

# Fertility Levels, Trends and Differentials in India

Jitender Saroha,

Associate Professor, Dr.B.R.Ambedkar College, University of Delhi, Delhi.

**Abstract:** Fertility represents occurrence of live births. Every aspect of human life is influenced by it. The analysis of fertility levels, trends and differentials is of great significance not only in the context of increasing gap between population growth and resources but also for efficient administration and sustainable development of all sections of the society. Fertility along with mortality and migration plays a significant role in population dynamics. The commonly used measures of fertility are crude birth rate (CBR), general fertility rates (GFR), age-specific fertility rates (ASFR), total fertility rate (TFR) and gross reproductive replacement (GRR). The objectives of the present paper are following: (i) to define commonly used measures of fertility; (ii) to describe fertility levels in India; (iii) to represent trends of fertility in India; and (iv) to explain fertility differentials in India with respect to major determinants of fertility.

**Key Words:** Fertility, Measurements, Trends, Differentials and Determinants.

## 1. Introduction

According to Thompson and Lewis (1965) the term fertility is generally used to indicate the actual reproductive performance of a woman or groups of women. They further stated that fertility of women has always been a matter of vital concern to all peoples. Fertility simply represents occurrence of live births. Every aspect of human life is influenced by it. The analysis of fertility levels, trends and differentials is of great significance not only in the context of rising gap between demand side (population growth) and supply side (economic resources) but also for efficient political administration and sustainable development of all sections of the society. Fertility along with mortality and migration plays a significant role in population dynamics.

## 2. Measurements of Fertility

Various measures of fertility have been devised and used by demographers and population geographers. The most commonly used measures of fertility are crude birth rate (CBR), general fertility rates (GFR), age-specific fertility rates (ASFR), total fertility rate (TFR) and gross reproductive replacement (GRR). Crude birth rate represents number of live births per thousand persons in a year. It is crude because total population is taken into consideration and not the reproductive population. A more refined measure is fertility ratio or child-women ratio which represents number of children (0-4 years) per thousand of women in reproductive age group. General fertility is slightly refined measure as it represents number of live births per thousand of women of reproductive age-group (15-49 years). This measure of fertility fails to show variations within this reproductive group to overcome this limitation age specific fertility rates are used. Age-specific fertility rates represent number of live birth in a particular age-group (e.g. 25-29 years) per thousand of women in that particular age-group. Total fertility rate is a more meaningful cross-sectioned measure. It simply represents total average number of live births by a woman during her reproductive life span as per the prevailing age-specific fertility rates. Reproductive replacement represents number of live births of girls per thousand of females in reproductive age-group (Box 1). The Census of India data provides information about CBR and child-women ratio. But for age specific fertility rates, total fertility rates and other measures

of fertility SRS (Sample Registration System) and NHFS (National Health and Family Survey) surveys provide more detailed and frequent information though these two sources also show different values for a fixed time and place.

### Box 1. Measures of Fertility

$$\text{Crude Birth Rate} = \frac{\text{Number of live births in a year}}{\text{Total mid-year population}} \times 1000$$

$$\text{Fertility Ratio or Child-Women Ratio} = \frac{\text{Number of children under 5 years (0-4)}}{\text{Number of women in child bearing age (15-49)}} \times 1000$$

$$\text{General Fertility Rate} = \frac{\text{Number of live births in a year}}{\text{Number of women in child bearing age (15-49)}} \times 1000$$

$$\text{Age-Specific Fertility Rate} = \frac{\text{Number of live births by a given age-group}}{\text{Total female population in that age-group}} \times 1000$$

$$\text{Total Fertility Rate} = \frac{\sum \text{ASFR} \times \text{Age interval}}{1000}$$

$$\text{Gross Reproductive Replacement} = \frac{\text{Number of live births of girls in a year}}{\text{Number of women in child bearing age (15-49)}} \times 1000$$

