Differential Gender Development Outcomes in India: A Socio-Spatial and Economic Analysis

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By

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This Thesis Dedicated to

My mother Arpita Bhattacharyya

&

My father Nanu Bhattacharyya

CERTIFIED THAT THE THESIS ENTITLED

I have submitted the thesis titled **"Differential Gender Development Outcomes in India: A Socio- Spatial and Economic Analysis"** for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University. This is my own work and it has been carried out under the supervision of **Prof. Sushil Kumar Haldar**. This thesis or part of the thesis has not been submitted before for any degree, diploma and certificate anywhere or elsewhere.

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Least Squre Dummy Variable (LSDV)
Coefficient of Inequaity (CI)
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IPO (Indian Penal Code)
CIE and CIL (Coefficient of Inequaity enrolment and literacy)
DSE and DSL (Sopher's Disparity Index enrolment and literacy)

CHAPTER-1

INTRODUCTION

1. Backdrop of the Study

Over the past decades (excluding past few years) India has achieved a spectacular rate of economic growth. It is desirable that India should achieve equality and inclusivity in different aspects of economic and social development parameters. The most important and desirable expectation is that India should achieve gender inclusivity. However, from the various reports or indexes regarding gender development outcomes in India reveal some disappointing facts. Though India has achieved some economic achievements, such economic growth fails to confirm the reduction of gender disparity in various aspects of life like employment, education and survival at the very early stage of life. For example, over the past decades, the child sex ratio (0-6 years) is showing a declining trend, crime rate against women is increasing and female workforce participation rate is found to be stagnant and in some states, it is declining. The recent Gender Gap report has shown that the rank of Gender Gap Index in India is 140 out of 156 countries (Global Gender Gap Report, world Economic Forum, 2021). The present study tries to highlight the gender disparity in India taking into account the core aspects of social and economic development parameters.

1.1: The Scenario of Gender Inequality in India:

From the early stage of a life the sort of discrimination a woman has to face that can be assessed by the child sex ratio of a particular country. We know in an adverse situation, female child survival rate is more than its male counterpart and this is biologically true (Gjersing and Jensen 2014, Zarulli et al, 2018). There must be some female infanticide, feticide, sex detection test along with discriminatory attitude towards girl child in respect food intake and nourishment that results in falling child sex ratio. This is socially generated at the household level. According to Census 2011, child sex ratio (CSR) was 914 and overall sex ratio (OSR) was 940 for India.According to NFHS-5 (2019-20), the overall sex ratio (OSR) is 1020 which indicates clearly females are outnumbering male. However, it is very alarming fact that the value of child sex ratio (CSR) is 929 and that is still considered to be a matter of great concern because it is socially generated that goes against the physiological norm.

It is well recognized that a healthy person can make a healthy nation. However, recent data on gender specific development in India do not support this view. Basically, the health of a female is being ignored from the early stage of life due to different social and cultural norms

prevailing in our patriarchal society. Women are expected to perform such a job which results in the degradation of their health status. Even in terms of health parameter India's rank is very much shocking in Gender Gap index. In the Global Gender Gap Index (GGI) 2021, India ranks 155 out of 156 countries in the domain of Health and Survival (Global Gender Gap Report, world Economic Forum, 2021). Another factor that needs to be looked into is that the education. Health and education both ensure human capital for a country. Therefore, gender gap in education is also a very crucial factor when we talk about the human development. In the Global Gender Gap Index (GGI) 2021, India's ranking is 114 out of 156 in terms of educational attainment (Global Gender Gap Report, world Economic Forum, 2021). Educated females are more aware and more empowered to take decision in favor of them. Any gap in education can lead the nation in a regressive path. If a female successfully educate herself, now she will look for the economic opportunity so she can take the advantage of her acquired human capital. In case of economic participation for female, the situation is found to be stagnant and or declining trend. There is 15 points (From136 in 2016 to 151 in 2021) drop in ranking in economic participation and opportunity for women in India (Global Gender Gap Index 2017). It is very obvious from the fact that females are not getting the opportunity to develop themselves. Last but not the Least, India's women are not free from facing crime. Moreover, females in India have been facing different sorts of crimes like dowry death, torture, molestation, rape, harassment etc. throughout their life time.Gender Inequality Index- India has ranked among bottom 40% among the countries (189) with the value of 0.488 compared to world average of 0.436 (UNDP, 2021). According to National Crime Record Bureau (NCRB), crime against a woman is committed every three minutes (NCRB, 2014). It is revealed that 65%of Indian men believe women should tolerate violence in order to keep family together and women sometimes deserve to be beaten (International Men and Gender Equality Survey, 2010). Therefore, a comprehensive study is required to understand what sort of discrimination women of India is facing throughout her lifetime. This thesis takes into account different aspects of gender disparity or inequality that can be studied in a comprehensive manner since this is a serious threat of well-being of women and creates a major obstacle to inclusive development in India.

1.2: Missing Female Phenomena

India is facing a declining female child sex ratio for decades. Fall from the desired ratio between male and female confirms the missing female phenomena in India. There exists a

confirmed son preference in Indian society and this is due to discriminating attitude towards a girl. This phenomenon first came to the lime light after Noble Laureate Amartya Sen (1990) wrote an essay in The New York Review of Books. At the very early stage of a life, there is an increasing number of female infanticide, female feticide and lack of nutrition in female child results in wide disparity between male and female child in respect of number which results in declining CSR (viz. number of females per thousand males).

1.3: Role of Government and Various Affirmative Actions

Gender discrimination against female in India has been a persistence socio-economic problem. In India, the CSR and female work force participation rate (FLFPR) are found to be declining over the decades. Gender gap in wage rate and crime rate against women is increasing day by day. In case of rape, honor killing, dowry death, molestation and torture against women is showing an upward trend. After achieving a healthy rate economic growth, still there exists backdated mindset like son preference and daughters are liability to the parents etc (Robitaille, 2013, 2020). The overall status of women in an Indian society is become very low over the decades. There are certain affirmative actions taken by the government to improve the role of women in the society. However, no such promising and significant improvement can be observed and rather it fails to ensure the gender parity. Some of the affirmative actions have been discussed in following paragraph.

1.3.1: Affirmative Actions to Improve Economic Participation of Women

India is facing a declining or stagnant female labor force participation rate. Government of India/ state has acknowledged the fact and tries to improve the scenario through launching of different schemes for successful realization of improving female labor force participation rate. Some schemes have been mentioned below:

1. Mahila Shakti Kendra (2017-18 to 2019-20): Basically this scheme empowers rural women by providing them opportunity for employment and development of skill.
2. Working Women Hostel (1973-73): For ensuring the safety, security and accessibility of accommodation for working women, Indian government has taken initiative to provide hostel for working women.

3. Rashtriya Mahila Kosh (1993): For generating income activities and livelihoods of poor women, an apex micro- finance institution has been set up. This organization provides micro-finance finance to the target group.
4. The National Creche Scheme (2017): This Scheme ensures gainful employment for women and it also provides an environment which is stimulating, secure and safe for children to grow up.
5. Skill Upgradation and Mohila Coir Yoyona (1994): This provides upgraded skill through the training program conducted via Micro Small and Medium Enterprises (MSME) to the women who are involved in the coir related industry.
6. Mahila Arthik Vikas Mahamandal (2003): It encourages females to take up the job of entrepreneur and provide micro finance so that they can lead Self Help Group (SHG) or different non-profit organizations (NGOs). Different e-Haat and Stand-Up India programs are there to help them to operate in an online market.

1.3.2: Affirmative Actions to Improve Educational Status of Women

Education is one of the main pillars to ensure women empowerment in the society. Therefore, Indian government has already taken some affirmative actions to improve the educational status of women. Few of them are discussed below:

1. Sukanya Samriddhi Yoyona (2015): This scheme mainly targets the parents and encourages them to build a fund for their girl child and that fund should be utilized for the girl's education.
2. National Scheme of Incentive to Girls for Secondary Education (2008): The government provides a fixed deposit to mitigate the challenges arises due to family pressure to girls students in the age cohort 14-18 years.
3. Balika Samriddhi Yoyona (1997): It is an annual scholarship provided to the mother on delivery of female child in rural areas.
4. Rajiv Gandhi Scheme for Empowerment of Adolescent Girl (2011): It is introduce to ensure in providing proper nutrition, health care, social and life skill to empower 11-18 years aged girl.

5. Beti Bachao, Beti Padao (2015): To prevent the declining child sex ratio and improving the educational status of women or female child Indian government initiates this scheme.

1.3.3: Affirmative Actions to Improve Health Status of women

Indian government has already taken some affirmative actions to improve the health status of women of India. Such as:

1. Pradhan Mantri Matriva Vandana Yoyona (2010): This scheme mainly takes into account the conditions that are safe for the delivery and nutrition, care etc.
2. Pradhan Mantri Surakshit Matriva Abhiyan (2017): This scheme mainly provides antenatal services to the women of semi-urban and rural areas.
3. Sanitease (2011): This scheme promotes hygiene and health for women.
4. Janani Suraksha Yoyona (2005): This is a fully funded program for motivating below the poverty line, schedule caste and schedule tribe woman who are pregnant to deliver in the health institution.
5. Kasturba Poshan Sohay Yoyona (2010): It provide monetary aids to the below the poverty line who are pregnant so that they get adequate nutrition.
6. Women Helpline Scheme (2010): This provides 24 hours helpline for those women who are getting affected by violence and its response is immediate and emergent.

In addition to the affirmative actions already undertaken, the Government of India had initiated various programs to improve the social status of women like:

PCPNDT Act (1994): Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act is mainly passed in parliament to eradicate the practice female feticide, infanticide, sex detection and abortion.

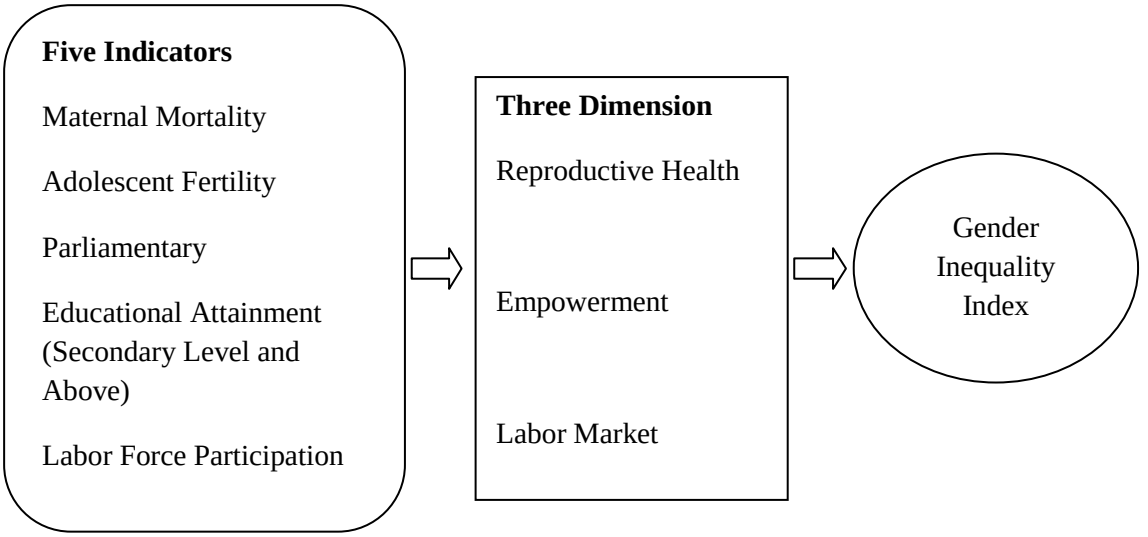
The Prohibition of Child Marriage Act (2006): This act restricts child marriage and set the minimum age of female marriage is 18.

Protection of Women from Domestic Violence Act (2005): This act safeguards women from any sort of violence.

1.4: Formation of Different Indices in Measuring Gender Disparity:

Gender disparity does exist in almost all the countries to some extent. To identify the acuteness of this problem, different inequality measurement has been developed. To measure the gender inequality, different measures or indices have been set up. Amongst that, few of the indices like GII (Gender Inequality index), Global Gender Gap Index, Gender Parity Index, Gender Development Index, Sopher's Disparity Index (1974) and Global Gender Equality Index have been discussed in the following section.

1.4.1: GII (Gender Inequality index): [UNDP, 2010]: This measure includes the reproductive health, empowerment and labor market participation.



1.4.2: Global Gender Gap Index: [World Economic Forum, 2006]

It basically designed to measure the gender inequality in terms of economic participation, health status, educational attainments and political empowerment.

1.4.3: Gender Representation Parity Index: [UNESCO, 2008]

Gender Parity Index is being calculated on the basis of female gross enrollment ratio divided by male gross enrollment ratio. In 2019, for India the value of the ratio was 0.95 at the primary level. In 2018, at the upper Primary and middle school level this ratio was 1.22 and for higher education the ratio was 0.97.

1.4.4: Gender Development Index: [UNDP, 1995]

This index uses the different dimension of human development such as health, standard of living and knowledge and measures the disparity between men and women in these three dimensions. In 2002, India's value in GDI was 0.82, where the value of female is 0.573 and that for male is 0.699.

1.4.5: Global Gender Equality Index: [World Population Review, 2021]

It takes into account 14 out of 17 sustainable development goals. That includes poverty, health, education, literacy, political representation and equality at the work place. In 2021, out of 129 countries India's rank is 95.

1.4.6: Sopher's Disparity Index (1974):

This measure is well accepted to find out the disparity between male-female and rural-urban. This index was later more developed by Kundu and Rao (1986).

$$D_i = \log\frac{X_2}{X_1} + \log\frac{Max\ (X_2 + X_1) - X_1}{Max\ (X_2 + X_1) - X_2}$$

X_2 =Male concerned variable

X_1 = Female concerned variable

In India, according to the India Human Development Survey (2004-05), the value of disparity between male and female was 0.551 (Chakraborty, 2013).

1.5: The Ranking of India in Global Gap Index:

Table 1.1: GDR GENDER GAP

Year	2017(out of number 144 of countries)	2018(out of number 149 of countries)	2020(out of number 153 of countries)	2021(out of number 156 of countries)
Overall ranking	**108**	**108**	**112**	**140**
Economic Participation and opportunity	**139**	**142**	**149**	**151**
Educational Attainment	**112**	**112**	**112**	**114**
Health and Survival	**141**	**147**	**150**	**155**
Political Empowerment	**15**	**19**	**18**	**51**

Source: World Economic Forum (2017, 2018, 2020, 2021)

1.6: Importance of my Study

India has been experiencing a discriminatory attitude towards a female for every aspects of her life. As discussed, starting from the early childhood to old age, a woman is witnessing discrimination, violence and negligence etc. Even, this discrimination disparity and violence etc. are not independent of different socio-cultural and economic aspects. Even, the role of time and space is very important as well. This study acknowledges that the role of space in gender discrimination is really a very crucial aspect. Discrimination originates from cultural perspectives, though it is a negative and detrimental culture. Some states or districts may exhibit the similar or dissimilar cultures. Some states and their neighbours may follow the same sort of attitude towards a female child. Therefore, the role of space is very important if there is a need to understand the proper explanation of the issue of gender discrimination. This study not only tries to explore the explanatory variables responsible in causing gender differential outcomes in different aspects of life, rather it tries to formulate some theoretical models with empirical support using secondary data in Indian backdrop. The distinctive

feature of my study is to incorporate space and neighbouring effect towards explanation of gender differential outcomes in India.

The literatures that I have gone through have taken various aspects of gender bias. But, none of the studies takes into account the space and neighbouring effects towards explaining the variations of gender differential outcomes in India. I could not find any study that simultaneously incorporates all aspects of discrimination against females, from early childhood to human capital accumulation; from human capital accumulation to labour force participation; moreover, crime against women has been a special feature in my research study. The different types of indices (like Gender Development Index, Gender Empowerment Measure, and Gender Inequality Index etc.) have been developed but none of the indices consider declining CSR and crime against women. Therefore, I assume that my research study is, to some extent, comprehensive highlighting some missing issues of female life.

1.7: Major Research Questions

- What are the variables responsible for declining child sex ratio (CSR) at the state and district level in India? Does space matter towards variations of CSR?
- What are the variables which can explain the variation in the disparity between male and female literacy rate and net enrollment ratio at the state and districts level in India over time? Does space matter?
- How far and to what extent the gender disparity of labor force participation does prevail across states and districts over time? What are the plausible reasons of declining female labor force participation rate in India?
- How does crime against women vary across states in India? What are the explanatory factors that are crucial to explain the variations in the crime against women in India at the state panel data framework? Does space play a role in this matter?

1.8: Data and Methodology:

The data that have been collected for this thesis are given in the Table 1.2 below along with its sources.

Table 1.2: Data Description

Data	Source
Per capita net state domestic product (PCNSDP)	Different Census reports of states and districts, RBI
Per capita net district domestic product (PCNDDP)	Different Census reports of states and districts, RBI
Per capita social expenditure (PCSE)	Different Census reports of states and districts, RBI
Poverty (Head Count Ratio)	National Sample Survey Office
Scheduled Tribe (ST)	Different Census reports of states and districts, RBI
Scheduled Caste (SC)	Different Census reports of states and districts, RBI
Female Literacy Rate (FLR)	Different Census reports of states and districts, RBI
Male Literacy Rate (MLR)	Different Census reports of states and districts, RBI
Urbanization (URB)	Different Census reports of states and districts, RBI
Child Sex ratio (CSR), Overall Sex ratio (OSR)	Different Census reports of states and districts
Total Fertility Rate (TFR),	National Family Health Survey
Infant Mortality Rate (IMR)	National Family Health Survey
Female Work Force Participation Rate (FWFPR)	Different Census reports of states and districts, RBI
Agricultural Labors (AGL)	Different Census reports of states and districts, RBI
Cultivators (CULTI)	Different Census reports of states and districts, RBI
Household Industry (HHI)	Different Census reports of states and districts, RBI
Other Activities (OTHER ACTI)	Different Census reports of states and districts, RBI
Net Enrolment ratio	National Institute of Educational Planning & Administration, New Delhi
Body Mass Index (BMI)	National Family Health Survey 4, 2015-16
Molestation, torture, rape and dowry death	National Crime Record Bureau (NCRB)

Methods:

The following econometric and statistical tools are used in my PhD thesis. I have discussed in details about these tools and techniques in the respective Chapters in my thesis.

- Panel data regression and Pooled data regression
- Least square dummy variable regression
- Global and Local Moran Index
- Spatial panel error and lag regression
- Sopher's Disparity Index
- Coefficient of Inequality

1.9: Organization of the Chapters:

- In the first Chapter, I have discussed about the current scenario of female's position in India in different spheres of life in broad perspectives across the countries in the world. This Chapter highlights the importance of the study, major research objectives, data and methodology.
- Second Chapter deals with the issues of child sex ratio (CSR) in India. What are the socio-economic factors explaining the CSR across states in India? I have examined whether space does matter towards spatial variations of CSR in a panel data framework at sub-national level analysis?
- In Chapter-3, I have explained gender differential outcomes of human capital in India in a panel data framework. Two variables are considered for measuring human capital- literacy rate and enrolment at upper primary Level. I have estimated the gender disparity in literacy and enrolment across states over time and explore the underlying reasons of gender disparity of human capital outcomes. The role of space is also introduced in this study.

- In Chapter-4, I have studied gender differential in labor force participation rate in India. I have formulated a theoretical model backed by empirical understanding to find out the reasons behind the declining or stagnant female labor force participation in India at the district level.

- The fifth Chapter deals with the issues of crime against women.I have tried to explore the underlying reasons of crime against women in India. The role of space is also highlighted in this Chapter.

- Concluding Observations and Policy Options is given in Chapter-6**.**

CHAPTER-2

Socio-Economic Development and Child Sex Ratio in India

2.1 Introduction:

Equality before law for women is enshrined in various articles in the Indian Constitution. Keeping in mind cumulative oppression against females in respect of various aspects of socio-economic and cultural life, the Constitution of India empowers the states for adopting appropriate measures towards ensuring gender empowerment. Various affirmative actions have been undertaken both Centrally as well as state levels in favor of females but discrimination against females is found to be aggravating in India; the 2011 Census found a worrying trend in child sex ratios (CSR) with only 914 females for 1,000 males, a drop from 927 in 2001. The greatest human tragedy and the biggest social problem especially among the countries in the developing world is the 'missing females' measured by shortfall in the number of females in sex ratio at different age cohorts relative to the expected number if there were no discrimination between males and females. In 1990, Sen had estimated that there were as many as 100 million missing females and Sen's estimation is more or less found to be consistent with the estimation made by Social Institutions and Gender Index (SIGI) in 2014; other estimates by UNFPA based on 2010 demographic surveys found that the number of missing women was even higher at 117 million (UNFPA 2012). Adverse CSR has been a direct result of 'missing females' which is generated at the household levels due to discrimination against females (Bhat 2002, 2003; Bhat and Zavier 2001, 2007). India shares the maximum proportion of this 'missing females' followed by China (Sen 1990, Klasen and Wink 2003, Agnihotri 2000, Kulkarni 2007, OECD 2014). The number of 'missing women' in the early 1990s is larger than the combined casualties of all famines in the twentieth century; it also exceeds the combined death toll of both world wars and the casualties of major epidemics such as the 1918 – 20 global influenza epidemic or the currently ongoing AIDS pandemic (Klasen et al 2003). Excess female mortality over male is far from a minor issue, but ranks among the worst human catastrophes of the twentieth century (Sen 1990).

In order to find out the determinants of CSR in India, Bhattacharya and Saxena (2015) have conducted a robust pooling study using district level data from 1981 to 2001. Their pooling study does not support any significant positive effect of economic development on CSR. Urbanization is associated with higher levels of female disadvantage in child survival (Dreze et al. 1995). Rosenzwieg and Schultz (1982), Kishor (1993), and Bhattacharya and Saxena (2015) have confirmed the hypothesis that female labour force participation tends to be associated with lower levels of female disadvantage in child survival. Miller (1981, 1993),

Krishnaji (1987), and Das Gupta (1993) in their studies have shown that the discrimination against female children was less intense among poorer households. Many scholars have suggested that the poverty might not be a major determinant of gender bias in child survival (Chen, Huq and D'Souza 1981; Harris 1990; Das Gupta 1987; Agarwal 1986). Kishor (1993) has argued that it is difficult to find any conclusive evidence that poorer households are necessarily less discriminatory. Krishnaji (1987) has highlighted the less discrimination against females among the poor, for mortality differentials cannot be wholly attributed to 'discrimination'. In the district level study, Dreze and Murthy (2001) have obtained the same results; but they have used Senian Index for measuring district level poverty which relates to 51 NSS regions rather than to individual districts. This limitation may lead to inaccurate estimates of the effect of poverty on excess female child mortality. Economic development is necessary but not sufficient for improving CSR (Chakrabarty and Sinha 2006, Bhattacharya 2009, 2012). Premi (2001) in his study has stated that sex ratio at birth becoming more favourable to males, however, influenced the overall sex ratio in the opposite direction, which is reflected in the adverse CSR. It is because rampant practice of female foeticide along with the certain amount of infanticide. Interestingly, all the states that have large declines in child sex ratio between 1991 and 2001 are economically well developed. Jha et al. (2006) pointed out that among the educated and wealthy, sex selective abortions have increased significantly, especially when the first born child is a daughter. Arnold, Kishor and Roy (2002) pointed out child sex ratio based on all the women who are at least literate and resided in the urban regions of India were lower than their rural counter parts.

The highest child sex ratio found in urban India is still lower than the lowest child sex ratio of non-illiterate women in the rural regions of India. In urban areas a declining sex ratio at birth (SRB) – such as in the context of the Indian population over the recent past has been diagnosed as being caused largely by the phenomenon of sex-selective foeticide (Arnold et al 2002, Jayaraj and Subramanian 2004). Even urban educated women are mainly involved with this mal-practice (Bhattacharya, 2012).

Murthi, Guio and Dreze (1995) contextualized that a higher proportion of schedule tribes in the population reduce the extent of anti-female bias in child survival. However, no significant association is found between the proportion of scheduled castes in the population and the extent of female disadvantage in child survival. The scheduled tribes are associated with a higher 0-6 sex ratio (Bhattacharya and Saxena 2015). There exists vast literature on the

relationship between education and female child disadvantage and a debate has been emerged in this connection which has produced inconclusive results. Das Gupta (1987, 1995) has concluded that there are families who apply death by neglect before the fourth born daughter and have observed a positive bi-variate association between anti- female bias and maternal education. Das Gupta and Mari Bhat (1995) have explained that educated mothers have lower fertility, which tends to be accompanied by higher gender bias. Low levels of fertility could mean that proportion of childless women or that of couples with only one child increases with higher levels of education and access to technology, it is possible that such couples would want to ensure that the one child they have is male (Patel 2002).

Following Dreze and Sen (2002), one can argue that education may be considered as an instrument of preference change, which would be supported by the enhancement of freedoms and power to question and reassess the existing social norm or values. Higher female literacy reduces child mortality and anti-female bias in child survival independently of male literacy (Dreze et. al, 1995). Simmons et al. (1982) have shown that the relationship between maternal education and gender bias in child survival is basically negative. Chakrabarty and Sinha (2006) have examined the monotonic decline in CSR over the past four decades and they suggest that higher literacy is necessary but not sufficient for improving the CSR. Female literacy rate has no significant effect on CSR in the district panel estimate in India (Bhattacharya 2009, Bhattacharya and Saxena 2015). Various authors have pointed out that educated parents' behavior is biased toward the use of sex-selective abortion technologies (Das Gupta 1987; Bourne and Walker 1991; Patel 2002; Bose and Trent 2005). Maternal education can cause favourable CSR in Northern and Southern states (Bourne and Walker 1991). Amin (1990) has argued that the relationship between maternal education and gender bias in child survival may be negative in the case of first daughter but positive for higher-parity daughter. Chen et al. (1981), Sen and Sengupta (1983), Caldwell and Reddy (1989) have observed that there is no simple relationship between the maternal education and gender bias.

Echavarri and Ezcurra (2010) have systematically reviewed the debate of the relationship between parental education and sex ratio at birth. Using district level data of India for the year 1991, they have observed that the relationship between the sex ratio at birth and education in India follows an inverted U-shape. UNICEF (1991) has examined the largest differences of sex ratio, of 20 percent or more are to be found in Western part in India, UP

and in North Bihar. Dyson and Moore (1983) have given an overview that there are strong regional differences in the manifestation of sex bias, with bias being more pronounced in the North than the South in India. The 0-6 sex ratio is higher in South and East compared to control region (viz. North). With regard to regional dummies, the Southern region has considerably lower levels of child mortality and better survival advantage of female children over boys compared to other regions in India (Dreze et al. 1995). The coefficients of time dummies for both 1991 and 2001 are found to be negative and significant. The impact of time on the 0-6 sex ratio is significantly greater in 2001 as compared to 1991 which means that female child disadvantage in respect of survival is worsening over time (Bhattacharyya and Saxena 2015).

2.2 Research Gap and Scope of the Present Study:

After going through the review of literature, I believe that there are some scopes to carry out further research on trend and determinants of declining child sex ratio (CSR) in India. I have explored the following gaps of research in connection with the determinants of the CSR in India:

- None of the earlier studies consider income (PCNSDP) and its square for five time points (viz. 1971, 1981, 1991, 2001 and 2011) for 32 states and UTs in a panel data framework; moreover, the effect of poverty and its square for five time points were not studied earlier. In previous state level panel study, only 15 major states are undertaken while the rest of other minor states, UTs and districts are not included.
- None of the earlier studies consider space and neighbouring effect on CSR in India. I have used Moran's Index (MI) that captures neighbourhood externalities. Moran's Index basically captures spatial auto-correlation but it cannot be used for prediction. If the spatial dimension is neglected, the usual panel data regression estimators can be severely affected. Thus, following recent developments on spatial panel data regression models, I try to capture the impact of space on CSR in panel data regression model. All these issues towards variations of CSR across states (or districts) in India is not captured by earlier studies.
- Earlier studies have captured space by using region specific or state specific dummy in panel data regression (Saxena and Bhattacharya 2015, Kishore 1993, Murthy 1995, and Chakraborty 2006). But, neighbouring impact cannot be captured by

incorporating dummy; it is only possible by creating a spatial weight matrix which is developed by Anselin (1995, 1996, 2001, 2005, and 2019).

2.3 Data, Data Source and Research Methods:

In my present chapter, data are collected from secondary sources. Data on child sex ratio (CSR), overall sex ratio (OSR), urbanization (URB), proportion of Scheduled Caste (SC) and Scheduled Tribe(ST) population, female literacy rate (FLR), male literacy rate (MLR), female work force participation rate (FWFPR) are drawn from various Census Reports, RG-Government of India. Total Fertility Rate (TFR) and Infant Mortality Rate (IMR) are drawn from Sample Registration System, Family Welfare Year Book, Ministry of Health and Family Welfare, Government of India. Per capita net state domestic products (PCNSDP) are drawn from the Reserve Bank of India (RBI). PCNSDP are measured at constant prices (base year: 1980-81). In order to capture the incidence of poverty (POV), I have considered head count ratio (HCR) from different survey periods of NSSO. These survey points are: 1972-73, 1977-78, 1983, 1987, 1992-93, 1999-2000, 2004-2005 and 2009-2010. From all these eight time points, I have estimated head count ratio (HCR) across thirty two states (including Union Territory) using suitable interpolation technique for the years 1971, 1981, 1991, 2001 and 2011. It is to be noted here that in 2009-10, we have used Tendulkar's estimation of poverty. I do not have data pertaining to head count ratio (HCR) for the following states/UT: Sikkim, Mizoram, Daman and Diu. I have used the HCR values of North Eastern states in order to estimate HCR of Sikkim and Mizoram as it was done by Planning Commission, Govt. of India. Similarly, the HCR values of Goa are used for Daman and Diu. Census was not conducted in Assam for the year 1981; therefore, the data pertaining to OSR, CSR, SC, ST, URB, FLR, MLR, FWFPR etc. are interpolated for the year 1981 in case of Assam. Due to unavailability of data on TFR and IMR for initial time points (viz. 1971 and 1981), I first estimate the observed relationship between TFR and IMR from the observed data set; thereafter, I indirectly estimate the values of TFR from FLR (for two points of time 1971 and 1981) for the following states and UTs: Andaman, Arunachal Pradesh, Chandigarh, Delhi, Manipur, Meghalaya, Nagaland, Pondichery, Tripura, Goa, Dadra, Sikkim, Lakswadweep and Daman Diu. From the observed relationship between TFR and IMR for all the states/UTs, I indirectly estimate the IMR of those states and UTs from estimated TFR.

2.4 Research Methods

The literature (pertaining to determinants of CSR) suggests that the main factors affecting CSR are FLR, FWFPR, URB, SC/ST, PCNSDP and many others. In a panel data framework, it is obvious that CSR in i-th region depends on those of neighbouring regions. Therefore, I first try to explore whether space does matter towards variations of CSR or not. Spatial factors need to be used in order to take into account the impact of neighbourhood externalities. In order to statistical testing of the existence of neighbourhood impact on CSR, I use **Moran's Index** which captures spatial autocorrelation. Following Anselin (1988, 1995) and Hongfei, Calder and Noel (2007), I define Moran's Index (MI) as:

$$MI = \frac{N}{W}.\frac{\sum_i \sum_j w_{ij}(X_i - \bar{X})(X_j - \bar{X})}{\sum_i (X_i - \bar{X})^2} \qquad (2.1)$$, where, N=number of spatial units indexed by i and j (districts), $W = \sum_i \sum_j w_{ij}$ =sum of spatial weights, w_{ij} is a matrix of spatial weights with zeros on the diagonal ($w_{ii} = w_{jj} = 0$), X be the variable of interest, $\bar{X}$ = mean of the variable. The spatial weight matrix can be defined in many ways but the Rook's contiguity matrix is assumed to be a better approach (Anselin 1988).I have adopted Rook's contiguity matrix; by geographic proximity we construct a binary matrix, in which, $w_{ij} = 1$ if two districts share borders otherwise zero. The weight matrix has been row standardized. Distance band matrix also used as spatial weights for graphical representation. Following Anselin (1988), for statistical significance testing, I transform equation (2.1) to Z (Normalized value) value.

$$Z_{MI} = \frac{MI - E[MI]}{\sqrt{V(MI)}} \qquad (2.2), \text{ where, } E[MI] = -\frac{1}{N-1} \text{ and}$$

$$V(MI) = \frac{NS_4 - S_3 S_5}{(N-1)(N-2)(N-3).W^2} - (E[MI])^2$$

where, $S_1 = \frac{1}{2}\sum_i \sum_j (w_{ij} + w_{ji})^2$, $S_2 = \sum_i \left(\sum_j w_{ij} + \sum_j w_{ji} \right)^2$, $S_3 = \frac{N^{-1}\sum_i (X_i - \bar{X})^4}{\left[N^{-1}\sum_i (X_i - \bar{X})^2 \right]^2}$,

$$S_4 = (N^2 - 3N + 3)S_1 - NS_2 + 3W^2,$$

$$S_5 = (N^2 - N))S_1 - 2NS_2 + 6W^2.$$

The Z-scores of MI along with the corresponding 'p-values' are used for measuring statistical significance whether or not to reject the null hypothesis (of no-spatial auto-correlation); high but positive MI for a feature indicates that the surrounding features have similar values (either high values or low values). This gives me that the feature is clustered or clubbed geographically (Anselin 1995). Similarly, negative MI for a feature indicates a statistically significant spatial data outlier which means that the feature values are dispersed spatially. Equation (2.1) is meant for Global Moran's Index, it measures the extent to which points that are "close together" on average in space having similar values.

However, a local Moran Index is suggested that captures the extent to which points that are "close" to a given point having similar values (Anselin 1995). Generally, the value of local MI happens to be low but the Z score is the most important that determines whether the feature (in our case, CSR) has some neighbourhood impact or not for a given state.

Analysis of local Moran's I is very similar to that of global Moran's I, as shown in equation (2.3).

$$MI_i^L = \frac{X_i - \overline{X}}{S_i^2} \sum_{j=1, i\neq j} w_{ij}\left(X_j - \overline{X}\right) \text{..(2.3)} \quad \text{where,} \quad S_i^2 = \frac{\sum_{j=1,i\neq j}^{N} w_{ij}}{N-1} - \overline{X}^2.$$ For a randomization hypothesis, the expected value is: $E(I_i) = -\frac{\sum_{j=1,i\neq j}^{N} w_{ij}}{N-1}$ and the variance of MI_i^L is given as:

$$Var(MI_i^L) = \frac{(N-B_2)\sum_{j=1,i\neq j}^{N} w_{ij}^2}{N-1} - \frac{(2B_2-N)\sum_{k=1,k\neq i}^{N}\sum_{k=1,k\neq i}^{N} w_{ik}w_{ik}}{(N-1)(N-2)} - \left[E(MI_i^L)\right]^2$$ where, B_2 is defined as: $B_2 = \frac{N\sum_{i=1,i\neq j}^{N}\left(X_i - \overline{X}\right)^4}{\left[\sum_{i=1,i\neq j}^{N}\left(X_i - \overline{X}\right)^2\right]^2}$

In regression analysis, if spatial dimension is neglected, the usual panel data estimators can be greatly affected; omitting the spatial dependence in an econometric analysis would lead to bias (Anselin 1988, Baltagi and Pirotte 2010). Therefore, following Anselin (1988), Anselin et al (2008), Kelejian et al (2006), we propose here basic two models of spatial panel regression: (a) Spatial Lag Panel Model(SLPM) and (b) Spatial Error Panel Model(SEPM).

Incorporating SLPM and SEPM, LeSage and Pace (2009) suggest another model known as Spatial Panel Durbin Model (SPDM); however, I will only estimate SLPM and SEPM.

I assume that CSR in the i-th state at time t, namely y_{it}, is generated according to the following linear spatial lag model (SLPM):

$$y_{it} = \rho\sum_{j=1}^{N} W_{ij}y_{jt} + X_{it}\beta + +\mu_i + \varepsilon_{it}\ i=1,2\ldots N;\ t=1,2\ldots..T\ ; \qquad (2.4)$$

where ρ is the spatial autoregressive parameter, β is the (*K x 1*) parameters, X_{it} stands for (*1 x K*) vector of explanatory variables. In standard panel data regression, μ_i captures individual (state/region) specific characteristics and it is fixed effect but in spatial panel, μ_i becomes random (Anselin and Bera 1998, Baltagi and Griffin 1997), with zero mean and constant variance, $IID(0,\sigma^2)$;ε_{it} is white noise, $IID(0,\sigma^2)$; *W* is the spatial standardized weight matrix of order (*N x N*) defined earlier. The term, $\sum_{j=1}^{N} W_{ij}y_{jt}$ represents the endogenous interaction effects of the dependent variable, y_{it}. The SEPM model includes interaction effects among the error terms and it is assumed that the spatial interaction effects are caused by omitted variables that affect both the local and neighbouring regions. The SEPM model is presented below:

$$y_{it} = X_{it}\beta + +\mu_i + \varphi_{it} \text{ where, } \varphi_{it} = \lambda\sum_{j=1}^{N} W_{ij}\varphi_{jt} + \varepsilon_{it} \qquad (2.5),$$

where, φ_{it} is spatially auto-correlated error term, λ is the spatial autocorrelation coefficient of the error term.

Due to multicollinearity of the explanatory variables, I have formulated different models. Moreover, in order to overcome the problem of heteroscadasticity, robust standard error is taken in all the models. Before running SLPM and SEPM, I first estimate static panel; after regression diagnostic, I run Fixed Effect panel data model.

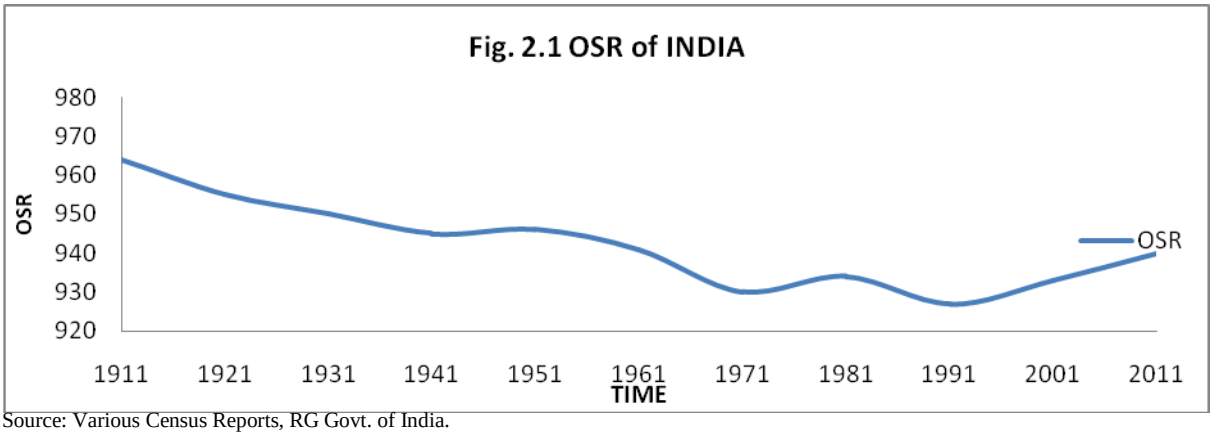
2.5Trend and Pattern of Overall and Child Sex Ratio in India: An Inter-State Analysis:

Adverse overall (OSR) and child sex ratio (CSR) give us some clues through which I can understand excess female mortality over male. This is a gross violation of human rights and dignity because the probability of survival of female is higher than that of male; in most of the developed countries (where gender bias in mortality is low or even nil) generally manifest

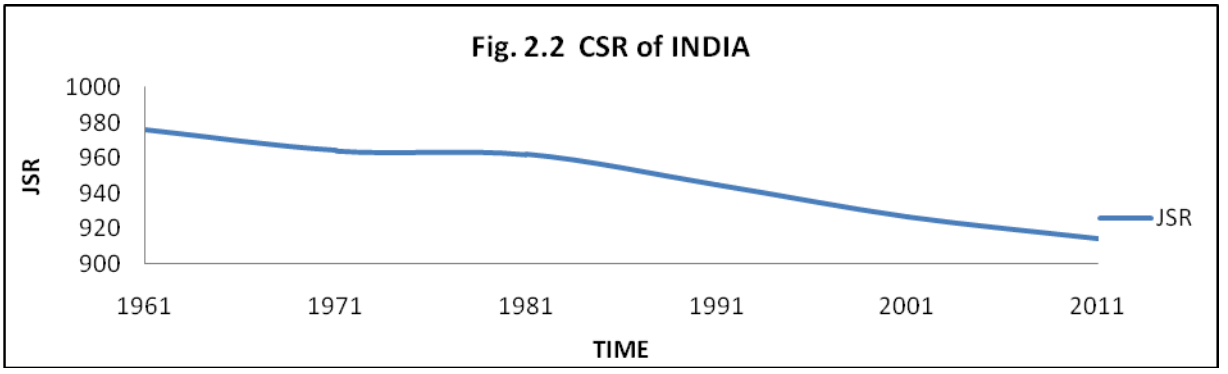
higher overall as well as child sex ratio. But, in India the adverse CSR is socially generated which goes against physiological norms (Sen 1990, Klassen and Wink 2002).

According to the Census 2011, the overall sex ratio stands at 940 for the country as a whole. This is a welcome improvement from the 2001 Census, which had recorded 933 females for every 1000 males. Figure-2.1 presents the trend in sex ratio in India since 1911. The overall sex ratio (OSR) in the country had always remained unfavourable to females. Moreover, it has shown a long term declining trend till 1991. The OSR at the beginning of the twentieth century was 972 and thereafter showed continuous decline until 1941. In 1951, the overall sex ratio was more or less same, but thereafter it again dropped for two consecutive decades to reach 930 in 1971. In fact, in between 1961 to 1971, the country has experienced a sharp decline of 11 points in the sex ratio. Thereafter, it has fluctuated marginally around 930 in successive censuses. But, after 1991 the OSR is found to be increasing marginally.

From Figure-2.2, it is clear that the sex ratio in the age group 0-6 (CSR) has decreased at a much faster pace than the overall sex ratio of the country after 1981. The decreasing CSR in this child population perhaps has a cascading effect on population over a period of time leading to diminishing sex ratio in the country. An important point is to note here that the imbalance that has set in at this early age-group is difficult to remove and would remain to haunt the population for a long time to come. To say the least, demographically the sex ratio of 914 in 2011 of the population in the age group 0-6 does not appear to be fruitful for the future of the country.



Source: Various Census Reports, RG Govt. of India.



Source: Various Census Reports, RG Govt. of India.

2.6 Rate of Change of OSR and CSR across the States and UTs in India over 1971-2011

The following Table-2.1 shows the picture of the growth rates of CSR or juvenile sex ratio (JSR) as well as OSR of 15 major states and 17 minor states and UTs. Usually it is known that the OSR is determined by several factors such as age-specific differences in mortality and migration rates between males and females. For this reason, sex ratios for infants and children are better measures of the differential treatment of males and females in a society. Although the overall sex ratio in India has improved to 940 in 2011 by seven points compared to that of 2001. The only reason is that life expectancy of women has gone up (Singariya 2013). This means, that there are older women in the population that there were 10 years ago but the main concern remains the poor child sex ratio.

During the last decade, 13 out of 15 major states have witnessed an increase in OSR, only two states like Bihar and Gujarat have failed to improve their OSR; however, in case of CSR only four states like Gujarat, Haryana, Punjab and Tamil Nadu have marginally improved but the other states have failed to improve their CSR. It is noticed that Maharashtra has experienced much decline of CSR whereas Punjab has improved maximum in CSR during the last decade. Almost all the major states had experienced declining trend of CSR except Kerala during 1981-1991 and 1991-2001.

In case of Minor states and UTs, no uniform trends are found during the last five decades. From Table-2.1, it can be observed that during the last decade only four states and UTs (like J&K, Dadra and Nagar Haveli, Lakshadweep and Daman Diu) have witnessed a decline of OSR; but eight states and UTs (like J &K, Manipur, Meghalaya, Nagaland, Tripura, Dadra and Nagar Haveli, Sikkim and Lakshadeep) have witnessed a declining trend of CSR. The highest rate of decline is observed in Daman and Diu for OSR; whereas the maximum decline is noticed in J&K.

Among the 32 states and UTs, 10 states and UTs have shown a higher decline compared to the national average (0.750) while 22 states and UTs have been observed above the national average for OSR. But for CSR, 11 states and UTs have experienced a higher rate of decline compared to the national average (-1.4) while rest of the 21 states and UTs are above the national average.

Table-2.1 Rate of Change in Overall Sex Ratio (OSR) and Child Sex Ratio (CSR: 0-6 Years) of 32 States and UT in India, 1971-2011

States	**1971-1981**		**1981-1991**		**1991-2001**		**2001-2011**	
Major States	**OSR**	**CSR(0-6)**	**OSR**	**CSR(0-6)**	**OSR**	**CSR(0-6)**	**OSR**	**CSR(0-6)**
Andh. Pra.	-0.204	0.202	-0.307	-1.713	0.617	-1.435	1.533	-1.873
Assam	1.562	-1.297	1.428	-1.415	0.975	-1.128	2.360	-0.726
Bihar	**-0.940**	1.763	**-4.324**	-2.242	1.543	-1.772	**-0.542**	-0.955
Gujrat	0.856	0.422	-0.842	-2.315	-1.391	-4.849	-0.325	0.339
Haryana	0.346	0.333	-0.574	-2.549	-0.462	-6.825	1.858	1.343
Karnataka	0.626	-0.408	-0.311	-1.437	0.416	-1.562	0.414	-0.211
Kerala	1.574	-0.614	0.387	-1.237	**2.123**	**0.208**	2.457	-0.104
Madh. Pra.	0.108	0.102	-0.977	-2.558	0.877	-2.100	1.086	-2.145
Maharastra	0.752	-1.646	-0.320	-1.150	-1.284	-3.386	0.325	**-3.285**
Orissa	-0.708	-2.450	-1.019	-2.713	-5.252	-1.549	**6.304**	-1.993
Punjab	1.618	1.001	0.341	-3.634	-0.907	**-8.8**	2.173	**6.015**
Rajasthan	0.878	**2.360**	-0.979	**-3.983**	1.318	-0.764	0.433	-2.860
T.N	-0.102	-0.718	-0.307	-1.964	1.026	-0.632	1.117	0.424
UP	0.684	1.300	**10.657**	**-0.748**	**-7.991**	-1.293	1.113	-1.855
W.B	**2.244**	**-6.837**	0.658	-1.427	1.853	-0.723	1.391	-1.041
Minor States & UT								
Andaman	18.012	17.973	7.631	-0.511	3.422	-0.822	3.782	0.310
Aruna. Pra.	0.116	0.100	-0.348	-1.504	**3.958**	-2.138	3.023	1.144
Chandigarh	2.670	2.718	2.730	-0.882	-1.645	**-6.006**	5.276	4.970
Delhi	0.873	1.870	2.351	-1.187	-0.725	-5.464	**5.481**	0.693
Hima. Pra.	1.565	1.569	0.308	-2.059	-0.819	-5.678	0.619	4.013
J & K	1.594	1.580	0.448	-1.452	-0.446	-1.368	-1.008	**-8.110**
Manipur	-0.918	-0.904	-1.338	-1.217	1.670	-1.334	1.334	-3.433
Mehgalaya	1.273	1.225	0.104	-0.504	1.780	-1.115	1.440	-1.333
Nagaland	-0.918	-0.902	2.665	0.506	1.580	-1.812	3.444	-3.282
Puduchery	-0.404	-0.408	-0.609	-1.230	2.247	-0.519	3.696	1.148
Tripura	0.318	0.309	-0.105	-0.514	0.317	0.827	1.371	-2.153
Mizoram	-2.854	-2.857	0.217	-1.724	1.520	0.206	4.278	**19.567**
Goa	-0.611	-0.617	-0.820	-0.103	-0.620	-3.215	0.728	5.251
Dadra & N-H	-3.277	-3.304	-2.258	**1.809**	-14.705	-3.948	-4.556	-1.952
Sikkim	-3.244	-3.264	5.149	-1.329	-0.341	0.932	1.6	-0.102
Lakshadweep	-0.306	-0.310	-3.282	**-2.385**	0.530	**3.506**	-0.210	-6.468
Daman & Diu	**-3.366**	**-3.788**	**-8.757**	-0.725	**-26.728**	-3.444	**-12.957**	0.972

Source: Basic data, Census of India, RG, Govt. of India. Author's estimation

2.7 Descriptive Statistics:

Before analysing the econometric models pertaining to the determinants of CSR, I first report the descriptive statistics of the variables incorporated in my study as given in Table-2.2 Descriptive statistics are estimated for each time point for the entire Major, Minor states as well as UTs- this helps me to analyse how the means and standard deviations of the variables move over time. It is observed that mean CSR is found to be low and declining over the decades; variance of CSR is found to be high for all the decades. Mean OSR is found to be low but stable up to 1991, it declines in 2001, again it starts to increase in 2011. Variance of OSR is found to be higher compared to CSR for all the time points. It is good news for us to

note that the mean incidence of HCR (POV) is observed to be diminishing over the decades but the dispersion of HCR (POV) is found to be high enough over the decades which means that the pace of decline of poverty across the states is not uniform. Mean per capita income (PCNSDP) of the states and UTs is found to be rising over the decades but the standard deviation at each time point is observed to be high and it increases over five time points which means sigma divergence. According to Census 2011, the proportion of SC and ST in total population is estimated at 16.2 and 8.2 respectively; but here I calculate mean value of percentage of SC and ST population among 32 states and UT; as a result we obtain apparently surprising results! The dispersions measured by SD and Range of SC population are quite low compared to ST population among the states and UTs. FLR and MLR across the states over time are found to be rising and SD falls over time which establishes sigma convergence. Mean urbanization is found to be rising and its dispersion is found to be high and more or less stable. Mean FWFPR is stable over last two decades but over time its SD is falling. Mean TFR among the states is falling and its SD is found to be low and diminishing over last two decades; therefore, I can argue that states are converging in respect of fertility decline. Mean IMR and its SD over five time points among the states are observed to be falling continuously which again establishes sigma convergence.

Table-2.2 Descriptive Statistics of the variables: Mean, Standard Deviation, and Range for 5 time points (1971, 1981, 1991, 2001 and 2011)

Variable	1971			1981			1991			2001			2011		
	Mean	**Max**	**MIn**	**Mean**	**Max**	**MIn**	**Mean**	**Max**	**MIn**	**Mean**	**Max**	**MIn**	**Mean**	**Max**	**MIn**
CSR	966.9 (46.6)	1053	829	966.8 (25.9)	997	902	953 (30.6)	1013	875	933.16 (46.7)	975	798	927.4 (40.5)	982	830
OSR	920.4 (84.5)	1099	644	924.1 (69)	1062	760	924.8 (53.9)	1036	790	913.8 (68.9)	1058	710	925.78 (82.4)	1084	618
POV	54.3 (11.6)	70	29	48.1 (11)	66	25	41.9 (11.4)	63	21	34.9 (10.2)	59	19	27.7 (11.2)	54	12
PCNSDP	685 (246.2)	1191	298	883.7 (397.2)	1890	441	1262 (639)	2549	502	1688 (891)	4153	566	3412 (1195)	8039	1006
SC	9.79 (7.6)	24.7	0	10.6 (8.2)	26.9	0	11.3 (8.5)	28.3	0	11.1 (8.5)	28.9	0	11.6 (9.1)	32	0
ST	23.2 (32.4)	94.3	0	22.7 (31)	93.8	0	23.1 (31.4)	94.8	0	22.5 (30.7)	94.5	0	22.8 (30.6)	95.1	0
FLR	28.4 (16.3)	65.3	4.4	37.1 (16.6)	73.4	13.4	48.7 (17.1)	86.2	20.4	61 (13.4)	87.9	33.6	71.6 (10.4)	92	52.7
MLR	50.7 (16)	77.1	20.6	59 (13.9)	84.6	33.4	69.4 (12.2)	93.6	51.5	78.9 (8.7)	94.2	60.3	85.2 (6.5)	96	72.6
URB	22.3 (20.3)	90.6	.94	27.3 (20.4)	93.6	6.6	30.6 (20.7)	89.9	8.5	32.4 (20.3)	93.2	7.1	40 (22.9)	97.5	10
FWFPR	29.5 (25.7)	81.6	1.67	37.2 (20.9)	75.5	1.34	38.6 (19)	77.7	7	41.1 (15.7)	71.4	12	40.2 (15.5)	69.6	9.8
TFR	4.38 (1.22)	6.7	2.2	3.74 (0.95)	5.8	2.23	3.17 (0.77)	5.8	1.2	2.89 (0.806)	4.5	1.7	2.35 ((0.73)	4.34	1.54
IMR	89.03 (36.78)	167	23	76.06 (33.99)	150	24	60.12 (25.5)	124	16	46.5 (20.9)	91	11	33.56 (13.9)	59	11

Source: Cited earlier, authors' estimation. TFR and IMR are drawn from SRS, RG, Govt. of India-various issues; Values in parentheses represent standard deviation

2.8 Determinants of CSR: Econometric Results and Explanations

In the panel data regression results of both Random Effect (RE) and Fixed Effect (FE) are reported in Table-2.3. In the footnote of the Table-2.3, we have given the results of Baltagi-Li Test and Hausman Test.

It is true that in my study I have considered fixed effect result. However, in the foot note of Table- 2.3, Hausman test clearly suggest that for both model 2.1 and model 2.2, fixed effect is being supported. Here, one thing is to be noticed that as fixed effect is being supported, it can be said that it removes omitted variable bias by measuring changes within group across times, usually by including dummy variables for the missing or unknown characteristics (Woolridge, 2005).

In case of the two Fixed Effect (FE) Models (2.1 and 2.2), variables like URB, POV (and its square) and FLR (and its square) appear to be significant. Therefore, one obvious question arises which model is considered to be better? Hausman Test (for FE vs. RE is 32.84, p=0.0002 at 10 df) as shown in foot note of Table-2.3 clearly supports FE model.

$$CSR_{it} = \beta' X_{it} + \eta_i + \mu_t + \varepsilon_{it} \text{.....(2.6)}$$

X_{it} = vector of the explanatory variables, η_i = captures the space effect, μ_t = captures the time effect and ε_{it} stands for white noise term. Here, i = 1, 2, 3,....., 32 and t = 1, 2, 3,..., 5. Due to multicollinearity of the explanatory variables, we have formulated different models. Moreover, in order to overcome the problem of heteroscadasticity, robust standard error is taken in all the models.

Table-2.3: Socio-economic Determinants of CSR

Fixed Effect Model		
Explanatory Variables	**Model-2.1**	**Model-2.2**
ln SC	-0.009(0.006)	-0.016(0.016)
ln ST	-0.002(0.002)	-0.004(0.002)
lnPCNSDP	-0.012(0.04)	
$(lnPCNSDP)^2$	0.002(0.002)	
ln URB	**-0.016**(0.008)**	0.001(0.008)
lnPOV	-	**0.047***(0.021)**
$(lnPOV)^2$	-	**-0.01***(0.004)**
lnFLR	**0.151***(0.06)**	0.092(0.06)
$(lnFLR)^2$	**-0.029***(0.01)**	**-0.019**(0.01)**
ln FWFPR	-0.0005(0.007)	-0.007(0.008)
lnTFR	-0.001(0.022)	-0.007(0.024)
lnIMR	0.005(0.013)	0.013(0.014)
Constant	**6.72***(0.214)**	**6.75***(0.106)**
R^2		
Within	0.2305	0.231
Between	0.200	0.201
No.of observations	160	160
WaldChiSq(10)		
Prob> Chi 2		
F (10, 118)	7.03	4.45
Prob> F	0.0001	0.0001

Source: Authors estimation. Values in parentheses are the Robust standard error. Note :Baltagi- Li LM test for panel vs. CLRM = 19.63 (1 df, prob value = 0.000). Hausman test for Fixed vs. Random effect = 32.84 (10 df, prob value = 0.0002); levels of significance at 1 % and 5% are represented by *** and ** respectively.

In Model-2.1, of FE, FLR and CSR are non-linearly related and their relationship is inverted U shape and in Model-2.2, POV and CSR are non-linearly related and their relationship is inverted U shape.

Education is generally considered a key instrument in the enhancement of freedom and power to achieve opportunities that are open to all (Drèze and Sen. 2002). When accounting for the nature of the sex determination technology, education is presented as an instrument of technological constraint change (Bose and Trent 2005). Echavarri and Ezcura (2010) in their district level study in India have investigated the possible existence of a nonlinear relationship between female disadvantage in natality and education. As is usual in the literature on cultural transmission, their framework stresses the relevance of social interaction when explaining cultural change. Specifically, the final impact of education on gender inequality in natality in their model depends on the final instance on the magnitude of two

effects that works in opposite directions. These two effects are based on the double role played by education in this context: as an instrument of preference changeand as an instrument of technological-constraint change (Drèze and Sen. 2002).

It is surprising to note that almost all the states including UTs have been experiencing a secular increase in FLR but such increase in FLR should have to reduce the extent of female child disadvantage; in our different econometric models, we find inconclusive results. However, if I consider Model-2.1 (Fixed Effect Model), then our econometric results support the findings of Echavarri and Ezcurra (2010); FLR and CSR are non-linearly related and the relationship is inverted U shape. It means that the access to information about sex determination and female foeticide has become easy with the increase in literacy rate. It is well documented that mother's education increases the bargaining power in household decision making but due to strong socio-cultural norms (like dowry system, sons are assumed to maintain family lineage and acts as old age security to the parents) prevailing in India, higher value of female education has not brought wisdom, rather education has been playing evil by strengthening the patriarchal mind-set of the parents.

2.9 Capturing the neighbouring state effect by Global and Local Moran Index:

Moran's Index measures spatial auto correlation both feature location and feature values simultaneously to evaluate whether the pattern expressed is clustered, dispersed or random (Griffith, 2010).

Here, it can be witnessed from the following table (Table 2.4) that for all time period (1971-2011), the global Moran Index for the CSR is significantly positive. It clearly specifies that, there are some definite clusters of high values with neighbouring high values of CSR states and low values with neighbouring low values CSR states. Therefore, state with higher and lower CSR may have an impact on the neighbouring states. This spatial impact can be recognised more clearly with spatial regression.

Table 2.4: Global Moran Index

Variable	GI 1971	GI 1981	GI 1991	GI 2001	GI 2011
CSR	**0.58*** **	**0.51*** **	**0.52*** **	**0.59*** **	**0.4*** **
	(7.43)	(6.72)	(6.85)	(7.78)	(6.07)

Source: Authors estimation. Values in parentheses are the Z score. Levels of significance at 1 % and 5% and 10% are represented by ***, ** and * respectively.

To make this spatial effect more comprehensive, Local Moran Index is considered in Table 2.5. In this table the values of Local Moran's Index of CSR is computed for each state over the time periods 1971-2011. Along with each Moran's Index value, Z-score is calculated to capture the significance level.

It can be seen from the following index that over the time periods, Punjab, Haryana, Rajasthan, Delhi, Chandigarh and UP who are sharing so many common borders with each other and having relatively lower CSR, are proven to have a positively significant spatial neighbourhood impact on CSR.

On the contrary, Assam, Tripura, Mizoram, Sikkim, Nagaland, Meghalaya, Arunachal Pradesh and Manipur those who are experiencing relatively higher CSR are having a positively significant spatial impact on CSR of each other over the periods.

Here it can be also observed that J&K, Himachal Pradesh, Orissa and West Bengal sometimes are influenced significantly by its neighbouring states. In this case, I went through several cases where it can be witnessed that in case of local Moran Index, the value may exceed the range -1 to +1. Even in one of the paper developed by Anselin (1995) has shown that the value of Local Moran Index are way above the mentioned range corresponding to high Z- value that surpasses the range -3 to +3 (Anselin, 1995).Therefore, it can be witnessed that there are clusters forming with high-high and low-values.

