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Fertility Transition in India 1991-2011

Dimensions of birth planning and birth limitation

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Abstract

This paper analyses fertility transition in India during 1991-2011 from two dimensional perspective - birth planning and birth limitation - which has been emphasised in the National Population Policy 2000. Fertility transition is measured on the basis of a fertility transition index that takes into account both transition in birth planning and transition in birth limitation. The analysis suggests that India remains in the middle of fertility transition. The analysis also reveals that the fertility transition path followed by India during 1991-2001 has essentially been different from the fertility transition path followed during 2001-2011. The fertility transition path during 1991-2001 is characterised by transition in birth planning but near stagnation in transition in birth limitation whereas fertility transition path followed during 2001-2011 is characterised by a rapid transition in birth limitation but almost stagnation in transition in birth planning. The analysis highlights the need of a two-dimensional approach of monitoring fertility transition in the country for the universal adoption of the small family norm and to make sure that fertility transition has the maximum development impact in terms of better survival and health for women and children and achievement of the replacement level fertility.

1. Introduction

Fertility transition in India continues to be off the track. The National Population Policy 2000 had aimed at achieving the replacement level fertility by the year 2010 (Government of India, 2000). This goal could not be achieved. The National Rural Health Mission launched in 2005 aimed at achieving the replacement level fertility by the year 2012 (Government of India, 2005). This goal could also not be achieved. According to the Sample Registration System, the total fertility rate in India was 2.4 children per woman during 2011-13 (Government of India, 2014) and, in view of the fact that there is some under reporting in the system, it is logical to assume that the total fertility rate is higher than that estimated by the Sample Registration System. Similarly, it was anticipated that successful implementation of the Policy would result in a decrease in infant mortality rate to 30 infant deaths per 1000 live births by the year 2010. This goal could also not be achieved as the infant mortality rate in India during 2013 was estimated to be 40 infant deaths per 1000 live births (Government of India, 2014). The XII Five-year Development Plan (2012-17) now aims at achieving a total fertility rate of 2.1 children per woman and an infant mortality rate of 25 infant deaths per 1000 live births by the year 2017 (Government of India, 2013). Population projections prepared by the United Nations suggest that India will be able to achieve a total fertility rate of 2.1 sometimes during 2015-20 under the low variant projection only which assumes a faster than average decrease in fertility. Under the most likely medium variant projection, India could not be able to achieve total fertility rate of 2.1 and infant mortality rate of 25 before 2030 (United Nations, 2012).

An implication of the slower than expected fertility transition is that India will not be able to achieve the goal of stable population by 2045 as stipulated in the National Population Policy 2000. It was envisaged that successful implementation of the National Population Policy 2000 would restrict population growth to 1107 million by 2010 against the projected 1162 million. Against these expectations, the population enumerated at the 2011 was 1211 million and the post enumeration survey after the 2011 population census suggested a net omission rate of 23 persons per 1000 population (Government of India, 2014a). This actually means that population growth during 2001-2011 was faster than the projected population growth. Based on the results of the 1991 population census, India's population was projected to increase to 1178.9 million by 2011 (Government of India, 1997). This means that actual population growth in the country during 1991-2011 was almost 60 million more than what was projected and confirms that fertility transition in India has been slower than the projected or the expected one during these 20 years.

It is in the above context that the present paper analyses fertility transition in India during 1991 through 2011 through the perspective of birth planning and through the perspective of birth limitation. The perspective of birth planning is relevant in the context of reduction in infant and child mortality and in the context of population growth due to population momentum. It is well known that even when the replacement level fertility is achieved, population continues to increase because of the in-built momentum in the population (Frejka 1982, Keyfitz 1971, Merrick 1982). The effect of the population momentum on population growth can at best be minimised by either lowering average fertility below the replacement level or by increasing the mean age at child bearing (Bongaarts, 1994). Theoretically, the average fertility of women can be decreased to a level at which birth rate is equal to the death rate. This, however, implies that many couples will have only one child. This is however not a feasible option especially when the demand for children is high because of either low child survival or a host of cultural and social factors as is the case with India. The only other option to minimise the effect of population momentum is to delay child bearing and increase spacing between successive births so that with the decrease in fertility, there is no decrease in the mean age at child bearing.

Birth planning is also relevant in the context of reduction in infant and child mortality as it is well known that timing and spacing of births has major impact on the health of mothers and children. Logically, transition in birth planning has an impact on the transition in birth limitation. Birth planning contributes to improvement in infant and child survival which in turn contributes to lowering the demand for 'bonus' children and hence accelerates transition in birth limitation. It has been observed that high infant and child mortality keeps the replacement level fertility higher than the universally accepted norm of a total fertility rate of 2.1 children per woman (Espenshade, 2003).This means that transition in birth planning has an additive impact of the transition in birth limitation. In any analysis of fertility transition, it is therefore important to take into account both transition in birth planning and transition in birth limitation. The traditional approach of analysing fertility transition is generally based on completed fertility measures like total fertility rate which does not take into consideration transition in birth planning. A woman may get married at the age of 17 years; delivers two children - first at the age of 18 years and second at the age of 19 years and get her or her husband sterilised to stop child bearing. Another woman gets married at the age of 18 years; delivers the first child at the age of 21 years and the second at the age of 25 years and then go for the adoption of a terminal method of family planning to stop child bearing. In both the cases, the completed fertility is two but the demographic and health implications of the two transition paths are essentially different.

The conceptual basis of the paper is also informed by India's National Population Policy, 2000 which perceives that meeting the unmet need of family planning for spacing births along with the increase in age at marriage and age at first birth would lead to better birth planning whereas meeting the unmet need of family planning to limit births would contribute to achieving the replacement level fertility. The broader development context of the Policy is to inculcate "small family norm" in the social and cultural fabric of the Indian society, although the term "small family norm" has not been defined. The policy equates "small family" with two-child family irrespective of the timing and spacing of births and thus ignores the birth planning perspective of fertility transition. It has been observed that women in India tend to marry early, complete child bearing as soon as possible and then adopt a terminal method of contraception to stop child bearing (Singh et al, 2012). This procreation behaviour is contrary to the very ethos of the National Population Policy 2000 and not conducive to better health for mothers and children and minimising the effect of population momentum on population growth. It is estimated that population momentum will account for substantial future population growth in the country (Chaurasia and Gulati, 2008).

The paper is based on the fertility transition index (*FTI*) developed by the author (Chaurasia, 2013) that takes into account both transition in birth planning and transition in birth limitation necessary for the universal adoption of the "small" family norm. The index follows the numerator-based approach of measuring fertility transition (Bertrand, Magnani and Knowles, 1994). The numerator-based approach has been argued to be more sensitive to short-term changes in individual fertility behaviour than the conventional fertility measures such as total fertility rate (Ryder, 1982; Srinivasan and Freymann 1990). Fertility measures like total fertility rate do not reflect transition in birth planning. they reflect on the transition in the birth limitation dimension of fertility.

The paper is organised as follows. The next section presents the conceptual foundations of the fertility transition index (*FTI*). The third section describes the data source while the fourth section analyses the level and pace of fertility transition at national, state and district level. The fifth section discusses policy and programme implications of the analysis while the last section summarises the main findings and advocates a two-dimensional approach to monitor and evaluate population stabilisation efforts in the country.

2. The Fertility Transition Index

The fertility transition index (*FTI*) developed by the author is based on the cross classification of reported live births reported by the age of the mother and the order of the birth. Let B_{ij} denotes the birth to a woman aged i of birth order j. Then total number of births in a year, B, is equal to

$$B = \sum_i \sum_j B_{ij}$$

Now

$$\sum_i \sum_j B_{ij} = \sum_{i<20} \sum_{j<3} B_{ij} + \sum_{i<20} \sum_{j\geq 3} B_{ij} + \sum_{i\geq 20} \sum_{j<3} B_{ij} + \sum_{i\geq 20} \sum_{j\geq 3} B_{ij}$$

or

$$\sum_i \sum_j B_{ij} = \sum_{i\geq 20} \sum_{j\leq 3} B_{ij} + \sum_{i<20} \sum_{j} B_{ij} + \sum_{i} \sum_{j\geq 3} B_{ij} - \sum_{i<20} \sum_{j\geq 3} B_{ij}$$

or

$$1 = b_{21} + b_{1.} + b_{.2} - b_{12}$$

or

$$b_{21} = 1 - (b_{1.} + b_{.2} - b_{12})$$

where

b_{21} = proportion of births to women aged 20-49 years and birth order<3.