### 3. Current Fertility Levels

The SRS report of 2016 reflects the current levels of fertility at National and State levels on the basis of different measures of fertility (Table 1). As per this report crude birth rate in India is 20.4 live births per thousand persons and general fertility rate is 74.4 live births per thousand females in reproductive age group. As per the prevailing age specific fertility rate on an average a woman gives birth to 2.3 children and it represents total fertility rate. The gross reproductive rate is 1.1 and it means that one woman in reproductive age group gives birth to 1.1 girls. As per the New Population Policy of India (2000) the target was to reduce total fertility rate to 2.1 children by the year 2010 but even in 2016 the total fertility rates are higher. The CBR, CFR, GPR all represent similar levels of fertility because all are measures of fertility. The State-wise comparison of fertility levels represents a wide diversity. Fertility rates are high in Bihar (3.3), Uttar Pradesh (3.1), Madhya Pradesh (2.8), Rajasthan (2.6), Jharkhand (2.6) and Chhatishgarh (2.5). But on the other hand, there are many states where TFR is less than RR i.e. reproductive replacement below 1.0. These states are –, Delhi (0.7), Andhra Pradesh (0.8), Himachal Pradesh (0.8), Jammu and Kashmir (0.8), West Bengal (0.8), Tamil Nadu (0.8), Telangana (0.8), Kerala (0.8), Maharashtra(0.8), Punjab (0.8), Odisha (0.9) and Karnataka (0.9). The National Family and Health Survey 4 (2015-16) data shows CBR and TFR in India, 19 and 2.18 respectively, which are slightly lower than in the SRS data but levels of fertility at national and state levels are more or less similar in both the data sources.

**Table 1. Fertility Levels in India and Bigger States/UTs, 2016**

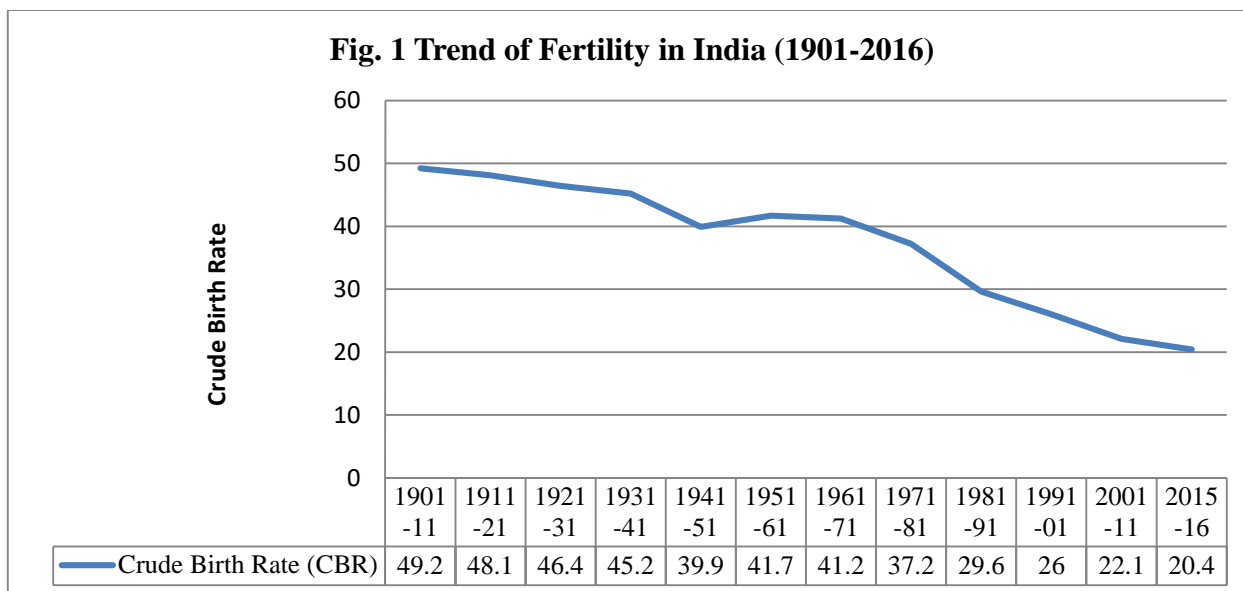
Region	CBR	GFR	TFR	GRR
India	20.4	74.4	2.3	1.1
Andhra Pradesh	16.4	56.4	1.7	0.8
Assam	21.7	78.2	2.3	1.1
Bihar	26.8	105.6	3.3	1.6
Chhattisgarh	22.8	81.8	2.5	1.2
Delhi	15.5	55.2	1.6	0.7
Gujarat	20.1	74.0	2.2	1.1
Haryana	20.7	77.5	2.3	1.0
Himachal Pradesh	16.0	56.2	1.7	0.8
Jammu & Kashmir	15.7	53.5	1.7	0.8
Jharkhand	22.9	84.6	2.6	1.3
Karnataka	17.6	61.4	1.8	0.9
Kerala	14.3	51.1	1.8	0.8
Madhya Pradesh	25.1	94.2	2.8	1.3
Maharashtra	15.9	58.5	1.8	0.8
Odisha	18.6	66.3	2.0	0.9
Punjab	14.9	55.2	1.7	0.8
Rajasthan	24.3	89.7	2.7	1.2
Tamil Nadu	15.0	53.4	1.6	0.8
Telangana	17.5	58.8	1.7	0.8
Uttar Pradesh	26.2	97.3	3.1	1.4
Uttarakhand	16.6	62.9	1.9	0.8
West Bengal	15.4	53.4	1.6	0.8

