

## **The Spatial Variation in Fertility and Family Planning Scenario in India: An Understanding Through GIS Approach**

**Sutapa Agrawal\***

### **Abstract:**

An effective programme can only be implemented on the basis of existing knowledge of the geographical area in terms of different demographic aspects. GIS plays a critical role in determining where and when to intervene, improving the quality of care, increasing the accessibility of services, and finding more cost-effective delivery modes. GIS in India have greater importance due to its abilities to integrate a wide range of data sources. This study attempted to understand the fertility and family planning scenario in India by mapping the district level data using GIS. Demographic variables like early age at marriage, high birth orders, contraceptive prevalence rate, and unmet need for family planning has been mapped. Distribution shows the districts of northern and central states of India to be demographically backward than the southern districts. The identified backward districts, which are performing poorer than national average, should be given more thrust for intervention programme.

**Key Words:** GIS, age at marriage, contraceptive prevalence rate, unmet need, birth order

3 and above

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## **Introduction:**

Geographical Information System (GIS) is a computer system, capable of assembling, storing, manipulating and displaying geographically referenced information i.e., data identified according to their location. Geographical information is information about geography, that is, information tied to some specific set of locations on the Earth's surface (including the zones immediately adjacent to the surface, and thus the subsurface, oceans, and atmosphere). GIS provides an excellent means of analyzing demographic data, revealing trends, dependencies and interrelationship that would be more difficult to discover in tabular format. Moreover it allows the policy makers to easily visualize the problems in relation to the resources and more efficiently target resources to those communities in needs.

Over the years the vision of a GIS has shifted significantly, but has always included the notion of processing geographical information within an integrated environment. GIS has continued to be used in public health for epidemiological studies. While health care professionals in the public health sector were early adopters of GIS and continue to find new and innovative uses for this technology, the use of GIS in the field of demography has been growing. Using GIS for demographic analysis to estimate the demand for various types of services can benefit the whole community as well as individuals. How consumers access the services of managed health care providers is controlled by geographic location. GIS is beginning to attract an increasing amount of interest within the demographic and health sector of our country. This has been demonstrated by the evolution of a variety of individually developed systems within the health industry offering such benefits as service location/delivery/and epidemiological analysis.

The National Family Welfare Programme in India has traditionally sought 'to promote responsible and planned parenthood through voluntary and free choice of family planning methods best suited to individual acceptors' (MOHFW, 1998). In April 1996, the programme was renamed the Reproductive and Child Health Programme and given a new orientation to meet the health needs of women and children more completely. The

programme now aims to cover all aspects of women's reproductive health throughout their lives. The new National population Policy, 2000, adopted by the Government of India has set as its immediate objective the task of addressing unmet need for contraception in order to achieve the medium-term objective of bringing the TFR down to replacement level by the year 2010. One of the 14 national socio-demographic goals identified for this purpose is to achieve universal access to information/counseling and services for fertility regulation and contraception with a wide range of choices (MOHFW, 2000). In this context, the mapping of the information, regarding fertility behaviour and family planning scenario in India, can create a powerful tool for monitoring and management of the population problem in India.

### **Objectives:**

The objective of the paper is to understand the spatial variation in fertility and family planning scenario in India at the district level using GIS. However, the more specific objectives of the study are:

- To see the spatial variation in the age at marriage, fertility situation, contraceptive use and the demand for family planning services in India, and
- To identify the districts performing poorer than the national level in the above indicators.

### **Data and Methodology:**

The district level Rapid Household Survey (RHS) published data, 1998, Phase 1, has been taken for the mapping purpose. This survey has been done under Reproductive and Child Health Project sponsored by the Ministry of Health and Family Welfare, Government of India, for the year 1998-99. International Institute for Population Sciences (IIPS) was the nodal agency for the data collection.

For the present study, the GIS Arcview 3.1 package has been used for mapping purpose. The district level data of India has been divided into three categories for each variable indicators using natural break method of choropleth technique from Arc view 3.1. Further for identification of the poorer performing districts for the different indicators, query builder facility of the same package has been used.