$b_{1.}$ = proportion of births to women aged less than 20 years

$b_{.2}$ = proportion of 3rd and higher order births

b_{12} = proportion of 3rd and higher order births to women aged less than 20 years.

Fertility transition then implies increasing b_{21} and when b_{21}=1, fertility transition is complete. This formulation argues that even if $b_{.2}$ =0, fertility transition is not complete if $b_{1.}$>0. Assuming that b_{12} is small compared to $b_{1.}$and $b_{.2}$, the fertility transition index (*FTI*) is defined as

$FTI = 1 - (b_{1.} + b_{.2})$.

When *FTI=1,* all reported births are 1st and 2nd order births to women aged at least 20 years. On the other hand, when all reported births are 3rd and higher order births to women aged less than 20 years, *FTI*<0 because *FTI* assigns double weight to b_{12}. However, b_{12} matters at the early stages of fertility transition only. As *FTI* increases, b_{12} becomes less and less important. When *FTI* = 1, both $b_{1.}$ and $b_{.2}$ and hence $b_{12} = 0$.

FTI captures transition in birth planning through the decrease in $b_{1.}$ - the proportion of briths to women aged less than 20 years - and transition in birth limitation through the decrease in decrease in $b_{.2}$ - the proportion of 3rd and higher births. The progression from 2nd to 3rd birth has been argued to be a crucial component of fertility change (United Nations, 1997) and a decrease in completed fertility is reflected in the decrease in the proportion of 3rd and higher order births (Prasartakul et al, 1987, Srinivasan et al, 1992, Singh, 2002). On the other hand, it has been observed that the latter is the age at first birth, the lower is the fertility and a decreasing proportion of births to women aged less than 20 years reflects the rising age at first birth (Sivakumar, 2000). An increase in the age at first birth and increased spacing between successive births is likely to result in a decrease in $b_{1.}$. Obviously, decrease in both $b_{1.}$ and $b_{.2}$ is necessary to achieve the "small" family norm.

Based on *FTI*, a population may be characterised at very early stage of fertility transition if *FTI*<0.30; at an early stage of transition if 0.30≤*FTI*<0.50; at the middle stage of transition if 0.50≤*FTI*<0.70; at advanced stage of transition if 0.70≤*FTI*<0.90; and at very advance stage of transition if *FTI*>0.90. Fertility transition is complete when *FTI*=1 which is the indication of the universal adoption of the "small" family norm. Moreover, it is obvious that the rate of increase in *FTI* reflects the pace of fertility transition.

3. Data

The analysis is based on the number of live births to currently married women reported during one year prior to 1991, 2001 and 2011 population census. At the population census, question related to births during one year prior to the census was canvassed to currently married women. As such, the available data do not include live births born to single, widowed or divorced women. Similarly, live births during one year prior to the census who might have died before the census have also been left out. These data are available for the country and for its constituent states/Union Territories and districts as they existed at the time of the respective population census.

There are two common sources of errors associated with population census data - under-enumeration and age mis-reporting. Post enumeration survey is conducted after each census to quantify omission and duplication in the census enumeration and measure the response errors in respect of certain selected characteristics. This survey suggests that the inconsistency between census enumeration and post enumeration survey at different population census was low (Government of India, 2014a). Moreover, live births reported at the population census and their classification by age of the woman and the order of the birth however appear to be fairly accurate when compared with the data available through the Sample Registration System. According to the Sample Registration System, fertility of women aged 15-19 years accounted for around 6.8 per cent of the cumulative fertility in 2011 whereas the proportion of 3rd and higher order births accounted for around 27.6 per cent of the total live births reported in the system (Government of India, 2013). According to the 2011 population census, births to women aged less than 20 years accounted for 6.4 per cent of the reported live births whereas around 31.6 per cent were 3rd and higher order births.

An examination of the data available through the 1991 population census, however, revealed that a number of live births were reported with unknown birth order. These live births were distributed proportionately to the known birth order in each age group as suggested in the methods protocol for human fertility database (Jasilioniene et al, 2012). On the other hand, all live births at the 2001 and 2011 population census were reported with the known birth order and therefore no adjustment in the data was carried out.

4. Fertility Transition in India

a. Country Scenario. *FTI* in India increased from 0.425 around 1991 to 0.619 around 2011 (Table 1) as a result of the decrease in the proportion of live births to women aged less than 20 years from 8.7 to 6.4 per cent and a decrease in the proportion of 3rd and higher order births from 48.8 to 31.6 per cent. This implies that the country has moved from early to middle stage of fertility transition during the 20 years between 1991 and 2011. Most of the increase in *FTI* has however been confined to the period 2001-11. During 1991-2001, the pace of fertility transition in the country has been very slow as is evident from a marginal increase in *FTI*. Moreover, around 88 per cent of the increase in *FTI* is attributed to the decrease in the proportion of 3rd and higher order births. Contribution of the decrease in the proportion of births to women aged less than 20 years to the increase in *FTI* has at best been marginal.

The fertility transition path followed by India during 1991-2001 has been essentially different from the path followed during 2001-2011. Fertility transition during 1991-2001 is attributed almost equally to transition in birth planning (47.7 per cent) and transition in birth limitation (52.3 per cent). However, fertility transition during 2001-2011 is attributed almost entirely to transition in birth limitation. Transition in birth limitation nearly stagnated during 1991-2001 while transition in birth planning virtually stagnated during 2001-2011.

b. State Scenario. Fertility transition was the most advanced in Kerala but the least advanced in Nagaland in 1991 while most of the states/Union Territories were early to very early stage of fertility transition (Table 2). There was no state/Union Territory which was at either advanced or very advanced stage of fertility transition. In 2001, there was no state/Union Territory at either very early or very advanced stage of fertility transition while all but three states/Union territories were at either or middle stage of fertility transition. In 2011, all but states/Union Territories were at either middle or advanced stage of fertility transition but there was no state/Union Territory at the very advanced stage of fertility transition. In 2011, fertility transition was the most advanced in Goa and Puducherry but the least advanced in Meghalaya. In majority of the states/Union Territories, at least 70 per cent of the increase in *FTI* was confined to the period 2001-11. There are only two states/Union Territories - Andaman and Nicobars Islands and Andhra Pradesh - where more than 50 per cent of the increase in *FTI* during 1991-2011 was confined to the period 1991-2001.

The pace of fertility transition during 1991-2011 varied widely across states/Union Territories. Fertility transition was the fastest in Manipur but the slowest in Sikkim. In 12 states/Union Territories, at least 80 per cent of the increase in *FTI* was confined to the period 2001-2011 which implies that fertility transition in these states/Union Territories was slow to very slow during 1991-2001. There are only two states/Union Territories where fertility transition was relatively faster during 1991-2001 than that during 2001-2011. Because of different pace of transition in fertility, rank of most of the states/Union Territories in *FTI* changed in 2011 compared to the rank in 1991. There are seven states/Union Territories - Chandigarh, Gujarat, Madhya Pradesh, Meghalaya, Nagaland, Punjab and Rajasthan - where rank in *FTI* slipped throughout the period under reference.

In most of the states/Union Territories, transition in birth planning has largely been confined to the period 1991-2001 whereas transition in birth limitation has been confined to the period 2001-2011. In 20 states/Union Territories, the proportion of births to women aged less than 20 years decreased during 1991-2001 but increased during 2001-2011. During 1991-2001, transition in birth limitation reversed in Bihar, Chhattisgarh, Sikkim and Uttar Pradesh while the decrease in the proportion of 3rd and higher order births during 1991-2001 has been faster than the decrease during 2001-2011. In Andhra Pradesh, most of the decrease in the proportion of 3rd and higher order births was confined to the period 1991-2001.

c. District Scenario. The distribution of districts by the level of *FTI* is presented in table 3 along with summary measures of inter-district variation. More than three fourth of the districts of the country were at early to very early stage of fertility transition in 1991. This proportion decreased to just around 12 per cent in 2011 whereas the proportion of districts at advanced stage of fertility transition increased from 2 per cent to almost 30 per cent.

