social and economic development.

It is evident from the analysis that the five-year period immediately after the introduction of the target free or the community needs assessment approach

in India was a period of setback for the official family welfare programme in India and in most of the states in terms of the increase in the total marital fertility rate or, equivalently, unweighted average marital fertility rate. However, despite this setback, fertility, at the level of the population, could continue to decrease because of some positive changes in the age distribution of married females in the reproductive age group and in the patterns of marriage. The very fact that the fertility of married women in the reproductive age group increased during this period suggests that changes in the use of family planning methods appear to have contributed little to population control efforts in the country and in most of its states.

The foregoing analysis also suggests that the decrease in population fertility (*b*) in India and in its most of the states after the introduction of the target-free or community needs assessment approach has been the result of the changes in the age distribution of the population and changes in the patterns of marriage of females in the reproductive age group. Changes in the age structure of the population are captured through changes in terms of the fertility impact of the change in the age distribution of married females in the reproductive age group and the change in the proportion of reproductive age females to total population. These changes are induced by the change in fertility in the past. The magnitude and direction of these changes on the change in population fertility can be analysed through the decomposition analysis, results of which are discussed in the next section.

Decomposition of Change in Population Fertility

Table 3 decomposes the change in population fertility (*b*) into changes in its four demographic determinants - individual fertility (*a*), age distribution of married females in the reproductive age group (*d*), proportion of married females to all females in the reproductive age group (*m*), and proportion of reproductive age females to the total population (*p*). Between 1986 and 2006, the population fertility (*b*) in the country decreased by around 9 births per 1000 population. Decrease in the individual fertility (*a*) has been the primary contributor to the observed decrease in population fertility during the 20 years under reference. It accounted for around 6.7 of the decrease of 9 births per 1000 population observed in population fertility between 1986 and 2006. On the other hand, the change in the age distribution of married females in reproductive age group (*d*) accounted for about 2.5 of these births; the change in the proportion of married females to all females in the reproductive age group (*m*) accounted for about 1.6 per cent of these births but the change in the proportion of reproductive age females in the population contributed to an increase, not decrease, of about 1.6 births per 1000 population during this period. A similar pattern may also be seen in rural and urban areas of the

country. Obviously, the decrease in the fertility of married women has been the prime contributor to the decrease in population fertility in India during the period under reference. This is expected, as official efforts to reduce population fertility in the country have always been directed towards regulating the fertility of married women in the reproductive age group. There has also been some emphasis on increasing the age at marriage of females and males which would have an impact on the reduction in population fertility but the contribution of these efforts has, at best, been small as may be seen from table 3.

However, the contribution of the change in the four components of population fertility to the change in population fertility has not been the same in different five-year periods (Figure 2). The most important observation of table 3 in this regard is that the contribution of the change in individual fertility (*a*) to the change in population fertility (*b*) was zero during the period 1996-2001 in the combined population as well as in the rural population of the country. In the urban population, on the other hand, this contribution was in opposite direction. It contributed to an increase, not decrease, in population fertility. The contribution of the change in the proportion of reproductive age females to the total population to the population fertility was also in the opposite direction. As the result, the decrease in the population fertility during the five-year period immediately after the introduction of the target-free approach was entirely due to the change in the age distribution of married females in the reproductive age group (*d*) and the proportion of married females to all females in the reproductive age group (*m*).

The decomposition of the change in population fertility in the constituent states of India is given in table 4. Perhaps, the most striking observation of the table is that every state has its own pattern of transition in fertility during the 20 years between 1986 through 2006. This is expected as the constituent states of India differ not only in terms of the level and speed of transition in fertility but also in terms of a host of social, economic and cultural variables that have a strong impact on family size desires and efficiency of fertility regulation services. In any case, one policy implication of table 4 is that a national approach to fertility regulation and population control appears largely irrelevant to India.

Another important observation of table 4 is that, in a number of states, the contribution of change in individual fertility was opposite to the change in population fertility during the period 1996-2001. These are the states where decrease in individual fertility either stalled or reversed immediately after the introduction of target-free or community needs assessment approach of the implementation of official family planning programme. In these states, the decrease in population fertility during the period 1996-2001 was not the result of the decrease in individual fertility. Rather, it was the result of changes in the

age structure of the population and proportion of married females in reproductive ages. Even in all but two of those states where individual fertility decreased during the period 1996-2001, the contribution of the change in factors other than individual fertility was higher than the contribution of the change in individual fertility to the population fertility. The two states where contribution of individual fertility was higher than the contribution of other factors are Kerala and Maharashtra. Among these, Kerala is already having very low levels of population fertility.

It may also be seen from table 4 that the change in individual fertility has generally been less than the change in the population fertility. This implies that factors other than individual fertility appear to have also contributed towards accelerating the pace of decline in population fertility in India. Out of the 60 observations (4 observations per state for 15 states) in table 4, the change in population fertility has been larger than the change in individual fertility. More specifically, change in the age distribution of married females in the reproductive age group and the change in the proportion of married females in reproductive age females have generally contributed towards hastening the pace of change in population fertility compared to individual fertility. The change in these two components of population fertility has also compensated for the change in the proportion of reproductive age females to the total population which has generally been opposite to the change in population fertility. Obviously, the decrease in population fertility in the country has not been the result of the decrease in individual fertility only.

