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## Spatio-Temporal Dimensions of Fertility in India: A Perspective on Rural-Urban Disparity

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*Abstract:*
*Fertility is continuously declining in India. Therefore, over the past few years, there has been an increasing interest among researchers as well as Indian policy-makers in the fertility decline in India. But the studies having their focus on the rural-urban disparity in fertility are only a few to count.*

*The present study has endeavoured, therefore, to explain the spatio-temporal dimensions of fertility and patterns of rural-urban disparity in fertility in India. Data for the present analysis have been drawn mainly from the Sample Registration System (SRS) which is being maintained by the Registrar General of India. The crude birth rate, which is the most common index of fertility, has been adopted for the analysis of spatio-temporal dimensions of fertility and patterns of rural-urban disparity in fertility in India. The absolute differential in the crude birth rate of rural-urban residence has been calculated by simply subtracting the urban CBR from the rural CBR. However, the relative differential, also known as disparity ratio, has been found by working out the ratio between the two rates, e.g. Rural:Urban, i.e. 30.9 : 24.3 = 1.27: 1. Though, these are two different views of disparity from different angles, but both suffer from a common vagary of grouping dissimilar areas into the same type.*

*Hence, a more sophisticated technique is required to measure the disparity between two segments. Therefore, disparityindices for crude birth rates were computed on the basis of  Sopher's Disparity Index (1974), as modified by Kundu and Rao (1982).*

*During the period of four decades between 1971 and2007, the crude birth rate for India declined gradually from 36.9 live births per thousand in 1971 to 23.1 live births per thousand population in 2007. The declining trend in crude birth rates was also observed both in rural (38.9 in 1971 to 24.7 in 2007) and urban (30.1 in 1971 to 18.6 in 2007) areas. The intensification of the family planning programmes; increase in literacy rate, rise in age at marriage, the high female participation rate in the non-agricultural activities, and reduction in marital fertility specially at the advanced ages due to the acceptance of family planning measures (mostly of sterilization) seem to be among the factors underlying the recent decline in fertility in India.*

*The resulting rural-urban differential in birth rates with certain ups and downs also registered a declining trend from 8.8 per thousand in 1971 to 6.1 per thousand in 2007. This is because of increasing awareness among rural masses about social values and adoption of various birth control measures.*

*In regional perspective, the rural-urban differentials in crude birth rates in India reveal that the CBR is declining continuously over the period of time in all the states and union territories. In 1971, the maximum rural-urban differential in CBR was observed in the state of West Bengal (17.0 per 1000) and followed by north-eastern states of Meghalaya (15.5 per 1000), Tripura (14.1 per 1000), Arunachal Pradesh (12.7 per 1000) and north-western states of Himachal Pradesh (14.3 per 1000), Haryana (11.8 per 1000), and Jammu & Kashmir (11.7 per 1000). On the other hand, the minimum rural-urban differential in CBR was noticed in the southern states of Orissa (1.7 per 1000) and Kerala  (1.7 per 1000) where birth rates are high in both rural and urban areas.*

*However, in 2007, the maximum rural-urban differential in CBR was observed in the state of Assam (10.2  per 1000) and followed by the states of Meghalaya (9.1 per 1000), Madhya Pradesh (9.0 per 1000), Jharkhand (8.8 per 1000), Mizoram (8.8 per 1000) and Chhattisgarh (8.4 per 1000). On the contrary, the minimum rural-urban differential in CBR was noticed in the southern states of Kerala  (0.3 per 1000) and Tamil Nadu (0.3 per 1000), followed by the states of Sikkim (0.7 per 1000), Maharashtra (1.4 per 1000), Nagaland (1.6 per 1000), and Punjab (1.9 per 1000) where birth rates are high in both rural and urban areas. Goa (-2.8 per 1000) and Manipur (-0.8 per 1000) are the two states and Lakshadweep (-0.4 per 1000) is the only union territory which experienced negative rural-urban differential in CBR. These are the states and union territories where the birth rates reduced drastically both in rural and urban areas, but more in rural areas over a span of  four decades. Spatially speaking, there are wide regional variations in rural-urban disparity in crude birth rates, which is more marked in the north-east India as well as West Bengal, Jharkhand and Chhattisgarh. On the other hand, low disparity is found in most of the south Indian states. On the basis of the value of disparity indices, the highest disparity is found in Assam (0.2443), whereas it is lowest in Kerala (0.0096).*

*The state of Manipur (- 0.0254) in the north-east and a minor state of Goa (- 0.0913) on the western coast of peninsular India are characterized by negative rural-urban differential disparity in CBR. Here, urban birth rate is higher than its rural counterpart, because of the high rural literacy rate, including rural female literates,high  level of urbanization  and high status of women.*

*Amongst the union territories, the maximum disparity is found in Chandigarh (0.2070), whereas it is minimum in Puducherry (0.0155). Lakshadweep (-0.0104) and Dadra & Nagar Haveli (-0.0496)  are the only union territories which are characterized with negative rural-urban disparity in CBR, because of the prevalence of high crude birth rate in urban areas (18.5 and 30.0 live births per thousand respectively) than their rural counterparts (18.1 and 27.2 live births per thousand respectively).*

## 1. Introduction

India is characterized by a considerable degree of heterogeneity of her population with regard to their cultural history, traditional values and norms of the people as they influence their nuptiality patterns, family size norms, contraceptive use and fertility behaviour. As a consequence of modernization, the traditional values that have kept natural fertility in most parts of the country at a moderately high level for centuries in the past are breaking down with different pace in different states both in urban and rural areas than their rural counterparts resulting into rural-urban differential in fertility.