Fertility transition was the most advanced in district Pathanamthitta of Kerala in 2011 (Table 4). There are only two districts in 2011 - Pathanamthitta and Alappuzha - both in Kerala, which were at very advanced stage of fertility transition. By contrast, fertility transition was the slowest in district Badgam of Jammu and Kashmir. In 2001, fertility transition was the slowest in district Tuensang of Nagaland whereas, in 1991, fertility transition was the slowest in district Upper subansiri of Arunachal Pradesh. There was no population census in Jammu and Kashmir in 1991.

The proportionate cumulative distribution of districts in *FTI* (Figure 4) suggests that fertility transition in the districts has generally been confined to the period 2001-2011 and is attributed to birth limitation. Moreover, it is also apparent from figure 4 that transition in birth planning in the districts has generally been confined to the period 1991-2001 whereas transition in birth limitation has been confined to the period 2001-2011.

Inter-district variation in *FTI* can be decomposed into inter-district variation in the proportion of births to women aged less than 20 years ($b_{.1}$) and inter-district variation in the proportion of 3rd and higher order births ($b_{.2}$). It is straightforward to show that

$$\text{var}(FTI) = \text{var}(b_{.1}) + \text{var}(b_{.2}) + 2\text{cov}(b_{.1}b_{.2})$$

This decomposition suggests that most of the inter-district variation in *FTI* is accounted by the inter-district variation in the proportion of 3rd and higher order births (Table 5) which means that fertility transition in India has largely been derived by transition in birth limitation. Moreover, low, negative correlation between proportion of births to women aged less than 20 years and the proportion of 3rd and higher order births suggests that transition in birth planning has largely been independent of the transition in birth limitation.

Districts also vary in terms of key population characteristics which influence fertility transition. The most common of these characteristics that have a direct relevance to fertility transition include gender balance, female literacy and participation in non-agricultural pursuits. In order to analyse how the three population characteristics impact upon fertility transition at the district level, segmentation analysis has been carried out using the decision tree procedure (IBM, 2012). For the purpose of the analysis, the districts were categorised into three categories in terms of *FTI* in 2011 - 1) districts at early or very stage of fertility transition ($FTI<0.5$); 2) districts at middle stages of fertility transition ($0.5 \leq FTI < 0.7$); and 3) districts at advanced or very advanced stage of fertility transition ($FTI \geq 0.7$). On the other hand, the gender balance in the population was measured in terms of female/male ratio in the population; female literacy rate was measured in terms of the proportion of population aged 7 years and above who can read and write with understanding; and participation in non-agricultural pursuits was measured in terms of the proportion of population aged 7 years and above engaged in a non-agricultural productive activity.

Results of the segmentation analysis are presented in table 6 and figure 4. The analysis suggests that 640 districts as they existed at the 2011 population census can be classified into six groups on the basis of three population characteristics and the proportion of districts at different stages of fertility transition is different in different groups. For example, the highest proportion of districts at the advanced stage of fertility transition is in those districts where female literacy rate is more than 66 per cent and population sex ratio is at least 981 females per 1000 males. At the same time, the proportion of districts at advanced stage of fertility transition is the second highest in those districts where population sex ratio is less than 981 females per 1000 males but female literacy rate is more than 66 per cent and participation rate in the non-agricultural pursuits is more than 19 per cent. On the other hand, the lowest proportion of districts at the advanced stage of fertility transition is in those districts where fertility is less than 66 per cent and participation rate in non-agricultural pursuits is less than 15 per cent. By comparison, among districts where female literacy is less than 66 per cent but participation in non-agricultural pursuits is more than 14 per cent, more than 25 per cent of the districts are at advanced stage of fertility transition. Similarly, among districts where female literacy is more than 66 per cent and participation rate in non-agricultural pursuits is less than 19 per cent, the proportion of districts at advanced stage of fertility transition is almost four times higher in those districts where population sex ratio ranges between 942 to 981 as compared to those districts where the population sex ratio is less than 942 females per 1000 males. The analysis thus shows that the probability of a district being at the advanced stage of fertility transition is the highest if female literacy rate in the district is more than 66 per cent and population sex ratio is more than 981 females per 1000 population. This probability is also more than 50 per cent if the population sex ratio is less than 981 females per 1000 males but the participation rate in non-agricultural pursuits is more than 19 per cent but less than 33 per cent in all other groups.

d. Urban-Rural Differentials. Fertility transition in 2011 was more advanced in the urban areas than in the rural areas at the national level and in all but one states/Union Territories. Goa is the only state where fertility transition is more advanced in the rural areas than in the urban areas. The urban-rural gap in fertility transition in 2011 was the widest in Dadra and Nagar Haveli followed by Assam, Meghalaya, Nagaland and Mizoram, all north-eastern states. On the other hand, this gap was the lowest in Lakshadweep followed by Kerala, Puducherry, Punjab and Chandigarh. At the district level, fertility transition in general has been more advanced in urban than in rural areas. There are less than 10 per cent districts where fertility transition was more advanced in rural than in urban areas in 2011.

The urban-rural disparity in fertility transition increased in all but five states/union territories during 1991-2001 indicating faster fertility transition in the urban than in rural areas. However, during 2001-2011, the urban-rural gap in *FTI* decreased in 27 states/Union Territories which indicates relatively faster fertility transition in rural than urban areas in these states/Union Territories. The 8 states/Union Territories where urban-rural disparity increased during 2001-2011 include Daman and Diu, Gujarat, Jharkhand, Madhya Pradesh, Meghalaya, Mizoram, Rajasthan and Uttar Pradesh. The urban-rural disparity in the proportion of 3rd and higher order births has primary been responsible for the urban-rural disparity in fertility transition. In 1991, the proportion of births to women aged less than 20 years was less in rural than in urban areas in 12 states/Union Territories but in only 4 states/Union Territories in 2011. On the other hand, the proportion of 3rd and higher order births has been higher in rural than in urban areas in all states/Union Territories in 1991 and 2001 but in all but one state in 2011. Goa is the only state/Union Territory where both proportion of births to women aged less than 20 years and proportion of 3rd and higher order births was less in rural than in urban areas in 2011. At the district level, in about 17 per cent districts, the proportion of births to women aged less than 20 years was less in rural than in urban areas in 2011 whereas in 12 per cent (77) districts, the proportion of 3rd and higher order births was less than that in the urban areas. There are 20 districts where both proportion of births to women aged less than 20 years and proportion of 3rd and higher order births were less in rural than in urban areas in 2011.

5. Conclusions

In the context of the National Population Policy 2000, births to women aged less than 20 years and 3rd and higher order births may be termed as "undesired" births and the reduction in these births is an indication of fertility transition. The analysis suggests that India has progressed on the path of fertility transition during the 20 years under reference as the proportion of "undesired" births in India decreased from around 57.5 per cent in 1991 to around 38.1 per cent around 2011. This progress has however largely been confined to transition in birth limitation rather than transition in birth planning. The fertility transition path followed by India during 1991-2001 has however been different from the path followed during 2001-2011. Fertility transition during 1991-2001 was slow and transition in birth planning and transition in birth limitation almost equally contributed to fertility transition during this period. In 1991, births to women aged less than 20 years accounted for around 15 per cent of the "undesired" births. This proportion decreased to around 12 per cent in 2001 but increased to almost 17 per cent in 2011. This means that the proportion of 3rd and higher order births to total "undesired" births increased from 85 per cent in 1991 to 88 per cent in 2001 but decreased to 83 per cent in 2011. The increased concentration of "undesired" births to very young women is bound to have implications in terms of minimising the effect of population momentum of future population growth and on survival and health of mothers and children.

What is even more revealing is that the fertility transition path followed by India during 2001-2011 is totally at odds to what has been aimed and professed in the National Population Policy 2000 and reiterated in the Xth and XIth Five-year Development Plans (Government of India, 2008; 2013) and the National Rural Health Mission launched in 2005. It is a matter of concern that very close of 40 per cent births reported at the 2011 population census were "undesired" through the policy perspective and in many states/Union Territories of the country, the proportion of births to women aged less than 20 years has increased indicating a reversal in the transition in birth planning. The focus on birth limitation in terms of reducing 3rd and higher order births may lead to achieving replacement level fertility but the goal of stable population by 2045 is definitely going to be delayed if the country continues to follow the current fertility transition path. From the perspective of population stabilisation, it is imperative that more and more couples limit their family to two children and, at the same time, child bearing is delayed and births are properly spaced so that there is no decrease in the mean age of childbearing and the impact of population momentum on future population growth is minimised to the extent possible (Bongaarts 1994, Ryder 1980). A focus on transition in birth planning is also necessary in the context of reduction in infant and child mortality and improvement in health of women so that the demand for 'bonus' children is reduced and the transition in birth limitation is accelerated. There is however little indication of such a fertility transition in India. There was some evidence of transition in birth planning during 1991-2001 but the tempo appears to have lost during 2001-2011. The current fertility transition path leads to 'two-child' family but definitely not to 'small' family. In order to universalise 'small' family, it is imperative to strike the balance between transition in birth planning and transition in birth limitation in the quest towards universal adoption of 'small' family norm as articulated in the National Population Policy 2000. The first step in this direction may be institutionalising a system of monitoring of transition in birth planning along with the system of monitoring transition in birth limitation. The fertility transition index may constitute the basis for such monitoring. The advantage of the fertility transition index is that it can be calculated even at the lowest level of the public administration system to promote gender sensitive multi-sector agenda for population stabilisation at the local level as emphasised in the National Population Policy 2000.