## **Analysis and Discussion:**

### ***Girls marrying below age 18 years***

Map No. 1.1 shows the district wise distribution of percent of girls who were married below age 18 years. The information pertains to 4-year period before the survey i.e. the marriage, which occurred since 1<sup>st</sup> Jan 1995 to the survey date. In India 36.8 percent of the girls are married below 18 years of age. The map shows a mixed pattern of girls' marriage below age 18 years. Maximum districts of the larger states of northern plain like Bihar, West Bengal, Madhya Pradesh, Uttar Pradesh and Rajasthan, shows high (> 45.0 %) percentage of girls marrying before age 18 years. However, districts of Jammu & Kashmir, Punjab, Himachal Pradesh, and Haryana shows low (< 20 %) percentage of girls marrying before age 18 years. Northeastern states of India show low along with medium category (20 % to 45 %). The south-central districts of India like the districts of southern Madhya Pradesh, eastern Maharashtra, western and southern Andhra Pradesh and eastern Karnataka along with northern Orissa, shows medium category of percentage girls marrying before age 18 years. The whole western districts of India adjoining the Arabian Sea, as well as the maximum districts of Tamil Nadu, shows low percentage of girls marrying before age 18 years.

### ***Birth order 3 and above***

Map No. 1.2 shows the district wise distribution of percent of births of order 3 and above. Birth of order 3 and above refers to births, which occurred since 1-1-1995 till the survey date. The national average of the percentage of birth of order 3 and above is 43.9 %. The districts of western Rajasthan, Uttar Pradesh, Bihar, western Jammu & Kashmir and

north- eastern states shows high (> 51 %) percentages of birth of order 3 and above. However, other districts of northern states like eastern Rajasthan, some districts of Madhya Pradesh, northern Uttar Pradesh and north-eastern states also shows high percentages of birth of order 3 and above. Medium category (33 % to 51 %) of birth of order 3 and above is found mainly in the districts of Punjab, some districts of Haryana, northern Rajasthan most of the districts of Gujarat, Maharashtra, northern Karnataka, Andhra Pradesh, eastern & central Orissa along with some districts of north-eastern states. About whole of the districts of South Indian states like Andhra Pradesh, Tamil Nadu, and Southern Karnataka along with southern West Bengal, western Himachal Pradesh, central and southern Gujarat and southwestern parts of Maharashtra and Kerala shows low (less than 33%) percentage of birth of order 3 and above.

### ***Current use of contraception***

Map No. 1.3 shows the district wise distribution of percent of currently married women aged 15-44 years using any methods of contraceptive. National average of percentage of women using any methods of contraceptive is 48 percent. Districts of eastern Jammu & Kashmir, Punjab, Haryana, Himachal Pradesh, West Bengal, Gujarat, Maharashtra, Central Madhya Pradesh, western and southern Karnataka, Kerala, Andhra Pradesh parts of Assam, coastal districts of Orissa, Tripura and Mizoram, shows high (more than 52 %) percentage of currently married women using any methods of contraceptives. The medium category (30-52 %) of women using any type of contraceptives is found in the districts of maximum part of Rajasthan, eastern and northwestern parts of Madhya Pradesh, Chattishgarh, most of the districts of Tamil Nadu and Sikkim. Districts of Bihar, Jharkhand, Uttar Pradesh, Western Rajasthan and northeastern India shows low (< 30 %) percentage of women using any methods of contraceptive.