The total fertility rate (TFR), which is the average number of children a woman would bear if she experienced current age-specific fertility rates during her reproductive years, is 2.8 births per woman in the country as a whole in 2006. The TFR is 3.1 in rural areas and 2.0 in urban areas. It means, at current fertility rates, a rural woman will have almost one child more than an urban woman, on an average.

## 2. Literature Cited

Fertility in India has been examined by a number of scholars. Most of them have made emphasis on fertility rates, types of fertility, factors affecting fertility, determinants of fertility decline and various methods or suggestions to reduce the level of fertility. But there are a few studies which looked into rural-urban disparity in fertility in Indian context. The notable among them are of Sinha (1979), Ahmad (1992), Sangwan (1999), and Sangwan and Sangwan (2003). The present study has endeavored, therefore, to describe and interpret the trends and patterns of rural-urban differentials in fertility in India.

## 3. Objectives of the Study

The three-fold objectives of the present study are as follows:
- To describe the temporal analysis of fertility by rural-urban residence,   1971-2007
- To analyze and interpret the rural-urban differentials in fertility in time and space perspective.
- To present an in-depth analysis ofspatial patterns of rural-urban disparity in fertility in India.

## 4. Hypotheses

The rural-urban disparity in fertility will be lower in areas having higher levels of urbanization.

The Infant mortality rate in rural areas will have a strong positive link with rural-urban disparity.

The rural-urban disparity in fertility will be lower in areas with high percentage of acceptors of family planning measures in rural areas.

A negative relationship is envisaged between rural female literacy rates and rural-urban disparity in fertility rates.

The rural-urban disparity in fertility will be lower in areas with high per capita income. Empirical evidence suggests that the higher income level of the parents, lesser the number of children.

## 5. Data Sources and Limitations

For calculating rural-urban differentials in crude birth rate, the secondary sources of data have been tapped. Data for the present analysis have been drawn mainly from the Sample Registration System (SRS), which is being maintained by the Registrar General of India. The Sample Registration System provides information on crude birth rate (CBR), total fertility rate (TFR), and general fertility rate (GFR) for the country as a whole as well as for its constituent states.

However, the district level data on vital rates could not be developed by the Sample Registration System. Hence, the rural-urban disparity in fertility has been examined for state level.

Some relevant data meant for the purpose have also been obtained from previous years publications of the Census of India. Various occasional papers published by Census of India, Office of the Registrar General, New Delhi, were also consulted.

The trend analysis of fertility differentials by rural-urban residence has not been possible for the first six decades of twentieth century. Because, in the absence of dependable vital rates from civil registration, the Office of the Registration General, India, initiated the sample registration of births and deaths in India popularly known as Sample Registration System (SRS) in 1964-65 on a pilot basis in a few selected states and it became fully operational during 1969-70.

Hence, the data with a greater degree of reliability for the analysis of spatio-temporal dimensions of fertility and patterns of rural-urban disparity in fertility indicators have been provided since 1970 onwards.

### 6. Methodology

The crude birth rate, which is the most common index of fertility, has been adopted for the analysis of spatio-temporal dimensions of fertility and patterns of rural-urban disparity in fertility in India.

The crude birth rate is the ratio of registered live births during one calendar year to the mid-year total population, multiplied by 1000. The formula for calculating crude birth rate (CBR) is:

$$CBR = \frac{\text{Total number of live births in a year}}{\text{Total population at mid point of the year}} \times 1000$$

The differentials in crude birth rate by rural-urban residence have been calculated by simply subtracting the urban CBR from the rural CBR. This is called absolute differential.

However, the relative differential, also known as disparity ratio, has been found by working out the ratio between the two rates, e.g. Rural:Urban, i.e. 30.9 : 24.3 = 1.27: 1. Though, these are two different views of disparity from different angles, but both suffer from a common vagary of grouping dissimilar areas into the same type. An area with a rural CBR of 60 per thousand and an urban CBR of 40 per thousand would have the same absolute differential as an area with 50 (rural) and 30 (urban) per thousand crude birth rates.

Similarly, the relative differential in an area with 60 (rural) and 30 (urban) per thousand crude birth rates would be the same as in an area with 40 (rural) and 20 (urban) per thousand crude birth rates.