The analysis reiterates the need of improving the gender balance in the population and universalising female literacy to accelerating fertility transition at the district level. The probability that fertility transition in a district is at an advanced stage if the population sex ratio in the districts is at least 981 females per 1000 males and the female literacy rate is at least 66 per cent. In districts where population sex ratio is less than 981 females per 1000 males, increasing the participation rate in non-agricultural pursuits to at least 20 per cent can contribute substantially towards accelerating the pace of fertility transition. This means that universalising female literacy and increasing participation in non-agricultural pursuits should be integral to planning and programming for fertility transition and hence population stabilisation at the district level.

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Table 1

Fertility transition in India and constituent states and Union Territories, 1991-2001

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
					Total population				
India	0.425	0.469	0.619	0.087	0.066	0.064	0.488	0.466	0.316
Andaman and Nicobars Islands	0.505	0.648	0.758	0.070	0.057	0.069	0.425	0.295	0.173
Andhra Pradesh	0.431	0.572	0.709	0.156	0.144	0.090	0.413	0.284	0.201
Arunachal Pradesh	0.311	0.374	0.536	0.079	0.054	0.060	0.609	0.572	0.404
Assam	0.361	0.426	0.582	0.077	0.058	0.079	0.562	0.516	0.339
Bihar	0.350	0.360	0.542	0.083	0.060	0.060	0.568	0.579	0.398
Chandigarh	0.559	0.596	0.751	0.038	0.035	0.027	0.402	0.368	0.222
Chhattisgarh	0.407	0.433	0.626	0.093	0.054	0.055	0.501	0.513	0.319
Dadra and Nagar Haveli	0.435	0.442	0.649	0.071	0.068	0.072	0.494	0.490	0.279
Daman and Diu	0.510	0.617	0.753	0.055	0.037	0.048	0.435	0.345	0.198
Delhi	0.491	0.557	0.726	0.052	0.038	0.029	0.457	0.405	0.245
Goa	0.638	0.729	0.833	0.023	0.022	0.022	0.339	0.249	0.144
Gujarat	0.511	0.539	0.663	0.044	0.041	0.055	0.445	0.420	0.282
Haryana	0.463	0.490	0.670	0.086	0.076	0.056	0.451	0.435	0.274
Himachal Pradesh	0.518	0.616	0.765	0.059	0.029	0.032	0.423	0.354	0.203
Jammu and Kashmir	na	0.407	0.540	na	0.027	0.026	na	0.567	0.434
Jharkhand	0.350	0.384	0.552	0.101	0.076	0.081	0.549	0.540	0.367
Karnataka	0.462	0.560	0.665	0.101	0.081	0.063	0.437	0.360	0.272
Kerala	0.681	0.733	0.806	0.064	0.049	0.040	0.254	0.218	0.154
Lakshadweep	0.383	0.473	0.666	0.075	0.037	0.020	0.542	0.490	0.313
Madhya Pradesh	0.366	0.404	0.531	0.098	0.067	0.065	0.536	0.529	0.404
Maharashtra	0.479	0.572	0.674	0.078	0.056	0.067	0.443	0.371	0.259

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Manipur	0.363	0.482	0.674	0.040	0.027	0.045	0.597	0.491	0.281
Meghalaya	0.297	0.336	0.470	0.053	0.039	0.067	0.650	0.625	0.463
Mizoram	0.362	0.452	0.548	0.035	0.045	0.062	0.603	0.503	0.390
Nagaland	0.294	0.322	0.498	0.035	0.026	0.042	0.671	0.652	0.460
Orissa	0.439	0.513	0.694	0.068	0.045	0.056	0.492	0.443	0.251
Puducherry	0.624	0.710	0.833	0.081	0.063	0.043	0.295	0.227	0.125
Punjab	0.560	0.595	0.774	0.039	0.029	0.029	0.401	0.376	0.196
Rajasthan	0.377	0.397	0.514	0.089	0.079	0.072	0.534	0.524	0.414
Sikkim	0.593	0.477	0.693	0.082	0.077	0.102	0.325	0.445	0.205
Tamil Nadu	0.578	0.648	0.765	0.071	0.058	0.051	0.351	0.294	0.184
Tripura	0.405	0.537	0.674	0.096	0.094	0.128	0.499	0.369	0.199
Uttar Pradesh	0.340	0.349	0.560	0.070	0.043	0.049	0.590	0.608	0.391
Uttarakhand	0.427	0.469	0.676	0.053	0.036	0.038	0.520	0.495	0.286
West Bengal	0.418	0.499	0.630	0.123	0.113	0.134	0.459	0.388	0.235
				Rural population					
India	0.408	0.439	0.587	0.090	0.070	0.070	0.503	0.491	0.343
Andaman and Nicobars Islands	0.465	0.612	0.734	0.070	0.054	0.075	0.464	0.335	0.191
Andhra Pradesh	0.420	0.553	0.693	0.163	0.159	0.099	0.418	0.289	0.208
Arunachal Pradesh	0.298	0.348	0.510	0.078	0.053	0.061	0.624	0.599	0.429
Assam	0.348	0.409	0.565	0.078	0.058	0.081	0.574	0.533	0.354
Bihar	0.348	0.355	0.537	0.083	0.061	0.060	0.568	0.584	0.403
Chandigarh	0.532	0.558	0.722	0.051	0.042	0.038	0.417	0.400	0.240
Chhattisgarh	0.399	0.414	0.601	0.095	0.055	0.058	0.506	0.530	0.341
Dadra and Nagar Haveli	0.427	0.389	0.548	0.072	0.073	0.090	0.500	0.538	0.362
Daman and Diu	0.479	0.586	0.665	0.052	0.042	0.044	0.469	0.372	0.291

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Delhi	0.423	0.515	0.696	0.067	0.049	0.044	0.511	0.436	0.260
Goa	0.619	0.732	0.846	0.019	0.014	0.016	0.361	0.254	0.139
Gujarat	0.494	0.505	0.614	0.046	0.045	0.062	0.460	0.450	0.324
Haryana	0.446	0.467	0.645	0.093	0.084	0.064	0.460	0.449	0.292
Himachal Pradesh	0.507	0.609	0.761	0.061	0.030	0.032	0.432	0.361	0.206
Jammu and Kashmir	na	0.383	0.514	na	0.028	0.028	na	0.590	0.458
Jharkhand	0.346	0.367	0.529	0.104	0.078	0.083	0.551	0.555	0.388
Karnataka	0.447	0.535	0.637	0.104	0.088	0.070	0.449	0.377	0.293
Kerala	0.669	0.720	0.801	0.065	0.053	0.045	0.266	0.227	0.154
Lakshadweep	0.366	0.445	0.662	0.060	0.039	0.015	0.574	0.516	0.323
Madhya Pradesh	0.351	0.380	0.502	0.102	0.070	0.071	0.547	0.550	0.427
Maharashtra	0.458	0.541	0.650	0.082	0.060	0.079	0.460	0.398	0.271
Manipur	0.355	0.460	0.644	0.040	0.027	0.046	0.605	0.513	0.310
Meghalaya	0.282	0.323	0.447	0.051	0.040	0.070	0.667	0.637	0.484
Mizoram	0.317	0.390	0.481	0.037	0.047	0.073	0.646	0.563	0.446
Nagaland	0.274	0.289	0.458	0.033	0.024	0.042	0.693	0.686	0.500
Orissa	0.436	0.500	0.683	0.068	0.045	0.057	0.496	0.455	0.260
Puducherry	0.599	0.675	0.817	0.080	0.069	0.053	0.321	0.255	0.131
Punjab	0.551	0.584	0.765	0.040	0.030	0.031	0.410	0.386	0.204
Rajasthan	0.368	0.380	0.491	0.089	0.082	0.077	0.544	0.538	0.432
Sikkim	0.507	0.466	0.664	0.088	0.078	0.114	0.405	0.455	0.222
Tamil Nadu	0.561	0.606	0.724	0.072	0.066	0.058	0.367	0.328	0.217
Tripura	0.384	0.511	0.647	0.095	0.095	0.133	0.521	0.394	0.220
Uttar Pradesh	0.335	0.337	0.542	0.072	0.045	0.051	0.594	0.618	0.407
Uttarakhand	0.417	0.455	0.658	0.057	0.038	0.040	0.526	0.507	0.302