### ***Unmet need for family planning***

Map No. 1.4 shows the district wise distribution of percentage of currently married women aged 15-44 years with unmet need of family planning. Unmet need refers to the

percentage of currently married women who are non pregnant, not in menopause, who are not using any methods of family planning at the time of survey and who not want additional children, or who want additional children but only after 24 months. Women who are unsure of whether they want additional children or unsure when they want next child are also considered as having unmet need. The national average of percentage of currently married women with unmet need for family planning is 27.3. The high (> 36 %) percent of unmet need is only distributed in the districts of Bihar, Uttar Pradesh, north-eastern states, western Rajasthan, some parts of Himachal Pradesh, Uttar Pradesh, Madhya Pradesh, north Bihar and north eastern states. Medium category (18-36 %) of unmet need is found in the districts of Tamil Nadu, northern Orissa, eastern Madhya Pradesh, eastern and southern Rajasthan, south Gujarat, Goa, and also in some parts of Bihar, Uttar Pradesh and northeastern states. Low (below 10 %) percentage of unmet need is found in few districts of eastern Andhra Pradesh, Kerala, and eastern Jammu & Kashmir, some districts of Haryana, Punjab, West Bengal, north Gujarat, Karnataka, west Andhra Pradesh, south Orissa, central part of Maharashtra and Madhya Pradesh and few districts of Mizoram, Tripura, Assam and Nagaland.

### **Poor performing districts in fertility and family planning situation**

In the maps 2.1, 2.2, 2.3 and 2.4, district wise all the above-discussed indicators have been shown where the value was poorer than the national average. It is clearly emerging from the map no. 2.1 and 2.2 that, there is a similarity in the distribution pattern of the girls marrying below 18 years and birth order 3 and above. The districts, which have more girls marrying below 18 years than the national average almost coincides with the districts, which have birth order of 3 and above. Similarly from Map no. 2.3 and 2.4 we can see that the districts where the contraceptive prevalence rate is below the national average, in those districts only the unmet need for family planning is high.

### **Conclusion:**

The identified backward districts, which are performing poorer than national average, should be given more thrust for intervention programme. The states like Bihar, Uttar Pradesh, West Bengal, Rajasthan, and North Eastern India shows grimmer situation in different fertility and family planning aspects in India. In the present scenario of the population explosion and population problem in India, the information-intensive environment of GIS will have greater importance due to its abilities to integrate a wide range of data sources, from legacy systems to image data, and to make complex data more quickly understood. The application of GIS would be more useful if micro level data like village level, block level etc. would have been available.

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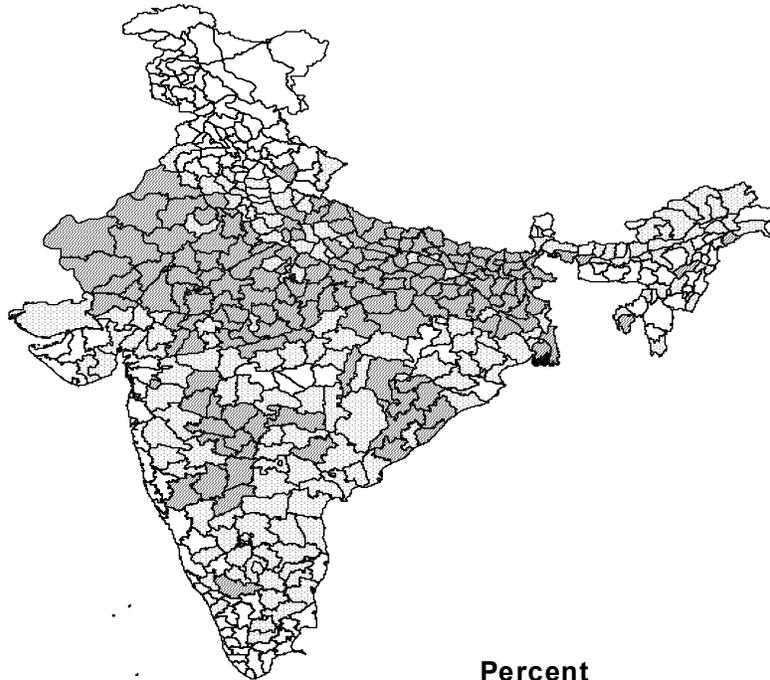
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MAP -1.1