Hence, a more sophisticated technique is required to measure the disparity between two segments. Therefore, disparity indices for crude birth rates were computed on the basis of Sopher's Disparity Index (1974), as modified by Kundu and Rao (1982), i.e.

$$D_S = \log (X_2 / X_1) + \log (200-X_1)/(200-X_2)$$

Where,

$X_2 \geq X_1$ and $X_1$ and $X_2$ are the crude birth rates of alphas and non-alphas respectively.

The Census Map of India (2001) has been adopted as the base map. The coefficients of correlation have been computed to determine the relationship between the dependent as well as the independent demographic and socio-economic variables. Finally, to ensure accuracy and to save time, the use of computer has been made.

### 7. Temporal Analysis of Fertility by Rural-Urban Residence, 1971-2007

Though, fertility has showed a steady and sometimes a slightly increasing trend right upto 1960,but it started to decline gradually from the mid 60's. mainly due to the intensification of the family planning programmes,increase in literacy level, rise in age at marriage, and high female participation rate in the non-agricultural activities.The reduction in marital fertility especially at the advanced ages due to the acceptance of family planning measures (mostly of sterilization) seems to be among the factors underlying the recent decline in fertility in India.

The crude birth rate for India based on the Sample Registration System (SRS) for the year 2007 is 23.1 per thousand, which has declined gradually from 36.9 per thousand in 1971. The declining trend in birth rates was also observed both in rural (from 38.9 in 1971 to 24.7 in 2007) and urban (from 30.1 in 1971 to 18.6 in 2007) areas (Table 1).

| Year | Crude Birth Rate (Per Thousand) | | |
|---|---|---|---|
| | **Total** | **Rural** | **Urban** |
| 1971 | 36.9 | 38.9 | 30.1 |
| 1974 | 34.5 | 35.9 | 28.4 |
| 1977 | 33.0 | 34.3 | 27.8 |
| 1980 | 33.3 | 34.6 | 28.1 |
| 1983 | 33.7 | 35.3 | 28.3 |
| 1986 | 32.6 | 34.2 | 27.1 |
| 1989 | 30.6 | 32.2 | 25.2 |
| 1992* | 29.2 | 30.9 | 23.1 |
| 1995* | 28.3 | 30.0 | 22.7 |

|  | Total | Rural | Urban |
|---|---|---|---|
| 1998 | 26.5 | 28.0 | 21.1 |
| 2001 | 25.4 | 27.1 | 20.3 |
| 2004 | 24.1 | 25.9 | 19.0 |
| 2007 | 23.1 | 24.7 | 18.6 |

*Table 1: India: Crude Birth Rates by Rural-Urban Residence, 1971-2007*
*Source:  Registrar General, India (2010), Compendium of India's Fertility and Mortality Indicators, 1971-2007, Table 1, p. 3.*
*\*Excludes Jammu and Kashmir due to non-receipt of  returns*

Notes:
- Estimates of birth rates at the national level upto 1995 do not include Mizoram as the SRS was not operational in Mizoram till 1995.
- Excludes Nagaland (Rural) due to part- receipt of returns from1995 to 2003.

## 8. Rural-Urban Differentials In Fertility, 1971-2007

It is a widely observed fact that the urban population is less fertile than its rural counterparts resulting into rural-urban differentials in birth rates (Table 2).

| Year | Crude Birth Rate (Per Thousand) | | Rural-Urban Differential |
|---|---|---|---|
|  | Rural | Urban |  |
| 1971 | 38.9 | 30.1 | 8.8 |
| 1974 | 35.9 | 28.4 | 7.5 |
| 1977 | 34.3 | 27.8 | 6.5 |
| 1980 | 34.6 | 28.1 | 6.5 |
| 1983 | 35.3 | 28.3 | 7.0 |
| 1986 | 34.2 | 27.1 | 7.1 |
| 1989 | 32.2 | 25.2 | 7.0 |
| 1992* | 30.9 | 23.1 | 7.8 |
| 1995* | 30.0 | 22.7 | 7.3 |
| 1998 | 28.0 | 21.1 | 6.9 |
| 2001 | 27.1 | 20.3 | 6.8 |
| 2004 | 25.9 | 19.0 | 6.9 |
| 2007 | 24.7 | 18.6 | 6.1 |

*Table 2: India: Rural-Urban Differentials in Birth Rates, 1971-2007.*
*Sources: Calculated from, Registrar General, India (2010), Compendium of India's Fertility and*
*Mortality Indicators, 1971-2007, Table 1, p. 3.*
*\*Excludes Jammu and Kashmir due to non-receipt of  returns.*

Notes:
- Estimates of birth rates at the national level upto 1995 do not include Mizoram as the SRS was not operational in Mizoram till 1995.
- Excludes Nagaland (Rural) due to part- receipt of returns from1995 to 2003.

Table 2 reveals that the rural areas witnessed a continuous gradual decline in birth rates from 38.9 per 1000 population in 1971 to 24.7 per 1000 in 2007 except in the years of 1980 and 1983. On the other hand, urban birth rate was 30.1 per 1000 in 1971 and decreased to 18.6 per 1000 in 2007 except in the years of 1980 and 1983 when a gradual increase was noticed. The increase in birth rates from 1980 to 1983 can be attributed to rapid fall in infant mortality rate.