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
West Bengal	0.399	0.474	0.606	0.126	0.121	0.149	0.475	0.404	0.245
					Urban population				
India	0.494	0.575	0.708	0.076	0.051	0.049	0.430	0.374	0.243
Andaman and Nicobars Islands	0.597	0.733	0.805	0.070	0.065	0.056	0.332	0.203	0.139
Andhra Pradesh	0.471	0.635	0.741	0.134	0.097	0.071	0.395	0.269	0.189
Arunachal Pradesh	0.429	0.500	0.635	0.095	0.058	0.057	0.477	0.442	0.308
Assam	0.531	0.622	0.739	0.069	0.052	0.057	0.400	0.326	0.205
Bihar	0.364	0.420	0.598	0.077	0.057	0.059	0.559	0.523	0.343
Chandigarh	0.565	0.602	0.752	0.036	0.034	0.027	0.399	0.363	0.221
Chhattisgarh	0.452	0.538	0.724	0.077	0.045	0.044	0.471	0.417	0.232
Dadra and Nagar Haveli	0.547	0.664	0.778	0.048	0.045	0.049	0.406	0.290	0.173
Daman and Diu	0.559	0.679	0.787	0.060	0.027	0.050	0.381	0.294	0.163
Delhi	0.503	0.561	0.727	0.049	0.037	0.028	0.448	0.402	0.244
Goa	0.663	0.725	0.826	0.029	0.031	0.026	0.308	0.244	0.148
Gujarat	0.552	0.616	0.743	0.040	0.033	0.044	0.408	0.351	0.213
Haryana	0.531	0.563	0.728	0.057	0.048	0.038	0.413	0.389	0.234
Himachal Pradesh	0.663	0.715	0.818	0.034	0.019	0.024	0.304	0.266	0.158
Jammu and Kashmir	na	0.538	0.636	na	0.020	0.018	na	0.441	0.346
Jharkhand	0.378	0.478	0.654	0.084	0.064	0.071	0.537	0.458	0.275
Karnataka	0.507	0.617	0.714	0.090	0.063	0.051	0.402	0.320	0.235
Kerala	0.718	0.774	0.812	0.062	0.038	0.035	0.220	0.188	0.153
Lakshadweep	0.399	0.516	0.667	0.087	0.033	0.022	0.514	0.451	0.311
Madhya Pradesh	0.426	0.503	0.629	0.081	0.055	0.044	0.494	0.442	0.328
Maharashtra	0.525	0.625	0.706	0.070	0.049	0.051	0.405	0.325	0.243
Manipur	0.385	0.558	0.741	0.042	0.027	0.044	0.573	0.415	0.215

Country/State/Union Territory	Fertility transition index (*FTI*)			Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Meghalaya	0.384	0.425	0.615	0.062	0.035	0.051	0.554	0.540	0.334
Mizoram	0.421	0.527	0.626	0.033	0.043	0.048	0.546	0.430	0.326
Nagaland	0.393	0.469	0.605	0.046	0.035	0.043	0.561	0.496	0.352
Orissa	0.469	0.608	0.757	0.071	0.042	0.051	0.460	0.350	0.192
Puducherry	0.641	0.729	0.841	0.081	0.060	0.038	0.279	0.211	0.122
Punjab	0.592	0.621	0.791	0.036	0.027	0.027	0.372	0.352	0.182
Rajasthan	0.426	0.486	0.602	0.092	0.063	0.053	0.482	0.450	0.345
Sikkim	0.647	0.615	0.788	0.078	0.065	0.063	0.275	0.321	0.149
Tamil Nadu	0.626	0.709	0.808	0.069	0.047	0.043	0.305	0.244	0.149
Tripura	0.555	0.711	0.774	0.101	0.090	0.107	0.344	0.198	0.118
Uttar Pradesh	0.367	0.417	0.646	0.063	0.032	0.039	0.570	0.551	0.315
Uttarakhand	0.470	0.534	0.729	0.037	0.027	0.031	0.493	0.439	0.240
West Bengal	0.519	0.605	0.700	0.107	0.078	0.093	0.374	0.317	0.207

Source: Author's calculations

Table 2

Distribution of *FTI* across districts of India: 1991-2011

FTI	Total population			Rural population			Urban population		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Less than 0.300	21	7	0	24	15	0	14	2	0
0.300-0.500	324	352	75	327	368	99	259	212	14
0.500-0.700	98	213	380	81	184	383	159	319	322
0.700-0.900	9	21	183	9	17	146	9	50	299
0.900 and above	0	0	2	0	0	3	0	0	2
N	452	593	640	446	584	631	441	583	637
Minimum	0.235	0.248	0.360	0.232	0.239	0.343	0.200	0.265	0.374
Q1	0.350	0.370	0.539	0.338	0.358	0.524	0.382	0.438	0.614
Median	0.400	0.458	0.616	0.384	0.434	0.592	0.460	0.553	0.688
Q3	0.491	0.564	0.715	0.469	0.541	0.692	0.551	0.634	0.759
Maximum	0.855	0.865	0.918	0.856	0.868	0.919	0.852	0.864	0.911
Skewness	1.184	0.624	0.151	1.365	0.765	0.264	0.471	0.120	-0.185
Excess kurtosis	1.731	-0.198	-0.697	2.494	0.167	-0.575	0.200	-0.614	-0.455

Table 3

Decomposition of inter-district variation in *FTI*: 1991-2011

FTI	Total population			Rural population			Urban population		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Var (*FTI*)	0.0115	0.0145	0.012	0.0113	0.0144	0.0124	0.0129	0.0135	0.0085
Var ($b_{1.}$)	0.0011	0.001	0.001	0.0012	0.0011	0.001	0.0012	0.001	0.001
Var ($b_{.2}$)	0.0107	0.0152	0.0111	0.0106	0.015	0.0116	0.0119	0.0139	0.0079
Cov ($b_{1.}$,$b_{.2}$)	0	0	0	0	-0.001	0	0	0	0
Var (*FTI*)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Var ($b_{1.}$)	9.52	6.68	5.73	10.69	8.03	6.45	9.38	4.29	5.52
Var ($b_{.2}$)	93.24	104.42	92.54	93.51	107.09	94.10	92.76	103.12	93.77
Cov ($b_{1.}$,$b_{.2}$)	-2.77	-11.09	1.73	-4.20	-15.11	-0.55	-2.11	-7.41	0.71

Table 4
Districts with the most advanced and districts with the slowest fertility transition: 1991-2011

Year		District with the most advanced transition			District with the slowest transition		
		Name	State	*FTI*	Name	State	*FTI*
1991	Total	Pathanamthitta	Kerala	0.855	Upper Subansiri	Arunachal Pradesh	0.235
	Rural	Ernakulam	Kerala	0.856	Tuensang	Nagaland	0.232
	Urban	Pathanamthitta	Kerala	0.852	West Sikkim	Sikkim	0.2
2001	Total	Alappuzha	Kerala	0.865	Tuensang	Nagaland	0.248
	Rural	Alappuzha	Kerala	0.868	Tuensang	Nagaland	0.239
	Urban	Pathanamthitta	Kerala	0.864	West Khasi Hills	Meghalaya	0.265
2011	Total	Pathanamthitta	Kerala	0.918	Badgam	Jammu and Kashmir	0.36
	Rural	Pathanamthitta	Kerala	0.919	Badgam	Jammu and Kashmir	0.343
	Urban	Alappuzha	Kerala	0.911	Kupwara	Jammu and Kashmir	0.374

Table 5
Classification of districts by population characteristics and stage of fertility transition