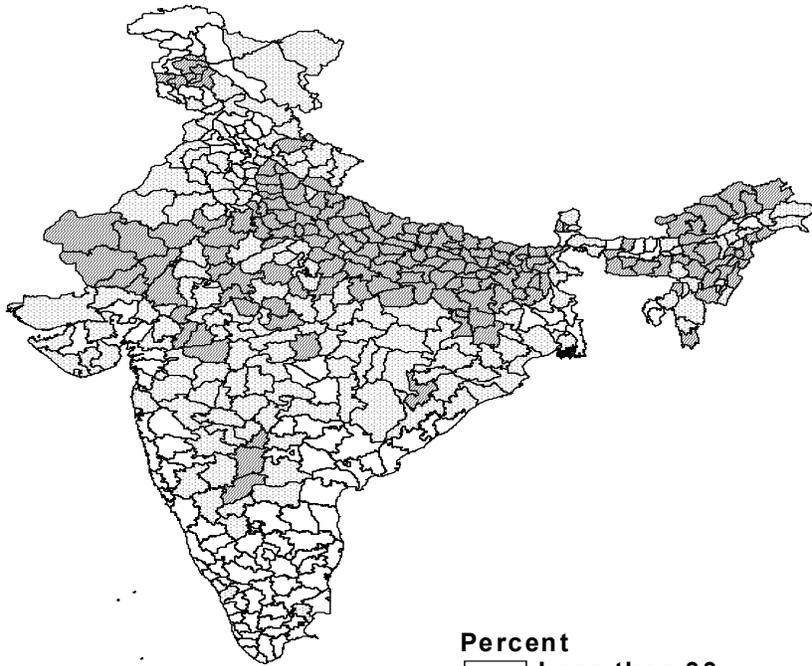
**India**  
**Girls marrying below age 18**  
**1995-99**



**Percent**  
Less than 20  
20-45  
More than 45

**India**  
**Birth order 3 and above**  
**1995-99**

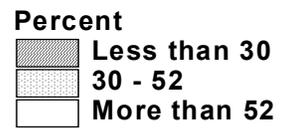
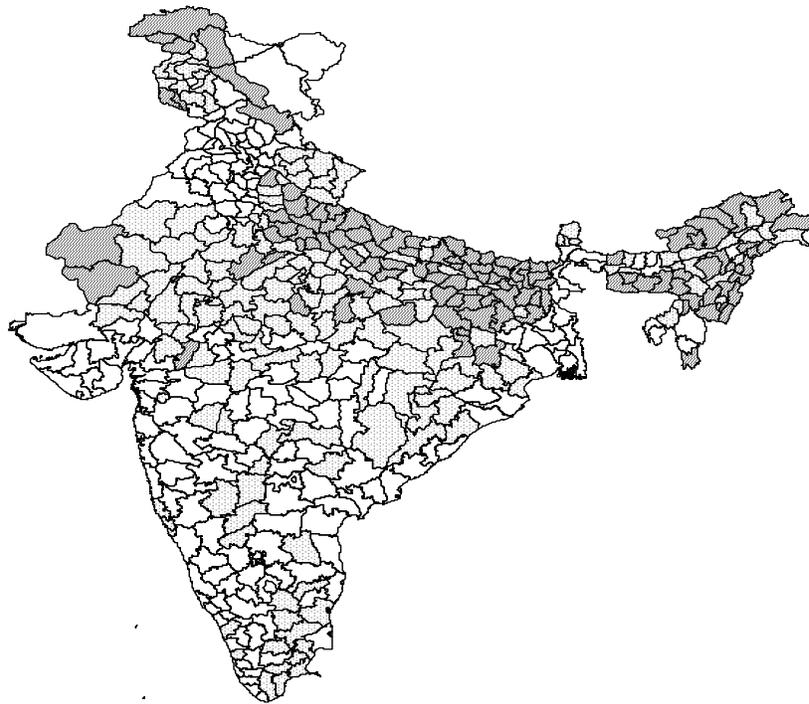
MAP-1.2