Despite the significant decrease of  14.2  per thousand in rural birth rate and 11.5 per thousand in its urban counterpart during the period of four decades, a very slow decrease of 2.7 per 1000 population with certain ups and downs was observed in rural-urban differential of birth rates (Table 2). It is because of increasing awareness among rural masses about social values and adoption of various birth control measures.

## 9. Rural-Urban Differentials in Fertility by States, 1971-2007

The rural-urban differentials in crude birth rates in India reveal that the CBR is declining continuously over the period of time in all the states and union territories. In 1971, the maximum rural-urban differential in CBR was observed in the state of West Bengal (17.0 per 1000) and followed by north-eastern states of Meghalaya (15.5 per 1000), Tripura (14.1 per 1000), Arunachal Pradesh (12.7 per 1000) and north-western states of Himachal Pradesh (14.3 per 1000), Haryana (11.8 per 1000), and Jammu & Kashmir (11.7 per 1000) (Table 3). On the other hand, the minimum rural-urban differential in CBR was noticed in the southern states of Orissa (1.7 per 1000) and Kerala  (1.7 per 1000) where birth rates are high in both rural and urban areas.

However, in 2007, the maximum rural-urban differential in CBR was observed in the state of Assam (10.2  per 1000) and followed by the states of Meghalaya (9.1 per 1000), Madhya Pradesh (9.0 per 1000), Jharkhand (8.8 per 1000), Mizoram (8.8 per 1000) and Chhattisgarh (8.4 per 1000) (Table 3). On the contrary, the minimum rural-urban differential in CBR was noticed in the southern states of Kerala  (0.3 per 1000) and Tamil Nadu (0.3 per 1000), followed by the states of Sikkim (0.7 per 1000),

Maharashtra (1.4 per 1000), Nagaland (1.6 per 1000), and Punjab (1.9 per 1000) where birth rates are high in both rural and urban areas. Goa (-2.8 per 1000) and Manipur (-0.8 per 1000) are the two states and Lakshadweep (-0.4 per 1000) is the only union territory which experienced negative rural-urban differential in CBR. These are the states and union territories where the birth rates reduced drastically both in rural and urban areas but more in rural areas over a span of  four decades.

| Country/State/ Union Territory | Crude Birth Rate (Per Thousand) | | | | Rural-Urban Differential | |
|---|---|---|---|---|---|---|
| | 1971 | | 2007 | | 1971 | 2007 |
| | Rural | Urban | Rural | Urban | | |
| **INDIA** | **38.9** | **30.1** | **24.7** | **18.6** | **8.8** | **6.1** |
| States | | | | | | |
| Andhra Pradesh | 35.6 | 31.3 | 19.5 | 16.7 | 4.3 | 2.8 |
| Arunachal Pradesh* | 35.1 | 22.4 | 23.4 | 17.3 | 12.7 | 6.1 |
| Assam | 39.3 | 31.0 | 25.7 | 15.5 | 8.3 | 10.2 |
| Bihar* | 39.7 | 33.9 | 30.2 | 22.9 | 5.8 | 7.3 |
| Chhattisgarh | NE | NE | 28.0 | 19.6 | - | 8.4 |
| Goa | 28.5 | 20.2 | 13.0 | 15.8 | 8.3 | -2.8 |
| Gujarat | 41.5 | 35.8 | 24.5 | 20.7 | 5.7 | 3.8 |
| Haryana | 44.2 | 32.4 | 24.5 | 20.8 | 11.8 | 3.7 |
| Himachal Pradesh | 38.2 | 23.9 | 17.9 | 12.6 | 14.3 | 5.3 |
| Jammu & Kashmir* | 34.1 | 22.4 | 20.4 | 14.1 | 11.7 | 6.3 |
| Jharkhand | NE | NE | 27.8 | 19.0 | - | 8.8 |
| Karnataka | 34.6 | 25.3 | 21.2 | 17.5 | 9.3 | 3.7 |
| Kerala | 31.3 | 29.6 | 14.8 | 14.5 | 1.7 | 0.3 |
| Madhya Pradesh | 40.0 | 34.5 | 30.5 | 21.5 | 5.5 | 9 |
| Maharashtra | 33.7 | 29.0 | 18.7 | 17.3 | 4.7 | 1.4 |
| Manipur | 34.0 | 26.4 | 14.4 | 15.2 | 7.6 | -0.8 |
| Meghalaya* | 36.1 | 20.6 | 26.1 | 17.0 | 15.5 | 9.1 |
| Mizoram | DNA | DNA | 22.5 | 13.7 | - | 8.8 |
| Nagaland * | 24.0 | 18.6 | 17.7 | 16.1 | 5.4 | 1.6 |
| Orissa | 34.7 | 33.0 | 22.4 | 16.1 | 1.7 | 6.3 |
| Punjab | 35.0 | 31.4 | 18.3 | 16.4 | 3.6 | 1.9 |
| Rajasthan | 43.5 | 37.2 | 29.2 | 23.7 | 6.3 | 5.5 |
| Sikkim* | 32.2 | 26.6 | 18.2 | 17.5 | 5.6 | 0.7 |
| Tamil Nadu | 32.9 | 27.8 | 16.0 | 15.5 | 5.1 | 0.5 |
| Tripura | 37.2 | 23.1 | 17.9 | 13.5 | 14.1 | 4.4 |
| Uttarakhand | NE | NE | 21.3 | 17.0 | - | 4.3 |
| Uttar Pradesh | 46.3 | 34.7 | 30.5 | 25.5 | 11.6 | 5.0 |
| West Bengal* | 37.0 | 20.0 | 19.8 | 12.7 | 17 | 7.1 |
| Union Territories | | | | | | |
| Andaman & Nicobar Islands | 33.8 | 21.8 | 17.7 | 12.5 | 12 | 5.2 |
| Chandigarh * | 33.9 | 40.4 | 23.1 | 15.0 | -6.5 | 8.1 |
| Dadra & Nagar Haveli* | 29.4 | 32.2 | 27.2 | 30.0 | -2.8 | -2.8 |
| Daman & Diu* | 35.0 | 20.1 | 19.5 | 15.1 | 14.9 | 4.4 |
| Delhi | 44.7 | 32.4 | 20.0 | 17.8 | 12.3 | 2.2 |
| Lakshadweep* | 34.6 | 28.5 | 18.1 | 18.5 | 6.1 | -0.4 |
| Puducherry | 29.2 | 28.0 | 15.4 | 14.9 | 1.2 | 0.5 |