Stalling of Individual Fertility Decline

The foregoing analysis indicates that the decrease in individual fertility (measured in terms of total marital fertility rate or, equivalently, unweighted average marital fertility rate) in India and in a number of states virtually stalled after the introduction of the target-free or community needs assessment approach. The reason for the stalling of individual fertility may be explored by analysing the change in the age specific marital fertility rates during the period 1996-2001. Estimates available through the Sample Registration System suggests that during the period 1996-2001, fertility of married women aged 15-24 years in India increased while that of married women aged 25 years and above decreased. It is also evident from table 5 that the total increase in the fertility of married women aged 15-24 years was marginally higher than the total decrease in the fertility of married women aged 25-49 years in so that individual fertility in India increased marginally during the period 1996-2001. A similar situation prevailed in 9 of the 15 major states included in this analysis. On the other hand in Rajasthan and West Bengal, fertility of married women aged 15-24 years also increased but this increase was less than the

decrease in the fertility of married women aged 25-49 years so that in both the states, the fertility of married women aged 15-49 years recorded a decrease. This leaves only three states Kerala, Maharashtra and Orissa where fertility of married women decrease in all ages of the reproductive period. Even during the period 2001-06, fertility of married women aged 15-19 years increased in India and in 9 of its states but in the remaining ages of the reproductive period, the fertility of married women decreased so that all states except Kerala recorded a decrease in the fertility of married women in the reproductive age group.

The differing trend in the age specific marital fertility rates can be explained in terms of the trends in the determinants of marital fertility. Within the institution of marriage, three factors primarily regulate fertility. The first is the practice of contraception to either space or limits births, the second is avoiding an unwanted pregnancy through induced abortion while the third is fertility inhibiting effects of breastfeeding (Bongaarts, 1978). Among the three main determinants of marital fertility, practice of family planning is regarded as the most important one. The importance of family planning in determining marital fertility in India also lies in the fact that the official family planning efforts in India primarily focus on the promotion of family planning to regulate fertility of married women. Many empirical studies have suggested that there exists a strong linear relationship between the contraceptive prevalence rate and the total fertility rate that explains between 72-91 per cent of the variations in the total fertility rate across countries (Bongaarts, 1984; Mauldin and Segal, 1988; Nortman, 1985; Pritchett, 1994; Srikantan and Balasubramaniam, 1988; United Nations, 1979; Westoff, 1990; Westoff and Bankole, 2001; World Bank, 1993). Bongaarts and Kirmeyer (1980) have however observed that contraceptive prevalence has relatively less impact on fertility of married women than fertility of all women because populations with high contraceptive prevalence rate tend to have relatively higher female age at first marriage and more marital disruption. In India, it has been observed that when the state is taken as the unit of analysis, the relationship between the level of fertility and the extent of family planning use is not so strong (Srinivasan, 1988). Srinivasan has also argued that as one goes down the level of aggregation, family planning use explains less and less variation in the level of fertility and, at the micro level or at the level of individual couple, use of family planning explains only a small proportion of variance in completed fertility among couples. For example, using the development block as the unit of analysis, the inter-block variations in contraceptive prevalence rate accounted for only about 20 per cent of inter-block variations in the total marital fertility rate in Madhya Pradesh (Chaurasia, 2004). Similarly, using the individual level data, it has been found that the number of children ever born are positively, not negatively related with the use of family planning methods (Chaurasia and Deolalikar, 2007).

Reasons for stalling and even increase in the fertility of married women during the period 1996-2001 in India and in many of its constituent states, therefore, need to be analysed in the context of trends in the three proximate determinants of fertility of married women. Unfortunately, information necessary to analyse this trend and to explore the relationship between the change in the proximate determinants of marital fertility and the change in marital fertility does not exist. However, in the context of family planning, it appears that the quality of family planning services is poor and its efficiency is low. The issue of quality of family planning services is particularly important in the Indian context as the official family planning programme in India which continues to be the mainstay of fertility reduction efforts, is known for its camp-based approach of implementation and bias towards terminal methods of contraception like sterilisation. The camp approach is most suited to methods like female and male sterilisation which require limited contact and little follow-up. This approach does not suite methods like IUD, condom and oral pill which require regular supplies and regular contacts with the beneficiaries. In fact, meeting the family planning needs of young couples has always been a challenging preposition in India's efforts towards fertility reduction and population control. The biasedness of India's family planning programme towards terminal methods of contraception - female and male sterilisation - has resulted in a focus on the older couples - couples who have achieved their fertility goals - at the cost of younger couples who are in the process of family formation. For the young couples, the concern is not birth limitation but proper spacing between successive births.

Because of the preoccupation of the official family planning programme with limiting, not spacing, births, the programme appears to have evolved a wrong orientation. There is a wide gap in the prevalence of contraception in older couples - couples with wife 30 years and older - and young couples - couples with wife 30 years and younger. It has been argued that family planning will have maximum impact on fertility when it is focussed on highly fecund women - in the reproductive age group (Srinivasan and Freymann, 1990). Women 30 years and older have normally passed their prime fertility period. It is clear that family planning in India is largely used for fertility limitation rather than fertility regulation.