Table 2.5: Local Moran's index

State	LMI 71	LMI 81	LMI 91	LMI 01	LMI 11	Z71	Z81	Z91	Z01	Z11
Ap	0.245	0.280	0.505	0.935	0.253	0.21	0.23	0.33	0.54	0.23
Assam	**4.667****	**4.763*****	**4.238****	**4.722*****	**2.721***	**2.06**	**2.12**	**1.90**	**2.12**	**1.35**
Bihar	-0.616	1.319	0.421	0.887	0.001	-0.16	0.69	0.29	0.50	0.16
Gujrat	-0.803	-0.090	-0.547	0.065	1.087	-0.36	0.03	-0.23	0.11	0.74
Haryana	**15.749*****	**17.835*****	**18.273*****	**17.97*****	**11.392*****	**6.68**	**7.62**	**7.81**	**7.74**	**5.26**
Karnataka	0.499	0.565	0.780	0.788	0.320	0.32	0.35	0.46	0.45	0.27
Kerala	0.098	0.200	0.256	1.158	0.919	0.13	0.19	0.22	0.67	0.59
Mp	-0.262	-1.363	0.072	-0.095	1.718	0.02	-0.43	0.16	0.09	0.87
Maharashtra	0.029	-0.797	-0.657	-0.303	-0.349	0.12	-0.25	-0.18	-0.03	-0.05
Orissa	**2.397****	1.620	0.318	0.432	0.001	**1.54**	1.08	0.26	0.34	0.07
Punjab	**13.741*****	**14.893*****	**16.858*****	**19.23*****	**8.615*****	**6.44**	**1.04**	**7.97**	**9.15**	**4.47**
Rajasthan	**7.822*****	**4.231****	**8.957*****	**4.516****	**6.684*****	**3.13**	**1.77**	**3.58**	**1.89**	**2.83**
Tn	0.057	0.027	-0.280	0.540	0.511	0.11	0.10	-0.05	0.36	0.36
Up	**8.596*****	**6.771*****	**5.149*****	2.091	**2.846***	**3.86**	**3.09**	**2.38**	1.04	**1.47**
Wb	**9.391*****	**3.044***	2.116	**3.652****	1.721	**4.03**	**1.40**	1.01	**1.67**	0.90

State	LMI 71	LMI 81	LMI 91	LMI 01	LMI 11	Z71	Z81	Z91	Z01	Z11
Arunachal pra	**2.584***	**5.472*****	**4.916*****	**3.928****	**4.004****	**1.23**	**2.52**	**2.27**	**1.85**	**2.04**
Chandigarh	**18.584*****	**17.786*****	**14.404*****	**14.87*****	**5.577*****	**8.22**	**7.94**	**6.64**	**6.71**	**2.77**
Delhi	**13.97*****	**12.617*****	**10.779*****	**11.98*****	**7.611*****	**5.94**	**5.42**	**4.66**	**5.19**	**3.55**
Himachal pra	**3.967****	-1.735	0.559	**6.666*****	-0.009	**1.84**	-0.66	0.35	**3.07**	0.11
J & k	**4.973*****	0.861	0.808	-1.312	**7.450*****	**2.93**	0.50	0.47	-0.52	**3.88**
Manipur	**3.699****	**4.211****	**4.070****	**4.339****	-0.600	**1.66**	**1.89**	**1.83**	**1.96**	-0,15
Meghalya	1.221	**5.629*****	**6.166*****	**6.289*****	**3.244****	0.616	**2.41**	**2.63**	**2.69**	**1.53**
Nagaland	**2.673***	**4.134****	**6.298*****	**5.457*****	1.129	**1.27**	**1.93**	**2.87**	**2.53**	0.65
Pondicherry	0.149	0.430	0.446	1.104	1.164	0.16	0.30	0.31	0.64	0.73
Tripura	-0.423	1.401	**2.929***	**6.289*****	2.401	-0.05	0.69	**1.31**	**2.69**	1.17
Mizoram	**6.300*****	**4.211****	**3.198***	**5.585*****	**11.92*****	**2.74**	**1.89**	**1.46**	**2.49**	**5.50**
Skkim	**5.633*****	**2.849***	2.544	**6.167*****	**4.341****	**2.39**	**1.28**	1.16	**2.64**	**2.00**
Goa	-0.041	-0.140	1.162	0.138	0.987	0.10	0.06	0.61	0.17	0.57
Dadra	-0.815	-1.029	-2.921	-1.472	-0.675	-0.25	-0.35	-1.18	-0.55	-0.21
Daman diu	0.069	-0.011	0.049	0.072	-0.028	0.14	0.10	0.13	0.14	0.10

Source: Authors estimation. Levels of significance at 1 % and 5% and 10% are represented by ***, ** and * respectively. Note: LMI71, 81, 91, 01, 11 are the local MI for the year 1971, 1981, 1991, 2001 and 2011 respectively; similarly, Z71, Z81, Z91, Z01, Z11 are the Z values of local MI for the year 1971, 1981, 1991, 2001 and 2011 respectively.

2.10 Capturing the role of Space: Spatial Panel Regression

When a value of a socio-economic variable (for example, child sex ratio (CSR) in our case) observed in one location depends on the values observed at neighbouring locations, there is a spatial dependence (Ward and Gleditsch, 2008). The spatial data may show spatial dependence in the variables and error terms. Reason for spatial dependence is that the spatial dimension of a social or economic characteristic may be an important aspect of the phenomenon. For example, based on the premise that location and distance are important forces at work, regional science theory relies on notions of spatial interaction and diffusion effects, hierarchies of place and spatial spill over (Kelejian and Piras, 2017). There are two primary types of spatial dependence: Spatial lag (SPLM) and Spatial Error (SPEM) model-in my case, low CSR or female foeticides are found to be prevalent in some of the states, especially in northern and western parts in India.In order to capture the neighbouring impact, I consider both SPLM and SPEM models. Following Anselin (1986) and Kelijian (2008), SPLM and SPEM are assumed to be better approach to overcome non-nested model. Step by step I have formulated the different models and ultimately shift our focus to SPLM and SPEM, just to justify why our spatial analysis is superior to the other approaches. A brief description in support of our argument is given below. It is to be noted that the standard spatial lag model and the spatial error model, instead of being related to global externalities, are non-nested (Anselin, 2003). Specification testing enters a stage of maturity as well, with

extensions of LM tests to detect multiple sources of misspecification, including functional form (Baltagi and Li 2001b), different types of spatial error correlation (Anselin 2001a; Anselin and Moreno 2003), various model selection strategies (Mur and Angulo 2006, 2009), and tests on non-nested hypotheses (Kelejian 2008).

Table-2.6: Socio-economic Determinants of CSR (Spatial Regression)

Explanatory Variables	Spatial Error Model		Spatial Lag Model	
	Model-2.3	**Model-2.4**	**Model-2.5**	**Model-2.6**
ln SC	**-0.004*****(0.0013)	**-0.004*****(0.0013)	**-0.004*****(0.0013)	**-0.004*****(0.0013)
ln ST	**0.004*****(0.0008)	**0.0038*****(0.008)	**0.004*****(0.0008)	**0.0038*****(0.0008)
lnPCNSDP	**-0.083*****(0.033)		**-0.083*****(0.032)	
(lnPCNSDP)^2	**0.0051*****(0.006)**		**0.005*****(0.0019)**	
ln URB	-0.0014(0.006)	-0.001(0.006)	-0.0014(0.006)	-0.0015(0.006)
lnPOV		-0.028(0.024)		-0.028(0.24)
(lnPOV)^2		0.007(0.004)		0.007(0.006)
lnFLR	0.048(0.048)	0.0004(0.05)	0.0403(0.048)	0.0001(0.05)
(lnFLR)^2	-0.009(0.007)	-0.0014(0.007)	-0.009(0.007**)**	-0.0014(0.0074)
ln FWFPR	-0.001(0.005)	-0.0007(0.005)	-0.001(0.005)	-0.0007(0.005)
Constant	**7.15*****(0.15)	**6.91*****(0.08)	**7.15*****(0.151)	**6.91*****(0.088)
Λ	**-0.0001***(0.00008)	-0.00009(0.00009)		
P			**-0.0001*(0.0009)**	-0.00009(0.00009)
Log Likelihood	288.661	286.34	288.609	286.31
No. of obs	150	150	150	150
Variance ratio	0.438	0.425	0.455	0.438
SQ. Corr	0.444	0.434	0.455	0.438
Sigma	0.04	0.04	0.04	0.04

Source: Authors estimation. Values in parentheses are the Robust standard error. levels of significance at 1 %, 5% and 10% are represented by *** , ** and * respectively.

Here, in this above model (Table 2.6), spatial regression has been performed. For avoiding the problem of multi-co linearity, separate models have been considered. Here spatial error as well as lag model has been considered for capturing whether the role of space matters in explaining the variation of CSR. From the following model is quite clear that PCNSDP has an inverse U-shaped relationship with CSR. The states having higher concentration of Schedule Caste population has a negative impact on CSR whereas the opposite phenomena can be observed for Schedule Tribe population. In case of both Spatial Error and Lag model (Model 2.3 and Model 2.5), negative significant values of **λ** and **ρ** respectively confirms that previous period of CSR and space does have an negative effect on the variation of CSR. It is true that λ, ρ are significant at 10% level. However, acceptable range λ, ρ is from -2.608 to 1.000; if λ, ρ stands between this ranges that means there exist a neighbourhood impact. In our model the value of λ, ρ falls between this two ranges. Acceptable range for λ, ρ: the lower and the upper limits of this range correspond to the inverse of the minimum and maximum Eigen values of the spatial weights matrix W.

2.11 Districts Level Analysis:

2.12 Descriptive Statistics

In case of districts, I have calculated the descriptive statistics that means number of observations, means, standard deviations, minimums, maximums and variances of different concerned variables. Here, in this study I have considered the variables like per capita district domestic product, urbanization, Schedule Caste (SC), Schedule Tribe, male literacy rate (MLR), female literacy rate (FLR), female workforce participation rate (FWFPR) and child sex ratio (CSR). Here I have taken 396 numbers of district and one time period 2011. For each variables there is a huge gap between min and max and high variances as well as standard deviations also ensures that the districts in terms of different variables are highly dispersed and heterogeneous in nature. Therefore, a study needs to be conducted to find out of these variations.

Table: 2.7: Descriptive Statistics

VARIABLES	Description	N	MEAN	SD	MIN	MAX	VAR
PCDDP	Per capita district domestic product	396	62,617	57,674	10,065	993,974	3.326e+09
URB	Urbanisation	396	26.63	20.07	3.390	128.4	402.7
SC	Schedule caste	396	18.01	7.917	1.140	51.85	62.69
ST	Schedule tribe	396	9.306	15.23	-4.270	87.08	231.9
MLR	Male literacy rate	396	82.20	10.56	-40.79	101.3	111.5
FLR	Female literacy rate	396	68.41	11.55	37.81	100.3	133.4
FWFPR	Female work force participation rate	396	26.89	11.08	0.500	51.85	122.8
CSR	% of female child per 1000 of male child from 0-6 years	396	921.08	43.39	764	1306	1882.692

Source: Authors estimation.

2.13 GMI and LMI (For district level)

In the following table (Table 2.8), the positive significant value of the global Moran Index indicates that in case of CSR there exists a spatial auto-correlation in an aggregate level. That means in an aggregate level the child sex ratio of most of the districts are influenced by or having an influence on the other districts. However, this index is having its own limitation. GMI fails to capture or identify the districts which are influenced by the other districts. Therefore, in order to understand the scenario at the disaggregate level; a formulation of another related index is required where the spatial auto-correlation at the district level can be observed. For that reason, Local Moran Index (Appendix 1A.1) has been formulated in the next table.

In case of Uttar Pradesh 39 districts are having a significant spatial neighbourhood influence on each other. 1 district is an outlier. However, 30 districts seem to be insignificant. Similarly, for Rajasthan, Punjab and Madhya Pradesh the numbers of districts are having significant influence on each other are 29, 16 and 20 out of 32, 17 and 45 respectively. Therefore, it can be observed that most of the districts of Northern region are having high-high or low- low value clustering and they are influencing each other. In Eastern region, 16 out of 17 districts of WB form cluster; 17 out of 30 districts of Orissa form cluster and 8 out of 37 districts of Bihar form cluster, however, majority of districts in Bihar (27 districts) which are found to be insignificant.

In Southern region, 26 out of 29 districts of Tamil Nadu are found to influence each other. The same was noticed in case of Kerala (14 out of 27) and Karnataka (19 out of 22).

In North-East region, Assam plays a significant role; Out of 21 districts all of them are being influenced by its neighbouring districts. From Western region, only Maharashtra has been considered and its most of the districts are not getting influenced by the neighbouring districts. Therefore, it can be concluded that almost all the regional parts of India and their districts are being influenced by each other. Therefore, it can be said in a definite manner that there exists a neighbourhood impact of high-high or low-low clustering between the districts in India.

Table: 2.8: GMI (2011)

Moran's GMI			
Variables	GMII	Z	p-value
CSR	0.234***	52.861	0

Source: Authors estimation. levels of significance at 1 % and 5% are represented by *** and ** respectively.

2.14 Spatial Regression:

In the next table (Table: 2.9), I have tried to formulate a spatial auto regressive model to find out the factors that can explain the variation of CSR at a districts level. Here, by the formulation of spatial autoregressive model, I have directly put weight on the dependent variable of the neighbouring districts and indirectly on explanatory variable of the neighbour districts. It can be seen that after giving spatial weights district's income is having an inverted U-shaped relationship with CSR. Here, it can be observed that female literacy is having a

positive impact on improving the CSR where male literacy is having a negative impact on CSR; Schedule Tribe (ST) population is having a positive impact on CSR.

Table: 2.9: Spatial Regression

VARIABLES	DEPENDENT
EXPLANATORY	CSR
PCDDP	-0.00019**
	(-9.03E-05)
$(PCDDP)^2$	1.69e-10*
	(-8.93E-11)
URB	-0.155
	(-0.125)
SC	-0.0361
	(-0.27)
ST	0.54***
	(-0.148)
MLR	-0.439**
	(-0.203)
FLR	0.761***
	(-0.253)
W	
CSR	-0.0325*
	(-0.0186)
E.CSR	1.362***
	(-0.0816)
CONSTANT	946.4***
	(-22.3)
WALD CHI2(8)	35.10
PROB > CHI2	0.0000
PSEUDO R2	0.1372
OBSERVATIONS	396

Source: Authors estimation. levels of significance at 1 % and 5% are represented by *** and ** respectively

2.15 Major Findings:

Socio-cultural discriminating attitude against female is deep rooted social problem in India and over the decades (at the disaggregate level), it is found to be aggravating since the rate of decline of CSR is found to be maximum during 2001-2011; it varies across regions, but female child disadvantage is found to be more acute in Northern states like Haryana, Punjab, UP and Rajasthan. Decline of poverty or increase in income or female literacy rate do not necessarily improve the CSR but female work force participation plays a significant role towards improving CSR. Positive Global and Local Moran Index results confirm that there are neighbourhood effects which result clusters of High-High CSR and Low-Low CSR states. Northern as well as Western state (Rajasthan) are forming clusters around a lower CSR value and North-Eastern and some of the Eastern states are forming clusters around High CSR value over the periods and they are significantly influenced by their CSR of neighbouring states. In order to eliminate societal ill practices, patriarchal mind-set and discrimination against women various constitutional and rules and provisions have already been enacted, however, implementation of all these affirmative actions are found to be weak.Some legal rights and affirmative actions (like RashtriyoMohilaKosh, Kishoree Shakti Yoyona, Self-Help Groups etc) have already been undertaken but in reality there are a lot to be done. The Government of India has passed Pre-Conception and Pre-natal Diagnostic Techniques (PCPNDT) Act in 1994 to ban and punish prenatal sex determination and female foeticide. But, PCPNDT Act has been poorly enforced by the authorities and it is revealed from the rate of decline of CSR between 2001 and 2011. For district level, Northern states and districts which are relatively having lower average CSR are having negative impact on CSR and it is influenced by their neighbours. The role of space and neighbouring effect is prominent among Northern-Eastern states as well as districts which are relatively better CSR compared to national average. Surpassing the cut-off level of income (opposite holds true for Poverty and FLR) CSR can be improved. Higher proportion of ST community is having a positive influence on CSR.

Appendix:

Appendix 1A.1: Table: LMI (2011)

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Andhra Pradesh	ADILABAD	920	0.304	0.075	0.47
Andhra Pradesh	Anantapur	912	-8.712	-0.915	0.18
Andhra Pradesh	Chittoor	920	-1.282	-0.115	0.454
Andhra Pradesh	Cuddapah–YSR	902	-20.4**	-2.212	0.013
Andhra Pradesh	East Godavari	963	19.2**	2.226	0.013
Andhra Pradesh	Guntur	938	14.483*	1.572	0.058
Andhra Pradesh	Hyderabad	900	-19.34**	-1.975	0.024
Andhra Pradesh	Karimnagar	922	0.31	0.073	0.471
Andhra Pradesh	Khammam	952	20.43**	2.182	0.015
Andhra Pradesh	Krishna	921	-0.061	0.03	0.488
Andhra Pradesh	Kurnool	928	6.761	0.762	0.223
Andhra Pradesh	Medak	946	16.29**	1.736	0.041
Andhra Pradesh	Nalgonda	909	-11.005	-1.106	0.134
Andhra Pradesh	Nellore	932	12.7*	1.449	0.074
Andhra Pradesh	Nizamabad	943	8.174	0.887	0.188
Andhra Pradesh	Prakasam	921	-0.087	0.026	0.489
Andhra Pradesh	Rangareddi	920	-0.926	-0.058	0.477
Andhra Pradesh	Srikakulam	948	23.4***	2.826	0.002
Andhra Pradesh	Visakhapatnam	954	18.205	2.225	0.013
Andhra Pradesh	Vizianagaram	951	23.8***	2.831	0.002
Andhra Pradesh	Warangal	907	-5.829	-0.564	0.286
Andhra Pradesh	West Godavari	962	27.7***	3.064	0.001
Assam	Barpeta	962	44.7***	5.827	0
Assam	Bongaigaon	968	52.6***	6.679	0
Assam	Cachar	951	31.4***	4.702	0
Assam	Darrang	966	46.1***	6.499	0
Assam	Dhemaji	940	10.2***	2.113	0.017
Assam	Dhubri	970	51.2***	6.134	0
Assam	Dibrugarh	962	19.5***	4.204	0
Assam	Goalpara	958	41.6***	5.261	0
Assam	Golaghat	963	38.5***	6.714	0
Assam	Hailakandi	968	50.3***	7.338	0
Assam	Jorhat	963	26.5***	4.99	0
Assam	KarbiAnglong	952	31.2***	4.956	0
Assam	Karimganj	971	54.3***	7.758	0
Assam	Kokrajhar	958	40.9***	5.065	0
Assam	Lakhimpur	956	22.2***	4.183	0
Assam	Morigaon	952	32.2***	4.585	0
Assam	Nagaon	959	39***	5.824	0
Assam	Nalbari	972	54.6***	7.376	0

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Assam	Sibsagar	957	20.3***	4.063	0
Assam	Sonitpur	963	42.8***	6.504	0
Assam	Tinsukia	962	18.2***	4.087	0
Bihar	Araria	955	29.5***	3.208	0.001
Bihar	Aurangabad	945	7.787	0.834	0.202
Bihar	Banka	933	10.412	1.14	0.127
Bihar	Begusarai	906	-11.674	-1.177	0.12
Bihar	Bhagalpur	924	2.439	0.297	0.383
Bihar	Bhojpur	908	-3.085	-0.268	0.394
Bihar	Buxar	939	0.127	0.059	0.476
Bihar	Darbhanga	940	11.301	1.218	0.112
Bihar	Gaya	956	16.1***	1.69	0.046
Bihar	Gopalganj	950	-2.044	-0.165	0.435
Bihar	Jamui	953	28.4***	2.997	0.001
Bihar	Jehanabad	925	1.664	0.214	0.415
Bihar	Kaimur (Bhabua).	944	1.377	0.187	0.426
Bihar	Katihar	959	33.2***	3.618	0
Bihar	Khagaria	924	2.33	0.284	0.388
Bihar	Kishanganj	985	57.3***	6.285	0
Bihar	Lakhisarai	905	-13.4*	-1.354	0.088
Bihar	Madhepura	932	8.179	0.905	0.183
Bihar	Madhubani	935	9.087	0.991	0.161
Bihar	Munger	926	4.019	0.461	0.322
Bihar	Muzaffarpur	909	-4.711	-0.446	0.328
Bihar	Nalanda	926	2.936	0.344	0.365
Bihar	Nawada	929	5.36	0.594	0.276
Bihar	PashchimChamparan	953	-4.729	-0.443	0.329
Bihar	Patna	903	-7.209	-0.697	0.243
Bihar	PurbaChaparan .	932	1.003	0.146	0.442
Bihar	Purnia	948	23.7***	2.596	0.005
Bihar	Rohtas	922	0.192	0.067	0.473
Bihar	Saharsa	944	17.3***	1.87	0.031
Bihar	Samastipur	916	-3.24	-0.297	0.383
Bihar	Saran	915	-1.556	-0.116	0.454
Bihar	Sheikhpura	933	9.353	1.013	0.156
Bihar	Sheohar	936	5.087	0.567	0.285
Bihar	Sitamarhi	933	4.981	0.56	0.288
Bihar	Siwan	944	-0.816	-0.039	0.485
Bihar	Supaul	954	24***	2.58	0.005
Bihar	Vaishali	888	-15*	-1.509	0.066
Karnataka	Bagalkot	933	9.092	1.021	0.154
Karnataka	Bangalore	945	24.4***	2.862	0.002

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Karnataka	Bangalore Rural	954	30.8***	3.543	0
Karnataka	Belgaum	941	11.6*	1.34	0.09
Karnataka	Bellary	967	42***	4.605	0
Karnataka	Bidar	943	14.5*	1.565	0.059
Karnataka	Bijapur	933	6.897	0.786	0.216
Karnataka	Chamarajanagar	948	29.7***	3.582	0
Karnataka	Chikmagalur	1025	83.1***	9.502	0
Karnataka	Chitradurga	948	22.1***	2.474	0.007
Karnataka	Dakshina Kannada	945	23.9***	2.819	0.002
Karnataka	Davanagere	950	22.5***	2.527	0.006
Karnataka	Dharwad	945	15.9**	1.812	0.035
Karnataka	Gadag	945	18.4**	2.061	0.02
Karnataka	Gulbarga	991	46.2***	4.955	0
Karnataka	Hassan	981	53.6***	6.188	0
Karnataka	Haveri	941	14.7**	1.672	0.047
Karnataka	Kodagu	979	55.2***	6.523	0
Karnataka	Kolar	964	45.9***	5.302	0
Karnataka	Koppal	961	33.7***	3.718	0
Karnataka	Mandya	942	20.8***	2.469	0.007
Karnataka	Mysore	961	37.9***	4.49	0
Karnataka	Raichur	943	20.2**	2.189	0.014
Karnataka	Shimoga	963	32.3***	3.685	0
Karnataka	Tumkur	964	39.9***	4.583	0
Karnataka	Udupi	958	31.7***	3.68	0
Karnataka	Uttara Kannada	960	27.9***	3.16	0.001
Kerala	Alappuzha	949	32.3***	4.301	0
Kerala	Ernakulam	965	50.4***	6.636	0
Kerala	Idukki	962	47.1***	6.254	0
Kerala	Kannur	976	56.2***	6.864	0
Kerala	Kasaragod	962	41.8***	5.027	0
Kerala	Kollam	980	65.3***	8.919	0
Kerala	Kottayam	965	50.4***	6.702	0
Kerala	Kozhikode	975	57.2***	7.067	0
Kerala	Malappuram	968	51***	6.367	0
Kerala	Palakkad	969	52.3***	6.589	0
Kerala	Pathanamthitta	981	68.3***	9.067	0
Kerala	Thiruvananthapuram	965	47.9***	6.63	0
Kerala	Thrissur	946	28.3***	3.661	0
Kerala	Wayanad	968	50.1***	6.105	0
Madhya Pradesh	Balaghat	967	-50***	-4.987	0
Madhya Pradesh	Barwani	937	-25***	-2.569	0.005
Madhya Pradesh	Betul	951	-42***	-4.158	0

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Madhya Pradesh	Bhind	849	158***	15.949	0
Madhya Pradesh	Bhopal	918	5.649	0.618	0.268
Madhya Pradesh	Chhatarpur	892	47.7***	4.848	0
Madhya Pradesh	Chhindwara	955	-47***	-4.683	0
Madhya Pradesh	Damoh	925	-6.7	-0.627	0.265
Madhya Pradesh	Datia	847	166***	16.758	0
Madhya Pradesh	Dewas	912	18.3**	1.925	0.027
Madhya Pradesh	Dhar	921	0.1	0.056	0.478
Madhya Pradesh	Dindori	961	-46***	-4.561	0
Madhya Pradesh	East Nimar (Khandw	928	-11	-1.039	0.149
Madhya Pradesh	Guna	900	49.7***	5.06	0
Madhya Pradesh	Gwalior	834	201***	20.324	0
Madhya Pradesh	Harda	930	-15.417	-1.506	0.066
Madhya Pradesh	Hoshangabad	916	8.402	0.896	0.185
Madhya Pradesh	Indore	898	43***	4.505	0
Madhya Pradesh	Jabalpur	920	1.596	0.221	0.412
Madhya Pradesh	Jhabua	928	-12.6*	-1.294	0.098
Madhya Pradesh	Katni	933	-17.3**	-1.693	0.045
Madhya Pradesh	Mandla	965	-55***	-5.459	0
Madhya Pradesh	Mandsaur	918	7.005	0.762	0.223
Madhya Pradesh	Morena	825	219***	22.183	0
Madhya Pradesh	Narsimhapur	908	21.1**	2.179	0.015
Madhya Pradesh	Neemuch	925	-9.193	-0.904	0.183
Madhya Pradesh	Panna	906	23.2**	2.391	0.008
Madhya Pradesh	Raisen	930	-16.04*	-1.562	0.059
Madhya Pradesh	Rajgarh	912	20.6**	2.131	0.017
Madhya Pradesh	Ratlam	930	-18.5**	-1.872	0.031
Madhya Pradesh	Rewa	865	62***	6.311	0
Madhya Pradesh	Sagar	922	-1.624	-0.11	0.456
Madhya Pradesh	Satna	900	27.5***	2.826	0.002
Madhya Pradesh	Sehore	905	30.9***	3.175	0.001
Madhya Pradesh	Seoni	941	-25***	-2.481	0.007
Madhya Pradesh	Shahdol	939	-17.8**	-1.743	0.041
Madhya Pradesh	Shajapur	913	18.08**	1.884	0.03
Madhya Pradesh	Sheopur	881	101***	10.235	0
Madhya Pradesh	Shivpuri	887	82.8***	8.383	0
Madhya Pradesh	Sidhi	895	14.3*	1.506	0.066
Madhya Pradesh	Tikamgarh	881	78.3***	7.919	0
Madhya Pradesh	Ujjain	927	-12.385	-1.227	0.11
Madhya Pradesh	Umaria	935	-18.2**	-1.787	0.037
Madhya Pradesh	Vidisha	918	5.808	0.635	0.263
Madhya Pradesh	West Nimar	926	-8.197	-0.809	0.209

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Maharashtra	Ahmadnagar	986	-5.869	-0.614	0.27
Maharashtra	Akola	902	17.4**	1.836	0.033
Maharashtra	Amravati	932	-10.51	-1.017	0.155
Maharashtra	Aurangabad	842	25.6***	2.811	0.002
Maharashtra	Bhandara	947	-27***	-2.632	0.004
Maharashtra	Bid	764	-43**	-4.635	0
Maharashtra	Buldana	829	73.5***	7.786	0
Maharashtra	Chandrapur	960	-21.1**	-2.093	0.018
Maharashtra	Dhule	894	26.3***	2.891	0.002
Maharashtra	Gadchiroli	959	-6.673	-0.639	0.261
Maharashtra	Gondiya	955	-34***	-3.321	0
Maharashtra	Hingoli	860	8.723	0.949	0.171
Maharashtra	Jalgaon	823	105***	11.104	0
Maharashtra	Jalna	854	19.4**	2.105	0.018
Maharashtra	Kolhapur	876	-18.5**	-2.094	0.018
Maharashtra	Latur	875	-24.7***	-2.583	0.005
Maharashtra	Mumbai	911	2.408	0.317	0.376
Maharashtra	Nagpur	926	-5.617	-0.513	0.304
Maharashtra	Nanded	901	-4.786	-0.456	0.324
Maharashtra	Nandurbar	936	-19.03**	-2.032	0.021
Maharashtra	Nashik	875	17.9**	2.058	0.02
Maharashtra	Osmanabad	854	-35.1***	-3.746	0
Maharashtra	Parbhani	865	-4.756	-0.462	0.322
Maharashtra	Pune	874	-3.291	-0.345	0.365
Maharashtra	Raigarh	934	5.179	0.57	0.284
Maharashtra	Ratnagiri	928	1.432	0.201	0.42
Maharashtra	Sangli	875	-21.4***	-2.372	0.009
Maharashtra	Satara	904	-4.467	-0.478	0.316
Maharashtra	Sindhudurg	911	-3.378	-0.373	0.355
Maharashtra	Solapur	878	-26.8***	-2.856	0.002
Maharashtra	Thane	921	0.022	0.031	0.487
Maharashtra	Wardha	915	6.175	0.671	0.251
Maharashtra	Washim	836	40.3***	4.22	0
Maharashtra	Yavatmal	917	3.175	0.368	0.357
Orrissa	Anugul	866	-51.2***	-5.35	0
Orrissa	Balangir	949	19.1***	1.984	0.024
Orrissa	Baleshwar	943	23.63***	2.596	0.005
Orrissa	Bargarh	957	21.1**	2.187	0.014
Orrissa	Baudh	985	52.6***	5.476	0
Orrissa	Bhadrak	942	21.6***	2.372	0.009
Orrissa	Cuttack	902	-19.5**	-2.079	0.019
Orrissa	Debagarh	913	-7.376	-0.72	0.236

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Orrissa	Dhenkanal	853	-71.6***	-7.599	0
Orrissa	Gajapati	969	35***	3.923	0
Orrissa	Ganjam	893	-24.6***	-2.648	0.004
Orrissa	Jagatsinghapur	931	9.916	1.133	0.129
Orrissa	Jajapur	921	-0.082	0.026	0.49
Orrissa	Jharsuguda	941	14.7*	1.541	0.062
Orrissa	Kalahandi	944	13.7*	1.464	0.072
Orrissa	Kandhamal	958	27.1***	2.86	0.002
Orrissa	Kendrapara	919	-2.03	-0.193	0.423
Orrissa	Kendujhar	970	47.7***	5.035	0
Orrissa	Khordha	912	-8.524	-0.897	0.185
Orrissa	Koraput	977	27.2***	2.967	0.002
Orrissa	Malkangiri	998	16.2**	1.82	0.034
Orrissa	Mayurbhanj	963	44.1***	4.724	0
Orrissa	Nabarangapur	998	23.7***	2.552	0.005
Orrissa	Nayagarh	831	-87.4***	-9.362	0
Orrissa	Nuapada	988	-18.9**	-2.22	0.013
Orrissa	Puri	933	11.3*	1.299	0.097
Orrissa	Rayagada	958	23.305***	2.555	0.005
Orrissa	Sambalpur	931	6.877	0.744	0.228
Orrissa	Sonapur	945	17.045**	1.783	0.037
Orrissa	Sundargarh	935	9.077	0.966	0.167
Punjab	Amritsar	845	141.1***	18.226	0
Punjab	Bathinda	889	66.3***	7.884	0
Punjab	Faridkot	871	100.2***	12.324	0
Punjab	Fatehgarh Sahib	880	85.5***	9.961	0
Punjab	Firozpur	860	119.9***	14.866	0
Punjab	Gurdaspur	838	146.9***	19.263	0
Punjab	Hoshiarpur	892	56.9***	7.101	0
Punjab	Jalandhar	909	24.1***	2.997	0.001
Punjab	Kapurthala	915	12.1***	1.532	0.063
Punjab	Ludhiana	882	80***	9.576	0
Punjab	Mansa	864	119.9***	13.777	0
Punjab	Moga	881	80.4***	9.852	0
Punjab	Muktsar	841	158.1***	19.263	0
Punjab	Patiala	868	112.1***	12.766	0
Punjab	Rupnagar	898	47.4***	5.626	0
Punjab	SahidBhagat Singh	924	-5.939	-0.689	0.246
Punjab	Sangrur	868	111.4***	12.885	0
Rajasthan	Ajmer	891	71***	7.52	0
Rajasthan	Alwar	854	146.9***	15.184	0
Rajasthan	Banswara	919	4.366	0.495	0.31

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Rajasthan	Baran	909	30.1***	3.086	0.001
Rajasthan	Barmer	897	34.8***	4.454	0
Rajasthan	Bharatpur	865	7.989	0.869	0.192
Rajasthan	Bhilwara	918	7.439	0.81	0.209
Rajasthan	Bikaner	904	34.5***	3.985	0
Rajasthan	Bundi	886	84.5***	8.668	0
Rajasthan	Chittaurgarh	904	42.4***	4.332	0
Rajasthan	Churu	898	49.4***	5.45	0
Rajasthan	Dausa	845	170.3***	17.521	0
Rajasthan	Dhaulpur	856	146.5***	14.852	0
Rajasthan	Dungarpur	906	30.4***	3.322	0
Rajasthan	Ganganagar	857	126.7***	15.384	0
Rajasthan	Hanumangarh	882	80.1***	9.424	0
Rajasthan	Jaipur	843	172.7***	17.893	0
Rajasthan	Jaisalmer	877	54.8***	7.545	0
Rajasthan	Jalor	882	68.5***	8.207	0
Rajasthan	Jhalawar	901	48.1***	4.912	0
Rajasthan	Jhunjhunun	825	205.3***	21.974	0
Rajasthan	Jodhpur	877	96.6***	10.831	0
Rajasthan	Karauli	842	187.4***	19.043	0
Rajasthan	Kota	893	68.8***	7.043	0
Rajasthan	SawaiMadhopur	856	157.3***	16.044	0
Rajasthan	Nagaur	888	70.9***	7.894	0
Rajasthan	Pali	887	76.3***	8.334	0
Rajasthan	Rajsamand	887	80.6***	8.53	0
Rajasthan	Sikar	830	197***	21.126	0
Rajasthan	Sirohi	887	70.04***	8.083	0
Rajasthan	Tonk	875	110.4***	11.372	0
Rajasthan	Udaipur	912	21.2**	2.291	0.011
Tamil Nadu	Chennai	939	24.8***	2.926	0.002
Tamil Nadu	Coimbatore	953	36.1***	4.481	0
Tamil Nadu	Cuddalore	866	-75.6***	-9.245	0
Tamil Nadu	Dharmapuri	935	15.8**	1.908	0.028
Tamil Nadu	Dindigul	936	17.5**	2.293	0.011
Tamil Nadu	Erode	960	44.8***	5.509	0
Tamil Nadu	Kancheepuram	959	47.8***	5.616	0
Tamil Nadu	Kanniyakumari	962	41.5***	5.903	0
Tamil Nadu	Karur	944	27.4***	3.445	0
Tamil Nadu	Madurai	936	17.5***	2.328	0.01
Tamil Nadu	Nagapattinam	957	42.8***	5.5	0
Tamil Nadu	Namakkal	927	6.93	0.874	0.191
Tamil Nadu	Nilgiris	988	70.8***	8.609	0

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Tamil Nadu	Perambalur	902	-24.7***	-3.041	0.001
Tamil Nadu	Pudukottai	963	48.9***	6.374	0
Tamil Nadu	Ramanathpuram	960	43.2***	5.873	0
Tamil Nadu	Salem	949	31.3***	3.793	0
Tamil Nadu	Sivganga	964	49.3***	6.544	0
Tamil Nadu	Thanjavur	956	42.81***	5.44	0
Tamil Nadu	Theni	956	40.6***	5.368	0
Tamil Nadu	Thirunelveli	962	44.7***	6.15	0
Tamil Nadu	Thiruvallur	941	26.3***	3.067	0.001
Tamil Nadu	Thiruvarur	951	35.8***	4.598	0
Tamil Nadu	Thoothukudi	969	52.1***	7.173	0
Tamil Nadu	Tiruchirapalli .	944	28.2***	3.598	0
Tamil Nadu	Tiruvannamalai .	922	1.109	0.161	0.436
Tamil Nadu	Vellore	945	26.9***	3.146	0.001
Tamil Nadu	Viluppuram	931	12.9*	1.593	0.056
Tamil Nadu	Virudhunagar	954	37.6***	5.036	0
Uttar Pradesh	Agra	859	136.2***	13.831	0
Uttar Pradesh	Aligarh	873	100.46***	10.277	0
Uttar Pradesh	Allahabad	881	33.7***	3.439	0
Uttar Pradesh	Ambedaker Nagar	927	-4.007	-0.356	0.361
Uttar Pradesh	Auraiya	897	51.3***	5.214	0
Uttar Pradesh	Azamgarh	904	7.645	0.819	0.207
Uttar Pradesh	Baghpat	837	189.4***	19.935	0
Uttar Pradesh	Bahraich	918	4.333	0.485	0.314
Uttar Pradesh	Ballia	879	-4.45	-0.406	0.343
Uttar Pradesh	Balrampur	945	-25.9***	-2.594	0.005
Uttar Pradesh	Banda	895	40.2***	4.089	0
Uttar Pradesh	Barabanki	928	-9.437	-0.903	0.183
Uttar Pradesh	Bareilly	902	39.8***	4.094	0
Uttar Pradesh	Basti	925	-3.1	-0.267	0.395
Uttar Pradesh	Bijnor	872	108.6***	11.419	0
Uttar Pradesh	Budaun	904	35.6***	3.656	0
Uttar Pradesh	Bulandshahar	848	156.2***	16.053	0
Uttar Pradesh	Chandauli	899	4.347	0.487	0.313
Uttar Pradesh	Chitrakoot	897	31.2***	3.193	0.001
Uttar Pradesh	Deoria	914	2.034	0.252	0.4
Uttar Pradesh	Etah	873	100.1***	10.17	0
Uttar Pradesh	Etawah	866	119.4***	12.061	0
Uttar Pradesh	Faizabad	925	-3.956	-0.354	0.362
Uttar Pradesh	Farrukhabad	885	73.9***	7.501	0
Uttar Pradesh	Fatehpur	898	29.9***	3.06	0.001
Uttar Pradesh	Firozabad	879	92.2***	9.369	0

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Uttar Pradesh	Gautam Buddha Naga	838	180.8***	18.617	0
Uttar Pradesh	Ghaziabad	848	160.7***	16.645	0
Uttar Pradesh	Ghazipur	895	4.533	0.505	0.307
Uttar Pradesh	Gonda	914	7.837	0.84	0.201
Uttar Pradesh	Gorakhpur	897	10.15	1.074	0.141
Uttar Pradesh	Hamirpur	878	81.7***	10.274	0
Uttar Pradesh	Hardoi	892	55.8***	5.671	0
Uttar Pradesh	Hathras	855	138.3***	14.091	0
Uttar Pradesh	Jalaun	877	90.2***	9.116	0
Uttar Pradesh	Jaunpur	912	4.504	0.504	0.307
Uttar Pradesh	Jhansi	857	140.4***	14.162	0
Uttar Pradesh	JyotibaPhule Naga	900	-8.052	-0.892	0.186
Uttar Pradesh	Kannauj	892	62.6***	6.494	0
Uttar Pradesh	Kanpur Dehat	900	41.3***	4.203	0
Uttar Pradesh	Kanpur Nagar	876	71.4***	7.227	0
Uttar Pradesh	Kaushambi	912	9.83	1.04	0.149
Uttar Pradesh	Kheri	911	18.4**	1.909	0.028
Uttar Pradesh	Kushinagar	917	0.961	0.143	0.443
Uttar Pradesh	Lalitpur	909	25.9***	2.659	0.004
Uttar Pradesh	Lucknow	915	8.743	0.929	0.176
Uttar Pradesh	Maharajganj	918	1.197	0.166	0.434
Uttar Pradesh	Mahoba	888	56.03***	5.683	0
Uttar Pradesh	Mainpuri	880	84.4***	8.564	0
Uttar Pradesh	Mathura	869	113.5***	11.574	0
Uttar Pradesh	Mau	917	0.856	0.134	0.447
Uttar Pradesh	Meerut	850	158.3***	16.504	0
Uttar Pradesh	Mirzapur	889	13.1*	1.372	0.085
Uttar Pradesh	Moradabad	919	4.475	0.502	0.308
Uttar Pradesh	Muzaffarnagar	865	127.6***	13.51	0
Uttar Pradesh	Pilibhit	899	44.6***	4.601	0
Uttar Pradesh	Pratapgarh	908	12.162	1.273	0.102
Uttar Pradesh	Rae Bareli	919	2.516	0.303	0.381
Uttar Pradesh	Rampur	926	-10.636	-1.045	0.148
Uttar Pradesh	Saharanpur	845	163.6***	17.881	0
Uttar Pradesh	SantKabir Nagar	943	-12.789	-1.246	0.106
Uttar Pradesh	SantRavidas Nagar	896	12.9*	1.356	0.088
Uttar Pradesh	Shahjahanpur	906	30.6***	3.146	0.001
Uttar Pradesh	Shrawasti	922	-1.19	-0.076	0.47
Uttar Pradesh	Siddharthnagar .	921	0.064	0.05	0.48
Uttar Pradesh	Sitapur	928	-12.409	-1.205	0.114
Uttar Pradesh	Sonbhadra	910	1.706	0.222	0.412
Uttar Pradesh	Sultanpur	913	8.113	0.866	0.193

Moran's LMI (CSR)					
STATE	**DISTRICTS**	**CSR**	**LMI**	**Z**	**p-value**
Uttar Pradesh	Unnao	919	3.256	0.377	0.353
Uttar Pradesh	Varanasi	868	18.7**	1.934	0.027
West Bengal	Bankura	948	27.8***	3.001	0.001
West Bengal	Barddhaman	949	29.08***	3.194	0.001
West Bengal	Birbhum	957	35.9***	3.899	0
West Bengal	DakshinDinajpur	953	31.08***	3.44	0
West Bengal	Darjiling	949	25.6***	2.919	0.002
West Bengal	Howrah	966	47.7***	5.333	0
West Bengal	Hooghly	953	33.2***	3.697	0
West Bengal	Jalpaiguri	948	26.01***	2.955	0.002
West Bengal	Koch Bihar	941	19.692***	2.309	0.01
West Bengal	Kolkata	936	15.94**	1.809	0.035
West Bengal	Maldah	944	20.8***	2.317	0.01
West Bengal	Murshidabad	967	44.3***	4.864	0
West Bengal	Nadia	955	33.6***	3.769	0
West Bengal	North 24 Parganas	1306	335.4***	37.415	0
West Bengal	Puruliya	948	26.6***	2.824	0.002
West Bengal	South 24 Parganas	963	43.36***	4.891	0
West Bengal	Uttar Dinajpur	947	23.7***	2.626	0.004

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, Values in parentheses represent Z values. Here distance matrix has been considered for spatial weight matrix

CHAPTER-3

Gender Differential in Human Capital Outcomes: Literacy Rate and Enrolment at Upper Primary Level

3.1 Introduction

Inclusive growth with a special focus on gender issue has been considered an important national objective in India. Both males and females have equal potentiality to acquire educational endowment but due to unequal opportunity there exists wide range of gender disparity in respect of educational outcomes. A women has to face different sorts of unequal treatments from their childhood onwards. The declining child sex ratio is one of its examples; even there exists spatial neighbourhood impact of this declining child sex ratio (Bhattacharyya & Haldar, 2020b). However, in this chapter, I have considered only the gender inequality in educational aspect. Accessibility to the proper education for all helps to improve a nation to go ahead in a right direction. Though, India's economic growth fails to narrow the gender gap. India is lagging a way behind in gross enrolment ratio than that of the world average (Rami, 2017). Lack of equality in education harms not only the present generation but it is also responsible for creating a depressing society for the future generation too (Singh, 2016, Katiyar, 2016). The gender inequality in education results in more demand for equal opportunity program. Promoting women education may encourage more enrolment in education for women (Kapur, 2018). This inequality imposes a great challenge for the policy makers and the researchers to suggest or implement some policies relevant to tackle this diversified complex challenge to improve the women's position in educational attainment (Karak, 2016). Though, some of the affirmative actions have played a significant role to improve this scenario; the Mahila Samakhya Programme, Jan Shikshan Sansthans and Sarba Sikhsha Abiyan are some examples (Pietkiewicz-Pareek, 2019). India has been experiencing a wide range of variations of gender inequality in education at the sub-national level (Pal, 2004). Gender differential in educational outcomes are more observed in northern states. In states like Uttar Pradesh, parental discriminatory attitude can be observed in case girl child's education (Kingdon, 2002). Even educated parents and developed village infrastructure has a positive effect on lowering the gap between male and female in Bihar and Uttar Pradesh (Chaudhury& Roy, 2009). In case of Jammu and Kashmir, developmental programs towards achieving the women's role in equal education, fail to achieve its desired goals (Bilal & Khan, 2014). Even in Assam mid-day meal scheme fails to address the problem of gender inequality (Nayak&Mahanta, 2013). In Andhra Pradesh and Telengana, villages can be found where villagers' negative mentality towards girl's education has a serious negative impact on female's education (Gouri, 2017). Family background plays a crucial role in determining the women's participation in education (Mishra & Mishra, 2015). Variation in socio-cultural and

familial factors resulted in a divergence between the male-female educational attainment rates (Batra&Reio, 2016). However, higher economic development results in lower gender differential and migration of wives to co-resides with the husband's family may have a negative impact on women's educational achievement (Rammohan& Vu, 2017).In case middle class society, no evidence can be found on the matter of egalitarian educational attainment (Vaid, 2004). The most interesting factor to state is that India is now slowly moving towards gender equality in primary and upper primary educational enrolment ratio (Ghosh, 2018). However, vulnerable society is still facing an unequal access (Sharma & Vats, 2019). Even for higher education, participation of women still is lagging behind that of male (Kesarwani, & Bala Komaraiah, 2019); inspite of the fact that the equality in higher education considers being a powerful tool to advancing the society in a right direction (Chauhan, 2011). Most of the women, who pursue education in abroad, are having university-literate mother or involve in a job other than regular household chores (Sondhi, 2016). Here, support by the spouse and in-laws, stop assigning the gender role and gender stereotypical thinking, parental negative thoughts towards a girl child can make huge difference in higher education attainment (Hassan et al., 2020, Dandapat&Sengupta, 2013). Proper implementation of policies and its improved qualities has a positive impact on narrowing the gender gap in elementary schooling (Velaskar, 2010). Even, in rural India the gender gap between male and female is getting reduced for gross enrolment ratio and elementary schooling (Virendra et al., 2013). This is mainly due to the fact that in rural India, male go outside to find a job after the completion of mainly upper primary education. Even, after successful completion of education women lag behind of its male counterpart in terms of economic opportunity (Bhattacharyya and Haldar, 2020a).

3.2 Research Gap and My Contribution

The earlier literature clearly suggests that numerous factors are responsible in explaining the variations of gender differential in educational outcomes. However, the previous studies could not capture the role of space and its neighbourhood impacts (through Moran's Index). How does space and neighbour's effect on gender differential of literacy rate and enrolment rate matter? My study tries to answer this question and I assume that this makes my study distinct from earlier studies. Moreover, the role of income, urbanization and social expenditure in explaining the variations in net enrolment ratio as well as literacy rate have not been discussed systematically in earlier studies. Giving spatial weights to the explanatory

variables and considering its impact on the variation of the inequality indexes of education has not been studied earlier; this broadens the scope of the present study. My present study consider the public school only; however, the importance of private school is not been considered here because of lack of data. However, it may be true that there is a shift in the preference of the parents between public to private school due to improved infrastructural quality.

3.3 Objective, Data and Methods

The first objective of this capter is to estimate the gender disparity in literacy and enrolment rate using coefficient of inequality and Sopher's Disparity Index. The 2nd objective is to study the effect of space on gender disparity of literacy and enrolment. The 3rd objective is to find out the socio-economic factors (along with space) determining such differential educational outcomes in a spatial panel data regression framework.

The data regarding urbanisation (URB), per capita social expenditure (PCSE), female work force participation rate (FWFPR) and male and female literacy rate have been collected from Census 2001 and 2011 and yearly PCNSDP has been drawn from RBI. Data regarding Net Enrolment ratio has been collected and calculated from the data source of National Institute of Educational Planning & Administration, New Delhi, Here we have considered four time points (viz. 2000, 2005, 2010 and 2015). The Census data are adjusted accordingly using appropriate interpolation and extrapolation techniques. Here, 24 states in India have been considered. The states are Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

The popular measure of disparity between male and female in educational achievement is coefficient of inequality (CI) as shown in equations (3.1).

$$CI = \frac{X_m - X_f}{X_f} \qquad (3.1)$$

where, X_m and X_f are the male and female achievements in education respectively. However, the Sopher's Disparity Index (1974) is a well-accepted measurement technique for identification the disparity between male and female in educational attainment (say, literacy rate) but the index fails to satisfy the additive

monotonocity axiom as pointed out by Kundu and Rao(1986); they have proposed the following modified formula for measuring disparity in educational outcomes:

$DI = \ln\left(\frac{X_m}{X_f}\right) + \ln\left(\frac{\theta - X_f}{\theta - X_m}\right)$ (3.2) where, X_m and X_f are the male and female achievements in education respectively as mentioned earlier, and $\theta = Max\{X_m + X_f\}$.

In order to find out the determinants of dependent variable, the following panel data regression model is considered:

$$Y_{it} = \beta' X_{it} + \eta_i + \mu_t + \varepsilon_{it}. \qquad (3.3)$$

X_{it} = vector of the explanatory variables, η_i = captures the space effect, μ_t = captures the time effect and ε_{it} stands for white noise term. Here, i = 1, 2, 3,....., 24 and t = 1, 2, 3 and 4. Due to multicollinearity of the explanatory variables, we have formulated different models. After regression diagnostic, we run spatial lag and error models if Hausman Test suggests Fixed Effect.In order to statistical testing of the existence of neighbourhood impact on gender disparity of educational outcomes, we use **Moran's Index** which captures spatial autocorrelation. Following Anselin (1988, 1995) and Hongfei, Calder and Noel (2007), we define Moran's's Index (MI) as:

$$MI = \frac{N}{W} \cdot \frac{\sum_i \sum_j w_{ij}(X_i - \bar{X})(X_j - \bar{X})}{\sum_i (X_i - \bar{X})^2} \qquad (3.4)$$, where, N=number of spatial units indexed by i and j (state), $W = \sum_i \sum_j w_{ij}$ =sum of spatial weights, w_{ij} is a matrix of spatial weights with zeros on the diagonal ($w_{ii} = w_{jj} = 0$), X be the variable of interest, $\bar{X}$ = mean of the variable. The spatial weight matrix can be defined in many ways but the Rook's contiguity matrix is assumed to be a better approach (Anselin 1988).We have adopted Rook's contiguity matrix; by geographic proximity we construct a binary matrix, in which, $w_{ij} = 1$ if two states share borders otherwise zero. The weight matrix has been row standardized. Following Anselin (1988), for statistical significance testing, we transform equation (3.4) to Z (Normalized value) value.

$$Z_{MI} = \frac{MI - E[MI]}{\sqrt{V(MI)}} \qquad (3.5)$$, where, $E[MI] = -\frac{1}{N-1}$ and

$$V(MI) = \frac{NS_4 - S_3 S_5}{(N-1)(N-2)(N-3).W^2} - \left(E[MI]\right)^2$$

where, $S_1 = \frac{1}{2}\sum_i \sum_j \left(w_{ij} + w_{ji}\right)^2$, $S_2 = \sum_i \left(\sum_j w_{ij} + \sum_j w_{ji}\right)^2$, $S_3 = \frac{N^{-1}\sum_i (X_i - \bar{X})^4}{\left[N^{-1}\sum_i \left(X_i - \bar{X}\right)^2\right]^2}$,

$S_4 = \left(N^2 - 3N + 3\right)S_1 - NS_2 + 3W^2$,

$S_5 = \left(N^2 - N\right)S_1 - 2NS_2 + 6W^2$.

The Z-scores of MI along with the corresponding 'p-values' are used for measuring statistical significance whether or not to reject the null hypothesis (of no-spatial auto-correlation); high but positive Z-score for a feature indicates that the surrounding features have similar values (either high values or low values). This gives us that the feature is clustered or clubbed geographically (Anselin 1995). Similarly, negative Z-score for a feature indicates a statistically significant spatial data outlier which means that the feature values are dispersed spatially. Equation (3.4) is meant for Global Moran's's Index, it measures the extent to which points that are "close together" on an average in space having similar values.

However, a local Moran's Index is suggested that captures the extent to which points that are "close" to a given point having similar values (Anselin 1995). Generally, the value of local MI happens to be low but the Z score is the most important that determines whether the feature has some neighbourhood impact or not for a given state.

Analysis of local Moran's's I is very similar to that of global Moran's's I, as shown in equation (3.6).

$$MI_i^L = \frac{X_i - \bar{X}}{S_i^2} \sum_{j=1, i \neq j} w_{ij}\left(X_j - \bar{X}\right) \qquad (3.6)$$

where, $S_i^2 = \frac{\sum_{j=1, i \neq j}^{N} w_{ij}}{N-1} - \bar{X}^2$. For a randomization hypothesis, the expected value is: $E\left(I_i\right) = -\frac{\sum_{j=1, i \neq j}^{N} w_{ij}}{N-1}$ and the variance of MI_i^L is given as:

$$Var(MI_i^L) = \frac{(N-B_2)\sum_{j=1,i\neq j}^{N} w_{ij}^2}{N-1} - \frac{(2B_2-N)\sum_{k=1,k\neq i}^{N}\sum_{k=1,k\neq i}^{N} w_{ik}w_{ik}}{(N-1)(N-2)} - \left[E(MI_i^L)\right]^2$$ where, B_2 is defined as: $$B_2 = \frac{N\sum_{i=1,i\neq j}^{N}(X_i-\bar{X})^4}{\left[\sum_{i=1,i\neq j}^{N}(X_i-\bar{X})^2\right]^2}$$

In regression analysis, if spatial dimension is neglected, the usual panel data estimators can be greatly affected; omitting the spatial dependence in an econometric analysis would lead to bias (Anselin 1988, Baltagi and Pirotte 2010). Therefore, following Anselin (1988), Anselin et al (2008), Kelejian et al (2006), we propose here basic two models of spatial panel regression: (a) Spatial Lag Panel Model(SLPM) and (b) Spatial Error Panel Model(SEPM). Incorporating SLPM and SEPM, LeSage and Pace (2010) suggest another model known as Spatial Panel Durbin Model (SPDM); however, we will only estimate SLPM and SEPM.

We assume that any dependent variables in the i-th state at time t, namely y_{it}, are generated according to the following linear spatial lag model (SLPM):

$$y_{it} = \rho\sum_{j=1}^{N} W_{ij}y_{jt} + X_{it}\beta + + \mu_i + \varepsilon_{it}\ i=1,2\ldots N;\ t=1,2\ldots..T\ ; \qquad (3.7)$$ where ρ is the spatial autoregressive parameter, β is the (*K x 1*) parameters, X_{it} stands for (*1 x K*) vector of explanatory variables. In standard panel data regression, μ_i captures individual (state/region) specific characteristics and it is fixed effect but in spatial panel, μ_i becomes random (Anselin and Bera 1998, Baltagi and Griffin 1997), with zero mean and constant variance, $IID(0,\sigma^2)$;ε_{it} is white noise, $IID(0,\sigma^2)$; *W* is the spatial standardized weight matrix of order (*N x N*) defined earlier. The term, $\sum_{j=1}^{N} W_{ij}y_{jt}$ represents the endogenous interaction effects of the dependent variable, y_{it}. The SEPM model includes interaction effects among the error terms and it is assumed that the spatial interaction effects are caused by omitted variables that affect both the local and neighbouring regions. The SEPM model is presented below:

$$y_{it} = X_{it}\beta + + \mu_i + \varphi_{it} \text{ where } \varphi_{it} = \lambda\sum_{j=1}^{N} W_{ij}\varphi_{jt} + \varepsilon_{it} \qquad (3.8),$$ where, φ_{it} is spatially auto-correlated error term, λ is the spatial autocorrelation coefficient of the error term.

3.4 Empirical Analysis

3.4.1 Descriptive Statistics:

In the following table (Table-3.1), summary statistics of all variables have been given. It can be seen that mean of URB is 28.14 (%), PCNSDP is Rs. 35992.32, FWFPR is 45.74(%) and PCSE is Rs. 5632.97. Wide differences between maximum and minimum value along with high standard deviation (especially in PCNSDP) confirms that there exists a variation of these variables across the states. Here, an interesting phenomenon is observed. Average value of net enrolment ratio is higher in case of female than male. However, in case of literacy rate, I find an exact opposite scenario; however, the mean value of literacy shows that male is 15% more literate than that of female. India still fails to narrow this significant gap. However, relatively higher standard deviation and differences in maximum and minimum value supports the existence of variability across states.

Table: 3.1: Descriptive Statistics

Variable(Notation)	Obs	Mean	Std. Dev.	Min	Max
Urbanisation (URB)	96	29.14831	12.8582	9.678495	66.40166
Per Capita Net State Domestic Product (PCNSDP)	96	35992.32	20300.67	11006.94	130181.6
Female Work Force Participation Rate (FWFPR)	96	45.74336	13.7064	21.95462	71.414
Per Capita Social Expenditure (PCSE)	96	5632.971	5331.08	729.8527	24956.85
Net Enrolment for upper primary level (Female)	96	39.58672	24.62221	16.21936	93.6
Net Enrolment for upper primary level (Male)	96	37.51291	23.13096	13.18	91.5
Female Literacy Rate (FLR)	96	67.92	12.7	33.12	94.11
Male Literacy Rate (MLR)	96	82.43	8.02	59.68	97.76

Source: Author's estimation

Here I have tried to capture the scenario of disparity between male and female in the net enrolment ratio and literacy rate across 24 states for four time points viz. 2000, 2005, 2010 and 2015. As discussed earlier, here, I have considered two measurements of disparity that is coefficient of inequality and Sopher's Disparity Index. We define, CIE=Coefficient of inequality of Enrolment; DSE=Sopher's Disparity Index of Enrolment; CIL=Coefficient of inequality of Literacy Rate, DSL=Sopher's Disparity Index of Literacy Rate; T1=2000; T2=2005; T3=2010 and T4=2015

In case of net enrollment ratio, the disparity between male and female is found to be negative; this means female is better off compared to male. This contrasting feature is found in almost all the states except Rajasthan, Orissa and Bihar as shown in Table-3.2. However, gender

disparity in literacy rate does prevail in all the states; it is noticed that the disparity is found to be declining over time in respect of literacy rate as shown in Table-3.3.

Table: 3.2 Trends of CIE and DSE of 24 states for 4 time points

State	CIE(T)	CIE(T2)	CIE(T3)	CIE(TIE4)	DSE(T1)	DSE(T2)	DSE(T3)	DSE(T4)
An. Pradesh	-0.088	-0.051	-0.047	-0.06	-0.044	-0.026	-0.026	-0.041
Arunachal	-0.160	-0.128	0.0298	-0.107	-0.083	-0.065	0.014	-0.081
Assam	-0.118	-0.11	-0.11	-0.107	-0.061	-0.05	-0.06	-0.081
Bihar &Rg.	-0.132	-0.077	0.1159	0.0184	-0.067	-0.038	0.0528	0.014
Goa	-0.013	-0.012	-0.09	-0.055	-0.006	-0.006	-0.052	-0.043
Gujrat	0.0117	0.0154	0.1613	-0.029	0.0057	0.0076	0.0762	-0.020
Harayna	-0.010	-0.002	-0.023	-0.109	-0.005	-0.001	-0.012	-0.077
Himachal	0.0125	0.0133	-0.033	-0.020	0.0062	0.0067	-0.018	-0.015
Karnataka	-0.046	-0.04	-0.037	-0.024	-0.023	-0.024	-0.019	-0.017
Kerala	-0.03	-0.039	-0.109	-0.017	-0.016	-0.020	-0.062	-0.012
M.P. &Rg.	0.0279	-0.001	0.035	-0.08	0.013	-0.0001	0.0167	-0.057
Maharashtra	0.027	0.017	-0.043	-0.050	0.013	0.0087	-0.022	-0.037
Manipur	-0.015	-0.022	-0.003	-0.022	-0.007	-0.011	-0.001	-0.018
Meghalaya	-0.275	-0.221	-0.187	-0.083	-0.155	-0.122	-0.097	-0.059
Mizoram	-0.07	-0.06	-0.150	-0.022	-0.038	-0.035	-0.083	-0.018
Nagaland	-0.184	-0.132	-0.089	-0.074	-0.099	-0.070	-0.045	-0.056
Orissa	0.012	-0.0008	0.004	0.0108	0.0059	-0.0004	0.0022	0.0073
Punjab	-0.127	-0.103	-0.138	-0.075	-0.067	-0.054	-0.073	-0.061
Rajasthan	0.1103	0.097	0.2572	0.0122	0.050	0.0456	0.113	0.007
Sikkim	-0.084	-0.064	-0.150	-0.099	-0.043	-0.033	-0.077	-0.077
Tamilnadu	-0.007	-0.018	-0.055	-0.030	-0.003	-0.009	-0.033	-0.022
Tripura	-0.03	-0.032	-0.035	-0.107	-0.019	-0.016	-0.017	-0.081
U.P. &Rg.	-0.025	-0.010	0.0293	-0.179	-0.012	-0.004	0.014	-0.123
W B	-0.057	-0.063	-0.099	-0.122	-0.029	-0.032	-0.052	-0.095

Source: Author's Estimation. CIE=Coefficient of inequality of Enrolment, DSE=Sopher's Disparity Index of Enrolment; T1=2000, T2=2005; T3=2010; T4=2015

The disparity between male and female in respect of enrolment and literacy is found to be counterintuitive. I find more female enrolment compared to male in same age cohort! Why is it happening? One possible explanation would be the prevalence of child labor in poor economies. Male child is more mobile than female and parents generally prefer to send their male child outside home compared to female in a destitute situation. The nature of job in a poor family at the very early stage of life is different between male and female! Under patriarchal society, poor family generally prefers more number of children; female child

generally looks after domestic chores whereas male child goes outside home for cash. Since, job opportunity of female child is restricted compared to male, the female enrolment may outweighs the male enrolment.