*Table 3: Rural-Urban Differentials in CBR by States, 1971-2007*
*Sources: Registrar General, India (1999), Compendium of India's Fertility and Mortality Indicators, 1971-1997, pp. 3-338.*
*Registrar General, India (2008), SRS Bulletin, Vol. 43, No. 1, Table 1, p. 1.*

- *The figures in parentheses are the initial years of the availability of data by rural-urban residence in the various states/union territories i.e. Chandigarh  (1972), Jammu & Kashmir (1972), Meghalaya(1976), Bihar (1981),  West Bengal (1981), Sikkim (1981),ArunachalPradesh (1982), Nagaland (1983), Lakshadweep (1983), Daman  &  Diu  (1985), Dadra & Nagar Haveli (1995).
- NE       stands for the states which were not in existence in 1971.
- DNA     Data Not Available
- Note:    Estimates of birth rates at the national level in 1971 do not include Mizoram as the SRS was not operational in Mizoram till 1995.

**10. Rural-Urban Disparity in Fertility:Spatial Patterns, 2007**
A detailed picture of the rural-urban disparity in crude birth rates can be observed by looking into the rural and urban birth rates and finally their differential index in various states and union territories of India (Table 4). The states are divided into two categories of major and minor states by Registrar General of India for calculation of vital statistics.
The rural-urban disparity calculated for birth rates shows that this disparity is more marked in the north-east India as well as West Bengal, Jharkhand, Chhattisgarh, Madhya Pradesh, Jammu & Kashmir and Himachal Pradesh. By contrast, low disparity is found in most of the south Indian states.
Due to the non-availability of data on district level, the disparity index is calculated for all the states and  union territories.  On the basis of disparity index calculated for birth rate in rural and urban areas, the value of disparity  indices ranges between 0.2443 in Assam to 0.0096 in Kerala. Goa (- 0.0254) and Manipur (- 0.0254) are the only states where disparity index is negative which is the result of higher urban birth rates (15.8 and 15.2 per thousand population respectively) than the rural birth rates (13.0 and 14.4 per thousand population respectively).

| Country/State/Union Territory | Differential Index |
|---|---|
| **INDIA** | **0.1380** |
| States | |
| Assam | 0.2443 |
| Mizoram | 0.2365 |
| West Bengal | 0.2096 |
| Meghalaya | 0.2083 |
| Jharkhand | 0.1869 |
| Chhattisgarh | 0.1756 |
| Jammu & Kashmir | 0.1754 |
| Madhya Pradesh | 0.1743 |
| Himachal Pradesh | 0.1649 |
| Orissa | 0.1586 |
| Arunachal Pradesh | 0.1459 |
| Bihar | 0.1385 |
| Tripura | 0.1329 |
| Uttarakhand | 0.1083 |
| Rajasthan | 0.1044 |
| Karnataka | 0.0922 |
| Uttar Pradesh | 0.0904 |
| Gujarat | 0.0825 |
| Haryana | 0.0802 |
| Andhra Pradesh | 0.0740 |
| Punjab | 0.0521 |
| Nagaland | 0.0449 |
| Maharashtra | 0.0371 |
| Sikkim | 0.0187 |
| Tamil Nadu | 0.0150 |
| Kerala | 0.0096 |
| Manipur | - 0.0254 |
| Goa | - 0.0913 |
| Union Territories | |
| Chandigarh | 0.2070 |
| Andaman & Nicobar Islands | 0.1633 |
| Daman & Diu | 0.1215 |
| Delhi | 0.0559 |
| Puducherry | 0.0155 |
| Lakshadweep | - 0.0104 |
| Dadra & Nagar Haveli | - 0.0496 |