Maharashtra and Orissa are the only two states in India, where fertility of married women aged 15-24 years decreased even after the introduction of the target-free or community needs assessment approach leading to an acceleration in the decrease in the fertility of married women in reproductive age group. What contributed to the decrease in the fertility of young married women in these states is not known at present. This is an issue which needs further exploration.

Conclusions

The good sign is that population fertility (measured in terms of birth rate) is decreasing in India and in its constituent states. However, the bad omen is that individual fertility (measured in terms of total marital fertility rate or unweighted average marital fertility rate) remains high and the decline in the individual fertility stalled in the country and increased in many states in the five years following the introduction of the target free or community needs assessment approach. At the national level, a married couple still have, on average, more than 4 live births and in at least three states, this number is still more than 5. Even in those states where replacement fertility is achieved, the fertility of married couples remain more than 3 live births indicating that 'beyond family planning factors' have played a major role in achieving replacement fertility in these states.

The observed high to very high fertility of married couples in India and in its constituent states is a reflection of the poor performance of official family planning programme which continue to be the mainstay of fertility reduction efforts in India right since independence. The programme coined the slogan of *Hum Do hamare Do* but it is clear from the trend in the fertility of married couples that realisation of this slogan still remains a distant dream. The situation appears to have worsened after the introduction of the target-free or community needs assessment approach.

The success of the target-free or the community needs assessment approach of family planning services delivery is critically dependent upon objectively assessing the family planning needs of couples and then meeting these needs through the provision of quality family planning services. It appears that after the introduction of the community needs approach, the programme could not objectively assess the family planning needs of younger couples. As the result, the family planning needs of the younger couples could not be met which resulted in an increase in their fertility. After 2001, there has been some let up in the situation but the trend in the age specific marital fertility rates clearly indicates that the family planning needs of couples 15-19 years of age largely remain unmet.

Regulating fertility of married women below 25 years of age appears critical to decreasing marital fertility in India. The official family planning programme need to orient itself to meeting the fertility regulation needs of young couples. There is possible only by building local capacity for need-based planning and beneficiary-centred delivery of family planning services. The grass roots level family planning services providers develop the capacity of assessing and addressing the family planning needs of individual couples. This is a challenging task as family planning needs not only vary from couple to couple but are very dynamic in nature. Grass roots level family planning

services providers have traditionally been entrusted with the task of family planning services delivery only. They have little capacity, skills and orientation to carry out local level planning which, obviously, is technical in nature and intensive in scope. The challenge is to transform these minimally trained service providers into grass-roots family planning managers who can bear the responsibility of planning, monitoring and evaluation functions in addition to the delivery of family planning services delivery.

There is also a need to evolve an alternative system of monitoring and evaluation that is tailored to the community needs assessment approach. Although, it is now more than 10 years since the target-free or community needs assessment approach was introduced, yet there has been little attempt in evolving a monitoring and evaluation system tailored to community needs assessment approach. Monitoring continues to be the number game with the word 'target' replaced by the term 'expected level of achievement.' Issues related to the quality of family planning services remain grossly neglected. At the same time, evaluation of fertility reduction efforts remains an isolated activity with virtually no link to planning, implementation and monitoring of family planning services delivery, especially at the grass roots level. A more effective approach is to establish a grass roots level family planning management information system which can provide information not only for planning for family planning services delivery but also for monitoring the progress of activities and evaluating the impact.

Last but not the least, birth rate reduction efforts, especially, family planning, should be perceived in a broader development perspective and not just as an intervention. Efforts to reduce birth rate, need to be integrated with broader development processes, especially in states where high birth rate and high marital fertility continue to persist. To institutionalise this integration, a 'lens and mirror' mechanism should be in place. Every development activity should be viewed through a population 'lens' while birth rate reduction efforts should have reflections in the development 'mirror.' The challenge is to define the 'population lens' and the 'development mirror' as both are sensitive to social, cultural, family and individual factors. Probably and so obviously, they can best be defined in the local context but this makes the job of grass roots level service providers even more complex and daunting.

References

- Bongaarts J (1978) A framework for analysing the proximate determinants of fertility. *Population and Development Review*, 4:105-132.
- Bongaarts J (1984) Implications of future fertility trends for contraceptive practice. *Population and Development Review*, 10:341-352.