The literacy rate takes into account all the age cohorts. This makes a huge difference between male and female. Both the enrolment and literacy have the asymptotic upper bound (viz. 100 percent), therefore, I find a declining trend of disparity between male and female in respect of literacy rate.

Table: 3.3 Trends of CIL and DSL of 24 states for 4 time points

State	CIL(T1)	CIL(T2)	CIL(T3)	CIL(T4)	DSL(T1)	DSL(T2)	DSL(T3)	DSL(T4)
Andhra Pradesh	0.394408	0.324135	0.264814	0.214069	0.206361	0.179037	0.154001	0.130801
Arunachal	0.466345	0.333851	0.237032	0.16319	0.226586	0.178621	0.138403	0.103424
Assam	0.305255	0.231457	0.171547	0.121943	0.168584	0.136868	0.108262	0.081957
Bihar &Rg.	0.801932	0.539271	0.376149	0.264996	0.331023	0.257225	0.202539	0.159135
Goa	0.173146	0.152789	0.134042	0.116721	0.117388	0.106993	0.096945	0.08719
Gujrat	0.378201	0.298553	0.233456	0.179256	0.211802	0.179637	0.150461	0.123511
Harayna	0.357958	0.289349	0.233281	0.186605	0.201174	0.174357	0.150366	0.128493
Himachal	0.265945	0.223302	0.18577	0.152482	0.165519	0.145841	0.127212	0.109423
Karnataka	0.33814	0.2716	0.216058	0.168994	0.189161	0.161576	0.136358	0.112962
Kerala	0.074327	0.058765	0.043923	0.029752	0.057118	0.046133	0.035223	0.024371
M.P. &Rg.	0.512428	0.419545	0.341719	0.275564	0.261714	0.227744	0.196469	0.167349
Maharashtra	0.28256	0.233527	0.189984	0.151057	0.174812	0.151254	0.128678	0.106896
Manipur	0.323461	0.246191	0.182688	0.129575	0.186686	0.152561	0.121195	0.091848
Meghalaya	0.097635	0.069046	0.045947	0.026897	0.058846	0.044264	0.031334	0.019529
Mizoram	0.045764	0.047062	0.048322	0.049545	0.034931	0.036361	0.037798	0.039244
Nagaland	0.157826	0.117988	0.086061	0.059902	0.095168	0.07635	0.059744	0.044648
Orissa	0.491784	0.373292	0.280298	0.205373	0.252626	0.208542	0.169292	0.13356
Punjab	0.187342	0.1634	0.142136	0.123125	0.114044	0.103342	0.09337	0.084003
Rajasthan	0.72634	0.618589	0.528864	0.452992	0.336197	0.304265	0.275358	0.248901
Sikkim	0.25894	0.193671	0.142091	0.100302	0.151609	0.122978	0.097651	0.074572
Tamilnadu	0.279218	0.223733	0.175332	0.132739	0.168775	0.142328	0.117205	0.093135
Tripura	0.24819	0.169796	0.108599	0.059499	0.15143	0.113764	0.079704	0.047816
U.P. &Rg.	0.630033	0.459007	0.337158	0.245943	0.292381	0.237734	0.192677	0.154025
West Bengal	0.292065	0.221152	0.161748	0.111263	0.168786	0.136121	0.105754	0.077127

Source: Author's Estimation. Notes: CIL=Coefficient of inequality of Literacy Rate, DSL=Sopher's Disparity Index of Literacy Rate; T1=2000, T2=2005; T3=2010; T4=2015

3.4.2 Econometric Analysis:

Before to analyse the econometric results, I have estimated the coefficient of inequality between male and female in respect of literacy and upper primary net enrolment; the same is estimated using Sophers Disparity Index as shown in Table-3.2 and 3.3. In the following table (Table-3.4), panel data regression has been performed for four dependent variables that are coefficient of inequality of Net Enrolment for upper primary level between male and female (CIE), coefficient of inequality of literacy rate between male and female (CIL), Sopher's Disparity Index of Net Enrolment for upper primary level between male and female (DSE) and Sopher's Disparity Index of literacy rate between male and female (DSL). In Appendix 3A.1, I have tried to represent the graphical representation of gender inequality in net enrolment ratio and literacy. As discussed earlier here two inequalities measurement have been considered. Here, I have four time points (viz. 2000, 2005, 2010 and 2015) and for each time point, I estimate CIE, DSE, CIL and DSL.

Here four explanatory variables such as urbanisations (URB), per capita net state domestic product (PCNSDP), per capita social expenditure (PCSE) and female work force participation rate (FWFPR) have been taken to capture the variation of the dependent variables. All the explanatory variables have been taken together in the models due to low multi-colinearity (VIF= 2.19). Eights models have been formulated and for each dependent variable; fixed effect and random effect models have been set up for finding out the cause variation: Is it purely due to random effect or is it due to space or time? Model-3.1 captures the fixed effect and model-3.2 captures the random effect for CIE. Similarly, Model-3.5 and Model-3.6 are meant for DSE. Low value of the Hausman test supports random effcts over the fixed effect for both CIE and DSE. However, none of the explanatory variables stand significant to capture the variation of the CIE and DSE. On the contrast, higher values of Hausman test support fixed effect over random effect for both CIL and DSL (viz. Model-3.3, Model-3.4, Model- 3.7 and Model -3.8).

Table: 3.4 Econometric Analysis: Using Panel Data regression

Depvar	CIE		CIL		DSE		DSL	
Expvar	**FE**	**RE**	**FE**	**RE**	**FE**	**RE**	**FE**	**RE**
	Mod 3. 1	**Mod 3.2**	**Mod 3.3**	**Mod 3.4**	**Mod 3.5**	**Mod 3.6**	**Mod 3.7**	**Mod 3.8**
URB	.004 (.002)	.001 (.001)	.006 (.003)	-.0006 (.002)	.002 (.001)	.0007 (.0006)	.002* (.001)	-.00006 (.0008)
PCNSDP	-1.85e-06(.1.12e-06)	-7.80e-07 (8.14e-07)	-4.17e-06 (1.40e-06)	-2.50e-06 (1.22e-06)	-9.80e-07 (6.10e-07)	-4.02e-07 (4.39e-07)	-1.71e-06***(5.18e-07)	-1.12e-06**(4.72e-07)
PCSE	1.54e-06 (2.63e-06)	-2.72e-07 (2.24e-06)	-3.73e-06 (3.30e-06)	-5.10e-06 (3.17e-06)	-2.39e-07(1.43e-06)	-1.22e-06(1.21e-06)	-1.95e-06 (1.22e-06)	-2.44e-06** (1.20e-06)
FWFPR	-.002 (.003)	.0001 (.0009)	-.0134 (.004)	-.001 (.0018)	-.001 (.001)	.0002(.0005)	-.004*** (.001)	-.001 (.0007)
Constant	.0006 (.134)	-.063 **(**.055)	.846 (.169)	.466*** (.097)	.001 (.07)	-.038 (.029)	.36*** (.062)	.24 (.041)
N	96	96	96	96	96	96	96	96
R.Sq W	0.049	0.03	0.474	0.52	0.09	0.08	0.55	0.51
R.Sq B	0.003	0.027	0.001	0.18	0.008	0.06	0.004	0.14
R.sq	0.005	0.027	0.015	0.26	0.01	0.07	0.027	0.22
Hausman	2.75 **(p=** 0.43**)**		11.58 **(p=**0.009**)**		2.42 **(p =**0.49**)**		12.75***(p=0.005)	

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$, standard error within the parenthesis

3.4.2.1 Global and Local Moran's Index for CIL:

Basically Global Moran Index (GMI) has been formulated to capture the spatial auto correlation impact on an aggregate level. In this case it helps to understand whether there exists a neighbourhood effect between different states or not. It can be clearly observed from the following table (Table: 3.5) that in case of CIL there exists a significant level of spatial auto correlation between the different states for all time points. However, this fails to identify the states having spatial neighbourhood impact on or between each other. Therefore, a construction of Local Moran Index (LMI) is required to be formulated. In Table-3.6, the states are getting impacted or having an impact on other states can be clearly identified. For example, the states like Arunachal Pradesh (for first time point), Madhya Pradesh, Meghalaya (for last two time points), Mizoram, Nagaland, Orissa (for first two time points), Rajasthan, Sikkim (for last time point), Tripura (for last time point) and Uttar Pradesh are getting impacted by their neighbouring states. Negative sign of this index shows the outlier effect, that means this particular state is behaving in a opposite direction than its neighbouring states; whereas positive sign shows that the state is moving in a same direction as its neighbouring states or it can be said that high-high and low-low CIL states are clustering together. Therefore other than Arunachal Pradesh, all other states that are discussed above are influenced by their neighbouring states in a same direction. Here, it can be observed that northern states and north eastern states are influenced by their neighbouring states.

Table: 3.5 Global Moran's Index (CIL)

Variables	GMI	Z-value	P-value
CIL 2000	0.21***	2.67	0.004
CIL 2005	0.26***	3.135	0.001
CIL 2010	0.31***	3.697	0.000
CIL 2015	0.354***	4.315	0.000

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$

Table: 3.6 Local Moran's Index (CIL)

State	LMI2000(Z)	LMI2005(Z)	LMI2010(Z)	LMI2015(Z)
AP	-0.87 (-0.33)	-1.15 (-0.48)	-1.26 (-0.54)	-1.23 (-0.54)
Arunachal	-3.36* (-1.39)	-2.74(-1.11)	-1.74 (-0.66)	-0.51 (-0.1)
Assam	0.72 (0.47)	1.05 (1.05)	1.52 (0.83)	2.12 (1.11)
Bihar	2.25 (1.16)	1.03 (0.61)	-0.02 (0.12)	-0.79 (-0.23)
Goa	1.46 (0.86)	1.07 (0.66)	0.68 (0.47)	0.35 (0.308)
Gujarat	0.38 (0.36)	0.6 (0.52)	0.77 (0.66)	0.84 (0.74)
Haryana	0.37 (0.3)	0.8 (0.52)	1.27 (0.78)	1.77 (1.06)
Himachal	-1.1 (-0.52)	-0.93 (-0.42)	-0.58(-0.23)	-0.11 (0.03)
Karnataka	-0.01 (0.1)	-0.15 (0.03)	-0.21 (-0.001)	-0.21 (0.001)
Kerala	1.2 (0.77)	0.75 (0.52)	0.26 (0.25)	-0.18 (-0.004)
MP	6.26***(3.14)	7.47*** (3.72)	8.11***(4.09)	8.22*** (4.24)
Maharashtra	-0.17 (0.02)	-0.22 (-0.003)	-0.18 (0.019)	-0.08 (0.07)
Manipur	0.31 (0.29)	0.54 (0.39)	1 (0.6)	1.65 (0.9)
Meghalaya	0.9 (0.55)	2.45 (1.21)	3.9** (1.8)	5.09***(2.39)
Mizoram	4.48** (2.12)	5.49*** (2.56)	6.02*** (2.83)	5.85*** (2.8)
Nagaland	3.1* (1.55)	3.89** (1.92)	4.52** (2.23)	4.89*** (2.45)
Orissa	2.59**(1.72)	2.21* (1.48)	1.68 (1.17)	1.112 (0.82)
Punjab	-1.43 (-0.82)	-1.7 (-1)	-1.65 (-0.98)	-1.2 (-0.73)
Rajasthan	3.39** (1.76)	5.07*** (2.57)	6.71*** (3.4)	8.2*** (4.22)
Sikkim	0.64 (0.44)	1.29 (0.71)	1.98 (1.02)	2.65* (1.32)
TN	0.6 (0.43)	0.45 (0.35)	0.33 (0.29)	0.24 (0.24)
Tripura	0.71 (0.47)	1.63 (0.86)	2.82 (1.38)	4.16** (1.98)
UP	8.08*** (4.27)	7.74*** (4.09)	7.02*** (3.78)	5.99***(3.33)
WB	0.15 (0.22)	0.45 (0.35)	0.87 (0.54)	1.46 (0.82)

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$, Values in parentheses represent Z values. Here distance matrix has been considered for spatial weight matrix

3.4.2.2 Global and Local Moran's Index for DSL:

In Table-3.7 and Table-3.8, applying an altogether a different method of capturing an inequality in literacy that is DSL method gives the same significant result like CIL in case of global as well as for Local Moran Index. However, these two indices only capture the neighbourhood impact on each other. The explanatory factors contributing towards variations in CIL and DSL cannot be captured by these GMI or LMI. This is why I have developed spatial lag as well as spatial error models. Therefore, in Table -3.9 SAR and SLM model have been formulated and results are been reported in the next section. Here in Appendix 3A.2, I have tried to capture the clustering pattern of different states in and around its neighbour. Here I have only considered the gender inequality measurement (Co efficient of inequality

and Sopher's Disparity Index) for literacy. In the first period, Sopher'sDispaity of literacy (DSL1), 11 states are having high-high (7 states) and low-low (4 states) association. Similarly, for DSL2, DSL3 and DSL4 number states are in negative- negative quadrant is 8 states, 8 states and 8 states respectively. In case of DSL2, DSL3 and DSL4 6 states, 6 states and 5 states are in positive quadrant. In case coefficient of inequality in literacy CIL for four time periods, CIL1, CIL2, CIL3 and CIL4 in negative-negative quadrant there are 6 states, 7 states, 9 states and 9 states respectively are there. In positive-positive quadrant 6 states, 6 states, 8 states and 8 states respectively are there.

Table: 3.7 Global Moran's Index (DSL)

Variables	GMI	Z-value	P-value
DSL 2000	0.24***	2.89	0.002
DSL 2005	0.29***	3.43	0.000
DSL 2010	0.35***	4.07	0.000
DSL 2015	0.4***	4.74	0.000

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$

Table: 3.8 Local Moran's Index (DSL)

State	**LMI2000(Z)**	**LMI2005(Z)**	**LMI2010(Z)**	**LMI2015(Z)**
AP	-0.84 (-0.31)	-0.96 (-0.38)	-1(-0.4)	-0.97 (-0.39)
Arunachal	-3.18* (-1.30)	-2.41 (-0.96)	-1.4 (-0.5)	-0.19 (0.04)
Assam	0.7 (0.45)	1.14 (0.65)	1.75 (0.92)	2.49 **(**1.26**)**
Bihar	1.91 (1)	0.85 (0.52)	-0.09 (0.09)	-0.88 (-0.26)
Goa	1.08 (0.66)	0.76 (0.5)	0.48 (0.36)	0.23 (0.23)
Gujarat	0.79 (0.66)	1.02 (0.84)	1.21 (0.99)	1.3 (1.08)
Haryana	0.94 (0.59)	1.44 (0.84)	2.03 (1.16)	2.69* (1.52)
Himachal	-0.54 (-0.2)	-0.26 (-0.04)	0.12 (0.17)	0.62 (0.45)
Karnataka	-0.26 (-0.02)	-0.32 (-0.05)	-0.32 (-0.05)	-0.29 (-0.04)
Kerala	0.79 (0.53)	0.34 (0.28)	-0.09 (0.04)	-0.51 (-0.19)
MP	6.86*** **(**3.4**)**	7.67*** **(**3.8**)**	8.18*** **(**4.07**)**	8.31*** **(**4.19**)**
Maharashtra	-0.07 (0.07)	0.006 (0.11)	0.11 (0.17)	0.22 (0.23)
Manipur	-0.41 (-0.03)	-0.13 (0.09)	0.43 (0.34)	1.29 (0.73)
Meghalaya	2.13 (1.07)	3.7** (1.7)	5.17*** (2.38)	6.42*** (2.93)
Mizoram	5.61*** **(**2.6**)**	6.6***1 **(**3.04**)**	7.11*** **(**3.28**)**	6.79*** **(**3.17**)**
Nagaland	3.97** **(**1.94**)**	4.74** **(**2.29**)**	5.37*** **(**2.6**)**	5.77*** **(**2.81**)**
Orissa	2.65** (1.74**)**	2.26* **(**1.5**)**	1.77 (1.21)	1.23 (0.88)
Punjab	-1.78 (-1.03)	-1.91 **(**-1.12**)**	-1.76 **(**-1.04**)**	-1.28 (-0.74)
Rajasthan	4.29** **(**2.17**)**	5.83** **(**2.91**)**	7.46*** **(**3.73**)**	9.09*** **(**4.57**)**
Sikkim	0.94 (0.56)	1.48 (0.8)	2.09 (1)	2.72* **(**1.34**)**
TN	0.28 (0.25)	0.22 (0.22)	0.19 (0.2)	0.17 (0.2)
Tripura	0.94 (0.56)	1.89 (0.97)	3.19* **(**1.53**)**	4.82** **(**2.24**)**
UP	7.35*** **(**3.85**)**	7.19*** **(**3.79**)**	6.86*** **(**3.65**)**	6.29*** **(**3.4**)**
WB	0.19 (0.23)	0.47 (0.35)	0.94 (0.56)	1.63 (0.88)

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$, Values in parentheses represent Z values. Here distance matrix has been considered for spatial weight matrix

3.4.2.3 Spatial Regression: In this section, there is an attempt towards capturing spatial causal effects of different socio economic variables on CIL and DSL as given in Table-3.9. These models specially signify for finding out the spatial impact of not only its direct neighbour but also its neighbour's neighbour. Suppose, in case of measuring the variation in CIL and whether it is space dependent or not, we have given a spatial weight to its explanatory variables. In case of Spatial Lag Model, CIL depends on its lag value and the lag value of its explanatory variables. Therefore, here the lags that I have incorporated are space that is the states and variation of CIL may not only depend on its exact neighbouring state but also the states that are the neighbours of its neighbour state. Surprisingly, for both CIL and DSL, the significance and directional impact of different explanatory variables' effects are more or less same. Here, it can be observed that urbanisation significantly reduces the inequality in literacy and even per capita social expenditure also helps to reduce the inequality. However, the per capita net state domestic product and female work force participation rate seem to be insignificant in capturing the variations of both CIL and DSL.

Table: 3.9: Spatial Error (SER) and Spatial Lag (SLM) Model

Dependent Variable	**CIL**		**DSL**	
Explanatory Variable	**Model 3. 9(SEM)**	**Model 3.10(SLM)**	**Model 3.11(SEM)**	**Model 3.12(SLM)**
URB	-.003*** (.001)	-.003*** (.001)	-.0015*** (.0005)	-.0015**.0006)
PCNSDP	-1.80e-06 (1.10e-06)	-1.21e-06 (1.13e-06)	-5.02e-07(4.91e-07)	-3.09e-075.05e-07)
FWFPR	.00004 (.001)	.0004 (.001)	.00015(.0004)	.00035(.0005)
PCSE	-7.67e-06*** (3.59e-06)	-9.25e-06*** (3.78e-06)	-4.35e-06*** (1.60e-06)	-4.80e-06***1.68e-06)
Cons	.621*** (.073)	.542*** (.089)	.3083*** (.032)	.287*** (.039)
Lambda	-.065*** (.016)	-	-.062*** (.014)	
Sigma	0.12	0.12	0.82	0.05
Rho	-	-.078*** (.027)		-.076*** (.0279)
N	96	96	96	96

Source: Author's estimation, $^{*}p< 0.1$, $^{**}p< 0.05$, $^{***}p< 0.01$, standard error within the parenthesis

3.5 Major Findings:

Northern and North-Eastern districts which are having relatively higher and lower gender inequality in education are found to be influenced by theirs neighbours' human capital outcomes.Higher urbanisation, social sector spending (PCSSE), income (PCDDP) and female work force participation rate are found to influence significantly the gender disparity in educational outcomes.

Appendix:

Appendix 3A.1: Graphical Representation of CIE, DSE, CIL and DSL (Mean Inequality of all states has been considerd as overall average)

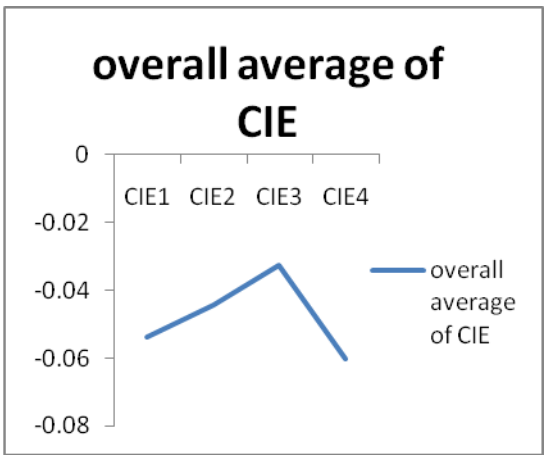


Figure :3A.1 (Source: Author's estimation)

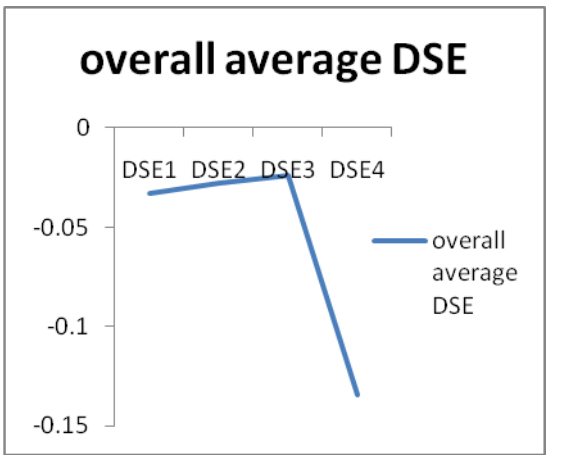


Figure: 3A.2(Source: Author's estimation)

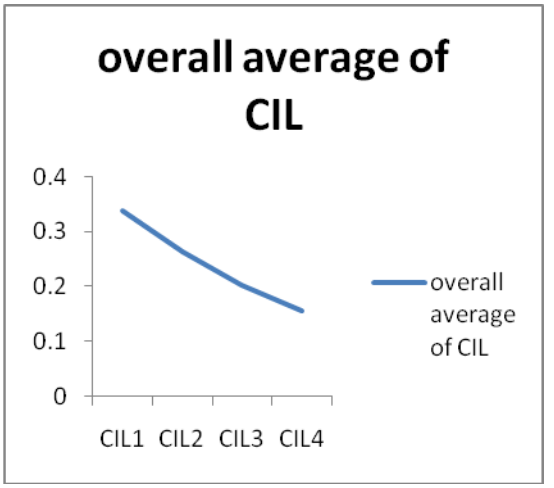


Figure: 3A.3 (Source: Author's estimation)

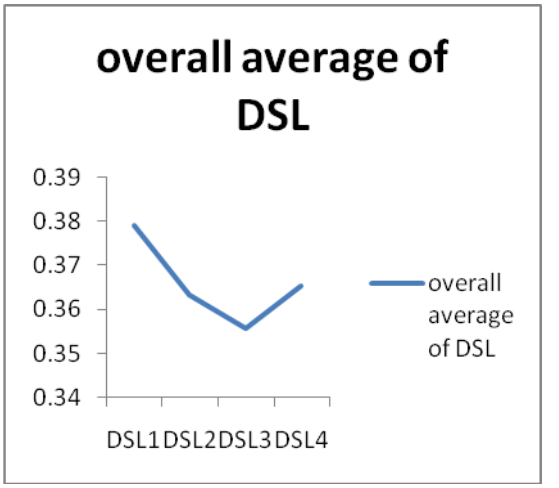


Figure: 3A.4 (Source: Author's estimation)

Appendix 3A.2: Graphical Representation of LMI of DSL and CIL over four time points (2000, 2005, 2010, 2015)

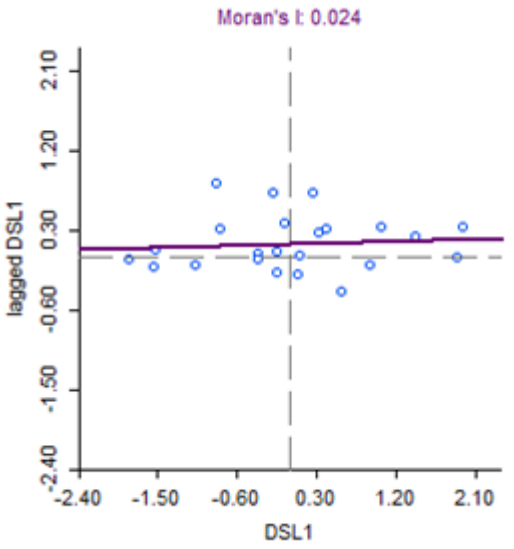


Figure: 3A.5(Source: Author's estimation)

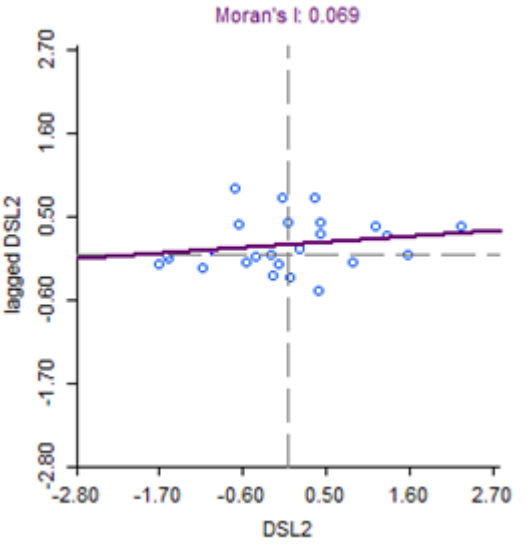


Figure: 3A.6(Source: Author's estimation)

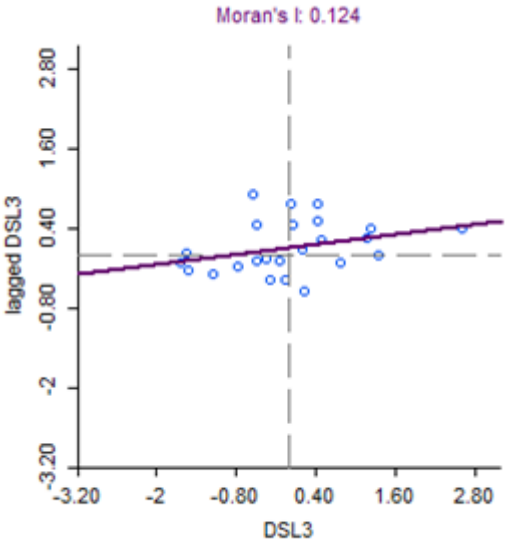


Figure: 3A.7 (Source: Author's estimation)

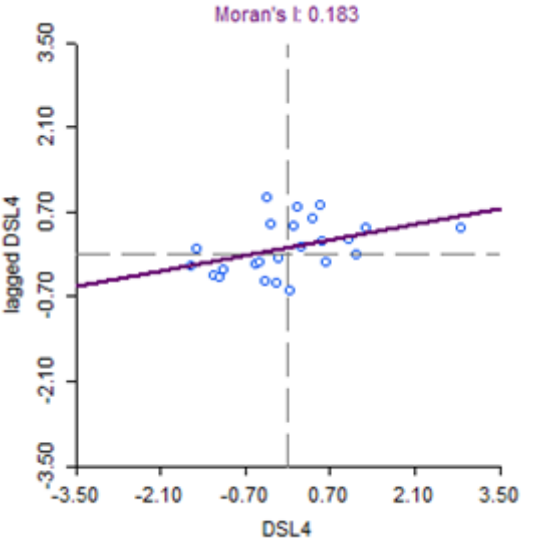


Figure: 3A.8 (Source: Author's estimation)

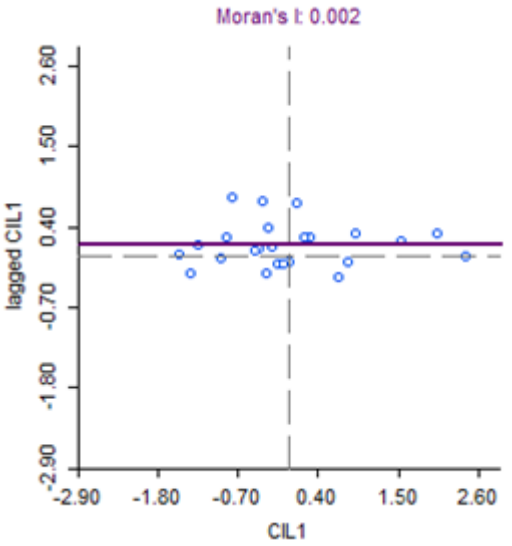


Figure: 3A.9 (Source: Author's estimation)

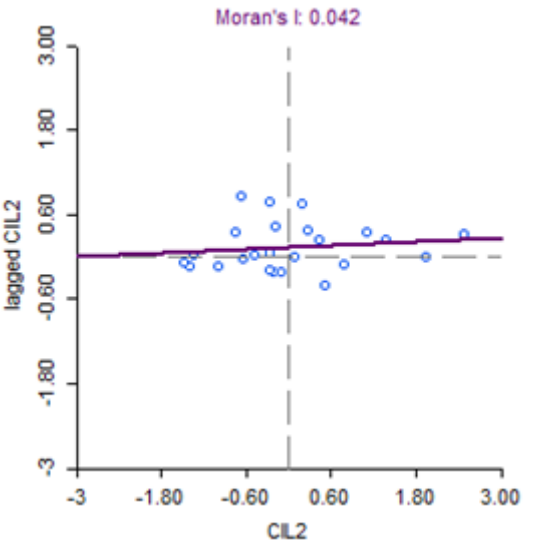


Figure: 3A.10 (Source: Author's estimation)

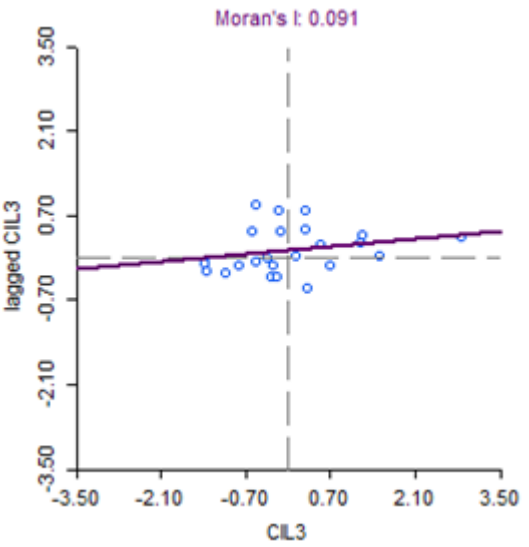


Figure: 3A.11 (Source: Author's estimation)

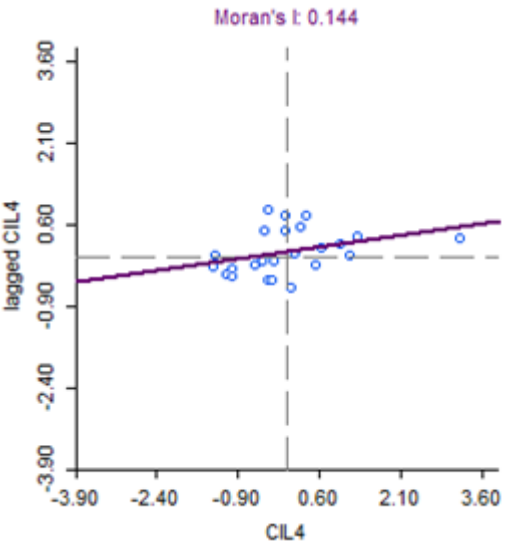


Figure: 3A.12 (Source: Author's estimation)

CHAPTER-4

Gender Differential in Labor Force Participation Rate in India

4.1 Introduction:

Decision making power has been considered as an important aspect of women empowerment; work force participation raises the bargaining power of women at the household level (Sen 1990, Desai and Jain, 1994; Kabeer, 2012; Mammen and Paxson, 2000). Female work force participation rate (FWFPR) in India is extremely low; only 32.6 percent of Indian adult females are reportedly joined in work force participation (United nation 2013); moreover, the FWFPR in India is found to be low in urban areas compared to rural (Klasen and Pieters 2015). It is quite evident that women are compelled to join in work force in order to avoid destitute situation, most probably when the entire income of the household is low, the so-called "added worker effect" (Abraham 2009; Attanasio et al. 2005; Bhalotra and Umana-Aponte 2010, Bhattacharya and Haldar 2019). In general, when women do work, they tend to be engaged in low-paid and low productivity jobs (ILO, 2011). Increase in income of the household results in lesser requirement of females involvement in work force participation (Neff, Sen and Kling 2012; Kannan and Raveendran 2012; Chowdhury 2011; Himanshu 2011). Sometimes, women are involved in an activity like care giving for which market in less developed countries is undervalued though it has a large economic benefit (Beneria, 1982; Boserup, 1970; Donahoe, 1999). The empirical relationship between economic development and female labour force participation rate is found to be U-shaped (Boserup, 1970; Fatima and Sultana, 2009; Goldin, 1994; Mammen and Paxson, 2000; Pampel and Tanaka, 1986; Schultz, 1990; Tansel, 2001). However, some panel data analysis envisages mixed empirical findings in case of India (Lahoti and Swaminathan 2013); recently, Lahoti and Swaminathan (2016) have investigated the U feminisationhypothesis for the state-level analysis; find little support for a U-shape of female work participation in India. Increase in male and female education results in reducing the women labour force participation in the rural areas (Afridi et al 2016).

Most of the earlier studies did not provide adequate theoretical explanation towards anti-U feminization hypotheses regarding FWFPR. Earlier studies are based on different rounds of NSSO data; we believe that district level Census data relating to female WFPR are quite rich and it can be decomposed into different categories like agricultural labor, cultivators, household industry and others. The major objective of my study is to formulate a simple theoretical model pertaining to FWFPR under different income levels, assuming household as a unit of analysis. The second objective is to empirically verify my theoretical model

considering district level Census data. In this regard, I consider a set of explanatory variables determining female WFPR. I am basically trying to arrest macro-picture from a microeconomic approach. In my empirical analysis, I assume the district as unit of analysis.

4.2 A Simple Theoretical Model

Suppose that a family consists of two adults (male and female) and one child. It does not matter at all if there is more than one child. The family obtains utility from consumption as well as household activities. Such activities are those that cannot be bought from the market, a typical example is childcare for which the market for the rural areas is underdeveloped in India.

The household utility function is given by Stone-Geary preferences:

$$U(Y,t) = \begin{cases} Y - sifY \leq s \\ (Y-s)tifY > s \end{cases} \quad (4.1)$$

Where, Y is the family income as well as consumption (assuming the price of the composite good to be 1), t is the time spent by the family in the household activities and s is the subsistence level of consumption.

While the particular form of the utility function is taken in order to have simple closed form expressions, the main assumption here is that the marginal utility of time spent in household activities is (a) zero below the subsistence level of consumption, and (b) increasing in income above the subsistence level. Continuing with the childcare example, time spent in childcare is valueless if the child does not receive a minimum level of nutrition and once that level is achieved, the quality of each unit time invested in childcare improves in family income in future.

The total available budget of time for both the male and female is fixed at 1. I assume that the male invests all his time to earn income while the female divides her time between earning income and household activities because there are some jobs at the household level that a female is supposed to perform which are assumed to be non-negotiable in Indian culture. The female devotes e units of time to work and $(1-e)$ to household activities. The wage rate for male labour is w_m and that for female labour is w_f, with $w_m > w_f$.

Therefore, I have

$$Y = w_m + ew_f \quad (4.2) t = 1 - e$$

I can now write the household utility as a function of a single variable, the woman's work hours$e$:

$$V(e) = \begin{cases} w_m + ew_f - sifw_m + ew_f - s \leq 0 \\ (w_m + ew_f - s)\ (1-e)ifw_m + ew_f - s > 0 \end{cases} \quad (4.3)$$

The objective of the family is to maximize $V(e)$ subject to$0 \leq e \leq 1$.

The solution to this problem is:

$$e^* = \begin{cases} 1 & ifs \geq w_m + w_f \\ \frac{s-(w_m - w_f)}{2w_f} ifw_m - w_f < s < w_m + w_f \\ 0 & ifs \leq w_m - w_f \end{cases} \quad (4.4)$$

Notice that $(w_m + w_f)$ is the total income of the family. Assume that all the available time is spent in earning income. This is also the maximum possible family income.

If the income is not enough to cover the subsistence, then the female participates full time in order to get rid of destitute situation. Once the threshold or subsistence income exceeds, Ihave an interior solution and the amount of time spent in earning income decreases for both male and female. Eventually, it is possible that female will stay at home full time; this condition depends on the comparison between subsistence level and the difference between male and female wage rates.

Solving for income, I have

$$Y^* = w_m + e^* w_f = \begin{cases} w_m + w_f ifs \geq w_m + w_f \\ \frac{1}{2}(w_m + w_f + s) ifw_m - w_f < s < w_m + w_f \\ w_m ifs \leq w_m - w_f \end{cases} \quad (4.5)$$

In order to simplify matters, assume that $w_m = w$and $w_f = w\beta$, where $\beta \leq 1$ is a measure of gender wage gap. Now, I have female work effort as a function of the base wage rate$w$.

$$e^* = \begin{cases} 1 & ifw \leq \frac{s}{1+\beta} \\ \frac{1}{2} + \frac{s-w}{2\beta w} if \frac{s}{1-\beta} < w < \frac{s}{1+\beta} \\ 0 & ifw \geq \frac{s}{1-\beta} \end{cases} \quad (4.6)$$

The corresponding household income is given as:

$$Y^* = \begin{cases} w(1+\beta) if w \leq \frac{s}{1+\beta} \\ \frac{1}{2}(w(1+\beta)+s) if \frac{s}{1-\beta} < w < \frac{s}{1+\beta} \\ w if w \geq \frac{s}{1-\beta} \end{cases} \quad (4.7)$$

While female work effort $e^*$is constant at 1, then decreasing and then again constant at 0 as w changes, household income Y^* is strictly increasing in$w$.

Now, I can track Y^* against e^*as the $w$changes in the background.

$$e^*(Y^*) = \begin{cases} 1 & if Y^* \leq s \\ \frac{1}{2}\left[\left(\frac{1+\beta}{2}\right)\left(\frac{1}{\frac{Y}{s}-1}\right)-(1-\beta)\right] & if s < Y^* < \frac{s}{1-\beta} \\ 0 & if Y^* \geq \frac{s}{1-\beta} \end{cases} \quad (4.8)$$

Thus, as household income increases, female work effort is maximum till the subsistence income is reached and then decreasing until it reaches zero when the income is high.

4.3 Data and Methodology

The data and variables used in my study are given in Table-4.1.

Table: 4.1 Description of the Variable

Description of the Variable	Notations	Data Source
Per Capita District Domestic Product	PCDDP	District specific gross domestic product (GDP) for the year 2001 and 2011 are drawn from open access Government data source (viz. data.gov.in) and Directorate of Economics and Statistics, Statistical Abstract of 11 major states respectively. The GDP data are based on 1999-2000 current prices. The population figures of the districts are drawn from District Census Reports, 2001 and 2011.
Female work force participation rate	FWFPR	District Census, Registrar General, Government of India, 2001 and 2011
Male work force participation rate	MWFPR	District Census, Registrar General, Government of India, 2001 and 2011
Female literacy rate	FLR	District Census, Registrar General,

Description of the Variable	Notations	Data Source
		Government of India, 2001 and 2011
Male literacy rate	MLR	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of SC population to total population	SC	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of ST population to total population	ST	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of population living in urban area	URB	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of female workers as agricultural labours	AGL	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of female workers as cultivators	CUL	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of female workers engaged in household industry	HHI	District Census, Registrar General, Government of India, 2001 and 2011
Percentage of female workers engaged in other activities	OW	District Census, Registrar General, Government of India, 2001 and 2011

To understand the extent of disparity between the male and female work force participation rate, I have used the Coefficient of inequality (CI) and Sopher's Disparity Index (DI) (methodology remains same as discussed in Chapter 3). After calculating the values of inequality for each district, I need to find out the possible reasons behind the disparity if exists. For that a pooled regression has been performed and shown in equation (4.9) and (4.10).

$$CI_{it} = \beta' X_{it} + \varepsilon_{it} \text{.....(4.9)}$$
$$DI_{it} = \beta' X_{it} + \varepsilon_{it} \text{.....(4.10)}$$

Here, I have considered 406 numbers of districts for two time periods (here districts are the unit of analysis). However, in Indian society there are some non-negotiable duties that are exclusively performed by women only, therefore it is also required to find out the factors that can improve the female labor force participation rate. Even, labor force participation can be decomposed into agricultural labors, household industry, cultivators and other activities. There can be a substitution between the different sectors and that can be a reason of

stagnancy in women participation (Kundu, 2015). Therefore, I have tried to explain the variations not only for FWFPR but also for its decomposition.

In order to study the effect of income (PCDDP), SC, ST, FLR, MLR, URB on FWFPR, a general pooled regression for two time points (2001 and 2011) is being considered as shown in equation (4.11).

The determinants of FWFPR can be found out from the pooled data regression models:

$$FWFPR_{it} = \beta' X_{it} + \varepsilon_{it} \text{.....(4.11)}$$

X_{it} = vector of the explanatory variables, and ε_{it} stands for white noise term. Here, i = 1, 2, 3,....., 381 and t = 1, 2. To avoid the problem of multicolinearity, different models have been formulated; robust standard error is being performed to overcome the problem of heteroschedasticity.

4.4 Empirical Findings

4.4.1 Descriptive Statistics:

The descriptive statistics of each variable is given for 762 observations in Table-4.2. It clearly depicts that the regional disparity among the districts in respect of PCDDP is high because of low mean but high variance. Except income, other variables have some asymptotic upper bound because all are measured in percentage terms.

Table: 4.2 Descriptive Statistics of the Variables

Variable	Observations	Mean	Std. Dev	Min	Max
PCDDP	762	31713.71	34012.5	3278.05	718371.1
URB	762	23.73335	17.68995	1.29	100
SC	762	17.41789	7.544803	1.44	50.17
ST	762	9.004952	14.84075	0.001	87
FLR	762	56.85244	15.06688	18.58	96.48
FWFPR	762	26.97637	10.91816	4.7	55
CUL	762	25.8058	16.92715	0.3	87.6
AGL	762	39.84888	19.0564	0.1	79.15
HHI	762	6.899741	7.151339	0.52	64.5
OW	762	27.46688	20.96909	2.58	95.5

Source: Authors estimation

4.4.2 Disparity in Labor Force Participation rate:

Here it can be seen that (Appendix Table : 4A.1) for almost all districts there exists a wide range of huge disparity between male and female in respect of work force participation. If there is complete equality then the value of both CI and DI would be zero. Any positive value of both the index confirms that female fails to achieve equal economic opportunity as male in

Indian society. However, only calculating these values fails to find out the reasons behind it. That is why I need to run the regression considering some socio-economic and cultural variable.

4.5 Econometric analysis:

Here I have used some econometric tools to understand the possible reason behind the disparity in work force participation rate between male female, FWFPR and its decomposition. In the following tables I have performed some regression for this purpose.

4.5.1: Explaining the Variation of CI and DI:

From following table (Table 4.3), it can be seen that (from Model 4.1 to 4.4) increase in income, percentage of ST population both male and female literacy rate significantly decreases the gender disparity in work force participation rate. However, increase in urbanization increase the disparity. This is due to the fact thatthe urbanization results in devaluation of participation in the work force for women (Sikarwar et.al, 2022).

Table: 4.3: Explaining the Variation of CI and DI

Dep var	**CI**		**DI**	
Expvar	**Mod 4.1**	**Mod4. 2**	**Mod 4.3**	**Mod 4.4**
PCDDP	-2.4E-06* (1.34E-06)	-2.45E-06*(1.41E-06)	-3.33E-07** (1.5E-07)	-3.07E-07* (1.6Ee-07)
URB	.005* (.002)	.003 (.002)	.0005* (.0003)	.0003 (.0003)
SC	-.003 (.005)	-.004 (.005)	-.0001 (.0006)	-.0002 (.0006)
ST	-.031*** (.003)	-.03*** (.003)	-.003*** (.003)	-.003*** (.0003)
MLR	-.024*** (.004)	-	-.003*** (.0004)	
FLR	-	-.01*** (.003)	-	-.001*** (.0003)
Constant	4.12***(.341)	2.9***1**(**.223)	.86*** (.039)	.705*** (.025)
N	812	812	812	812
F(5,806)	29.54	24.54	37.02	30.34
Prob> F	0.000	0.000	0.000	0.000

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % , 5% and 10% are represented by ***, ** and * respectively

4.5.2: Explaining the Variation of FWFPR:

To maintain parity with the theoretical model, let me suppose individual district (unit of analysis) is considered to be a representation of a household. Actually, I am capturing macro-phenomena from microeconomic approach. Before, reporting my result let me understand the general U- shaped phenomena of FWFPR.

Women are actively involved with household care economy though their economic contribution of performing certain household jobs are not included in anywhere making their effort under reporting and estimated (Sudarshan and Bhattacharya 2009; Mazumdar and Neetha 2011; Klasen and Pieters 2015). Even formal and semi-formal paid work is more prominent to enhance women empowerment and status than un paid or informal and casual (Anderson and Eswaran 2009; Kabeer, Assaad, Darkwah, Mahmud, Sholkamy, Tasneem, and Tsikata 2013). Globally, FWFPR exhibits a U- shaped relationship with economic growth (Kottis 1990; Goldin 1994; Tansel 2002; Fatima and Sultana 2009). In general, as economic development goes on increasing, FWFPR shows a declining trend and after surpasses a cut-off level again it starts increasing due to structural change in the economy and income as well as substitution effect (Goldin 1994). Using state level panel data in India, Luci (2009) and Tam (2011) have obtained an inverted U-shaped relationship between FWFPR and income and they have tested the endogeneity problem in their econometric exercise. However, U-shaped relationship is weak depending on the data that have been used (Gaddis and Klasen 2014).

Keeping in mind the above theoretical backdrop, I consider female work force participation (FWFPR) as the dependent variable. Here, the unit of analysis is district and the pooling regression results for two time points 2001 and 2011 is reported in Table 4.4. It is observed that districts with higher concentration of backward community like SC give me opposite results compared to ST dominated districts. The ST community has been living in abject poverty (Meenakshi et al 2000; Panagariya 2008; Thorat 2006; Thorat et al 2012). The FWFPR increases if the district is sharing higher concentration of ST population; this supports my theoretical prediction. The FWFPR is non-linearly related to income measured by PCDDP. Such non-linearity is due to the existence of backward bending supply curve of labour that deals with labour-leisure trade-off; in my theoretical model, I assume leisure as non-market activities performed by a female at the household level. Basically, it is non-traded services done by a female at the family level. I hypothesize that there exists a threshold or minimum or cut-off level of income where the female worker makes a trade-off between work and leisure and this critical level of income is not unique and it varies across socio-economic, occupations and cultural profile of the female as well as family. Now, I can easily calculate the critical or cut-off level of income (Rs. 38421.78) beyond which the FWFPR goes down. The same is found in case of FLR where the critical or threshold level of FLR is estimated as 36.59; the detailed analysis pertaining to the estimation of critical level of

income (PCDDP) and female literacy rate (FLR) is given in Appendix-4A.2. Urbanization appears to be insignificant in our empirical findings.

This result clearly signifies that, low per-capita income of any district (household in our theoretical model) manifests lower economic involvement. However, as the income increases FWFPR increases and reaches its highest level. After reaching the highest cut-off level, again it starts decreasing. This is possible due to the fact that there is a strong trade-off between the substitution and income effect. Just below the cut-off level of income, household (in our case district) tries to achieve minimum subsistence level of income irrespective of their gender. However, after the income level is met by the particular district, female prefers to stay at home and performs the household job (like cooking, child-care etc), market for which is not developed that much in rural as well as in urban areas in India. This may reduce employment level of women after that cut-off level. Surely, as per my theory suggests, women like to invest her time in child caring and child bearing activities which directly results in increasing human capital for future generation and ultimately leads to an increase in household (or district in my case) income in near future.

Table 4.4: Dependent variable: ln*FWFPR*

Explanatory Variables	**Model 4.5**	**Model 4.6**	**Model 4.7**	**Model 4.8**	**Model 4.9**
lnSC	-0.1334*** (.0302)			-0.1573*** (0.0291)	
lnST		0.1092*** (0.006)	0.1108*** (.005)		0.1108*** (0.005)
lnPCDDP	1.438** (.4659)	0.352 (0.425)			
$(lnPCDDP)^2$	-0.0674** (.023)	-0.0168 (0.02)			
lnURB			-0.0075 (0.0202)		
lnFLR				3.7585*** (1.287)	2.4978*** (0.9048)
$(lnFLR)^2$				-0.5388*** (0.1431)	-0.345*** (0.1156)
Constant	-4.049* (2.346)	-1.319 (2.1593)	3.169*** (0.0614)	-3.8694 (2.181)*	-1.29 (1.765)
No. of obs	762	762	762	762	762
F (3, 758) =	14.19	128.19	194.97	14.34	158.94
Prob> F =	0.0000	0.0000	0.0000	0.000	0.000
R-Sq =	0.0449	0.3266	0.3258	0.0477	0.3457
Root MSE =	0.4665	0.3917	0.39168	0.46581	0.38612

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % and 5% are represented by *** and ** respectively.

4.5.3 Decomposition of FWFPR

Now in table 4.5 to table 4.8, FWFPR has been decomposed into four distinct categories namely percentage of female workers who are cultivators, agricultural laborers, household industry workers and other activity workers in total female work force participation. In Table 4.5, it is clearly evident that SC population and urbanization has a negative effect whereas ST population has a positive impact on the variation of percentage of female cultivators in total FWFPR. Income and FLR show an inverted U-shaped relationship with changes in percentage of female cultivators. In table 4.6, it can be seen that both SC and ST population has a positive impact on female agricultural labors. Income and its square are found to be insignificant. However, urbanization has a significant negative impact whereas FLR showing an inverted U relationship with the variation of female agricultural labors. In table 4.7, it is quite evident that the SC population has a positive impact and surprisingly ST population has a negative impact on female workers of household industry. Urbanization here appears to be insignificant. Female household industry workers show a significantly nonlinear inverted U-shape relationship with income as well as with FLR. From table 4.8, in case of percentage of female engaged in other activities, the SC population does not have any significant impact whereas ST population has a negative impact. Urbanization has a positively significant impact on variations of female involved in other activities. Here, income shows an inverted U whereas FLR shows U-shaped relationships with other activity female workers. Therefore, other than agricultural worker (though the relationship between FWFPR and income is found to be insignificant still the relation is inverted U), for all other sectors FWFPR has an inverted U relation with increase in PCDDP. This results are due to presence of substation effect (preference for household work) over the income effect (increase in per-capita district income or lowering the gap between male and female wage, male wage is good enough to cover the subsistence minimum wage).

According to Lahoti and Swaminathan (2016), growth of manufacturing employment has a negative impact whereas agriculture and construction employment has significantly positive impact on FWFPR. This may be due to the fact that female work force is more mobile across the sectors rather than within a sector. Using NSS data for three time points (1999-2000, 2004-5 and 2009-10), Mehrotra et al 2012 have observed (1) an increase in employment of FWFPR in tertiary sector over 1999-2000 to 2009-10; (2) an increase in female employment in agriculture and construction in the first phase (1999-2000 to 2004-05) but a decrease in the

2nd phase (2004-05 to 2009-10) but such decrease does not mean to transfer of female workers to tertiary sector.

On the contrary, in the pooled data regression, it is evident that for all four sectors, FWFPR exhibits an inverted U- shaped relationship with per capita district domestic product and female literacy rate (except, for other sectors where the relationship is witnessed to be U-shaped with FLR). Women withdraw themselves from the economic opportunity for household's preference (reproductive economy) and improvement in economic opportunity for men (Rangarajan, Kaul and Seema 2011). The U-shaped relation with FWFPR only can be associated with educated women mostly performing the formal jobs (Olsen and Mehta, 2006). However, sometimes higher education leads to status production rather than work participation (Ramaswami and Wadhwa 2013). Lack of credits or savings are leading to higher participation in the work force for the womenunder destitute situation (Attanasio 2005).

Table 4.5: Dependent Variable: percentage of female cultivators

Explanatory Variables	Model 4.10	Model 4.11	Model 4.12	Model 4.13	Model 4.14	Model 4.15
lnSC	-0.0906*		-0.047		-0.2047***	
	(0.053)		(0.0543)		(0.0418)	
lnST		0.0411***		0.0196**		0.0253***
		(0.008)				(0.0071)
				(0.0084)		
lnPCDDP	1.465**	1.05				
	(0.7301)	(0.7321)				
$(lnPCDDP)^2$	-0.0903***	-0.0709**				
	(0.0369)	(0.0369)				
lnURB			-0.3099***	-0.3113***		
			(0.039)	(0.0377)		
lnFLR					15.64***	14.47***
					(1.54)	(1.441)
$(lnFLR)^2$					-2.168***	-2.013***
					(0.2001)	(0.1865)
Constant	-2.304	-0.362	4.020***	3.887***	-24.121***	-22.404***
	(3.606)	(3.612)	(0.16)	(0.105)	(2.97)	(2.776)
No. of obs	762	762	762	762	762	762
F(3,758)	47.23	48.27	36.94	34.84	119.83	107.33
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
R Square	0.1394	0.1534	0.0930	0.0962	0.352	0.3388
Root MSE	0.68159	0.6760	0.69926	0.69801	0.59144	0.59743

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % and 5% are represented by *** and ** respectively.

Table 4.6: dependent variable: percentage of female agricultural labours

Explanatory Variables	Model 4.16	Model 4.17	Model 4.18	Model 4.19	Model 4.20	Model 4.21
lnSC	0.2051***		0.2457***		0.1544***	
	(0.424)		(0.1392)		(0.04)	
lnST		0.0548***		0.0382**		0.043***
		(0.008)		(0.007)		(0.0075)
lnPCDDP	0.0367	-0.4677				
	(0.693)	(0.689)				
$(lnPCDDP)^2$	-0.0125	0.01				
	(0.035)	(0.034)				
lnURB			-0.2980***	-0.2764***		
			(0.031)	(0.033)		
lnFLR					5.6169***	6.09***
					(1.268)	(1.227)
$(lnFLR)^2$					-0.8168***	-0.8822***
					(0.1665)	(0.1613)
Constant	3.911	7.149**	3.753***	4.3512***	-6.182***	-6.616***
	(3.41)	(3.394)	(0.1392)	(0.0926)	(2.39)	(2.32)
No. of obs	762	762	762	762	762	762
F(3,758)	30.83	34.20	56.81	42.31	42.23	46.97
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
R Square	0.0974	0.1131	0.1455	0.1265	0.1678	0.1303
Root MSE	0.5888	0.5836	0.5725	0.5788	0.5654	0.737

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % and 5% are represented by *** and ** respectively.

Table 4.7: Dependent Variable: percentage of female involved in household industry

Explanatory Variables	Model 4.22	Model 4.23	Model 4.24	Model 4.25	Model 4.26	Model 4.27
lnSC	0.2329***		0.2342***		0.222***	
	(0.0534)		(0.053)		(0.053)	
lnST		-0.1112***		-0.1086**		-0.1112***
		(0.0105)				(0.009)
				(0.000)		
lnPCDDP	1.79***	2.918				
	(0.769)	(0.7864)				
$(lnPCDDP)^2$	-0.094***	-0.1469***				
	(0.038)	(0.0389)				
lnURB			0.004	0.0063		
			(0.035)	(0.035)		
lnFLR					3.353**	5.223***
					(1.606)	(1.58)
$(lnFLR)^2$					-0.4119**	-0.6488***
					(0.2085)	(0.2046)
Constant	-7.47**	-12.744***	0.9814***	16478***	-5.775*	-8.793***
	(3.85)	(3.957)	(0.16)	(0.1067)	(3.075)	(3.053)
No. of obs	762	762	762	762	762	762
F(3,758)	11.25	44.54	9.72	57.51	8.92	46.97
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
R Square	0.0401	0.1312	0.0237	0.1151	0.0312	0.1303
Root MSE	0.7742	0.7366	0.7803	0.7429	0.7778	0.737

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % and 5% are represented by *** and ** respectively.

Table 4.8: Dependent Variable: percentage of female involved in other activities

Explanatory Variables	Model 4.28	Model 4.29	Model 4.30	Model 4.31	Model 4.32	Model 4.33
lnSC	-0.0204		-0.0839*		0.0554	
	(0.04795)		(0.0514)		(0.0425)	
lnST		-0.0877***		-0.0469***		-0.0536***
		(0.0078)				(0.008)
				(0.0086)		
lnPCDDP	2.4787***	3.332***				
	(0.6194)	(0.6023)				
$(lnPCDDP)^2$	-0.0968***	-0.1365***				
	(0.0309)	(0.0298)				
lnURB			0.475***	0.4642***		
			(0.0338)	(0.0359)		
lnFLR					-4.85***	-4.172***
					(1.233)	(1.2365)
$(lnFLR)^2$					0.8364***	0.7455**
					(0.1579)	(0.1569)
Constant	-11.994***	-16.561***	1.895***	1.713***	8.936***	7.75***
	(3.089)	(3.0236)	(0.1842)	(0.1125)	(2.373)	(2.429)
No. of obs	762	762	762	762	762	762
F(3,758)	131.24	173.02	101.70	94.23	203.64	254.48
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
R Square	0.3086	0.3943	0.2178	0.2399	0.421	0.4605
Root MSE	0.599	0.560	0.6367	0.62765	0.54817	0.5291

Source: Authors estimation. Robust standard error within the parentheses;levels of significance at 1 % , 5% and 10% are represented by ***, ** and * respectively

4.6 Major findings:

I find that all the districts have been experiencing gender disparity of work force participation but the degree of disparity varies to a large extent.It is observed that the increase in income, literacy rate and higher concentration of ST Population decrease the inequality in work force participation rate; whereas urbanisation increases the disparity.My theoretical model supports the empirical findings. At the very low level of income, females go outside home for earnings in order to avoid destitute situation. These phenomena stop when the income of the household is sufficient exceeding the cut off level (Rs. 38421.78) and for literacy cut-off level (36.59%). Thus, as household income increases, female work effort is maximum till the subsistence income is reached and then decreasing until it reaches zero when the income is high.I find that concentration of SC is having a negative (other than AGL and HHI) impact whereas ST is having a positive impact on FWFPR. The FLR and PCDDP arefound to have an inverted U-shaped for all FWFPR and its decomposition (except: FLR is U shaped for other activities).

