DETERMINANTS OF CHILD SEX RATIO: ANDHRA PRADESH, PUNJAB AND WEST BENGAL

Dissertation submitted to Jawaharlal Nehru University

in partial fulfillment of requirements

for the award of the degree of

MASTER OF PHILOSOPHY

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JAWAHHARLAL NEHRU UNIVERSITY

NEW DELHI- 110067, INDIA

2013

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DECLARATION

I declare that the dissertation entitled "Determinants of Child Sex Ratio: Andhra Pradesh, Punjab and West Bengal" submitted by me for the award of the degree of Master of Philosophy of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this university or any other university.

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(SHRABONI MONDAL)

CERTIFICATE

We recommend that this dissertation can be placed before the examiners for evaluation.
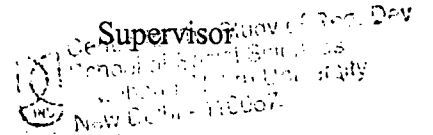
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ACKNOWLEDGEMENTS

me for a fruitful work. I am also thankful to Asheesh for his supportive presence and fruitful debates. I would like to thank Apala, Dhiren, Ghanshyam, Pintu, Sreenita, Tania, Neelu, Priya and other friends. Among the seniors, I would like to thank Debanganadi (for providing me important data), Saikatda (for helping me with regression and motivation), Vishalda (for final editing) and also Ankita di. My beloved junior and sister, Padma (Padmaja Mondal) has helped me in organizing references and drawing GIS maps. Her loving and caring presence have been a source of inspiration for me. Bishu (Biswajit Kar) has constantly motivated me for a good work.

In Godavari hostel, I am really thankful to roommate (Bhavna di) and Pooja for their caring acts and support. Gunjan also deserves special mention.

Date: 26/07/2013   *Shraboni Mondal*

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Chapter-I:

INTRODUCTION

1.1 INTRODUCTION:

The world population has two major interdependent sexes -- male and female. There has been a necessary balance in sex composition, often measured in ratio scale, since emergence of the human society. It has been argued that imbalance of such sex ratio adversely affects demographic as well as social processes. Nature never creates differences, and hence imbalances existing in form of such declining sex ratios represent the socio-cultural milieu of any region. Child Sex Ratio (CSR) is more important in this regard, because it has a future cascading effect on the overall sex ratio. The western world (North America and Europe) has higher proportion of female than male, but in the south and west Asia, the situation is opposite and quite different. The recent trends of population composition reflect that India, China, Africa and Latin America have surprisingly higher masculine population.

The sex ratio at the birth around the world is found to be male dominated (Sen, 1990), but after birth, biologically, the situation goes in favour of woman. According to researchers, woman has more capability than man to survive under a given healthcare and nutrition support. Women live much longer than the men throughout their total lifespan. Biologically speaking, it has been noted that after thirty, women have higher life expectancy than men (Sen, 1990). However, in the highly populated countries of the world (for example, China and India) the status of women is not very satisfying and this situation reflects on their shares of population compared to their male counterpart. This discrimination starts from the sex ratio at birth, continues in child sex ratio and finally enters into the total sex ratio and as a result sex ratios in these regions are male dominated. There are several factors underlying these inequalities of sexes. These factors are also interrelated to each other. According to different research studies, there may be demographic, economic, social or cultural factors like son preference, excess morality of girl child, neglect of girl child in terms of health, nutritional care and education, sex selective abortion, infanticide, foeticide and so on.

In India, one of the most important issues is gradual decline of child sex ratio. The child sex ratio in India went from 962 females per 1000 males in 1981, to 945 in 1991, to 927 in 2001, to 919 in 2011 which has become a major concern among Government and civil society. It is reflected in the policies taken by the Government during different Five Year Plan periods. The Ministry of Women and Child Development in India suggests that there is an immediate

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need to sense and understand the value of female child as an 'asset' to society and not as 'burden'. The traditional belief in society makes a girl to be considered as a responsibility or 'property' of some other house where she will go away after marriage. It is thought that possession of any asset or property of a girl will go away with her to the other family where she will stay after marriage. Marriage of a girl usually causes a sizeable loss of monetary savings of her parents in terms dowry and/or marriage expenses. Moreover, traditionally a girl cannot perform the last rituals of her birth parents. Therefore, certainly, a girl is not able to help her parents to the way of heaven! Now, there is an urgent need to enforce laws and legislation that will provide a girl the equal opportunity of asset and property and prohibit dowry and child marriage. In last two or three Five Year Plan periods, Government has taken some initiatives on these aforesaid issues. The concept of the overall development of woman and child has first got emphasized in the Ninth Five Year Plan. Some incentives were there like *Balika Samriddhi Yojana* for providing scholarship for education of girls up to Class X in poor families. After the 9th Five Year Plan, the issue of declining child sex ratio has been considered as a distinct and serious issue. During 10th to 12th Five Year Plan, several policies have been anchored to eliminate the problem of imbalanced child sex ratio. Some of the significant policies and programmes are the conditional transfer (cash, non cash), effective implementation of Pre-Conception and Pre-Natal Diagnostic Act (Prohibition of Sex Selection Act), enabling education for girls and nutrition of girls by ICDS programme etc.

1.2 RATIONALE OF THE STUDY:

As the title of this dissertation suggests, the area of interest of this study is Child Sex Ratio (CSR). Child Sex Ratio denotes the number of females per thousand males in human population between age group 0-6 in India. Presently, the declining number of girl child has emerged as a cause of concern in India. Previously, it was a character restricted to some small parts of India. According to the most reliable source, the Census of India, skewed child sex ratio was found only in the north-west central and extreme south west regions of India in 2001. Now, in 2011, the affected districts are spreading all over. Nineteen districts, for the first time in 2011, have experienced child sex ratio below 850. Previously, in 2001, the corresponding figure was 31. Therefore, the total number of problematic districts is 50 at

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present. For example, Mahesana and Gandhinagar in Gujarat had child sex ratio below 850 in 2001; in 2011, now Surat has also experienced this worst situation.

The exactly same situation is found in Haryana where Gurgaon and Faridabad are new two districts in 2011 with child sex ratio below 850 along with previously affected fifteen districts like Ambala, Bhiwani, Fatehabad, Hisar, Jhajjar, Jind, Kaithal, Karnal, Kurukshetra, Mahendragarh, Panipat, Rewari, Rohtak, Sonipat and Yamunanagar. In Maharashtra, Ahmadnagar, Aurangabad, Bid, Buldana, Jalgaon, Jalna are six new districts with child sex ratio below 850 in 2011. In 2001 however, it was only one district (i.e. Kolhapur) where child sex ratio was below 850. Rajasthan and Uttar Pradesh are two states where up to 2001, there were no districts with such adverse child sex ratio; but now in Jhunjhunu, Karauli and Sikar in Rajasthan and Agra, Bulandshahr and Gautam Buddha Nagar in Uttar Pradesh, the incident of declining child sex ratio has already been spreading. Remaining four newly affected worsened districts are Anantnag, Badgam and Rajouri in Jammu and Kashmir and Gwalior in Madhya Pradesh.

An interesting and important fact is that the states with skewed child sex ratio mostly belong to the rich or wealthy states of India. According to 2011 Census, the states and Union Territories having child sex ratio less than 900 are Punjab, Rajasthan, Gujarat, Haryana, Jammu and Kashmir, Maharashtra, Uttar Pradesh, Uttarakhand and Chandigarh. Most of these states have higher Per Capita Net State Domestic Product than the national average (see Table 1.A).

Table 1.A: Child Sex Ratio and Per Capita NSDP at State Level (2011-12)

States	Child Sex Ratio 2011	Per Capita Net Domestic Product*
India	919	38037
Delhi	871	119032
Chandigarh	880	95937
Maharashtra	894	64951
Haryana	834	62927
Gujarat	890	57508
Uttarakhand	890	50045

Punjab	846	46422
Jammu & Kashmir	862	29215
Rajasthan	888	28851
Uttar Pradesh	902	18249

*Note: *at constant (2004-05) prices (as on 27/2/13)*

Source: Census of India, Planning Commission of India

There were some states of India where sex ratio was balanced before 2011, like West Bengal, Andhra Pradesh, Jharkhand, Orissa, Sikkim, Nagaland and Manipur. Now, all these states have child sex ratio below 950. The phenomenon of skewed child sex ratio was typically found in North West Central parts in India. Now, this new trend of 2011 of decreasing child sex ratio in eastern parts of India should be a serious concern among the Government, NGOs as well as the whole Indian society.

1.3 STUDY AREA

The common understanding of socio-economic and cultural set-up may lead one to hypothesize that in due course of progressive development, child sex ratio comes in a balance. But in India, situation is quite different on spatial scale. Therefore, the choice of study area is of paramount importance. Composite Development Index (see Methodology section and Appendix-I for details), Human Development Index and CSR has been thoroughly analysed for choosing study area, as mentioned in Table 1.B:

Table 1.B: Profile of Study Area

STATE	(1) COMPOSITE DEVELOPMENT INDEX		(2) HUMAN DEVELOPMENT INDEX		(3) CHILD SEX RATIO		
	2001	2011	1999-2000	2007-2008	2001	2011	DECADAL CHANGE
Andhra Pradesh	-0.08	0.34	0.368	0.473	961	939	-22
West Bengal	-0.03	0.07	0.422	0.492	960	956	-4
Punjab	0.63	0.58	0.543	0.605	798	846	+48

Source: (1) Own compilation and computation; (2) India Human Development Report 2011, Planning Commission; (3) Primary Census Abstract, Census of India, 2001 and 2011

Punjab, one of the 'more developed' states, has a legacy of highly imbalanced child sex ratio. Andhra Pradesh and West Bengal, two 'less developed' states, however, show balanced child sex ratio. But, over the decade of 2001-2011, Punjab and Andhra Pradesh have revealed contrasting scenario. While Punjab has strongly returned to slightly balanced CSR, Andhra Pradesh has seen a massive decline of 22 points from a comfortable CSR (961 in 2001). In West Bengal, CSR has slightly declined. That suggests, these three states are in different positions so far as CSR is concerned. The choice of study area is, therefore, linked with the notion of socio-economic and human development of concerned states.

The latest Census Data, when appeared as provisional form, made a hue and cry on massive decline of child sex ratio (from 927 in 2001 to 914 in 2011). The interest among social scientists was readily visible, and some of them started commenting on the nature and pattern of such phenomenon. As Primary Census Abstract (PCA) of India 2001 and 2011 figures reveal, CSR has declined from 927 to 919 over the decade. In Primary Census Abstract (PCA), one can see contrasting pictures of CSR for these three states. Punjab, the state with highest increase in CSR (from 798 in 2001 to 846 in 2011), is still characterized by second most adverse CSR. Andhra Pradesh and West Bengal have gradually improved their status of socio-economic development. But, in both these states, CSR has declined (22 points for Andhra Pradesh and 4 points for West Bengal). Therefore, it is interesting to see whether there is any interconnection between so-called standard concept of 'socio-economic development' and CSR differentials. Indirectly speaking, this has posed alarming question on social, economic and political strength of women as a whole. The figures of the study area of this paper shows that for Andhra Pradesh only seven districts out of 23 districts have child sex ratio above 950 (viz. Medak, Srikakulam, Khammam, Vizianagaram, Vishakhapatnam, West Godavari and East Godavari) though in 2001, the corresponding figure was 22. In case of West Bengal in 2001, only the district of Kolkata had child sex ratio less than 950. Now, according to 2011 Primary Census Abstract (PCA) figures, 4 districts out of 19 have child sex ratio below 950 (viz. Bankura, Koch Bihar, Purba Medinipur and Kolkata). So, one can say that these new emerging areas with declining girl child need to be focused and analyzed from a research point of view. Therefore, a research for the social, economic and demographic factors behind such decline in new areas appears quite pragmatic. However,