- Bongaarts J, Kirmeyer S (1980) Estimating the impact of contraceptive prevalence on fertility: Aggregate and age-specific versions of a model. Working Paper No. 63. New York, The Population Council. Centre for Policy Studies.
- Chaurasia Alok Ranjan (2004) Fertility in the development blocks of Madhya Pradesh: An analysis of the impact of contraceptive use. *Social Change*, 34 (2): 26-39.
- (Chaurasia) Alok Ranjan, Deolalikar Anil (2007) The institutional context of fertility in Madhya Pradesh, India. *Demography India*, 36(1):55-72.
- Chaurasia Alok Ranjan, Gulati SC (2008) *India: The State of Population 2007*. New Delhi, Oxford University Press.
- Curtis SL, Diamond I (1995) When fertility seems too high for contraceptive prevalence: An analysis of Northeast Brazil. *International Family Planning Perspectives*, 21:58-63.
- Durand JD (1948) *The Labour Force in the United States: 1890-1960. Appendix B: Methods of Analyzing Labour Force Change*. New York, Social Science Research Council.
- Government of India (1983) Report on intensive enquiry conducted in a sub-sample of SRS units (1980-81). Occasional Paper No. 2 of 1983. New Delhi, Registrar General.
- Government of India (1988) Report on intensive enquiry conducted in a sub-sample of SRS units. Occasional Paper 1 of 1988. New Delhi, Registrar General.
- Government of India (2005) *National Rural Health Mission*. New Delhi, Ministry of Health and Family Welfare.
- Government of India (2008) *SRS Bulletin*, 43(1). New Delhi, Office of the Registrar General. Sample Registration System.
- Government of India (2008a) *Sample Registration System Statistics Report 2006*. New Delhi, Office of the Registrar General.
- Gujarati DN (1988) *Basic Econometrics*. New York, McGraw-Hill Book Company.
- Kim YJ, Strobino DM (1984) Decomposition of the difference between two rates with hierarchical factors. *Demography*, 21(3):361-72.
- Kittagawa EM (1955) Components of the difference between two rates. *Journal of American Statistical Association*, 50: 1168-1194.
- Mari Bhat, PN (2002) Completeness of India's Sample Registration System. An assessment using the general growth balance method. *Population Studies*, 56(2):119-134.
- Mauldin WP, Segal SJ (1988) Prevalence of contraceptive use: Trends and issues. *Studies in Family Planning*, 19:335-353.

- Nortman DL (1985) *Population and Family Planning Programme: A Compendium of Data through 1980*. New York, Population Council.
- Pritchett LH (1994) Desired fertility and impact of population policies. *Population and Development Review*, 20:1-55.
- Srikantan KS, Balasubramaniam K (1988) *Factors Underlying Stalling of Birth Rate Decline in India*. Pune, Gokhale Institute of Politics and Economics.
- Srinivasan K (1988) Modernisation, contraception and fertility change in India. *International Family Planning Perspective*, 14(3).
- Srinivasan K, Freymann MW (1990) Need for reorientation of family planning programme strategies in developing countries: A case for birth-based approach. In K Srinivasan and KB Pathak (eds) *Dynamics of Population and Family Welfare*, 1989. Mumbai, Himalaya Publishing House.
- United Nations (1979) *Economic and Social Survey of Asia and Pacific, 1978*. Bangkok, Economic and Social Commission for Asia and Pacific.
- Westoff CF (1990) Reproductive intentions and fertility rates. *International Family Planning Perspectives*, 16:84-96.
- Westoff CE, Bankole A (2001) The contraception-fertility link in sub-Saharan Africa and other developing countries. *DHS Analytical Studies No. 4*, Maryland, ORC Macro.
- World Bank (1993) *Effective Family Planning Programs*. Washington DC, The World Bank.

Table 1: Levels of population fertility and individual fertility in India and states, 2005-07.

India/States	Crude birth rate	Total fertility rate	Unweighted average fertility per woman per year	Total marital fertility rate	Unweighted average fertility per women
India	23.5	2.8	80	4.4	125
Andhra Pradesh	18.9	2.0	56	3.4	97
Assam	24.6	2.8	79	5.4	155
Bihar	29.9	4.1	118	5.1	147
Gujarat	23.4	2.7	77	4.0	115
Haryana	23.9	2.7	77	4.4	125
Karnataka	20.2	2.1	61	4.0	114
Kerala	14.9	1.7	49	4.1	116
Madhya Pradesh	29.0	3.5	100	4.9	139
Maharashtra	18.5	2.1	60	3.5	100
Orissa	21.9	2.5	71	4.2	121
Punjab	17.8	2.1	59	4.1	118
Rajasthan	28.3	3.5	101	4.6	131
Tamil Nadu	16.2	1.7	48	3.9	112
Uttar Pradesh	30.0	4.1	117	5.6	161
West Bengal	18.4	2.0	57	3.5	100

Source: Sample Registration System

Table 2: Trend rate of decrease in the crude birth rate and total marital fertility rate India: 1986-2006.

Country/ State	Fertility indicator	1986-91	1991-96	1996-2001	2001-06
India	CBR	-1.918	-1.369	-1.175	-1.175
	TMFR	-1.539	-1.858	0.183	-1.687
India (Rural)	CBR	-1.793	-1.109	-1.687	-1.336
	TMFR	-1.619	-1.512	0.160	-1.696
India (Urban)	CBR	-2.620	-1.918	-1.597	-1.514
	TMFR	-1.929	-2.223	0.465	-1.932

Source: Author's calculations

Table 3: Trend rate of decrease in the crude birth rate and total marital fertility rate in Indian states: 1986-2006.