**Percent**  
Less than 33  
33 - 51  
More than 51

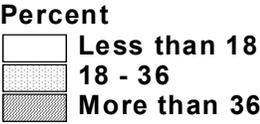
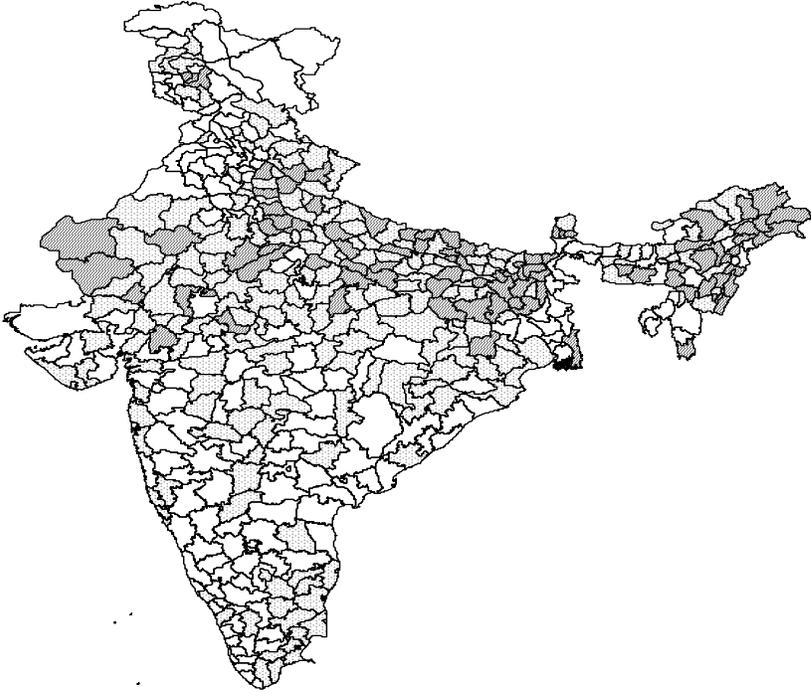
**India**  
**Contraceptive Prevalance Rate**  
**1995-99**

MAP-1.3



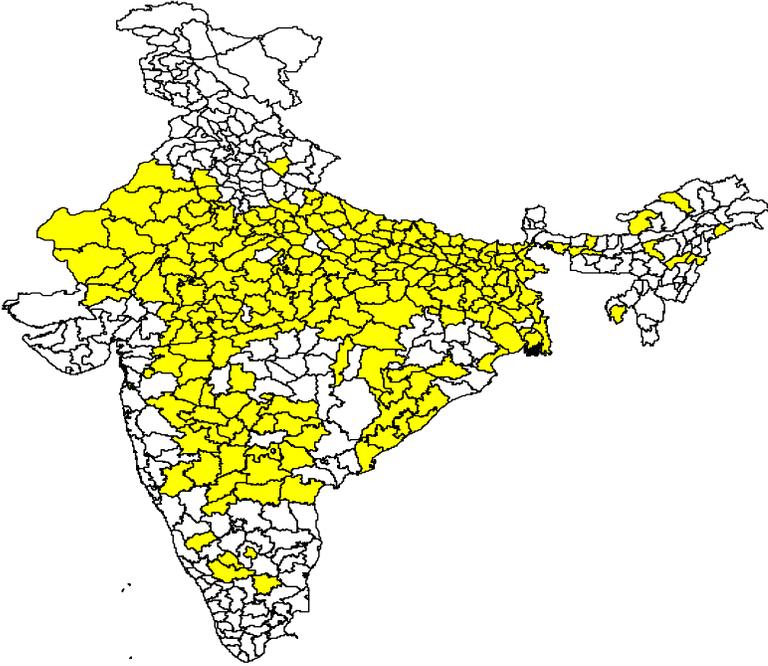
**India**  
**Unmet need in India**  
**1995-99**