Source: SRS Report 2016

#### 4. Trends of Fertility in India

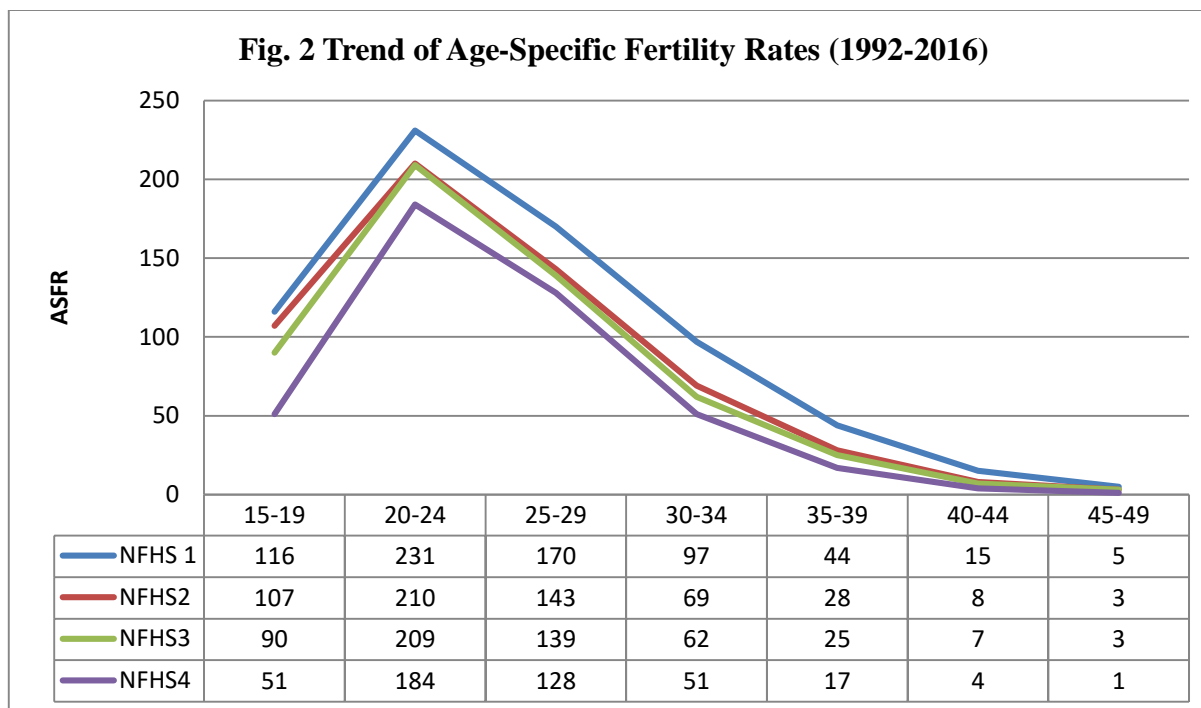
An analysis of crude birth rates from 1901 to 2016 reveals that fertility rates in India remained very high in the first half of the twentieth century. Kingsley Davis (1951) in his work on 'The Population of India and Pakistan' concluded that fertility rates in India are high and an early and substantial decline in fertility seems unlikely until some deliberate control by means of contraception is not introduced. After independence in the planned era of development, in the very first Five Year Plan in 1952, India was the first country in the world to introduce a national programme emphasizing family planning to the extent necessary for reducing birth rates to stabilize the population at a level consistent with the requirement of national economy. The family planning approach was followed in successive Five Year Plans. As predicted by Davis, the fertility rates without any substantial changes remained very high i.e. more than 40 live births per thousand of population in 1950s and 1960s due to 'clinical approach' of family planning measures.