Country/ State	Fertility indicator	1986-91	1991-96	1996-2001	2001-06
Andhra Pradesh	<i>b</i>	-3.695	-1.702	-1.941	-2.229
	<i>g</i>	-3.050	-3.481	0.618	-1.274
Assam	<i>b</i>	-2.364	-1.037	-1.401	-1.626
	<i>g</i>	-1.867	-1.145	0.336	-2.683
Bihar	<i>b</i>	-3.189	-0.076	-.0468	-0.881
	<i>g</i>	-2.514	-1.163	1.222	-1.887
Gujarat	<i>b</i>	-2.150	-1.611	-0.825	-1.207
	<i>g</i>	-2.022	-1.944	0.664	-0.667
Haryana	<i>b</i>	-1.426	-2.547	-1.492	-2.072
	<i>g</i>	-1.353	-2.094	0.041	-0.693
Karnataka	<i>b</i>	-1.403	-3.339	-0.833	-1.649
	<i>g</i>	-1.608	-3.160	0.613	-1.747
Kerala	<i>b</i>	-4.270	-0.343	-0.279	-3.644
	<i>g</i>	-4.482	-0.195	-1.096	3.343
Madhya Pradesh	<i>b</i>	-0.777	-2.203	-0.181	-1.151
	<i>g</i>	-0.694	-1.684	0.916	-1.831
Maharashtra	<i>b</i>	-2.360	-2.365	-2.737	-2.030
	<i>g</i>	-2.519	-0.941	-1.879	-1.409
Orissa	<i>b</i>	-2.123	-1.375	-2.695	-1.338
	<i>g</i>	-1.891	-0.891	-1.356	-0.898
Punjab	<i>b</i>	-0.738	-3.014	-2.195	-3.409
	<i>g</i>	-1.276	-1.933	1.939	-4.039
Rajasthan	<i>b</i>	-0.781	-0.939	-1.107	-1.784
	<i>g</i>	-0.739	-1.719	-0.212	-1.507

Country/ State	Fertility indicator	1986-91	1991-96	1996-2001	2001-06
Tamil Nadu	<i>b</i>	-3.047	-1.606	-0.131	-3.362
	<i>g</i>	-2.514	-2.509	1.646	-.0795
Uttar Pradesh	<i>b</i>	-0.775	-1.184	-1.288	-1.264
	<i>g</i>	-0.091	-1.469	0.776	-1.695
West Bengal	<i>b</i>	-2.238	-3.209	-2.120	-1.951
	<i>g</i>	-2.115	-3.773	0.009	-2.928

Source: Author's calculations

Table 4: Decomposition of the change (per 1000) in the birth rate in India: 1985-2006.

State	Period	Δb	Δa	Δd	Δm	Δp
Total	1986-1991	-2.93	-2.33	-0.76	-0.73	0.89
	1991-1996	-1.97	-2.53	0.29	0.42	-0.14
	1996-2001	-2.27	0	-2.03	1.29	1.06
	2001-2006	-1.93	-1.80	0.04	0	-0.18
	<i>1986-2006</i>	<i>-9.10</i>	<i>-6.65</i>	<i>-2.46</i>	<i>-1.61</i>	<i>1.63</i>
	Rural	1986-1991	-2.90	-2.58	-0.32	-0.83
1991-1996		-1.77	-2.18	0.17	0.53	-0.29
1996-2001		-2.30	0	-1.99	-1.39	1.06
2001-2006		-1.93	-2.03	0.56	-0.10	-0.36
<i>1986-2006</i>		<i>-8.90</i>	<i>-6.79</i>	<i>-1.58</i>	<i>-1.79</i>	<i>1.26</i>
Urban		1986-1991	-3.50	-2.30	-1.52	-0.51
	1991-1996	-2.10	-2.44	-0.27	0.18	0.43
	1996-2001	-1.60	0.17	-1.74	-0.76	0.73
	2001-2006	-1.50	-1.62	-0.18	0.34	-0.04
	<i>1986-2006</i>	<i>-8.70</i>	<i>-6.19</i>	<i>-3.71</i>	<i>-0.75</i>	<i>1.95</i>

Source: Author's calculations based on SRS data.

Table 5: Decomposition of the change in birth rate (per 1000 population) in Indian states, 1986-2006.