Fig-1.1: Districts of Andhra Pradesh, Census of India, 2011

DISTRICTS OF ANDHRA PRADESH

H - Hyderabad

0 40 80 160 240 320
Kilometers
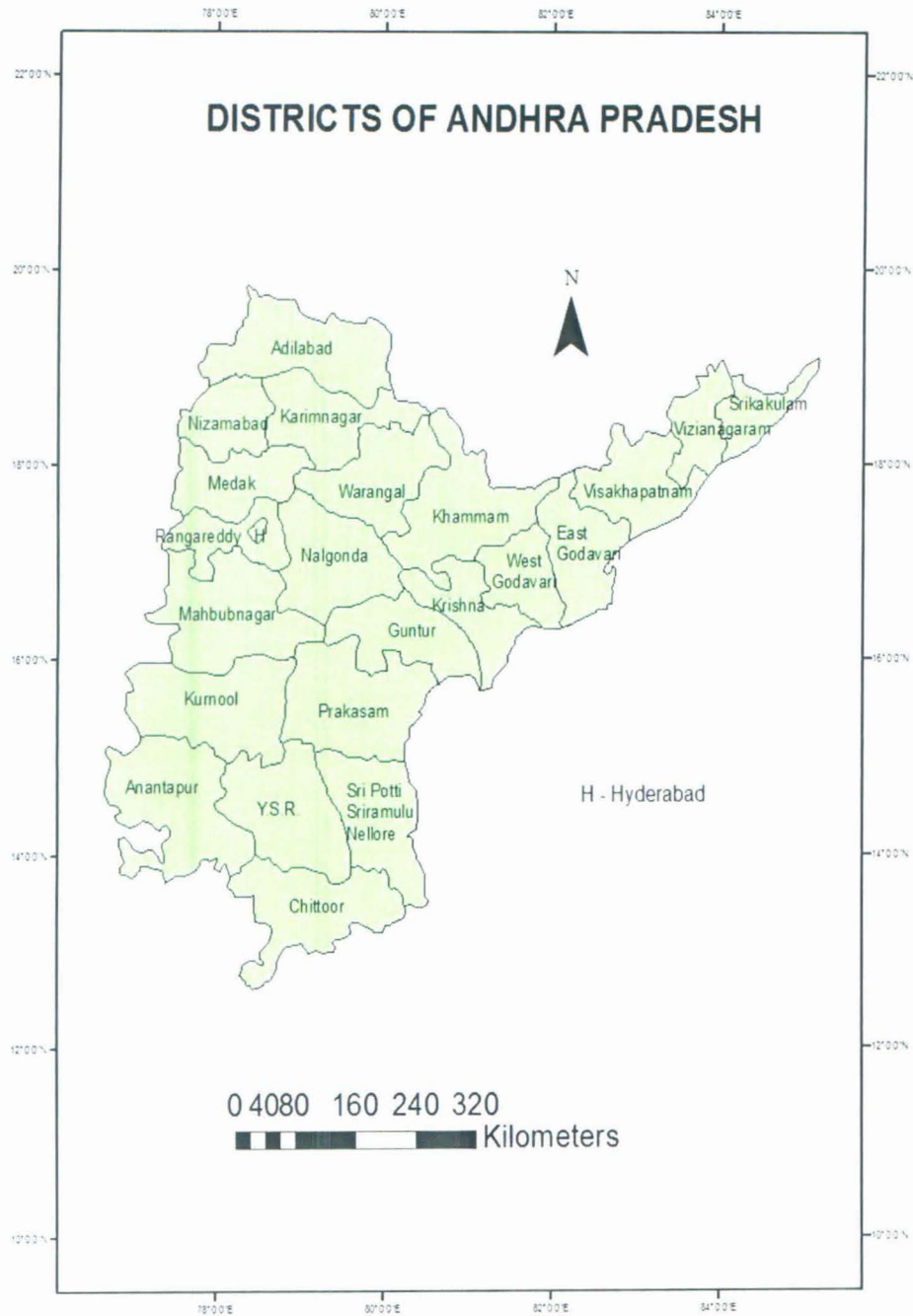
1.2: Districts of Punjab, Census of India, 2011

DISTRICTS OF PUNJAB

N

Gurdaspur

Amritsar

Hoshiarpur

Tarn Taran

Kapurthala

K

Jalandhar

SBS Nagar

Rupnagar

Moga

Ludhiana

S.A.S Nagar

CH

Faridkot

Fatehgarh Sahib

Firozpur

Muktsar

Barnala

Patiala

Bathinda

Sangrur

Mansa

CH - Chandigarh
K - Kapurthala

SBS Nagar - Shahid
Bhagat Singh Nagar

S.A.S Nagar - Sahibzada
Ajit Singh Nagar

Kilometers

0 0.2 0.4   0.8   1.2   1.6
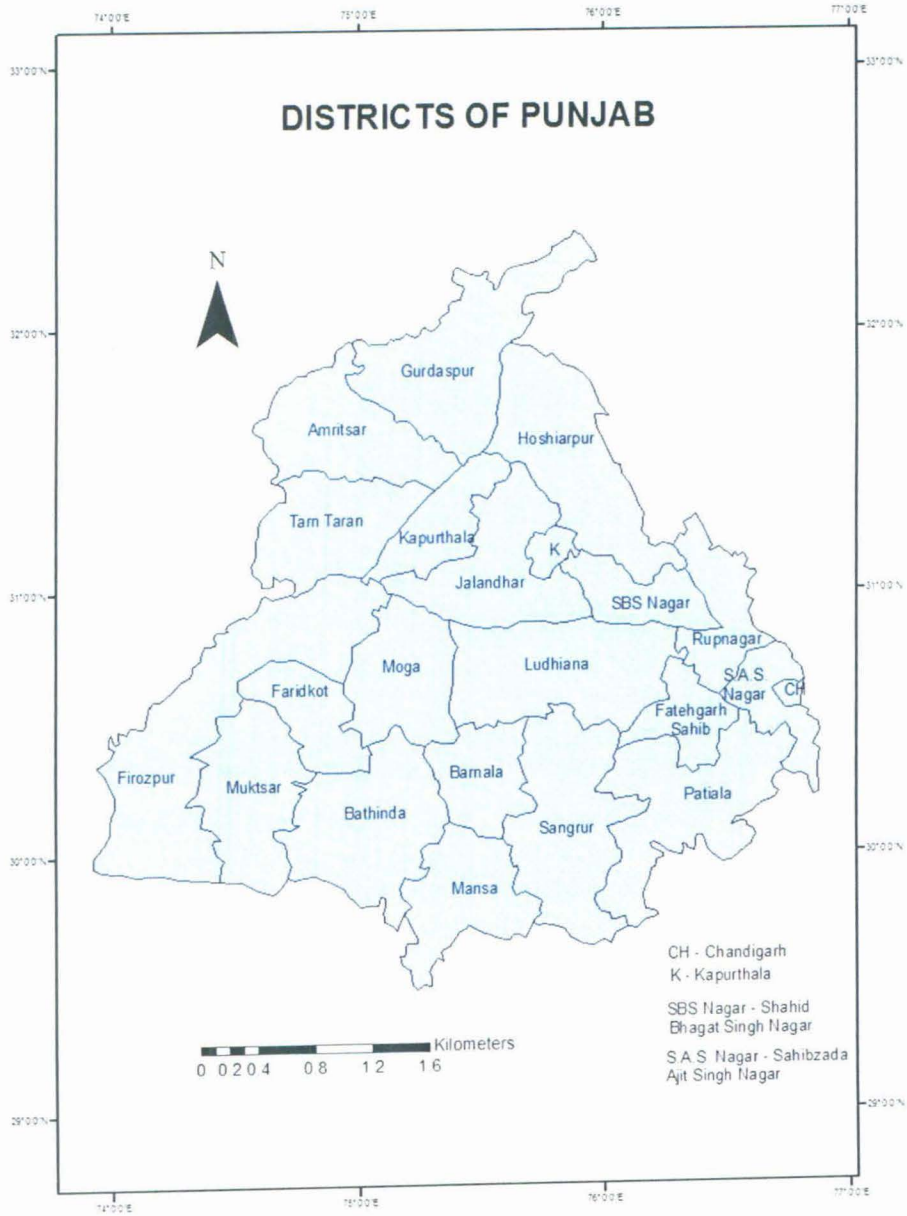
Fig-1.3: Districts of West Bengal, Census of India, 2011

DISTRICTS OF WEST BENGAL
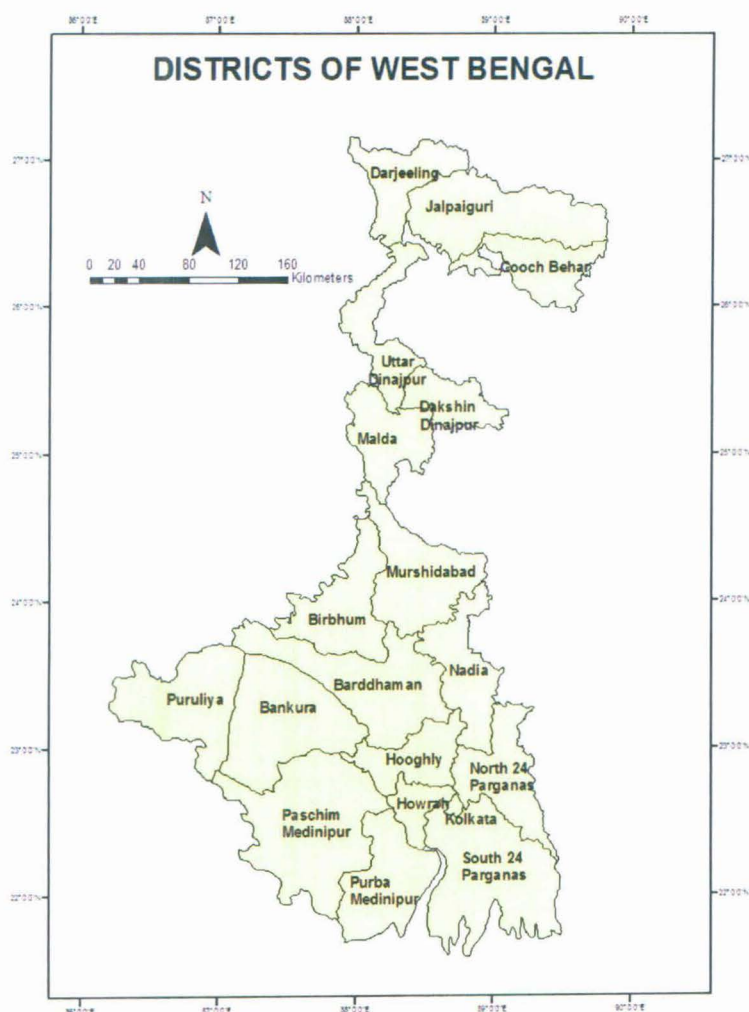
Punjab has a different story; it has a legacy of low child sex ratio. In 2001, no district was there with CSR above 850 and 13 districts out of 17 had CSR of less than 800 (viz. Gurdaspur, Kapurthala, Bathinda, Amritsar, Patiala, Mansa, Fatehpur Sahib etc). Now, 2011 PCA figures show that there is no district left with child sex ratio less than 800, but only 9 districts have reached above 850 (viz. Faridkot, Bathinda, Ludhiana, Moga, Rupnagar, Hoshiarpur, Kapurthala, Jalandhar and Shahid Bhagat Singh Nagar). Hence, it is seen that Punjab has made some improvement in child sex ratio. It should be noted that within 2001-2011, number of districts in Punjab has increased, and the new districts are Tarn Taran,

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Sahibjada Ajit Singh Nagar and Barnala. Tarn Taran has the lowest child sex ratio (820) in Punjab.

1.4 CONCEPTUAL FRAMEWORK:

CONCEPTUAL FRAMEWORK
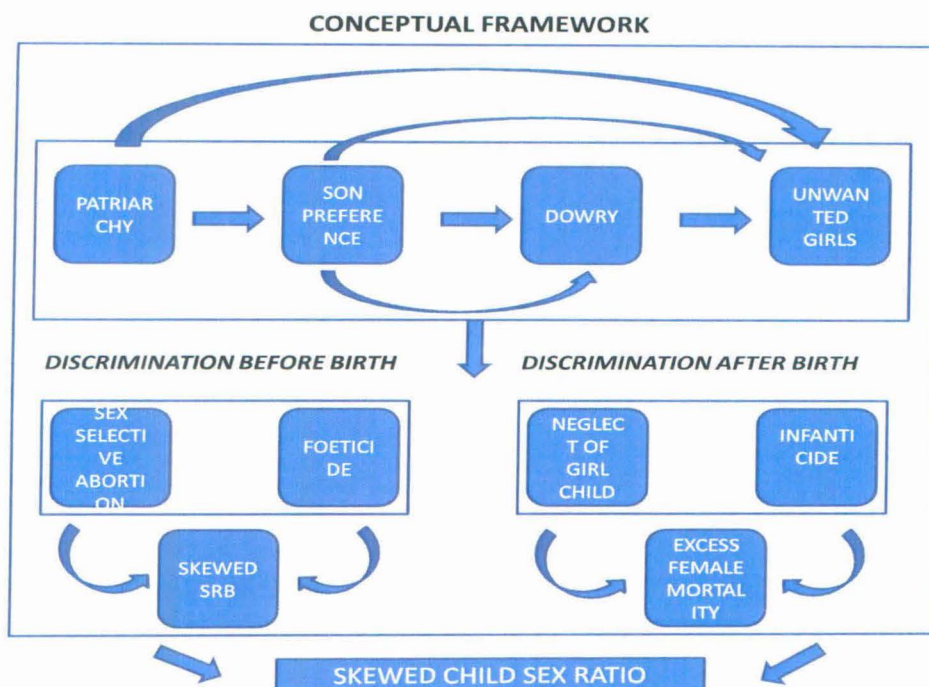
1.5 OBJECTIVES:

1. To study levels, trends and patterns of Child Sex Ratio (CSR) of India across districts in the time period (District level data for 2001-2011);
2. To trace the pattern of Sex Ratio at Birth and Infant Mortality Rate in the study area and its correlation with Child Sex Ratio;
3. To find out the reasons or influencing factors behind such adverse Child Sex Ratio in context with socio-economic reality.

1.6 RESEARCH QUESTIONS:

1. What are the trends and patterns of child sex ratio that has changed on spatio-temporal scale?

2. Whether there is any spatial differentiation in Sex Ratio at Birth and Infant Mortality Rate in the study area which can be analyzed further with the pattern of child sex ratio in the aforesaid area?

3. Are the changes in the socio-economic-cultural factors of development in the study area, trends and patterns of child sex ratio has altered on spatio-temporal scale?

1.7 DATABASE:

VARIABLES	DATA SOURCE	YEAR	LEVEL
Child Sex Ratio	Primary Census Abstract, Census of India,	2001 and 2011	District
Sex Ratio At Birth	Civil Registration System of India,	2008	District
Infant mortality rate	Infant and Child Mortality in India District Level Estimates, Rajan *et al* (2008) or District Level Estimates of child mortality in India based on the 2001 census	2001	District
Female Literacy Rate, Level of Urbanization (%) and Female Workforce Participation Rate	Census of India	2001 and 2011	District
Age at Marriage of women below 18 years	Census of India and DLHS-3	2001 and 2007-2008	District
District Domestic Product	Statistical Abstract of Andhra Pradesh, 2009; District Domestic Product of Punjab; State Domestic Product and District Domestic Product of West Bengal	Andhra Pradesh (2009); Punjab (2004-05 to 2009-10); West Bengal (2011)	District
Average Operational Landholding (Female owned)	Agricultural Census	2000-01 and 2005-06	District

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1.8 METHODOLOGY:

This study of child sex ratio has been accomplished in quantitative as well as qualitative manner. Firstly, to see the levels, trends and patterns of child sex ratio among the states of the country by choropleth maps through GIS and other cartographic techniques. For choosing study area, (three states: Andhra Pradesh, West Bengal and Punjab) recent picture of socio-economic and human development is also taken into account. To work out a composite index of socio-economic development across states, some indicators have been taken into account. These are Per Capita SDP, Percentage Industrial Net Output, Level of Urbanization, Literacy Rate, Life Expectancy at Birth, Pucca Road Density/100 Km, Electrified Households, Household Having Tap Water and Household having Latrine (Appendix-I).