*Table 4: India: Rural-Urban Disparity Indices in Crude Birth  Rates, 2007*
*Source:  Calculated from,Registrar General, India (2008), SRS Bulletin, Vol. 43, No. 1, Table 1, p.1.*
*Note: States and union territories are arranged in descending order of rural-urbandisparity indices.*

On correlating   disparity in fertility rates with various factors affecting these rates, we observe that rural-urban disparityis correlated negatively (Table 5) with percentage of family planning programme acceptors, female mean age at effective marriage,

rural female literacy rate, level of urbanization, per capita income and percentage of rural female non-agricultural workers to total rural workers.

| Indicator | Coefficient of Correlation |
|---|---|
| Percentage of family planning programme acceptors | -0.3610 |
| Per capita Income | -0.3571 |
| Female mean age at effective marriage | -0.2062 |
| Percentage of rural female non-agricultural workers to total rural workers | -0.2033 |
| Rural female literacy rate | -0.1932 |
| Level of urbanization | -0.1212 |
| Rural infant mortality rate | +0.3791 |

*Table 5: India:Coefficients of Correlation of Rural-Urban Disparity in Fertility, 1991*
*Source:  Computed from, Publications made by Registrar General of India (1994,1995,1997,1998)*
*and Economic Intelligence Service (1991,1993, 1994,1997).*

The expansion of national family planning programmes has influenced the fertility rates in the country and proved as an important means to control it. The couple protection rate improved considerably in the major states of the country during 1981-90 to reach 42 per cent in 1988-89 of which 30 per cent is due to sterilization alone. Similarly, female mean age at marriage is an important determinant of fertility as it is directly related to the duration of likelihood of conceiving and carrying pregnancy. Therefore, a lower female age at marriage besides having high fertility potential, also lengthens the span of marital union. In contrast, a relatively higher female age at marriage causes a shortening of reproductive span which accompanied by factors like higher female literacy and work force participation ultimately contributes towards lowering fertility. India in this regard falls into the former group. There, states of high disparity indices have a low mean age at marriage. The disparity is also positively correlated with infant mortality rates in rural areas. If, unfortunately, the infant mortality rate in rural areas increases, the rural-urban disparity will also increase.

Although, there does not exist a wide range of rural-urban disparity in birth rate, but for an understanding of disparity in fertility by residence, all the states and union territories are divided into 3 major categories, which is depicted on Map 1(Map 3.3).

States and union territories with rural birth rate higher than urban with:
- High rural-urban disparity index (0.2000 and above)
- Moderate rural-urban disparity index (0.1000 to 0.2000)
- Low rural-urban disparity  index (below 0.1000)

States and union territories with urban birth rate higher than rural

*10.1. States and Union Territories With Rural Birth Rate Higher Than Urban*
Keeping in view the national average (0.1380) of rural-urban disparity index, the states with rural birth rate higher than urban are discussed under three sub-categories:

10.1.1. High Rural-Urban Disparity Index (0.2000 and Above)
The states which have experienced high rural-urban disparity index values are eastern hill states of Assam (0.2443) Mizoram (0.2365) and Meghalaya (0.2083). The state of West Bengal (0.2096) in eastern plains is also a part of this category of high rural-urban disparity. In the eastern hill states, the birth rate in rural areas is nearly one and a half times more than what it is in urban areas and is quite high from national average (23.1 per 1000 population). The reasons being early age at marriage, low level of literacy especially among females, and a large proportion of population residing in rural areas belonging to reproductive age-group.

Chandigarh is the only union territory where rural-urban disparity index value is high (0.2070). This is because of wide gap (8.1 live births per 1000 population) between rural (23.1  live births per 1000 population) and urban (15.0  live births per 1000 population) birth rates that exist mainly due to the dominance of labour class in rural sector.

10.1.2. Moderate Rural-Urban Disparity Index (0.1000 to 0.2000)
The areas attributed with moderate level of rural-urban disparity indices of CBR are northern hill states of Jammu & Kashmir (0.1754), Himachal Pradesh (0.1649), and Uttarakhand (0.1083); eastern part of northern plains consisting of Bihar; north-eastern and southern parts of central highlands [comprising Jharkhand (0.1869), Madhya Pradesh (0.1743), and Chhattisgarh (0.1756)]; eastern plateaus (covering Orissa (0.1586)) and Assam valley [comprising Arunachal Pradesh (0.1459) and Tripura (0.1329)]. In this category, the rural-urban disparity index is maximum in Jharkhand (0.1869). It is followed by Chhattisgarh (0.1756), Jammu & Kashmir (0.1754), Madhya Pradesh (0.1743), and Himachal Pradesh (0.1649).