SN	Population characteristics			Number of districts	Stage of fertility transition					
	Female literacy rate	Population sex ratio	Population engaged in non-agricultural pursuits		Early		Middle		Advanced	
					Number	%	Number	%	Number	%
1	≤ 66.12		≤ 14.25	250	36	14.40	200	80.00	14	5.60
2	≤ 66.12		> 14.25	120	17	14.17	72	60.00	31	25.83
3	> 66.12	> 981		85	2	2.35	15	17.65	68	80.00
4	> 66.12	≤ 981	> 18.57	105	10	9.52	42	40.00	53	50.48
5	> 66.12	≤ 942	≤ 18.57	34	4	11.76	27	79.41	3	8.82
6	>66.12	> 942	≤ 18.57	46	7	15.22	24	52.17	15	32.61
All districts				640	76	11.88	380	59.38	184	28.75

Table 5

Districts by stage of fertility transition across states/Union Territories: 1991-2011

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
									1991									
India	21	324	98	9	0	452	29	327	81	9	0	446	14	261	157	9	0	441
Regions																		
North	0	25	25	0	0	50	0	29	21	0	0	50	0	10	38	0	0	48
Central	6	174	1	0	0	181	10	170	1	0	0	181	10	165	6	0	0	181
East	15	64	4	0	0	83	19	60	2	0	0	81	4	39	33	0	0	76
West	0	25	24	0	0	49	0	29	19	0	0	48	0	19	29	0	0	48
South	0	33	36	9	0	78	0	35	33	9	0	77	0	27	42	9	0	78
Union Territories	0	3	8	0	0	11	0	4	5	0	0	9	0	1	9	0	0	10
States/Union Territories																		
AN Islands	0	0	2	0	0	2	0	1	1	0	0	2	0	0	1	0	0	1
Andhra Pradesh	0	20	3	0	0	23	0	21	1	0	0	22	0	15	8	0	0	23
Arunachal Pradesh	3	8	0	0	0	11	3	8	0	0	0	11	0	7	0	0	0	7
Assam	4	19	0	0	0	23	4	19	0	0	0	23	1	7	15	0	0	23
Bihar	0	29	0	0	0	29	0	29	0	0	0	29	2	27	0	0	0	29
Chandigarh	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Chhattisgarh	0	7	0	0	0	7	0	7	0	0	0	7	0	7	0	0	0	7
DN Haveli	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1
Daman and Diu	0	1	1	0	0	2	0	1	1	0	0	2	0	0	2	0	0	2
Delhi	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Goa	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2
Gujarat	0	7	12	0	0	19	0	8	11	0	0	19	0	4	14	0	0	18
Haryana	0	11	5	0	0	16	0	13	3	0	0	16	0	5	11	0	0	16
Himachal Pradesh	0	4	8	0	0	12	0	5	7	0	0	12	0	0	10	0	0	10
Jammu & Kashmir																		
Jharkhand	1	12	0	0	0	13	2	11	0	0	0	13	0	13	0	0	0	13
Karnataka	0	10	10	0	0	20	0	10	10	0	0	20	0	8	12	0	0	20
Kerala	0	1	5	8	0	14	0	1	5	8	0	14	0	2	4	8	0	14
Lakshadweep	0	1	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	1
Madhya Pradesh	2	35	1	0	0	38	4	33	1	0	0	38	1	34	3	0	0	38
Maharashtra	0	18	12	0	0	30	0	21	8	0	0	29	0	15	15	0	0	30
Manipur	3	5	0	0	0	8	3	5	0	0	0	8	0	5	0	0	0	5
Meghalaya	3	2	0	0	0	5	4	1	0	0	0	5	1	4	0	0	0	5
Mizoram	0	3	0	0	0	3	1	2	0	0	0	3	0	3	0	0	0	3
Nagaland	2	5	0	0	0	7	4	3	0	0	0	7	1	6	0	0	0	7
Orissa	0	13	0	0	0	13	0	13	0	0	0	13	0	12	1	0	0	13
Puducherry	0	0	4	0	0	4	0	0	2	0	0	2	0	0	4	0	0	4
Punjab	0	0	12	0	0	12	0	1	11	0	0	12	0	0	12	0	0	12
Rajasthan	1	26	0	0	0	27	1	26	0	0	0	27	0	25	2	0	0	27
Sikkim	0	4	2	0	0	6	0	4	1	0	0	5	1	0	5	0	0	6
Tamil Nadu	0	2	16	1	0	19	0	3	15	1	0	19	0	2	16	1	0	19
Tripura	0	3	0	0	0	3	0	3	0	0	0	3	0	0	3	0	0	3

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Uttar Pradesh	2	52	0	0	0	54	3	51	0	0	0	54	7	47	0	0	0	54
Uttarakhand	0	9	0	0	0	9	0	9	0	0	0	9	0	5	4	0	0	9
West Bengal	0	15	2	0	0	17	0	15	1	0	0	16	0	7	10	0	0	17
									2001									
India	7	352	213	21	0	593	15	368	184	17	0	584	2	212	319	50	0	583
Regions																		
North	1	28	54	1	0	84	1	35	45	1	0	82	0	10	63	9	0	82
Central	2	226	20	0	0	248	6	227	15	0	0	248	1	169	78	0	0	248
East	4	71	19	0	0	94	8	70	15	0	0	93	1	22	63	2	0	88
West	0	15	45	0	0	60	0	20	38	0	0	58	0	5	49	5	0	59
South	0	10	68	18	0	96	0	13	65	16	0	94	0	6	59	31	0	96
Union Territories	0	2	7	2	0	11	0	3	6	0	0	9	0	0	7	3	0	10
States/Union Territories																		
AN Islands	0	0	2	0	0	2	0	0	2	0	0	2	0	0	0	1	0	1
Andhra Pradesh	0	2	21	0	0	23	0	4	18	0	0	22	0	0	22	1	0	23
Arunachal Pradesh	0	13	0	0	0	13	2	11	0	0	0	13	0	5	7	0	0	12
Assam	0	19	4	0	0	23	0	20	3	0	0	23	0	1	22	0	0	23
Bihar	0	37	0	0	0	37	0	37	0	0	0	37	0	37	0	0	0	37
Chandigarh	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Chhattisgarh	0	15	1	0	0	16	0	16	0	0	0	16	0	4	12	0	0	16
DN Haveli	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1
Daman and Diu	0	0	2	0	0	2	0	1	1	0	0	2	0	0	2	0	0	2

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Delhi	0	1	8	0	0	9	0	3	4	0	0	7	0	1	8	0	0	9
Goa	0	0	0	2	0	2	0	0	0	2	0	2	0	0	0	2	0	2
Gujarat	0	8	17	0	0	25	0	10	15	0	0	25	0	1	23	0	0	24
Haryana	0	8	11	0	0	19	0	10	9	0	0	19	0	0	19	0	0	19
Himachal Pradesh	0	2	9	1	0	12	0	2	9	1	0	12	0	0	2	8	0	10
Jammu & Kashmir	1	10	3	0	0	14	1	11	2	0	0	14	0	7	6	1	0	14
Jharkhand	0	17	1	0	0	18	0	18	0	0	0	18	0	15	3	0	0	18
Karnataka	0	7	19	1	0	27	0	8	18	1	0	27	0	6	18	3	0	27
Kerala	0	1	3	10	0	14	0	1	4	9	0	14	0	0	3	11	0	14
Lakshadweep	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	1
Madhya Pradesh	0	43	2	0	0	45	2	43	0	0	0	45	0	23	22	0	0	45
Maharashtra	0	7	28	0	0	35	0	10	23	0	0	33	0	4	26	5	0	35
Manipur	0	7	2	0	0	9	0	7	2	0	0	9	0	1	4	0	0	5
Meghalaya	2	5	0	0	0	7	2	5	0	0	0	7	1	6	0	0	0	7
Mizoram	0	7	1	0	0	8	0	8	0	0	0	8	0	4	3	0	0	7
Nagaland	2	6	0	0	0	8	4	4	0	0	0	8	0	4	4	0	0	8
Orissa	0	14	16	0	0	30	0	15	15	0	0	30	0	5	25	0	0	30
Puducherry	0	0	2	2	0	4	0	0	2	0	0	2	0	0	2	2	0	4
Punjab	0	0	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0	17
Rajasthan	0	32	0	0	0	32	1	31	0	0	0	32	0	18	14	0	0	32
Sikkim	0	3	1	0	0	4	0	3	1	0	0	4	0	0	4	0	0	4
Tamil Nadu	0	0	25	5	0	30	0	0	25	4	0	29	0	0	16	14	0	30