Secondly, the low child sex ratio has been partly explained by the variations of sex ratio at birth. Through GIS bi-variate mapping, it has been explored whether districts having poor sex ratio at birth also have imbalanced child sex ratio. Here the hypothesis is: "if SRB of a district is balanced, child sex ratio is supposed to be balanced in near future".

Thirdly, to identify the possible determinants of child sex ratio in the study area, proper review of existing literature has been done in details. In this regard, some variables have been chosen like 'female literacy rate' and 'female workforce participation rate' for women empowerment, 'level of urbanization' for technological development, 'age at marriage of woman' for social system (patriarchal/liberal), 'District Domestic Product' for income, etc. Finally, Spearman Product-Moment correlation and multiple linear regressions have been done for three states to explore whether these controlling factors or variables explain variation in child sex ratio of this study area.

1.10 CHAPTERISATION SCHEME:

In the First Chapter, the topic study has been introduced. After briefly discussing rationale of the study and study area, it continues with the conceptual framework. It is followed by few objectives and research questions. Sources, levels and years of data have been mentioned and suitable methodologies have been chosen.

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In the Second Chapter, relevant literature has been reviewed. This literature review points out some correlates of child sex ratio, such as (1) sex ratio at birth, (2) excess female mortality, (3) female infanticide, class and caste, (4) status of woman, neglect of girl child and dowry, (5) son preference, patriarchy, sex selective abortion, (6) education, work participation rate and income and so on.

In the Third Chapter, trends and patterns of child sex ratio has been discussed both for 2001 and 2011. Rural-urban differential of CSR in 2011 has also been discussed. Then, trends and patterns of CSR for rural and urban areas have been discussed in detail for three states, Andhra Pradesh, Punjab and West Bengal.

In the fourth chapter, determinants of child sex ratio have been analyzed in detail. The list of determinants include Sex Ratio at Birth (SRB), Infant Mortality Rate (IMR), Level of Urbanization, Female Literacy Rate, Female Workforce Participation Rate, Female married below legal age at Marriage, Average Operational Landholding of females, and Gross Domestic Product at district level. Then, correlation and multiple linear regression have been done to explore which of these variables explain variation in child sex ratio. The trends of infanticide and foeticide have also been shown.

In the final chapter, summary of findings have been mentioned. Then, child development policies of Punjab, Andhra Pradesh and West Bengal have been discussed. This is followed by a conclusion.

1.11 LIMITATIONS OF THE STUDY:

The study is considerably dependent on secondary sources, updated data for which is not always available in district level for the same year. For example, child sex ratio is available at district level for 2001 and 2011. A major problem is the non-availability of data for direct determinants, say sex-selective abortion and foeticide. Moreover, data on indirect determinants is not always available for 2011. For example, data on landholding is available only up to 2005-06 for district level. As child sex ratio is affected by socio-cultural and economic factors, only secondary data and use of statistical techniques are not sufficient to explain its spatio-temporal differential.

Chapter-II:

Literature Review

2.1 INTRODUCTION:

The preceding chapter may give one an indication that child sex ratio of any region has its roots in history and its nature and pattern is also well-connected with social, cultural, demographic and economic aspects. In this chapter, an attempt has been undertaken to bring out different correlates of child sex ratio through review of literature.

2.2 CORRELATES OF CHILD SEX RATIO IN INDIA:

The literature review brings some correlates of this sensitive social issue, i.e. child sex ratio-

2.2.1 Child Sex Ratio and Sex Ratio at Birth:

Sex ratio at birth i.e. the number of born males per 100 born females is 107 – 106 in most of the countries. Although in India, sex ratio at birth is high and favorable for men. Griffiths *et al* (2000) have raised the issue of sex-selective abortion which manipulates natural sex ratio at birth as cited in Freed and Freed (1989) by authors. Sex ratio at birth is high in the north-western part of the country. On the other hand, in north-eastern portion of India, sex ratio at birth is favourable for female, thereby showing approximate similarity with the overall sex ratio pattern of India. Some states in south-western part and extreme north-east have sex ratio at birth similar to some developed countries of the world. Age and sex structure at age 0-6 population is affected by variation in sex ratio at birth and differential mortality (Premi and Raju, 1998).

2.2.2 Excess Female Mortality:

Most of the countries in the world, except some developing ones, have higher life expectancy at birth of female than male. Life expectancy is at birth is low in some developing countries because they are characterized by mortality disadvantage. Life expectancy at birth has increased in developed countries and in the late Eighties; it has become equal for both male and female (data of United Nations in 1995). Krisnaji (1987) has cited some relevant works of Visaria (1961) that reveals higher female mortality of children and woman in reproductive period is one of the main reasons behind deficits of females in India. Basu's (1988) study on Punjab has also considered sex differentials in infant and child mortality as a big concern.

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Mayer (1999) has argued that infant mortality has been declining during past centuries but comparatively higher female mortality still exists. Griffiths *et al* (2000) has also cited from several studies like Das Gupta's (1987) study on Punjab where he has found high male neonatal mortality but high female mortality at 1-59 age groups. In IIPS (1994), the female post neonatal mortality is 13 percent higher than male and 49 percent higher mortality of female than male at age 1-4. Excess female child mortality is high in some states like Punjab, Haryana, Uttar Pradesh while the opposite situation prevails in Tamil Nadu, Kerala etc states. According to them, existing database also reveals higher female child mortality. Gaps and under coverage of Census enumeration (1991 and 2001), rigid patriarchal social structure, sex selective abortion, infanticide, foeticide using ultrasound technology are some of the reasons behind such scene of adverse CSR (Bose, 2001). Agnihotri (2001b) has talked about comparatively higher female IMR is districts of Malda, Nadia and South 24 Parganas in West Bengal. Padmanabhan (1982) has found that the female post neonatal mortality is 20 percent higher than male and 30 percent higher mortality of female than male at age 1-4.Visaria (2008) has broadly discussed on issues of deficit of women, falling Juvenile Sex Ratio (mainly due to survival disadvantage of women, high female mortality etc). Guilmoto (2008) has argued the incident of surplus of male is coincided with the incidence of continuing sex-specific mortality differential among children and adults and incidence of gradual decline of sex ratio of children under five.

2.2.3 Under-enumeration of Girls:

Griffiths *et al* (2000) has pointed out that NFHS shows lower sex ratio than Census and SRS estimates figures in 1991 for both rural and urban population while estimation of sex ratio is one of the major demographic variables of NFHS. The post enumeration checks of Government of India suggest that this gap of sexes in enumeration is decreasing. They also argue that the effect of the under enumeration is not enough for answering the question of the low sex ratio in this country.

2.2.4 Female Infanticide, Class, Caste and Child Sex Ratio:

Since 1931, there is practice of infanticide as cited by Shirras (1935). He has given an example of an incident in which a mother has killed her 12 daughters out of 13. Premi and Raju (1998) have estimated that multi-caste villages have better child sex ratio than single-caste villages of Madhya Pradesh *"..may be because in multi-caste settings, other castes provide informal counter vigilance against the practice of female infanticide"*(p. 102). They have also tried to assert the extent and intensity of the incident of female infanticide. They have found in a study on Madhya Pradesh, infanticide is higher in warrior class in nineteenth century or early twentieth century. This incidence was very low among the lower caste people. Among Khatris, Rajputs, Jats and all class of Sikhs, this practice is prevalent. Some tribal villages have no single daughter due to infanticide. Morena district, mostly populated by Tonwar Thakurs in Madhya Pradesh, has very low sex ratio 526 females per 1000 males. Along with it, Bhadauria, Kachwala, Shekhawat, Tonwar, Bhatti, Jadeja Rajput and Gurjar also practice this inhuman act. They have also found Yadav in Godhad Block in Madhya Pradesh practicing infanticide. The authors have confirmed that female infanticide is community specific. Gurjar, Yadav and Rajput have low sex ratio and they have got direct or indirect evidences of female infanticide. In describing the process of infanticide, authors have observed different crude methods used by the villagers like putting tobacco in the mouth of new born girl child. On asking about the reasons behind crib death, villagers answered that baby had pneumonia (even for 1 day old baby) or baby turned pale, green, blue or her body became stiff. All these reasons are not solid enough to prove that cribs died naturally. Since colonial period, there was a practice of killing girl child in upper landholding class. According to British residents, the king and prince in Banaras and Jaunpur district killed their child daughter. Britishers reported that Rajput, Gurjar, Ahir, Jats, Khatris and Moyal Bramhins practiced infanticide. Bedi-Khatris in Punjab also practice female infanticide. Hindu and Sikhs have adverse child sex ratio than Muslims and Christians. Jat, Rajput and Gurjar have also found to do this kind of barbaric act. Prevalence of infanticide and foeticide is very high in Andhra Pradesh (Tandon and Sharma, 2006).

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2.2.5 Status of Woman, Neglect of Girl Child, Dowry and Child Sex Ratio:

It has already been mentioned that sex structure at age 0-6 population is affected by variation in sex ratio at birth and differential mortality. Mortality may differ due to neglect of girl child in period of illness. So it can be assumed that, one of the reasons behind excess female mortality is acute neglect of female child (Sen, 1990; Premi and Raju, 1998). While discussing about nitty-gritty of women trafficking issue on a case study of Anantapur district in Andhra Pradesh, Vindhya and Dev (2011) have pointed out a root cause behind neglect girl children in the family. The root cause is just the sole perception in families that girl children are 'dispensable' or 'burden'.

Since the primitive days, the division of labour in Indian society was that where man interacted with the external world while woman did the domestic or household chores. That is why, it helped men to get the exposure to influence the authoritarian structure and made them more powerful (Durkheim 1933, Morgan 1964 cited by Arokiasamy and Goli, 2012). It has been observed that the class and caste groups where child sex ratio is abnormal, the status of women is also not satisfactory. Rajputs do not let their woman folk to work outside (Premi and Raju, 1998). Perwez, Jeffery and Jeffery (2012) have cited on Kelly (1975) that the main reason behind low child sex ratio is neglect of the girl child in terms less health care during early childhood and low nutrition and therefore leading to their death. In a study on West Bengal, Sen (1985) cited by Mayer (1999) tells that villages in West Bengal have undernourished girls than boys. Mayer has also pointed out that dowry and 'bride price' as a factor responsible for sex ratio disfavoured for woman. He has also cited Randeria and Visaria (1984) that giving 'dowry' has more adverse effect than providing bride price. Booth et al (1994) has also noted that though foetal sex determination is illegal, growing demand of ultrasound technology at less expensive way indirectly saves parents' income that is burdened under 'dowry' system for daughter's marriage in Punjab. Even in Andhra Pradesh, dowry system is prevalent and amount even comes at crores of Rupees (Misra, 2006).

2.2.6 Son Preference, Patriarchy and Child Sex Ratio:

Krisnaji, well back in 1987, has identified the factor of 'son preference' as daughter's marriage results in property share and dowry payment. In a study of Punjab, Booth et al

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(1994) has observed that use of foetal sex determination is higher in case of mothers with elder daughters and higher socio-economic rung, thereby suggesting the issue of 'son preference'. Through an interactive primary survey, Rajivan (2006) has brought out few realities in Andhra Pradesh. Desire for male child prevails among women. Even in some cases, father-in-law and mother-in-law are found to be insisting on birth of a son. The mental set-up of family members also appears disappointing, as girls are considered (1) an 'expense' because of 'dowry' and (2) useless for parents, because they get married off and go to other families. On the other hand, sons are preferred as (1) family name upholds with presence of sons and (2) they take care of parents during old ages.

Hypergamy, i.e. giving daughter in marriage to upper caste family, reflects patriarchy. In that case, lower-caste women cannot express their own opinion or desire and are compelled to listen to their in-laws. After such a marriage, the receiving end of the in-law family becomes "*paun puj k khandan*" to be treated as superior and object of worship (p.101, Premi and Raju 1998). Guilmoto (2008) has remarked that strong patriarchal upper class people, with desire for sons, have access to female foetus-killing medical techniques. Arokiasamy and Goli (2012) have attempted to test a hypothesis that patriarchy can be determined by landholding possession. According to them, land possession means having power. That is why the 'power relationship' between wife and husband can be more equal in poor household (i.e. absence of landholdings):

> *Land is a significant determinant of economic well-being, social status, and even political power. Land is the most valuable economic resource through which men asserted control in the early stages of human civilizations and it continues to determine the power dynamics between genders even today* [Bagchi, 1981 cited by Arokiasamy and Goli (2012) p. 86].

So by adopting NFHS as data source, they have gone for further analysis on sex ratio patterns and landholding size (that are very small or large) of family. The fundamental determinant of son preference is the socio-economic status of woman. Son preference factor also leads to consequences like sex selective abortion, excess female mortality. Other determinants of son preference are women's freedom to work outside the household, decision making power on

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their own health and their freedom of mobility (Agatha *et al*, 2007 cited by Arokiasamy and Goli, 2012). With the same NFHS data source, authors have made composite index showing the different variables (like likelihood of having lower female autonomy, having son preference, sonography/ultrasound test, having induced abortion, having female compared to male death etc.); and by using the binary logit regression, they have reached to a conclusion that larger landholding size is associated strong patriarchy and less woman autonomy. Landholding size and child sex ratio has a negative association that means larger the landholding size, child sex ratio is lower.