In all these states, rural-urban disparity in birth rate is between 4.3 to 8.8 live births per thousand population which, in turn, results in moderate rural-urban disparity index. All these areas are agricultural regions as far as their economy is concerned. A majority of people in rural areas depend on the traditional occupations by adopting labour intensive technologies with less inclination to the idea of modernization of these occupations and motivated high fertility aspirations among these poor illiterate rural people. So, the

children, more or less, are considered as their assets useful for their vocations (Reddy, 1996). Further, the prevalence of high infant and childhood moralities in the rural areas compel the couples to aspire to have more number of children in their families to assure the survival of a few of them. Male sex preference seems to be another predominant factor in rural areas, mainly because patriarchal society exists in north India. Most of the couples in rural areas want to have, at least, two male living children in their families and in some families, especially among the rural people, they continued and aspired to have at least a male child in the event of not having male living children in their families. These expectations deliberately stimulate higher fertility among the couples in rural areas. The cost of rearing children in the rural areas is low. In some rural areas, there are no proper educational facilities and in some cases, parents do not send their children to schools, also they are utilized as a contributory labour in their parents' productive activities.

But, the situation is entirely different in urban areas, because most of the people in urban areas are involved in non-traditional, modern occupations. Under this environment, children are considered to be consumer products and liabilities. They invest large sums of money in educating their children and these children cannot give any help to their parents in their professional activities. So, the cost of bearing and rearing of children in the urban areas puts pressure upon the people to limit their family size. So, the ways of life in rural and urban areas influence the people towards having children and this, in turn, influences their fertility rates also. The imbalanced sex ratio also contributes to this. The level of urbanization and literacy is also low in comparison to south. Bihar, Madhya Pradesh and Rajasthan are among BIMARU states and are a real cause of worry.

Out of seven, four union territories characterized by moderate rural-urban disparity index values are Andaman & Nicobar Islands (0.1633), Daman & Diu (0.1215), Delhi (0.0559), and Puducherry (0.0155).

10.1.3. Low Rural-Urban Disparity Index (Below 0.1000)
The entire peninsular India (barring Madhya Pradesh and Chhattisgarh); Sikkim and Nagaland in north-east; Punjab, Haryana and Uttar Pradesh in the north; and Gujarat in the west are the areas which cover almost 60 per cent of the country's total area, are characterised by low rural-urban disparity index. In all these areas, the rural and urban birth rates are less than 20 live births per thousand population and are somewhat similar to each other. So, the resultant rural-urban disparity is low. The rural-urban disparity index is minimum  in Kerala (0.0096) and is followed by Tamil Nadu (0.0150), Sikkim (0.0187) and Maharashtra (0.0371). In south Indian states, level of status of women is high because of matrilineal society. Per capita income is fairly high. Both Kerala (1058) and Tamil Nadu (987) have sex ratio above national average (933 females per thousand males). Moreover, Kerala has the distinction of having lowest value of rural-urban disparity index in CBR. The impact of Christian missionaries in creating awareness, wide acceptance of family planning programmes, a large number of the population engaged in secondary and tertiary activities, very high literacy rates among both the sexes in rural and urban areas, a high status enjoyed by women and lesser gender inequalities explain the phenomenon. Nagaland is a state where highest percentage (90 per cent) of Christian population is found amongst all the states and union territories of India, hence low rural-urban disparity in birth rates.

Amongst the union territories, Delhi (0.0559) and Puducherry (0.0155) are the two union territories which have experienced low rural-urban disparity index in CBR. This is because, both the union territories are highly urbanized, per capita income is fairly high, rural female literacy rate is high, proportion of non-agricultural workers is very high, and rural infant mortality rate is low. That's why, their birth rates compared fairly well with the national average for urban areas resulting into low disparity index.

Haryana presents an interesting case. Despite being a fairly rich state with high per capita income (Rs. 3380) and where literacy rates are also comparable with national average, it shows high crude birth rates (24.5 live births per thousand population) in rural areas. Besides BIMARU states (Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh) where CBR is more than 30 live births per thousand population, Haryana constitutes one of the demographically vulnerable states because of the inferior status of women, which partly explains the high level of CBR despite of economic prosperity (Bose, 1991).

10.2. States with Urban Birth Rate Higher than Rural
The state of Manipur (- 0.0254) in the north-east and a minor state of Goa (- 0.0913) on the western coast of peninsular India are attributed with negative rural-urban disparity in CBR. Here, the CBR in urban areas exceeds the rural one. The state of Goa ranks high in rural literacy rate (79.67 per cent) including rural female literates (71.92 per cent). Despite a high  level of urbanization (49.76 per cent), high level of economic development (index above 2.51) and high status of women, the urban birth rate is more (15.8 live births per thousand), whereas the rural birth rate is 13.0 live births per thousand.