The high fertility rates were due to socio-cultural and economic conditions like universal and early marriage, preference for male child, patriarchal agrarian rural society, and high infant mortality and child mortality rates. Even after the absence of modern methods of contraception the fertility rates were counteracted by factors operating in opposite direction such as the low incidence of widow remarriage, different taboos governing sexual indulgence, prolonged phases of lactation and post partum amenorrhoea. Therefore, fertility rates in India remained high and stable for such a long period (Fig.1).



Fertility rates started declining at a faster pace in 1970s and 1980s. The crude birth rates declined from around 40 per thousand in 1971 to about 30 per thousand in 1991. The next same level drop has taken about 25 years and CBR in 2016 is around 20 per thousand. The total fertility rate in India in 1961 was 5.6 children, in 1981 it declined to 4.5 children, in 1992-93 (NFHS 1) it declined to 3.4 children, in 1998-99 (NFHS 2) it declined to 2.85, in 2005-06 (NFHS 3) it declined to 2.68 children and finally in 2015-16 (NFHS 4) is further declined to 2.18 children though as per the National Population Policy 1976 the target of CBR 25 per thousand was to be achieved by 1985 and according to New National Population Policy 2000 total fertility target of 2.1 was to be achieved by 2010. Even after introduction of family planning programme and population policies fertility decline has not been of the desired level. These programmes and policies have been ‘a saga of great expectations and poor performance’ (Srinivasan, 1998).

The trend of age-specific fertility rates (ASFR) during the four National Family and Health Surveys indicates sharp decline in fertility rates in the age group 15-19, in this age group the number of live births were 116 in 1992-93 but in 2015-16 it has declined to 51 live births. The ASFR of last three age groups (35-39, 40-44 and 45-49 years) has declined from 64 to 22 live births during this time period. In all age groups the fertility rates have declined still the most reproductive age group is 20-24 years (Fig.2). In trend of fertility decline at state level shows demographic divide between northern states and southern states. The fertility decline to the desired levels was first of all recorded in southern states namely – Kerala, Tamil Nadu, Andhra Pradesh and Karnataka. But fertility rates have remained high over the period in so called BIMARU states like Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh.



Source: NFHS (National Family Health Surveys).

## 5. Determinants of Fertility Differentials

### 5.1. Biological Factors

The most important biological factor directly affecting fertility is fecundity. Fecundity refers to the reproductive potential of woman. Fertility is indispensably limited to the reproductive life span of a woman which extends from the age of attainment of puberty i.e. start of menstruation to the age of menopause. Generally, females in the age group 15 – 49 represent the reproductive age group. The genetic fertility of man is also an equally significant factor contributing directly in fertility. In case of males fecundity or fertile period begins from age of around eight years and may continue till the end of life.

### 5.2. Universal and Early Marriage

In India family is the unit of reproduction and marriage provides the base for family formation. Marriage through woman's exposure to risk of pregnancy directly contributes in fertility. Therefore, universal and early marriages are primary indicators of this exposure and associated high fertility. In Indian society marriage is considered as a social necessity. In the social groups such as Muslims, lower castes and scheduled tribes where the practice of remarriage and widow marriage and polygamy are more common the fertility rates are relatively higher.

In comparison to MDCs (More Developed Countries) in India the mean age at marriage is low and consequently the fertility rates are high. There is inverse relationship between fertility and mean age at marriage. Early marriage provides early and prolonged opportunities through exposure to risk of pregnancy during the reproductive age of a woman. Therefore results into high total fertility rates. The role of mean age of females at marriage in high fertility rates have been well established in studies conducted by scholars like Talwar and Seal. In 2005-06 (NFHS 3) women age 20-24 married by age 18 years is 47.4 per cent and by 2015-16 (NFHS 4) it declined to 17.5 per cent.