M A D



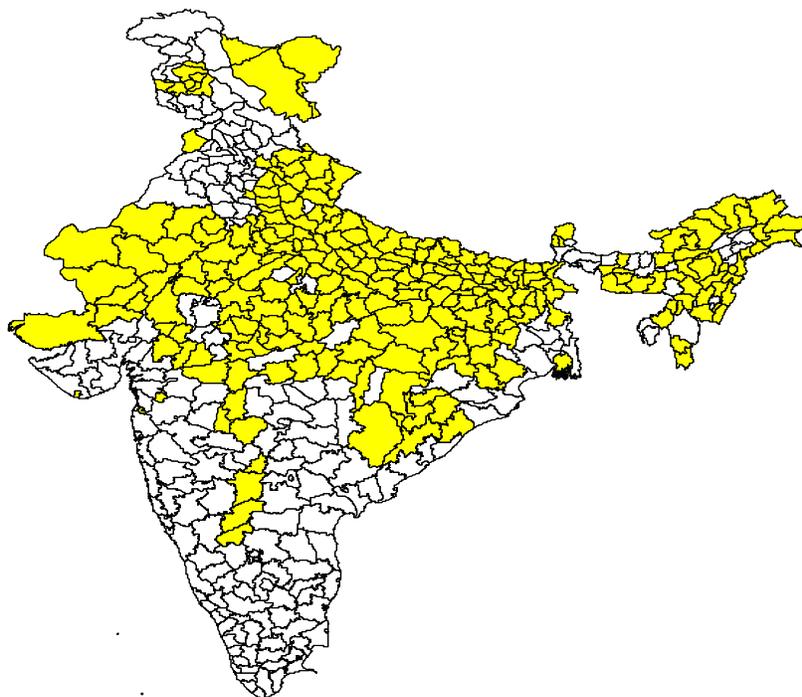
**India**  
**Girls Marrying below age 18 years**  
**Districts above Average (36.8 %)**  
**1995-99**

MAD



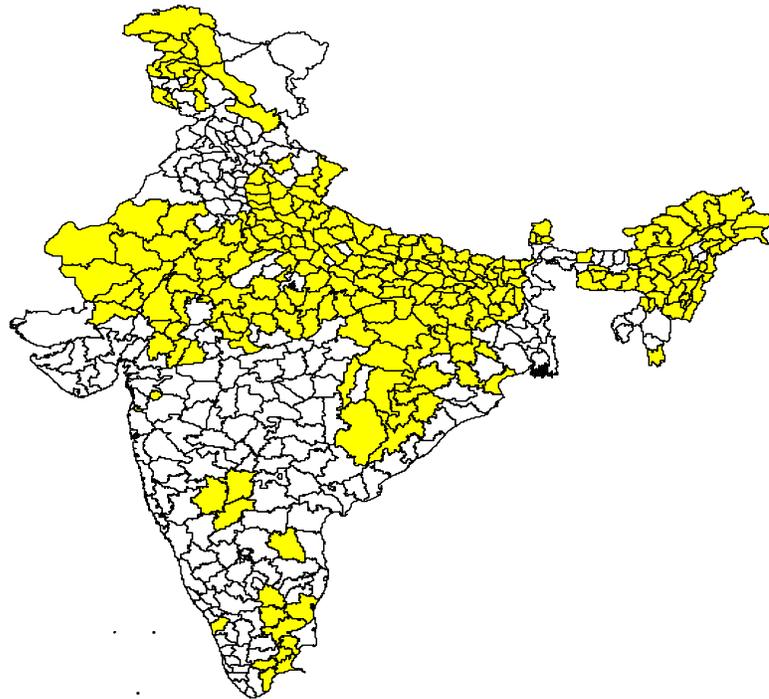
**India**  
**Birth order 3 and above**  
**Districts more than national average (43.9%)**  
**1995-99**

M A D



**India**  
**Contraceptive Prevalence Rate**  
**Districts below National Average (48.1 %)**  
**1995-99**

M A D



**India** MAD  
**Unmet Need for Family Planning**  
**Districts more than national average (27.3 %)**  
**1995-99**