2.2.7 Sex-selective Abortion and Child Sex Ratio:

Sex-selective abortion is not a new phenomenon in India. Shirras (1935) has mentioned that 1931 Census Commissioner referred the practice of abortion if the sex of the foetus was girl. Sex-selective abortion is an important cause for low child sex ratio [Kundu and Sahu (1991) and Raju and Premi (1992) as cited by Mayer (1999)]. According to Pallikadavath and Stones (2006), there may be sex selection in the regions where pre-natal sex identification techniques are easily accessible and the culture is characterized by strong patriarchy. By using NFHS 2nd Round data, they have analyzed that sex of the previous child has no significant association with the induced abortion in any birth order. But in Haryana, sex of the previous child has found to have association with abortion. Their results reveal that abortion would be higher if the sex of the previous child is girl. In contrast, Jha *et al* (1997) have asserted that the cause of low child sex ratio is sex-selective abortion (cited by Pallikadavath and Stones, 2006). John (2011), through the extensive study of Census data and NFHS-3 data, has blamed societal structural imbalance and malpractice of pre-birth sex determination by some dishonest medical practitioners for such adverse CSR scenario in India. Perwez, Jeffery and Jeffery (2012) have cited on Kishwar's (2011) study that increasing number of sex determination and followed by sex-selective abortion are the main causes of declining child sex ratio. According to them, low sex ratio at birth is due to sex selective abortions. It is found mainly in second and third order births in the family who already have one or two girls. According to them, demographers-social scientists-NGOs-Government officials also agree with the fact that in higher order births, the incidence of infanticide or sex-selective abortions are more. They have argued that the families attempting

sex-selective abortion have already contributed so-called 'sufficient' number of female births to the society, and hence this exercise would not dwindle overall CSRs. Dréze (2012) has criticized this fact by giving the logic that

> *Sex-selective abortion (of female foetuses) drives down the female-male ratio at birth, irrespective of where it takes place in the population. Any female foeticide contributes to the problem of "missing girls", whether it is preceded by a female birth or a male birth in the same family.* (p. 97)

2.2.8 Education, Work Participation Rate, Income and Child Sex Ratio:

Mothers with no education have less imbalanced child sex ratio than mothers with higher education. Higher income group population is also characterized with less female children than male as compared to the poor income group (Krisnaji, 1987; Arokiasamy and Goli, 2012). Female Work Participation rate has 'moderately strong' correlation with juvenile sex ratio (Millar 1981, cited by Mayer 1999) Using data from different sources like Committee on the status of woman (1975), Padmanabhan (1982) and Tata Services Limited (1995), he has found positive correlation between sex ratio and percentage of female workforce as well as negative correlation between sex ratio and literate females.

2.2.9 Migration and Child Sex Ratio:

Premi and Raju (1998) have argued that 0-6 population cannot be affected by male or female selective migration. Age and sex structure at age 0-6 population is affected only by variation in sex ratio at birth and differential mortality.

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Chapter-III
Trends and Patterns of Child Sex Ratio

3.1 INTRODUCTION:

The previous chapter guides to the fact the phenomenon of child sex ratio is affected by multiple socio-cultural factors. These factors vary in a spatio-temporal scale. Hence, for proper understanding of child sex ratio in any state, one has to know the trends and patterns of child sex ratio itself. In this chapter, the analysis of district level trends and patterns of child sex ratio has been done with the help of Census data for 2001 and 2011. Choropleth maps have been drawn in Arc GIS environment to show spatial variations. At first, all India district level trends and patterns have been discussed. Then, focus has been shifted on the study area, i.e. Andhra Pradesh, Punjab and West Bengal.

3.2 INDIA:

If one just glances at district level Child Sex Ratio map of India in 2001, then two types of spatial pattern are observed. Firstly, southern, eastern and north-eastern parts reveal balanced CSR. In contrary, three problem zones also exist:

(1) North-western part- 'Highly Imbalanced CSR' (below 850) in Punjab, Haryana and Delhi, surrounded by semi-oval ring of 'Imbalanced CSR' in northern and north-eastern Rajasthan, northern Madhya Pradesh and Western Uttar Pradesh;

(2) Western part- Except Rann of Kachh, the whole Gujarat and central Maharashtra;

(3) Southern part- Only northern Tamil Nadu

Raju (2011) has pointed out that 'generally accepted' CSR is 950 girls per 1000 boys. Given this cut-off or accepted limit, among 35 states/Union Territories in India, 17 have CSR below 950. Among total 588 districts, as many as 329 have failed to reach this accepted limit. The situation is worst in 48 districts, because they have even less than 850 girl children per 1000 boys. Another 64 districts have CSR ranging between 850 and 899.

In 2011, 393 districts have CSR values below accepted limit of 950. The following table (3.A) shows that among 41 districts with 'Highly Imbalanced CSR'. Among these, 32 (i.e. 78%) are limited only in five states, viz. Haryana, Punjab, Jammu & Kashmir, Madhya Pradesh and Rajasthan. Among 115 districts characterized by 'Imbalanced CSR', 97 (i.e. 84%) are restricted within 8 states, viz. Uttar Pradesh, Rajasthan, Maharashtra, Gujarat,

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Punjab, Jammu & Kashmir, Uttarakhand and Madhya Pradesh. Therefore, the problem zones, as identified in 2001, more or less have continued to exist. In Andhra Pradesh, child sex ratio has substantially declined from 961 (2001) to 939 (2011). Rest parts of India have reported overall balanced CSR. In a nutshell, there is not any considerable change in the broad spatial pattern of 2001 and 2011.

Table-3.A: Spatial variation of Child Sex Ratio, 2011

Child Sex Ratio	State	Number of Districts
'Highly Imbalanced CSR'	Haryana	14
Below 850	Punjab	8
(total 41 districts in India)	Jammu & Kashmir	4
	Madhya Pradesh	3
	Rajasthan	3
	SUM	**32**
'Imbalanced CSR'	Uttar Pradesh	27
850-899	Rajasthan	17
(total 115 districts in India)	Maharashtra	14
	Gujarat	11
	Punjab	11
	Jammu & Kashmir	6
	Uttarakhand	6
	Madhya Pradesh	5
	SUM	**97**

Source: Compiled from Primary Census Abstract, Census of India, 2011

Fig 3.1: Child Sex Ratio in Districts of India, 2001

CHILD SEX RATIO
INDIA 2001

child sex ratio

<850
850-900
900-950
>950

570   285   0   570 Kilometers

Fig-3.2: Child Sex Ratio in Districts of India, 2011

CHILD SEX RATIO
INDIA 2011

Legend
csr total
<850
850-900
900-950
>950
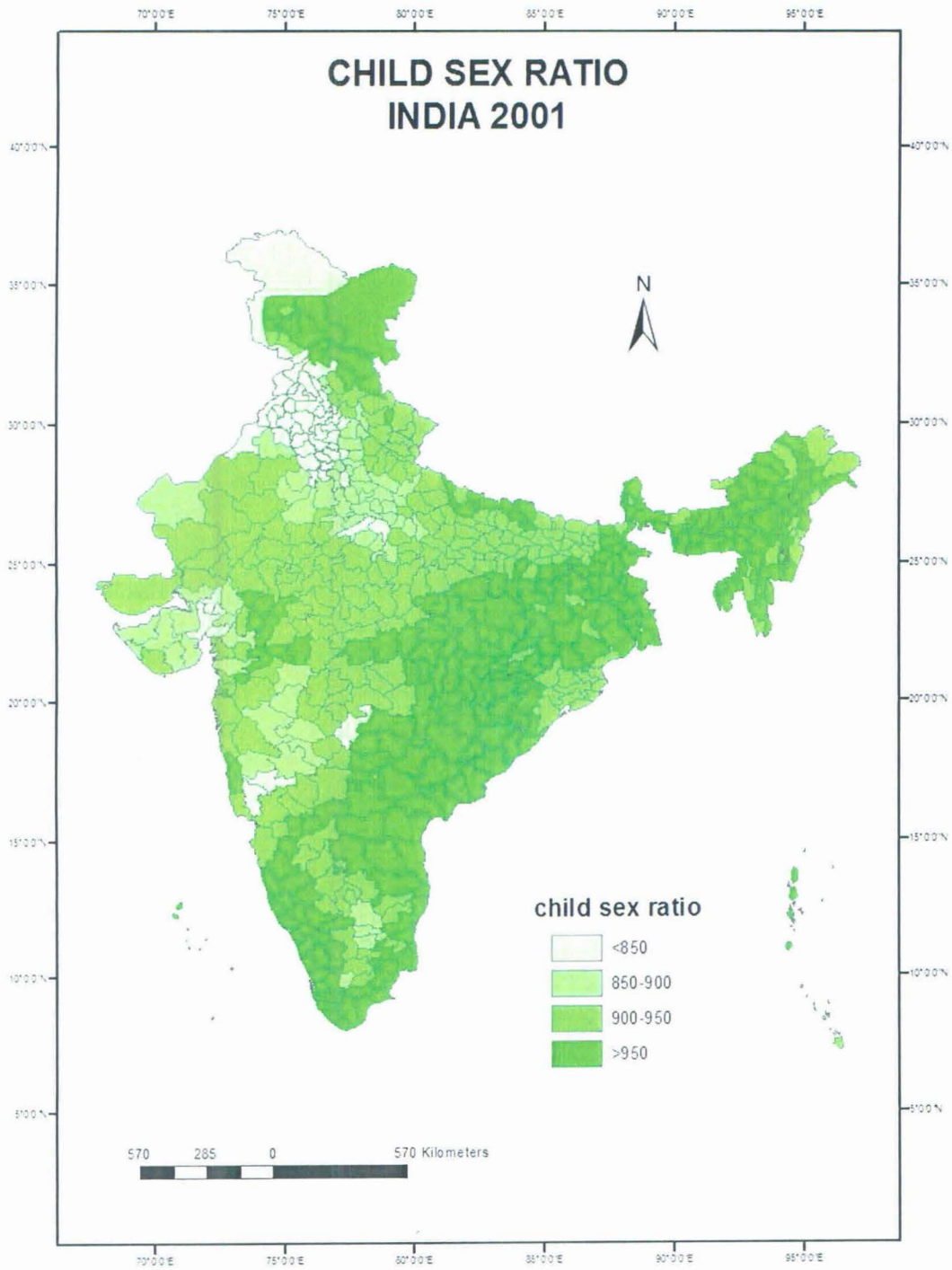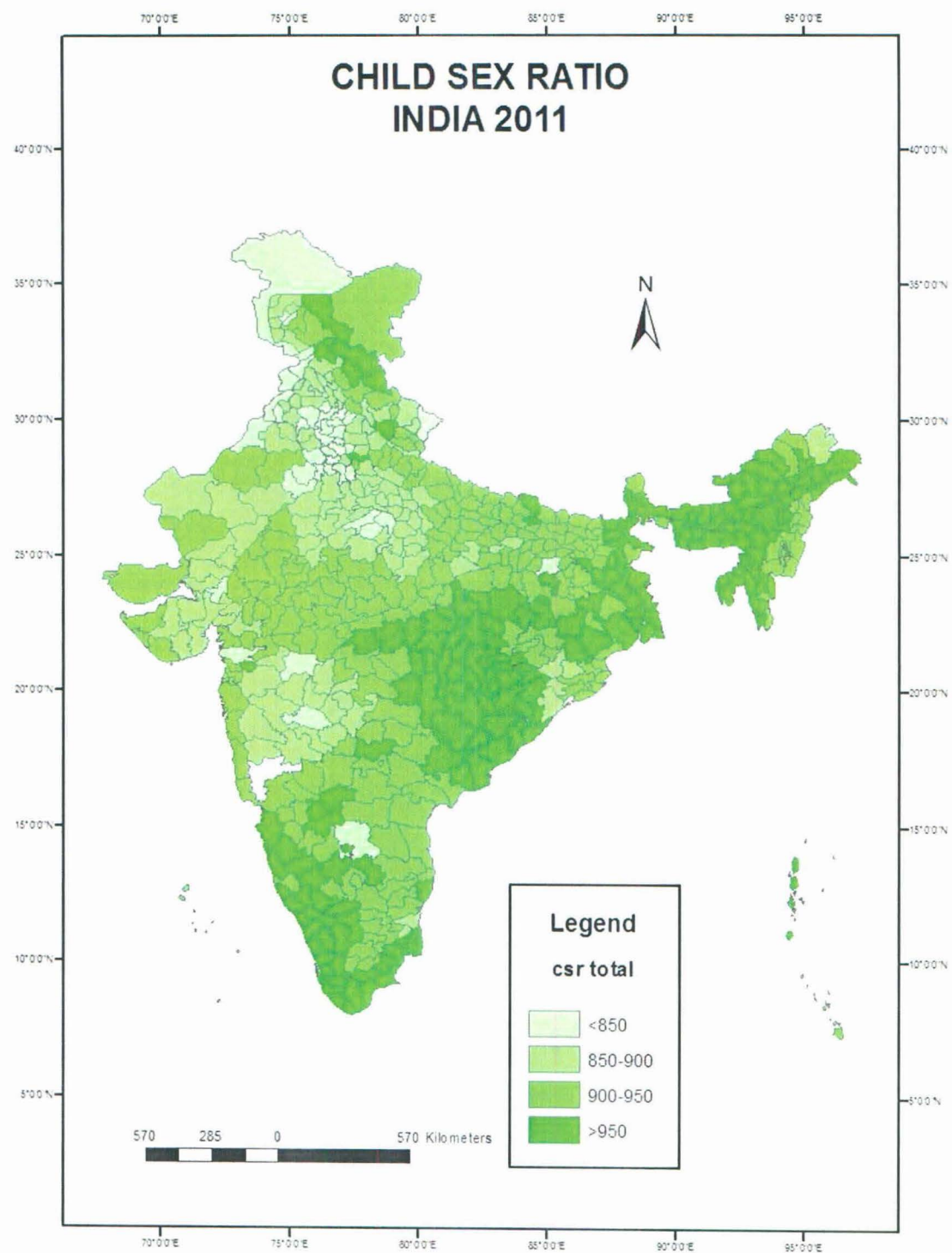
Rural CSR-2011:

The scenario becomes clear when one looks into disaggregated rural-urban shares. Around 7 percent districts (total 44) in rural India have reported 'Highly Imbalanced' CSR below 850. Among these districts, Haryana, Punjab and Jammu Kashmir have large shares. Approximately 17 percent districts (total 108) have 'Imbalanced' CSR ranging between 899 and 850. Within this category of districts, Uttar Pradesh, Maharashtra, Rajasthan, Punjab and Jammu & Kashmir have lion's shares. On the other hand, around 36 percent districts (total 225) have shown CSR above comfortable limit of 950. This category of districts mostly falls in Assam, Tamil Nadu, Arunachal Pradesh, Chhattisgarh, Odisha, Jharkhand and Karnataka.