State	Period	Δb	Δa	Δd	Δm	Δp
Andhra Pradesh	1986-1991	-5.00	-4.29	-0.77	-0.83	0.89
	1991-1996	-2.43	-4.18	0.43	0.96	0.35
	1996-2001	-2.17	0.41	-2.68	-0.94	1.05
	2001-2006	-2.10	-1.32	-0.75	-0.56	0.54
	<i>1986-2006</i>	<i>-11.70</i>	<i>-9.38</i>	<i>-3.77</i>	<i>-1.37</i>	<i>2.83</i>
Assam	1986-1991	-3.93	-3.1	-1	0.03	0.14
	1991-1996	-2.10	-1.6	-0.78	1.49	-1.21
	1996-2001	-1.53	0.31	-2.97	-0.79	1.92
	2001-2006	-2.20	-2.69	0.6	0.53	-0.63
	<i>1986-2006</i>	<i>-9.76</i>	<i>-7.09</i>	<i>-4.15</i>	<i>1.26</i>	<i>0.21</i>
Bihar	1986-1991	-5.00	-3.73	-0.39	-1.7	0.82
	1991-1996	-0.00	-1.38	0.99	0.42	-0.03
	1996-2001	-0.63	1.36	-1.51	-1.34	0.85
	2001-2006	-1.43	-2.3	2	0.71	-1.84
	<i>1986-2006</i>	<i>-7.07</i>	<i>-6.04</i>	<i>1.09</i>	<i>-1.91</i>	<i>-0.21</i>
Gujarat	1986-1991	-3.60	-3.22	-0.91	-0.44	0.97
	1991-1996	-2.40	-2.57	-0.29	0.21	0.25
	1996-2001	-1.03	0.62	-1.71	-0.64	0.7
	2001-2006	-1.57	-0.59	-1.07	0.64	-0.55
	<i>1986-2006</i>	<i>-8.60</i>	<i>-5.76</i>	<i>-3.99</i>	<i>-0.22</i>	<i>1.37</i>
Haryana	1986-1991	-2.83	-2.75	-0.75	-0.46	1.12
	1991-1996	-3.33	-2.94	-0.28	0.2	-0.31
	1996-2001	-2.23	-0.2	-2.6	-1.28	1.85
	2001-2006	-2.90	-1.32	-1.38	-0.51	0.3
	<i>1986-2006</i>	<i>-11.30</i>	<i>-7.21</i>	<i>-5.01</i>	<i>-2.05</i>	<i>2.97</i>
Karnataka	1986-1991	-2.10	-2.21	-0.7	0.64	0.16
	1991-1996	-3.80	-3.28	-1.36	0.19	0.66
	1996-2001	-1.17	0	-1.61	-0.53	0.97
	2001-2006	-1.90	-1.53	-0.37	0	-0.01
	<i>1986-2006</i>	<i>-8.97</i>	<i>-7.02</i>	<i>-4.04</i>	<i>0.31</i>	<i>1.78</i>
Kerala	1986-1991	-3.97	-3.85	-1	0.57	0.31
	1991-1996	-0.57	-0.48	-1.55	0.97	0.5
	1996-2001	-0.60	-0.96	-0.31	0.66	0.01
	2001-2006	-2.50	2.13	-4.21	0.13	-0.55
	<i>1986-2006</i>	<i>-7.63</i>	<i>-3.16</i>	<i>-7.08</i>	<i>2.34</i>	<i>0.27</i>

State	Period	Δb	Δa	Δd	Δm	Δp
Madhya Pradesh	1986-1991	-1.73	-1.49	-0.4	-0.96	1.11
	1991-1996	-3.47	-2.95	0.14	-0.21	-0.45
	1996-2001	-1.53	1.01	-2.04	-1.55	1.05
	2001-2006	-1.93	-2.74	1.14	-0.4	0.07
	<i>1986-2006</i>	<i>-8.67</i>	<i>-6.18</i>	<i>-1.15</i>	<i>-3.11</i>	<i>1.79</i>
Maharashtra	1986-1991	-3.00	-3.04	0.03	-0.38	0.39
	1991-1996	-2.67	-0.98	-1.32	-0.11	-0.25
	1996-2001	-3.00	-2.04	-1.08	-0.74	0.86
	2001-2006	-2.13	-1.61	-0.48	-0.2	0.16
	<i>1986-2006</i>	<i>-10.80</i>	<i>-7.67</i>	<i>-2.85</i>	<i>-1.44</i>	<i>1.16</i>
Orissa	1986-1991	-2.53	-2.33	-0.71	-1.21	1.72
	1991-1996	-1.77	-1.35	-0.14	0.34	-0.62
	1996-2001	-3.43	-1.47	-1.85	-1.2	1.09
	2001-2006	-1.77	-1.22	-0.46	0.05	-0.14
	<i>1986-2006</i>	<i>-9.50</i>	<i>-6.37</i>	<i>-3.16</i>	<i>-2.01</i>	<i>2.04</i>
Punjab	1986-1991	-1.17	-1.1	-0.55	0.25	0.23
	1991-1996	-3.57	-2.32	-1.64	-0.21	0.61
	1996-2001	-2.70	1.44	-4.33	-0.8	1
	2001-2006	-3.37	-3.18	0.11	0.08	-0.38
	<i>1986-2006</i>	<i>-10.80</i>	<i>-5.16</i>	<i>-6.41</i>	<i>-0.68</i>	<i>1.46</i>
Rajasthan	1986-1991	-2.57	-2.35	-0.54	-1.45	1.78
	1991-1996	-1.90	-3.03	0.96	0.34	-0.17
	1996-2001	-1.57	-0.43	-1.09	-1.17	1.13
	2001-2006	-2.77	-1.67	0.38	-0.8	-0.67
	<i>1986-2006</i>	<i>-8.80</i>	<i>-7.49</i>	<i>-0.3</i>	<i>-3.08</i>	<i>2.06</i>
Tamil Nadu	1986-1991	-3.13	-2.36	-0.78	-0.35	0.36
	1991-1996	-1.43	-2.19	-0.21	0.4	0.57
	1996-2001	-0.63	1.15	-1.76	-0.29	0.27
	2001-2006	-2.80	-0.44	-2.03	-0.44	0.11
	<i>1986-2006</i>	<i>-8.00</i>	<i>-3.84</i>	<i>-4.78</i>	<i>-0.69</i>	<i>1.31</i>
Uttar Pradesh	1986-1991	-1.80	-0.58	-0.45	-1.59	0.82
	1991-1996	-1.77	-2.29	1.28	-0.07	-0.68
	1996-2001	-1.93	1.11	-1.82	-2.38	1.16
	2001-2006	-2.17	-2.47	0.73	-0.41	-0.01
	<i>1986-2006</i>	<i>-7.67</i>	<i>-4.24</i>	<i>-0.26</i>	<i>-4.45</i>	<i>1.29</i>