Appendix:

Appendix 4A.1: Table: District wise CI and DI for the time periods 2001 and 2011

Districts	State	CI	DI	Districts	State	CI	DI
ADILABAD (2001)	Andhra Pradesh	1.12	0.46	Medak (2001)	Andhra Pradesh	1.05	0.45
ADILABAD (2011)	Andhra Pradesh	0.89	0.39	Medak (2011)	Andhra Pradesh	0.93	0.40
Anantapur (2001)	Andhra Pradesh	1.07	0.45	Nalgonda (2001)	Andhra Pradesh	0.97	0.43
Anantapur (2011)	Andhra Pradesh	0.93	0.41	Nalgonda (2011)	Andhra Pradesh	0.80	0.37
Chittoor (2001)	Andhra Pradesh	0.84	0.37	Nellore (2001)	Andhra Pradesh	1.25	0.47
Chittoor (2011)	Andhra Pradesh	1.09	0.44	Nellore (2011)	Andhra Pradesh	1.19	0.45
Cuddapah-YSR (2001)	Andhra Pradesh	1.26	0.48	Nizamabad (2001)	Andhra Pradesh	0.88	0.40
Cuddapah -YSR(2011)	Andhra Pradesh	1.09	0.43	Nizamabad (2011)	Andhra Pradesh	0.81	0.37
East Godavari (2001)	Andhra Pradesh	2.10	0.61	Prakasam (2001)	Andhra Pradesh	0.97	0.43
East Godavari (2011	Andhra Pradesh	1.92	0.58	Prakasam (2011)	Andhra Pradesh	0.89	0.40
Guntur (2001)	Andhra Pradesh	1.04	0.44	Rangareddi (2001)	Andhra Pradesh	1.51	0.51
Guntur (2011)	Andhra Pradesh	0.95	0.40	Rangareddi (2011)	Andhra Pradesh	1.38	0.48
Hyderabad (2001)	Andhra Pradesh	3.71	0.77	Srikakulam (2001)	Andhra Pradesh	1.06	0.44
Hyderabad (2011)	Andhra Pradesh	1.92	0.56	Srikakulam (2011)	Andhra Pradesh	0.96	0.40
Karimnagar (2001)	Andhra Pradesh	0.90	0.40	Visakhapatnam (2001)	Andhra Pradesh	1.37	0.49
Karimnagar (2011)	Andhra Pradesh	0.80	0.37	Visakhapatnam (2011)	Andhra Pradesh	1.24	0.46
Khammam (2001)	Andhra Pradesh	1.05	0.44	Vizianagaram (2001)	Andhra Pradesh	0.91	0.41
Khammam (2011)	Andhra Pradesh	0.81	0.37	Vizianagaram (2011)	Andhra Pradesh	0.91	0.40
Krishna (2001)	Andhra Pradesh	1.38	0.50	Warangal (2001)	Andhra Pradesh	0.96	0.42
Krishna (2011)	Andhra Pradesh	1.16	0.44	Warangal (2011)	Andhra Pradesh	0.82	0.37
Kurnool (2001)	Andhra Pradesh	1.04	0.45	West Godavari (2001)	Andhra Pradesh	1.52	0.53
Kurnool (2011)	Andhra Pradesh	0.84	0.38	West Godavari (2011)	Andhra Pradesh	1.37	0.49
Mahbubnagar (2001)	Andhra Pradesh	0.95	0.44	Barpeta (2001)	Assam	3.16	0.74
Mahbubnagar (2011)	Andhra Pradesh	0.81	0.38	Barpeta (2011)	Assam	3.12	0.73
Bongaigaon (2001)	Assam	2.82	0.70	Karimganj (2001)	Assam	3.72	0.79
Bongaigaon (2011)	Assam	2.63	0.67	Karimganj (2011)	Assam	3.33	0.75
Cachar (2001)	Assam	2.90	0.70	Kokrajhar (2001)	Assam	1.67	0.55
Cachar (2011)	Assam	2.54	0.66	Kokrajhar (2011)	Assam	1.66	0.54
Chirang (2011)	Assam	1.45	0.50	Lakhimpur (2001)	Assam	0.99	0.47
Darrang (2001)	Assam	2.24	0.63	Lakhimpur (2011)	Assam	1.38	0.49
Darrang (2011)	Assam	2.56	0.67	Morigaon (2001)	Assam	2.84	0.71
Dhemaji (2001)	Assam	1.12	0.46	Morigaon (2011)	Assam	2.27	0.64
Dhemaji (2011)	Assam	0.99	0.42	Nagaon (2001)	Assam	3.60	0.78
Dhubri (2001)	Assam	5.83	0.96	Nagaon (2011)	Assam	2.91	0.71
Dhubri (2011)	Assam	3.08	0.74	Nalbari (2001)	Assam	2.21	0.61
Dibrugarh (2001)	Assam	1.28	0.46	Nalbari (2011)	Assam	2.60	0.66
Dibrugarh (2011)	Assam	1.20	0.44	North Cachar Hills (2001) (Dima Hasao)	Assam	1.58	0.52
Goalpara (2001)	Assam	2.52	0.67	Sibsagar (2001)	Assam	1.27	0.47
Goalpara (2011)	Assam	2.21	0.62	Sibsagar (2011)	Assam	1.29	0.46
Golaghat (2001)	Assam	1.31	0.48	Sonitpur (2001)	Assam	1.71	0.55
Golaghat (2011)	Assam	1.18	0.45	Sonitpur (2011)	Assam	1.65	0.54
Hailakandi (2001)	Assam	2.72	0.69	Tinsukian (2001)	Assam	1.35	0.49
Hailakandi (2011)	Assam	3.20	0.74	Tinsukia (2011)	Assam	1.28	0.47
Jorhat (2001)	Assam	1.28	0.47	Udalguri (2011)	Assam	1.40	0.49
Jorhat (2011)	Assam	1.11	0.43	Araria (2001)	Bihar	2.06	0.64
Kamrup (2011)	Assam	1.45	0.50	Araria (2011)	Bihar	1.80	0.59
Kamrup Metro (2011)	Assam	1.97	0.57	Arwal (2011)	Bihar	3.19	0.82
KarbiAnglong (2001)	Assam	1.35	0.50	Aurangabad (2001)	Bihar	2.21	0.63
KarbiAnglong (2011)	Assam	1.29	0.47	Aurangabad (2011)	Bihar	2.22	0.63

Districts	State	CI	DI	Districts	State	CI	DI
Banka (2001)	Bihar	1.73	0.58	Khagaria (2011)	Bihar	2.21	0.64
Banka (2011)	Bihar	1.75	0.57	Kishanganj (2001)	Bihar	5.25	0.94
Begusarai (2001)	Bihar	2.92	0.72	Kishanganj (2011)	Bihar	3.68	0.80
Begusarai (2011)	Bihar	2.81	0.70	Lakhisarai (2001)	Bihar	2.11	0.63
Bhagalpur (2001)	Bihar	2.18	0.63	Lakhisarai (2011)	Bihar	2.46	0.66
Bhagalpur (2011)	Bihar	2.56	0.67	Madhepura (2001)	Bihar	1.36	0.54
Bhojpur (2001)	Bihar	3.47	0.77	Madhepura (2011)	Bihar	1.59	0.55
Bhojpur (2011)	Bihar	2.98	0.71	Madhubani (2001)	Bihar	2.32	0.65
Buxar (2001)	Bihar	3.78	0.80	Madhubani (2011)	Bihar	1.88	0.59
Buxar (2011)	Bihar	2.59	0.67	Munger (2001)	Bihar	3.11	0.72
Darbhanga (2001)	Bihar	3.11	0.74	Munger (2011)	Bihar	2.64	0.67
Darbhanga (2011)	Bihar	3.05	0.73	Muzaffarpur (2001)	Bihar	3.65	0.79
Gaya (2001)	Bihar	1.80	0.58	Muzaffarpur (2011)	Bihar	2.93	0.72
Gaya (2011)	Bihar	1.65	0.56	Nalanda (2001)	Bihar	1.70	0.57
Gopalganj (2001)	Bihar	3.00	0.72	Nalanda (2011)	Bihar	1.80	0.57
Gopalganj (2011)	Bihar	2.78	0.68	Nawada (2001)	Bihar	1.82	0.59
Jamui (2001)	Bihar	1.36	0.52	Nawada (2011)	Bihar	1.70	0.56
Jamui (2011)	Bihar	1.38	0.51	PashchimChamparan (2001)	Bihar	2.12	0.64
Jehanabad (2001)	Bihar	1.64	0.56	PashchimChamparan (2011)	Bihar	1.88	0.60
Jehanabad (2011)	Bihar	2.36	0.65	Patna (2001)	Bihar	3.13	0.72
Kaimur (Bhabua)(2001)	Bihar	2.33	0.66	Patna (2011)	Bihar	2.56	0.66
Kaimur (Bhabua)(2011)	Bihar	2.53	0.67	PurbaChaparan (2001)	Bihar	3.35	0.77
Katihar (2001)	Bihar	2.26	0.66	PurbaChaparan (2011)	Bihar	2.42	0.67
Katihar (2011)	Bihar	2.73	0.70	Purnia (2001)	Bihar	2.20	0.65
Khagaria (2001)	Bihar	2.19	0.65	Purnia (2011)	Bihar	2.19	0.64

Districts	State	CI	DI	Districts	State	CI	DI
Rohtas (2001)	Bihar	3.34	0.76	Bangalore Rural (2011)	Karnataka	1.36	0.49
Rohtas (2011)	Bihar	2.81	0.70	Belgaum (2001)	Karnataka	1.34	0.50
Saharsa (2001)	Bihar	1.69	0.57	Belgaum (2011)	Karnataka	1.31	0.48
Saharsa (2011)	Bihar	2.15	0.63	Bellary (2001)	Karnataka	1.24	0.49
Samastipur (2001)	Bihar	3.15	0.75	Bellary (2011)	Karnataka	1.16	0.45
Samastipur (2011)	Bihar	3.07	0.73	Bidar (2001)	Karnataka	1.64	0.54
Saran (2001)	Bihar	4.19	0.83	Bidar (2011)	Karnataka	1.39	0.50
Saran (2011)	Bihar	4.36	0.83	Bijapur (2001)	Karnataka	1.53	0.53
Sheikhpura (2001)	Bihar	1.93	0.61	Bijapur (2011)	Karnataka	1.21	0.46
Sheikhpura (2011)	Bihar	1.91	0.59	Chamarajanagar (2001)	Karnataka	1.40	0.51
Sheohar (2001)	Bihar	5.28	0.94	Chamarajanagar (2011)	Karnataka	1.33	0.49
Sheohar (2011)	Bihar	3.13	0.75	Chikkaballapura (2011)	Karnataka	0.92	0.40
Sitamarhi (2001)	Bihar	4.53	0.88	Chikmagalur (2001)	Karnataka	1.31	0.48
Sitamarhi (2011)	Bihar	3.19	0.76	Chikmagalur (2011)	Karnataka	1.06	0.43
Siwan (2001)	Bihar	3.33	0.75	Chitradurga (2001)	Karnataka	1.10	0.45
Siwan (2011)	Bihar	3.38	0.75	Chitradurga (2011)	Karnataka	0.91	0.40
Supaul (2001)	Bihar	1.50	0.55	Dakshina Kannada (2001)	Karnataka	0.88	0.39
Supaul (2011)	Bihar	1.55	0.55	Dakshina Kannada (2011)	Karnataka	0.99	0.40
Vaishali (2001)	Bihar	4.23	0.84	Davanagere (2001)	Karnataka	1.40	0.50
Vaishali (2011)	Bihar	3.79	0.80	Davanagere (2011)	Karnataka	1.29	0.47
Bagalkot (2001)	Karnataka	1.31	0.49	Dharwad (2001)	Karnataka	1.44	0.51
Bagalkot (2011)	Karnataka	1.21	0.46	Dharwad (2011)	Karnataka	1.49	0.51
Bangalore (2001)	Karnataka	2.14	0.61	Gadag (2001)	Karnataka	1.12	0.46
Bangalore (2011)	Karnataka	1.58	0.52	Gadag (2011)	Karnataka	1.10	0.44
Bangalore Rural (2001)	Karnataka	1.23	0.48	Gulbarga (2001)	Karnataka	1.32	0.51

Districts	State	CI	DI	Districts	State	CI	DI
Gulbarga (2011)	Karnataka	1.21	0.46	Uttara Kannada (2011)	Karnataka	1.58	0.52
Hassan (2001)	Karnataka	1.01	0.43	Yadgir (2011)	Karnataka	1.08	0.45
Hassan (2011)	Karnataka	1.27	0.48	Alappuzha (2001)	Kerala	1.64	0.51
Haveri (2001)	Karnataka	1.32	0.50	Alappuzha (2011)	Kerala	1.47	0.49
Haveri (2011)	Karnataka	1.33	0.49	Ernakulam (2001)	Kerala	2.19	0.60
Kodagu (2001)	Karnataka	1.10	0.44	Ernakulam (2011)	Kerala	1.89	0.57
Kodagu (2011)	Karnataka	1.02	0.42	Idukki (2001)	Kerala	1.33	0.47
Kolar (2001)	Karnataka	1.09	0.45	Idukki (2011)	Kerala	1.12	0.44
Kolar (2011)	Karnataka	1.11	0.44	Kannur (2001)	Kerala	2.27	0.61
Koppal (2001)	Karnataka	1.20	0.49	Kannur (2011)	Kerala	2.20	0.60
Koppal (2011)	Karnataka	1.04	0.43	Kasaragod (2001)	Kerala	1.66	0.52
Mandya (2001)	Karnataka	1.26	0.48	Kasaragod (2011)	Kerala	1.73	0.53
Mandya (2011)	Karnataka	1.37	0.47	Kollam (2001)	Kerala	1.95	0.55
Mysore (2001)	Karnataka	1.66	0.54	Kollam (2011)	Kerala	1.78	0.54
Mysore (2011)	Karnataka	1.51	0.51	Kottayam (2001)	Kerala	2.68	0.66
Raichur (2001)	Karnataka	1.31	0.50	Kottayam (2011)	Kerala	1.89	0.57
Raichur (2011)	Karnataka	1.01	0.42	Kozhikode (2001)	Kerala	4.34	0.82
Ramanagara (2011)	Karnataka	1.17	0.46	Kozhikode (2011)	Kerala	2.95	0.69
Shimoga (2001)	Karnataka	1.46	0.51	Malappuram (2001)	Kerala	5.24	0.88
Shimoga (2011)	Karnataka	1.40	0.49	Malappuram (2011)	Kerala	4.51	0.83
Tumkur (2001)	Karnataka	1.00	0.43	Palakkad (2001)	Kerala	1.73	0.53
Tumkur (2011)	Karnataka	1.01	0.42	Palakkad (2011)	Kerala	1.84	0.56
Udupi (2001)	Karnataka	1.05	0.42	Pathanamthitta (2001)	Kerala	2.56	0.64
Udupi (2011)	Karnataka	1.27	0.46	Pathanamthitta (2011)	Kerala	2.00	0.57
Uttara Kannada (2001)	Karnataka	1.48	0.51	Thiruvananthapuram (2001)	Kerala	2.45	0.63

Districts	State	CI	DI	Districts	State	CI	DI
Thiruvananthapuram (2011)	Kerala	1.67	0.52	Dhar (2001)	Madhya Pradesh	1.17	0.49
Thrissur (2001)	Kerala	2.32	0.61	Dhar (2011)	Madhya Pradesh	1.04	0.44
Thrissur (2011)	Kerala	1.93	0.56	Dindori (2001)	Madhya Pradesh	0.85	0.44
Wayanad (2001)	Kerala	1.65	0.53	Dindori (2011)	Madhya Pradesh	0.77	0.39
Wayanad (2011)	Kerala	1.41	0.49	East Nimar (Khandwa) (2001)	Madhya Pradesh	1.37	0.52
Balaghat (2001)	Madhya Pradesh	0.89	0.41	East Nimar (Khandwa) (2011)	Madhya Pradesh	1.14	0.47
Balaghat (2011)	Madhya Pradesh	0.78	0.37	Guna (2001)	Madhya Pradesh	1.71	0.58
Barwani (2001)	Madhya Pradesh	1.25	0.54	Guna (2011)	Madhya Pradesh	1.47	0.52
Barwani (2011)	Madhya Pradesh	1.12	0.48	Gwalior (2001)	Madhya Pradesh	2.88	0.70
Betul (2001)	Madhya Pradesh	1.20	0.48	Gwalior (2011)	Madhya Pradesh	2.73	0.68
Betul (2011)	Madhya Pradesh	0.91	0.41	Harda (2001)	Madhya Pradesh	1.34	0.52
Bhind (2001)	Madhya Pradesh	2.06	0.62	Harda (2011)	Madhya Pradesh	1.56	0.53
Bhind (2011)	Madhya Pradesh	5.27	0.91	Hoshangabad (2001)	Madhya Pradesh	2.13	0.62
Bhopal (2001)	Madhya Pradesh	2.66	0.67	Hoshangabad (2011)	Madhya Pradesh	1.81	0.56
Bhopal (2011)	Madhya Pradesh	1.95	0.57	Indore (2001)	Madhya Pradesh	2.18	0.62
Chhatarpur (2001)	Madhya Pradesh	1.64	0.57	Indore (2011)	Madhya Pradesh	1.93	0.58
Chhatarpur (2011)	Madhya Pradesh	1.36	0.51	Jabalpur (2001)	Madhya Pradesh	1.73	0.55
Chhindwara (2001)	Madhya Pradesh	1.33	0.50	Jabalpur (2011)	Madhya Pradesh	1.52	0.51
Chhindwara (2011)	Madhya Pradesh	1.03	0.42	Jhabua (2001)	Madhya Pradesh	1.12	0.53
Damoh (2001)	Madhya Pradesh	1.32	0.51	Jhabua (2011)	Madhya Pradesh	2.15	0.72
Damoh (2011)	Madhya Pradesh	1.28	0.49	Katni (2001)	Madhya Pradesh	1.40	0.51
Datia (2001)	Madhya Pradesh	1.16	0.50	Katni (2011)	Madhya Pradesh	1.31	0.48
Datia (2011)	Madhya Pradesh	1.65	0.55	Mandla (2001)	Madhya Pradesh	0.93	0.44
Dewas (2001)	Madhya Pradesh	1.28	0.50	Mandla (2011)	Madhya Pradesh	0.78	0.38
Dewas (2011)	Madhya Pradesh	1.11	0.46	Mandsaur (2001)	Madhya Pradesh	1.12	0.47

Districts	State	CI	DI	Districts	State	CI	DI
Mandsaur (2011)	Madhya Pradesh	0.95	0.42	Shahdol (2001)	Madhya Pradesh	1.26	0.48
Morena (2001)	Madhya Pradesh	2.00	0.61	Shahdol (2011)	Madhya Pradesh	1.05	0.43
Morena (2011)	Madhya Pradesh	2.55	0.67	Shajapur (2001)	Madhya Pradesh	1.17	0.50
Narsimhapur (2001)	Madhya Pradesh	1.57	0.54	Shajapur (2011)	Madhya Pradesh	1.12	0.46
Narsimhapur (2011)	Madhya Pradesh	1.42	0.51	Sheopur (2001)	Madhya Pradesh	1.54	0.55
Neemuch (2001)	Madhya Pradesh	1.08	0.46	Sheopur (2011)	Madhya Pradesh	1.51	0.53
Neemuch (2011)	Madhya Pradesh	0.93	0.41	Shivpuri (2001)	Madhya Pradesh	1.33	0.53
Panna (2001)	Madhya Pradesh	1.38	0.53	Shivpuri (2011)	Madhya Pradesh	1.28	0.49
Panna (2011)	Madhya Pradesh	1.37	0.51	Sidhi (2001)	Madhya Pradesh	1.42	0.54
Raisen (2001)	Madhya Pradesh	2.18	0.64	Sidhi (2011)	Madhya Pradesh	1.34	0.50
Raisen (2011)	Madhya Pradesh	1.92	0.59	Tikamgarh (2001)	Madhya Pradesh	1.15	0.49
Rajgarh (2001)	Madhya Pradesh	1.11	0.49	Tikamgarh (2011)	Madhya Pradesh	1.17	0.47
Rajgarh (2011)	Madhya Pradesh	1.06	0.46	Ujjain (2001)	Madhya Pradesh	1.34	0.51
Ratlam (2001)	Madhya Pradesh	1.25	0.49	Ujjain 2011)	Madhya Pradesh	1.23	0.47
Ratlam (2011)	Madhya Pradesh	1.08	0.45	Umaria (2001)	Madhya Pradesh	1.35	0.51
Rewa (2001)	Madhya Pradesh	1.27	0.51	Umaria (2011)	Madhya Pradesh	1.14	0.46
Rewa (2011)	Madhya Pradesh	1.27	0.48	Vidisha (2001)	Madhya Pradesh	2.40	0.68
Sagar (2001)	Madhya Pradesh	1.55	0.55	Vidisha (2011)	Madhya Pradesh	2.21	0.64
Sagar (2011)	Madhya Pradesh	1.51	0.53	West Nimar (Khargaone)(2001)	Madhya Pradesh	1.20	0.50
Satna (2001)	Madhya Pradesh	1.46	0.53	West Nimar (Khargaone)(2011)	Madhya Pradesh	1.05	0.45
Satna (2011)	Madhya Pradesh	1.38	0.50	Ahmadnagar (2001)	Maharashtra	1.09	0.45
Sehore (2001)	Madhya Pradesh	1.38	0.52	Ahmadnagar (2011)	Maharashtra	1.15	0.46
Sehore (2011)	Madhya Pradesh	1.22	0.48	Akola (2001)	Maharashtra	1.58	0.53
Seoni (2001)	Madhya Pradesh	1.03	0.45	Akola (2011)	Maharashtra	1.40	0.49
Seoni (2011)	Madhya Pradesh	0.90	0.40	Amravati (2001)	Maharashtra	1.45	0.52

Districts	State	CI	DI	Districts	State	CI	DI
Amravati (2011)	Maharashtra	1.40	0.49	Latur (2001)	Maharashtra	1.45	0.52
Aurangabad (2001)	Maharashtra	1.41	0.51	Latur (2011)	Maharashtra	1.30	0.49
Aurangabad (2011)	Maharashtra	1.26	0.47	Mumbai (2001)	Maharashtra	3.18	0.74
Bhandara (2001)	Maharashtra	0.88	0.39	Mumbai (2011)	Maharashtra	2.19	0.62
Bhandara (2011)	Maharashtra	0.83	0.37	Mumbai (Suburban) (2001)	Maharashtra	3.28	0.74
Bid (2001)	Maharashtra	1.18	0.49	Mumbai (Suburban) (2011)	Maharashtra	2.17	0.61
Bid (2011)	Maharashtra	0.96	0.43	Nagpur (2001)	Maharashtra	1.69	0.54
Buldana (2001)	Maharashtra	1.13	0.47	Nagpur (2011)	Maharashtra	1.58	0.51
Buldana (2011)	Maharashtra	1.01	0.42	Nanded (2001)	Maharashtra	1.32	0.51
Chandrapur (2001)	Maharashtra	1.07	0.43	Nanded (2011)	Maharashtra	1.15	0.45
Chandrapur (2011)	Maharashtra	0.94	0.39	Nandurbar (2001)	Maharashtra	1.09	0.47
Dhule (2001)	Maharashtra	1.25	0.48	Nandurbar (2011)	Maharashtra	0.93	0.41
Dhule (2011)	Maharashtra	1.09	0.44	Nashik (2001)	Maharashtra	1.24	0.48
Gadchiroli (2001)	Maharashtra	0.90	0.42	Nashik (2011)	Maharashtra	1.13	0.44
Gadchiroli (2011)	Maharashtra	0.75	0.36	Osmanabad (2001)	Maharashtra	1.29	0.51
Gondiya (2001)	Maharashtra	0.86	0.39	Osmanabad (2011)	Maharashtra	1.13	0.46
Gondiya (2011)	Maharashtra	0.82	0.37	Parbhani (2001)	Maharashtra	1.36	0.52
Hingoli (2001)	Maharashtra	1.18	0.50	Parbhani (2011)	Maharashtra	1.14	0.46
Hingoli (2011)	Maharashtra	1.00	0.43	Pune (2001)	Maharashtra	1.44	0.50
Jalgaon (2001)	Maharashtra	1.25	0.48	Pune (2011)	Maharashtra	1.37	0.48
Jalgaon (2011)	Maharashtra	1.18	0.45	Raigarh (2001)	Maharashtra	1.32	0.48
Jalna (2001)	Maharashtra	1.24	0.50	Raigarh (2011)	Maharashtra	1.55	0.51
Jalna (2011)	Maharashtra	1.05	0.45	Ratnagiri (2001)	Maharashtra	1.00	0.42
Kolhapur (2001)	Maharashtra	1.09	0.44	Ratnagiri (2011)	Maharashtra	1.04	0.42
Kolhapur (2011)	Maharashtra	1.25	0.46	Sangli (2001)	Maharashtra	1.13	0.46

Districts	State	CI	DI	Districts	State	CI	DI
Sangli (2011)	Maharashtra	1.32	0.48	Bhadrak (2001)	Orrissa	5.23	0.90
Satara (2001)	Maharashtra	1.04	0.44	Bhadrak (2011)	Orrissa	3.46	0.72
Satara (2011)	Maharashtra	1.13	0.44	Cuttack (2001)	Orrissa	3.04	0.72
Sindhudurg (2001)	Maharashtra	1.00	0.42	Cuttack (2011)	Orrissa	3.01	0.71
Sindhudurg (2011)	Maharashtra	1.42	0.49	Debagarh (2001)	Orrissa	1.07	0.45
Solapur (2001)	Maharashtra	1.17	0.47	Debagarh (2011)	Orrissa	0.83	0.39
Solapur (2011)	Maharashtra	1.18	0.46	Dhenkanal (2001)	Orrissa	2.73	0.68
Thane (2001)	Maharashtra	2.12	0.61	Dhenkanal (2011)	Orrissa	2.55	0.66
Thane (2011)	Maharashtra	1.80	0.56	Gajapati (2001)	Orrissa	0.93	0.45
Wardha (2001)	Maharashtra	1.20	0.46	Gajapati (2011)	Orrissa	0.89	0.41
Wardha (2011)	Maharashtra	1.12	0.44	Ganjam (2001)	Orrissa	1.35	0.50
Washim (2001)	Maharashtra	1.15	0.47	Ganjam (2011)	Orrissa	1.38	0.49
Washim (2011)	Maharashtra	0.99	0.42	Jagatsinghapur (2001)	Orrissa	3.52	0.76
Yavatmal (2001)	Maharashtra	1.15	0.47	Jagatsinghapur (2011)	Orrissa	2.94	0.70
Yavatmal (2011	Maharashtra	0.97	0.41	Jajapur (2001)	Orrissa	5.88	0.94
Anugul (2001)	Orrissa	1.52	0.52	Jajapur (2011)	Orrissa	5.59	0.92
Anugul (2011)	Orrissa	1.46	0.50	Jharsuguda (2001)	Orrissa	1.74	0.55
Balangir (2001)	Orrissa	1.54	0.53	Jharsuguda (2011)	Orrissa	1.46	0.50
Balangir (2011)	Orrissa	1.37	0.50	Kalahandi (2001)	Orrissa	1.25	0.49
Baleshwar (2001)	Orrissa	3.83	0.80	Kalahandi (2011)	Orrissa	1.11	0.46
Baleshwar (2011)	Orrissa	1.96	0.59	Kandhamal (2001)	Orrissa	1.04	0.45
Bargarh (2001)	Orrissa	1.36	0.50	Kandhamal (2011)	Orrissa	0.97	0.43
Bargarh (2011)	Orrissa	1.03	0.43	Kendrapara (2001)	Orrissa	4.24	0.83
Baudh (2001)	Orrissa	1.23	0.48	Kendrapara (2011)	Orrissa	3.73	0.78
Baudh (2011)	Orrissa	1.00	0.44	Kendujhar (2001)	Orrissa	1.44	0.50

Districts	State	CI	DI	Districts	State	CI	DI
Kendujhar (2011)	Orrissa	1.35	0.49	Amritsar (2001)	Punjab	2.70	0.69
Khordha (2001)	Orrissa	4.56	0.85	Amritsar (2011)	Punjab	2.68	0.68
Khordha (2011)	Orrissa	2.95	0.70	Barnala (2011)	Punjab	3.94	0.81
Koraput (2001)	Orrissa	1.05	0.45	Bathinda (2001)	Punjab	1.58	0.54
Koraput (2011)	Orrissa	1.00	0.45	Bathinda (2011)	Punjab	2.37	0.65
Malkangiri (2001)	Orrissa	1.09	0.47	Faridkot (2001)	Punjab	2.15	0.62
Malkangiri (2011)	Orrissa	1.04	0.47	Faridkot (2011)	Punjab	3.50	0.77
Mayurbhanj (2001)	Orrissa	1.05	0.44	Fatehgarh Sahib (2001)	Punjab	2.35	0.65
Mayurbhanj (2011)	Orrissa	0.97	0.42	Fatehgarh Sahib (2011)	Punjab	3.79	0.79
Nabarangapur (2001)	Orrissa	1.11	0.48	Firozpur (2001)	Punjab	2.44	0.66
Nabarangapur (2011)	Orrissa	1.06	0.47	Firozpur (2011)	Punjab	2.56	0.67
Nayagarh (2001)	Orrissa	4.11	0.83	Gurdaspur (2001)	Punjab	3.34	0.75
Nayagarh (2011)	Orrissa	3.50	0.77	Gurdaspur (2011)	Punjab	3.72	0.78
Nuapada (2001)	Orrissa	1.24	0.49	Hoshiarpur (2001)	Punjab	2.35	0.64
Nuapada (2011)	Orrissa	0.97	0.43	Hoshiarpur (2011)	Punjab	3.42	0.74
Puri (2001)	Orrissa	5.46	0.92	Jalandhar (2001)	Punjab	3.38	0.76
Puri (2011)	Orrissa	2.86	0.70	Jalandhar (2011)	Punjab	3.17	0.73
Rayagada (2001)	Orrissa	1.03	0.44	Kapurthala (2001)	Punjab	3.02	0.72
Rayagada (2011)	Orrissa	0.99	0.43	Kapurthala (2011)	Punjab	3.35	0.75
Sambalpur (2001)	Orrissa	1.10	0.44	Ludhiana (2001)	Punjab	2.71	0.69
Sambalpur (2011)	Orrissa	1.02	0.42	Ludhiana (2011)	Punjab	2.95	0.71
Sonapur (SUBARNAPUR) (2001)	Orrissa	1.31	0.49	Mansa (2001)	Punjab	1.80	0.58
Sonapur (SUBARNAPUR) (2011)	Orrissa	1.18	0.46	Mansa (2011)	Punjab	1.55	0.53
Sundargarh (2001)	Orrissa	1.34	0.48	Moga (2001)	Punjab	1.82	0.58
Sundargarh (2011)	Orrissa	1.37	0.48	Moga (2011)	Punjab	3.06	0.72

Districts	State	CI	DI	Districts	State	CI	DI
Muktsar (2001)	Punjab	1.97	0.60	Bhilwara (2011)	Rajasthan	1.05	0.44
Muktsar (2011)	Punjab	3.02	0.72	Bikaner (2001)	Rajasthan	1.69	0.57
Patiala (2001)	Punjab	2.45	0.66	Bikaner (2011)	Rajasthan	1.43	0.52
Patiala (2011)	Punjab	3.35	0.75	Bundi (2001)	Rajasthan	1.18	0.49
Rupnagar (2001)	Punjab	1.75	0.56	Bundi (2011)	Rajasthan	1.00	0.42
Rupnagar (2011)	Punjab	2.73	0.67	Chittaurgarh (2001)	Rajasthan	0.99	0.45
SahidBhagat Singh Nagar (Nawanshahr) (2001)	Punjab	1.29	0.49	Chittaurgarh (2011)	Rajasthan	0.90	0.41
SahidBhagat Singh Nagar (Nawanshahr) (2011)	Punjab	3.61	0.77	Churu (2001)	Rajasthan	1.26	0.51
Sangrur (2001)	Punjab	1.82	0.58	Churu (2011)	Rajasthan	1.14	0.46
Sangrur (2011)	Punjab	4.04	0.82	Dausa (2001)	Rajasthan	1.23	0.49
SAS Nagar (Mohali) (2011)	Punjab	3.45	0.76	Dausa (2011)	Rajasthan	1.03	0.42
Tarn Taran (2011)	Punjab	3.39	0.76	Dhaulpur (2001)	Rajasthan	1.63	0.60
Ajmer (2001)	Rajasthan	1.51	0.52	Dhaulpur (2011)	Rajasthan	1.42	0.53
Ajmer (2011)	Rajasthan	1.34	0.48	Dungarpur (2001)	Rajasthan	1.19	0.52
Alwar (2001)	Rajasthan	1.14	0.50	Dungarpur (2011)	Rajasthan	1.01	0.44
Alwar (2011)	Rajasthan	0.97	0.42	Ganganagar (2001)	Rajasthan	1.85	0.59
Banswara (2001)	Rajasthan	1.17	0.51	Ganganagar (2011)	Rajasthan	1.21	0.47
Banswara (2011)	Rajasthan	0.93	0.44	Hanumangarh (2001)	Rajasthan	1.49	0.53
Baran (2001)	Rajasthan	1.28	0.50	Hanumangarh (2011)	Rajasthan	1.03	0.43
Baran (2011)	Rajasthan	1.05	0.44	Jaipur (2001)	Rajasthan	1.88	0.58
Barmer (2001)	Rajasthan	1.25	0.53	Jaipur (2011)	Rajasthan	1.57	0.51
Barmer (2011)	Rajasthan	1.18	0.50	Jaisalmer (2001)	Rajasthan	1.76	0.60
Bharatpur (2001)	Rajasthan	1.43	0.53	Jaisalmer (2011)	Rajasthan	1.37	0.52
Bharatpur (2011)	Rajasthan	1.14	0.45	Jalor (2001)	Rajasthan	1.22	0.54
Bhilwara (2001)	Rajasthan	1.24	0.50	Jalor (2011)	Rajasthan	1.04	0.47

Districts	State	CI	DI	Districts	State	CI	DI
Jhalawar (2001)	Rajasthan	1.23	0.50	Udaipur (2001)	Rajasthan	1.42	0.52
Jhalawar (2011)	Rajasthan	1.02	0.44	Udaipur (2011)	Rajasthan	1.22	0.48
Jhunjhunun (2001)	Rajasthan	1.30	0.49	Ariyalur (2001)	Tamil Nadu	0.93	0.41
Jhunjhunun (2011)	Rajasthan	1.08	0.43	Ariyalur (2011)	Tamil Nadu	0.95	0.40
Jodhpur (2001)	Rajasthan	1.68	0.56	Chennai (2001)	Tamil Nadu	2.87	0.69
Jodhpur (2011)	Rajasthan	1.40	0.50	Chennai (2011)	Tamil Nadu	1.94	0.57
Karauli (2001)	Rajasthan	1.34	0.51	Coimbatore (2001)	Tamil Nadu	1.42	0.50
Karauli (2011)	Rajasthan	1.05	0.44	Coimbatore (2011)	Tamil Nadu	1.39	0.49
Kota (2001)	Rajasthan	2.10	0.60	Cuddalore (2001)	Tamil Nadu	1.28	0.47
Kota (2011)	Rajasthan	1.63	0.52	Cuddalore (2011)	Tamil Nadu	1.10	0.43
SawaiMadhopur (2001)	Rajasthan	1.25	0.49	Dharmapuri (2001)	Tamil Nadu	1.01	0.43
SawaiMadhopur (2011)	Rajasthan	1.01	0.42	Dharmapuri (2011)	Tamil Nadu	0.85	0.38
Nagaur (2001)	Rajasthan	1.40	0.52	Dindigul (2001)	Tamil Nadu	0.94	0.41
Nagaur (2011)	Rajasthan	1.13	0.45	Dindigul (2011)	Tamil Nadu	0.69	0.31
Pali (2001)	Rajasthan	1.50	0.54	Erode (2001)	Tamil Nadu	0.89	0.40
Pali (2011)	Rajasthan	1.13	0.43	Erode (2011)	Tamil Nadu	0.93	0.41
Pratapgarh (2011)	Rajasthan	0.86	0.43	Kancheepuram (2001)	Tamil Nadu	1.58	0.52
Rajsamand (2001)	Rajasthan	1.53	0.54	Kancheepuram (2011)	Tamil Nadu	1.50	0.50
Rajsamand (2011)	Rajasthan	1.08	0.46	Kanniyakumari (2001)	Tamil Nadu	2.96	0.70
Sikar (2001)	Rajasthan	1.38	0.51	Kanniyakumari (2011)	Tamil Nadu	2.38	0.63
Sikar (2011)	Rajasthan	1.39	0.48	Karur (2001)	Tamil Nadu	0.90	0.40
Sirohi (2001)	Rajasthan	1.54	0.54	Karur (2011)	Tamil Nadu	0.96	0.41
Sirohi (2011)	Rajasthan	1.44	0.51	Krishnagiri (2011)	Tamil Nadu	1.10	0.43
Tonk (2001)	Rajasthan	1.17	0.48	Madurai (2001)	Tamil Nadu	1.39	0.49
Tonk (2011)	Rajasthan	0.93	0.40	Madurai (2011)	Tamil Nadu	1.26	0.46

Districts	State	CI	DI	Districts	State	CI	DI
Nagapattinam (2001)	Tamil Nadu	1.68	0.54	Thiruvarur (2011)	Tamil Nadu	1.41	0.49
Nagapattinam (2011)	Tamil Nadu	1.47	0.50	Thoothukudi (2001)	Tamil Nadu	1.26	0.47
Namakkal (2001)	Tamil Nadu	0.81	0.38	Thoothukudi (2011)	Tamil Nadu	1.42	0.50
Namakkal (2011)	Tamil Nadu	0.83	0.38	Tiruchirapalli (2001)	Tamil Nadu	1.19	0.45
Nilgiris (2001)	Tamil Nadu	0.90	0.37	Tiruchirapalli (2011)	Tamil Nadu	1.19	0.45
Nilgiris (2011)	Tamil Nadu	0.91	0.38	Tiruppur (2011)	Tamil Nadu	1.09	0.44
Perambalur (2001)	Tamil Nadu	0.74	0.36	Tiruvannamalai (2001)	Tamil Nadu	1.01	0.43
Perambalur (2011)	Tamil Nadu	0.72	0.35	Tiruvannamalai (2011)	Tamil Nadu	0.91	0.40
Pudukottai (2001)	Tamil Nadu	1.08	0.43	Vellore (2001)	Tamil Nadu	1.43	0.50
Pudukottai (2011)	Tamil Nadu	1.06	0.43	Vellore (2011)	Tamil Nadu	1.29	0.47
Ramanathpuram (2001)	Tamil Nadu	1.15	0.44	Viluppuram (2001)	Tamil Nadu	1.00	0.43
Ramanathpuram (2011)	Tamil Nadu	1.17	0.44	Viluppuram (2011)	Tamil Nadu	0.93	0.40
Salem (2001)	Tamil Nadu	1.14	0.45	Virudhunagar (2001)	Tamil Nadu	0.92	0.40
Salem (2011)	Tamil Nadu	1.07	0.43	Virudhunagar (2011)	Tamil Nadu	0.96	0.40
Sivganga (2001)	Tamil Nadu	1.13	0.44	Agra (2001)	Uttar Pradesh	6.18	0.97
Sivganga (2011)	Tamil Nadu	1.10	0.43	Agra (2011)	Uttar Pradesh	3.12	0.72
Thanjavur (2001)	Tamil Nadu	1.54	0.51	Aligarh (2001)	Uttar Pradesh	3.47	0.77
Thanjavur (2011)	Tamil Nadu	1.57	0.51	Aligarh (2011)	Uttar Pradesh	2.99	0.71
Theni (2001)	Tamil Nadu	1.03	0.42	Allahabad (2001)	Uttar Pradesh	1.78	0.56
Theni (2011)	Tamil Nadu	1.01	0.41	Allahabad (2011)	Uttar Pradesh	1.56	0.51
Thirunelveli (2001)	Tamil Nadu	0.91	0.39	Ambedaker Nagar (2001)	Uttar Pradesh	2.05	0.61
Thirunelveli (2011)	Tamil Nadu	1.02	0.41	Ambedaker Nagar (2011)	Uttar Pradesh	1.93	0.57
Thiruvallur (2001)	Tamil Nadu	1.92	0.57	Auraiya (2001)	Uttar Pradesh	3.22	0.75
Thiruvallur (2011)	Tamil Nadu	1.60	0.52	Auraiya (2011)	Uttar Pradesh	1.74	0.49
Thiruvarur (2001)	Tamil Nadu	1.43	0.49	Azamgarh (2001)	Uttar Pradesh	2.10	0.61

Districts	State	CI	DI	Districts	State	CI	DI
Azamgarh (2011)	Uttar Pradesh	1.97	0.57	Chitrakoot (2001)	Uttar Pradesh	1.36	0.53
Baghpat (2001)	Uttar Pradesh	3.13	0.74	Chitrakoot (2011)	Uttar Pradesh	1.54	0.54
Baghpat (2011)	Uttar Pradesh	3.57	0.78	Deoria (2001)	Uttar Pradesh	2.42	0.64
Bahraich (2001)	Uttar Pradesh	3.28	0.78	Deoria (2011)	Uttar Pradesh	2.40	0.63
Bahraich (2011)	Uttar Pradesh	3.06	0.74	Etah (2001)	Uttar Pradesh	6.19	0.98
Ballia (2001)	Uttar Pradesh	2.65	0.67	Etah (2011)	Uttar Pradesh	3.36	0.75
Ballia (2011)	Uttar Pradesh	2.01	0.58	Etawah (2001)	Uttar Pradesh	7.26	1.03
Balrampur (2001)	Uttar Pradesh	0.61	0.26	Etawah (2011)	Uttar Pradesh	3.41	0.76
Balrampur (2011	Uttar Pradesh	2.13	0.63	Faizabad (2001)	Uttar Pradesh	1.69	0.57
Banda (2001)	Uttar Pradesh	1.59	0.56	Faizabad (2011)	Uttar Pradesh	2.13	0.61
Banda (2011)	Uttar Pradesh	1.79	0.58	Farrukhabad (2001)	Uttar Pradesh	6.31	0.99
Barabanki (2001)	Uttar Pradesh	2.53	0.69	Farrukhabad (2011)	Uttar Pradesh	4.02	0.82
Barabanki (2011)	Uttar Pradesh	2.29	0.65	Fatehpur (2001)	Uttar Pradesh	1.82	0.58
Bareilly (2001)	Uttar Pradesh	5.39	0.94	Fatehpur (2011)	Uttar Pradesh	1.57	0.54
Bareilly (2011)	Uttar Pradesh	3.81	0.80	Firozabad (2001)	Uttar Pradesh	6.67	1.00
Basti (2001)	Uttar Pradesh	2.04	0.62	Firozabad (2011)	Uttar Pradesh	3.52	0.77
Basti (2011)	Uttar Pradesh	2.17	0.61	Gautam Buddha Nagar (2001)	Uttar Pradesh	4.14	0.83
Bijnor (2001)	Uttar Pradesh	6.01	0.97	Gautam Buddha Nagar (2011)	Uttar Pradesh	2.52	0.66
Bijnor (2011)	Uttar Pradesh	4.53	0.85	Ghaziabad (2001)	Uttar Pradesh	5.00	0.89
Budaun (2001)	Uttar Pradesh	6.96	1.04	Ghaziabad (2011)	Uttar Pradesh	3.13	0.72
Budaun (2011)	Uttar Pradesh	4.95	0.90	Ghazipur (2001)	Uttar Pradesh	2.05	0.60
Bulandshahar (2001)	Uttar Pradesh	1.78	0.59	Ghazipur (2011)	Uttar Pradesh	1.76	0.55
Bulandshahar (2011)	Uttar Pradesh	2.56	0.67	Gonda (2001)	Uttar Pradesh	3.20	0.76
Chandauli (2001)	Uttar Pradesh	2.30	0.64	Gonda (2011)	Uttar Pradesh	2.31	0.64
Chandauli (2011)	Uttar Pradesh	1.98	0.58	Gorakhpur (2001)	Uttar Pradesh	2.41	0.64

Districts	State	CI	DI	Districts	State	CI	DI
Gorakhpur (2011)	Uttar Pradesh	2.46	0.64	Kheri (2011)	Uttar Pradesh	4.32	0.85
Hamirpur (2001)	Uttar Pradesh	1.73	0.58	Kushinagar (2001)	Uttar Pradesh	2.02	0.61
Hamirpur (2011)	Uttar Pradesh	1.66	0.55	Kushinagar (2011)	Uttar Pradesh	2.28	0.63
Hardoi (2001)	Uttar Pradesh	5.24	0.94	Lalitpur (2001)	Uttar Pradesh	1.38	0.53
Hardoi (2011)	Uttar Pradesh	3.96	0.82	Lalitpur (2011)	Uttar Pradesh	1.49	0.53
Hathras (2001)	Uttar Pradesh	4.75	0.88	Lucknow (2001)	Uttar Pradesh	3.90	0.80
Hathras(Mahamaya Nagar) (2011)	Uttar Pradesh	3.67	0.78	Lucknow (2011)	Uttar Pradesh	2.76	0.68
Jalaun (2001)	Uttar Pradesh	2.27	0.64	Maharajganj (2001)	Uttar Pradesh	1.63	0.57
Jalaun (2011)	Uttar Pradesh	2.26	0.63	Maharajganj (2011)	Uttar Pradesh	1.66	0.55
Jaunpur (2001)	Uttar Pradesh	1.97	0.59	Mahoba (2001)	Uttar Pradesh	1.48	0.54
Jaunpur (2011)	Uttar Pradesh	1.69	0.53	Mahoba (2011)	Uttar Pradesh	1.64	0.55
Jhansi (2001)	Uttar Pradesh	1.84	0.57	Mainpuri (2001)	Uttar Pradesh	7.47	1.05
Jhansi (2011)	Uttar Pradesh	1.52	0.52	Mainpuri (2011)	Uttar Pradesh	3.98	0.81
JyotibaPhule Nagar (Amorah) (2001)	Uttar Pradesh	3.49	0.79	Mathura (2001)	Uttar Pradesh	1.97	0.61
JyotibaPhule Nagar (Amorah) (2011)	Uttar Pradesh	2.67	0.68	Mathura (2011)	Uttar Pradesh	2.50	0.66
Kannauj (2001)	Uttar Pradesh	3.38	0.78	Mau (2001)	Uttar Pradesh	1.89	0.58
Kannauj (2011)	Uttar Pradesh	3.68	0.79	Mau (2011)	Uttar Pradesh	1.87	0.56
Kanpur Dehat (2001)	Uttar Pradesh	3.34	0.77	Meerut (2001)	Uttar Pradesh	7.87	1.20
Kanpur Dehat (2011)	Uttar Pradesh	2.75	0.69	Meerut (2011)	Uttar Pradesh	3.53	0.77
Kanpur Nagar (2001)	Uttar Pradesh	4.32	0.83	Mirzapur (2001)	Uttar Pradesh	2.22	0.64
Kanpur Nagar (2011)	Uttar Pradesh	2.15	0.60	Mirzapur (2011)	Uttar Pradesh	1.83	0.57
Kashiram Nagar ((2011)	Uttar Pradesh	3.22	0.75	Moradabad (2001)	Uttar Pradesh	4.24	0.85
Kaushambi (2001)	Uttar Pradesh	1.61	0.56	Moradabad (2011)	Uttar Pradesh	4.51	0.86
Kaushambi (2011)	Uttar Pradesh	1.46	0.53	Muzaffarnagar (2001)	Uttar Pradesh	3.30	0.77
Kheri (2001)	Uttar Pradesh	5.88	0.98	Muzaffarnagar (2011)	Uttar Pradesh	4.11	0.82

Districts	State	CI	DI	Districts	State	CI	DI
Pilibhit (2001)	Uttar Pradesh	8.79	1.12	Sultanpur (2011)	Uttar Pradesh	1.99	0.58
Pilibhit (2011)	Uttar Pradesh	5.19	0.91	Unnao (2001)	Uttar Pradesh	2.87	0.72
Pratapgarh (2001)	Uttar Pradesh	1.76	0.56	Unnao (2011)	Uttar Pradesh	2.48	0.67
Pratapgarh (2011)	Uttar Pradesh	1.64	0.52	Varanasi (2001)	Uttar Pradesh	2.58	0.67
Rae Bareli (2001)	Uttar Pradesh	2.01	0.61	Varanasi (2011)	Uttar Pradesh	2.32	0.63
Rae Bareli (2011)	Uttar Pradesh	2.04	0.60	Bankura (2001)	West Bengal	1.34	0.50
Rampur (2001)	Uttar Pradesh	7.23	1.05	Bankura (2011)	West Bengal	1.71	0.55
Rampur (2011)	Uttar Pradesh	3.97	0.82	Barddhaman (2001)	West Bengal	2.59	0.67
Saharanpur (2001)	Uttar Pradesh	7.53	1.05	Barddhaman (2011)	West Bengal	2.44	0.64
Saharanpur (2011)	Uttar Pradesh	5.70	0.94	Birbhum (2001)	West Bengal	2.26	0.64
SantKabir Nagar (2001)	Uttar Pradesh	2.00	0.61	Birbhum (2011)	West Bengal	2.40	0.65
SantKabir Nagar (2011)	Uttar Pradesh	2.22	0.62	DakshinDinajpur (2001)	West Bengal	1.83	0.58
SantRavidas Nagar (2001)	Uttar Pradesh	2.83	0.70	DakshinDinajpur (2011)	West Bengal	1.64	0.54
SantRavidas Nagar 2011)	Uttar Pradesh	2.31	0.62	Darjiling (2001)	West Bengal	1.68	0.53
Shahjahanpur (2001)	Uttar Pradesh	10.80	1.20	Darjiling (2011)	West Bengal	1.49	0.49
Shahjahanpur (2011)	Uttar Pradesh	6.05	0.97	Haora (2001)	West Bengal	4.85	0.88
Shrawasti (2001)	Uttar Pradesh	2.06	0.65	Haora (2011)	West Bengal	3.14	0.73
Shrawasti (2011)	Uttar Pradesh	2.29	0.65	Hugli (2001)	West Bengal	2.63	0.67
Siddharthnagar (2001)	Uttar Pradesh	1.78	0.59	Hugli (2011)	West Bengal	2.58	0.67
Siddharthnagar (2011)	Uttar Pradesh	2.05	0.61	Jalpaiguri (2001)	West Bengal	1.81	0.57
Sitapur (2001)	Uttar Pradesh	6.06	0.99	Jalpaiguri (2011)	West Bengal	1.69	0.53
Sitapur (2011)	Uttar Pradesh	3.94	0.82	Koch Bihar (2001)	West Bengal	2.11	0.63
Sonbhadra (2001)	Uttar Pradesh	1.85	0.59	Koch Bihar (2011)	West Bengal	2.04	0.60
Sonbhadra (2011)	Uttar Pradesh	1.40	0.50	Kolkata (2001)	West Bengal	3.32	0.75
Sultanpur (2001)	Uttar Pradesh	2.29	0.64	Kolkata (2011)	West Bengal	2.24	0.62

Districts	State	CI	DI
Maldah (2001)	West Bengal	1.70	0.57
Maldah (2011)	West Bengal	1.83	0.57
Murshidabad (2001)	West Bengal	2.83	0.71
Murshidabad (2011)	West Bengal	2.43	0.65
Nadia (2001)	West Bengal	3.18	0.74
Nadia (2011)	West Bengal	3.72	0.79
North 24 Parganas (2001)	West Bengal	3.74	0.79
North 24 Parganas (2011)	West Bengal	3.16	0.73
PachimMedinipur (2001)	West Bengal	1.91	0.59
PachimMedinipur (2011)	West Bengal	1.55	0.52
PurabMedinipur (2001)	West Bengal	1.91	0.59
PurabMedinipur (2011)	West Bengal	2.64	0.67
Puruliya (2001)	West Bengal	1.15	0.46
Puruliya (2011)	West Bengal	1.26	0.47
South 24 Parganas (2001)	West Bengal	3.80	0.80
South 24 Parganas (2011)	West Bengal	2.77	0.69
Uttar Dinajpur (2001)	West Bengal	2.09	0.63
Uttar Dinajpur (2011)	West Bengal	1.54	0.51

Source: Authors estimation.

Appendix 4A.2: Cut-off level of income and female literacy rate to improve female work force participation rate

In case of income:

$$\ln FWFPR = -4.049^{*} - 0.1334^{***} \ln SC + 1.438^{**} \ln PCDDP - 0.0674^{**} (\ln PCNSDP)^2 \text{.....(4A.1)}$$

If we differentiate equation (4A.1) with respect to PCDDP, assuming $Y = \ln PCDDP$, we have:

$$\frac{1}{FWFPR}\frac{\partial FWFPR}{\partial Y} = 1.438 + 2 \times (-0.0674) \times Y \text{ or,}$$

$$\frac{\partial FWFPR}{\partial Y} = FWFPR(1.438 - 2 \times 0.0674 \times Y) \text{.....(4A.2), again differentiating equation (4A.2),}$$

we get:

$$\frac{\partial^2 FWFPR}{\partial Y^2} = (1.438 - 2 \times 0.0674 \times Y)\frac{\partial FWFPR}{\partial Y} - FWFPR(2 \times 0.0674) \text{ ..... (4A.3),}$$

inserting the value of $\frac{\partial FWFPR}{\partial Y}$ from equation (4A.2), into equation (4A.3), we obtain:

$$\frac{\partial^2 FWFPR}{\partial Y^2} = (1.438 - 2 \times 0.0674 \times Y) \times FWFPR \times (1.438 - 2 \times 0.0674 \times Y) - FWFPR \times 2 \times 0.0674$$

$$Or, \frac{\partial^2 FWFPR}{\partial Y^2} = (1.438 - 2 \times 0.0674 \times Y)^2 \times FWFPR - FWFPR \times 2 \times 0.0674 < 0 \text{.....(4A.4)}$$

For maximization as well as minimization, the first order condition is zero:

Setting, $\frac{\partial FWFPR}{\partial Y} = FWFPR(1.438 - 2 \times 0.0674 \times Y) = 0$, we have, $Y = \ln PCDDP = 10.55$,

therefore, *PCDDP*=38421.78 at which the *FWFPR* is maximum.

In case of female literacy rate:

$$\ln FWFPR = -1.29 - 0.11^{***} \ln ST + 2.49^{***} \ln FLR - 0.345^{***} (\ln FLR)^2 \text{.....(6)}$$

If we differentiate equation (6) with respect to FLR, assuming $Z = \ln FLR$, we have:

$$\frac{1}{FWFPR}\frac{\partial FWFPR}{\partial Z} = 2.49 + 2 \times (-0.345) \times Z \text{ or,}$$

$$\frac{\partial FWFPR}{\partial Z} = FWFPR(2.49 + 2 \times (-0.345) \times Z) \text{ .....(7), again differentiating equation (8), we}$$

get:

$$\frac{\partial^2 FWFPR}{\partial Z^2} = (2.49 + 2 \times (-0.345) \times Z)\frac{\partial FWFPR}{\partial Z} - FWFPR(2 \times 0.345) \text{ ……(9),}$$

inserting the value of $\frac{\partial FWFPR}{\partial Z}$ from equation (7), into equation (8), we obtain:

$$\frac{\partial^2 FWFPR}{\partial Z^2} = (2.49 + 2 \times (-0.345) \times Z) \times FWFPR \times (2.49 + 2 \times (-0.345) \times Z) - FWFPR \times 2 \times 0.345$$

$$Or, \frac{\partial^2 FWFPR}{\partial Z^2} = (2.49 + 2 \times (-0.345) \times Z)^2 \times FWFPR - FWFPR \times 2 \times 0.345 < 0 \text{.....(10)}$$

For maximization as well as minimization, the first order condition is zero:

Setting, $\frac{\partial FWFPR}{\partial Z} = FWFPR(2.49 + 2 \times (-0.345) \times Z) = 0$, we have, $Z = \ln FLR = 3.6$,

therefore, *FLR*=36.59 at which the ln *FWFPR* is maximum.

Chapter-5

Crime against Women in India

5.1 Introduction:

Gender inequality in developmental outcomes along with crime against women is one of the major social problems faced by many countries in the world and it is more acute in India. India has dropped four places from 2018 to take the 112th rank in the global gender gap index in 2019 -2020; in the health and survival dimensions, India's performance is dismal, it ranks 150th out of 153 countries in the world (World Economic Forum 2020). Violence against women is a manifestation of historically asymmetrical power relations between men and women, which have led to domination over and discrimination against women by men and to the prevention of the full advancement of women, and that violence against women is one of the crucial social mechanisms by which women are forced into a subordinate position compared with men (United Nations 2015). According to the report of National Crime Record Bureau (NCRB), crime against woman is committed every three minutes (Govt. of India 2019); even according to International Men and Gender Equality survey (2010) 65%of Indian men believe women should tolerate violence in order to keep family together and women sometimes deserve to be beaten (Barker et al., 2011). Recently, improved technology makes the women more vulnerable; it raises the chance of getting affected by different means like cyber bullying, defamation, stalking, blackmailing, morphed pornographic image etc (Halder & Karuppannan, 2012). Violence against women in India is actually more present than it may appear at first glance, as many expressions of violence are not considered crimes, or may otherwise go unreported or undocumented due to certain Indian cultural values and beliefs. The 2012 Delhi gang rape case which is known as the infamous 'Nirbhaya (viz. fearless)' case generated widespread outrages and was widely condemned in India and abroad; after two years (in May, 2014), the Badaun (in Uttar Pradesh) gang rape of two teenage Dalit girls was widely reported in the press in India as well as overseas; the United Nations condemned this brutal gang rape and called for immediate action against the perpetrators. Consequently, the government of India has adopted the 'National Policy for Women' in 2016 with an objective to eliminate of all forms of violence against women through strengthening of policies, legislation, programmes, institutions and community involvement. But, such initiative could not stop the crimes against women, for example, the Unnao (in Uttar Pradesh) rape case in 2017 and the gang rape and murder case of a veterinary doctor of Hyderabad (in Andhra Pradesh) are the examples as reported in media.

Therefore, the violence against women affects women of all races, ages, ethnic groups and socio-economic classes. It cuts across cultural and religious barriers, impeding the right of women to participate fully in society. Violence against women takes a dismaying variety of forms from domestic cruelty to rape, to child marriages and to female circumcision. All of them are violations of the most fundamental human rights. All these issues have motivated me to revisit the spatial distribution and determinants of crime against women in India. Before analyzing the determinants of different forms of crime against women, I first try to explore the theoretical backdrops of crime against women as given in the next section.

5.2 Theoretical Backdrop of Crime against Women:

The nature, extent and severity of crimes against women vary across space and time, among different religious and socio-ethnic groups. Violence or crime against women is originated due to unequal power relations between men and women; it arises from a sense of entitlement and superiority which is assumed to have strong historical perspectives (United Nations 2015). There is a strong micro foundation of macro outcomes pertaining to the crime against women. This perspective includes some of the developed and existing theories on crime and violence against woman in and around the world irrespective of their socio-cultural and economic diversity.

The most popular theory in this respect is the social learning theory (Anderson & Kimberly 2007; Powers et.al 2017). The theory postulates that people imitate other who is closely associated; the social environment may induce men to behave in a certain derogatory manners against woman. The close association may be measured either in physical or socio-cultural distances. The home is often equated with a sanctuary, a place where individuals seek love, safety, security and shelter (Das et.al 2016). For some women, the home is a place that endangers lives and breeds some of the most severe forms of ferocity executed against girls and women. Violence is usually perpetrated by males who are in positions of trust, intimacy, power and living in close vicinity of the victims.

The second most obvious theory is the psychopathological one (Gannon et. al, 2008). Here, some sort of mental illness or dysfunctional personality like any kind of disorders can be found who are violent against women. If sometimes not finding a positive consent from the female partner leads a man ego-hurt. That finally leads to a physical aggression (Bohra et. al, 2015). This theory originates under natural selection of stereotypical gender symbolic role

based on biological and physiological characteristics. Intimate partner violence has been defined as any behaviour within an intimate relationship that causes physical, sexual or psychological harm; the definition encompasses a broad range of physical aggression, sexual coercion, psychological abuse and controlling behaviours (Dahlberg et al 2002).

The crime against women can be located in the exchange approach to human behavior. This is developed in Sociology and the theory assumes that social behavior is a series of exchanges that attempt to maximize their rewards and minimize their costs (Nye, 1979). Even under the exchange theory, it has been discussed that violence against woman helps men to maintain their higher social status (Riger & Krieglstein, 2000). The exchange theory fosters to ensure complete dependence on the male sex.

Like exchange theory, the resource theory also emphasizes the discussions on how lack of resources can lead a man to exercise his power over woman (Basile et. al, 2013). In some societies like India, son is preferred than a daughter because son is considered to be financial asset (as old age security to the parents) and daughter is considered as liability (Sen 1990; 2015; Klasen and Wink 2003; Kulkarni 2007; Bhattacharya and Saxena 2015; Lin & Adsera, 2013; Robitaille, 2013; Das Gupta 2019). Therefore, it is a kind of social security approach based on resource theory of gender discrimination and the empirical evidence is the declining child sex ratio or missing females from Indian society (Gandhi, 2009; Ramaiah, 2010). The adverse and declining child sex ratio in India is socially generated that goes against physiological norms because female child survival rate is higher than that of male but this is not recorded as 'crime' against female in India. A declining child sex ratio is an example of gender discriminating attitude which ultimately leads to violence against women (Yodanis, 2004, Edwards, 2017, Haq et al., 2019). A culturally ingrained parental preference for sons emanating from their importance as old age security for parents is linked to poorer consequences for daughters (Haddad 1999). The banning of sex-selective test fails to correct these adverse social consequences because it is deep rooted social problem in India (Das Gupta, 2019). The adverse child sex ratio is not space independent; rather neighbourhood impact does matter in India (Bhattacharyya and Haldar, 2020b).

Contrary to the micro foundation of crime against women, the macro foundations try to build up a theory based on socioeconomic and cultural aspects of different societies (Hazra & Cui, 2018). The influence of different socio-economic variables like social class, income, education, participation in different economic activities, institutions along with geographical

locations have been taken into account towards explaining gender discrimination (Desai 1994; Bhattacharjee et al 2015). This is basically a synthesis model of discrimination against women that incorporates a large number of socio-cultural variables towards explaining the extent and depth of this crucial social issue (Renzetti et.al, 2001). Given this theoretical backdrop, the chapter is structured as follows.

The review of literature and the scope of the study are presented in section-5.3. The Data and research methods are highlighted in Section-5.4. Section-5.5 deals with empirical findings. The major findings of the study are mentioned in Section-5.6.

5.3 Review of Literature and Scope of the Present Study:

There are various forms of crimes against women and very few crimes have been properly reported in India (Babu 2009, Ghooi et al. 2013). Even those which are reported, that number may be much lower than the actual numbers and some of the crimes can never be considered directly as a 'crime', adverse child sex ratio is an example. In this chapter, I have considered only the reported crimes in India. Females in India face different types of crimes like rape, molestation, acid-attack, torture, murder, abduction and dowry-death. Due to excess demand of dowry, many young brides are being killed every year in India (Jeyaseelan et al. 2015). These sorts of obstacles result in huge mental trauma which leads to the hindrance of proper over all development of a female (Ram et al 2019). Acknowledging the depth of the situations, several governmental affirmative actions have been implemented for taking care of these situations but the status of Indian women could not improve (Bohra et al 2015). According to Indian Penal Code, seven types of crimes against women (such as rape, kidnapping and abduction, dowry deaths, physical and mental torture, molestation, sexual harassment and importation of girls and crime under special and local laws) are listed (Govt. of India 2010, 2015).