Urban CSR-2011:

Approximately 10 percent districts (total 62) in urban India have revealed 'Highly Imbalanced' CSR below 850. Among these districts, Haryana, Jammu & Kashmir, Punjab and Uttarakhand have large shares. Approximately 27 percent districts (total 168) have 'Imbalanced' CSR ranging between 899 and 850. Within this category of districts, Uttar Pradesh, Madhya Pradesh, Gujarat, Maharashtra, Punjab and Rajasthan have bulk shares. On the other hand, 21.4 percent districts (total 225) have shown CSR above comfortable limit of 950. This category of districts mostly falls in Assam, Tamil Nadu, Andhra Pradesh, Chhattisgarh, Bihar, Odisha, Jharkhand and Karnataka. While considering level of urbanization and CSR together, a mixed picture comes out. For example, urban CSR is relatively imbalanced not only in highly urbanized districts like Gurgaon, Surat, Ahmedabad, Faridabad, Gwalior, Ghaziabad but also in less urbanized districts like Mahendergarh, Bilaspur, Shupian, Nayagarh, Tarn Taran, Uttarkashi, Rudraprayag etc.

Table-3.B: India- Urban CSR and Level of Urbanization

			Urban Child Sex Ratio					Total
			<850	851-899	900-949	949-1000	>1000	
Level of Urbanization (%)	<20	No. of Dists	24	79	154	62	1	320
		% of Total	3.80%	12.60%	24.60%	9.90%	0.20%	51.20%
	20-30	No. of Dists	17	41	41	27	0	126
		% of Total	2.70%	6.60%	6.60%	4.30%	0.00%	20.20%
	30-40	No. of Dists	7	17	32	11	0	67
		% of Total	1.10%	2.70%	5.10%	1.80%	0.00%	10.70%
	>40	No. of Dists	14	30	35	33	0	112
		% of Total	2.20%	4.80%	5.60%	5.30%	0.00%	17.90%
Total		No. of Dists	62	167	262	133	1	625
		% of Total	9.90%	26.70%	41.90%	21.30%	0.20%	100.00%

Source: Calculated from Primary Census Abstract, Census of India, 2011

Fig-3.3: Rural Child Sex Ratio in Districts of India, 2011

RURAL CHILD SEX RATIO
INDIA 2011

Legend
rural CSR

<850
850-900
900-950
>950

570   285   0   570 Kilometers

Fig-3.4: Urban Child Sex Ratio in Districts of India, 2011

URBAN CHILD SEX RATIO
INDIA (2011)

Legend
urban C SR

<850
850-900
900-950
>950

570   285   0   570 Kilometers
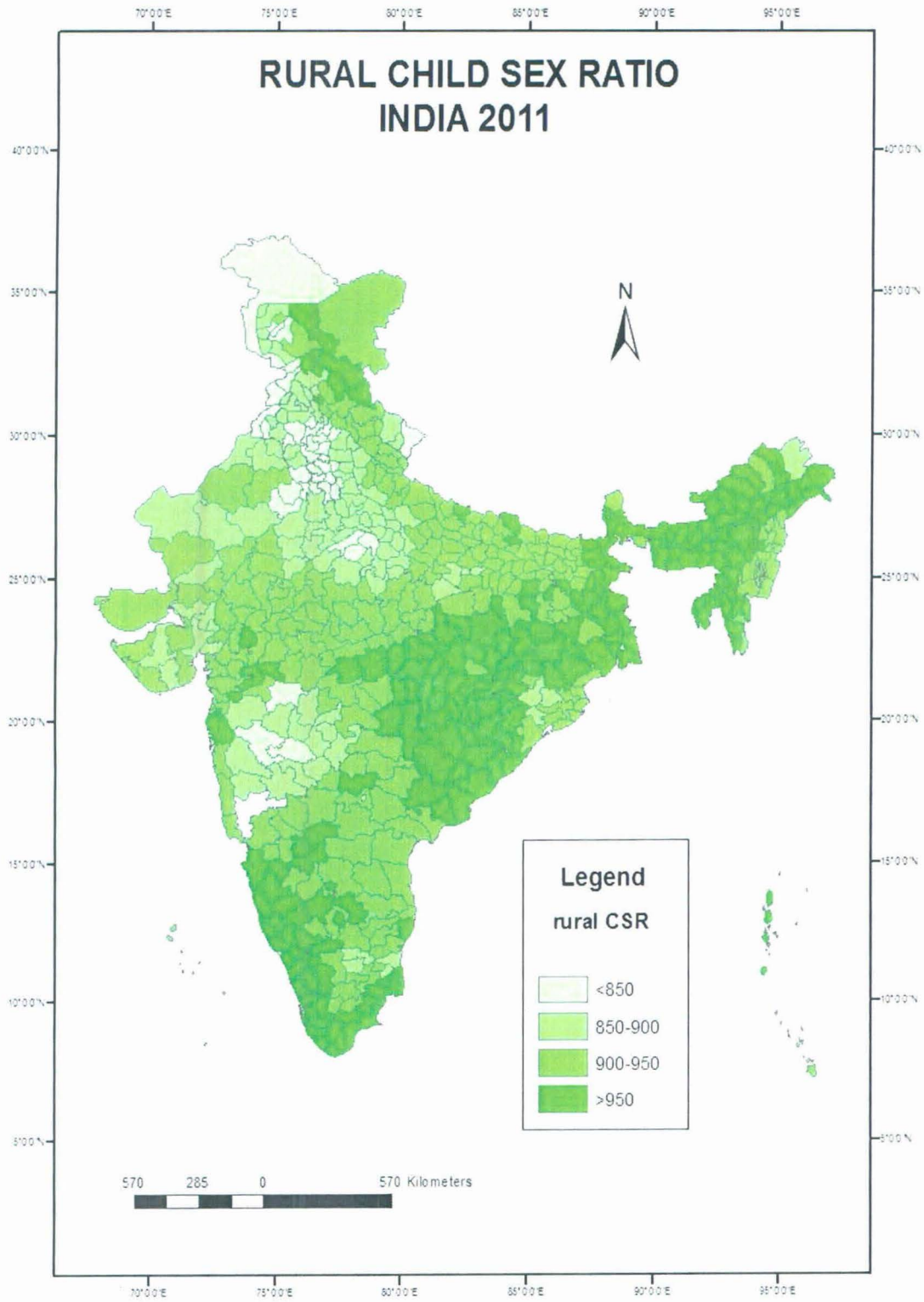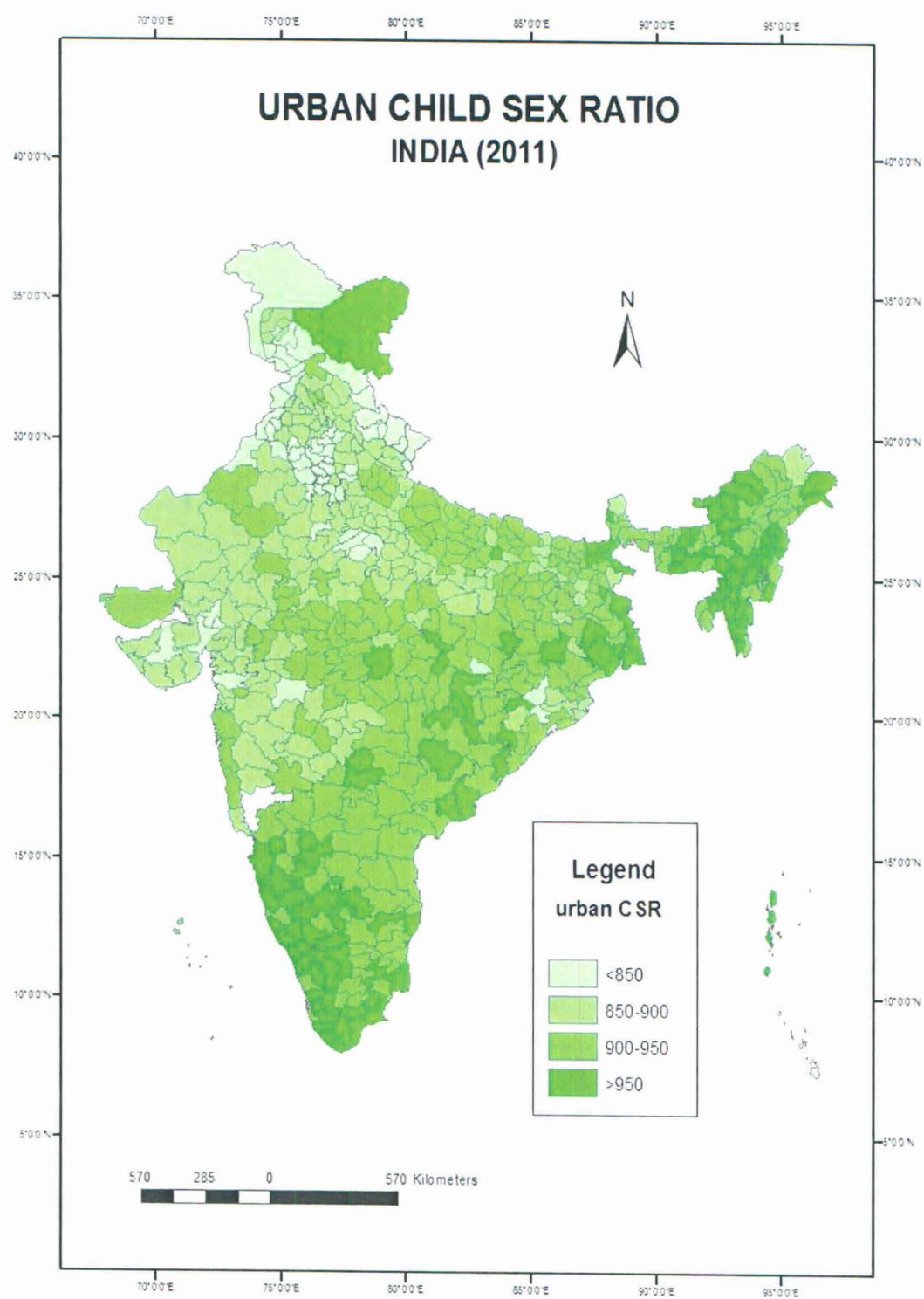
3.3 CHILD SEX RATIO IN THE STUDY AREA:

3.3.1 ANDHRA PRADESH:

A glance on Andhra Pradesh district map of CSR (2001) gives a satisfactory figure. Except Hyderabad, all the districts have child sex ratio above 950. Hyderabad has 7 points less than generally accepted child sex ratio of 950. The urban child sex ratio in 2001 is little more depressing. Adilabad (939), Hyderabad (943), Chittoor (945) and Karimnagar (948) are four districts which have low levels of child sex ratio in urban areas. Among these four districts, level of urbanization is 100 percent only for Hyderabad. Rest three districts are less urbanized; Adilabad, Chittoor and Karimnagar have 27, 22 and 19 percent urban population, respectively. Rural areas in the districts of Andhra Pradesh show a charming picture. All districts, except Cudappa (949) (now Y.S.R), fall under the balanced child sex ratio group i.e. above 950. Two districts with highest rural child sex ratio are Visakhapatnam (990) and Vizianagaram (984).

Within ten years, a depressing picture has come out. In 2011, out of 23 districts, 16 (i.e. 70 percent) have child sex ratio less than 950. Therefore, now only 7 districts (i.e. only 30 percent) viz. Medak, Srikakulam, Khammam, Vizianagaram, Visakhapatnam, West Godavari and East Godavari remain in the balanced category of child sex ratio. The declining trend of the number of girls is clearly visible here.