In 1901 the mean age at marriage for females in India was 13.1 years, in 1921 it was 13.7 years, it improved to 15.8 years in 1961, and it further improved to 17.2 years in 1981 and to 18.4 years in 2001 and to 19.2 years in 2011. The tradition of early marriage dominated due to social and cultural belief that girl should be married before she attains puberty and also due to illiterate agrarian rural conditions. Mean age at marriage is high among Christians, highly educated females and in urban areas and as compared to Muslims, lower caste groups and scheduled tribes and rural areas. Keeping in view the National Population Policy of 1976, from 1978, the legal minimum age at marriage has been 21 for males and 18 for females, but child marriages are still common. The births by the age of 20 years are also common though in new National Population Policy 2000 it was stated that girls should be married preferably after 20 years of age. The age-specific fertility rates in age group 15-19 years were 116 live births per thousand of females in this age group in NHFS 1 (1992-93) and they declined to 51 live births per thousand in this age group in NHFS 4 (2015-16).

### 5.3. Religion and Fertility

Religion is a significant factor affecting fertility. In all religions the birth of the child is considered as an act of god or child as gift of god and any interference in the form of contraceptives or abortion is considered as immoral. But the level of control of religion on fertility varies religion to religion and also from time to time. Fertility differentials in different religious communities of India are common (Table 2). Muslims have highest fertility rates in different religious communities of India, followed by Hindus and Christians on the other hand Janis have lowest fertility rates. The trend shows that fertility rates have declined in all religious communities but at different rates. Fertility differentials on religion basis have been revealed in studies conducted by Driver (1963) and Vasaria (1974).

**Table 2. Religion and Fertility Differentials**

Religion	Total Fertility Rate			
	NHFS 1 (1992-93)	NHFS 2 (1998-99)	NHFS 3 (2005-06)	NHFS 4 (2015-16)
Hindu	3.30	2.78	2.59	2.13
Muslim	4.41	3.59	3.40	2.62
Christian	2.87	2.44	2.34	1.99
Sikh	2.43	2.26	1.95	1.58
Buddhist/Neo-Buddhist		2.13	2.25	1.74
Jain		1.90	1.54	1.20
Others	2.77	2.33/3.91 (No religion)	3.98	2.57

Fertility differentials on religion basis have been explained by scholars on two bases – firstly, by associating fertility decisions with religious beliefs of different religions and secondly the socio-economic background of different religions. The degree and type of value system attached to early marriage, widow remarriage, abstinence and religious purity and adoption of modern contraceptives varies among religions and is reflected to a certain level in fertility differentials. Majority scholars have highlighted that role of religious beliefs in fertility differentials is less significant as compared to the socio-economic characteristics of different religions. The Muslim population growth in poorer states like Bihar and Uttar Pradesh is higher as compared to Muslim population growth rates in states like Tamil Nadu and Kerala where their growth rates are lower even to national average. Level of education, age at marriage and work participation of Muslim women are far more significant determinants in their fertility than religion.

#### 5.4. Education Status and Fertility

Education, especially of females (since they bear the primary responsibility for child-rearing) is an important determinant of fertility. The relationship between these two is inverse i.e. fertility rates decrease with improvements in levels of literacy and education (Table 3). The data shows that in 2015-16 illiterate mothers without schooling have TFR of about 3 children whereas mothers with 12 years of schooling and above literacy have TFR of only 1.71 children. Literacy and education change the attitude and broaden horizon of people towards socio-cultural barriers in the path of low fertility and small size family norm. Prolonged mass female illiteracy and high primary school drop-out rates has played a significant role in high fertility in India especially in rural areas.

**Table 3. Educational Background and Fertility**

Educational Background	Total Fertility Rate			
	NHFS 1 (1992-93)	NHFS 2 (1998-99)	NHFS 3 (2005-06)	NHFS 4 (2015-16)
No schooling	4.03	3.47	3.55	3.07
<5 years complete	3.01	2.64	2.45	2.43
5-7 years complete	2.49	2.26	2.51	2.38
8-9 years complete	2.15		2.23	2.19
10-11 years complete	-	1.99	2.08	1.99
12 or more years complete	-		1.80	1.71

Drèze and Murthi (2001) have highlighted the role of female education in reducing fertility and family size. According to them, female education helps in reducing the family size to desired levels for a number of reasons. First, female education widens the opportunities for women and to avail these opportunities repeated child-bearing is to be avoided. Second, education of females reduces their dependence on sons for social recognition or as old age security. This reduces preference of sons in reproduction and fertility decreases. Third, educated women have higher aspirations for their children and lower expectations from them in terms of labour services. They prefer to give more time per children than more number of children. Fourth, educated women are more aware and receptive to modern family planning measures and prefer small family size norm. In addition to these, education increases the mean age at marriage and also provides opportunity for women empowerment resulting in low fertility.