Numerous studies have conducted towards exploring the determinants of crime against women in India using National Crime Record Bureau (NCRB), National Family Health Survey (NFHS) and Indian Human Development Survey (IHDS) data. Recent findings suggest that states having higher income inequality face the risk of having more incidence of crime against women (Rashad and Sharaf 2017); crimes against women seem to grow with lower income, higher inflation and increased unemployment rate (Cui & Hazra, 2017). Even within a state (in India), the spatial distribution of districts may also play an important role of

crime against women; for example, in the districts of Uttar Pradesh, it is observed that the space plays a role in determining the incidence of dowry death and adverse child sex ratio (Vicente et al., 2019). Using nationally representative data in India, Amaral et al (2019) have found that the opening of police stations increase the reported crime against women by 22 percent which is due to increase in reports of female kidnappings and domestic violence. Earlier studies have found that violence or crime against women is associated with unemployment or limited resources of the husband (Goode 1971, Prescott & Letko1977). Lower socio economic status and torture against wife has a positive correlation; torture or abuse by the in-laws or groom's relative is observed where the bride is economically dependent on spouse having a lower self-esteem or education (Prasad, 1994). In India there is a strong preference for within cast marriages, any deviation from that led to a chance of domestic violence (Halder & Karuppannan, 2017). It is observed that women's political participation results greater reporting of crime (Iyer et. al. 2012); female rather than male legislature supports "women- friendly" laws (Clots-Figueras, 2011). It is observed that if the spouse is entitled for inheritance, it may reduce domestic violence by a significant percentage; this is because immovable property provides a woman financial security, augments her self-esteem, and visibly signals the strength of her fall-back position and tangible exit option (Agarwal and Panda 2007; Amaral 2017). Using NCRB and IHDS data, Dang et al (2017) have carried out a panel data regression in Indian states and have observed that crimes against women largely vary between the states, culture, religion and rural-urban areas; higher sex ratio leads to lower incidence of crime against women but the opposite result is found in case of per capita state domestic product. It is commonly argued that the women's participation in politics and economic activities lead to higher social status and lower the incidence of crime. But, the relationship between female work force participation rate (FWFPR) (as an instrument of female empowerment) and the income are not straightforward in India; there exists an inverted U-shape relationship between FWFPR and household's income (Bhattacharyya and Haldar 2020b). Moreover, the FWFPR is found to be stagnant over the decades and majority of the work force are in informal sector.

There are various studies highlighting an association and spatial dependence of crime (Alshbol, 2011, Yarwood, 2015, Pak et al., 2018, Adeyemi et al., 2021). It can be observed that crime is not a random phenomenon, rather it is space dependent and it may vary across different socioeconomic as well as demographic characteristics of the population (Bottoms, 2007, Ceccato, 2008). Even geography plays an important role to determine the crime of any

sort and spatial distribution of the crime is needed to be identified for policy intervention (Lersch & Hart, 2011, Tyner**,** 2012). The motivation of using spatial effects in regression model is to handle the problem of data versus major spatial dependence (Anselin, 1988). The spatial error terms model (SEM) is basically used for spatial filtering versus spatial interaction. The need for this method is to express the idea of neighbourhood impact by developing the concept of spatial weight matrix that I have discussed in the methodological section.

However, there is lack of studies in Indian context to find the neighbourhood influences of crimes against women. It is acknowledged by several studies that the crime rate differs from places to places. Therefore, space and its neighbourhood impact (which is captured by the Moran's Index) may play a crucial role in this aspect. It helps us to find out the concentration of crime. I acknowledge the fact that state as a unit of analysis is large and within a state there is a large socio-economic and cultural variation. However, the present chapter makes a few contributions on crime against women in India; my study is distinct from earlier studies in the following grounds:

Firstly, very few studies in India have considered panel data towards examining the determinants of crime against women. Secondly, earlier studies could not deal with the issues of space and neighbouring effects on crime against women. Thirdly, crimes against women are of different types. I consider the variables like rape, dowry deaths, molestation and torture as representations of crimes against women. Are all the crimes associated with each other? Does space matter? The earlier studies could not capture the spill-over effect of crime against women which may be space dependent. Therefore, the prime objective of my study is to explore the impact of space along with standard socio-economic and cultural factors explaining the incidence of crime against women in Indian states in a panel study framework.

5.4 Data and Research Methods:

In my present chapter, data are collected from secondary sources. The data regarding rape, molestation, dowry deaths and torture by husbands and relatives (per lac) reported by women are collected from the National Crime Records Bureau (NCRB), Government of India. Data on urbanization (URB), population, female literacy rate (FLR), female work force participation rate (FWFPR), number of police station per lac population (Police), are drawn from various Census Reports (like 1991, 2001 and 2011), Registrar General- Government of

India. Yearly per-capita net state domestic product (PCNSDP) (at constant prices 2004-2005) is drawn from Reserve Bank of India (RBI).

In panel study, I consider five time points (1995, 2000, 2005, 2010 and 2015) and 24 states in India; the states are Andhra Pradesh, Arunachal Pradesh, Assam, Bihar and Region (including Jharkhand after bifurcation of Bihar), Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh and Region (inclusive of Chattisgarh after bifurcation of Madhya Pradesh), Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and Region (inclusive of Uttaranchal after bifurcation of Uttar Pradesh) and West Bengal. The Census data are given in decennial form, therefore, suitable interpolation method is used for finding out the values of the variables for intermediate periods (like 1995, 2005 and 2015) drawn from Census records.

To examine the correlation between different kinds of crime against women, a Spearman rank correlation has been performed for five distinct time points.

In order to find out the determinants of several dependent variables, the following panel data regression model is considered: $Y_{it} = \beta' X_{it} + \eta_i + \mu_t + \varepsilon_{it}$.

X_{it} = vector of the explanatory variables, η_i = captures the space effect, μ_t = captures the time effect and ε_{it} stands for white noise term. Here, i = 1, 2, 3,....., 24 and t = 1, 2, 3,..., 5. Due to multicollinearity of the explanatory variables, we have formulated different models. Moreover, in order to overcome the problem of heteroscadasticity, robust standard error is taken in all the models. After regression diagnostic, we run LSDV (least square dummy variable) models if Hausman Test suggests Fixed Effect.

The literature (pertaining to the determinants of rape, molestation, torture and dowry deaths) suggests that the main factors affecting these variables are FLR, FWFPR, URB, PCNSDP and many others. In a panel data framework, it is obvious that dependent variable in the i-th region depends on those of neighbouring regions. Therefore, I first try to explore whether space does matter towards variations of dependent variables (in our case rape, molestation, torture and dowry deaths) or not. Spatial factors need to be used in order to take into account the impact of neighbourhood externalities. In order to statistical testing of the existence of neighbourhood impact on dependent variables, we use **Moran's Index** which captures spatial autocorrelation (Anselin, 1988, 1995, Li et al., 2007).

In regression analysis, if spatial dimension is neglected, the usual panel data estimators can be severely affected; omitting the spatial dependence in an econometric analysis would lead to bias estimation (Anselin 1988, Baltagi and Pirotte 2010). Therefore, following Anselin (1988), Anselin et al (2008), Kelejian et al (2006), I propose here two basic models of spatial panel regression: (a) Spatial Lag Panel Model(SLPM) and (b) Spatial Error Panel Model(SEPM).

A detailed note pertaining to SLPM and SEPM is given in **Note of this chapter**.

The spatial lag model consists of weighted average of neighbouring values; the row standardised weight matrix helps me to interpret and compare across the model (Anselin and Bera 1998). Here, explanatory variables are lag dependent. In my analysis, I am interested to explain the crime against women incorporating some socioeconomic variables. Spatial panel model help me to capture the average crime against women for neighbouring states. The coefficients here interpret the direct strength of the spatial interaction. In my model $\rho\ (Rho)$ signifies how much crime against women is explained by the average neighbours. The spill over effect is captured by using the spatial panel model (Anselin et al. 2000). Even emergence of social or collective behavioural trend can be captured by individual interaction patterns (Brock and Durlauf, 2001).

5.5 Empirical Findings:

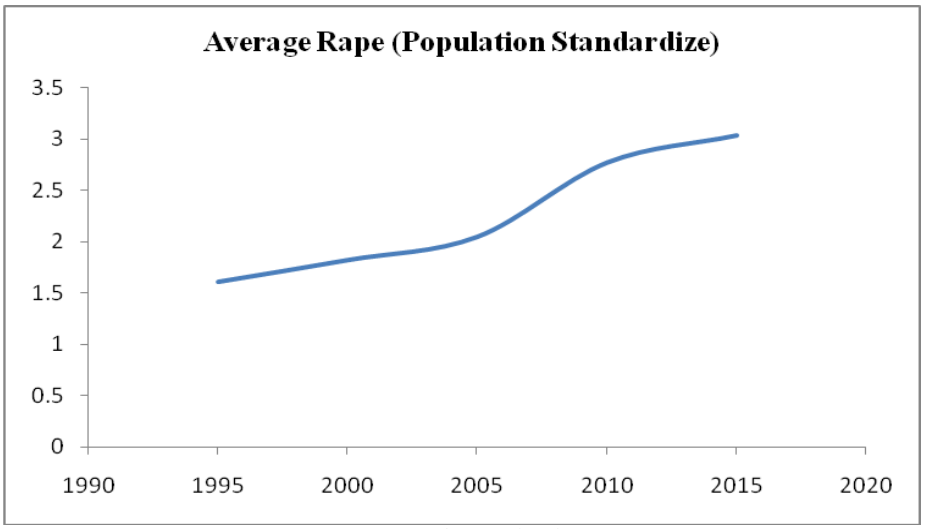
From the following table (Table 5.1), large variation in the occurrence of different types (Rape, Dowry-Death, Molestation, Torture) of crime against women can be witnessed. The ranges between minimum and maximum are high for all types of crime as reported by NCRB for the given five time points (estimated from panel data). Even, some socioeconomic variables such as urbanisation (URB), income (PCNSDP), female literacy (FLR), female workforce participation rate (FWFPR) and existence of police station per one lakh population (POLICE) also varies largely from states to state. Therefore, it would be interesting to find out how the variations in explanatory variables may impact the outcome variables like rape, dowry death, torture and molestation separately. In the following figures (Figure 5.1 to 5.4) scenario for Average rape, molestation, torture and dowry death (per Lac) for 24 states over the 5 time periods has been discussed. It can be evident from the following figures that, except dowry death all other crime aspects against women had been increased over the time.

Table: 5.1: Descriptive Statistics

Variable(Notation)	Obs	Mean	Std. Dev.	Min	Max
RAPE (rape)	120	2.256959	1.661524	0.314961	9.126985
DOWRY DEATH (dowry)	120	0.393466	0.386379	0.000034	1.319619
TORTURE (tort)	120	5.012195	5.695257	4.08E-05	33.91171
MOLESTATION (molest)	120	3.957861	3.080494	7.19E-05	14.65521
URB	120	28.28278	12.56836	9.127686	66.40166
FLR	120	63.60732	14.42465	27.168	93.244
PCNSDP	120	32761.73	19611.66	9836.66	130181.6
POLICE	120	281.6081	259.9089	63.69487	1222.806
FWFPR	120	45.22464	14.0617	15.67	71.684

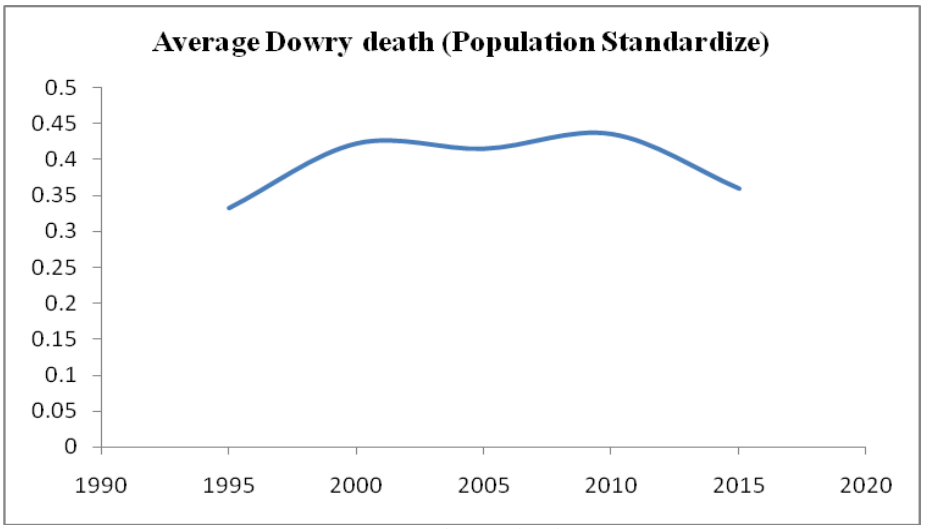
Source: Authors' estimation

Fig 5.1: Scenario for Average Rape (per Lac) in 24 states over the 5 time periods



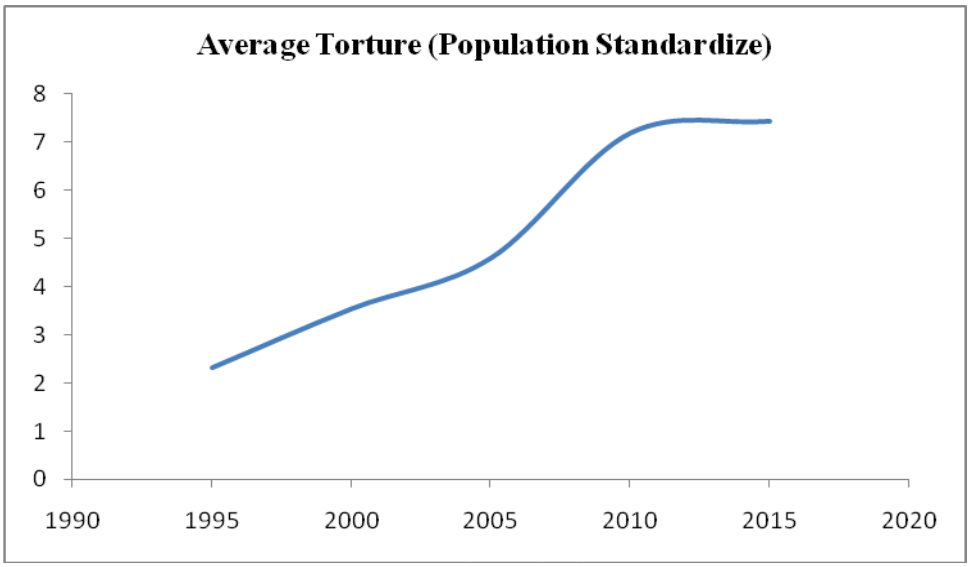
Source: Author's estimation

Fig 5.2: Scenario for Average Dowry Death (per Lac) in 24 states over the 5 time periods



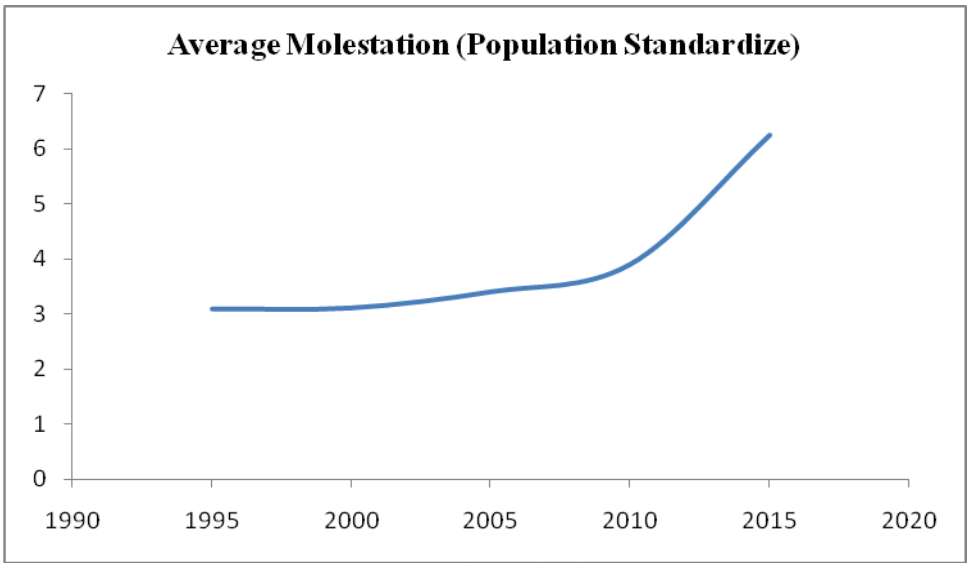
Source: Author's estimation

Fig 5.3: Scenario for Average Torture (per Lac) in 24 states over the 5 time periods



Source: Author's estimation

Fig 5.4: Scenario for Average Molestation (per Lac) in 24 states over the 5 time periods



Source: Author's estimation

5.5.1 Correlating the incidence of crime against women:

In this chapter, one of the major objectives is to observe whether there exists any sort of correlation between different kinds of crime against women. Sometimes, prevalence or occurrence of death can be highly associated with torture, molestation and rape. This is why; in this study I have performed Spearman rank correlation.

It is observed from the following results (as reported in Table-5.2 to 5.6) that there exist significant positive relation between the occurrence of rape and molestation, dowry death and

torture, torture and molestation. This means that states having higher rate in the occurrence of rape do experience the higher rate of molestation and vice-versa. Similarly, occurrence of dowry death is highly and positively associated with torture and torture is having a positive association with molestation.

Table: 5.2 Rank correlations between different forms of crime against women: 1995

	Rape	Dowry Death	Torture	Molestation
Rape	1			
Dowry Death	0.1617	1		
Torture	0.1765	**0.5600***	1	
Molestation	**0.4130***	0.2548	**0.4522***	1

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$,

Table: 5.3 Rank correlations between different forms of crime against women: 2000

	Rape	Dowry Death	Torture	Molestation
Rape	1			
Dowry Death	0.1574	1		
Torture	0.1287	**0.5296***	1	
Molestation	**0.6017***	0.1330	0.3957	1

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$,

Table: 5.4 Rank correlations between different forms of crime against women: 2005

	Rape	Dowry Death	Torture	Molestation
Rape	1			
Dowry Death	0.2070	1		
Torture	0.0643	**0.4904***	1	
Molestation	**0.5878***	0.0687	0.2783	1

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$,

Table: 5.5 Rank correlations between different forms of crime against women: 2010

	Rape	Dowry Death	Torture	Molestation
Rape	1			
Dowry Death	0.0174	1		
Torture	0.0913	**0.5583***	1	
Molestation	**0.5765***	0.1661	**0.4261***	1

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$,

Table: 5.6 Rank Correlation between different forms of crime against women: 2015

	Rape	Dowry Death	Torture	Molestation
Rape	1			
Dowry Death	0.1470	1		
Torture	0.3591	**0.5635***	1	
Molestation	**0.7809***	0.2522	**0.5574***	1

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$,

5.5.2 Econometric Analysis: Using Panel Data regression:

I consider logarithmic transformations of all dependent (Rape, Torture, Dowry Death and Molestation) and explanatory variables (URB, PCNSDP, FLR, FWFPR and Police) and report the econometric results in Table-5.7. The Hausman test clearly suggests random effect (RE) for rape, molestation and torture whereas dowry death supports fixed effect (FE). The non-linearity (viz. U- shaped relation) is being observed between FLR and rape; FLR and molestation. The plausible explanation of such relationship may be of two reasons: firstly, more education makes a female more independent, confident and vocal towards reporting a crime against them and secondly, as women are more educated which may increase the probability of work outside home; consequently, she is more exposed to the risk of being raped and molestation. Torture is negatively related to FLR but it is non-linear with income (PCNSDP) and having an inverted U-shaped relationship. It means as education of female increases, it will lessen the incidence or prevalence of torture and this result is quite expected. But, it is difficult to explain inverted U shape relationship between torture and PCNSDP! Torture against female is happened among low socio-economic strata of the population; but it is not properly reported due to sociological and economic reasons (Himabindu et al., 2014). Here, the unit of analysis is state, only I have 120 observations; based on this limited secondary data, the results show that after reaching a critical level of income (PCNSDP), torture starts falling as income increases further. At the very low level income, women join in work force, generally go outside home for cash in order to avoid destitute situation of the family that reduces the incidence of torture; the same happens at the very high level of income where women, to some extent, join either in family business or join in workforce providing financial assistance to the family (Bhattacharyya and Haldar, 2020a). It is observed that the incidence of torture and molestation decrease with rising police station. This means more frequent police station nearby helps decrease the cases of torture and molestation with a fear of getting arrested under IPC if reported.

Table: 5.7 Determinants of crime against women: A Panel Data Regression

Dep var	lnRape		lnDowry		lnTorture		lnMolestation	
Exp var	**RE**	**FE**	**RE**	**FE**	**RE**	**FE**	**RE**	**FE**
lnURB	-0.447	-0.437	0.165	2.05	-0.997	1.949	0.165	1.022
	(0.242)	(0.37)	(0.962)	(1.716)	(0.915)	(1.83)	(0.492)	(0.837)
lnFLR	**-16.1*****	**-17.5****	-0.0327	-8.511	**-43.24***	**-60.1***	**-36.10*****	**-47.82*****
	(4.798)	(5.511)	(21.75)	(25.55)	(21.93)	(26.85)-	(10.54)	(12.46)
(lnFLR)^2	**2.163*****	**2.356****	-0.387	0.835	5.319	**7.762***	**4.948*****	**6.634*****
	(0.625)	(0.735)	(2.801)	(3.407)	(2.81)	(3.58)	(1.363)	(1.661)
lnPCNSDP	-1.461	-2.397	**41.60****	**41.11***	**43.38****	**47.58****	-6.809	-7.17
	(3.365)	(3.658)	(15.67)	(16.96)	(15.97)	(17.82)	(7.512)	(8.268)
(lnPCNSDP)^2	0.0752	0.116	**-1.939****	**-1.973***	**-1.948***	**-2.22****	0.281	0.255
	(0.159)	(0.172)	(0.744)	(0.798)	(0.759)	(0.839)	(0.356)	(0.389)
lnPolice	0.058	0.173	**-1.797*****	0.555	**-2.2*****	-0.84	**-0.874****	**-0.848***
	(0.13)	(0.189)	(0.525)	(0.875)	(0.504)	(0.919)	(0.267)	(0.427)
lnFWFPR	0.545	0.902	**-2.816***	-1.047	-2.134	-4.851	0.81	-0.552
	(0.322)	(0.535)	(1.252)	(2.479)	(1.182)	(2.604)	(0.645)	(1.208)
Constant	36.55*	42.09*	-198.8*	-201.3*	-128.5	-121.5	106.6**	134.9**
	(17.74)	(20.42)	(80.04)	(94.68)	(80.45)	(99.48)	(38.86)	(46.16)
N	120	120	120	120	120	120	120	120
R^2 W	0.35	0.36	0.02	0.08	0.35	0.38	0.28	0.31
R^2 B	0.1	0.11	0.62	0.01	0.49	0.15	0.1	0.04
R^2	0.16	0.15	0.52	0.002	0.44	0.18	0.14	0.08
Hausman	**4.99(p= 0.66)**		**14.89(p =0.03)**		**11.85(p=0.1)**		**7.04(p=0.42)**	

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, robust standard error within the parenthesis

5.5.3 Region- specific impact on Dowry Death: Using LSDV model:

From the above results (in Table-5.7), it is quite clear that dowry death is influenced by the state specific characteristics. Bhattacharyya et al (2019) have found more or less same results in the context of missing female children in India. As the Hauman test suggests Fixed Effect (FE) model for dowry death, I have considered the least square dummy variable model (LSDV). In Table 5.8, I have considered four regional dummies along with pre-discussed explanatory variables. Considering Western region (viz. Goa, Gujarat and Maharashtra) as reference category, we have set up North-Eastern (D_1), Eastern (D_2), Northern (D_3) and Southern (D_4) regional dummies. In this case, the existence of nearby police station along with higher participation in female work force reduces the incidence of dowry death. However, from the following model, the impact of all the regional dummies on dowry death is found to be insignificant. That is why my next attempt is to find state specific impact, considering West Bengal as a reference category as shown in Table-5.9.

Table:5.8: Dependent Variable-lndowry

Explanatory Variable	*Regression Coefficient*
lnUrb	-0.216
	(0.645)
lnFLR	7.74
	(23.09)
$(lnFLR)^2$	-0.938
	(2.924)
lnPCNSDP	10.67
	(24.85)
$(lnPCNSDP)^2$	-0.519
	(1.2)
lnPolice	**-2.062****
	(0.759)
lnFWFPR	**-2.436****
	(0.721)
D_1	-1.109
	(1.565)
D_2	0.259
	(0.884)
D_3	1.355
	(0.718)
D_4	0.223
	(0.65)
Cons	-52.72
	(105.6)
R^2	0.5859
N	120

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, robust standard error within the parenthesis

5.5.4 State-specific impact on dowry death: Using LSDV model:

In the following model (in Table 5.9), I carry out a more disaggregate study by incorporating state specific dummies. Here, states are Andhra Pradesh(S_1), Arunachal Pradesh(S_2), Assam(S_3), Bihar(S_4), Goa(S_5), Gujarat(S_6), Haryana(S_7), Himachal Pradesh(S_8), Karnataka(S_9), Kerala(S_{10}), Madhya Pradesh (S_{11}), Maharashtra(S_{12}), Manipur(S_{13}), Meghalaya(S_{14}), Mizoram(S_{15}), Nagaland(S_{16}), Orissa(S_{17}), Punjab(S_{18}), Rajasthan(S_{19}), Sikkim(S_{20}), Tamil Nadu(S_{21}), Tripura(S_{22}), Uttar Pradesh (S_{23}) and West Bengal (as reference category). It is observed that Arunachal Pradesh (S_2), Gujarat (S_6), Manipur (S_{13}) and Nagaland (S_{16}) appear significant in lowering the incidence of DD

Table: 5.9: State-specific impact on dowry death: LSDV model

Explanatory Variables	Coefficients	***Explanatory Variables***	Coefficients
lnUrb	-2.05(1.976)	$\mathbf{S_{11}}$	-1.86(1.48)
lnFLR	-8.51(21.37)	$\mathbf{S_{12}}$	-0.308(1.06)
$\mathbf{(lnFLR)^2}$	0.835(2.986)	$\mathbf{S_{13}}$	**-8.450** (2.92)**
lnPCNSDP	41.11(24.5)	$\mathbf{S_{14}}$	-5.523(3.05)
$\mathbf{(lnPCNSDP)^2}$	-1.973(1.15)	S_{15}	-7.516* (3.307)
lnPolice	-0.555(0.933)	$\mathbf{S_{16}}$	**-7.34***(2.12)**
lnFWFPR	-1.047(1.50)	$\mathbf{S_{17}}$	-3.003(1.71)
$\mathbf{S_1}$	-0.467(1.407)	$\mathbf{S_{18}}$	-1.083(0.96)
$\mathbf{S_2}$	**-8.385**** (2.84)	$\mathbf{S_{19}}$	1.291(1.58)
$\mathbf{S_3}$	-1.786(2.009)	$\mathbf{S_{20}}$	-3.529(3.92)
$\mathbf{S_4}$	-3.231(1.64)	$\mathbf{S_{21}}$	-1.001(0.91)
$\mathbf{S_5}$	-2.482(1.46)	S_{22}	-0.748(2.11)
$\mathbf{S_6}$	**-2.043*** (0.907)	$\mathbf{S_{23}}$	-1.445(0.75)
$\mathbf{S_7}$	-1.083(1.43)	**Constant**	-199.9(128.2)
S_8	-0.683(3.39)	-	-
$\mathbf{S_9}$	-0.0756(0.905)	-	-
$\mathbf{S_{10}}$	-2.117(1.316)	-	-
R^2		0.8413	
N		120	

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, robust standard error within the parenthesis

5.5.5: State- Specific Neighbourhood Impact: Global and local Moran Index

Though the above discussed model (in Table-5.9) is able to identify the states exhibiting lower incidence of dowry death (DD), still it has some limitations. It fails to capture the state specific neighbourhood impact. To overcome this limitation, I have estimated the Global and Local Moran's Index and report the result of Global Moran Index (GMI) in Table 5.10; it is found that for all the time points, the incidences dowry death (DD) is statistically significant which means that neighbouring effect does matter towards incidence of DD. Positive and significant values of GMI suggest that there is clustering of High-High and Low–Low values of DD among the states. However, by looking at GMI, I cannot identify the high-high or low-low clusters in respect of DD.

This is why I employ Local Moran Index (LMI). The LMI for each state (as reported in Table-5.11) indicates that Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim (North eastern) and Haryana, MP, UP along with Rajasthan (Northern) and Bihar are influenced by neighbouring states behaviour towards the incidence of DD. However, Himachal Pradesh has been appeared as an outlier. This may happen due to the fact that Himachal Pradesh shares some similar socio-economic and geographical features of North-

eastern states in India (Bhattacharyya et. al. 2021). The FLR (and FWFPR) is higher in Himachal Pradesh compared to its neighbouring states in India.

Table: 5.10: Global Moran's Index (GMI) of Dowry Death with Z value over time: 1995-2015

Variables	GMI	Z-value	P-value
Dowry Death(DD) 1995	0.493***	5.570	0.000
Dowry Death (DD) 2000	0.476***	5.238	0.000
Dowry Death (DD) 2005	0.234***	2.758	0.003
Dowry Death (DD) 2010	0.333***	3.748	0.000
Dowry Death (DD) 2015	0.318***	3.597	0.000

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table: 5.11 Local Moran's Index (LMI) of Dowry Death with Z value over time: 1995-2015

State	**LM1995(Z)**	**LM2000(Z)**	**LM2005(Z)**	**LM2010(Z)**	**LM2015(Z)**
AP	-0.42(-0.1)	-0.72(-0.26)	-0.81(-0.3)	-1.6(-0.69)	1.27(0.75)
Arunachal	**5.12** (2.49)**	**5.61** (2.68)**	**3.52* (1.72)**	**4.18*** (2.9)**	2.53(1.27)
Assam	2.85(1.41)	**3.43* (1.65)**	0.73(0.46)	-1.57(-0.53)	**-3.11* (-1.96)**
Bihar	0.22(0.24)	2.8(1.41)	**6.74*** (3.16)**	**6.52*** (3.06)**	**7.93*** (3.69)**
Goa	-0.05(0.08)	0.56(0.39)	0.72(0.47)	0.88(0.55)	2.31(1.27)
Gujrat	-1.01(-0.7)	-0.47(-0.29)	-0.21(-0.09)	-0.41(-0.24)	-0.33(-0.18)
Haryana	**11.31***(5.98)**	**9.02*** (4.69)**	**2.90* (1.56)**	**4.75**(2.49)**	**4.39** (2.31)**
Himachal	**-4.47** (-2.4)**	**-5.40*** (-2.89)**	**-3.26* (-1.68)**	**-3.93** (-2.05)**	**-3.57** (-1.85)**
Karnatak	-0.15(0.03)	0.02(0.12)	-0.27(-0.03)	0.06(0.14)	-0.28(-0.04)
Kerala	0.18(0.2)	0.52(0.38)	0.47(0.35)	0.71(0.48)	1.89(1.13)
MP	**5.34*** (2.7)**	**7.82*** (3.38)**	**8.85*** (4.29)**	**10.10*** (4.48)**	**9.31***(4.51)**
Maharastra	0.22(0.23)	-0.01(0.11)	-0.07(0.07)	-0.03(0.09)	0.31(0.26)
Manipur	**5.68**(2.66)**	**5.72**(2.67)**	**3.19**(1.53)**	**3.86**(1.82)**	2.11(1.07)
Meghalaya	**5.49** (2.52)**	**4.17** (1.93)**	1.08(0.62)	1.91(0.97)	0.44(0.35)
Mizoram	**5.68** (2.66)**	**5.77*** (2.67)**	-0.07(0.12)	**3.86*(1.82)**	2.11(1.06)
Nagaland	**5.12** (2.49)**	**4.96**(2.38)**	**3.54* (1.73)**	**4.18**(2.42)**	2.53(1.27)
Orrissa	0.19(0.21)	2.04(1.36)	**4.50** (2.85)**	**4.52**(2.87)**	**4.27** (2.71)**
Punjab	**2.32* (1.57)**	2.21(1.46)	-0.07(0.04)	0.02(0.09)	-0.24(-0.07)
Rajasthan	**6.44*** (3.25)**	**4.39** (2.21)**	0.98(0.58)	1.76(0.95)	2.04(1.09)
Sikkim	**5.49** (2.5)**	**4.16* (1.93)**	1.07(0.62)	1.45(0.77)	0.45(0.35)
TN	0.25(0.24)	0.32(0.27)	0.28(0.25)	0.56(0.4)	1.67(1.01)
Tripura	1.89(0.98)	0.03(0.18)	**-6.10** (-2.4)**	-2.17(-0.75)	-2.27(-0.79)
UP	**10.03***(5.31)**	**10.16*** (5.23)**	**5.07**(2.65)**	**7.63*** (3.89)**	**8.75*** (4.51)**
WB	2.16(1.1)	0.34(0.3)	0.35(0.31)	0.06(0.17)	0.57(0.4)

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, Values in parentheses represent Z values Rook's contiguity matrix has been considered for spatial weight matrix

By using the distance band matrix I have tried to generate some Local Moran Index graphs and Maps of Dowry Death (Appendix 5A.1). It can evident from figures that for the first two time points (1995, 2000) High-High and Low-Low values states are clustering together. For all other time periods this trend of clustering can not be observed. The trend line of LMI is getting flatter over the period and ensured that over the period neighbouring states are having dissimilarilties in terms of dowry death. This results are been supported by the maps given in the Appendix 5A.2. However, in case of Rook's contiguity matrix as spatial weights, GMIs remain highly significant; though spatial association got decreased over the periods and that can be evident from the LMI (Less number of districts seems to be significantly having spatial auto-correlation).

5.5.6: Econometric Analysis: Using Spatial Panel data regression Model (SPEM and SPAR)

The GMI (and LMI) cannot be used for prediction or forecasting, it helps to identify spatial clustering and spatial outliers for a specific variable as discussed earlier (Zhang et al. 2016). Thus, for prediction purposes, I have formulated two models namely spatial panel auto-regressive model (SLM) and spatial panel error corrected model (SEM) comprising two parameters λ and ρ respectively. Low values of these parameters ensure that there exists a space related factors. The acceptable ranges of these two parameters are $-2.608 < \lambda, \rho < 1.000$. The results (given in Table-5.12) of two parameters are lying between the acceptable range. Therefore, it can be said states are not only affected by its direct border sharing neighbour but also get affected by the neighbours of its neighbouring states via indirect effect. Though, as distance of other states goes on increasing from the particular state, the strength of the influence gets weakened. Therefore, given the spatial weights to explanatory variables, results remain the same (as obtained earlier) which proves that there exists a spatial impact of explanatory variables on the dependent variables (viz. DD). Increase in police station (as proxy for maintaining law and order) and FWFPR (as proxy for financial empowerment) lower the incidence of dowry death (DD). However, FWFPR is found to be stagnant overtime and FWFPR shows an inverted U- shaped relationship with income (Bhattacharyya and Haldar 2020); therefore if income fails to improve the situation of FWFPR, it indirectly fails to lower the incidence of dowry deaths in India.

Table: 5.12: Spatial Panel Regression Results of Dowry Death: SER and SLM Models

Explanatory Variable	SEM	SLM
lnUrb	-0.27	-0.36
	(0.59)	(0.59)
lnFLR	0.864	3.238
	(22.38)	(22.24)
(lnFLR)^2	-0.303	-0.528
	(2.766)	(2.753)
lnPCNSDP	24.62	21.37
	(16.93)	(16.55)
(lnPCNSDP)^2	-1.144	-1.005
	(0.804)	(0.787)
lnPolice	**-3.02*** **	**-2.7*** **
	(0.448)	(0.444)
lnFWFPR	**-2.711*****	**-2.76*****
	(0.739)	(0.744)
Cons	-106.7	-94.2
	(79.43)	(77.69)
Lambda	-0.00064	
	(0.00091)	
Sigma	**2.385*****	**2.390*****
	(0.154)	(0.154)
Rho		0.00196
		(0.0099)
N	120	120

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, robust standard error within the parenthesis

There exist outliers for some outliers in the data. Here we have tried to accommodate outliers by building spatial panel model (Cerioli & Riani, 1999, Jin et al., 2015, Mastuti et al., 2019). However, I have run spatial panel regression eliminating some of the outliers. I have seen that after eliminating the outliers the results remain the same. The additional model is given in Appendix 5A.3.

The above econometric results suggest that the culture and language (even dialect) plays a pivotal role in determining the crime against women. However, according to Ambedkar, the emergence of different states in India are based on not only its geographical boundaries but also based on different languages and culture (Sarangi, 2006). Even Language and culture is intertwined (Jiang, 2000). Acknowledging this fact, I have considered a state-specific study (using dummy) where it is assumed that there are some certain special features an individual state does carry in respect of culture and language vis a vis crime against women. Even provincial boundaries have been made based on language (Annamalai, 2006). Here, I have tried to consider the cultural concentration by considering the region or state specific dummies. However, the inclusion of state dummy in regression fails to capture the influence

of state-specific culture on the neighbouring states. Here, lies the importance of SEM and SLM models that confirm the existence of neighbourhood effect of crime against women.

5.6 Major Findings:

For rape, molestation and torture- RE model supports. DD FE model supports. U- shaped FLR for Rape and Molestation. Torture is negatively related with FLR and inverted U-shaped with PCNSDP. Incidence of torture and molestation is less with existence of nearby police station. Considering western region (GOA, Gujarat and Maharashtra) as reference category, we have set up North-Eastern (D1), Eastern (D2), Northern (D3) and Southern (D4) four regional dummies. Increase in police station and FWFPR lowers the incidence of DD. Here, States are Andhra Pradesh(S1), Arunachal Pradesh(S2), Assam(S3), Bihar(S4), Goa(S5), Gujarat(S6), Haryana(S7), Himachal Pradesh(S8), Karnataka(S9), Kerala(S10), Madhya Pradesh (S11), Maharashtra(S12), Manipur(S13), Meghalaya(S14), Mizoram(S15), Nagaland(S16), Orissa(S17), Punjab(S18), Rajasthan(S19), Sikkim(S20), Tamil Nadu(S21), Tripura(S22), Uttar Pradesh (S23) and West Bengal (as reference category). Arunachal Pradesh (S2), Gujarat (S6), Manipur (S13) and Nagaland (S16) are significantly lowers the incidence of DD. LMI indicates that Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim (North eastern) and Haryana, MP, UP along with Rajasthan (Northern) and Bihar are influenced by neighbouring states for DD. However, Himachal Pradesh has an opposite effect than its neighbouring states for DD. Given the spatial weights to explanatory variables, results remain the same proves that there exists a spatial impact of explanatory variables on the depended variable (DD). Increase in police station and FWFPR lowers the incidence of DD. North Eastern states which are experiencing relatively lower incidence of dowry death also showing a spatial neighbourhood influence and opposite holds true for Northern states. Nearby existence of police station significantly lowers the incidence of torture, molestation and dowry death. Increase in literacy decreases torture, however for rape and molestation its showing a U-shaped relationship. Female work force participation rate significantly lowers the dowry death.

NOTE:

Following Aneselin and Bera 1998; Anselin and Florax 1995; Anselin, Gallo and Jayet 2008; Elhorst 2010; we have presented here the Spatial Econometrics Models. There are i number of observations and t number of time. Here balanced model is being considered. The panel data model is

$$y_{it} = \lambda \sum_{j} w_{it} y_{ij} + \alpha_i + x_{it}\beta + u_{it}$$

$\alpha_i \sim N(0, \sigma_\alpha^2)$ is region specific effects, $z_{it} \sim N(0, \sigma^2 I)$, $v_{i0} \sim N(0, \frac{\sigma_z^2}{1-\rho^2})$initial value of temporally autocorrelated disturbance vector. Here α and z are assumed to be independent. x_{it} = vector of explanatory variables, y_{it}= vector of explained variables, w_{it}= spatial weight matrix. λ= spatial error auto-correlation, ρ = temporal autocorrelation

$$y_{it} = x_{it}\beta + u_{it}$$

$$u_{it} = \alpha_i + \varepsilon_{it}$$

$$\varepsilon_{it} = \lambda W \varepsilon_{it} + v_{it}$$

$$v_{it} = \rho v_{i,t-1} + z_{it}$$

Estimation:

ML estimation of the SAR model

$$x = \lambda W x + Z\beta + u$$

Or $(I - \lambda W)x = Z\beta + u$

$$Bx = Z\beta + u$$

Here $u \sim N(0, \sigma^2 I)$, $A = (I - \lambda W)$

The log-likelihood function is:

$$lnL(\beta, \lambda, \sigma) = -\left(\frac{R}{2}\right) ln\sigma^2 + ln \parallel B \parallel - \left(\frac{1}{2\sigma^2}\right)(Bx - Z\beta)^{\intercal}(Bx - Z\beta)$$

$$b = (Z^{\intercal}Z)^{-1}Z^{\intercal}Bx$$

$$= (Z^{\intercal}Z)^{-1}Z^{\intercal}y - \lambda(Z^{\intercal}Z)^{-1}Z^{\intercal}Wx$$

$$= b_0 - \lambda b_L$$

Then the residuals,

$$e_0 = x - Zb_0$$

$$e_L = Wx - Zb_L$$

ML estimate of σ^2 is, $s^2 = \left(\frac{1}{R}\right)(e_0 - \lambda e_L)^{\intercal}(e_0 - \lambda e_L)$

Then the log-likelihood function is,

$$\ln L^* = C - (R/2) ln\left[\left(\frac{1}{R}\right)(e_0 - \lambda e_L)^{\intercal}(e_0 - \lambda e_L) + ln \parallel B \parallel\right]$$

Now we can maximize L^* with respect to λ and we get ML estimate of this parameter.

ML estimation of the SEM model:

$y = X\beta + u$

$u = \rho Wu + v$

v is classical

$y = X\beta + u$

$Au = v$

$A = (I - \rho W)$

v is classical

The log-likelihood is

$$lnL = -\left(\frac{R}{2}\right) ln\pi - \left(\frac{R}{2}\right) ln\sigma^2 + ln\|A\| - \left(\frac{1}{2\sigma^2}\right)(y - X\beta)^{\intercal} A^{\intercal} A(y - X\beta)$$

where R is total number of observations.

The concentrated log- likelihood is

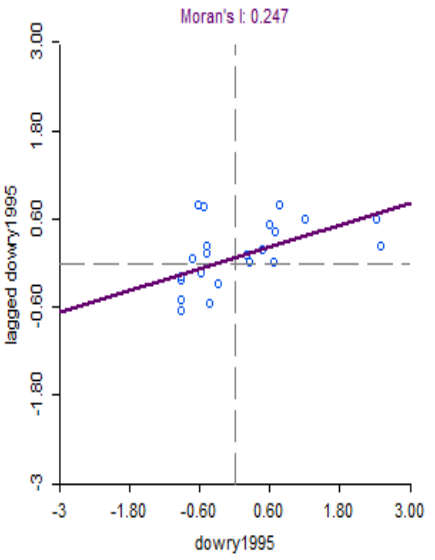
$$lnL^* = C - \left(\frac{R}{2}\right) ln\left[\left(\frac{1}{R}\right) e^{\intercal} A^{\intercal} Ae\right] + ln\|I - \rho W\|$$

Now we can maximize L^* with respect to ρ and we get ML estimate of this parameter.

Appendix:

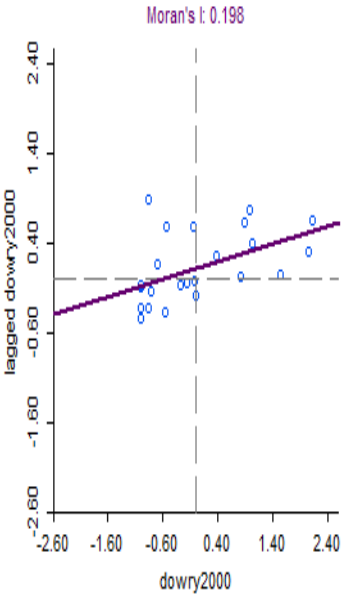
Appendix: 5A1: Dowry Death LMI

Fig: 5A.1 Dowry Death LMI (1995)



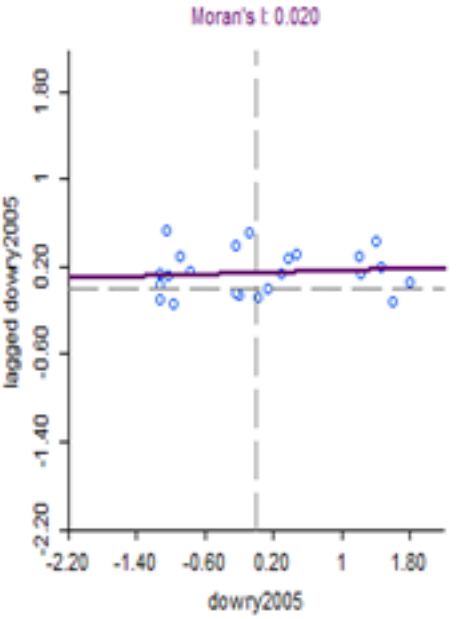
Source: Authors' estimation, in this graph the spatial weights are given by considering the Distance Band Matrix.

Fig: 5A.2 Dowry Death LMI (2000)



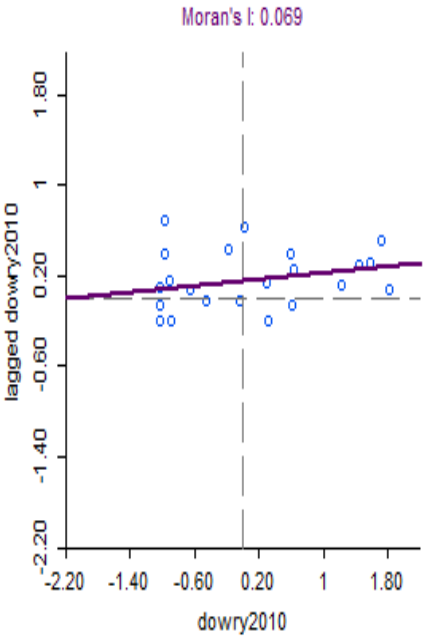
Source: Authors' estimation, in this graph the spatial weights are given by considering the Distance Band Matrix.

Fig: 5A.3 Dowry Death LMI (2005)



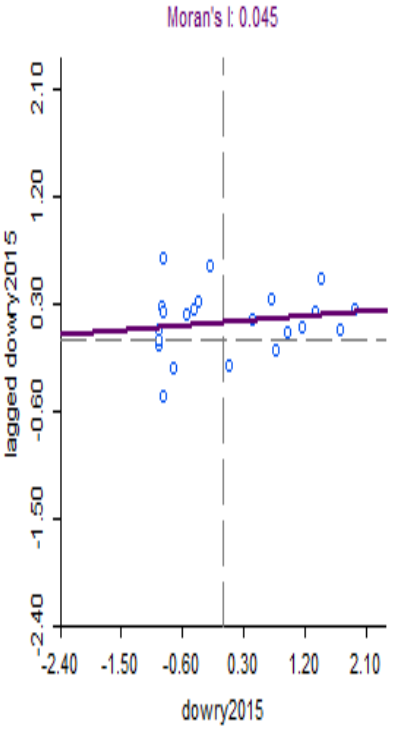
Source: Authors' estimation, in this graph the spatial weights are given by considering the Distance Band Matrix.

Fig: 5A.4 Dowry Death LMI (2010)



Source: Authors' estimation, in this graph the spatial weights are given by considering the Distance Band Matrix.

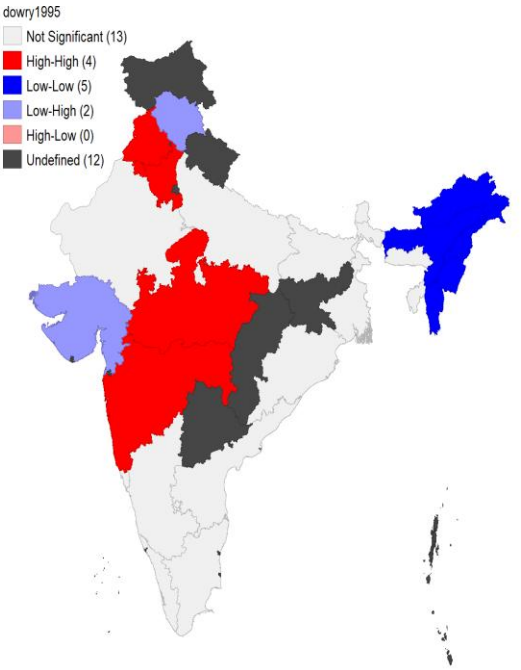
Fig: 5A.5 Dowry Death LMI (2015)



Source: Authors' estimation, in this graph the spatial weights are given by considering the Distance Band Matrix.

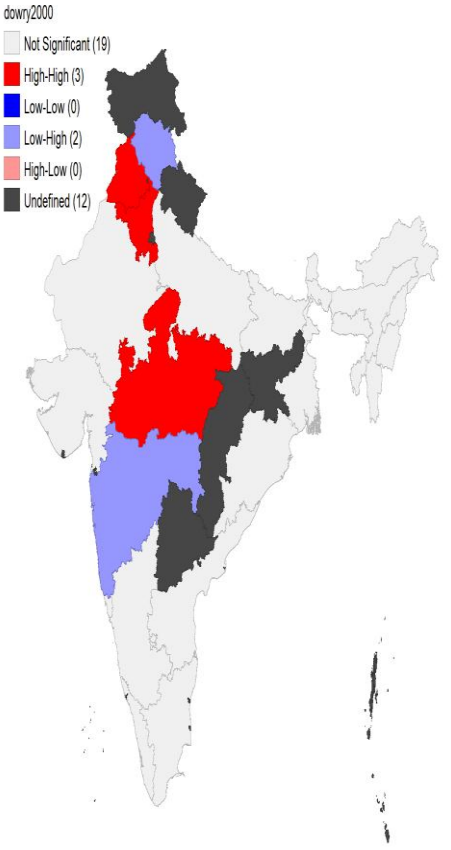
Appendix: 5A2: Map: State-Wise Dowry Death LMI

Map: 5.A.1 State-Wise Dowry Death LMI (1995)



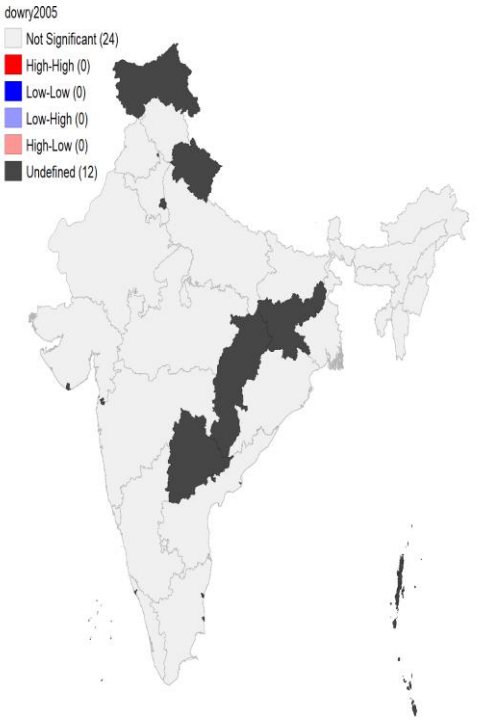
Source: Authors' estimation

Map: 5.A.2 State-Wise Dowry Death LMI (2000)



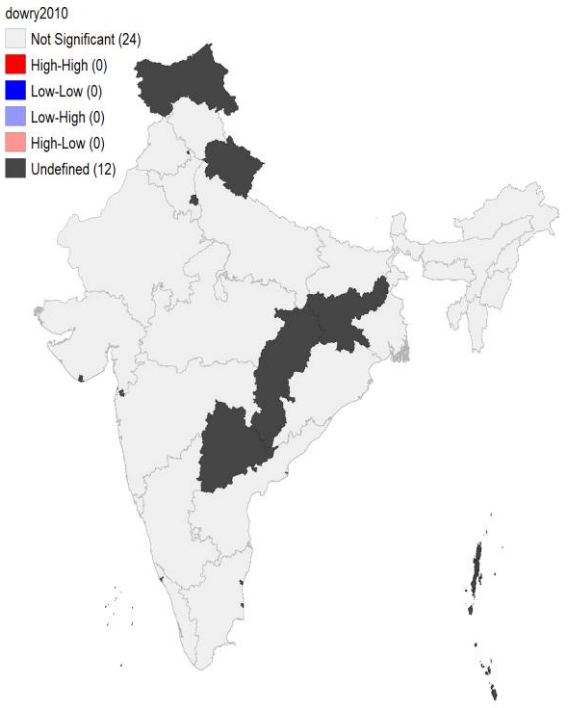
Source: Authors' estimation

Map: 5.A.3 State-Wise Dowry Death LMI (2005)



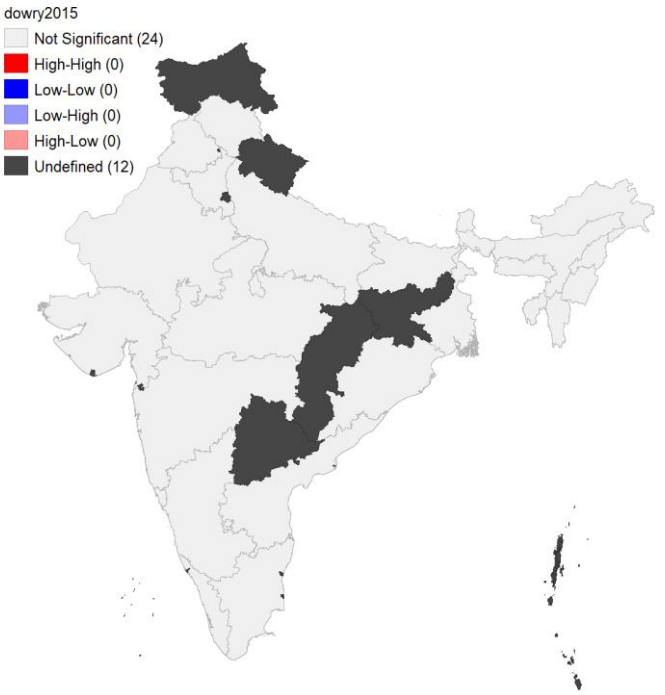
Source: Authors' estimation

Map: 5.A.4 State-Wise Dowry Death LMI (2010)



Source: Authors' estimation

Map: 5.A.5 State-Wise Dowry Death LMI (2015)



Source: Authors' estimation

Appendix: 5A.3

Table: Spatial Panel Regression Results of Dowry Death: SER and SLM Models

Explanatory Variable	SEM	SLM
lnUrb	-.126 (.589)	-.22 (0.59)
lnFLR	8.9 (22.052)	11.51 (21.98)
(lnFLR)^2	-1.24 (2.72)	-1.51 (2.719)
lnPCNSDP	-3.78 (12.33)	-3.20 (18.62)
(lnPCNSDP)^2	.229 (.594)	.185 (.890)
lnPolice	-2.87*** (.433)	-2.57*** (.451)
lnFWFPR	-2.65*** (.718)	-2.76*** (.72)
Cons	21.4 (48.42)	13.79 (86.16)
Lambda	.00197 (.0052)	
Sigma	2.385*** (0.154)	2.390*** (0.154)
Rho		.005 (.01)
N	118	118

Source: Authors' estimation, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, robust standard error within the parenthesis

CHAPTER-6

Concluding Observations and Policy Options

6.1 Overall conclusion:

Socio-cultural discriminating attitude against female is deep rooted social problem and over the decades (at the disaggregate level), it is found to be aggravating since the rate of decline of CSR is found to be maximum during 2001-2011; it varies across regions, but female child disadvantage is found to be more acute in Northern States like Haryana, Punjab, UP and Rajasthan. Decline of poverty or increase in income or female literacy rate do not necessarily improve the CSR but female work force participation plays a significant role towards improving CSR. Positive Global and Local Moran Index results confirm that there are neighbourhood effects which result clusters of High-High CSR and Low-Low CSR states. Northern as well as Western state (Rajasthan) are forming clusters around a lower CSR value and North-Eastern and some of the Eastern states are forming clusters around High CSR value over the period and they are significantly influenced by their neighbouring states' CSR values.Northern states and districts which are relatively having lower average CSR are having negative impact on CSR and are being influenced by their neighbours. North-Eastern states as well as districts which are relatively having higher CSR form cluster.In order to eliminate societal ill practices, patriarchal mind-set and discrimination against women, various constitutional, legal rights and affirmative actions (like Rashtriyo Mohila Kosh, Kishoree Shakti Yoyona, Self-Help Groups etc) have already been undertaken but in reality there are a lot to be done. The Government of India has passed Pre-Conception and Pre-natal Diagnostic Techniques (PCPNDT) Act in 1994 to ban and punish prenatal sex determination and female foeticide. But, PCPNDT Act has been poorly enforced by the authorities and it is revealed from the rate of decline of CSR between 2001 and 2011.

Gender disparity in net enrolment ratio is not space dependent. In case of Moran Index, it can be observed that Northern states and North-Eeastern states are influenced by their neighbouring states both for Coefficient of Inequality as well as for Sopher's Disparity index(of literacy rate). In case of disparity in literacy rate, urbanisation and per capita social expenditure are found to be significant and there exists a direct as well as indirect impact of space. In case of total literacy still females are lagging behind of male though over time disparity is found to be diminishing. Direct as well as indirect effects of space do matter here in case of urbanization and per capita social sector spending. As this thesis has identified the way to reduce the gender disparity in literacy and this is space dependent. Therefore, government has to take initiatives to increase in investment in social sector expenditure.

Keeping in mind the space dependency of literacy rate, state specific allocation of development grant may reduce the gender disparity.

My theoretical model of female labour force participation supports the empirical findings. At the very low level of income, females go outside home for earnings in order to avoid destitute situation. These phenomena may stop when the income of the household is sufficient exceeding the critical or cut off level. In order to define critical level of income pertaining to female work force participation rate (FWFPR), I consider the case of backward bending supply curve of labour that deals with labour-leisure trade off. In my empirical analysis, I treat wage is equivalent to income and leisure is considered as non-remunerative, non-market and un-paid household activities of the female; as income increases, labour supply increases and reaches to a maximum level; there exists a cut-off or threshold level of income where the substitution between labour (for earning income outside home) and household chores (like child caring and rearing activities) takes place. Leisure (viz. un-paid household chores) time starts increasing more as the wage(viz. income) increases than the time devoted to labour (for wage earning outside home). In that case, Ihypothesize a critical level of family income beyond that level, female prefers to opt un-paid activities at the household level; in my case as the family income (PCDDP in my case) falls sort of the minimum or subsistence level of income, female participation in the work force increases in order to get rid of the destitute situation and once the subsistence level of income is reached, woman starts making trade-off between going out for work or engaging herself in the domestic chores and taking care of her children to ensure the human capital investment for earning future income (Dasgupta et al 2006). Therefore, there exists a critical level of income, below which FWFPR increases and above which trade off starts between going out for work or staying home for household activities. This critical level of income is not unique; it does vary across occupations of the females. The empirical part of my analysis reveals that FWFPR is non-linear with PCDDP; the critical income (PCDDP) is estimated at Rs.38421.78.These cut-off or threshold levels of income are Rs.3333.73, Rs. 13647.02 and Rs. 362067.80 for females engaged in cultivators, household industry and other activities respectively. Here, in my empirical analysis, the critical or cut-off income for females engaged in agricultural worker is found to be insignificant. One interesting point must be mentioned in my analysis. The critical or cut-off level of income does vary positively with hierarchy of occupations of the female workers. The critical income is found to be maximum among those females who are engaged in other activities (for examples, government and municipal employees, teachers, factory workers,

plantation workers, those engaged in trade, commerce, business, transport, banking, mining, construction, political or social work, priests, entertainment artists, etc). If the family income is high, withdrawing female from the work force may result in welfare gain in the family (Dasgupta et al 2006). In India, the family bondage is so strong that female after getting married generally sacrifices earnings in order to give more time for child caring activities. Future human capital formation of the siblings becomes more important for the educated and Ill off families (Chatterjee et al. 2018). This could be an explanation of having an inverted U-shaped pattern of female labour force participation in India. Similarly, well educated females in most of the cases fail to join in workforce because of constraints of jobs; this is well explained by Afridi (2016). Females belonging to ST community accentuate FWFPR especially in agricultural labor and cultivator. This result is not surprising because of two reasons –ST community is poor compared to other communities and they live in remote and rural areas where the principal occupation is agriculture. The income effects, the separation of home and work, and social stigma might explain the inverted U shaped FWFPR in India. The three sectors' (in agricultural labour, cultivators and household industry) combined effects are dominant enough to offset the effect of other activities and this overall impact results in an inverted U-shaped FWFPR.