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Tripura	0	2	2	0	0	4	0	2	2	0	0	4	0	0	2	2	0	4
Uttar Pradesh	2	68	0	0	0	70	3	67	0	0	0	70	1	67	2	0	0	70
Uttarakhand	0	7	6	0	0	13	0	9	4	0	0	13	0	2	11	0	0	13
West Bengal	0	9	9	0	0	18	0	10	7	0	0	17	0	1	17	0	0	18
									2011									
India	0	75	380	183	2	640	0	99	383	146	3	631	0	14	322	299	2	637
Regions																		
North	0	8	33	56	0	97	0	8	39	48	0	95	0	3	18	74	0	95
Central	0	43	205	16	0	264	0	60	190	14	0	264	0	5	203	56	0	264
East	0	22	71	12	0	105	0	29	71	4	0	104	0	6	57	42	0	105
West	0	1	35	25	0	61	0	1	43	15	0	59	0	0	22	39	0	61
South	0	1	32	66	2	101	0	1	36	59	3	99	0	0	21	78	2	101
Union Territories	0	0	4	8	0	12	0	0	4	6	0	10	0	0	1	10	0	11
States/Union Territories																		
AN Islands	0	0	1	2	0	3	0	0	1	2	0	3	0	0	0	2	0	2
Andhra Pradesh	0	0	9	14	0	23	0	0	12	10	0	22	0	0	5	18	0	23
Arunachal Pradesh	0	4	12	0	0	16	0	4	12	0	0	16	0	2	11	3	0	16
Assam	0	5	19	3	0	27	0	6	19	2	0	27	0	0	10	17	0	27
Bihar	0	2	36	0	0	38	0	2	36	0	0	38	0	0	38	0	0	38
Chandigarh	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	1	0	1
Chhattisgarh	0	0	17	1	0	18	0	0	18	0	0	18	0	0	2	16	0	18
DN Haveli	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Daman and Diu	0	0	1	1	0	2	0	0	1	1	0	2	0	0	0	2	0	2
Delhi	0	0	2	7	0	9	0	0	3	4	0	7	0	0	2	7	0	9
Goa	0	0	0	2	0	2	0	0	0	2	0	2	0	0	0	2	0	2
Gujarat	0	1	16	9	0	26	0	1	22	3	0	26	0	0	4	22	0	26
Haryana	0	2	9	10	0	21	0	2	13	6	0	21	0	1	2	18	0	21
Himachal Pradesh	0	0	2	10	0	12	0	0	2	10	0	12	0	0	0	10	0	10
Jammu & Kashmir	0	6	13	3	0	22	0	6	13	3	0	22	0	2	12	8	0	22
Jharkhand	0	3	21	0	0	24	0	6	18	0	0	24	0	1	21	2	0	24
Karnataka	0	1	15	14	0	30	0	1	15	14	0	30	0	0	15	15	0	30
Kerala	0	0	1	11	2	14	0	0	1	10	3	14	0	0	1	11	2	14
Lakshadweep	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Madhya Pradesh	0	14	36	0	0	50	0	21	29	0	0	50	0	1	44	5	0	50
Maharashtra	0	0	19	16	0	35	0	0	21	12	0	33	0	0	18	17	0	35
Manipur	0	0	6	3	0	9	0	0	7	2	0	9	0	0	5	4	0	9
Meghalaya	0	4	3	0	0	7	0	7	0	0	0	7	0	1	6	0	0	7
Mizoram	0	3	5	0	0	8	0	5	3	0	0	8	0	0	8	0	0	8
Nagaland	0	6	5	0	0	11	0	7	4	0	0	11	0	3	8	0	0	11
Orissa	0	0	15	15	0	30	0	0	16	14	0	30	0	0	3	27	0	30
Puducherry	0	0	0	4	0	4	0	0	0	2	0	2	0	0	0	4	0	4
Punjab	0	0	0	20	0	20	0	0	0	20	0	20	0	0	0	20	0	20
Rajasthan	0	16	17	0	0	33	0	18	15	0	0	33	0	3	30	0	0	33
Sikkim	0	0	3	1	0	4	0	0	4	0	0	4	0	0	1	3	0	4

State	Total						Rural						Urban					
	VE	E	M	A	VA	All	VE	E	M	A	VA	All	VE	E	M	A	VA	All
Tamil Nadu	0	0	7	25	0	32	0	0	8	23	0	31	0	0	0	32	0	32
Tripura	0	0	3	1	0	4	0	0	4	0	0	4	0	0	0	4	0	4
Uttar Pradesh	0	8	63	0	0	71	0	13	58	0	0	71	0	0	65	6	0	71
Uttarakhand	0	0	7	6	0	13	0	0	8	5	0	13	0	0	2	11	0	13
West Bengal	0	0	15	4	0	19	0	0	18	0	0	18	0	0	8	11	0	19

Source: Author's calculations

Remarks: VE Very early stage of fertility transition ($FTI<0.3$)

E Early stage of fertility transition ($0.3 \leq FTI<0.5$)

M Middle stage of fertility transition ($0.5 \leq FTI<0.7$)

A Advanced stage of fertility transition ($0.7 \leq FTI<0.9$)

VA Very advanced stage of fertility transition ($FTI \geq 0.9$)

Figure 1
Fertility transition in India: 1991-2011
(All figures are proportions)