#### 5.5. Economic Factors and Fertility

Among the economic factors level of income is the most significant one. A negative correlation has been noticed between income level and family size. The higher income groups though can afford more number of children and large family size but they prefer small size of family and, therefore, have lower fertility rates. On the other hand, lower income group or poor persons cannot afford more children and large families but they have higher fertility and large family size (Table 4). For instance, in wealth index the lowest income population group has TFR of 3.17 and highest income group has TFR of 1.54 which is half of the lowest income group. In lower income group or poor families child is considered as an economic asset as the potential source of augmenting the family income.

**Table 4. Income Levels and Fertility**

Wealth Index	Total Fertility Rate			
	NHFS 1 (1992-93)	NHFS 2 (1998-99)	NHFS 3 (2005-06)	NHFS 4 (2015-16)
Lowest	-	3.37	3.89	3.17
Second	-	-	3.17	2.45
Middle	-	2.85	2.58	2.07
Fourth	-	-	2.24	1.84
Highest	-	2.10	1.78	1.54
Total	3.39	2.85	2.68	2.18

According to demographic transition theory the pre-requisite of fertility decline is economic development. Demographic transition from high to low levels of fertility is considered by some scholars as a by-product of economic growth and rising incomes. The direct and indirect costs of rearing the children increases in higher income groups and the utilities from children remain limited, therefore, family size becomes smaller as income levels move on the higher side. According to economic theories of fertility the rising costs and declining economic values of children as productive agents and as old age security drives the high income parents towards small size family norms. Another economic argument is that the focus shifts on quality and not quantity of children as couples move towards higher income levels. Further, child rearing is a time taking process and high income people work hard so that they can use time for satisfaction of personal aspirations, wills, dreams and goals. In India, though in minority, DINK (Double Income No Kid) families have also gained significance.

Occupation also affects fertility behaviour. In primary activities job opportunities are always present for children. Poor farmers try to increase physical product by increasing the labour force through high rate of reproduction. As Indian society has remained agrarian and predominantly rural the prevalence and preference for larger families has prevailed.

Working status of women especially in secondary and tertiary sectors has also a great influence on fertility. The involvement of women in gainful employment increases the burden of responsibilities along with domestic work, therefore, fertility decreases. Further, exposure to outside world increases their level of awareness towards birth control measures and significance of family planning.

Level of urbanization is generally inversely related to fertility. The social and economic environments in rural and urban areas differ significantly. In India urban areas have maintained low fertility levels as compared to rural areas (Table 5).

**Table 5. Rural Urban Fertility Differentials**

Region	Total Fertility Rate			
	NHFS 1 (1992-93)	NHFS 2 (1998-99)	NHFS 3 (2005-06)	NHFS 4 (2015-16)
Urban	2.70	2.27	2.06	1.75
Rural	3.67	3.07	2.98	2.41



## 5.6. Social Development and Fertility

The empirical validity of the role of economic factors in bringing a decline in fertility was questioned in context of the fertility decline observed in Kerala and to a great extent in Tamil Nadu also. Fertility decline in Kerala occurred without high rates of economic growth, industrialization, high levels of per capita income and urbanization. By 1980s it was established that for demographic transition in south India especially in Kerala social development is the primary determinant (Table 6). Overall very high level of literacy and access to public health services improved health status of people and indicated high level of social development. Female literacy and low infant mortality rates played a very significant role in fertility decline in Kerala and Tamil Nadu (Krishnan 1976, Bhat and Rajan 1990). Print media and electronic media have also played a significant role in fertility decline in Kerala, Tamil Nadu and Andhra Pradesh.

**Table 6. State-wise Fertility, Infant Mortality Rate and Literacy Rates (%)**

Region	TFR (2016)	IMR (2016)	Literacy (2011)
Bihar	3.3	38	63.82
Uttar Pradesh	3.1	43	69.71
Assam	2.3	44	73.18
Odisha	2.0	44	73.45
Kerala	1.8	10	93.91
Himachal Pradesh	1.7	25	83.78
Goa	1.4	08	87.40
India	2.3	34	74.04

Source: SRS 2016 and Census of India 2011.