Amongst the union territories, Lakshadweep (- 0.0104) andDadra & Nagar Haveli (- 0.0496) are the only union territories which are characterized by negative rural-urban disparity in CBR, because of the prevalence of high crude birth rate in urban areas (18.5 and 30.0 live births per thousand respectively) than their rural counterparts (18.1 and 27.2 live births per thousand respectively).

**11. Conclusion**
Fertility is continuously declining in India. During the period of four decades between 1971 and 2007, the crude birth rate, which is the most common index of human fertility, for India declined gradually from 36.9 live births per thousand population in 1971 to 23.1 live births per thousand population in 2007. The declining trends in birth rates were also observed both in rural (38.9 in 1971 to 24.7 in 2007) and urban (30.1 in 1971 to 18.6 in 2007) areas.The intensification of the family planning programmes; increase in literacy rate, rise in age at marriage, high female participation rate in the non-agricultural activities, and reduction in marital fertility specially at the advanced ages due to the acceptance of family planning measures (mostly of sterilization) seem to be among the factors underlying the recent decline in fertility in India.

The rural-urban differential in birth rates with certain ups and downs also registered a declining trend from 8.8 per thousand in 1971 to 6.1 per thousand in 2007. This is because of increasing awareness among rural masses about social values and adoption of various birth control measures.

Not only the rural-urban differentials in birth rates existed ever since, but also the rural birth rates  have remained higher than urban throughout the period under study. The low urban birth rates are caused by unbalanced sex ratio, high living standards, economic insecurity and unemployment, social capillarity, occupational status, female employment, educational facilities and the availability of clinical aids towards family planning and so on. The rural areas are denied many of these. The latter drenched in poverty, ignorance and insecurity result in high birth rates.

In regional perspective, the rural-urban differentials in crude birth rates in India reveal that the CBR is declining continuously over the period of time in all the states and union territories. In 1971, the maximum rural-urban differential in CBR was observed in the state of West Bengal (17.0 per 1000) and followed by north-eastern states of Meghalaya (15.5 per 1000), Tripura (14.1 per 1000), Arunachal Pradesh (12.7 per 1000) and north-western states of Himachal Pradesh (14.3 per 1000), Haryana (11.8 per 1000), and Jammu & Kashmir (11.7 per 1000). On the other hand, the minimum rural-urban differential in CBR was noticed in the southern states of Orissa (1.7 per 1000) and Kerala  (1.7 per 1000) where birth rates are high in both rural and urban areas.

However, in 2007, the maximum rural-urban differential in CBR was observed in the state of Assam (10.2  per 1000) and followed by the states of Meghalaya (9.1 per 1000), Madhya Pradesh (9.0 per 1000), Jharkhand (8.8 per 1000), Mizoram (8.8 per 1000) and Chhattisgarh (8.4 per 1000). On the contrary, the minimum rural-urban differential in CBR was noticed in the southern states of Kerala  (0.3 per 1000) and Tamil Nadu (0.3 per 1000), followed by the states of Sikkim (0.7 per 1000), Maharashtra (1.4 per 1000), Nagaland (1.6 per 1000), and Punjab (1.9 per 1000) where birth rates are high in both rural and urban areas. Goa (-2.8 per 1000) and Manipur (-0.8 per 1000) are the two states and Lakshadweep (-0.4 per 1000) is the only union territory which experienced negative rural-urban differential in CBR. These are the states and union territories where the birth rates reduced drastically both in rural and urban areas but more in rural areas over a span of  four decades.

The rural-urban fertility differentials are correlated negatively with percentage of family planning programme acceptors, female mean age at effective marriage, rural female literacy rate, level of urbanization, per-capita income and percentage of rural female non-agricultural workers to total rural workers. On the other hand, it is correlated positively with infant mortality rate in rural areas. A balanced top-down, and bottom-up forces, therefore, would operate for minimizing rural-urban fertility differentials.

Spatially speaking, there are wide regional variations in rural-urban disparity in crude birth rates which is more marked in the north-east India as well as West Bengal, Jharkhand and Chhattisgarh. On the other hand, low disparity is found in most of the south Indian states. On the basis of the value of disparity indices, the highest disparity is found in Assam (0.2443), whereas it is lowest in Kerala (0.0096).

The state of Manipur (- 0.0254) in the north-east and a minor state of Goa (- 0.0913) on the western coast of peninsular India are characterized with negative rural-urban differential disparity in CBR. Here, urban birth rate is higher than its rural counterpart, because of the high rural literacy rate including rural female literates, high  level of urbanization  and high status of women.

Amongst the union territories, the maximum disparity is found in Chandigarh (0.2070), whereas it is minimum in Puducherry (0.0155). Lakshadweep (-0.0104) and Dadra & Nagar Haveli (-0.0496)  are the only union territories which are characterized by negative rural-urban disparity in CBR, because of the prevalence of high crude birth rate in urban areas (18.5 and 30.0 live births per thousand respectively) than their rural counterparts (18.1 and 27.2 live births per thousand respectively).

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