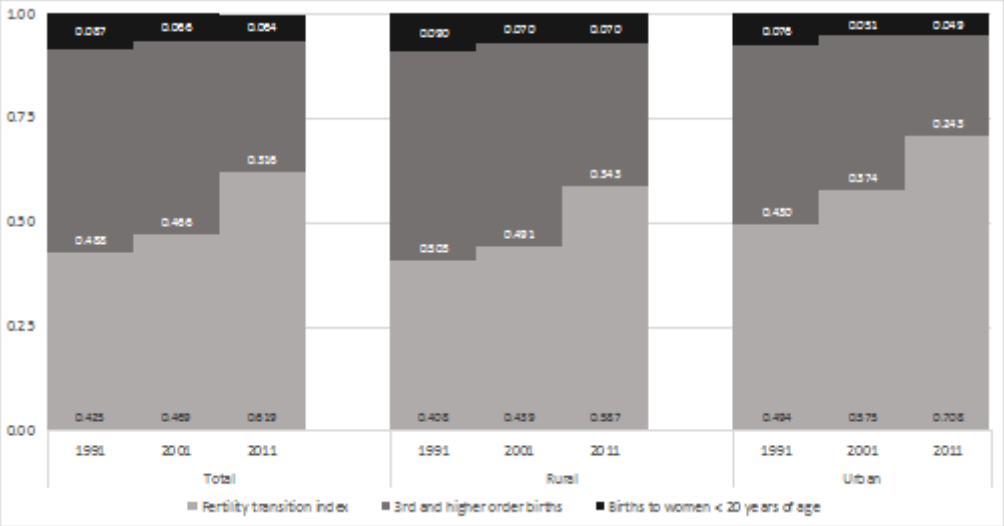


Figure 2
Fertility transition in states/Union Territories: 1991-2011

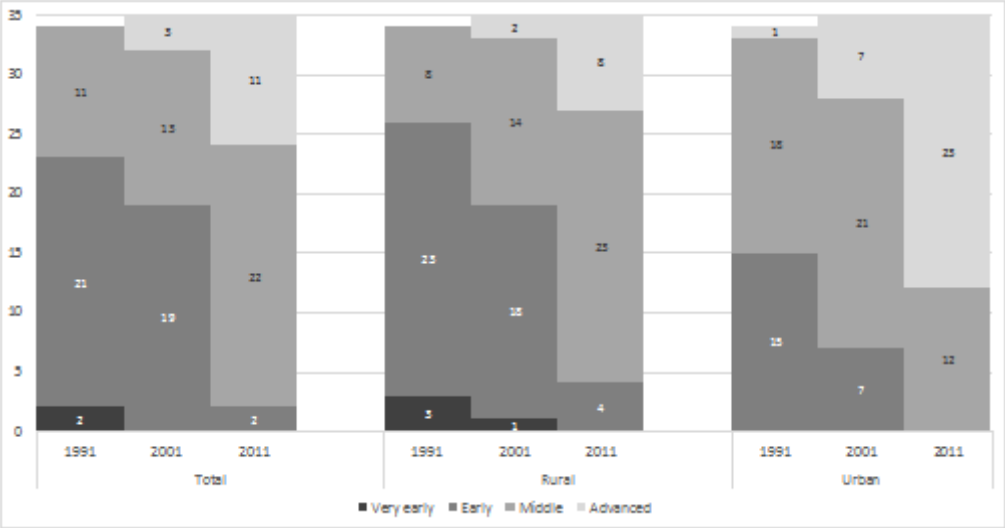
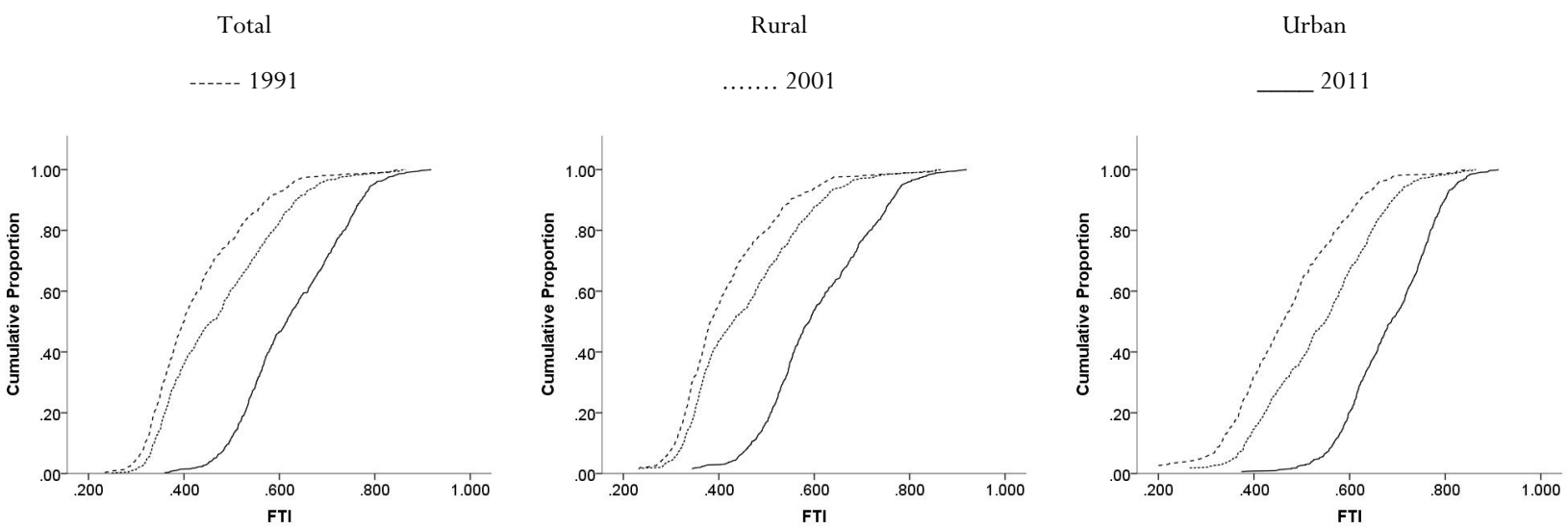
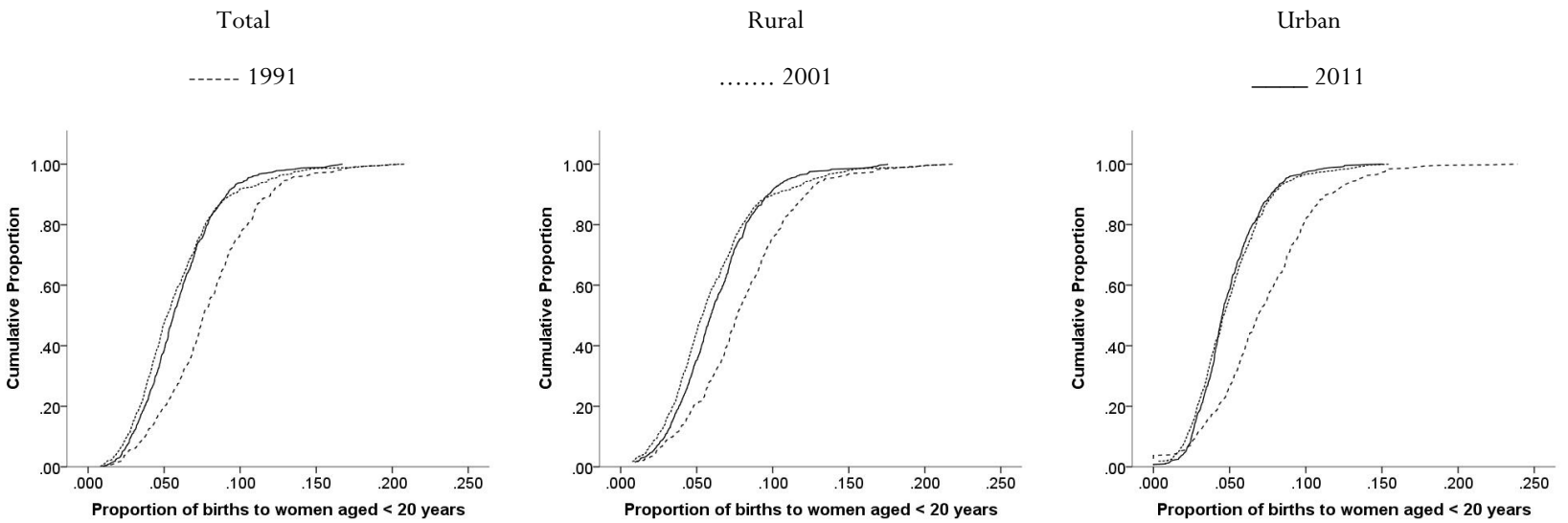


Figure 3

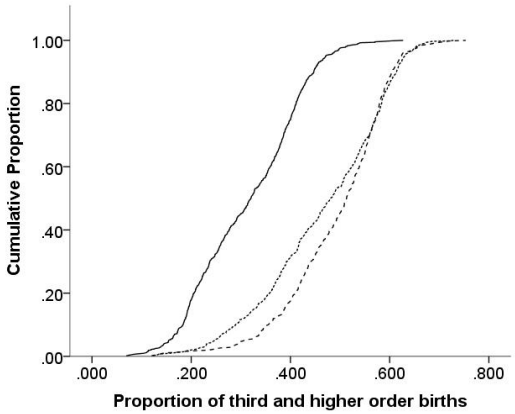
Cumulative distribution of districts by *FTI*, proportion of births to women aged less than 20 years and proportion of 3rd and higher order births




Total
Rural
Urban
------ 1991
……. 2001
____ 2011
Cumulative Proportion
1.00
.80
.60
.40
.20
.00
.000
.050
.100
.150
.200
.250
Proportion of births to women aged < 20 years

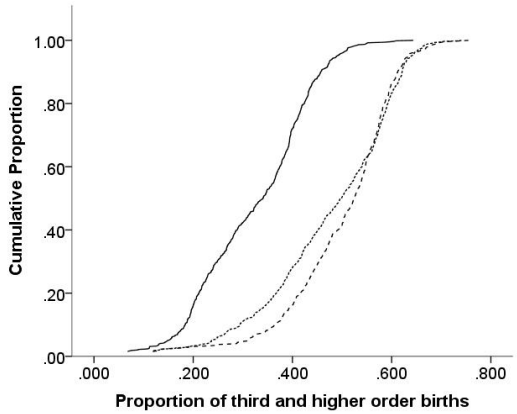
Total

------ 1991



Rural

……. 2001



Urban

____ 2011

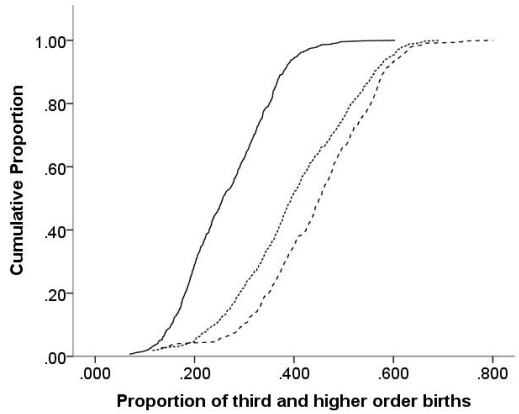


Figure 4
The classification tree