## 5.7. Role of Community

Dev, James and Sen (2002) in their article titled 'Causes of Fertility Decline in India and Bangladesh' highlighted the role of community in fertility decline. According to them the conventional approaches in studies on fertility decline have long assumed the primacy of the household factors such as economic standard of living, social status, exposure to mass media and work status as the main decision-maker. However, these individual and household level factors fail to explain fertility decline in some regions of India where fertility transition cuts across socio-economic and cultural boundaries. In these geographical regions the fertility transition is mainly outcome of level of interactions at household and community levels. Even in conditions of low standard of living, low level of literacy and lack of modernization these areas have recorded fertility decline and it is because of community factor. In Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal fertility decline has taken place without economic advancement and even without social development like high female literacy and low infant mortality rates which operated in fertility transition in Kerala. Though the decision on the number of children and contraceptive use is purely private affair but it is shaped in some areas due to community interactions. As members of large groups, women get opportunity to discuss and learn from experiences of one another and change their attitude to overcome social constraints in adoption of modern contraception techniques. Self-help groups have provided main channels of social interaction in many regions of India for fertility transition.

## 5.8. Birth Control Measures

Family planning measures like use of contraceptive and abortion have played a very significant role in fertility transition in India. Before the introduction of National Population Policy (NPP) of 1976, India followed 'clinical approach', 'extension approach' and 'cafeteria approach' to increase the supply of a

variety of modern birth control measures free of cost to users by using mass media campaigns for public awareness. In 1971 couple protection rate (CPR) is just 10 per cent. As population explosion was at peak, in 1976 NPP was introduced with a vision that to wait for education to bring a drop in fertility is not a practical solution, the time factor is so pressing and problem is formidable that direct assault on fertility as a national commitment is required. It means government realized that contraceptive development is the best development or contraceptives are the best contraceptive. According to NHFS 4 (2015-16) 53.5 per cent of the currently married women in age 15-49 years use family planning methods and 47.8 per cent use modern methods. Female sterilization is still the most popular contraceptive method, used by 36 percent of currently married women (Table 7). Sixty-nine percent of modern contraceptive method users obtained the method from the public health sector. Many scholars have described the significance of diffusion theory i.e. the spread of birth control techniques or family planning measures in different areas over the period of time as a significant factor in bringing fertility decline. For instance, the current use of family planning methods in Kerala is more than twice as compared with Bihar.

**Table7. Current Use of Family Planning Methods (per cent currently married women age 15-49 years)**

Methods	India	Kerala	Bihar
Any Method	53.5	53.1	24.1
Any Modern Method	47.8	50.3	23.3
Female Sterilization	36.0	45.8	20.7
Male Sterilization	0.3	0.1	0.0
IUD/PPIUD	1.5	1.6	0.5
Pill	4.1	0.2	0.8
Condom	5.6	2.6	1.0

Source: NHFS 4.

## 5.9. Government Policy

The government policies like population policy, education policy, health policy and other policies all play significant role in determining the levels and trends of fertility. In the era of planned development from the very First Five Year plan the government of India has focused on family planning. In 1976 in NPP the slogan of 'we two ours two' was coined to achieve CBR 25 per thousand by the year 1985 but the government failed to achieve this target and it was achieved by year 2002. In the new population policy 2000, the medium term goal was to reduce TRF to 2.1 by the year 2010 which is still to be achieved. The long term goal of the new policy is to achieve population stabilization by 2045. This policy is based on the thinking that 'development is the best contraceptive'. In addition to national population policies state level population policies and efforts to implement them have a significant role in fertility transition. All these population policies through incentives and disincentives help in reducing fertility.

## Conclusion

Every aspect of human life is influenced by fertility. The analysis of fertility levels, trends and differentials is of great significance not only in the context of increasing gap between population growth and resources but also for efficient administration and sustainable development of all sections of the society. In case of India the population policies and programmes has been a saga of great expectations but poor performance. The trend of fertility is towards declining side but the rate of decline has remained low especially in the populous states of north India. Age at marriage, literacy and level of education, infant mortality rates,

diffusion of family planning measures and improvements in level of income are major factors responsible for fertility differentials, levels and trends.

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