Table-3.C: Child Sex Ratio across Districts of Andhra Pradesh, 2001 and 2011

2001				2011			
DISTRICT	TOTAL	RURAL	URBAN	DISTRICT	TOTAL	RURAL	URBAN
Adilabad	962	970	939	Adilabad	934	937	925
Anantapur	959	956	967	Anantapur	927	928	926
Chittoor	955	957	945	Chittoor	931	932	926
Cuddapah	951	949	957	East Godavari	968	968	968
East Godavari	978	976	985	Guntur	945	945	947
Guntur	959	958	962	Hyderabad	914	-	914
Hyderabad	943	-	943	Karimnagar	935	937	932
Karimnagar	962	965	948	Khammam	958	962	947
Khammam	971	973	958	Krishna	935	934	938

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Krishna	963	964	961	Kurnool	938	940	933
Kurnool	958	957	960	Mahbubnagar	925	923	935
Mahbubnagar	952	951	953	Medak	952	951	955
Medak	964	966	954	Nalgonda	923	919	943
Nalgonda	952	951	955	Nizamabad	948	944	962
Nellore	954	953	957	Prakasam	932	930	945
Nizamabad	959	960	953	Rangareddy	933	938	931
Prakasam	955	955	956	Sri Potti Sriramulu Nellore	939	- 939	940
Rangareddi	959	969	950	Srikakulam	954	958	932
Srikakulam	967	968	965	Visakhapatnam	961	972	946
Visakhapatnam	976	990	952	Vizianagaram	960	962	951
Vizianagram	980	984	957	Warangal	923	916	939
Warangal	955	954	961	West Godavari	964	965	960
West Godavari	970	968	978	Y.S.R.	918	918	918

Source: Computed from Primary Census Abstract tables, Census of India, 2001 and 2011

Within ten years, a depressing picture has come out. In 2011, out of 23 districts, 16 (i.e. 70 percent) have child sex ratio less than 950. Therefore, only 7 districts (i.e. only 30 percent) viz. Medak, Srikakulam, Khammam, Vizianagaram, Visakhapatnam, West Godavari and East Godavari presently remain in the balanced category of child sex ratio. The declining trend of the number of girls is clearly visible here.

In 2011, mainly two types of spatial pattern can be seen:

(1) North- eastern part: Only this part has balanced child sex ratio (i.e. more than 950). The districts are Srikakulam, Khammam, Vizianagram, Visakhapatnam, West Godavari and East Godavari.

(2) North- western part: Only one district (Medak) in this part is within the margin of balanced sex ratio category i.e. 952 (Just 2 point difference with the margin).

(3) Remaining North-west-south part: The entire state, barring above two parts in 2011, is now showing declining pattern of child sex ratio (i.e. less than 950 or imbalanced situation). There are 16 districts in this category. The districts with low child sex

ratios are Hyderabad (914), Y.S.R. (918), Warangal (923), Nalgonda (923), Mahbubnagar (925), and Anantapur (927). Other districts that range between 930 and 949 are Chittoor, Prakasam, Rangareddy, Adilabad, Karimnagar, Krishna, Kurnool, Sri Potti Sriramulu Nellore, Guntur and Nizamabad.

Fig-3.5: Child Sex Ratio in Districts of Andhra Pradesh, 2001
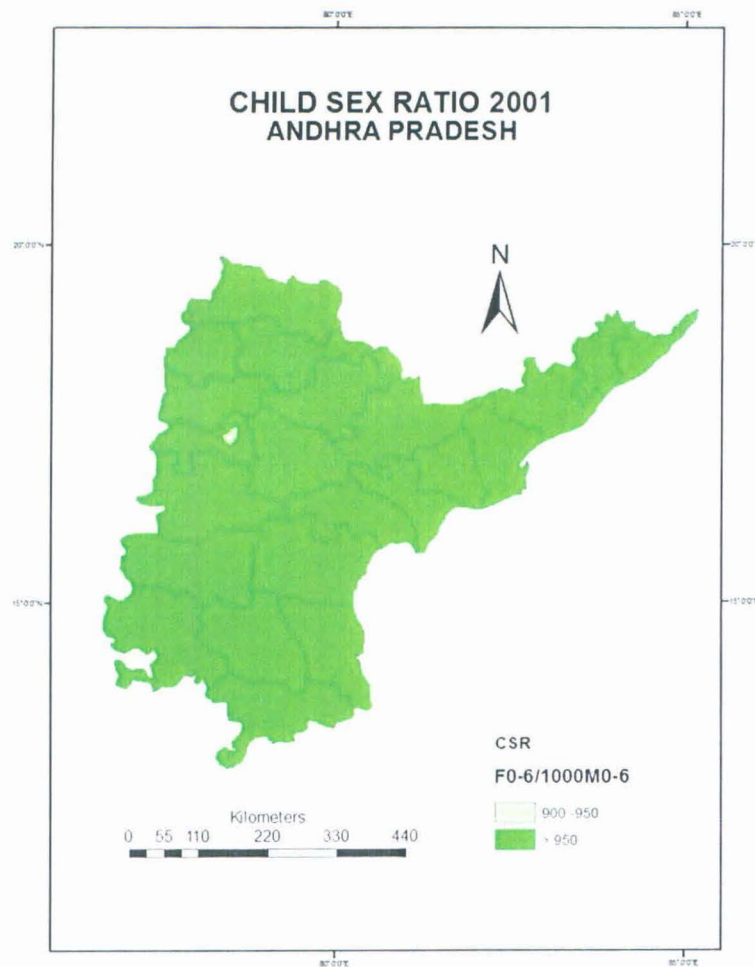
Fig-3.6: Child Sex Ratio in Districts of Andhra Pradesh, 2011
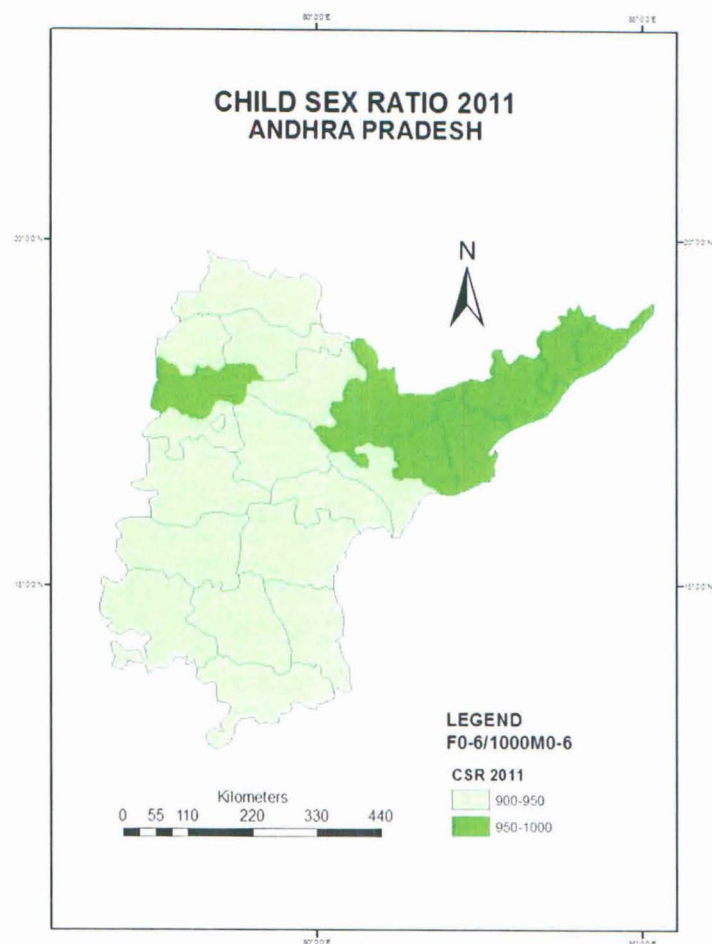
In rural areas, out of 23 districts child sex ratio of 15 districts (65 percent) fall under imbalanced child sex ratio of 900-949 viz. Adilabad, Anantapur, Chittoor, Guntur, Karimnagar, Krishna, Kurnool, Mahbubnagar, Nalgonda, Nizamabad, Prakasam, Rangareddy, Sri Potti Sriramulu Nellore, Warangal and Y.S.R. In urban areas, 18 districts (78 percent) fall under 900-949 child sex ratio category which should be a major concern for the Government, NGOs as well as entire human society.

Fig-3.7: Urban Child Sex Ratio in Districts of Andhra Pradesh, 2001
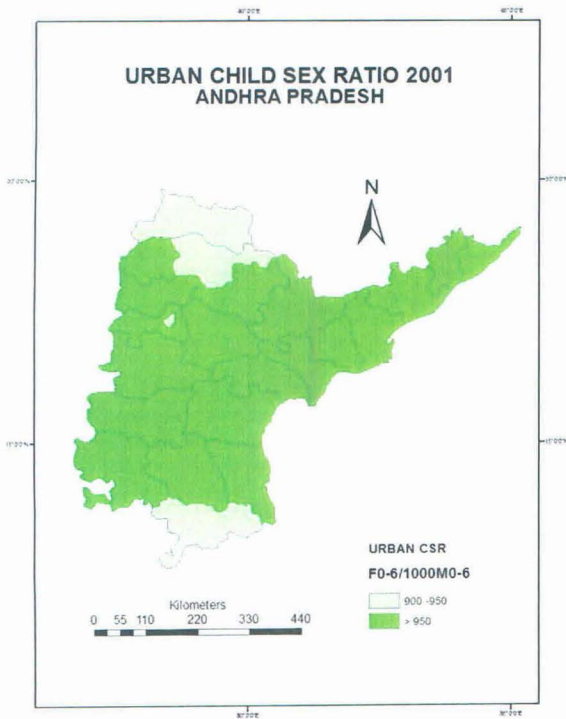
URBAN CHILD SEX RATIO 2001
ANDHRA PRADESH

URBAN CSR
F0-6/1000M0-6
900 -950
> 950

Fig-3.8: Urban Child Sex Ratio in Districts of Andhra Pradesh, 2011

URBAN CHILD SEX RATIO 2011
ANDHRA PRADESH

LEGEND
F0-6/1000M0-6
URBAN CSR
>950
>950

Fig- 3.9: Rural Child Sex Ratio in Districts of Andhra Pradesh, 2011

**RURAL CHILD SEX RATIO 2011
ANDHRA PRADESH**

N

LEGEND
F0-6/1000M0-6

RURAL CSR
<950
>950

Kilometers
0 55 110   220   330   440
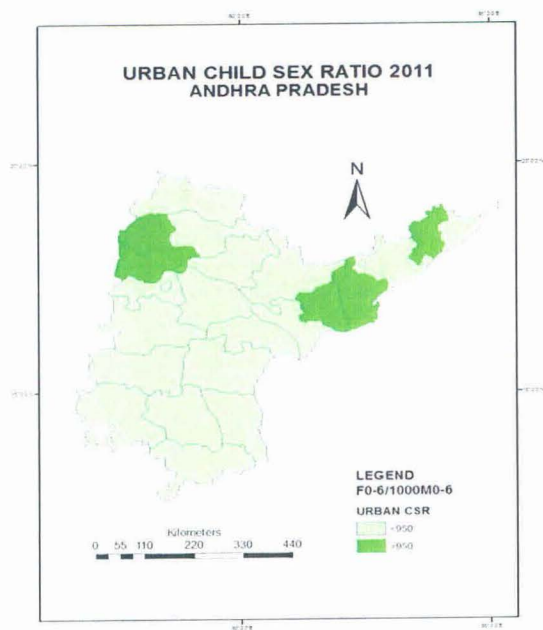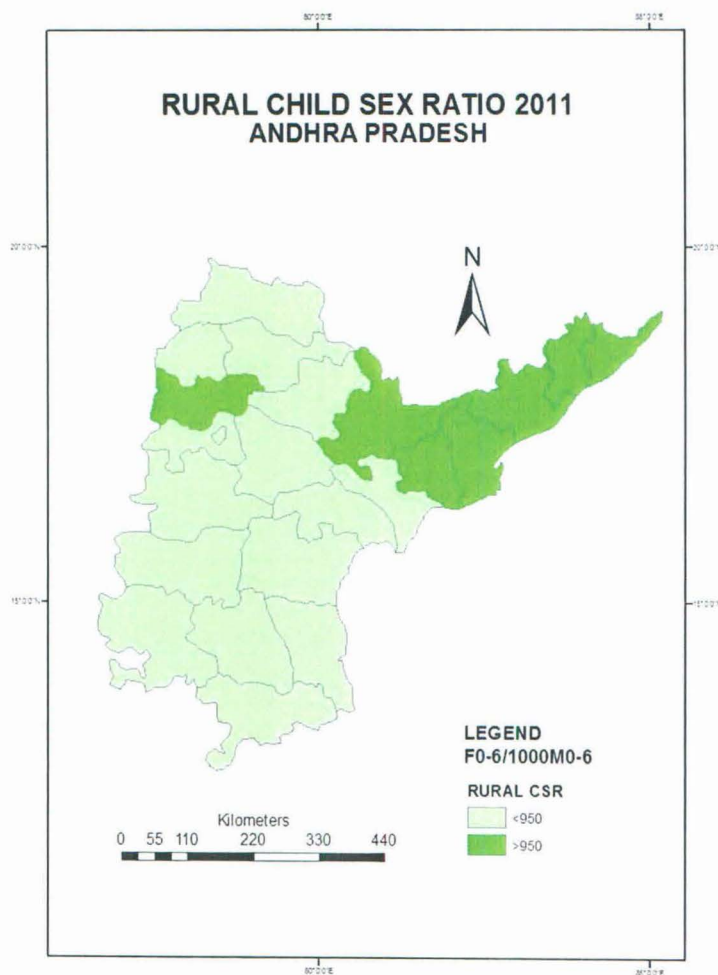
3.3.2 PUNJAB:

In 2001, Punjab has not a satisfactory position regarding CSR. Amritsar, Fatehgarh Sahib, Patiala, Mansa, Kapurthala, Bathinda, Sangrur, Gurdaspur and Rupnagar are the districts which have child sex ratio between 700 and 800. This 'Highly Imbalanced' category includes 50 percent districts. Remaining nine districts have child sex ratio less 850. The district with lowest child sex ratio is Fatehgarh Sahib (766) and highest child sex ratio is Chandigarh (845). Gurdaspur, Bathinda, Mansa, Amritsar, Fatehgarh Sahib, Kapurthala, Jalandhar, Patiala, Faridkot and Rupnagar are districts where in urban areas child sex ratio is less than 800. Among these districts, level of urbanization is high in Kapurthala (33%), Patiala (35%), Faridkot (35%), Amritsar (40%) and Jalandhar (47%).