State	Period	Δb	Δa	Δd	Δm	Δp
West Bengal	1986-1991	-3.27	-3.29	-0.71	-0.19	0.92
	1991-1996	-3.73	-4.45	-0.47	0.78	0.4
	1996-2001	-2.33	-0.36	-2.61	-0.54	1.18
	2001-2006	-2.23	-2.6	0.22	0.46	-0.31
	<i>1986-2006</i>	<i>-11.57</i>	<i>-10.69</i>	<i>-3.58</i>	<i>0.52</i>	<i>2.19</i>

Source: Author's calculations.

Table 6: Change in the age specific marital fertility rates in India, between 1996 and 2001.

Country/State	1991-96			1996-2001			2001-06		
	15-24	25-49	15-49	15-24	25-49	25-49	15-24	25-49	15-49
India	48.6	30.8	79.4	-40.2	39.8	-0.4	1.7	63.9	65.6
Andhra Pradesh	8.4	79.8	88.3	-50.9	43.4	-7.5	33.3	9.0	42.2
Assam	26.0	41.1	67.1	-51.7	45.1	-6.6	61.7	56.0	117.7
Bihar	42.9	12.0	54.9	-70.4	15.8	-54.6	8.7	76.8	85.5
Gujarat	96.6	8.5	105.1	-66.3	22.2	-44.1	-42.1	60.2	18.1
Haryana	59.2	38.6	97.8	-51.2	59.2	8.0	-16.7	60.9	44.2
Karnataka	63.9	61.6	125.5	-41.1	39.5	-1.6	5.8	45.6	51.4
Kerala	25.8	2.3	28.2	38.9	0.2	39.1	-105.1	4.3	-100.8
Madhya Pradesh	36.2	48.0	84.2	-52.5	22.7	-29.8	32.1	59.2	91.3
Maharashtra	-3.6	33.0	29.4	36.7	46.2	82.9	6.9	41.5	48.4
Orissa	38.1	11.7	49.7	7.2	43.4	50.6	10.6	43.5	54.1
Punjab	51.6	39.1	90.7	-105.0	51.8	-53.2	87.5	49.5	137.0
Rajasthan	66.8	21.3	88.1	-48.7	63.7	15.1	-18.1	77.3	59.2
Tamil Nadu	71.2	21.0	92.2	-48.1	-6.6	-54.7	-3.4	30.6	27.2
Uttar Pradesh	71.2	11.7	82.9	-87.5	44.7	-42.8	-26.6	120.2	93.5
West Bengal	41.2	103.6	144.8	-22.1	39.2	17.2	30.0	70.2	100.2

Source: Authors calculations based on SRS data.