Crimes against women are found to be increasing in India over the past two decades. Some of the crimes are being reported directly to the police station and some are under reported. Overall, the crime against women is not only showing the vulnerability of women in our society but also reflects society's behaviour, attitude and discrimination towards a woman. The case of demeaning, defamation and under estimation is well documented in our society. In Indian society, the women are basically assigned to perform certain roles, jobs or duties which are assumed to be non-negotiable and any sort of dispersion and deviation is not welcome by the majority of the family (as well as society). Sometimes, physical abuse towards a female of all ages is considered to be normal phenomena. The dowry death is positively associated with torture (that is revealed from my study), but torture randomly vary across states. Under-reporting may be one of the reasons. Dowry to the groom's family is considered to be a ritual in Indian context manifesting a pride of bride's family (Dalmia& Lawrence, 2005). However, these kinds of ill-ritual make a society more regressive. Therefore, a bride's family constantly feels the pressure of the fulfilment of the demand of the groom's family and failing to fulfil makes the bride more vulnerable and expose to the risk of torture and dowry death. It is found that molestation has a positive association with

rape and torture; states with higher female illiteracy raise the incidence of rape and molestation and the same happens with rising and higher female literacy, however, the causes may be different. It is supposed that more literacy makes women more vocal to report a crime against them. Incidence of torture decreases with increase in literacy rate and it is low with lower income and again starts falling at the higher income. Existence of higher number of police station (per 100 thousand populations) lowers the incidence of torture, molestation and dowry death as well. Urbanisation does not appear significant association with the crime which defies the phenomena that violence against women only conducted in cities. Space and neighbouring impact does matter towards variations of dowry death in Indian backdrop. I find that states like Arunachal Pradesh, Gujarat, Manipur and Nagaland appear significantly to lowering the incidence of dowry death. Seven sister's states (in North-Eastern India) along with Himachal Pradesh are more likely to have a lower incidence of dowry death because all these states are characterized by matriarchal having a higher share of FWFPR compared to other states in India. North-Eastern as well as Himachal Pradesh are heavily relied on tourism business where the involvement of women is relatively more than male counterparts (North Eastern Council 2008). I observe two interesting phenomena. Firstly, woman of these days are more vocal, they can raise voice and report a crime against them. Secondly, the incidence of crime is increasing due to higher exposure of women to the outer world. Even cyber-crimes are also increasing due to the increased accessibility of different web media platform. Therefore, I can observe two contrasting outcomes: The first one shows the empowerment of women and on the contrary, if the second one is true then it is really a matter of great concern. In twenty first century any sort of a forceful oppression or dictation leads to a regressive society. The new century should be an era of fair justice, equality, transparency and breeding ground of maintaining the freedom without violating anyone's personal space.

Spatial analysis suggests clustering of similar effect of the states.The states like Arunachal Pradesh, Gujarat, Manipur and Nagaland successfully lower the incidence of dowry death. As culture, language and space are inter-twined and related, crime rate or discrimination against women which is mirror of a culture of that place may be well documented by the variations of space along with its socio economic status.

6.2 Policy Implication:

"Save the Girl Child" has been a big social awareness programme launched by the Government of India to break the patriarchal mind-set; in order to promote the campaign of

"Save the Girl Child", Prime Minister of India, Sri Narendra Modi has launched another campaign called "Beti Bachao-Beti Padhao" (means Save the Girl Child and Educate Her). Will this campaign capable to change the mind-set of our patriarchal society? In order to get the desired result, I have to wait next 2021 Census! The status of female may be changed towards positive direction in near future if some pro-female child incentives programmes are incorporated along with this national level gender sensitisation awareness campaign.In India, equal achievement in literacy rate of male and female is still not witnessed, whereas in case of enrolment ratio the gap over the year is being narrowed down. It needs to be mentioned here that after 1991, more privileged section of my society prefers to move their children (irrespective of the sex of their children) to the private schools for improved infrastructure and functional quality. This results in more deterioration of the public school quality and this has a negative impact on girl child's education especially for the poorer section of the society (Ramachandran, 2008).. Even, sending younger girl child in rural private school is likely than male counterparts. Therefore, more affirmative actions towards the improvement of gender equality are required to improve the position of female not only in upper primary level education but also in overall literacy. Acknowledging the importance of crime against women, the central and various state governments in India have taken some affirmative actions over time. Some preventive measures like Sexual Harassment of Women at Workplace Act, The Indecent Representation of Women (Prohibition) Act, Domestic Violence Act, and Protection of Women from Domestic Violence Act etc. are providing punishment for crime against women. However, all these laws fail to correct the adverse social phenomena. Therefore, strict enforcement of laws is suggested to implement among the clustered of states revealed from my econometric analysis; all these states belong to North-Central region (viz. UP, Rajasthan, MP and Bihar, Punjab and Haryana) in India and spatial influence is well established. The incidence of dowry death cannot be hidden or under-reported and it does not randomly vary across states, rather state-specific character does matter towards variations of dowry death. Hence, gender sensitized special programmes need to be implemented among those states. The social awareness campaign in favour of female along with enforcement of laws may be helpful for getting a desirable outcome.

6.3 Limitation:

This study has been conducted at the state level. It is true that some of the Indian states are larger than the other states in respect of population size as well as area. State as unit of

analysis cannot represent the true picture of socio-cultural variables; the heterogeneity within state can be captured by the district level study which is assumed to be an important limitation of my paper. Central as well as various state governments have adopted some of the affirmative actions towards improving the gender position in India, but their impact are not considered in my empirical exercises.Firstly, I acknowledge the limitations of my data. In a poor country like India, where women appear to be engaged in innumerable activities like agriculture– processing, storing, animal husbandry, large number of subsistence work-all these are not included in my data. The ILO (2008) has rightly raised this question of measurement and has recommended time use data. When women are engaged in informal sector – with scattered, unstable and uncertain activities, Census or Sample Surveys cannot capture the data correctly. Secondly, my empirical study fails to exercise the application of wage differential between male and female of a family. The decision of a married female in joining workforce depends on wage differential between husband and wife but I could not incorporate this in my empirical model. Thirdly, I fail to incorporate the socio-cultural norms influencing the decision of female participation in workforce in India. Fourthly, it is true for Indian aspect that there is insignificant demand for jobs availability for women and they feel discouraged if they find difficulty in job-matching, higher wage-gap, lower vocational training. Increase in household income is not consistently accompanied by the rise of job openings for the females; however, the females are engaged in many economic activities (directly or indirectly) that are not brought into the market, as a result the real picture of female work force participation remains unreported or under-reported. Even if any family member's earning exceeds more than the woman's income, this results to lesser involvement in the FWFPR (Sarkar 2008; Sarkar et al. 2017; Chatterjee et al. 2018).I exclusively try to understand whether the occurrence of crime against women is space dependent or not or it has some neighbourhood impact or not. This is purely a macro picture where state is considered as unit of analysis (with under reporting of crime against women) cannot capture the true reality. I believe that micro level survey based research may reveal the real picture of crime against women.I could not include poverty as explanatory variable in my model because of inadequacy of data of 24 states over the specific time points. The study could be done at the district level, if NCRB could provide district level estimates of crime against women. Adverse child sex ratio (0-6) is also a crime against female child but it is not included in my study since it is not reported as well as recorded crime by NCRB, India.

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Appendix: A1: State-wise data on CSR and different socio-economic variable over the years

STATES	TIME	OSR	SC	ST	CSR(0-6)	PCNSDP	POVERTY (HCR)	URBANI-SATION	MLR	FLR	FWFPR
AP	1971	977	13.27	3.81	990	585	61	19.31	38.43	18.32	25.24
	1981	975	14.87	5.93	992	647	51	23.25	44.61	23.26	52.21
	1991	972	15.93	6.31	975	965	40	26.25	55.13	32.72	52.56
	2001	978	16.19	6.59	961	1428	31	27.01	70.85	51.17	51.89
	2011	993	16.4	6.98	943	2748	21	33.49	75.56	59.74	54.13
ASSAM	1971	896	6.24	10.99	1002	535	55	8.82	44.31	23.52	6.15
	1981	910	6.82	11.91	989	558	53	9.88	53.09	33.28	21.57
	1991	923	7.4	12.83	975	670	50	11.09	61.87	43.03	37
	2001	932	6.85	12.41	964	704	44	12.72	71.93	56.03	33.25
	2011	954	7.16	12.46	957	1006	38	14.08	78.81	67.27	35.64
BIHAR	1971	957	14.11	8.75	964	402	68	10	35.78	10.24	10.58
	1981	948	14.51	8.31	981	441	66	12.46	43.79	15.8	22.64
	1991	907	14.56	7.66	959	543	63	13.17	52.49	22.89	25.42
	2001	921	15.72	0.91	942	566	59	10.47	60.32	33.57	35.04
	2011	916	15.96	1.28	933	1007	54	11.3	73.39	53.33	33.94
GUJRAT	1971	934	6.84	13.92	946	829	61	28.08	53.78	29	10.65
	1981	942	7.15	14.22	950	904	53	31.08	62.07	36.94	32.23
	1991	934	7.41	14.92	928	1230	45	34.4	73.13	48.64	41.33
	2001	921	7.09	14.76	883	1441	34	37.35	80.5	58.6	42.56
	2011	918	6.75	14.77	886	2959	23	42.58	87.23	70.73	36.52
HARYANA	1971	867	18.89	0.0001	899	877	29	17.66	44.02	17.77	3.17
	1981	870	19.07	0.0001	902	1060	25	21.96	55.33	25.79	17.78
	1991	865	19.75	0.0001	879	1569	21	24.79	69.1	40.47	18.56
	2001	861	16.35	0.0001	819	1974	21	28.92	79.25	56.31	43.6
	2011	877	20.17	0.0001	830	3869	20	24.25	85.38	66.77	27.63
KARNATAKA	1971	957	13.14	0.79	978	641	58	24.31	48.51	24.55	15.13
	1981	963	15.07	4.91	974	687	54	28.91	55.67	31.68	40.66
	1991	960	16.38	4.26	960	921	50	30.91	67.26	44.34	46.19
	2001	964	16.2	6.55	945	1500	37	33.98	76.29	57.45	47.8
	2011	968	17.14	6.95	943	2507	24	38.57	82.85	68.13	48.07
KERALA	1971	1016	8.3	1.26	976	594	70	16.24	77.13	62.53	13.68
	1981	1032	10.02	1.03	970	621	52	18.78	84.56	73.36	26.63
	1991	1036	9.92	1.1	958	713	34	26.44	93.62	86.17	24.04
	2001	1058	9.81	1.14	960	1098	23	25.97	94.2	87.86	22.45
	2011	1084	9.1	1.45	959	2179	12	47.72	96.02	91.98	28.04
MP	1971	920	13.09	20.14	976	484	64	16.29	38.77	13.08	19.77
	1981	921	14.1	22.97	977	516	58	20.31	45.51	22.63	49.13
	1991	912	14.54	23.27	952	644	52	23.21	58.42	28.85	53.69
	2001	920	15.17	20.27	932	748	45	24.82	76.8	50.28	56.93
	2011	930	15.62	21.1	912	1171	38	27.63	80.53	60.2	53.76
MAHARASTRA	1971	930	6	5.86	972	783	58	31.7	59.4	31	21.49
	1981	937	7.14	9.19	956	957	55	35.03	66.61	39.55	48.87
	1991	934	11.1	9.27	945	1368	52	38.73	76.66	52.35	52.61
	2001	922	10.2	8.85	913	1955	39	42.4	86.27	67.51	46.93
	2011	925	11.81	9.35	883	4148	25	45.23	89.82	75.48	48.52
ORISSA	1971	988	15.09	23.11	1020	478	53	8.41	44.5	16.29	7.58
	1981	981	14.66	22.43	995	477	43	11.82	53.34	23.99	31.73
	1991	971	16.2	22.21	968	502	32	13.43	63.09	34.68	32.8
	2001	920	16.53	22.13	953	630	35	14.97	75.95	50.97	37.7
	2011	978	17.14	22.86	934	1195	37	16.68	82.4	64.36	42.77
PUNJAB	1971	865	24.71	0.0001	899	1070	33	23.73	46.22	29.91	1.67
	1981	879	26.87	0.0001	908	1354	26	27.72	53.33	38.37	9.77
	1991	882	28.31	0.0001	875	1887	23	29.72	65.66	50.41	7.01
	2001	874	28.85	0.0001	798	2405	19	33.95	75.63	63.55	28.66
	2011	893	31.98	0.0001	846	3462	16	37.49	81.48	71.34	21.2
RAJASTHAN	1971	911	15.82	12.13	932	651	53	17.63	33.87	10.06	10.42
	1981	919	17.04	12.21	954	535	49	20.93	42.04	13.36	35.57

STATES	TIME	OSR	SC	ST	CSR(0-6)	PCNSDP	POVERTY (HCR)	URBANI-SATION	MLR	FLR	FWFPR
	1991	910	17.29	12.44	916	751	45	22.88	54.99	20.44	46.05
	2001	922	17.16	12.56	909	1012	35	23.39	76.46	44.34	54.99
	2011	926	17.81	13.46	883	1230	25	24.89	80.51	52.66	58.24
TAMILNADU	1971	978	17.76	0.75	974	581	56	30.26	59.54	30.92	16.96
	1981	977	18.35	1.07	967	584	51	32.98	65.58	39.37	39.78
	1991	974	19.18	1.03	948	814	45	34.2	73.75	51.33	43.99
	2001	984	19	1.04	942	1405	31	43.86	82.33	64.55	44.26
	2011	995	20.01	1.1	946	2731	17	48.45	86.81	73.83	47.89
UP	1971	876	21	0.22	923	486	42	14.02	36.69	12.46	8.78
	1981	882	21.16	0.21	935	519	42	18.01	44.5	16.34	1.34
	1991	976	21.04	0.21	928	646	42	19.84	55.73	25.31	20.76
	2001	898	21.15	0.01	916	751	40	20.78	70.23	42.98	28.28
	2011	908	20.72	0.005	899	1053	38	22.28	79.24	59.26	28.06
WB	1971	891	19.89	5.72	1053	722	53	24.75	49.57	26.56	5.36
	1981	911	21.99	5.53	981	791	44	26.49	57.04	34.43	13.38
	1991	917	23.62	5.6	967	937	34	27.39	67.81	46.56	18.18
	2001	934	23.02	5.5	960	1533	31	28.03	77.58	60.22	28.13
	2011	947	25.5	5.8	950	2601	27	31.89	82.67	71.16	27.31
A AND N	1971	644	0.0001	15.72	829	1115	72	22.77	63.63	42.56	16.76
	1981	760	0.0001	11.85	978	1225	55	26.29	70.3	53.2	19.21
	1991	818	0.0001	9.54	973	1207	39	26.7	79	65.5	21.9
	2001	846	0.0001	8.27	965	2035	21	32.63	86.3	75.2	24.35
	2011	878	0.0001	8.02	968	4659	1	37.7	90.3	82.4	26.88
ARUNACHAL PRADESH	1971	861	0.07	79.02	996	456	54	3.69	20.63	4.43	81.61
	1981	862	0.46	69.82	997	736	50	6.56	33.36	13.39	74.62
	1991	859	0.47	63.66	982	2532	42	12.79	51.5	29.7	63.55
	2001	893	0.56	64.22	961	1312	37	20.75	63.8	43.5	60.64
	2011	920	0.58	63.73	972	4389	35	22.94	72.6	57.7	53.65
CHANDIGARH	1971	749	11.3	0.0001	883	1070	26	90.55	75.2	65.33	11.41
	1981	769	14.09	0.0001	907	1890	25	93.63	78.9	69.3	14.67
	1991	790	16.51	0.0001	899	2549	13	89.69	82	72.3	16.63
	2001	777	17.5	0.0001	845	4153	6	89.77	86.1	76.5	21.19
	2011	818	17.7	0.0001	887	5999	22	97.25	90	81.2	24.45
DELHI	1971	801	15.64	0.0001	909	1191	19	89.7	75.43	56.5	9.66
	1981	808	18.03	0.0001	926	1890	17	92.73	79.3	62.6	11.33
	1991	827	19.15	0.0001	915	2549	2	89.93	82	67	12.13
	2001	821	16.92	0.0001	865	3352	2	93.18	87.3	70.4	14.67
	2011	866	16.96	0.0001	871	7461	10	97.5	90.9	79.5	16.34
HIMACHAL PRADESH	1971	958	22.24	4.09	956	664	29	6.99	50.32	23.67	45.02
	1981	973	24.62	4.61	971	797	24	7.61	61.04	36.1	51.16
	1991	976	25.34	4.22	951	1049	23	8.69	75.4	52.1	55.14
	2001	968	24.782	4.02	897	1877	9	9.8	85.4	67.4	63.44
	2011	974	24.87	4	933	3361	8	10.03	89.5	75.9	69.58
J AND K	1971	878	8.26	0.0001	949	519	40	18.59	31.01	10.94	52.96
	1981	892	8.31	0.0001	964	799	33	21.05	41.46	18.37	48.75
	1991	896	7.95	0.0001	950	835	28	23.83	54.03	30.69	41.54
	2001	892	7.59	10.9	937	1192	4	24.81	66.6	43	34.33
	2011	883	7.36	14.53	861	1992	10	27.38	76.8	56.4	27.12
MANIPUR	1971	980	1.53	31.18	995	432	54	24.41	53.7	22.87	68.73
	1981	971	1.25	27.3	986	665	50	26.42	61.05	33.39	64.86
	1991	958	2.02	34.41	974	814	42	27.52	71.6	47.6	61.22
	2001	974	2.62	32.31	961	1046	36	26.58	80.6	60.5	57.11
	2011	987	2.98	32.69	928	1491	37	32.45	86.1	72.4	53.24
MEGHALAY	1971	942	0.38	80.48	979	432	62	14.54	40.44	29.31	64.18
	1981	954	0.41	80.58	991	642	50	18.06	44.26	35.41	62.22
	1991	955	0.51	85.53	986	814	42	18.59	53.1	44.9	60.43
	2001	972	0.48	85.94	975	1282	36	19.58	65.4	59.6	58.3
	2011	986	0.51	87.76	962	2262	12	25.54	76	72.9	56.34
NAGALAND	1971	871	0.0001	88.61	997	489	60	9.95	39.65	21.56	70.76

STATES	TIME	OSR	SC	ST	CSR(0-6)	PCNSDP	POVERTY (HCR)	URBANI-SATION	MLR	FLR	FWFPR
	1981	863	0.0001	83.99	988	642	50	15.52	56.2	38.77	66.08
	1991	886	0.0001	87.7	993	924	42	17.21	67.6	54.8	60.1
	2001	900	0.0001	89.15	975	1350	36	17.23	71.2	61.5	56.72
	2011	931	0.0001	89.33	943	3167	19	28.86	82.8	76.1	52.04
PONDICHERRY	1971	989	15.46	0.0001	979	815	71	42.04	72.3	43.77	19.94
	1981	985	15.99	0.0001	975	1310	55	52.28	77.1	53	21.81
	1991	979	16.25	0.0001	963	1490	39	64	83.7	65.6	23.4
	2001	1001	16.19	0.0001	958	2940	21	66.57	88.6	73.9	24.93
	2011	1038	16.43	0.0001	969	6058	10	68.83	91.3	80.7	26.49
TRIPURA	1971	943	12.39	28.95	969	502	61	10.43	46.84	24.84	15.58
	1981	946	15.12	28.44	972	613	50	10.99	58.35	36.28	21.39
	1991	945	16.36	30.95	967	768	42	15.29	70.6	49.7	23.23
	2001	948	17.37	31.05	975	1284	36	17.06	81	59.6	32.69
	2011	961	19.03	31.75	954	2644	14	26.17	91.5	70	38.34
MIZORAM	1971	946	0.02	94.26	1015	298	59	11.31	68	56.27	77.52
	1981	919	0.03	93.55	986	603	50	24.67	74.32	64.53	75.47
	1991	921	0.1	94.75	969	2098	42	46.1	85.6	78.6	71.9
	2001	935	0.03	94.46	971	1533	36	49.63	90.7	86.8	71.36
	2011	975	0.03	94.52	971	3361	20	52.11	93.3	89.3	69.31
GOA	1971	981	1.78	0.06	971	915	30	25.64	70.47	45.37	36.25
	1981	975	2.05	0.07	965	1475	24	32.07	76	55.2	34.59
	1991	967	2.08	0.03	964	2287	12	41.01	83.6	67.1	30.94
	2001	961	1.77	0.04	933	3359	3	49.76	88.4	75.4	31.28
	2011	968	1.77	0.03	982	8039	5	62.17	92.6	84.7	29.36
DADRA	1971	1007	1.79	86.89	1029	829	26	0.94	31.1	13.8	70.81
	1981	974	1.97	78.82	995	904	29	6.66	44.6	20.4	67.62
	1991	952	1.97	78.99	1013	1230	60	8.47	53.6	27	77.67
	2001	812	1.86	62.24	973	1441	22	22.89	73.3	43	61.23
	2011	775	1.88	54.02	954	2959	39	46.72	85.2	64.3	58.04
SIKKIM	1971	863	4.53	21.26	1011	446	63	9.52	28.52	10.31	70.76
	1981	835	5.78	23.27	978	737	50	16.14	50.49	26.17	61.86
	1991	878	5.93	22.36	965	1576	42	9.1	65.7	46.7	51.53
	2001	875	5.02	20.6	974	1316	36	7.14	76	60.4	57.63
	2011	889	5.18	27.47	973	4762	8	25.15	86.6	75.6	55.52
LAKS	1971	978	0.0001	92.86	967	1115	58	3.31	76.4	44.43	18.45
	1981	975	0.0001	93.82	964	1225	44	46.28	81.2	55.3	16.28
	1991	943	0.0001	93.15	941	1207	27	56.3	90.2	72.9	12.94
	2001	948	0.0001	94.51	974	2035	10	44.46	92.5	80.5	11.93
	2011	946	0.0001	95.06	911	4659	3	78.07	95.6	87.9	9.76
DAMAN DIU	1971	1099	3.7	11.52	1003	915	30	37.9	68.83	35.5	36.25
	1981	1062	3.56	11.85	965	1475	24	37.42	74.5	46.5	34.59
	1991	969	3.83	11.54	958	2287	23	48.76	82.7	59.4	30.94
	2001	710	3.06	8.85	925	3359	9	36.24	88.4	70.4	31.28
	2011	618	2.85	7.96	934	8039	8	75.17	91.5	79.5	29.63

Appendix: A2: State-wise data on Enrolment and literacy over the years

State	Time	Net enrolment ratio for Boys	Net enrolment ratio for Girls	MLR	FLR
Andhra Pradesh	2000	19.79472	21.709925	70.32	50.43
Andhra Pradesh	2005	22.658082	23.899421	72.94	55.085
Andhra Pradesh	2010	39.806846	41.776355	75.56	59.74
Andhra Pradesh	2015	61.39	65.49	78.18	64.395
Arunachal	2000	16.560143	19.721296	63.83	43.53
Arunachal	2005	18.232182	20.910091	68.76	51.55
Arunachal	2010	18.939308	18.38994	73.69	59.57
Arunachal	2015	73.66	82.55	78.62	67.59
Assam	2000	20.154492	22.868935	71.28	54.61
Assam	2005	21.730159	24.435658	75.045	60.94
Assam	2010	24.126902	27.258456	78.81	67.27
Assam	2015	73.66	82.55	82.575	73.6
Bihar & Rg.	2000	14.759598	17.019282	59.68	33.12
Bihar & Rg.	2005	17.392675	18.847691	66.535	43.225
Bihar & Rg.	2010	20.690535	18.54125	73.39	53.33
Bihar & Rg.	2015	88.26	86.66	80.245	63.435
Goa	2000	28.144173	28.518817	88.42	75.37
Goa	2005	29.55159	29.912435	90.615	78.605
Goa	2010	27.376916	30.344672	92.81	81.84
Goa	2015	82.51	87.38	95.005	85.075
Gujrat	2000	24.082898	23.803765	79.66	57.8
Gujrat	2005	26.07711	25.680691	83.445	64.26
Gujrat	2010	31.79771	27.379932	87.23	70.72
Gujrat	2015	72.38	74.55	91.015	77.18
Harayna	2000	23.535656	23.797293	78.49	57.8
Harayna	2005	25.617843	25.691026	82.86	64.265
Harayna	2010	26.656182	27.301473	87.23	70.73
Harayna	2015	65.93	74.04	91.6	77.195
Himachal	2000	26.677294	26.345935	85.35	67.42
Himachal	2005	28.386304	28.011912	88.09	72.01
Himachal	2010	34.790347	36.002715	90.83	76.6
Himachal	2015	79.66	81.36	93.57	81.19
Karnataka	2000	22.426149	23.530888	76.1	56.87
Karnataka	2005	23.810071	25.002605	79.475	62.5
Karnataka	2010	30.414462	31.606939	82.85	68.13
Karnataka	2015	78.43	80.39	86.225	73.76
Kerala	2000	30.703166	31.695122	94.24	87.72
Kerala	2005	31.245988	32.518575	95.13	89.85
Kerala	2010	35.252235	39.602036	96.02	91.98
Kerala	2015	79.25	80.68	96.91	94.11
M.P. & Rg.	2000	22.412879	21.802529	76.06	50.29
M.P. & Rg.	2005	23.050799	23.087019	78.295	55.155
M.P. & Rg.	2010	19.841429	19.162134	80.53	60.02
M.P. & Rg.	2015	69.47	75.6	82.765	64.885
Maharashtra	2000	26.931806	26.200888	85.97	67.03
Maharashtra	2005	27.506891	27.031177	87.895	71.255
Maharashtra	2010	27.541323	28.806818	89.82	75.48
Maharashtra	2015	76.63	80.7	91.745	79.705
Manipur	2000	24.023788	24.390168	79.54	60.1
Manipur	2005	25.383192	25.971453	83.015	66.615
Manipur	2010	31.090407	31.207484	86.49	73.13
Manipur	2015	91.5	93.6	89.965	79.645
Meghalaya	2000	17.589507	24.266326	65.43	59.61
Meghalaya	2005	20.123446	25.837508	71.3	66.695
Meghalaya	2010	13.180181	16.219356	77.17	73.78
Meghalaya	2015	69.75	76.12	83.04	80.865
Mizoram	2000	29.137838	31.442422	90.72	86.75
Mizoram	2005	29.22181	31.313596	92.22	88.075

State	Time	Net enrolment ratio for Boys	Net enrolment ratio for Girls	MLR	FLR
Mizoram	2010	27.267497	32.104918	93.72	89.4
Mizoram	2015	91.5	93.6	95.22	90.725
Nagaland	2000	20.204761	24.78573	71.16	61.46
Nagaland	2005	23.262154	26.817611	77.225	69.075
Nagaland	2010	20.31952	22.311059	83.29	76.69
Nagaland	2015	77.92	84.16	89.355	84.305
Orissa	2000	22.125736	21.858059	75.35	50.51
Orissa	2005	24.166212	24.186719	78.875	57.435
Orissa	2010	30.691737	30.555765	82.4	64.36
Orissa	2015	72.38	71.6	85.925	71.285
Punjab	2000	22.053658	25.275121	75.23	63.36
Punjab	2005	23.743907	26.492232	78.355	67.35
Punjab	2010	22.442119	26.041216	81.48	71.34
Punjab	2015	86.26	93.26	84.605	75.33
Rajasthan	2000	22.260139	20.047928	75.7	43.85
Rajasthan	2005	23.748367	21.633681	78.105	48.255
Rajasthan	2010	27.568321	21.927933	80.51	52.66
Rajasthan	2015	67.55	66.73	82.915	57.065
Sikkim	2000	22.401196	24.458989	76.04	60.4
Sikkim	2005	25.13866	26.857582	81.665	68.415
Sikkim	2010	15.919811	18.748427	87.29	76.43
Sikkim	2015	78.34	87.02	92.915	84.445
Tamilnadu	2000	25.334975	25.530267	82.42	64.43
Tamilnadu	2005	27.057651	27.565134	84.615	69.145
Tamilnadu	2010	50.851404	53.820238	86.81	73.86
Tamilnadu	2015	75.9	78.31	89.005	78.575
Tripura	2000	24.649786	25.618106	81.02	64.91
Tripura	2005	26.517384	27.416304	86.6	74.03
Tripura	2010	19.718711	20.44584	92.18	83.15
Tripura	2015	73.66	82.55	97.76	92.27
U.P. & Rg.	2000	19.060748	19.553245	68.82	42.22
U.P. & Rg.	2005	21.538323	21.758323	74.03	50.74
U.P. & Rg.	2010	23.986495	23.303377	79.24	59.26
U.P. & Rg.	2015	55.11	67.19	84.45	67.78
West Bengal	2000	22.843554	24.235276	77.02	59.61
West Bengal	2005	24.23389	25.882638	79.845	65.385
West Bengal	2010	26.415583	29.319373	82.67	71.16
West Bengal	2015	76.19	86.82	85.495	76.935

Appendix: A3: District-wise Data on FWFPR, Decomposition of FWFPR and different socio-economic variable over the years

Districts	State	Per capita Income	Urban pop	SC Population	ST Population	Male literacy Rate	Female literacy Rate	FWFPR	Percentage Female Labors as Cultivators	Percentage Female Labors as Agrl. Labors	Percentage Female Labors in HH Industry	Percentage Female Labors in others activities	Work Force Participation
ADILABAD (2001)	Andhra Pradesh	11562.76731	26.52	18.54	16.74	64.98	40.30	37.40	27.10	42.20	16.80	13.90	79.25
ADILABAD (2011)	Andhra Pradesh	60220.94389	27.73	17.82	18.09	70.81	51.31	41.90	23.10	47.42	11.24	18.24	79.07
Anantapur (2001)	Andhra Pradesh	15731.17596	25.26	14.14	3.49	68.38	43.34	39.40	25.90	54.50	6.00	13.60	81.70
Anantapur (2011)	Andhra Pradesh	54080.3715	28.07	14.29	3.78	73.02	53.97	41.04	16.30	58.62	5.29	19.79	79.39
Chittoor (2001)	Andhra Pradesh	17831.21434	21.65	18.75	3.42	77.62	55.78	41.60	30.00	48.60	4.90	16.60	76.65
Chittoor (2011)	Andhra Pradesh	53322.13402	29.50	18.82	3.81	79.83	63.28	35.09	21.87	51.20	3.60	23.34	73.42
Cuddapah-YSR (2001)	Andhra Pradesh	15171.70632	22.59	15.74	2.36	75.83	49.54	32.70	19.80	57.50	6.90	15.50	73.78
Cuddapah -YSR(2011)	Andhra Pradesh	57409.11698	33.97	16.16	2.63	77.78	56.77	34.70	13.50	59.30	5.39	21.81	72.68
East Godavari (2001)	Andhra Pradesh	21001.54649	23.50	17.99	3.91	70.00	60.94	20.60	5.60	66.40	7.00	21.00	63.90
East Godavari (2011	Andhra Pradesh	66689.99995	25.49	18.34	4.14	74.51	67.52	21.20	3.33	66.65	4.25	25.77	61.93
Guntur (2001)	Andhra Pradesh	20365.90533	28.79	18.32	4.66	71.24	53.74	38.90	14.20	67.00	2.90	15.90	79.47
Guntur (2011)	Andhra Pradesh	62940.21477	33.81	19.59	5.06	74.79	60.09	38.38	9.17	69.86	2.03	18.94	74.84
Hyderabad (2001)	Andhra Pradesh	27624.70582	100.00	8.02	0.90	83.74	73.50	9.90	2.90	1.30	6.60	89.20	46.62
Hyderabad (2011)	Andhra Pradesh	120735.7348	100.00	6.29	1.24	86.99	79.35	19.10	3.51	2.25	5.25	89.00	55.74
Karimnagar (2001)	Andhra Pradesh	18892.62969	19.44	18.62	2.60	67.09	42.75	43.30	22.00	44.00	21.80	12.20	82.38
Karimnagar (2011)	Andhra Pradesh	66377.68655	25.19	18.80	2.83	73.65	54.79	43.65	16.25	50.11	14.97	18.66	78.63
Khammam (2001)	Andhra Pradesh	21947.96518	19.80	16.55	26.47	66.11	47.44	39.60	18.42	67.50	2.27	11.81	81.14
Khammam (2011)	Andhra Pradesh	70984.5319	23.45	16.55	27.37	72.30	57.44	43.17	12.02	72.90	1.29	13.79	78.17
Krishna (2001)	Andhra Pradesh	22450.35091	32.08	17.83	2.57	74.39	63.19	29.50	5.50	71.60	3.90	19.00	70.33
Krishna (2011)	Andhra Pradesh	78478.80572	40.81	19.28	2.93	78.30	69.18	32.07	3.54	67.65	2.78	26.04	69.31
Kurnool (2001)	Andhra Pradesh	15664.14336	23.16	17.81	1.97	65.96	40.03	42.40	18.54	62.28	4.52	14.66	86.59
Kurnool (2011)	Andhra Pradesh	52298.49144	28.35	18.21	2.04	70.10	49.78	42.96	12.19	65.67	3.59	18.55	79.13
Mahbubnagar (2001)	Andhra Pradesh	13423.84348	10.56	17.10	7.93	56.63	31.89	47.40	24.00	59.60	4.70	11.80	92.59
Mahbubnagar (2011)	Andhra Pradesh	50401.82303	14.99	17.49	8.99	65.21	44.72	47.06	22.40	59.76	3.05	14.79	85.37
Medak (2001)	Andhra Pradesh	24281.58977	14.36	17.58	5.04	64.33	38.66	41.40	25.90	50.90	6.50	16.80	84.92
Medak (2011)	Andhra Pradesh	101104.8077	24.00	17.73	5.57	71.43	51.37	40.01	21.49	52.45	7.66	18.39	77.32
Nalgonda (2001)	Andhra Pradesh	16423.92107	13.32	17.73	10.55	69.23	44.68	43.10	20.30	61.20	4.50	14.00	84.98
Nalgonda (2011)	Andhra Pradesh	63589.03569	18.99	18.27	11.30	74.10	54.19	44.26	13.81	67.61	2.55	16.03	79.86
Nellore (2001)	Andhra Pradesh	19449.37427	22.45	22.00	9.08	73.67	56.38	32.30	11.80	64.70	5.30	18.20	72.83
Nellore (2011)	Andhra Pradesh	61517.29155	28.94	22.49	9.65	75.74	61.99	30.92	6.48	67.66	3.42	22.43	67.78
Nizamabad (2001)	Andhra Pradesh	15202.5954	18.10	14.84	7.07	64.91	39.48	44.60	22.40	33.80	26.30	17.50	83.88
Nizamabad (2011)	Andhra Pradesh	55821.75606	23.06	14.54	7.56	71.47	51.54	44.34	17.83	38.71	25.19	18.27	80.07

Districts	State	Per capita Income	Urban pop	SC Population	ST Population	Male literacy Rate	Female literacy Rate	FWFPR	Percentage Female Labors as Cultivators	Percentage Female Labors as Agrl. Labors	Percentage Female Labors in HH Industry	Percentage Female Labors in others activities	Work Force Participation
Prakasam (2001)	Andhra Pradesh	17169.96963	15.28	21.29	3.86	69.35	45.08	42.60	20.60	58.80	4.30	16.30	83.85
Prakasam (2011)	Andhra Pradesh	69022.39563	19.56	23.19	4.45	72.92	53.11	42.12	12.09	69.53	2.81	15.57	79.70
Rangareddi (2001)	Andhra Pradesh	23153.73935	54.20	14.55	4.09	75.27	56.49	26.30	24.00	39.50	3.60	33.00	66.14
Rangareddi (2011)	Andhra Pradesh	91048.43903	70.22	12.31	4.13	82.11	69.40	27.24	14.31	28.38	4.10	53.20	64.85
Srikakulam (2001)	Andhra Pradesh	13146.63147	10.98	9.05	5.96	67.19	43.68	38.40	19.04	61.27	5.09	14.60	78.95
Srikakulam (2011)	Andhra Pradesh	44944.46035	16.16	9.46	6.15	71.61	52.08	38.48	9.70	69.36	2.86	18.09	75.37
Visakhapatnam (2001)	Andhra Pradesh	25503.1396	39.94	7.60	14.55	69.68	50.12	28.00	32.70	39.80	4.80	22.60	66.45
Visakhapatnam (2011)	Andhra Pradesh	99848.76202	47.45	7.68	14.42	74.56	59.34	30.25	19.29	44.40	3.66	32.65	67.79
Vizianagaram (2001)	Andhra Pradesh	13365.94266	18.33	10.58	9.55	62.37	39.51	44.60	27.20	54.10	3.90	14.80	85.14
Vizianagaram (2011)	Andhra Pradesh	51981.80914	20.94	10.57	10.05	68.15	49.87	40.46	17.05	62.61	2.34	17.99	77.47
Warangal (2001)	Andhra Pradesh	15243.69656	19.19	16.99	14.10	68.88	45.09	42.00	25.70	56.00	6.10	12.20	82.49
Warangal (2011)	Andhra Pradesh	54395.97606	28.25	17.54	15.11	74.58	55.69	42.48	19.63	62.33	2.82	15.23	77.18
West Godavari (2001)	Andhra Pradesh	19933.10402	19.74	19.17	2.54	78.05	68.99	28.20	4.16	74.73	4.44	16.67	71.16
West Godavari (2011)	Andhra Pradesh	71984.36563	20.54	20.62	2.77	77.92	71.36	29.10	2.82	74.95	2.59	20.04	68.88
Barpeta (2001)	Assam	16763.34374	7.7	5.7	7.48	64.83	47.07	14.10	30.87	19.24	15.04	34.85	58.63
Barpeta (2011)	Assam	18658.18932	8.7	5.63	1.61	69.29	58.06	14.1	16.07	24.78	14.7	44.4	58.16
Baska (2001)	Assam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baska (2011)	Assam	22508.00372	1.29	7.69	34.84	77.03	61.27	29.9	22.84	31.64	9.5	36.03	68.43
Bongaigaon (2001)	Assam	9059.552294	12.13	10.25	12.23	67.67	50.44	15.45	39.61	26.13	7.11	27.15	59.04
Bongaigaon (2011)	Assam	37703.30175	14.86	11.21	2.55	74.87	64.43	16.05	25.75	29.72	8.2	36.32	58.3
Cachar (2001)	Assam	13149.64624	13.94	14.41	1.29	75.73	59.41	14.40	15.11	17.18	8.64	59.07	56.09
Cachar (2011)	Assam	27578.72914	18.17	15.25	1.01	84.78	73.68	16.27	10.31	13.92	10.7	65.06	57.6
Chirang (2001)	Assam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chirang (2011)	Assam	22309.84247	7.33	7.29	37.06	70.24	56.65	27.45	34.31	27.92	7.46	30.31	67.38
Darrang (2001)	Assam	8867.395235	4.97	4.55	16.61	63.91	46.4	19.40	39.48	18.7	7.22	34.6	62.81
Darrang (2011)	Assam	26172.50363	5.98	4.34	0.91	67.87	58.04	17.21	27.97	32.85	8.5	30.68	61.32
Dhemaji (2001)	Assam	8940.560614	6.79	5.33	47.29	74.41	53.86	37.68	77.89	9.94	4.49	7.68	79.74
Dhemaji (2011)	Assam	21387.36753	7.04	6.45	47.45	79.84	65.21	38.89	77.19	8.6	3.31	10.91	77.5
Dhubri (2001)	Assam	7933.030567	11.75	3.86	1.99	55.91	40.04	8.12	27.71	27.87	10.29	34.13	55.45
Dhubri (2011)	Assam	14310.10087	10.45	3.61	0.32	63.1	53.33	15.23	14.77	33.38	9.29	42.56	62.13
Dibrugarh (2001)	Assam	21481.39522	19.28	4.05	7.45	77.3	59.95	28.90	35.14	10.78	3.63	50.45	65.88
Dibrugarh (2011)	Assam	50558.04472	18.38	4.44	7.76	82.82	68.99	29.63	23.86	15.82	3.51	56.82	65.27
Goalpara (2001)	Assam	8895.606635	8.14	4.8	16.03	64.86	50.85	17.80	32.29	24.81	12.17	30.73	62.58
Goalpara (2011)	Assam	23348.80346	13.69	4.47	22.97	71.46	63.13	19.29	24.45	32.76	8.2	34.59	61.9

Districts	State	Per capita Income	Urban pop	SC Population	ST Population	Male literacy Rate	Female literacy Rate	FWFPR	Percentage Female Labors as Cultivators	Percentage Female Labors as Agrl. Labors	Percentage Female Labors in HH Industry	Percentage Female Labors in others activities	Work Force Participation
Golaghat (2001)	Assam	14392.79536	8.57	5.41	9.93	77.14	60.99	30.20	47.12	14.31	5	33.57	69.73
Golaghat (2011)	Assam	32801.77399	9.16	5.84	10.48	83.56	71.09	32.62	35.82	20.78	4.96	38.44	70.96
Hailakandi (2001)	Assam	9393.927114	8.12	10.91	0.15	68.24	50.46	16.53	24.53	15.52	8.72	51.23	61.48
Hailakandi (2011)	Assam	27564.8197	7.3	10.72	0.1	80.74	67.6	13.52	11.88	12.06	11.11	64.95	56.8
Jorhat (2001)	Assam	20996.6564	17.14	7.87	12.32	83.62	68.49	29.51	46.31	11.58	8.04	34.07	67.37
Jorhat (2011)	Assam	44621.85915	20.19	8.12	12.81	87.63	76.45	33.22	28.93	15.89	10.65	44.53	70.16
Kamrup (2001)	Assam	NA	36	6.76	9.93	81.16	66.31	14.67	22.73	15.06	17.11	45.1	54.6
Kamrup (2011)	Assam	39001.01945	9.38	7.11	12	81.3	69.47	27.12	17.96	22.03	23.93	36.08	66.33
Kamrup Metro (2001)	Assam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kamrup Metro (2011)	Assam	57353.9413	82.7	8.12	5.99	92.13	85.07	19.02	4.43	6.82	4.9	83.85	56.42
Karbi Anglong (2001)	Assam	11218.09492	11.3	3.63	55.69	67.22	47.3	31.62	57.67	20.14	7.08	15.11	74.43
Karbi Anglong (2011)	Assam	32961.85069	11.81	4.7	56.33	76.14	62	29.44	52.6	26.36	4.69	16.35	67.31
Karimganj (2001)	Assam	10243.10103	7.33	12.99	0.29	74.69	57.28	11.70	13.55	15.15	15	56.3	55.19
Karimganj (2011)	Assam	28261.6856	8.93	12.85	0.16	84.12	72.09	13.17	12.54	18.31	13.44	55.71	57.04
Kokrajhar (2001)	Assam	12135.72189	7.06	3.44	33.67	60.32	42.4	25.20	43.45	26.64	6.36	23.55	67.31
Kokrajhar (2011)	Assam	35017.22466	6.19	3.33	31.41	71.89	58.27	24.14	39.75	23.87	6.95	29.43	64.22
Lakhimpur (2001)	Assam	9704.052823	7.33	7.88	23.49	77.06	59.59	49.90	75.65	8.39	3.9	12.06	99.37
Lakhimpur (2011)	Assam	25615.40334	8.76	7.85	23.93	83.52	70.67	28.83	58.88	14.58	4.07	22.47	68.72
Morigaon (2001)	Assam	9795.479842	4.89	12.93	15.55	65.15	51.51	16.50	47.89	25.85	9.49	16.77	63.36
Morigaon (2011)	Assam	23488.42248	7.66	12.31	14.29	71.9	64.04	19.79	29.48	29.47	9.95	31.09	64.8
Nagaon (2001)	Assam	8764.125914	12.02	9.3	3.86	68.27	54.74	12.60	34.15	21.56	9.62	34.67	57.95
Nagaon (2011)	Assam	18543.32841	13.09	9.43	4.08	76.51	68.07	15.4	22.71	25.19	9.31	42.79	60.28
Nalbari (2001)	Assam	9850.159816	2.39	7.51	17.63	76.56	57.26	17.80	35.66	19.77	15.44	29.13	57.19
Nalbari (2011)	Assam	29675.11747	10.72	7.8	3.03	84.36	72.57	15.29	9.88	13.89	21.06	55.18	55.02
North Cachar Hills (2001)(Dima Hasao)	Assam	19476.92193	31.6	1.79	68.28	75.67	58.39	24.60	62.78	7.05	5.28	24.89	63.55
North Cachar Hills (2011)(Dima Hasao)	Assam	NA	NA	NA	NA	NA	NA	22.79	60.95	8.07	2.9	28.07	
Sibsagar (2001)	Assam	24671.30535	9.24	3.4	3.95	81.53	66.81	29.70	41.87	9.66	5.03	43.44	67.53
Sibsagar (2011)	Assam	60121.00943	9.56	3.68	4.26	85.84	74.71	28.59	26.49	13.99	4.52	55	65.4
Sonitpur (2001)	Assam	10230.60779	10.45	5.23	11.6	67.54	49.73	24.20	30.71	19.12	5.8	44.37	65.6
Sonitpur (2011)	Assam	23316.71856	9.04	5.67	12.04	73.65	60.73	24.83	24.69	22.36	5.45	47.5	65.73
Tinsukian (2001)	Assam	18954.10856	19.47	2.72	5.85	70.15	50.78	29.50	37.94	8.47	2.77	50.82	69.28
Tinsukia (2011)	Assam	47928.63682	19.94	2.84	6.18	77.19	61.73	29.42	27.4	12.28	3.41	56.91	67.08
Udalguri (2001)	Assam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Udalguri (2011)	Assam	27066.33749	4.52	4.55	32.15	72.58	58.05	27.88	22.15	29.2	6.05	42.6	66.86

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Araria (2001)	Bihar	4311.760171	6.13	13.6	1.36	46.38	22.37	25.80	18.83	74.09	3.13	3.95	78.98
Araria (2011)	Bihar	13017.21565	6	13.61	1.38	62.3	43.93	26.81	14.36	72.84	3.8	9	75.2
Arwal (2001)	Bihar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arwal (2011)	Bihar	12121.117	7.4	20.16	0.08	79.06	54.85	20.26	13.45	72.81	3.9	9.83	84.93
Aurangabad (2001)	Bihar	5534.672426	8.45	23.49	0.08	71.13	41.9	20.20	30.21	56.76	5.26	7.77	64.87
Aurangabad (2011)	Bihar	13729.01487	9.32	24.1	0.04	80.11	59.71	19.54	14.58	56.72	7.75	20.96	62.95
Banka (2001)	Bihar	4371.903308	3.51	12.44	4.67	55.29	28.67	28.20	29.37	60.35	6.23	4.05	76.93
Banka (2011)	Bihar	11050.47615	3.5	12.18	4.44	67.62	47.66	26.17	17.93	65.87	5.06	11.14	72
Begusarai (2001)	Bihar	8104.058712	4.58	14.52	0.06	59.13	35.64	15.90	12.55	61.72	11.88	13.85	62.29
Begusarai (2011)	Bihar	26409.93678	19.18	14.55	0.05	71.58	55.21	15.88	10.28	51.51	11.53	26.68	60.55
Bhagalpur (2001)	Bihar	7252.559868	18.67	10.51	2.29	59.22	38.13	21.50	16.35	62.63	9.89	11.13	68.35
Bhagalpur (2011)	Bihar	22240.91652	19.83	10.49	2.21	70.3	54.89	17.12	10.01	56.48	9.83	23.68	60.95
Bhojpur (2001)	Bihar	6618.166288	13.93	15.32	0.37	74.29	41.8	12.60	24.83	57.54	6.08	11.55	56.36
Bhojpur (2011)	Bihar	16755.38144	14.29	15.59	0.51	81.74	58.03	14.04	15.83	48.62	11.01	24.54	55.93
Buxar (2001)	Bihar	5432.203172	9.19	14.12	0.6	71.92	39.88	11.90	21.94	61.3	6.03	10.73	56.92
Buxar (2011)	Bihar	14789.73858	9.64	14.75	1.57	80.72	58.63	16.64	13.89	58.45	8.63	19.03	59.79
Darbhanga (2001)	Bihar	5428.078072	8.12	15.51	0.03	56.72	30.78	14.90	16.7	66.66	6.36	10.28	61.27
Darbhanga (2011)	Bihar	16612.75186	9.74	15.64	0.07	66.83	45.24	14.69	13.77	61.69	6.55	17.99	59.49
Gaya (2001)	Bihar	5854.015111	13.69	29.64	0.08	63.27	36.66	25.50	31.3	56.4	4.73	7.57	71.51
Gaya (2011)	Bihar	14927.50178	13.24	30.39	0.07	73.31	53.34	27.67	19.44	53.09	6.87	20.6	73.37
Gopalganj (2001)	Bihar	5052.916468	6.07	12.41	0.29	62.96	32.16	15.10	30.95	60.77	3.01	5.27	60.45
Gopalganj (2011)	Bihar	16533.52912	6.35	12.49	2.37	76.51	54.81	14.57	22.38	57.61	4.42	15.59	55.05
Jamui (2001)	Bihar	4600.742353	7.38	17.35	4.82	57.06	26.32	34.80	20.76	30	38.78	10.46	82
Jamui (2011)	Bihar	14888.73299	8.26	17.19	4.48	71.24	47.28	32.6	15.19	40.78	29.04	14.99	77.74
Jehanabad (2001)	Bihar	3278.049811	7.37	18.9	0.09	70.07	39.37	27.90	31.32	55.38	4.62	8.68	73.66
Jehanabad (2011)	Bihar	13612.92369	12.01	19.81	0.11	77.66	55.01	18.33	17.35	59.18	5.79	17.68	61.65
Kaimur (Bhabua)(2001)	Bihar	5742.183924	3.24	22.21	2.77	69.67	38.83	20.70	23.48	62.94	4.78	8.8	68.84
Kaimur (Bhabua)(2011)	Bihar	14504.38519	4.03	22.69	3.57	79.37	58.4	17.35	15.67	63.22	7.08	14.03	61.23
Katihar (2001)	Bihar	5925.885989	9.12	8.71	5.87	45.31	23.8	23.10	16.08	74.5	3.95	5.47	75.26
Katihar (2011)	Bihar	15539.05873	8.92	8.57	5.86	59.36	44.39	17.21	9.59	74.3	3.93	12.18	64.18
Khagaria (2001)	Bihar	5224.102084	5.96	14.46	0.03	51.82	29.35	22.90	19.6	68.91	3.26	8.23	73.05
Khagaria (2011)	Bihar	13473.98682	5.23	14.83	0.04	65.25	49.56	20.76	12.73	64.73	6.59	15.95	66.69
Kishanganj (2001)	Bihar	5047.02441	9.95	6.62	3.63	42.71	18.63	10.20	15.98	66.78	6.62	10.62	63.75
Kishanganj (2011)	Bihar	13307.91529	9.53	6.69	3.8	63.66	46.76	13.1	12.1	62.16	5.75	19.99	61.28

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Lakhisarai (2001)	Bihar	5567.764655	14.68	15.78	0.7	60.74	33.96	23.30	24.26	60.59	3.75	11.4	72.38
Lakhisarai (2011)	Bihar	15886.21177	14.29	15.31	0.83	71.26	52.57	18.14	16.57	59.97	7.04	16.42	62.76
Madhepura (2001)	Bihar	4835.174625	4.45	17.06	0.61	48.8	22.11	37.30	29.44	65.93	1.81	2.82	88.06
Madhepura (2011)	Bihar	12183.51632	4.42	17.3	0.63	61.77	41.74	29.5	18.23	71.03	2.8	7.94	76.35
Madhubani (2001)	Bihar	5328.532219	3.48	13.48	0.04	56.79	26.25	20.10	25.94	64.77	4.37	4.92	66.78
Madhubani (2011)	Bihar	16292.65101	3.6	13.08	0.09	70.14	46.16	24.6	20.34	64.08	5.24	10.35	70.92
Munger (2001)	Bihar	9283.378318	27.93	13.27	1.59	69.89	47.4	13.40	14.46	58.09	7.62	19.83	55.05
Munger (2011)	Bihar	28823.81111	27.79	13.44	1.56	77.74	62.08	15.53	9.31	59.32	6.69	24.68	56.58
Muzaffarpur (2001)	Bihar	6855.900931	9.3	15.87	0.09	59.1	35.81	12.70	18.76	63.18	4.84	13.22	59.09
Muzaffarpur (2011)	Bihar	19199.66874	9.86	15.66	0.12	71.28	54.67	15.49	12.63	54.66	8.15	24.56	60.86
Nalanda (2001)	Bihar	5638.575035	14.92	19.99	0.04	66.4	38.58	27.00	32.62	53.58	5.4	8.4	73.01
Nalanda (2011)	Bihar	15077.7387	15.91	21.12	0.05	74.86	53.1	24.77	15.49	59.15	6.97	18.39	69.24
Nawada (2001)	Bihar	4752.124114	7.65	24.09	0.12	60.58	32.17	25.80	36.02	52.73	4.3	6.95	72.86
Nawada (2011)	Bihar	11903.40789	9.71	25.47	0.09	69.98	48.86	25.84	22.53	55.26	6.76	15.46	69.82
Pashchim Champaran (2001)	Bihar	6058.980123	10.17	14.28	1.48	51.08	25.23	23.60	13.39	79.15	2.7	4.76	73.62
Pashchim Champaran (2011)	Bihar	16784.11565	9.99	14.08	6.35	65.59	44.69	25.6	10.09	76.51	3.53	9.88	73.6
Patna (2001)	Bihar	24926.71543	41.57	15.47	0.2	73.34	50.83	13.30	17.21	57.29	5.3	20.2	54.87
Patna (2011)	Bihar	87474.13918	43.07	15.66	15.9	78.48	61.96	16.14	11.17	46.12	6.97	35.74	57.38
Purba Chaparan (2001)	Bihar	4499.523196	6.37	13.05	0.12	49.31	24.27	14.70	18.01	71.55	4.21	6.23	64.01
Purba Chaparan (2011)	Bihar	13028.86179	7.87	12.74	0.24	65.34	45.12	19.72	13.41	69.38	4.64	12.57	67.41
Purnia (2001)	Bihar	5459.872906	8.74	12.27	4.4	45.63	23.42	23.30	15.08	78.75	2.15	4.02	74.66
Purnia (2011)	Bihar	14020.22717	10.51	11.98	4.27	59.06	42.34	21.72	14.36	72.84	3.8	9	69.2
Rohtas (2001)	Bihar	6900.056636	13.33	18.13	1.05	75.31	45.71	13.50	22.86	58.68	6.3	12.16	58.6
Rohtas (2011)	Bihar	18433.21335	14.45	18.57	1.07	82.88	62.97	15.32	15.06	51.67	9.68	23.58	58.36
Saharsa (2001)	Bihar	5997.883545	8.3	16.09	0.31	51.56	25.27	28.40	26.12	66.84	2.42	4.62	76.33
Saharsa (2011)	Bihar	17304.82185	8.24	16.69	0.32	63.56	41.68	21.38	18.77	66.46	4.67	10.1	67.33
Samastipur (2001)	Bihar	5707.859065	3.64	18.52	0.1	57.59	31.67	15.10	18.95	61.92	7.1	12.03	62.67
Samastipur (2011)	Bihar	17304.82185	3.47	18.85	0.04	71.25	51.51	15.05	14.75	61.33	6.65	17.27	61.22
Saran (2001)	Bihar	4827.560308	9.19	12	0.21	67.3	35.82	10.40	23.78	60.44	5.91	9.87	54.01
Saran (2011)	Bihar	13626.05779	8.94	12	0.93	77.03	54.42	9.46	15.12	53.64	6.61	24.63	50.66
Sheikhpura (2001)	Bihar	4697.032552	15.47	19.74	0.04	61.94	33.92	25.00	31.1	57.6	3.37	8.25	73.21
Sheikhpura (2011)	Bihar	13103.95982	17.13	20.6	0.1	73.56	53.4	23.84	18.18	56.33	6.11	19.37	69.29
Sheohar (2001)	Bihar	3915.024585	4.12	14.42	0.01	45.28	23.86	9.80	15.05	70.03	4.77	10.15	61.57
Sheohar (2011)	Bihar	10217.46168	4.28	14.73	0.05	61.31	45.26	16.05	11.52	58.86	11.06	18.55	66.23

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Sitamarhi (2001)	Bihar	4720.097513	5.76	11.77	0.07	49.36	26.13	11.20	16.63	65.47	7.32	10.58	61.98
Sitamarhi (2011)	Bihar	12445.70732	5.56	11.85	0.09	60.64	42.41	15.35	13.6	59.44	7.28	19.68	64.39
Siwan (2001)	Bihar	4743.863077	5.51	11.38	0.51	67.26	36.88	12.80	30.98	54.65	5.28	9.09	55.37
Siwan (2011)	Bihar	13129.37176	5.49	11.61	2.61	80.23	58.66	12.2	25.44	50.6	4.88	19.07	53.44
Supaul (2001)	Bihar	4930.744821	5.09	14.8	0.3	52.42	20.81	33.00	30.19	65.26	1.97	2.58	82.64
Supaul (2011)	Bihar	12214.70241	4.74	15.89	0.46	69.62	44.77	30.36	17.36	71.12	3.83	7.69	77.4
Vaishali (2001)	Bihar	4929.994287	6.87	20.68	0.11	63.23	36.58	10.90	22.71	57.83	6.68	12.78	57.04
Vaishali (2011)	Bihar	15907.45807	6.67	21.12	0.07	75.41	56.73	12.22	17.59	53.47	6.8	22.13	58.52
Bagalkot (2001)	Karnataka	17360.75966	28.97	15.17	4.85	70.88	43.56	33.30	17.6	61.4	7.6	13.5	76.88
Bagalkot (2011)	Karnataka	43106.18536	31.64	16.89	5.14	79.23	58.4	32.62	15.24	57.07	5.52	22.17	72.24
Bangalore (2001)	Karnataka	38679.24182	88.11	13.02	1.32	87.92	77.48	18.70	3.8	5.4	5.5	85.2	58.77
Bangalore (2011)	Karnataka	133239.433	90.94	12.46	1.98	91.01	84.01	24.61	2.51	3.13	3.13	91.24	63.58
Bangalore Rural (2001)	Karnataka	26799.21595	21.65	20.07	3.27	73.99	54.99	34.70	38	32.4	6.1	23.5	77.44
Bangalore Rural (2011)	Karnataka	103721.4799	27.12	21.57	5.34	84.82	70.63	29.97	24.24	30.53	5.09	40.14	70.86
Belgaum (2001)	Karnataka	16827.76506	24.03	10.96	5.78	75.7	52.32	32.70	33.5	50.6	3.5	12.4	76.47
Belgaum (2011)	Karnataka	46649.75194	25.34	12.08	6.22	82.2	64.58	31.11	27.66	49.58	3	19.76	71.93
Bellary (2001)	Karnataka	18939.6391	34.87	18.46	17.99	69.2	45.28	35.90	20.6	60.5	3.5	15.4	80.39
Bellary (2011)	Karnataka	79499.46893	37.52	21.1	18.41	76.64	58.09	34.03	18.7	55.63	2.3	23.37	73.34
Bidar (2001)	Karnataka	12269.78919	22.95	19.89	12.13	72.46	48.81	26.20	19.6	59.3	2.9	18.2	69.08
Bidar (2011)	Karnataka	35260.96401	25.01	23.47	13.85	79.09	61.55	29.25	16.09	57.31	2.84	23.76	69.92
Bijapur (2001)	Karnataka	13891.3332	21.92	18.5	1.66	69.94	43.47	28.50	18.5	65.4	2.7	13.4	72.13
Bijapur (2011)	Karnataka	40545.05264	23.05	20.34	1.81	77.21	56.72	32.6	19.23	56.96	3.02	20.79	72.15
Chamarajanagar (2001)	Karnataka	15703.15559	15.34	24.61	10.99	59.03	42.48	31.10	15.8	59.7	6.9	17.6	74.54
Chamarajanagar (2011)	Karnataka	36804.79158	17.14	25.41	11.78	67.93	54.92	30.94	14.29	58.19	4.39	23.13	72.06
Chikkaballapura (2001)	Karnataka	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chikkaballapura (2011)	Karnataka	37064.65759	22.4	24.9	12.47	77.75	61.55	41.27	29.64	43.61	3.7	23.05	79.44
Chikmagalur (2001)	Karnataka	20379.69857	19.52	20.43	3.6	80.29	64.01	30.9	17.7	33.5	2.7	46.2	71.28
Chikmagalur (2011)	Karnataka	64597.99589	21.05	22.29	3.95	85.41	73.16	36.39	21.55	32.41	1.57	44.47	74.8
Chitradurga (2001)	Karnataka	15730.98552	18.07	22.17	17.54	74.66	53.78	37.7	30.2	52.2	4	13.6	79.35
Chitradurga (2011)	Karnataka	50408.08554	19.86	23.45	18.23	81.37	65.88	41.93	25.42	49.32	3.53	21.72	80.24
Dakshina Kannada (2001)	Karnataka	30937.06692	38.44	6.91	3.32	89.7	77.21	41.7	3.6	3.6	46.1	46.7	78.39
Dakshina Kannada (2011)	Karnataka	94144.99756	47.67	7.09	3.94	93.13	84.13	35.72	2.26	2.09	45.66	49.99	71.09
Davanagere (2001)	Karnataka	15263.66982	30.32	18.61	11.71	76.37	58.04	30.1	20	56.1	6.3	17.6	72.28
Davanagere (2011)	Karnataka	48661.08763	32.33	20.18	11.98	82.4	68.91	30.19	15.66	51.22	5.33	27.79	69.24