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In 2011, Punjab has overcome such an adverse situation. Now out of 20 districts, 9 districts (45%) viz. Faridkot (851), Bathinda (854), Ludhiana (860), Moga (860), Rupnagar (863), Hoshiarpur (865), Kapurthala (871), Jalandhar (874) and Shahid Bhagat Singh Nagar (885) have child sex ratio above 850. All other 11 districts (55 percent) have child sex ratio within 800. The district with lowest child sex ratio is Tarn Taran (820) and highest is

In 12 districts (60 percent) urban child sex ratio is greater than 800 which is a positive indication of improvement in child sex ratio than 2001. The same case can be seen in rural areas where 45 percent districts have child sex ratio more than 800. Before in 2001, 50 percent districts has child sex ratio less than 800.

Table-3.D: Child Sex Ratio across Districts of Punjab, 2001 and 2011

2001				2011			
DISTRICT	TOTAL	RURAL	URBAN	DISTRICT	TOTAL	RURAL	URBAN
Amritsar	790	793	784	Amritsar	826	826	826
Bathinda	785	795	762	Barnala	843	847	835
Chandigarh	845	847	845	Bathinda	854	852	857
Faridkot	812	820	797	Faridkot	851	854	844
Fatehgarh Sahib	766	757	791	Fatehgarh Sahib	842	835	857
Firozpur	822	825	813	Firozpur	847	848	846
Gurdaspur	789	797	762	Gurdaspur	821	821	820
Hoshiarpur	812	815	800	Hoshiarpur	865	865	863
Jalandhar	806	817	793	Jalandhar	874	885	865
Kapurthala	785	782	792	Kapurthala	871	859	896
Kapurthala	785	782	792	Ludhiana	860	859	860
Ludhiana	817	815	819	Mansa	836	840	820
Mansa	782	783	778	Moga	860	863	853
Moga	818	822	802	Muktsar	831	832	828
Muktsar	811	814	804	Patiala	837	827	852
Nawanshahr	808	809	804	Rupnagar	863	859	874
Patiala	777	769	794	Sahibzada Ajit Singh Nagar	841	821	859
Rupnagar	794	793	799	Sangrur	840	827	869

Sangrur	786	779	803	Shahid Bhagat Singh Nagar	885	884	889
				Tarn Taran	820	818	835

Source: Computed from Primary Census Abstract tables, Census of India, 2001 and 2011

Fig-3.10: Child Sex Ratio in Districts of Punjab, 2001

Fig-3.11: Child Sex Ratio in Districts of Punjab, 2011

CHILD SEX RATIO
PUNJAB, 2011

LEGEND
F0-6/1000M0-6
Punjab
T CSR
-850
850-900
900-950
-950
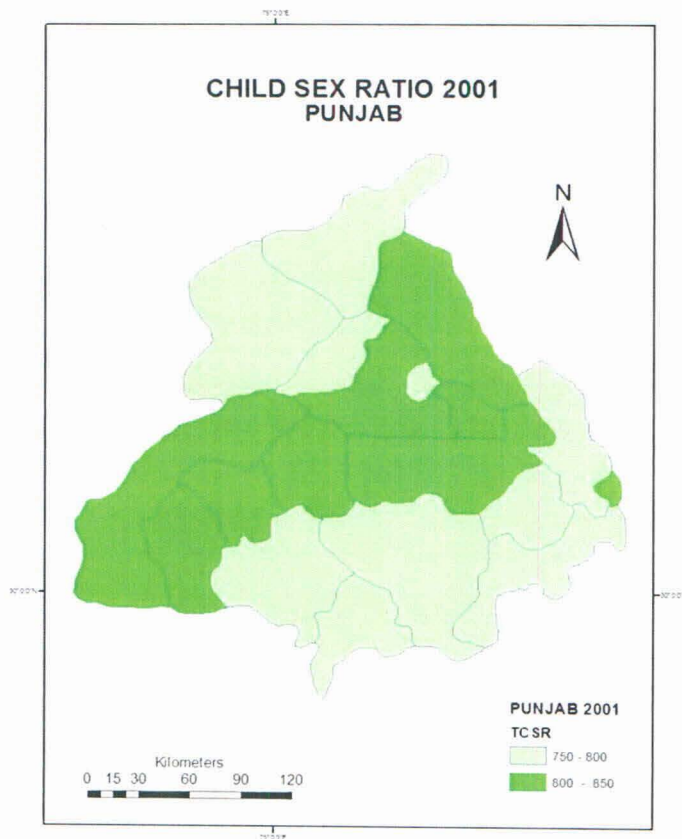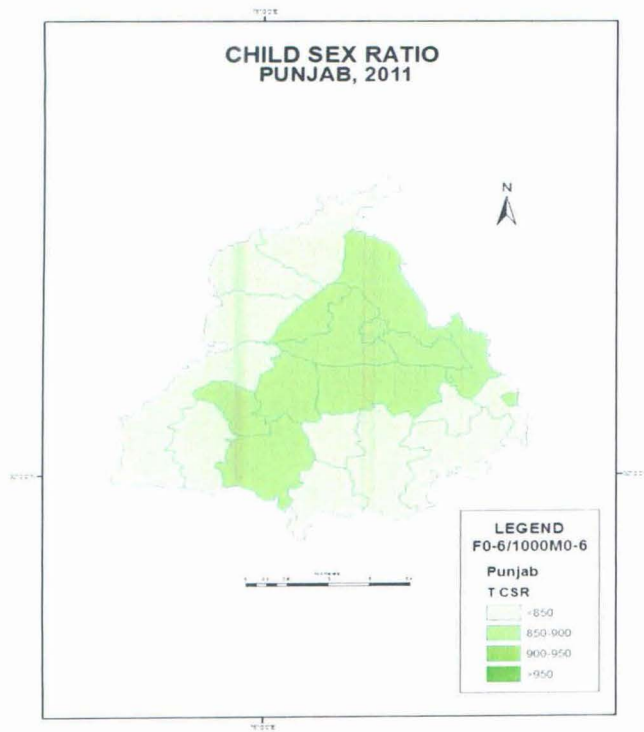
Fig-3.12: Rural Child Sex Ratio in Districts of Punjab, 2001
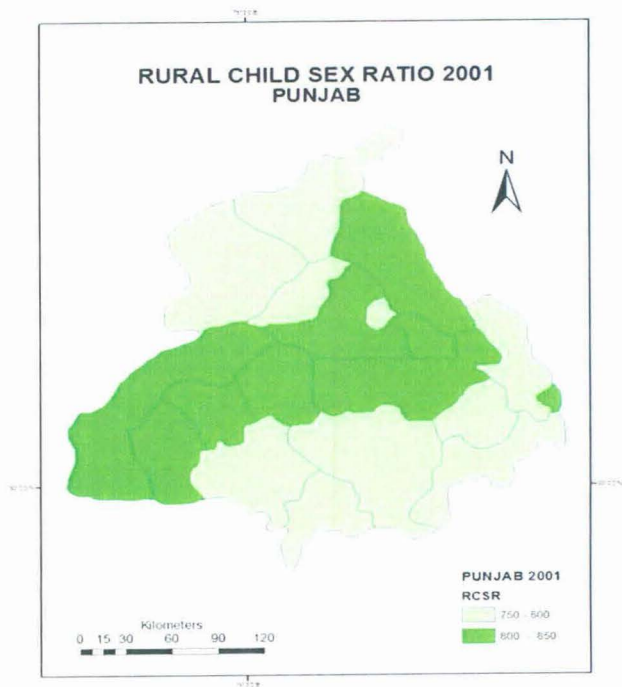
RURAL CHILD SEX RATIO 2001
PUNJAB

PUNJAB 2001
RCSR
750 - 800
800 - 850

Kilometers
0 15 30   60   90   120

Fig-3.13: Rural Child Sex Ratio in Districts of Punjab, 2011

RURAL CHILD SEX RATIO
PUNJAB, 2011

LEGEND
F0-6/1000M0-6
Punjab
R CSR
- <850
- 850-900
- 900-950
- >950

Fig-3.14: Urban Child Sex Ratio in Districts of Punjab, 2001

URBAN CHILD SEX RATIO 2001
PUNJAB

PUNJAB 2001
UCSR
- 750 - 800
- 800 - 850

Kilometers
0   15 30   60   90   120

37
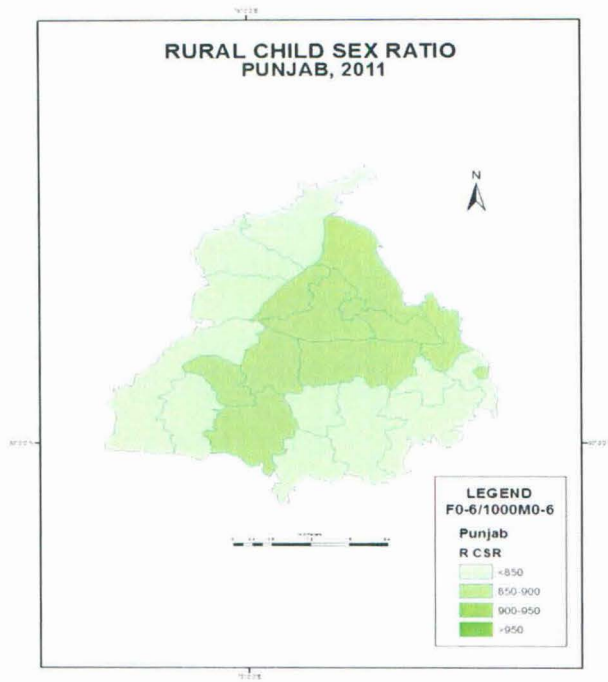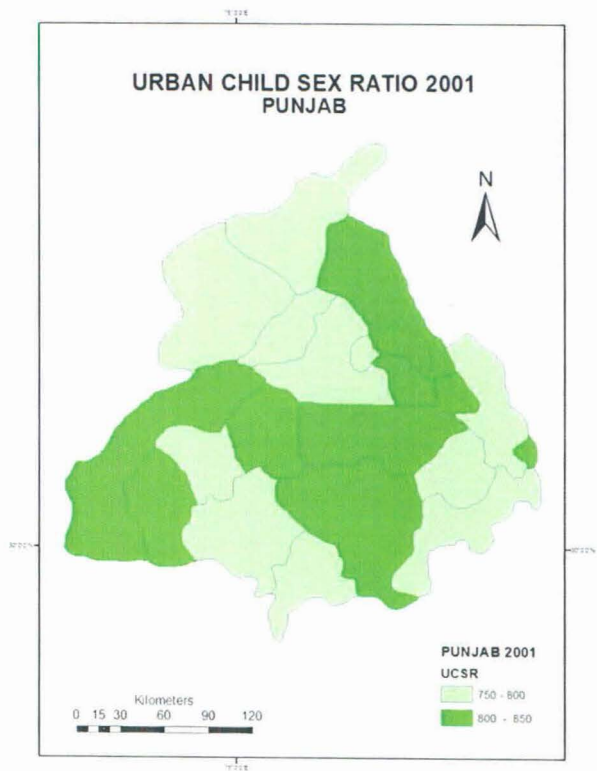
Fig-3.15: Urban Child Sex Ratio in Districts of Punjab, 2011

URBAN CHILD SEX RATIO
PUNJAB, 2011

LEGEND
F0-6/1000M0-6
Punjab
U CSR
<850
850-900
900-950
>950
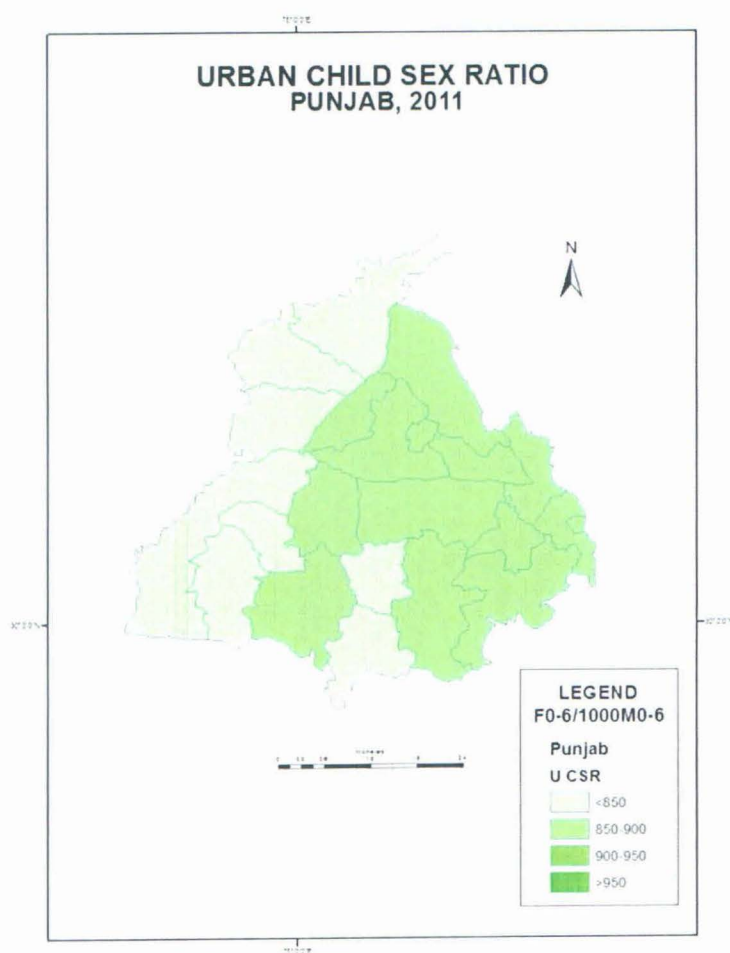
3.3.3 WEST BENGAL:

In 2001, district level scenario of CSR is found to be quite balanced (Table-3.E). CSR has ranged from 972 in Murshidabad and Nadia to 951 in Medinipur. Only fully urbanized district of Kolkata (927) has CSR below 950. Rural CSR is also highest in Murshidabad and Nadia (972) and lowest in Medinipur (951). In case of rural population, all districts have CSR above 950. The range of Urban CSR is from 971 in Koch Bihar to 932 in Puruliya. Seven districts (Kolkata, Puruliya, Hugli, Uttar Dinajpur, Darjiling, Malda and Haora) have shown urban CSR below 950. Rural-urban difference is insignificant. Only in Bankura, Jalpaiguri, Koch Bihar and Medinipur, urban CSR is higher than rural CSR.