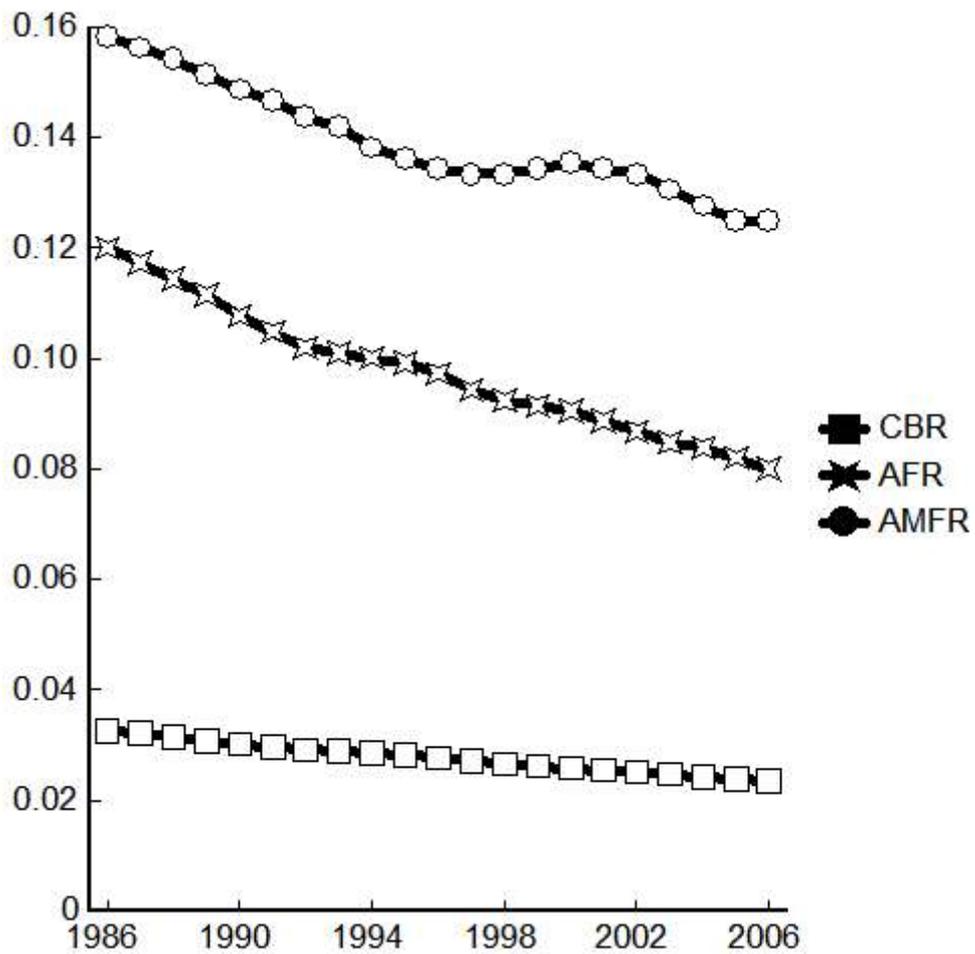
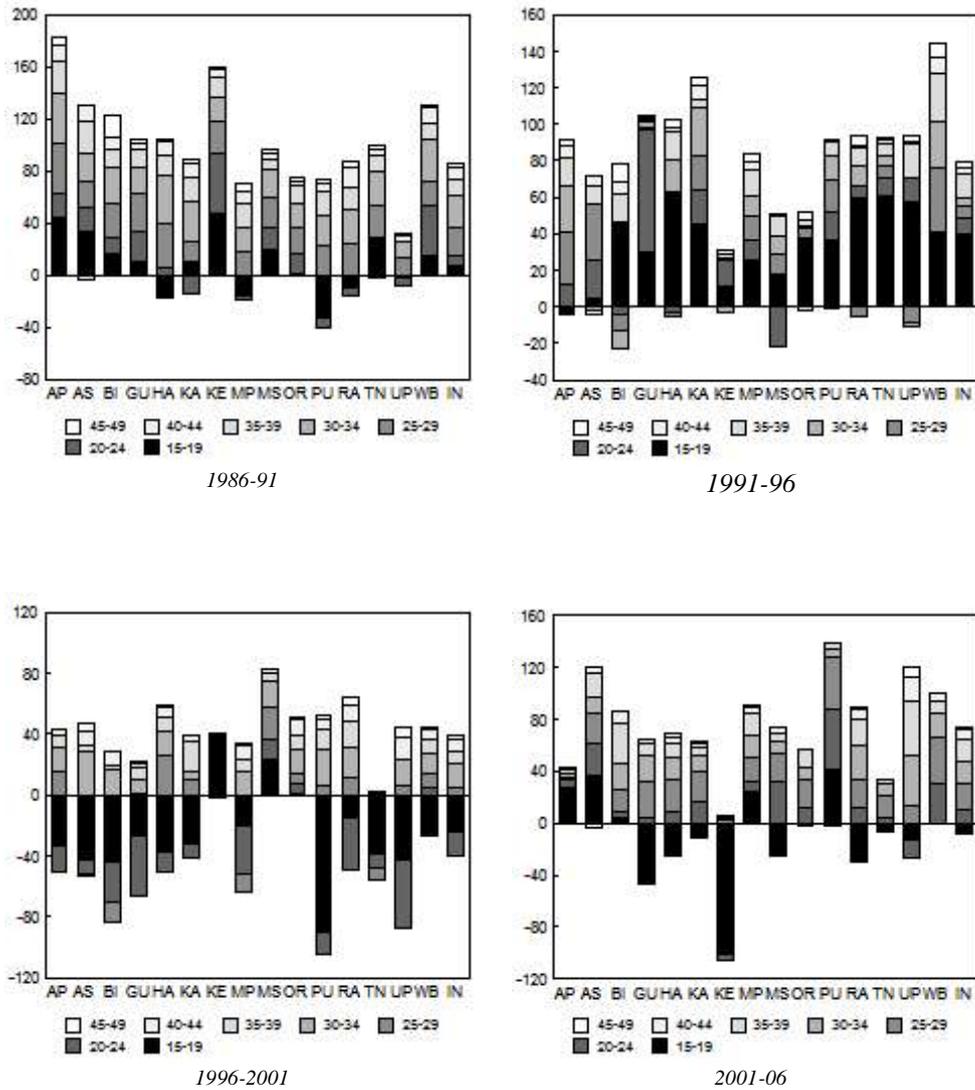


Figure 1: Trends in birth rate (CBR), un-weighted average fertility rate per woman (AFR) and un-weighted average fertility rate per married woman (AMFR) in India, 1986-2006.

Figure 2: Change in age specific marital fertility rates in India.



AP Andhra Pradesh
 BI Bihar
 HA Haryana
 KE Kerala
 MS Maharashtra
 PU Punjab
 TN Tamil Nadu
 WB West Bengal

AS Assam
 GU Gujarat
 KA Karnataka
 MP Madhya Pradesh
 OR Orissa
 RA Rajasthan
 UP Uttar Pradesh
 IN India