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Dharwad (2001)	Karnataka	19630.00848	54.97	8.23	4.39	80.82	61.92	28.6	24.9	49.5	3.5	22.1	69.87
Dharwad (2011)	Karnataka	75342.86254	56.82	9.63	4.74	86.37	73.46	26.59	18.56	46.48	2.31	32.65	66.3
Gadag (2001)	Karnataka	15706.47281	35.21	14.14	5.6	79.32	52.52	37.7	23	61.7	3.7	11.6	79.94
Gadag (2011)	Karnataka	44196.24825	35.63	16.36	5.79	84.66	65.44	35.13	17.66	60.65	3.13	18.56	73.88
Gulbarga (2001)	Karnataka	13299.11764	27.25	22.92	4.92	61.77	37.9	34.9	16.1	64.7	2.9	16.4	80.96
Gulbarga (2011)	Karnataka	39406.52902	32.56	25.28	2.54	74.38	55.09	32.19	12.88	56.81	2.6	27.7	71.06
Hassan (2001)	Karnataka	16006.27066	17.7	18.11	1.54	78.37	59	39.7	54.3	24.1	1.7	19.9	79.98
Hassan (2011)	Karnataka	55229.0251	17.08	14.69	1.24	78.27	62.54	32.89	34.75	38.8	2.83	23.62	74.53
Haveri (2001)	Karnataka	13546.16306	20.78	12.19	8.84	77.61	77.37	33.7	18.1	66.8	5.9	9.2	78.02
Haveri (2011)	Karnataka	36553.2764	22.25	13.77	8.85	84	70.46	30.74	16.15	63.14	3.8	16.91	71.64
Kodagu (2001)	Karnataka	28261.21434	13.74	12.29	8.41	83.7	72.26	36.2	6.2	5.5	1.1	87.1	76.14
Kodagu (2011)	Karnataka	102809.8226	14.61	13.27	10.47	87.19	78.14	38.17	6.91	7.04	0.52	85.53	76.97
Kolar (2001)	Karnataka	15042.57179	24.66	26.49	8.11	73.17	52.23	39	34.8	40.3	4.2	20.6	81.52
Kolar (2011)	Karnataka	51223.60634	31.25	30.32	5.13	81.81	66.84	34.71	23.62	39.76	4.91	31.71	73.16
Koppal (2001)	Karnataka	17189.94155	16.58	15.48	11.59	68.42	39.61	38.9	18.9	65.3	3.2	12.6	85.65
Koppal (2011)	Karnataka	42182.28387	16.81	18.61	11.82	78.54	57.55	38.67	16.12	61.04	3	19.84	78.88
Mandya (2001)	Karnataka	15315.76993	16.03	14.02	0.97	70.5	51.53	33.9	41	38.4	3.1	17.5	76.62
Mandya (2011)	Karnataka	41516.93821	90.94	12.46	1.98	91.01	84.01	24.61	2.51	3.13	3.13	91.24	358.4
Mysore (2001)	Karnataka	20383.54776	37.19	17.71	10.27	70.88	55.81	25.3	33.8	37.7	3.9	24.6	67.32
Mysore (2011)	Karnataka	63716.064	41.5	17.88	11.15	78.46	67.06	26.35	22.16	36.85	2.88	38.11	66.12
Raichur (2001)	Karnataka	11506.07093	25.2	19	18.15	61.52	35.93	34.7	14.4	70.7	1.9	13.1	80.29
Raichur (2011)	Karnataka	37681.22554	25.42	20.79	19.03	70.47	48.73	38.69	18.13	60.76	2.21	19.8	77.59
Ramanagara (2001)	Karnataka	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ramanagara (2011)	Karnataka	72268.05685	24.73	18.83	2.12	76.76	61.5	35	36.52	29.43	4.41	29.63	76.09
Shimoga (2001)	Karnataka	18697.63081	34.76	16.41	3.41	82.01	66.88	28	24.3	52.1	3.4	20.2	68.85
Shimoga (2011)	Karnataka	51964.629	35.59	17.58	3.73	86.07	74.84	28.12	18.99	48.66	2.35	30	67.48
Tumkur (2001)	Karnataka	14575.59472	19.62	18.34	7.5	76.78	56.94	41.4	41	37.3	7	14.7	82.78
Tumkur (2011)	Karnataka	51079.14206	22.36	18.92	7.82	82.81	67.38	38.93	29.13	40.65	6.16	24.06	78.13
Udupi (2001)	Karnataka	23787.78738	18.55	6.09	3.74	88.23	75.19	33.9	22	25.2	26.1	26.6	69.56
Udupi (2011)	Karnataka	79329.95912	28.37	6.41	4.49	2.219512	81.58	28.91	13.87	18.19	2.85	65.08	65.67
Uttara Kannada (2001)	Karnataka	18717.77218	28.66	7.53	1.76	84.53	68.47	27.8	26.5	25.2	2.1	46.2	68.81
Uttara Kannada (2011)	Karnataka	55546.70328	29.15	8.1	2.38	89.63	78.39	25.03	17.25	30.92	1.33	50.5	64.49
Yadgir (2001)	Karnataka	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yadgir (2011)	Karnataka	28894.52264	18.79	23.28	12.51	62.25	41.38	39.48	16.18	64.02	2.7	17.1	81.94

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Alappuzha (2001)	Kerala	23202.2701	29.46	9.45	0.15	96.27	90.82	20.3	1.71	16.74	13.89	67.66	53.59
Alappuzha (2011)	Kerala	78222.13575	53.96	9.46	0.31	97.36	94.25	24.02	1.7	10.75	7.14	80.4	59.28
Ernakulam (2001)	Kerala	33517.27962	47.55	8.48	0.32	95.81	90.66	17.2	4.29	13.35	4.73	77.63	54.94
Ernakulam (2011)	Kerala	113641.9278	68.07	8.18	0.5	97.36	94.46	20.21	2.67	7.58	2.32	87.42	58.5
Idukki (2001)	Kerala	31603.99957	5.1	14.11	4.51	92.33	85.02	28.1	12.58	31.69	2.3	53.43	65.39
Idukki (2011)	Kerala	94143.59579	4.69	13.12	5.03	94.56	89.45	33.2	13.06	35.54	1.43	49.97	70.52
Kannur (2001)	Kerala	21585.90692	50.34	4.11	0.83	96.13	89.4	15.3	6.5	22.03	4.42	67.05	50.05
Kannur (2011)	Kerala	75076.05025	65.04	3.3	1.64	97.19	93.29	16.01	3.77	16.13	2.17	77.94	51.29
Kasaragod (2001)	Kerala	19477.80792	19.4	7.49	2.52	90.36	79.12	21	3.12	10.9	33.6	52.38	55.82
Kasaragod (2011)	Kerala	64534.20021	38.94	4.08	3.74	94.05	86.49	20.32	3.99	9.5	13.38	73.13	55.44
Kollam (2001)	Kerala	22380.2108	18.02	12.49	0.2	94.43	88.18	16.8	2.53	7.39	3.52	86.56	49.49
Kollam (2011)	Kerala	76278.4044	45.05	12.46	0.41	96.09	92.31	19.28	2.7	6.5	2.75	88.05	53.63
Kottayam (2001)	Kerala	25450.51662	15.34	7.69	0.94	97.34	94.35	14	2.52	15.19	6.59	75.7	51.51
Kottayam (2011)	Kerala	94321.4432	28.63	7.79	1.11	97.97	96.48	20.41	3.04	8.4	3.43	85.13	59
Kozhikode (2001)	Kerala	22494.63467	38.24	6.98	0.21	96.11	88.62	8.2	3.29	10.73	4.04	81.94	43.75
Kozhikode (2011)	Kerala	73485.66711	67.15	6.45	0.49	97.42	92.99	12.17	2.42	8.61	1.94	87.04	48.1
Malappuram (2001)	Kerala	16030.96536	9.82	7.87	0.34	93.25	86.26	6.6	4.86	27.52	3.98	63.64	41.18
Malappuram (2011)	Kerala	50710.85749	44.18	7.5	0.56	95.76	91.62	7.63	3.68	12.94	2.27	81.11	42.05
Palakkad (2001)	Kerala	22376.50536	13.62	16.53	1.52	89.52	79.56	21.2	7.16	56.21	3.76	32.87	57.78
Palakkad (2011)	Kerala	72274.01071	24.09	14.37	1.74	93.1	85.79	20.42	5.06	40.71	2.49	51.73	58.06
Pathanamthitta (2001)	Kerala	25058.02194	10.03	13.13	0.53	96.41	93.43	13.4	6.39	15.98	4.19	73.44	47.65
Pathanamthitta (2011)	Kerala	90876.32327	10.99	13.74	0.68	97.36	95.83	17.45	4.43	10.12	3.16	82.29	52.36
Thiruvananthapuram (2001)	Kerala	24977.55349	33.75	11.47	0.65	92.64	86.14	14.5	2.69	9.54	6.35	81.42	50.05
Thiruvananthapuram (2011)	Kerala	85346.57892	53.66	11.3	0.81	95.06	91.17	21.37	2.27	6.23	3.06	88.44	56.99
Thrissur (2001)	Kerala	24382.69779	28.22	11.91	0.16	95.11	89.71	15.2	4.02	19.91	8.96	67.11	50.41
Thrissur (2011)	Kerala	80112.77714	67.17	10.39	0.3	96.78	93.56	18.67	2.99	9.35	3.2	84.46	54.76
Wayanad (2001)	Kerala	20051.39511	3.79	4.27	17.43	89.77	80.72	23.2	10.26	37.19	1.39	51.16	61.44
Wayanad (2011)	Kerala	65740.86761	3.86	3.99	18.53	92.51	85.7	26.8	9.36	36.82	1.64	52.18	64.6
Balaghat (2001)	Madhya Pradesh	11665.46949	12.95	7.75	21.8	80.63	57.18	46.4	39	48	5	77	87.8
Balaghat (2011)	Madhya Pradesh	29383.59215	14.39	7.37	22.51	85.36	69.04	47.05	26.57	60.69	2.25	10.49	83.75
Barwani (2001)	Madhya Pradesh	7880.134006	14.61	6.33	67.02	50.96	31.82	43.7	58.6	34.1	1.2	6.2	98.45
Barwani (2011)	Madhya Pradesh	21947.77185	14.72	6.35	69.42	55.7	42.39	41.94	42.52	49.99	0.92	6.57	88.88
Betul (2001)	Madhya Pradesh	12963.39169	18.36	10.58	39.41	76.81	55.58	37.1	38.3	53.2	1.5	7	81.68
Betul (2011)	Madhya Pradesh	35234.3144	19.62	10.11	42.34	76.65	60.94	42.92	27.05	59.6	1.45	11.91	82.13

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Bhind (2001)	Madhya Pradesh	9298.250895	23.72	21.48	0.47	83.19	55.23	22.9	41.1	26.5	3.6	28.7	70.08
Bhind (2011)	Madhya Pradesh	23537.21804	25.42	22.01	0.36	85.4	63.14	8.37	26.36	39.79	5.4	28.45	52.51
Bhopal (2001)	Madhya Pradesh	24205.07619	80.43	14	3.29	81.94	66.37	14.9	18	23.7	3.6	54.8	54.51
Bhopal (2011)	Madhya Pradesh	70637.70186	80.85	15.08	2.93	85.42	74.87	19.6	9.53	21.07	3.6	65.8	57.86
Chhatarpur (2001)	Madhya Pradesh	10482.85	21.99	23.26	3.5	65.28	39.26	29.7	52.8	31.9	6.3	9	78.41
Chhatarpur (2011)	Madhya Pradesh	26088.4318	22.64	23	4.18	72.66	53.59	32.71	36.2	43.17	4.69	15.95	77.33
Chhindwara (2001)	Madhya Pradesh	13294.66609	24.45	11.58	34.68	76.45	54.63	33	37.3	51.4	1.3	10	77
Chhindwara (2011)	Madhya Pradesh	42265.94775	24.16	11.11	36.82	79.04	63.01	36.6	25.31	58.91	1.25	14.53	74.19
Damoh (2001)	Madhya Pradesh	11079.21129	18.85	19.49	12.56	74.67	47.3	35.8	17.8	33.5	38.9	9.8	82.99
Damoh (2011)	Madhya Pradesh	29624.93049	19.82	19.49	13.15	79.27	59.22	34.35	10.45	49.12	21.82	18.61	78.26
Datia (2001)	Madhya Pradesh	12535.81434	21.89	24.95	1.59	84.29	57.23	43.2	64.3	21.8	2.4	11.5	93.49
Datia (2011)	Madhya Pradesh	29489.77698	23.13	25.46	1.91	84.2	59.41	26.05	41.74	40.35	3.6	14.3	68.91
Dewas (2001)	Madhya Pradesh	12221.76953	27.39	18.26	16.45	75.74	45.03	36.4	43.4	48	1.4	7.2	82.83
Dewas (2011)	Madhya Pradesh	33232.84614	28.89	18.67	17.44	80.3	57.76	38.4	34.38	54.48	1.4	9.74	80.88
Dhar (2001)	Madhya Pradesh	10973.04016	16.56	6.49	54.5	65.75	38.57	40.5	54.1	38.8	1.1	6	87.81
Dhar (2011)	Madhya Pradesh	30886.18181	18.9	6.65	66.94	68.95	48.77	40.16	35.53	53.98	1.43	9.06	82.09
Dindori (2001)	Madhya Pradesh	7582.869836	4.63	5.83	64.48	69.95	38.24	55	14.7	41.4	17.3	26.6	101.81
Dindori (2011)	Madhya Pradesh	16226.70058	4.59	5.65	64.69	75.47	52.41	52.9	34.42	55.38	2.14	8.06	93.87
East Nimar (Khandwa) (2001)	Madhya Pradesh	11391.4615	26.85	11.07	29.68	73.73	48.95	34.4	36.2	53.9	1.6	8.3	81.58
East Nimar (Khandwa) (2011)	Madhya Pradesh	43347.75251	19.8	11.95	35.05	76.29	55.92	38.27	26.24	63.2	1.16	9.4	81.83
Guna (2001)	Madhya Pradesh	11005.37748	21.29	17.61	12.22	74.13	42.88	29.2	44.1	43.2	4.1	8.5	79.03
Guna (2011)	Madhya Pradesh	48384.68038	25.18	15.55	15.37	74.05	51.36	30.3	37.1	48.76	2.75	11.39	74.79
Gwalior (2001)	Madhya Pradesh	19585.76296	60.23	18.91	3.49	80.36	56.4	14.7	30.1	30.8	6.6	32.5	57.1
Gwalior (2011)	Madhya Pradesh	51957.19958	62.69	19.34	3.55	84.7	67.38	14.49	16.76	32.65	5.74	44.85	54.06
Harda (2001)	Madhya Pradesh	13772.72267	21.32	16.06	26.63	77.94	54.06	36.4	39.6	53.2	1.5	5.7	85.16
Harda (2011)	Madhya Pradesh	44037.75867	20.92	16.28	27.99	81.14	63.27	26.89	21.79	60.7	3.09	14.38	68.9
Hoshangabad (2001)	Madhya Pradesh	17514.26081	30.84	15.75	15.13	80.83	57.83	20.5	14.7	41.4	17.3	26.6	64.23
Hoshangabad (2011)	Madhya Pradesh	48543.60172	31.42	16.51	15.89	83.35	66.45	22.38	15.13	57.16	2.65	25.06	62.87
Indore (2001)	Madhya Pradesh	30240.4021	70.17	15.75	6.65	84.6	64.81	19.1	25.8	30.3	4.3	39.6	60.8
Indore (2011)	Madhya Pradesh	82339.68536	74.09	16.64	6.64	87.25	74.02	20.87	15.13	26.95	3.65	54.28	61.1
Jabalpur (2001)	Madhya Pradesh	17481.14892	57.05	12.73	15.01	84.56	65.88	22.7	14.7	41.4	17.3	26.6	62.05
Jabalpur (2011)	Madhya Pradesh	61369.00705	58.46	14.13	15.23	87.29	74.37	25.27	7.96	41.43	10.92	39.69	63.57
Jhabua (2001)	Madhya Pradesh	7870.864021	8.68	2.82	86.85	47.97	25.7	50.7	73.6	18.2	0.9	7.3	107.37
Jhabua (2011)	Madhya Pradesh	36166.40391	8.97	1.7	87	52.85	33.77	31.27	62.3	29.01	0.88	7.81	98.6

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Katni (2001)	Madhya Pradesh	14468.59375	21.17	11.48	23.07	77.94	48.24	31.3	27.2	46.2	13.6	13	75.14
Katni (2011)	Madhya Pradesh	33866.46874	20.4	12.05	24.59	81.92	61.56	31.02	16.06	53.76	8.87	21.3	71.74
Mandla (2001)	Madhya Pradesh	9216.358992	10.28	4.62	57.23	73.72	45.49	48.3	41.4	51	1.4	6.1	93.05
Mandla (2011)	Madhya Pradesh	25192.88467	12.34	4.59	57.88	77.52	57.39	48.98	23.4	65.84	1.58	9.18	87.37
Mandsaur (2001)	Madhya Pradesh	13775.59296	18.64	17.93	3.17	85.24	54.73	40.4	53.1	39.4	1.1	6.5	85.68
Mandsaur (2011)	Madhya Pradesh	38465.44082	20.71	18.58	2.47	85.14	57.98	42.89	40.02	51.19	1	7.79	83.81
Morena (2001)	Madhya Pradesh	9593.059394	21.55	21.08	0.81	79.89	46.24	23.8	46.1	16	3.3	34.7	71.43
Morena (2011)	Madhya Pradesh	24853.63459	23.93	21.44	0.87	82.93	56.9	16.79	28.93	25.63	5.04	40.4	59.61
Narsimhapur (2001)	Madhya Pradesh	13107.76634	15.99	16.14	13.17	86.13	68.47	29.1	25	60.4	4.2	10.3	74.66
Narsimhapur (2011)	Madhya Pradesh	30116.48077	18.64	16.87	13.36	83.64	67.06	29.51	14.21	70.5	2.29	13	71.45
Neemuch (2001)	Madhya Pradesh	14258.68029	27.95	12.55	8.51	82.53	48.99	40.1	57.6	33.9	1.3	7.2	83.54
Neemuch (2011)	Madhya Pradesh	40589.32266	29.69	13.46	8.65	83.91	57.13	42.88	45.56	43.1	0.79	10.55	82.56
Panna (2001)	Madhya Pradesh	9550.199753	12.63	20	15.39	73.33	47.97	35.1	42.7	42.9	3.9	10.5	83.44
Panna (2011)	Madhya Pradesh	25304.07665	12.33	20.46	16.81	74.14	54.44	32.42	23.84	58.39	3.35	14.41	76.96
Raisen (2001)	Madhya Pradesh	11231.70695	18.38	16.37	15.74	81.58	61.3	21.9	23.6	54.6	8.6	13.2	69.73
Raisen (2011)	Madhya Pradesh	29842.8128	22.79	16.96	15.4	80.81	64.24	23.36	16.32	60.22	6.51	16.95	68.12
Rajgarh (2001)	Madhya Pradesh	9769.513231	17.33	17.44	3.78	69.14	37.1	44.8	55.4	37.5	1.7	5.4	94.69
Rajgarh (2011)	Madhya Pradesh	27676.93914	17.88	19.13	3.48	73.02	48.95	41.8	33.28	57.37	1.52	7.82	86.19
Ratlam (2001)	Madhya Pradesh	14696.15178	30.31	13.41	25.89	79.52	54.28	36.2	46.8	43	1.4	8.8	81.27
Ratlam (2011)	Madhya Pradesh	39379.98817	29.9	13.65	28.17	77.54	55.77	39	30.02	58.02	1.31	10.65	80.94
Rewa (2001)	Madhya Pradesh	9975.796962	16.24	15.57	12.87	75.65	47.58	37.7	45.8	43.1	4.9	6.2	85.49
Rewa (2011)	Madhya Pradesh	23461.8237	16.73	16.22	13.19	81.43	61.16	32.87	23.62	56.43	6	13.95	74.58
Sagar (2001)	Madhya Pradesh	10999.27942	29.22	20.54	9.72	79.41	54.35	30.4	16.9	29.4	44	9.7	77.39
Sagar (2011)	Madhya Pradesh	31104.18599	29.8	21.09	9.33	84.85	67.02	28.87	11.48	42.75	28.21	17.57	72.42
Satna (2001)	Madhya Pradesh	11991.25824	20.62	16.27	14.34	77.14	51.05	30.6	32	43.5	13.4	11.1	75.41
Satna (2011)	Madhya Pradesh	29916.03613	21.28	17.88	14.36	81.37	62.45	29.95	21.75	53.35	6.91	17.99	71.39
Sehore (2001)	Madhya Pradesh	11368.30437	17.96	20.49	10.76	77.28	47.36	34.1	43.5	49	1.3	6.1	81.32
Sehore (2011)	Madhya Pradesh	30599.19227	18.95	20.69	11.1	80.83	58.33	35.3	28.53	51.51	1.79	18.17	78.48
Seoni (2001)	Madhya Pradesh	10371.43582	10.34	10.34	36.78	77.18	53.82	43.5	38.6	53.8	1.2	6.3	88.31
Seoni (2011)	Madhya Pradesh	27343.59535	11.88	9.48	37.69	80.45	63.67	42.41	20.68	66.62	1.71	10.99	80.5
Shahdol (2001)	Madhya Pradesh	13754.05239	25.27	7.36	44.48	71.8	44.99	34	36.5	52	2.3	9.1	76.92
Shahdol (2011)	Madhya Pradesh	62496.86932	20.6	8.42	44.65	76.14	56.99	38.14	15.84	65.08	2.94	16.14	78.07
Shajapur (2001)	Madhya Pradesh	10350.47281	18.53	21.98	2.74	83.29	57.42	42	50.4	42.9	1.4	5.3	91.28
Shajapur (2011)	Madhya Pradesh	30816.80804	19.41	23.4	2.5	81.47	55.93	39.06	36.81	54.83	1.08	7.28	82.86

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Sheopur (2001)	Madhya Pradesh	9538.423042	15.83	16.16	21.53	61.76	29.07	31.5	48.5	40.5	1.5	9.5	80.09
Sheopur (2011)	Madhya Pradesh	24513.9643	15.61	15.76	23.47	69.33	44.23	28.73	29.12	57.33	2.14	11.41	71.97
Shivpuri (2001)	Madhya Pradesh	9866.014772	16.62	18.78	11.19	74.11	40.84	37.3	66.9	25.3	1.5	6.4	86.93
Shivpuri (2011)	Madhya Pradesh	24201.38466	17.12	18.63	13.2	74.56	48.79	34.52	49.28	37.46	2.07	11.18	78.78
Sidhi (2001)	Madhya Pradesh	17903.92059	14.25	11.85	29.89	67.36	35.98	34.2	51.3	41.6	2.1	5	82.86
Sidhi (2011)	Madhya Pradesh	96190.43985	8.26	11.55	27.8	74.44	54.07	32.2	18.86	66.15	3.76	11.23	75.34
Tikamgarh (2001)	Madhya Pradesh	9955.12877	17.68	24.29	4.32	68.68	40.99	41.3	63.6	24.5	4.1	7.8	88.99
Tikamgarh (2011)	Madhya Pradesh	22787.5552	17.29	25.02	4.7	71.77	49.97	36.88	41.64	45.01	2.9	10.45	80.11
Ujjain (2001)	Madhya Pradesh	16130.2106	38.74	24.72	3.11	83.05	57.87	33.9	48	37.2	2.4	12.5	79.37
Ujjain 2011)	Madhya Pradesh	47866.63808	39.22	26.37	2.45	83.46	60.74	33.8	33.22	46.64	2.32	17.83	75.25
Umaria (2001)	Madhya Pradesh	9947.031086	16.11	6.81	44.04	72.89	44.54	33.3	35.1	52.5	3.4	9	78.18
Umaria (2011)	Madhya Pradesh	23989.77601	17.15	9.02	46.64	76.02	55.23	36.29	17.12	62.84	3.53	16.51	77.62
Vidisha (2001)	Madhya Pradesh	12027.25918	21.43	19.85	4.88	74.23	47.4	21.2	26.6	56.5	4.1	12.8	72.04
Vidisha (2011)	Madhya Pradesh	32423.27136	23.28	20.03	4.63	79.14	60.85	21.29	18.59	58.83	3.63	18.96	68.24
West Nimar (Khargaone)(2001)	Madhya Pradesh	9504.485598	15.39	11.41	35.48	74.79	50.64	39.5	49.2	44	1.2	5.6	86.99
West Nimar (Khargaone)(2011)	Madhya Pradesh	27171.19601	15.96	11.16	38.98	72.08	53.03	40.86	34.26	57.36	1.07	7.31	83.83
Ahmadnagar (2001)	Maharashtra	18855.64225	19.89	12	7.51	85.7	64.35	38.9	49.5	34.5	3.7	12.3	81.44
Ahmadnagar (2011)	Maharashtra	71298.40712	20.09	12.63	8.33	86.82	70.89	36.91	49.46	32.59	3.2	14.76	79.46
Akola (2001)	Maharashtra	18003.24983	38.49	10.33	6.14	88.91	73.43	26.9	16.5	70.1	1.7	11.6	69.29
Akola (2011)	Maharashtra	64049.6255	39.68	20.07	5.53	92.34	83.54	28.11	14.48	66.87	1.42	17.23	67.34
Amravati (2001)	Maharashtra	18234.86092	34.5	17.13	13.68	88.91	75.73	29.5	14.8	71.8	2.1	11.3	72.41
Amravati (2011)	Maharashtra	63947.90276	35.91	17.53	13.99	91.46	83.1	28.33	11.5	70.97	1.89	15.64	67.97
Aurangabad (2001)	Maharashtra	21780.50288	37.53	12.99	3.47	84.89	60.09	31.1	45.1	37.7	2.3	14.8	74.99
Aurangabad (2011)	Maharashtra	84781.43519	43.77	14.57	3.87	87.37	70.08	31.47	41.33	36.63	2.24	19.8	71.19
Bhandara (2001)	Maharashtra	18596.72965	15.47	17.77	8.6	88.97	67.82	41.6	24.6	58.4	7.2	9.8	78.01
Bhandara (2011)	Maharashtra	60974.69538	19.48	16.69	7.41	90.35	77.08	42.41	18.94	63.86	3.08	14.13	77.47
Bid (2001)	Maharashtra	15662.60266	17.91	13.01	1.12	80.7	54.52	39.2	52.1	39	1.7	7.2	85.63
Bid (2011)	Maharashtra	50966.1519	19.9	13.59	1.27	85.55	67.82	42.7	50.49	37.62	1.86	10.03	83.9
Buldana (2001)	Maharashtra	18596.72965	21.2	10.82	5.16	86.93	64.07	38.7	36.2	57.7	1.4	4.7	82.38
Buldana (2011)	Maharashtra	49542.62104	21.22	18.21	4.83	90.54	75.84	38.89	31.61	59.16	1.11	8.12	77.99
Chandrapur (2001)	Maharashtra	24562.00832	32.11	14.34	18.12	82.94	62.89	36	25.8	58.7	1.9	13.5	74.48
Chandrapur (2011)	Maharashtra	77443.84063	35.18	15.8	17.67	86.79	72.97	37.91	20.19	61.22	1.72	16.87	73.39
Dhule (2001)	Maharashtra	17121.19873	26.11	6.39	25.97	81.4	61.39	34.2	25.3	62.2	3.2	9.2	76.84
Dhule (2011)	Maharashtra	60642.79313	27.84	6.22	31.56	79.5	65.77	36.71	22.92	61.09	2.39	13.6	76.87

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Gadchiroli (2001)	Maharashtra	14292.98749	6.93	11.22	38.31	71.86	48.07	46.9	41.1	50.1	1.5	7.3	89.04
Gadchiroli (2011)	Maharashtra	43646.34808	11	11.25	38.71	82.31	66.27	49.08	34.8	52.48	1.86	10.86	85.94
Gondiya (2001)	Maharashtra	17386.67302	11.94	13.97	16.36	89.61	67.58	43.3	30.9	44.5	15.6	9	80.67
Gondiya (2011)	Maharashtra	50827.70828	17.08	13.31	16.2	92.04	77.89	42.71	26.44	51.21	7.09	15.25	77.78
Hingoli (2001)	Maharashtra	13741.03489	15.6	10.2	8.8	80.71	51.17	41.6	46.3	47.3	1.2	5.2	90.61
Hingoli (2011)	Maharashtra	41619.06663	15.18	15.51	9.51	86.94	68.95	41.73	42.98	47.41	1.43	8.18	83.5
Jalgaon (2001)	Maharashtra	20313.41221	28.59	7.79	11.84	85.91	64.3	33	24.1	65	2.5	8.3	74.35
Jalgaon (2011)	Maharashtra	73951.80567	31.74	9.2	14.29	85.36	70.56	33.31	19.31	65.15	2.35	13.19	72.52
Jalna (2001)	Maharashtra	14082.19569	19.09	11.22	1.99	79.14	49.04	38.4	45.1	45.4	2.3	7.2	86.09
Jalna (2011)	Maharashtra	53475.00773	19.27	13.9	2.16	81.53	60.95	40.72	45.86	41.1	2.14	10.9	83.32
Kolhapur (2001)	Maharashtra	26967.90553	29.81	12.76	0.61	87.47	66.02	36.7	48.3	26.5	4.2	21	76.82
Kolhapur (2011)	Maharashtra	94543.31926	31.73	13.01	0.78	88.57	74.22	30.54	46.11	24.44	4.21	25.24	68.86
Latur (2001)	Maharashtra	13503.24595	23.57	19.43	2.3	82.94	59.4	31.4	37.3	51.6	2.1	9.1	76.79
Latur (2011)	Maharashtra	50525.71188	25.47	19.6	2.34	84.39	69.63	31.91	32.34	51	2.08	14.57	73.49
Mumbai (2001)	Maharashtra	167164.565	100	5.5	0.62	90.23	81.38	13.7	0.3	0.1	6.7	92.9	57.26
Mumbai (2011)	Maharashtra	718371.0695	100	7.13	0.81	91.48	86.45	18.8	0.86	0.5	4.94	93.71	59.93
Mumbai (Suburban) (2001)	Maharashtra	NA	100	4.65	0.82	91.56	81.12	12.8	0.2	0.2	6.5	93.2	54.74
Mumbai (Suburban) (2011)	Maharashtra	NA	100	6.23	1.12	92.92	86.37	18.28	0.81	0.67	5.12	93.39	58
Nagpur (2001)	Maharashtra	27794.07307	64.26	17.12	10.93	90.18	77.42	22.8	18.8	44.9	3.4	32.9	61.42
Nagpur (2011)	Maharashtra	101822.9016	68.31	18.65	9.4	92.09	84.51	23.55	12.8	39.24	3.37	44.59	60.7
Nanded (2001)	Maharashtra	13478.48021	23.96	17.32	8.82	80.44	54.35	34.4	31.9	55.8	3.3	9	79.97
Nanded (2011)	Maharashtra	49430.3976	27.19	19.05	8.38	84.27	66.15	34.86	29.33	54.42	2.41	13.85	75.01
Nandurbar (2001)	Maharashtra	13655.31532	15.45	3.16	65.53	66.16	45.18	41	28.8	62.8	1.8	6.6	85.88
Nandurbar (2011)	Maharashtra	37608.55915	16.71	2.91	69.28	72.17	56.47	42.84	21.89	66.91	2.06	9.13	82.84
Nashik (2001)	Maharashtra	26908.2878	38.8	5.54	23.92	83.65	64.35	34	45.7	37.1	2.8	14.4	76.14
Nashik (2011)	Maharashtra	79462.1157	42.53	9.08	25.62	88.17	76.08	34.48	41.17	37.47	2.49	18.87	73.36
Osmanabad (2001)	Maharashtra	13894.25166	15.69	16.53	1.87	80.42	56.89	36.7	36.3	53	3.2	7.6	83.88
Osmanabad (2011)	Maharashtra	54573.66661	16.96	16	2.17	85.84	70.51	37.7	36.26	48.21	3.33	12.2	80.34
Parbhani (2001)	Maharashtra	15547.14066	31.76	9.98	2.3	79.63	52.02	34.8	38.9	51.9	1.4	7.8	81.99
Parbhani (2011)	Maharashtra	53298.15706	31.03	13.47	2.21	82.64	63.63	35.98	36.87	49.62	1.72	11.79	77.17
Pune (2001)	Maharashtra	37153.08076	58.08	10.53	3.62	88.34	71.89	27.1	40	22.9	4.1	33.1	66.14
Pune (2011)	Maharashtra	124617.5794	60.99	12.52	3.7	90.84	81.05	27.5	31.15	17.62	3.78	47.46	65.31
Raigarh (2001)	Maharashtra	34561.1204	24.22	2.43	12.19	86.15	67.75	29.8	40.9	32.1	3.2	23.8	69.18
Raigarh (2011)	Maharashtra	112052.9952	36.83	5.12	11.58	89.13	76.92	24.74	25.89	29.14	4.2	40.77	63.02

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Ratnagiri (2001)	Maharashtra	20641.42784	11.33	1.44	1.18	85.89	65.77	39.5	68.3	16.8	1.7	13.2	78.81
Ratnagiri (2011)	Maharashtra	86175.88475	16.33	4.15	1.26	90.93	74.53	35.96	51.81	27.69	2.49	18	73.25
Sangli (2001)	Maharashtra	23374.97155	24.51	12.13	0.69	86.26	66.73	37.9	49.7	33	4.4	12.9	80.55
Sangli (2011)	Maharashtra	80793.21282	25.49	12.51	0.65	88.22	74.59	29.93	36.39	35.6	5.06	22.95	69.57
Satara (2001)	Maharashtra	22453.05615	14.17	8.76	0.78	88.2	68.38	39.1	54.5	31	3.1	11.4	79.86
Satara (2011)	Maharashtra	77197.06859	18.99	10.76	0.99	89.42	76.31	34.17	44.5	32.28	3.9	19.32	72.73
Sindhudurg (2001)	Maharashtra	20634.99554	9.47	4.44	0.57	90.26	71.23	39.2	55.4	24.2	3.9	16.4	78.55
Sindhudurg (2011)	Maharashtra	84281.66388	12.59	6.54	0.82	91.58	79.81	27.18	41.54	28.85	2.92	26.69	65.68
Solapur (2001)	Maharashtra	19778.21783	31.83	15.02	1.79	81.99	58.84	36.9	35.3	41.1	9	14.7	80.12
Solapur (2011)	Maharashtra	70256.4017	32.4	15.05	1.8	85.03	68.55	33.09	32.93	40.54	6.44	20.09	72.28
Thane (2001)	Maharashtra	36443.44601	72.58	4.18	14.75	87.06	73.1	19.6	25.9	22	5	47.1	61.14
Thane (2011)	Maharashtra	123703.5888	76.99	6.6	13.95	88.72	79.77	21.74	12.99	17.82	4.8	64.39	60.93
Wardha (2001)	Maharashtra	20089.73621	26.28	12.83	12.49	87.18	72.45	33.8	22.7	63	2	12.3	74.28
Wardha (2011)	Maharashtra	69643.15092	32.54	14.52	11.49	91.92	81.81	34.14	18.65	64.06	2.1	15.19	72.5
Washim (2001)	Maharashtra	14438.11899	17.49	15.94	6.96	85.44	60.57	38	29.3	65.5	1.2	4	81.8
Washim (2011)	Maharashtra	52165.12413	17.66	19.17	6.72	90.55	75.48	39.77	27.4	63.81	1.4	7.39	79.19
Yavatmal (2001)	Maharashtra	16442.00334	18.6	10.28	19.26	84.09	62.52	37.2	25.3	65.6	1.1	8.1	80.09
Yavatmal (2011	Maharashtra	56078.81839	21.58	11.85	18.54	89.41	75.93	39.97	22.21	66.74	1.24	9.82	78.66
Anugul (2001)	Orrissa	26294.40449	13.9	17.2	11.67	81.43	55.37	26.7	29.41	43.84	8.48	18.27	67.35
Anugul (2011)	Orrissa	86215.80269	16.21	18.81	14.1	85.98	68.64	26.79	16.64	65.43	7.1	10.83	65.93
Balangir (2001)	Orrissa	10782.57904	11.54	16.92	20.63	71.67	39.51	28.4	16.76	62.82	5.08	15.34	72.07
Balangir (2011)	Orrissa	40763.50654	11.97	17.88	21.05	75.85	53.5	30.61	10.49	66.12	4.33	19.07	72.67
Baleshwar (2001)	Orrissa	9972.842785	10.88	18.84	11.28	81.69	58.9	11.4	17.98	50.27	9.81	21.94	55.03
Baleshwar (2011)	Orrissa	36025.96649	10.92	20.62	11.88	87	72.28	21.92	18.61	55.76	4.07	21.56	64.99
Bargarh (2001)	Orrissa	10727.18846	7.69	19.37	19.36	77.41	50.26	31.3	21.39	61.13	8.09	9.39	73.91
Bargarh (2011)	Orrissa	34603.02244	10.13	20.17	18.98	26.56	65.38	39.45	16.64	65.43	7.1	10.83	80.14
Baudh (2001)	Orrissa	10384.0138	4.83	21.88	12.47	76.23	39.02	35.5	23.59	58.59	8.28	9.54	79.23
Baudh (2011)	Orrissa	37195.63335	4.63	23.79	12.55	83.34	59.79	42.74	14.33	67.51	5.52	12.65	85.46
Bhadrak (2001)	Orrissa	8427.672673	10.58	21.5	1.88	84.65	62.85	8.1	23.42	39.07	7.69	29.82	50.44
Bhadrak (2011)	Orrissa	29461.33568	12.34	22.23	2.02	89.64	75.83	7.91	14.93	35.95	6	43.13	35.31
Cuttack (2001)	Orrissa	13835.07027	27.38	19.08	3.57	85.82	66.9	13.8	12.71	35.91	9.31	42.07	55.74
Cuttack (2011)	Orrissa	50012.61207	28.05	19	3.57	91.11	79.55	13.72	6.25	34.74	7.97	51.05	55.03
Debagarh (2001)	Orrissa	13308.62288	7.33	15.37	33.6	73.33	47.18	38.6	27.22	59.3	4.52	8.96	80.06
Debagarh (2011)	Orrissa	33618.64841	7.16	16.67	35.33	81.92	63.05	47.35	17.68	62.76	5.86	13.7	86.57

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Dhenkanal (2001)	Orrissa	11175.31714	8.71	18.49	12.79	80.57	57.89	15.1	14.79	55.19	7.53	22.49	56.36
Dhenkanal (2011)	Orrissa	40750.71407	9.85	19.62	13.59	86.18	71	16.37	5.69	57.69	4.92	31.7	58.13
Gajapati (2001)	Orrissa	11297.96063	10.19	7.5	50.78	54.71	28.42	49.7	27.49	57.69	2.2	12.62	96.05
Gajapati (2011)	Orrissa	38444.69789	12.23	6.78	54.29	64.38	43.18	46.8	13.74	66.33	1.83	18.1	88.25
Ganjam (2001)	Orrissa	10830.16546	17.6	18.57	2.88	75.22	46.44	30.9	17.18	61.38	4.49	16.95	72.75
Ganjam (2011)	Orrissa	38972.39781	21.76	19.5	3.37	80.99	61.13	29.25	10.62	61.36	2.83	25.19	69.51
Jagatsinghapur (2001)	Orrissa	14201.00999	9.87	21.05	0.82	88.55	69.28	11.5	17.31	37.49	6.31	38.89	51.93
Jagatsinghapur (2011)	Orrissa	52281.80842	10.2	21.83	0.69	92.38	80.63	13.96	15.54	36.42	5.57	42.47	55.06
Jajapur (2001)	Orrissa	9783.475268	4.49	22.99	7.76	81.89	60.76	6.8	10.6	43.07	6.87	39.46	46.75
Jajapur (2011)	Orrissa	53820.45237	7.39	23.72	8.29	86.84	73.29	7.34	10.5	38.41	5.06	46.04	48.36
Jharsuguda (2001)	Orrissa	24123.62963	36.47	17.07	31.34	82.16	58.48	22.6	18.47	38.47	19.69	23.37	61.86
Jharsuguda (2011)	Orrissa	88287.93539	39.89	18.05	30.5	86.61	70.73	26.76	10.92	39.7	13.12	36.26	65.74
Kalahandi (2001)	Orrissa	10167.47361	7.5	17.67	28.65	62.66	29.28	35.9	15.57	71.8	3.45	9.18	80.71
Kalahandi (2011)	Orrissa	34997.51723	7.74	18.17	28.5	71.9	46.68	38.57	8.53	76.2	2.53	12.74	81.49
Kandhamal (2001)	Orrissa	13205.62603	6.8	16.89	51.96	69.79	35.86	42.2	26.1	46.57	12.81	14.52	86.13
Kandhamal (2011)	Orrissa	65712.10323	9.86	15.76	53.18	76.93	51.94	43.37	13.73	59.41	4.79	22.07	85.34
Kendrapara (2001)	Orrissa	8401.887858	5.69	20.52	0.52	87.11	66.76	10	35.01	32.6	5.41	26.98	52.4
Kendrapara (2011)	Orrissa	28262.35923	5.8	21.51	0.66	91.45	78.96	11.14	17.25	35.69	6.4	40.66	52.74
Kendujhar (2001)	Orrissa	12715.89447	13.64	11.62	44.5	71.99	46.22	28.05	23.21	54.88	7.83	14.08	68.51
Kendujhar (2011)	Orrissa	96883.38949	14.05	11.62	45.45	78.12	58.28	29.98	12.13	66.11	3.36	18.4	70.39
Khordha (2001)	Orrissa	17455.14396	42.92	13.54	5.18	87.9	70.36	8.8	5.36	25.85	5.88	62.91	48.96
Khordha (2011)	Orrissa	60568.74155	48.16	13.21	5.11	91.78	81.61	13.49	4.86	18.07	6.52	70.55	53.35
Koraput (2001)	Orrissa	16315.68382	16.81	13.04	49.62	47.2	24.26	40.4	24.45	56.69	2.15	16.71	82.97
Koraput (2011)	Orrissa	45763.73522	16.39	14.25	50.56	60.32	38.55	44.14	20.58	59.49	2.11	17.82	88.22
Malkangiri (2001)	Orrissa	10176.75596	6.86	21.35	57.43	40.14	20.91	42.3	46.94	37.45	3.97	11.64	88.41
Malkangiri (2011)	Orrissa	27333.20069	8.08	22.55	57.83	59.07	38.28	45.28	32.01	53.24	4.21	10.55	92.5
Mayurbhanj (2001)	Orrissa	9636.259948	7	7.68	56.6	65.76	37.86	39.9	16.32	48.63	24.65	10.4	81.76
Mayurbhanj (2011)	Orrissa	33427.91989	7.66	7.33	58.72	73.76	52.71	41.61	8.65	59.07	14.87	17.41	81.91
Nabarangapur (2001)	Orrissa	8716.120441	5.78	14.1	55.03	47.04	20.67	42.4	15.38	72.42	2.28	9.92	89.64
Nabarangapur (2011)	Orrissa	25568.94408	7.18	14.53	55.79	57.31	35.8	43.54	11.07	75.84	2.46	10.63	89.84
Nayagarh (2001)	Orrissa	8657.560994	4.29	14.04	5.88	82.66	57.64	11	14.53	37.69	22.81	24.97	56.2
Nayagarh (2011)	Orrissa	27123.07681	8.28	14.17	6.1	88.16	72.05	12.83	11.17	41.41	10.64	36.78	57.73
Nuapada (2001)	Orrissa	11565.32062	5.66	13.62	34.71	58.46	25.79	36.8	19.27	67.9	2.95	9.88	82.3
Nuapada (2011)	Orrissa	33082.06992	5.58	13.46	33.8	70.29	44.76	44.51	17.93	69.33	2.84	9.9	87.52

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Puri (2001)	Orrissa	10324.53972	13.58	18.23	0.3	88.08	67.57	7.7	13.29	41.17	8.3	37.24	49.71
Puri (2011)	Orrissa	31886.99793	15.6	19.14	0.36	90.85	78.28	14.79	12.13	37.72	6.61	43.55	57.05
Rayagada (2001)	Orrissa	11934.65598	13.88	13.92	55.76	48.18	24.56	41.3	21.39	62.15	2.03	14.43	83.83
Rayagada (2011)	Orrissa	39187.69391	15.18	14.41	55.99	61.04	39.19	42.16	12.75	70.28	2.14	14.83	83.76
Sambalpur (2001)	Orrissa	15938.6413	27.12	17.04	34.5	78.99	55.16	35.7	13.56	39.28	28.81	18.35	75.08
Sambalpur (2011)	Orrissa	57734.75913	29.59	18.43	34.12	84.35	67.93	37.47	9.37	41.47	23.56	25.6	75.67
Sonapur (SUBARNAPUR) (2001)	Orrissa	9835.835633	7.39	23.62	9.78	78.94	46.17	32.8	17.9	64.75	7.88	9.47	75.74
Sonapur (SUBARNAPUR) (2011)	Orrissa	32806.22371	8.18	25.6	9.37	84.4	64.04	35.15	10.87	68.47	7.35	13.3	76.62
Sundargarh (2001)	Orrissa	13954.48559	34.37	8.62	50.19	75.34	53.88	28.9	26.45	52.02	2.56	18.97	67.63
Sundargarh (2011)	Orrissa	83433.84587	35.26	9.16	50.75	81.01	65.48	27.95	14.78	51.27	3.11	30.84	66.32
Amritsar (2001)	Punjab	27058.50016	39.51	28.78	0	72.61	61.26	16.7	14.74	22.17	8.62	54.47	61.82
Amritsar (2011)	Punjab	66798.9879	53.58	30.95	0	80.15	71.96	15.58	7.59	16.52	8.77	67.13	57.3
Barnala (2001)	Punjab	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barnala (2011)	Punjab	82792.88764	32.02	32.24	0	71.57	63.57	11.21	9.15	18.63	5	67.22	55.33
Bathinda (2001)	Punjab	25461.52904	29.73	29.97	0	67.78	53.7	27.5	19.48	22.9	5.96	51.66	70.85
Bathinda (2011)	Punjab	73001.06228	35.95	32.44	0	73.79	61.94	18.13	12.89	28.46	5.24	53.41	61.16
Faridkot (2001)	Punjab	29627.76733	35.14	36.17	0	68.15	55.03	20.6	10.14	18.68	8.16	63.02	64.89
Faridkot (2011)	Punjab	80448.51241	35.15	38.92	0	74.6	63.91	12.55	8.76	27.47	8.41	55.36	56.51
Fatehgarh Sahib (2001)	Punjab	34695.49718	28.08	30.67	0	78.27	68.31	18.9	5.78	5.99	3.33	84.9	63.4
Fatehgarh Sahib (2011)	Punjab	91554.79428	30.91	32.07	0	83.33	74.8	11.46	7.53	6.97	7.03	78.47	54.93
Firozpur (2001)	Punjab	27018.16097	25.81	22.82	0	68.73	51.72	18.9	23.11	33.75	4.91	38.23	65.02
Firozpur (2011)	Punjab	70962.27146	27.23	42.17	0	75.44	61.69	16.74	16.11	44.49	3.43	35.97	59.55
Gurdaspur (2001)	Punjab	24084.42732	25.44	24.75	0	79.78	67.14	13.1	11.27	14.51	15.05	59.17	56.82
Gurdaspur (2011)	Punjab	68651.49067	28.69	25.26	0	84.56	74.85	11.01	11.87	10.77	9.69	67.68	51.94
Hoshiarpur (2001)	Punjab	25069.22233	19.72	34.28	0	86.45	75.32	17.6	21.35	21.84	4.57	52.24	59
Hoshiarpur (2011)	Punjab	84295.28086	21.11	35.14	0	88.75	80.31	11.23	9.53	17.52	5.05	67.9	49.65
Jalandhar (2001)	Punjab	30302.03291	47.48	37.69	0	82.49	73.08	12.8	9.16	14.94	9.22	66.68	56.11
Jalandhar (2011)	Punjab	88341.25794	52.93	38.95	0	86.15	78.48	12.88	5.68	10.95	6.06	77.31	53.73
Kapurthala (2001)	Punjab	30742.02043	32.67	29.92	0	79.02	68.29	14.6	13.47	16.04	5.46	65.03	58.69
Kapurthala (2011)	Punjab	92839.26749	34.65	33.94	0	83.15	74.63	12.5	8.79	18.81	5.28	67.11	54.34
Ludhiana (2001)	Punjab	34894.03135	55.84	24.99	0	80.25	71.95	16.5	4.53	6.54	8.44	80.49	61.15
Ludhiana (2011)	Punjab	97449.85265	59.16	26.39	0	85.98	77.88	14.18	5.19	7.37	9.53	77.91	56.08
Mansa (2001)	Punjab	23606.69495	20.68	30.33	0	58.9	45.18	25.6	19.46	25.36	7.14	48.04	71.56
Mansa (2011)	Punjab	74669.73086	21.25	33.63	0	67.31	55.68	27.08	20.27	33.57	7.4	38.76	69.06

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Moga (2001)	Punjab	35083.60023	19.96	31.84	0	68.01	58.52	24.5	12.27	20.1	13.05	54.58	69.02
Moga (2011)	Punjab	100746.3751	22.82	36.5	0	74.44	66.48	14.22	9.01	17.6	11.98	61.41	57.77
Muktsar (2001)	Punjab	25508.78272	25.53	37.75	0	65.39	50.25	22.8	17.8	31.74	3.09	47.37	67.82
Muktsar (2011)	Punjab	75277.19382	27.96	42.31	0	71.76	59.24	14.69	10.21	44.91	2.4	42.48	59.01
Patiala (2001)	Punjab	31487.35944	34.94	23.05	0	75.88	62.86	17.8	11.37	21.55	6.67	60.41	61.46
Patiala (2011)	Punjab	79849.7747	40.26	24.55	0	80.2	69.8	12.38	5.67	14.65	7.33	72.35	53.87
Rupnagar (2001)	Punjab	30120.65141	32.47	23.89	0	83.97	71.4	23.8	17.54	4.83	2.59	75.04	65.49
Rupnagar (2011)	Punjab	82702.5519	25.97	26.42	0	87.5	76.42	14.3	15.39	8.12	11.27	65.22	53.27
Sahid Bhagat Singh Nagar (Nawanshahr) (2001)	Punjab	33173.7218	13.8	40.46	0	82.86	69.52	33.2	9.91	7.51	3.57	79.01	75.99
Sahid Bhagat Singh Nagar (Nawanshahr) (2011)	Punjab	112781.9242	20.48	42.51	0	85.41	73.93	11.4	10.02	14.5	8.99	66.5	52.5
Sangrur (2001)	Punjab	30342.2254	29.24	27.57	0	65.81	53.38	24.6	13.86	13.66	6.52	65.96	69.4
Sangrur (2011)	Punjab	83711.63307	31.17	27.89	0	73.18	62.17	10.76	11.09	16.3	6.38	66.22	54.25
SAS Nagar (Mohali) (2001)	Punjab	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SAS Nagar (Mohali) (2011)	Punjab	71847.7662	54.76	21.74	0	87.89	79.18	12.38	5.57	4.89	7.24	82.3	55.14
Tarn Taran (2001)	Punjab	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tarn Taran (2011)	Punjab	72959.38737	12.66	33.71	0	73.24	61.85	12.65	13.49	18.19	14.32	54	55.57
Ajmer (2001)	Rajasthan	17295.46632	40.09	17.71	2.41	79.37	48.86	28	53.3	19.2	4.8	22.8	70.29
Ajmer (2011)	Rajasthan	51452.82919	40.08	18.51	2.46	82.44	55.68	29.2	38.03	24.05	3.63	34.29	68.2
Alwar (2001)	Rajasthan	17112.9576	14.53	18.01	8.02	78.09	43.28	43.9	70.6	12.4	2.1	14.9	93.95
Alwar (2011)	Rajasthan	50860.08421	17.81	17.77	7.87	83.75	56.25	41.17	60.78	17.55	2.33	19.34	81.13
Banswara (2001)	Rajasthan	10735.69399	7.14	4.28	72.27	60.45	28.43	43.9	77.8	15.3	2	5	95.16
Banswara (2011)	Rajasthan	22798.65479	7.1	4.46	76.38	69.48	43.06	48.82	54.82	31.87	2.34	10.98	94.17
Baran (2001)	Rajasthan	17284.34214	16.83	17.72	21.23	75.78	41.55	35.6	49.7	38.9	3.7	7.6	81.18
Baran (2011)	Rajasthan	46837.53218	20.79	18.09	22.64	80.35	51.96	37.84	34.3	46.92	3.62	15.16	77.73
Barmer (2001)	Rajasthan	12912.33106	7.4	15.73	6.04	72.76	43.45	41.8	83.2	5.7	3	8.2	94.03
Barmer (2011)	Rajasthan	28298.32295	6.98	16.76	6.77	70.86	40.63	41	69.98	13.86	2.64	13.52	89.57
Bharatpur (2001)	Rajasthan	13004.26149	19.46	21.7	2.24	80.54	43.56	33	68.2	20.9	1.7	9.1	80.34
Bharatpur (2011)	Rajasthan	31435.22119	19.43	21.87	2.12	84.1	54.24	35.54	48.13	32.33	3.18	16.35	76.15
Bhilwara (2001)	Rajasthan	17889.51077	20.6	15.72	8.97	67.39	33.48	38.6	69.5	11.6	2.9	16	86.37
Bhilwara (2011)	Rajasthan	57054.79527	21.28	16.94	9.52	75.27	47.21	39.87	56.15	21.47	2.36	20.01	81.54
Bikaner (2001)	Rajasthan	21255.87793	35.54	19.96	0.36	70.05	42.03	27.5	73.2	7	4.1	15.7	73.91
Bikaner (2011)	Rajasthan	38023.91801	33.86	20.88	0.33	75.9	53.23	30.77	63.15	13.85	2.74	20.26	74.81
Bundi (2001)	Rajasthan	16970.24787	18.65	18.11	20.24	71.68	37.79	40.5	63.1	21.2	2.1	13.6	88.27

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Bundi (2011)	Rajasthan	44916.98968	20.05	18.97	20.57	75.44	46.55	39.59	49.29	30.88	2.23	17.6	79.03
Chittaurgarh (2001)	Rajasthan	15666.71694	16.03	13.9	21.53	71.3	36.39	46.2	74.9	15.1	1.7	8.2	91.86
Chittaurgarh (2011)	Rajasthan	42892.64828	18.47	16.2	13.05	76.61	46.53	45.47	63.96	21.82	1.66	12.56	86.6
Churu (2001)	Rajasthan	10518.13057	27.87	21.17	0.52	79.69	53.35	38.4	87.6	4.6	1.8	5.9	86.78
Churu (2011)	Rajasthan	29149.55135	28.25	22.15	0.55	78.78	54.04	36.58	78.62	10.94	1.34	9.1	78.1
Dausa (2001)	Rajasthan	12558.09327	10.31	21.21	26.82	79.35	42.32	36.1	79.3	10.5	2.3	7.5	80.68
Dausa (2011)	Rajasthan	30237.55172	12.35	21.68	26.51	82.98	51.93	36.87	67.44	16.53	2.69	13.34	74.95
Dhaulpur (2001)	Rajasthan	10636.37418	17.96	20.13	4.84	75.09	41.84	34	35.3	9.5	3.2	52.1	89.47
Dhaulpur (2011)	Rajasthan	28348.68332	20.51	20.36	4.86	81.22	54.67	33.3	35.43	17.52	4.18	42.87	80.57
Dungarpur (2001)	Rajasthan	10944.04966	7.29	4.15	65.14	66.04	31.77	44.7	61.6	24.2	2.4	11.8	98.03
Dungarpur (2011)	Rajasthan	25769.84273	6.39	3.76	70.82	72.88	46.16	42.61	23.24	40.94	2	33.81	85.46
Ganganagar (2001)	Rajasthan	20012.98743	25.33	33.72	0.82	75.53	52.44	25	39.7	32.4	2.5	25.4	71.31
Ganganagar (2011)	Rajasthan	57417.52524	27.19	36.58	0.68	78.5	59.7	34.17	24.85	30.7	2.02	42.43	75.43
Hanumangarh (2001)	Rajasthan	17453.76333	19.99	26.13	0.66	75.18	49.56	29.9	70.5	18.5	2.1	9	74.59
Hanumangarh (2011)	Rajasthan	45772.26546	19.75	27.85	0.81	77.41	55.84	38.23	43.78	21.94	2.05	32.23	77.5
Jaipur (2001)	Rajasthan	21507.36488	49.36	14.81	7.86	82.8	55.52	22.3	59.6	9.1	5.1	26.2	64.25
Jaipur (2011)	Rajasthan	64085.18858	52.4	15.14	7.97	86.05	64.02	23.75	48.42	9.78	3.93	37.87	60.97
Jaisalmer (2001)	Rajasthan	17174.1299	15.03	14.58	5.48	66.26	32.05	29.4	60.1	12.3	2.6	24.9	81.22
Jaisalmer (2011)	Rajasthan	43096.25492	13.29	14.8	6.33	72.04	39.71	34.5	52.81	21.16	2.52	23.51	81.81
Jalor (2001)	Rajasthan	15451.70953	7.59	18.03	8.75	64.72	27.8	46.1	71.2	14.7	2.8	11.2	102.2
Jalor (2011)	Rajasthan	29482.9964	8.3	19.53	9.77	70.67	38.47	45.03	57.8	22.91	2.4	16.89	91.99
Jhalawar (2001)	Rajasthan	14066.65802	14.25	15.64	12.02	73.31	40.02	39.6	60.5	32.5	1.6	5.4	88.23
Jhalawar (2011)	Rajasthan	37803.39005	16.25	17.26	12.91	75.75	46.53	41.27	44.56	44.26	1.52	9.66	83.37
Jhunjhunun (2001)	Rajasthan	13399.09463	28.65	16.16	1.92	86.09	59.51	32.6	79.2	7.2	2.3	11.3	75.06
Jhunjhunun (2011)	Rajasthan	34674.25659	22.89	16.88	1.95	86.9	60.95	33.93	76.18	7.81	1.14	14.87	70.52
Jodhpur (2001)	Rajasthan	17257.86028	33.85	15.81	2.76	72.96	38.64	27.1	69.2	16.4	2.5	12	72.58
Jodhpur (2011)	Rajasthan	41191.37061	34.3	16.49	3.23	78.95	51.83	29.75	52.07	25.78	2.48	19.67	71.44
Karauli (2001)	Rajasthan	11581.71891	14.21	23.16	22.37	79.54	44.39	34.2	71.8	17.4	2.9	7.8	80.11
Karauli (2011)	Rajasthan	35852.123	14.96	24.31	22.28	81.41	48.61	38.2	59.92	28.08	1.52	10.48	78.45
Kota (2001)	Rajasthan	19963.2776	53.46	19.16	9.69	85.23	60.43	19.4	33.6	32.2	5.4	28.8	60.15
Kota (2011)	Rajasthan	51335.47308	60.61	20.78	9.42	86.31	65.87	23.03	20.33	35.42	4.86	39.39	60.66
Sawai Madhopur (2001)	Rajasthan	13187.77824	19.03	19.98	21.58	75.74	35.17	35.6	76	13.1	3	7.9	80.21
Sawai Madhopur (2011)	Rajasthan	36120.0633	19.95	20.87	21.4	81.51	47.51	37.1	62.57	22.57	2.14	12.72	74.72
Nagaur (2001)	Rajasthan	12897.4962	17.2	19.65	0.23	74.1	39.67	32.9	76.5	14.5	2.1	6.8	78.87

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Nagaur (2011)	Rajasthan	31258.48653	19.26	21.16	0.31	77.16	47.82	35.3	62.53	24.57	1.6	11.3	75.28
Pali (2001)	Rajasthan	15643.17229	21.47	17.77	5.81	72.2	36.48	30.9	39.3	35.4	4.4	20.9	77.23
Pali (2011)	Rajasthan	45331.44743	22.58	19.54	7.1	76.81	48.01	31.54	28.89	45.15	2.79	23.18	67.32
Pratapgarh (2001)	Rajasthan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pratapgarh (2011)	Rajasthan	41488.71692	8.27	6.96	63.42	69.5	42.35	53.38	61.39	26.61	1.03	10.97	99.04
Rajsamand (2001)	Rajasthan	16142.97119	13.04	12.41	13.09	73.99	37.59	30	52.8	23.5	3.6	20.1	76.04
Rajsamand (2011)	Rajasthan	44128.69824	15.89	12.81	13.9	78.42	47.95	40.21	44.46	28.82	2.49	24.24	83.76
Sikar (2001)	Rajasthan	12602.12922	20.65	14.85	2.73	84.34	56.11	31.5	79.9	6.9	2.9	10.4	75.11
Sikar (2011)	Rajasthan	33760.06396	23.68	15.64	2.81	85.11	58.23	26.77	69.89	10.69	2.16	17.25	64.06
Sirohi (2001)	Rajasthan	21873.51297	17.73	19.15	24.76	69.89	37.15	30.1	34.5	33.4	3.2	28.9	76.47
Sirohi (2011)	Rajasthan	45534.7667	20.13	19.48	28.22	69.98	39.73	29.4	29.47	39.58	2.14	28.81	71.6
Tonk (2001)	Rajasthan	13667.65401	20.9	19.24	12.04	70.52	32.15	38.3	66.3	16.8	3.9	12.9	83.3
Tonk (2011)	Rajasthan	34797.67485	22.35	20.26	12.54	77.12	45.45	40.01	55.25	25.64	2.59	16.53	77.15
Udaipur (2001)	Rajasthan	17098.69548	18.62	6.01	47.86	73.62	43.26	31.8	63	18.9	2.4	15.6	76.88
Udaipur (2011)	Rajasthan	40947.19541	19.83	6.14	49.71	74.74	48.45	35.29	40.86	35.73	2.48	20.94	78.23
Ariyalur (2001)	Tamil Nadu	NA	11.36	21.74	1.23	77.19	51.15	41.5	24.6	60.2	6.5	8.7	80.18
Ariyalur (2011)	Tamil Nadu	16310.63434	11.1	23.34	1.42	81.23	61.74	38.74	24.96	58.69	4.06	12.28	75.62
Chennai (2001)	Tamil Nadu	28686.25314	100	13.7	0.15	90.01	80.44	13.5	3.2	0.6	4.6	91.6	52.22
Chennai (2011)	Tamil Nadu	59208.83752	100	16.78	0.22	93.7	86.64	19.39	1.24	1.3	4.2	93.27	57.08
Coimbatore (2001)	Tamil Nadu	29150.9358	66.02	14.76	0.68	84.59	69.06	28.7	10.9	32.6	4.8	51.7	69.35
Coimbatore (2011)	Tamil Nadu	62596.03331	75.73	15.5	0.82	89.06	78.92	28.04	5.89	23.22	4.63	66.27	66.91
Cuddalore (2001)	Tamil Nadu	19547.12424	33.01	27.76	0.52	81.64	60.27	29.6	16.7	63.9	4.5	14.9	67.4
Cuddalore (2011)	Tamil Nadu	42679.15211	33.97	29.32	0.6	85.93	70.14	32.47	11.69	61.91	4.11	22.29	68.26
Dharmapuri (2001)	Tamil Nadu	8425.655568	15.96	14.6	2.08	71.6	50.65	40.5	37.4	44.7	3.6	14.3	81.52
Dharmapuri (2011)	Tamil Nadu	45462.86508	17.32	16.29	4.18	76.85	59.8	41.65	27.99	47.3	2.89	21.82	77.24
Dindigul (2001)	Tamil Nadu	21042.85252	35.01	19.56	0.34	79.76	58.87	40.7	19.9	55.4	4	20.6	79.16
Dindigul (2011)	Tamil Nadu	44823.55801	37.41	20.95	0.37	84.23	68.33	40.76	15.11	54.01	3.51	27.37	68.9
Erode (2001)	Tamil Nadu	25006.12047	46.25	16.35	0.69	75.32	55.15	44.3	21.4	44.6	6.9	27.1	83.92
Erode (2011)	Tamil Nadu	64394.44271	51.43	16.41	0.97	80.42	64.71	41.33	15.68	41.08	6.32	36.92	79.73
Kancheepuram (2001)	Tamil Nadu	26164.18323	53.34	25.09	0.92	84.73	68.79	24	11.3	44	7.6	37.1	61.88
Kancheepuram (2011)	Tamil Nadu	58848.09162	63.49	23.71	1.03	89.89	79.02	24.81	5.18	26.43	4.78	63.62	61.96
Kanniyakumari (2001)	Tamil Nadu	25693.57185	65.27	4.04	0.32	90.37	84.79	12.7	2.6	11.1	21.2	65.2	50.3
Kanniyakumari (2011)	Tamil Nadu	73022.72166	82.33	3.97	0.39	93.65	89.9	16.42	1.65	7.4	15.1	75.84	55.52
Karur (2001)	Tamil Nadu	22047.03287	33.26	20.33	0.15	79.63	56.76	43.2	20.1	52.7	5.3	21.9	81.9

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Karur (2011)	Tamil Nadu	55681.62496	40.82	20.8	0.05	84.54	66.86	39.95	15.39	50.33	2.72	31.35	78.43
Krishnagiri (2001)	Tamil Nadu	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Krishnagiri (2011)	Tamil Nadu	52787.01187	22.79	14.22	1.19	78.72	63.91	34.38	26.95	42.04	4	27.01	72.14
Madurai (2001)	Tamil Nadu	22816.02559	56.01	12.54	0.23	86.17	69.35	27.6	14.4	47.1	5.8	32.7	65.95
Madurai (2011)	Tamil Nadu	50165.0291	60.78	13.46	0.37	89.72	77.16	29.89	7.74	42.09	5.78	44.4	67.48
Nagapattinam (2001)	Tamil Nadu	18494.07491	22.18	29.64	0.23	84.89	67.96	23.6	8.5	72.6	2.9	16	63.28
Nagapattinam (2011)	Tamil Nadu	32994.15386	22.56	31.54	0.23	89.79	77.58	25.76	5.62	70.18	2.36	21.84	63.72
Namakkal (2001)	Tamil Nadu	28623.69448	36.51	18.8	3.44	77.56	57	48.2	22.8	42.3	7.4	27.5	87.01
Namakkal (2011)	Tamil Nadu	59260.65142	40.32	20	3.3	82.64	66.57	42.78	20.11	38.67	5.45	35.77	78.5
Nilgiris (2001)	Tamil Nadu	20581.75587	59.65	31.23	3.72	88.54	71.64	35.4	3.2	16.6	0.8	79.4	67.3
Nilgiris (2011)	Tamil Nadu	48029.35569	59.24	32.08	4.46	91.72	78.98	36.72	4.15	27.57	1.59	66.69	70.3
Perambalur (2001)	Tamil Nadu	29076.90936	16.05	30.21	0.67	77.89	54.43	49.7	45.5	44.6	1.8	8.1	86.32
Perambalur (2011)	Tamil Nadu	16402.19878	17.19	31.01	0.46	82.87	65.9	48.43	38.24	49.12	1.72	10.92	83.11
Pudukottai (2001)	Tamil Nadu	17767.93795	17.02	17.09	0.05	82.55	59.97	35.5	34.6	48.6	3.4	13.5	73.81
Pudukottai (2011)	Tamil Nadu	34903.31172	19.55	17.7	0.09	85.56	69	35.65	25.88	53.57	2.3	18.25	73.28
Ramanathpuram (2001)	Tamil Nadu	19878.6801	25.46	18.21	0.09	83.01	63.36	33.1	39.9	35.9	8.7	15.5	71.03
Ramanathpuram (2011)	Tamil Nadu	33376.53174	30.34	18.4	0.08	87.81	73.52	31.34	33.84	36.01	6.57	23.59	68.05
Salem (2001)	Tamil Nadu	21835.62496	46.09	15.77	3.45	74.39	55.2	35.2	23.9	40.1	9.9	26.1	75.5
Salem (2011)	Tamil Nadu	46965.75816	50.95	16.67	3.43	80.24	65.15	35.89	17.73	40.2	8.96	33.11	74.27
Sivganga (2001)	Tamil Nadu	17348.24591	28.22	16.35	0.09	83.14	61.74	33.5	39.4	40.1	3.6	17	71.19
Sivganga (2011)	Tamil Nadu	37652.42502	30.83	17.01	0.06	87.92	71.85	34.14	22.98	43.47	3.29	30.26	71.62
Thanjavur (2001)	Tamil Nadu	18281.53301	33.78	18.03	0.16	84.47	66.7	24.9	12.3	64.2	5.6	17.8	63.14
Thanjavur (2011)	Tamil Nadu	38948.45567	35.39	18.91	0.15	89.04	76.5	24	9.38	59.59	4.44	26.6	61.68
Theni (2001)	Tamil Nadu	19269.0708	54.1	19.36	0.15	81.88	61.19	37.3	9.1	67.6	3.2	20.1	75.6
Theni (2011)	Tamil Nadu	30561.30553	53.82	20.72	0.15	85.03	69.46	35.91	10	65	5	20	72.11
Thirunelveli (2001)	Tamil Nadu	22003.69458	48.03	17.66	0.31	85.21	67.43	39.1	7.1	27.9	46.4	18.6	74.86
Thirunelveli (2011)	Tamil Nadu	49317.74747	49.4	18.51	0.33	89.24	75.98	36	5.1	27.69	37.5	29.1	72.56
Thiruvallur (2001)	Tamil Nadu	26408.21909	54.45	21.81	1.37	85.26	68.39	19.8	8.8	43.6	8.4	39.3	57.75
Thiruvallur (2011)	Tamil Nadu	60562.5004	65.14	22.04	1.27	89.69	78.32	23.46	5.07	29.21	6.36	59.36	60.89
Thiruvarur (2001)	Tamil Nadu	15775.5538	20.29	32.35	0.23	85.43	67.9	27.1	8.2	47.7	2.7	11.3	65.73
Thiruvarur (2011)	Tamil Nadu	25962.58573	20.39	34.08	0.24	89.13	76.72	26.71	7.35	72.75	2.74	17.16	64.44
Thoothukudi (2001)	Tamil Nadu	27124.48792	42.28	18.38	0.22	88.32	75.13	30.7	10.6	34.8	14.8	39.8	69.36
Thoothukudi (2011)	Tamil Nadu	58968.35518	50.1	19.88	0.28	91.14	81.33	27.61	6.16	40.44	5.79	47.62	66.75
Tiruchirapalli (2001)	Tamil Nadu	23460.05526	47.1	16.52	0.78	86.55	69.31	31.1	22.5	48.4	5.6	23.5	68.06

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Tiruchirapalli (2011)	Tamil Nadu	59929.06707	49.15	17.14	0.67	89.72	76.87	31.01	15.48	47.36	3.78	33.37	68.04
Tiruppur (2001)	Tamil Nadu	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tiruppur (2011)	Tamil Nadu	63734.52433	61.36	15.97	0.22	85.49	71.82	36.2	12.13	28.29	4.35	55.23	75.51
Tiruvannamalai (2001)	Tamil Nadu	14802.67597	18.33	21.39	3.33	79.17	55.63	39.6	2.6	56.6	4.8	11	79.49
Tiruvannamalai (2011)	Tamil Nadu	31781.81449	20.08	22.94	3.69	83.11	65.32	40.62	19.84	59.22	3.83	17.11	77.71
Vellore (2001)	Tamil Nadu	21526.39521	37.61	20.53	1.81	81.99	62.79	27.4	16.5	41.9	17.1	24.5	66.52
Vellore (2011)	Tamil Nadu	51497.24452	43.24	21.85	1.85	86.5	71.95	28.64	9.68	33.83	14	42.49	65.57
Viluppuram (2001)	Tamil Nadu	13561.09517	14.42	27.39	2.16	75.06	52.38	40	25.4	62.1	2.8	9.7	79.94
Viluppuram (2011)	Tamil Nadu	26758.97612	15.01	29.37	2.16	80.55	63.15	39.92	18.33	62.4	2.79	16.48	76.88
Virudhunagar (2001)	Tamil Nadu	31941.85351	44.39	18.97	0.13	83.96	63.64	41.3	9.6	29.7	9.5	51.3	79.45
Virudhunagar (2011)	Tamil Nadu	69721.79203	50.47	20.59	0.12	87.71	72.69	38.07	6	29.92	6	58.09	74.51
Agra (2001)	Uttar Pradesh	12699.93448	43.3	21.78	0.02	74.6	48.35	7.2	20.4	20.9	14.1	44.6	51.7
Agra (2011)	Uttar Pradesh	38495.00215	45.81	22.43	0.16	80.62	61.18	13.15	13.47	19.87	12.82	53.84	54.13
Aligarh (2001)	Uttar Pradesh	12429.79448	28.9	21.2	0.01	71.71	43.03	13.3	25.7	25.3	14.7	34.4	59.43
Aligarh (2011)	Uttar Pradesh	36083.61603	33.13	20.56	0.02	77.97	55.68	14.23	15.31	25.44	14.33	44.92	56.84
Allahabad (2001)	Uttar Pradesh	11222.67456	24.45	21.58	0.09	75.81	46.38	23.1	33.1	39.1	13.3	14.4	64.31
Allahabad (2011)	Uttar Pradesh	31384.51942	24.74	22	0.13	82.55	60.97	24.3	21.97	34.34	12.4	31.3	62.23
Ambedaker Nagar (2001)	Uttar Pradesh	7232.164178	8.93	24.44	0.01	71.37	45.3	21.8	34.5	51.4	5.9	8.2	66.48
Ambedaker Nagar (2011)	Uttar Pradesh	20658.59623	11.71	24.65	0.03	81.66	62.66	20.24	20.16	47.21	8.65	23.99	59.22
Auraiya (2001)	Uttar Pradesh	9437.937344	14.32	27.69	0.01	80.14	59.13	14.8	42.1	34.3	7.5	16	62.42
Auraiya (2011)	Uttar Pradesh	27420.27263	16.98	28.39	0.01	86.11	70.61	12.12	26.04	41.15	6.25	26.57	33.25
Azamgarh (2001)	Uttar Pradesh	7053.830589	7.54	25.73	0.02	71.04	43.4	20.2	40.3	43.2	7.7	8.8	62.53
Azamgarh (2011)	Uttar Pradesh	20086.05277	8.53	25.39	0.2	81.34	60.91	18.47	25.15	42.52	11.1	21.23	54.93
Baghpat (2001)	Uttar Pradesh	16526.33053	19.71	10.98	0	76.99	49.17	15.1	40.3	27.3	5.5	26.8	62.4
Baghpat (2011)	Uttar Pradesh	53757.72803	21.11	11.44	0	82.45	59.95	12.29	22.59	22.28	10.32	44.81	56.18
Bahraich (2001)	Uttar Pradesh	7030.572784	9.99	14.39	0.36	45.58	22.78	16.1	42	48.6	2.8	6.7	68.92
Bahraich (2011)	Uttar Pradesh	14764.49875	8.14	14.6	0.32	58.34	39.18	15.61	25.27	50.9	6.02	17.81	63.39
Ballia (2001)	Uttar Pradesh	7067.880447	9.78	16.46	0.01	71.91	43.16	15.4	20	62	6.4	11.6	56.28
Ballia (2011)	Uttar Pradesh	20474.79238	9.39	15.27	3.4	81.49	59.75	18.92	14.34	42.85	9.64	33.17	56.99
Balrampur (2001)	Uttar Pradesh	7086.456445	8.06	13.48	1.15	45.84	21.79	31.2	50.4	43.8	2	3.8	50.38
Balrampur (2011	Uttar Pradesh	16763.01331	7.74	12.9	1.16	59.73	38.43	21.85	29.17	52.48	5.28	13.08	68.38
Banda (2001)	Uttar Pradesh	8582.585177	15.87	20.83	0	69.28	36.78	30.3	45.4	44.1	3	7.5	78.53
Banda (2011)	Uttar Pradesh	25249.165	15.32	21.55	0.01	77.78	53.67	25.96	31.08	51.61	3.2	14.12	72.44
Barabanki (2001)	Uttar Pradesh	10426.46548	9.3	26.89	0.02	58.85	34.29	20	38.8	43.8	8.9	8.5	70.63

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Barabanki (2011)	Uttar Pradesh	33104.46625	10.15	26.51	0.02	70.27	52.34	20.7	28.71	44.6	9.46	17.23	68.1
Bareilly (2001)	Uttar Pradesh	12673.22705	32.92	12.65	0.01	58.73	35.22	9.2	34.1	19.5	13.2	33.1	58.79
Bareilly (2011)	Uttar Pradesh	30267.74593	35.26	12.52	0.07	67.5	48.3	11.91	13.5	14.75	24.21	47.54	57.29
Basti (2001)	Uttar Pradesh	6896.202731	5.56	20.87	0.01	67.1	36.92	23	47.7	40.4	4	8	69.87
Basti (2011)	Uttar Pradesh	17694.35463	5.6	20.85	0.15	77.88	56.23	18.61	30.32	45.74	5.8	18.13	58.98
Bijnor (2001)	Uttar Pradesh	14475.64343	24.31	20.94	0.08	68.78	46.1	7.9	26.6	27.2	18.3	27.9	55.38
Bijnor (2011)	Uttar Pradesh	39029.13423	25.13	21.38	0.08	76.56	59.72	9.45	15.55	26.58	11.44	46.42	52.25
Budaun (2001)	Uttar Pradesh	11316.38293	18.15	17.09	0	48.96	25.14	7.6	45.2	18.7	11.3	24.8	60.52
Budaun (2011)	Uttar Pradesh	26797.09041	17.51	16.91	0	60.98	40.09	9.78	35.3	21.82	12.26	30.63	58.17
Bulandshahar (2001)	Uttar Pradesh	16553.16873	23.15	20.21	0.01	74.31	42.48	28.3	29.5	19	9.6	41.8	78.66
Bulandshahar (2011)	Uttar Pradesh	42025.23969	24.79	20.74	0.01	80.93	55.57	16.65	20.12	24.59	12.6	42.68	59.34
Chandauli (2001)	Uttar Pradesh	10803.15789	10.56	24.29	0.02	74.04	44.13	18.9	23.5	54.6	9.4	12.5	62.31
Chandauli (2011)	Uttar Pradesh	23427.50451	12.42	22.88	2.14	81.72	60.35	20.28	13.45	46.58	13.31	26.66	60.4
Chitrakoot (2001)	Uttar Pradesh	7161.342948	9.99	26.34	0	77.69	50.3	36.1	53.8	36.2	2.9	7.1	85.32
Chitrakoot (2011)	Uttar Pradesh	17427.82814	9.71	26.89	0.04	75.8	52.74	30	36.62	48.21	4.08	11.09	76.17
Deoria (2001)	Uttar Pradesh	6123.532339	9.89	18.19	0.02	75.01	42.51	16.6	37.5	50.5	3.6	8.4	56.77
Deoria (2011)	Uttar Pradesh	18028.07917	10.22	15.11	3.54	83.27	59.38	15.17	22.97	44	7.69	25.34	51.59
Etah (2001)	Uttar Pradesh	9714.092194	17.33	17.15	0	67.52	39.26	7.9	38.8	22.6	15.6	23	56.83
Etah (2011)	Uttar Pradesh	30630.04373	15.11	15.84	0.01	81.28	58.8	12.78	27.16	23.07	12.89	36.88	55.76
Etawah (2001)	Uttar Pradesh	10077.22178	23.01	23.41	0	79.92	57.38	6.3	32.1	31.7	11.4	24.9	52.05
Etawah (2011)	Uttar Pradesh	26436.61375	23.16	24.55	0.01	86.06	69.61	12.55	23.75	34.92	8.29	33.04	55.35
Faizabad (2001)	Uttar Pradesh	8265.052697	13.46	22.59	0.01	69.42	42.26	27.9	41.5	44.1	4.4	10	75.02
Faizabad (2011)	Uttar Pradesh	26997.57507	13.77	22.46	0.04	78.12	59.03	19.26	26.37	41.71	7.07	24.85	60.35
Farrukhabad (2001)	Uttar Pradesh	10591.7061	21.75	16.43	0.06	71.14	48.65	7.7	32.4	11.8	35.1	20.8	56.25
Farrukhabad (2011)	Uttar Pradesh	21581.86416	22.08	16.59	0.01	77.4	59.44	11.12	24.53	16.53	24.74	34.21	55.86
Fatehpur (2001)	Uttar Pradesh	8573.313625	10.3	25.04	0.02	69.01	41.93	25.5	40	46.6	4.1	9.3	71.83
Fatehpur (2011)	Uttar Pradesh	26775.84262	12.23	24.75	0.01	72.02	56.58	28.06	24.84	50.66	7.04	17.46	72.13
Firozabad (2001)	Uttar Pradesh	12216.95719	30.32	18.85	0.01	75.89	50.95	6.9	18.5	15.3	20.5	45.7	52.93
Firozabad (2011)	Uttar Pradesh	28823.66033	33.35	18.97	0.1	80.82	61.75	11.98	13.18	15.5	16.77	54.55	54.16
Gautam Buddha Nagar (2001)	Uttar Pradesh	38911.34165	37.39	16.31	0.03	81.26	53.7	10.9	22.9	16.1	7.2	53.7	56.07
Gautam Buddha Nagar (2011)	Uttar Pradesh	113348.1584	59.12	13.11	0.13	88.06	70.82	16.59	11.03	10.62	10.83	67.52	58.39
Ghaziabad (2001)	Uttar Pradesh	19107.81241	55.2	18.04	0.01	79.84	58.01	8.6	19.4	13.5	10.4	56.7	51.63
Ghaziabad (2011)	Uttar Pradesh	42440.25337	67.55	16.52	0.08	85.42	69.79	13.18	8.67	10.24	9.27	71.83	54.42
Ghazipur (2001)	Uttar Pradesh	7229.763674	7.68	21.38	0.01	74.87	44.03	20.8	41.2	41.9	7.6	9.3	63.37

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Ghazipur (2011)	Uttar Pradesh	20949.13968	7.58	20.07	0.79	82.8	60.29	22.43	27.36	44.85	7.76	20.03	61.81
Gonda (2001)	Uttar Pradesh	6934.73282	7.06	15.67	0.01	56.39	27.17	15.8	47.5	42	3.2	7.4	66.37
Gonda (2011)	Uttar Pradesh	20445.41528	6.55	15.49	0.03	69.41	47.09	19.11	26.34	42.85	9.33	21.48	63.27
Gorakhpur (2001)	Uttar Pradesh	8700.141347	19.59	22.05	0.02	73.57	42.88	17.1	26.21	58.41	4.1	11.28	58.25
Gorakhpur (2011)	Uttar Pradesh	24924.30017	18.83	21.08	0.41	81.8	59.36	15.48	15.9	41.67	8.31	34.12	53.52
Hamirpur (2001)	Uttar Pradesh	10718.35083	16.65	22.79	0.02	71.87	40.14	27.4	35.2	53.4	2.5	9	74.81
Hamirpur (2011)	Uttar Pradesh	31462.71117	19	21.84	0.04	79.76	55.95	26.46	20.72	54.67	6.21	18.39	70.48
Hardoi (2001)	Uttar Pradesh	7401.893767	11.98	31.36	0.01	64.39	36.77	10	42.1	26.1	15.4	16.4	62.41
Hardoi (2011)	Uttar Pradesh	20689.5448	13.24	31.14	0.01	74.39	53.19	11.94	29.23	33.48	10.3	26.99	59.25
Hathras (2001)	Uttar Pradesh	14301.61426	19.79	25.2	0.01	76.28	46.31	10	24.9	29.9	14.6	30.7	57.47
Hathras(Mahamaya Nagar) (2011)	Uttar Pradesh	39765.82212	21.26	24.77	0.02	82.38	59.23	11.8	14.03	33.16	14.61	38.2	55.12
Jalaun (2001)	Uttar Pradesh	11522.55282	23.41	27.04	0.01	77.39	49.21	20.3	33.1	52.7	4.8	9.5	66.38
Jalaun (2011)	Uttar Pradesh	31139.88736	24.79	27.7	0.05	83.48	62.46	19.11	20.67	52.07	7.64	19.62	62.26
Jaunpur (2001)	Uttar Pradesh	6741.248451	7.4	21.93	0.01	76.18	44.07	21.9	54.4	29.7	7.7	8.2	64.98
Jaunpur (2011)	Uttar Pradesh	17629.44005	7.71	22.04	0.11	83.8	59.81	22.13	37.47	37.2	6.93	18.39	59.46
Jhansi (2001)	Uttar Pradesh	15659.64499	40.79	28.07	0.06	78.76	50.16	23.1	39.6	37.7	9	13.8	65.58
Jhansi (2011)	Uttar Pradesh	43604.65785	41.7	28.14	0.19	85.38	63.49	26.52	23.19	43.96	8.92	23.93	66.73
Jyotiba Phule Nagar (Amorah) (2001)	Uttar Pradesh	15892.40782	24.56	17.27	0	62.57	34.56	14.1	45.5	15.9	20.9	17.7	63.26
Jyotiba Phule Nagar (Amorah) (2011)	Uttar Pradesh	31981.86522	24.93	17.28	0.01	74.54	52.1	15.97	31.95	24.13	11.58	32.34	58.63
Kannauj (2001)	Uttar Pradesh	13546.3953	16.7	18.43	0	72.76	49.16	14.6	30.5	14.6	41.5	13.5	63.89
Kannauj (2011)	Uttar Pradesh	26479.58247	16.95	18.71	0	80.91	63.33	12.1	21.25	17.93	35.57	25.25	56.66
Kanpur Dehat (2001)	Uttar Pradesh	11450.25765	6.89	24.85	0.02	76.39	54.64	14.7	42.2	40.7	4.8	12.3	63.87
Kanpur Dehat (2011)	Uttar Pradesh	26361.10777	9.66	25.64	0.04	83.45	66.86	16.19	25.26	46.21	5.73	22.8	60.67
Kanpur Nagar (2001)	Uttar Pradesh	15519.24557	67.12	16.45	0.05	80.25	67.46	9.7	23.5	26.9	6.2	43.5	51.57
Kanpur Nagar (2011)	Uttar Pradesh	51691.213	65.83	17.83	0.08	83.62	75.05	17	10.71	24.07	6.2	59.02	53.6
Kashiram Nagar (2001)	Uttar Pradesh	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kashiram Nagar ((2011)	Uttar Pradesh	30888.15558	20.06	17.7	0.01	71.56	49	14.5	37.96	21.53	13.6	26.9	61.2
Kaushambi (2001)	Uttar Pradesh	9656.46783	7.1	36.1	0.01	61.96	29.79	30.1	29.6	57.6	6.8	6	78.44
Kaushambi (2011)	Uttar Pradesh	25902.10278	7.78	34.72	0.01	72.78	48.56	31.07	18.22	59.16	6.08	16.54	76.58
Kheri (2001)	Uttar Pradesh	10857.68039	10.77	25.58	1.18	59.5	35.38	8.9	38.9	34.3	8.3	18.5	61.2
Kheri (2011)	Uttar Pradesh	25190.09669	11.46	26.4	1.33	69.57	50.42	10.87	24.22	34.71	10.2	30.87	57.88
Kushinagar (2001)	Uttar Pradesh	6927.079949	4.58	18.12	0.01	63.64	29.64	22.5	28.6	63	3.1	5.3	68.05
Kushinagar (2011)	Uttar Pradesh	16921.94009	4.72	15.27	2.25	77.71	52.36	17.87	18.09	53.04	6.52	22.35	58.6
Lalitpur (2001)	Uttar Pradesh	9063.405793	14.52	24.93	0	63.81	32.97	35	59.4	30.6	3.8	6.2	83.33

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Lalitpur (2011)	Uttar Pradesh	33338.87255	14.36	19.69	5.86	74.98	50.84	30.41	45.22	39.91	3.81	11.06	75.58
Lucknow (2001)	Uttar Pradesh	17531.4721	63.62	21.29	0.08	75.98	60.47	10.4	19.9	25.4	7.7	47	51.01
Lucknow (2011)	Uttar Pradesh	51312.05066	66.21	20.66	0.16	82.56	71.54	14.41	10.82	15.81	8.17	65.19	54.12
Maharajganj (2001)	Uttar Pradesh	7113.830675	5.09	19.51	0.12	63.92	27.93	29.9	33.2	60.2	2.1	4.6	78.75
Maharajganj (2011)	Uttar Pradesh	18341.9544	5.02	18.36	0.61	75.85	48.92	25.69	16.67	62.43	5.05	17.05	68.35
Mahoba (2001)	Uttar Pradesh	12323.29306	21.86	25.78	0.01	67.74	36.41	32.7	40.1	49.3	2.4	8.3	80.96
Mahoba (2011)	Uttar Pradesh	35108.64676	21.16	25.22	0.07	75.83	53.22	27.47	24.42	51.09	4.8	19.69	72.5
Mainpuri (2001)	Uttar Pradesh	10754.43503	14.6	19.31	0.04	76.7	51.41	6.3	52.8	19.2	7.6	20.4	53.34
Mainpuri (2011)	Uttar Pradesh	27228.95925	15.44	19.71	0.03	84.53	66.3	10.83	33.1	25.69	10.74	30.47	53.89
Mathura (2001)	Uttar Pradesh	14233.00664	28.3	19.6	0.01	76.47	43.43	24.5	40.9	26	6.9	26.2	72.82
Mathura (2011)	Uttar Pradesh	37524.57616	29.68	19.89	0.06	81.97	56.89	17.44	24.05	31.68	9.26	35	61.04
Mau (2001)	Uttar Pradesh	9138.310364	19.44	22.74	0.02	75.6	48.66	22.5	27.9	41.6	20.9	9.6	65.06
Mau (2011)	Uttar Pradesh	24730.63979	22.63	21.51	1.04	82.45	63.63	20.28	16.01	38.32	21.06	24.61	58.2
Meerut (2001)	Uttar Pradesh	17644.58802	48.44	18.44	0.01	75	53.12	10.7	26.1	20.2	9.3	44.4	94.95
Meerut (2011)	Uttar Pradesh	49594.17067	51.08	18.12	0.1	80.74	63.98	11.85	14.88	16.88	9.73	58.51	53.72
Mirzapur (2001)	Uttar Pradesh	8919.293662	13.54	26.76	0.06	69.59	39.26	20.6	25.5	56.7	7.9	10	66.4
Mirzapur (2011)	Uttar Pradesh	21393.08842	13.92	26.48	0.81	78.97	56.86	22.7	14.65	50.96	11.19	23.19	64.33
Moradabad (2001)	Uttar Pradesh	12280.84722	30.53	15.86	0.01	54.91	33.01	11.7	35.3	16.1	13.4	35.2	61.36
Moradabad (2011)	Uttar Pradesh	32578.01855	32.98	15.33	0.01	64.83	47.86	9.89	19.12	23.18	13.87	43.83	54.54
Muzaffarnagar (2001)	Uttar Pradesh	15103.02927	25.51	13.5	0	71.91	47.81	14.9	33.1	31.5	6.1	29.4	64.06
Muzaffarnagar (2011)	Uttar Pradesh	39970.58534	28.75	13.55	0.01	78.44	58.69	10.77	17.81	27.34	7.33	47.52	55.06
Pilibhit (2001)	Uttar Pradesh	11574.3355	17.88	15.23	0.11	62.49	35.11	5.6	27.9	32.9	17	22.2	54.81
Pilibhit (2011)	Uttar Pradesh	36687.17045	17.3	16.42	0.08	71.7	50	8.72	20.26	32.95	13.88	32.91	53.95
Pratapgarh (2001)	Uttar Pradesh	6246.398069	5.29	22.01	0.01	73.99	41.54	24.2	42.7	44.7	5.1	7.5	66.83
Pratapgarh (2011)	Uttar Pradesh	19043.25799	5.46	22.1	0.02	81.88	58.45	22.58	25.65	45.47	7.29	21.6	59.72
Rae Bareli (2001)	Uttar Pradesh	7710.834565	9.54	29.83	0.06	67.61	39.3	22.7	33	54.1	4.5	8.4	68.37
Rae Bareli (2011)	Uttar Pradesh	15184.90797	9.04	30.26	0.05	77.63	56.29	20.41	18.88	52.1	6.76	22.26	62.1
Rampur (2001)	Uttar Pradesh	13586.82233	24.97	13.38	0.02	48.2	27.89	6.9	27.7	23.3	23.5	25.5	56.77
Rampur (2011)	Uttar Pradesh	29094.42042	25.2	13.18	0.02	61.4	44.44	11.47	18.72	27.17	19.69	34.42	57
Saharanpur (2001)	Uttar Pradesh	14956.17846	25.81	21.73	0.02	70.91	50	6.3	19	31.7	9.8	39.5	53.75
Saharanpur (2011)	Uttar Pradesh	43661.25834	30.77	22.05	0.03	78.28	61.74	7.73	10.68	29.26	6.46	53.59	51.79
Sant Kabir Nagar (2001)	Uttar Pradesh	6704.496327	7.08	21.19	0.02	66.57	34.92	23.7	35.2	55.8	3.4	5.6	71.01
Sant Kabir Nagar (2011)	Uttar Pradesh	16900.41238	7.49	21.52	0.09	78.39	54.8	18.45	20.09	55.27	6.4	18.24	59.48
Sant Ravidas Nagar (2001)	Uttar Pradesh	9728.855253	12.81	21.63	0.02	75.76	38.44	15	29.3	31.8	24.5	14.4	57.48

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Sant Ravidas Nagar 2011)	Uttar Pradesh	22866.81202	14.53	22.37	0.12	81.47	56.03	16.53	19.73	34.98	16.99	28.3	54.64
Shahjahanpur (2001)	Uttar Pradesh	10997.13288	20.63	17.72	0	59.73	36.25	4.7	27.8	27.2	17	28.1	55.45
Shahjahanpur (2011)	Uttar Pradesh	27324.75026	19.76	17.72	0.02	68.18	49.57	7.78	19.32	26.61	12.22	41.85	54.87
Shrawasti (2001)	Uttar Pradesh	5426.002069	2.83	18.39	0.4	46.67	18.58	26	46	45.3	3.1	5.5	79.68
Shrawasti (2011)	Uttar Pradesh	20886.26684	3.46	16.94	0.5	57.16	34.78	20.97	28.04	46.6	7.97	17.39	68.93
Siddharthnagar (2001)	Uttar Pradesh	6367.234699	3.81	16.53	0.01	56.66	27.08	28	42.78	50.69	1.82	4.71	77.96
Siddharthnagar (2011)	Uttar Pradesh	18224.10607	6.28	15.97	0.47	70.92	47.41	22.36	28.56	52.55	4.39	14.5	68.13
Sitapur (2001)	Uttar Pradesh	9573.272193	11.95	31.87	0.01	59.97	34.59	8.5	37.6	34	12	16.5	60.04
Sitapur (2011)	Uttar Pradesh	27015.28013	11.84	32.26	0.04	70.31	50.67	11.92	23.98	34.66	10.94	30.42	58.83
Sonbhadra (2001)	Uttar Pradesh	23597.78042	18.82	41.92	0.03	62.95	33.7	25	30.9	59.8	2.4	6.9	71.27
Sonbhadra (2011)	Uttar Pradesh	30967.34117	16.88	22.64	20.67	74.92	52.14	29.94	16.15	64.11	4.62	15.13	71.85
Sultanpur (2001)	Uttar Pradesh	8177.161357	4.74	22.25	0.01	70.49	40.86	19.3	32.2	48.6	9	10.2	63.56
Sultanpur (2011)	Uttar Pradesh	14707.15809	5.26	22.43	0.02	80.19	58.28	19.8	20.52	49.23	8.97	21.29	59.29
Unnao (2001)	Uttar Pradesh	8849.012193	15.24	30.64	0.04	66.28	41.59	16.8	44.8	37.7	7.2	10.3	65.04
Unnao (2011)	Uttar Pradesh	26273.79585	17.1	30.52	0.09	75.05	56.76	18.52	33.17	38.36	6.7	21.77	64.4
Varanasi (2001)	Uttar Pradesh	9696.269536	40.16	13.88	0.02	77.87	53.05	16.5	30.3	24.4	23.4	21.8	59.04
Varanasi (2011)	Uttar Pradesh	27175.6108	43.44	13.24	0.78	83.78	66.69	17.06	21.04	24.74	15.29	38.93	56.58
Bankura (2001)	West Bengal	17133.39358	7.37	31.24	10.36	76.76	49.43	32	18.1	46	9.5	26.5	74.72
Bankura (2011)	West Bengal	39095.31417	8.33	32.65	10.25	80.05	60.05	23.62	7.88	63.15	7.56	21.41	63.95
Barddhaman (2001)	West Bengal	21907.46042	36.94	26.91	6.41	78.63	60.95	16	5.9	37.6	12	44.5	57.44
Barddhaman (2011)	West Bengal	60176.32768	39.89	27.41	6.34	82.42	69.63	16.48	3.73	44.11	9.67	42.49	56.69
Birbhum (2001)	West Bengal	15897.5427	8.56	29.51	6.74	70.89	51.55	19.7	11.1	35.6	15.2	38.6	64.22
Birbhum (2011)	West Bengal	36847.34828	12.83	29.5	6.92	76.92	64.14	17.64	5.65	49.75	13.6	31	60.03
Dakshin Dinajpur (2001)	West Bengal	15980.80866	13.1	28.78	16.12	72.43	54.28	25.1	17.5	43	10.4	29.1	70.92
Dakshin Dinajpur (2011)	West Bengal	40795.78781	14.1	28.8	16.43	78.37	67.01	24.84	12.44	53.26	9.83	24.47	65.65
Darjiling (2001)	West Bengal	22490.69708	32.34	16.09	12.69	80.05	62.94	21.4	15.3	6.19	2.61	75.9	57.36
Darjiling (2011)	West Bengal	69965.17804	39.42	17.18	21.52	85.61	73.33	22.44	10.52	12.58	2.9	74	55.96
Haora (2001)	West Bengal	19342.51933	50.36	15.42	0.45	83.22	70.11	9.2	2.5	3.6	21.7	72.2	53.82
Haora (2011)	West Bengal	54649.59076	63.38	14.82	0.31	86.95	79.43	13.69	2.93	6.57	30.71	59.8	56.68
Hugli (2001)	West Bengal	20285.14217	33.47	23.58	4.21	82.59	67.21	16.2	5.4	32.4	10.2	52.1	58.75
Hugli (2011)	West Bengal	57770.27058	38.57	24.35	4.15	87.03	76.36	16.24	4.59	38.12	10.29	47.01	58.08
Jalpaiguri (2001)	West Bengal	17743.34913	17.84	36.71	18.87	72.83	52.21	23.5	11.7	15.1	2.8	70.4	65.96
Jalpaiguri (2011)	West Bengal	45673.6209	27.38	37.65	18.89	79.95	66.23	22.31	7.67	30.62	2.95	58.76	60.09
Koch Bihar (2001)	West Bengal	14544.7945	9.1	50.11	0.57	75.93	56.12	22.2	26.8	36.4	11.3	25.6	69.11

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Koch Bihar (2011)	West Bengal	38829.18081	10.27	50.17	0.64	80.71	68.49	20.67	21.95	47.56	7.54	22.94	62.8
Kolkata (2001)	West Bengal	31751.57166	100	6.01	0.21	83.79	77.3	12.8	1	0.3	3.2	95.5	55.27
Kolkata (2011)	West Bengal	90852.96887	100	5.38	0.24	88.34	84.06	17.91	2.06	0.94	5.38	91.62	58
Maldah (2001)	West Bengal	17205.21215	7.32	16.84	6.9	58.8	41.25	28.3	8.27	20.06	44.51	27.17	76.44
Maldah (2011)	West Bengal	39209.79632	13.58	20.94	7.87	66.24	56.96	23.3	6.44	30.22	35.62	27.72	65.85
Murshidabad (2001)	West Bengal	16073.671	12.49	12	1.29	60.71	47.63	16.4	3.5	6.4	64.5	25.6	62.83
Murshidabad (2011)	West Bengal	39918.96176	19.72	12.63	1.28	69.95	63.09	17.64	2.9	10.34	57.68	29.09	60.59
Nadia (2001)	West Bengal	18004.69377	21.27	29.66	2.47	72.31	59.58	14.1	4.4	10.6	32.6	52.4	58.94
Nadia (2011)	West Bengal	46706.22726	27.84	29.93	2.72	78.75	70.98	11.48	4.05	14.85	28.59	52.51	54.15
North 24 Parganas (2001)	West Bengal	19098.99683	54.3	20.6	2.23	83.92	71.72	11.3	3	7.4	10.6	79	53.52
North 24 Parganas (2011)	West Bengal	58455.34483	57.27	21.67	2.64	87.61	80.34	12.81	3.44	14.31	11.87	70.39	53.35
Pachim Medinipur (2001)	West Bengal	NA	10.24	16.4	8.31	84.91	64.42	22.8	15.9	32.9	17.5	33.7	66.32
Pachim Medinipur (2011)	West Bengal	43109.19991	12.22	19.08	14.88	85.26	70.5	25.87	11.37	57.34	11.18	20.12	65.98
Purab Medinipur (2001)	West Bengal	NA	10.24	16.4	8.31	84.91	64.42	22.8	15.9	32.9	17.5	33.7	66.32
Purab Medinipur (2011)	West Bengal	73413.45696	11.63	14.63	0.55	92.32	81.37	15.99	12.5	40.23	15.68	31.59	58.23
Puruliya (2001)	West Bengal	15463.92769	10.06	18.29	18.27	73.72	36.5	36.2	37.2	30.1	14.1	18.6	77.77
Puruliya (2011)	West Bengal	33243.64402	12.74	19.38	18.45	77.86	50.52	31.29	14.56	56.31	10.82	18.32	70.79
South 24 Parganas (2001)	West Bengal	17907.68341	15.72	32.12	1.23	79.19	59.01	11.8	9.8	11.5	13.4	65.3	56.62
South 24 Parganas (2011)	West Bengal	45936.35035	25.58	30.19	1.19	83.35	71.4	15.24	8.76	24.89	17.63	48.72	57.46
Uttar Dinajpur (2001)	West Bengal	12107.00002	12.06	27.71	5.11	58.48	36.51	23.8	20.1	44.1	9.1	26.8	73.61
Uttar Dinajpur (2011)	West Bengal	31894.85404	12.05	26.87	5.41	65.52	52.17	24.84	11.64	49.41	9.16	29.79	63.2

Appendix: A4: State-wise Data on Crime against Women and different socio-economic variable over the years

State	Time	Population (In lakhs)	Rape	Dowry Deaths	Torture H &R	Molestation	Sex Ratio	Urbanisation	FLR	MLR	PCNSDP	Police Stn. Sd	FWFPR
Andhra Pradesh	1995	717.1	856	362	2829	2677	974.4	26.96701	38.288	59.18	16720.984	101.47957	52.292
Andhra Pradesh	2000	758.5	944	442	5399	3231	977.4	27.057404	49.023	68.905	21022.404	77.771918	51.957
Andhra Pradesh	2005	798.09	935	443	8696	3595	962	29.589289	54.362	72.462	27486	98.282149	52.786669
Andhra Pradesh	2010	841.29	1362	588	12080	4634	942	32.731548	58.352	74.477	40054	130.63747	53.907505
Andhra Pradesh	2015	878.4	1027	174	6121	4616	931.2	34.653061	65.04	79.576	47831.672	140.35677	54.446007
Arunachal	1995	9.6	25	0.001	1	11	875.8	15.841212	37.316	58.688	20334.764	436.875	62.386
Arunachal	2000	12	36	0.001	10	53	896.8	19.64785	43.086	63.173	20347.145	445.33333	60.931
Arunachal	2005	11.59	35	0.001	9	67	923.8	21.313506	49.624	67.462	26870	493.35634	60.366161
Arunachal	2010	12.35	47	0.001	12	84	952.3	22.443918	56.354	71.702	34470	602.83401	60.023862
Arunachal	2015	15.28	71	0.001	66	101	977.8	24.644819	62.7	76.04	39181.745	658.15368	59.236482
Assam	1995	246.1	588	44	485	572	926.6	11.748992	48.212	65.912	14715.74	197.71638	35.5
Assam	2000	263	762	50	978	777	931.1	12.561317	54.727	70.927	14978.17	208.14449	33.625
Assam	2005	286.92	1238	99	2206	899	926.4	13.26627	60.126	74.298	17050	181.40597	34.207641
Assam	2010	309.78	1721	175	5410	1400	919.4	13.944378	65.246	77.258	21611	174.54	35.404693
Assam	2015	331.0067	1733	216	11225	4293	917	14.676174	70.924	81.04	23909.42	166.81454	35.372924
Bihar & Rg.	1995	949.1	1312	383	622	563	919	12.075231	27.168	55.628	9836.6601	84.422084	29.268
Bihar & Rg.	2000	1005.6	1570	1085	1396	456	929	10.739338	32.503	59.538	11006.936	94.361575	34.078
Bihar & Rg.	2005	1187.05	1900	1271	2164	744	926.2	13.355296	43.269	68.086	12497	63.694874	37.497086
Bihar & Rg.	2010	1281.21	1568	1533	2921	779	920.2	16.959216	51.7615	73.031	18210	84.661375	40.568444
Bihar & Rg.	2015	1142.16	1041	1154	3792	198	920.6	18.587211	59.959333	78.832	21001.113	84.741138	44.335259
Goa	1995	12.7	19	2	13	27	964.2	44.513865	70.464	85.712	50679.052	206.45669	31.076
Goa	2000	16.1	21	2	13	20	960.7	48.891572	74.669	88.352	66107.974	156.77019	31.246
Goa	2005	15.07	20	2	11	30	943.6	54.728268	79.17	90.388	80844	235.36828	31.319843
Goa	2010	17.43	36	1	17	36	923.1	60.929711	83.745	92.273	110306	269.59266	31.369648
Goa	2015	14.88	86	0.001	19	150	909.4	66.40166	88.172	94.46	130181.65	290.63798	31.46753
Gujrat	1995	446.1	309	61	1926	1042	928.8	35.632763	52.6	76.06	22665.146	147.01188	41.822
Gujrat	2000	484.9	330	93	3739	944	922.3	37.0661	57.6	79.76	23628.278	123.04186	42.437
Gujrat	2005	542.74	324	48	4090	802	904.2	39.443661	63.032	82.6	36102	106.12264	40.145671
Gujrat	2010	581.93	408	19	5600	668	883.2	42.057277	68.572	85.225	53813	110.98242	37.127759
Gujrat	2015	649.19	503	12	4133	1164	868	44.198781	73.896	88.28	64195.618	98.972601	35.563012

State	Time	Population (In lakhs)	Rape	Dowry Deaths	Torture H &R	Molestation	Sex Ratio	Urbanisation	FLR	MLR	PCNSDP	Police Stn. Sd	FWFPR
Harayna	1995	180.7	311	218	426	483	863.4	26.377217	46.824	73.16	24925.697	176.64084	28.576
Harayna	2000	199.3	421	263	1286	605	861.4	28.563155	54.729	78.235	30217.991	137.92775	41.096
Harayna	2005	227.92	461	212	2075	380	905.4	27.100205	60.162	81.174	40627	159.18305	37.212623
Harayna	2010	245.9	720	284	2720	476	960.9	24.725034	64.977	83.579	57797	193.15169	29.228403
Harayna	2015	269.39	1070	243	3525	1886	993.4	24.174307	71.028	87.052	68754.101	198.6553	29.44587
Himachal	1995	56.1	116	6	219	296	973.6	9.1276853	58.492	79.648	21055.168	207.20143	58.46
Himachal	2000	67.4	129	4	307	288	970.6	9.6784956	66.482	84.958	27731.548	177.52226	62.61
Himachal	2005	63.81	141	2	228	286	937.6	9.8891946	71.22	87.424	35806	177.82479	65.350049
Himachal	2010	66.87	160	2	275	350	897.1	10.014866	75.145	89.179	46682	203.00583	67.73761
Himachal	2015	70.46	244	2	226	434	871.6	10.310593	80.696	92.356	55224.277	201.6073	70.830147
Karnataka	1995	480.5	263	202	1488	1356	961.6	32.145769	49.56	70.896	18185.485	117.55255	46.834
Karnataka	2000	523	281	217	1688	1568	963.6	33.675652	56.135	75.391	23510.91	97.384321	47.639
Karnataka	2005	557.02	343	261	1883	1585	1012	35.816977	61.702	78.762	29295	97.673333	47.908721
Karnataka	2010	587.99	586	248	3441	2544	1072	38.111163	67.017	81.852	40699	121.76568	48.044622
Karnataka	2015	649.21	589	254	2732	5112	1108.8	40.099628	72.836	85.504	48203.505	123.17005	48.448162
Kerala	1995	309.1	266	21	787	810	1044.8	26.222763	86.864	93.84	20991.721	124.42575	23.404
Kerala	2000	323.5	552	25	2418	1695	1055.8	26.008582	87.694	94.14	25130.668	130.68934	22.609
Kerala	2005	333.38	478	21	3283	2339	1013.2	34.667448	89.544	94.964	34837	129.2639	24.686218
Kerala	2010	349.72	634	22	4797	2936	957.2	45.544575	91.649	95.919	48504	115.9499	27.481489
Kerala	2015	339.94	1256	8	3668	3987	928	51.985179	93.244	96.612	57674.76	113.12462	28.840653
M.P. & Rg.	1995	721.4	3119	417	2640	7355	940.6	24.57282	37.452	65.76	13961.863	124.29304	54.986
M.P. & Rg.	2000	802.3	3737	685	3092	8516	952.6	26.317543	48.142	74.96	14283.149	121.28007	56.606
M.P. & Rg.	2005	885.34	3911	839	3721	7876	960.6	26.175893	54.7	78.198	17228.5	110.19156	57.820533
M.P. & Rg.	2010	966.44	4147	1007	4617	8352	967.6	25.562649	58.9	79.283	23848.5	122.0769	58.9337
M.P. & Rg.	2015	764	4391	664	5281	8049	976.6	25.892592	66.049333	83.790667	27144.046	121.33819	60.2496
Maharashtra	1995	859.1	1362	471	8760	3475	929.2	40.173269	58.384	80.468	27041.481	150.51915	50.338
Maharashtra	2000	914.3	1310	371	6768	2805	923.2	42.026106	65.989	85.303	29688.294	145.48179	47.498
Maharashtra	2005	1031.59	1545	341	6233	3228	950	43.530004	70.854	87.114	40671	131.93808	47.567993
Maharashtra	2010	1100.49	1599	393	7434	3661	985	44.946667	75.034	88.169	59587	163.52261	48.365483
Maharashtra	2015	1187	4144	268	7640	11713	1003.6	46.5378	80.584	90.736	70435.506	167.8571	47.707978
Manipur	1995	20.3	12	0.001	0.001	24	966	26.066082	52.44	74.108	13645.028	575.96059	59.576
Manipur	2000	25.4	8	0.001	4	18	976	24.244494	58.49	77.243	15809.019	572.71654	57.521

State	Time	Population (In lakhs)	Rape	Dowry Deaths	Torture H &R	Molestation	Sex Ratio	Urbanisation	FLR	MLR	PCNSDP	Police Stn. Sd	FWFPR
Manipur	2005	25.39	25	0.001	20	25	982.4	22.412106	64.768	81.146	19478	535.48641	56.724158
Manipur	2010	27.02	34	0.001	18	31	987.9	20.577018	71.103	85.241	21147	870.57735	56.241855
Manipur	2015	29.4	46	0.001	39	84	995.2	18.747329	77.324	88.952	23647.657	968.78294	55.130474
Meghalaya	1995	19.6	17	0.001	0.001	14	963	19.008711	51.104	58.316	16459.343	390.76531	59.578
Meghalaya	2000	24.5	35	0.001	0.001	8	973	19.523946	58.859	64.836	20410.472	339.87755	58.513
Meghalaya	2005	24.52	63	1	3	44	975.4	19.808196	65.402	70.064	25642	364.15171	58.095975
Meghalaya	2010	26.09	149	0.001	24	48	975.9	20.034699	71.642	74.969	35363	392.75585	57.840944
Meghalaya	2015	33.19	93	1	44	95	980.2	20.376695	78.488	80.52	41664.219	393.41936	57.261925
Mizoram	1995	7.9	41	0.001	0.001	59	927.8	47.455745	81.612	87.636	20014.901	756.58228	71.684
Mizoram	2000	9.6	58	0.001	0.001	70	936.3	49.156138	85.377	90.181	21701.882	664.16667	71.414
Mizoram	2005	9.47	37	4	0.001	49	935.2	50.30173	87.386	91.754	25826	854.48786	71.309667
Mizoram	2010	10.08	92	0.001	3	75	931.7	51.308622	88.956	93.084	40072	1064.7817	71.246751
Mizoram	2015	11.91	58	0.001	9	75	933	52.592914	91.404	94.9	46757.7	1167.5149	71.101001
Nagaland	1995	13.9	16	0.001	0.001	0.001	895.2	17.425727	57.648	69.268	27488.967	1222.8058	58.748
Nagaland	2000	17	14	1	0.001	2	906.7	17.68917	61.208	71.353	27673.476	889.29412	57.058
Nagaland	2005	21.17	17	0.001	0.001	7	937	22.233116	67.596	76.162	33072	565.70619	56.399383
Nagaland	2010	22.5	16	0.001	1	13	972	27.847186	74.691	81.652	43992	444.57778	55.998613
Nagaland	2015	29.2	35	0.001	4	8	997.6	31.321006	80.372	85.78	49493.011	185.16845	55.08215
Orissa	1995	342.7	553	196	554	1446	971.4	14.015343	41.208	68.24	12764.808	99.168369	34.76
Orissa	2000	359.6	747	276	1088	1658	971.9	14.813824	49.343	74.665	13535.512	96.254171	37.21
Orissa	2005	387.53	799	334	1671	2238	998	15.656112	56.186	78.206	18194	90.085929	39.728517
Orissa	2010	408.28	1025	388	2067	2905	1030.5	16.509352	62.706	81.026	23968	106.40982	42.264164
Orissa	2015	443.46	2251	356	3605	6499	1041.4667	11.572134	56.817333	79.441333	15459.663	80.156938	37.991502
Punjab	1995	216	96	130	133	73	878.8	31.308643	55.66	69.672	29342.803	315.1713	15.67
Punjab	2000	236.2	334	199	917	340	874.8	33.507544	62.235	74.637	30826.539	288.91617	26.495
Punjab	2005	257.64	398	99	729	308	895.6	35.364394	66.422	77.554	34096	275.5007	25.67983
Punjab	2010	272.68	546	121	1163	349	922.6	37.135732	70.012	79.959	44769	244.49905	21.954618
Punjab	2015	292.88	886	85	1583	1123	937.2	39.078095	74.796	83.388	49911.066	220.94163	24.049491
Rajasthan	1995	482.1	1036	369	3202	2121	914.8	23.079449	29.976	63.584	14305.309	119.37565	49.626
Rajasthan	2000	538.7	1242	429	5437	3092	920.8	23.332901	41.946	74.314	15989.71	117.37888	54.096
Rajasthan	2005	616.68	993	361	5997	2503	909.2	23.986155	47.452	77.552	19445	101.64591	56.29181
Rajasthan	2010	671.06	1571	462	11145	2339	893.2	24.739359	51.342	78.917	27502	106.65216	57.919073

State	Time	Population (In lakhs)	Rape	Dowry Deaths	Torture H &R	Molestation	Sex Ratio	Urbanisation	FLR	MLR	PCNSDP	Police Stn. Sd	FWFPR
Rajasthan	2015	735.29	3644	463	14383	4813	886	25.292662	58.464	84.028	31900.897	102.411	60.68343
Sikkim	1995	4.7	3	0.001	0.001	37	876.8	9.9034786	52.604	70.112	18367.093	713.19149	53.97
Sikkim	2000	5.6	6	0.001	0.001	14	875.3	10.902164	59.984	75.627	21130.274	723.21429	57.02
Sikkim	2005	5.75	18	0.001	4	38	923.4	16.649141	67.12	80.658	29008	608.86957	58.284219
Sikkim	2010	6.1	18	1	3	11	983.9	23.58319	74.195	85.568	66136	623.60656	59.101992
Sikkim	2015	6.32	5	1	2	21	1019.6	28.143094	81.392	90.72	82058.969	593.74491	60.812656
Tamilnadu	1995	582.9	268	94	345	1212	978.8	38.035724	56.6	77.152	21204.795	126.48653	44.098
Tamilnadu	2000	619.3	538	191	837	1948	984.8	42.888937	63.225	81.467	26586.715	133.63959	44.233
Tamilnadu	2005	648.56	571	215	1650	1764	975.6	45.695748	68.106	84.106	34126	129.53004	45.710658
Tamilnadu	2010	676.32	686	165	1570	1405	962.6	47.990958	72.551	86.326	53507	128.27508	47.523981
Tamilnadu	2015	773.28	421	65	1900	1163	957.2	51.309369	77.868	89.384	64274.402	128.87126	48.665975
Tripura	1995	30.5	75	7	57	80	947	15.984605	55.984	74.948	12443.208	419.63934	27.014
Tripura	2000	38.1	86	16	129	59	949.5	16.846317	63.839	80.383	18374.557	358.50394	31.744
Tripura	2005	33.9	162	34	439	161	934.8	20.683195	72.338	85.494	25688	541.85841	34.110176
Tripura	2010	36.1	238	25	937	376	915.8	25.263866	80.998	90.524	36718	671.99446	35.885396
Tripura	2015	39.04	213	28	501	352	905.4	28.356953	89.336	95.716	44809.597	756.11283	38.842527
U.P. & Rg.	1995	1501.2	1808	1850	3165	2631	899.8	20.313724	32.212	61.512	14059.136	103.35398	23.768
U.P. & Rg.	2000	1715.4	1865	2222	6021	2607	925.8	20.900453	40.852	68.777	15495.312	94.067856	27.528
U.P. & Rg.	2005	1906.07	1350	1627	4777	1935	931	23.17868	56.29	79.208	20613	86.631656	28.19069
U.P. & Rg.	2010	2088.45	1684	2292	8312	2918	931	25.87978	62.3775	81.818	32956.5	76.696114	28.079053
U.P. & Rg.	2015	2140.32	3025	2335	8660	7885	941.4	27.735132	72.432667	88.586667	39255.621	67.810158	29.51607
West Bengal	1995	732.7	787	89	3319	1314	923.8	27.700045	52.048	71.712	14936.122	107.52832	22.16
West Bengal	2000	793.3	814	284	4025	1057	932.3	27.975513	58.858	76.602	18996.765	101.51645	27.135
West Bengal	2005	850.55	1686	446	6936	1572	940.4	29.574364	64.348	79.224	23808	94.102639	27.803366
West Bengal	2010	902.22	2311	507	17796	2465	948.4	31.504061	69.508	81.279	31314	95.427944	27.395074
West Bengal	2015	956.34	1199	498	20163	5069	956.6	32.772066	75.328	84.468	36773.293	91.394486	29.140098

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RESEARCH PAPER

Socio-economic development and child sex ratio in India: revisiting the debate using spatial panel data regression

Antara Bhattacharyya[1] · **Sushil Kr. Haldar**[1]

Abstract
The paper aims to explore the possible determinants of declining child sex ratio (CSR) in India across 32 state and UTs over time (viz. 1971–2011). The spatial panel data regression results are assumed to be better compared to simple panel because the CSR is very much influenced by space and neighbouring state' CSR. This is confirmed by both global (and local Moran Index) in one hand and the Hausman test (fixed vs. random effect) on the other hand. The spatial panel regression results show that income and CSR are nonlinear with U-shaped pattern; the other socio-economic variables like female literacy rate, urbanization, poverty and female work participation do not appear to be significant. The state sharing higher concentration of scheduled tribe community positively improve CSR in all the spatial regression models; the opposite happens in case of scheduled caste dominated state. Our spatial panel regression findings contradict earlier findings of the determinants of CSR in case of income and female literacy. The U-shaped relationship between income and CSR does have some policy relevance; income of any state may go up due to various factors. If we argue in the context of female labour force participation, we find that the female work force participation is found to be stagnant, and even in some state it is declining over the decades. Therefore, female employment directly augments female autonomy as well as empowerment, which indirectly increases income and thereby a state may cross that cut-off level of income and may experience higher CSR.

Keywords Socio-economic development · Child sex ratio · Moran's Index · Spatial panel econometrics · Gender bias

JEL Classification J16 · C10 · C23 · R15

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ARTICLE

Does U Feminisation Work in Female Labour Force Participation Rate? India: A Case Study

Antara Bhattacharyya[1] · **Sushil Kr. Haldar**[1]

Abstract
In this paper, we try to develop a simple theoretical model of joining work of a married female under different income levels; there exists a critical level of income of the family; if that is achieved, then female devotes her time at home. We investigate the standard U feminisation hypothesis for India using district-level census data for two time points (2001 and 2011) and observe an inverted U shape of female participation in workforce. Higher income and education induce female to make some trade-off between joining in workforce and staying at home, but income effect forces the female out of workforce that goes in favour of staying at home or to childcare. In our patriarchal society, female tries to stay with husband; the fear of separation from home and sociocultural stigma might explain the anti-U feminisation hypotheses in respect of female workforce participation. Our empirical findings also support the anti-U feminisation hypotheses in case of higher educated females.

Keywords Women · Female workforce · Economic growth · Feminisation · Female literacy rate · Inverted U-shaped curve

JEL Classification J21 · O10 · O50

1 Introduction

Decision-making power has been considered as an important aspect of women empowerment; workforce participation raises the bargaining power of women at the household level (Sen 1990; Desai and Jain 1994; Kabeer et al. 2013; Mammen and Paxson 2000). Female workforce participation rate (FWFPR) in India is extremely low; only 32.6 per cent of Indian adult females are reportedly joined

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Article

Determinants of Crime Against Women in India: A Spatial Panel Data Regression Analysis

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Antara Bhattacharyya[1], Sushil Kr. Haldar[1] and Swapnendu Banerjee[1]

Abstract

Gender discrimination has been an important socio-economic and cultural issue in Indian backdrop; though India is one of the fastest-growing nations in the world but she has ranked 108th (out of 144 countries) in 2016 on the global gender gap index. In order to explore the determinants of crimes (such as dowry death, rape, molestation and torture) in India, we consider 24 states and five time points (over 1995–2015). Rank correlation over time clearly suggests that states exhibiting higher incidence of molestation experience higher incidence of rape; we get similar results in case of torture and dowry death as well. We employ both global and local Moran's indices for dowry death, which has the least reporting bias, and observe that space as well as neighbourhood effect does matter; on the contrary, we find that other types of crimes vary randomly. Specifically, spatial panel regression results on dowry death clearly show that space along with neighbourhood effect does matter towards variations of dowry death; only two variables namely female work force participation and police station significantly reduce the incidence of dowry death.

Keywords

Crime against women, Moran's index, spatial regression, female literacy rate, female work force participation rate

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