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Table-3.E: Child Sex Ratio in Districts of West Bengal, 2001 and 2011

	CHILD SEX RATIO 2001			CHILD SEX RATIO 2011			
DISTRICT	TOTAL	RURAL	URBAN	DISTRICT	TOTAL	RURAL	URBAN
Bankura	953	952	969	Bankura	949	947	965
Barddhaman	956	958	953	Barddhaman	951	962	935
Birbhum	964	965	950	Birbhum	959	962	934
Dakshin Dinajpur	966	966	961	Dakshin Dinajpur	957	957	958
Darjiling	962	968	942	Darjiling	953	965	930
Haora	956	962	948	Haora	962	965	960
Hugli	951	957	936	Hugli	952	954	948
Jalpaiguri	969	969	970	Jalpaiguri	955	957	949
Koch Bihar	964	963	971	Koch Bihar	948	949	937
Kolkata	927	-	927	Kolkata	933	0	933
Maldah	964	965	943	Maldah	950	960	882
Medinipur	951	951	957	Murshidabad	968	968	970
Murshidabad	972	972	966	Nadia	960	962	953
Nadia	972	972	967	North 24 Parganas	956	960	951
North 24 Parganas	958	963	950	Paschim Medinipur	963	962	972
Puruliya	964	967	932	Purba Medinipur	946	945	958
South 24 Parganas	964	965	955	Puruliya	953	956	933
Uttar Dinajpur	965	967	936	South 24 Parganas	963	964	957
				Uttar Dinajpur	953	953	955

Source: Computed from Primary Census Abstract tables, Census of India, 2001 and 2011

In 2011 also, district level data of West Bengal presents a balanced picture of Child Sex Ratio (Table-). This is highest in Murshidabad (968) and lowest in Kolkata (933). It needs to be mentioned that erstwhile Medinipur has been sub-divided into Purba Medinipur and Paschim Medinipur in Census 2011. Now, four districts namely Kolkata (933), Purba

Medinipur (946), Koch Bihar (948) and Bankura (949) have CSR below 950. Rural CSR has ranged from 945 in Purba Medinipur to 953 in Uttar Dinajpur. Three districts (Purba Medinipur, Bankura and Koch Bihar) have rural CSR below 950. The range of urban CSR is quite high, from 882 in Maldah to 972 in Paschim Medinipur. Nine districts have reported CSR below 950, and these include Maldah, Darjiling, Kolkata, Puruliya, Birbhum, Barddhaman, Koch Bihar, Hugli and Jalpaiguri. Only in districts of Bankura, Dakshin Dinajpur, Purba Medinipur, Paschim Medinipur and Murshidabad, urban CSR is higher than that of rural counterpart. If one considers level of urbanization, no such direct pattern of CSR can be observed. For example, urban CSR is relatively imbalanced not only in highly urbanized districts like Kolkata, Barddhaman and Darjeeling but also in less urbanized districts like Maldah, Birbhum, Puruliya and Koch Bihar.

Therefore, over the decade of 2001-2011, decline of CSR is evident both in rural and urban areas. In case of rural areas, only three districts (Medinipur, Haora and Barddhaman) have seen increase in CSR over this decade. In Koch Bihar, Uttar Dinajpur and Puruliya, there has been considerable decline of 15, 14 and 11 points, respectively. Urban areas show a mixed result for this temporal analysis of 2001 and 2011. Uttar Dinajpur (19 points), Hugli (13 points), Haora (12) and Medinipur (9) have seen improvement in urban CSR. In contrary, Malda (61), Koch Bihar (34) and Jalpaiguri (21) have seen massive decline in urban CSR.

Fig-3.16: Child Sex Ratio in Districts of West Bengal, 2001
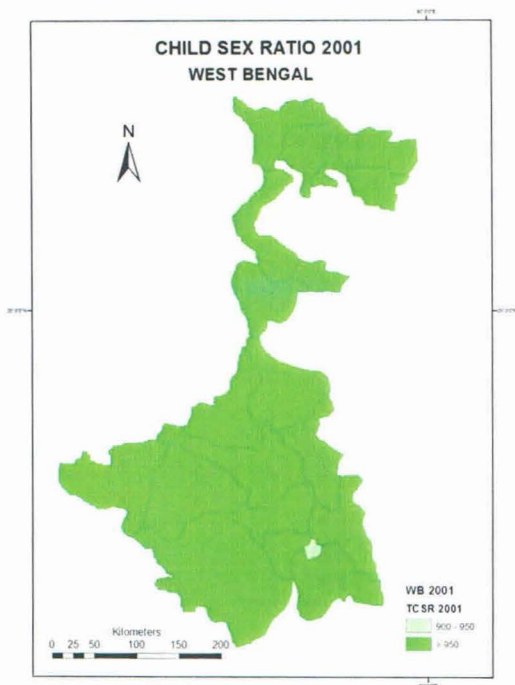
Fig-3.17: Child Sex Ratio in Districts of West Bengal, 2011

41
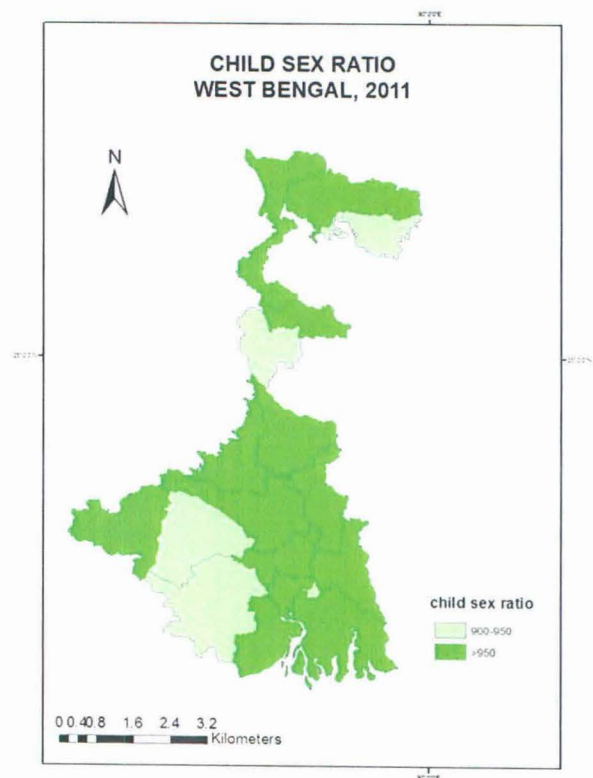
Fig-3.18: Rural Child Sex Ratio in Districts of West Bengal, 2001

RURAL CHILD SEX RATIO 2001
WEST BENGAL

N

WB 2001
RC SR 2001
900 - 950
> 950

Kilometers
0 25 50   100   150   200

Fig-3.19: Rural Child Sex Ratio in Districts of West Bengal, 2011

RURAL CHILD SEX RATIO
WEST BENGAL, 2011

N

child sex ratio
900-950
>950

0 0.40.8 1.6   2.4   3.2
Kilometers

42
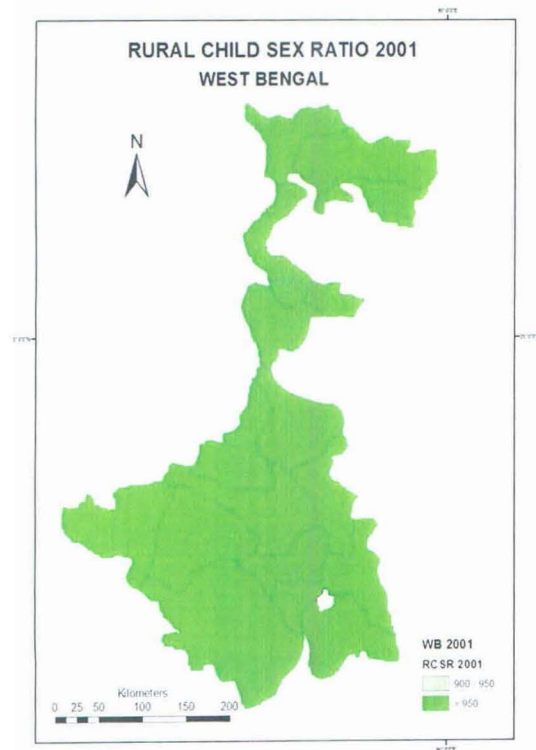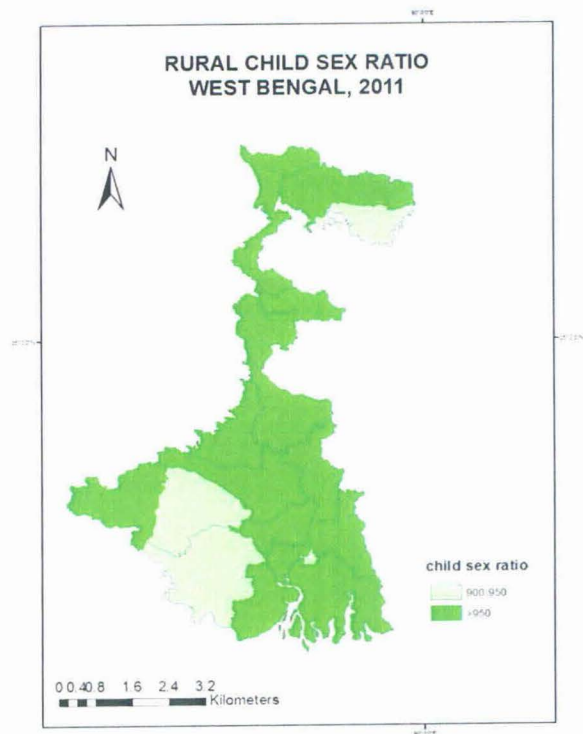
Fig-3.20: Urban Child Sex Ratio in Districts of West Bengal, 2001
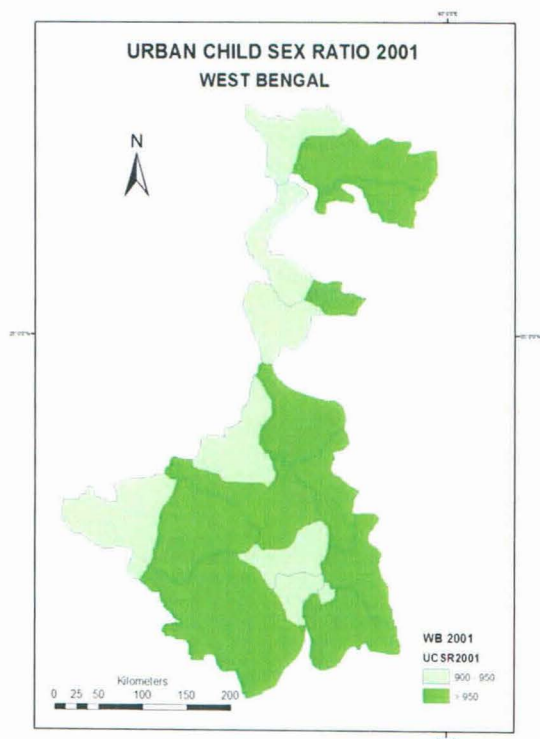
Fig-3.21: Urban Child Sex Ratio in Districts of West Bengal, 2011
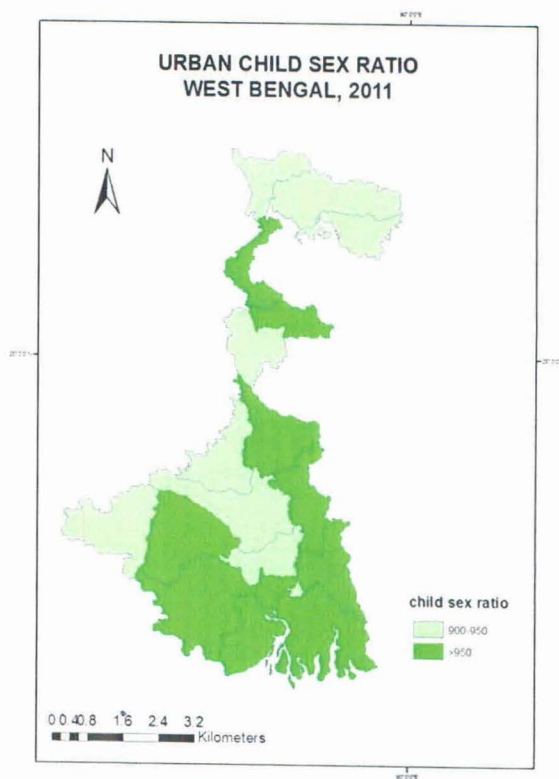
Chapter-IV
Determinants of
Child Sex Ratio

4.1: INTRODUCTION:

The trends and patterns of child sex ratio in have shown different results in Andhra Pradesh, Punjab and West Bengal. Perhaps, this difference has occurred due to historical as well as present socio-cultural factors in these states. Although there is no measureable variable which is directly changing child sex ratio, but existing body of literature has pointed out some correlated factors. In this chapter, an attempt has been made to trace those correlated variables which partially explain variations in child sex ratio of Andhra Pradesh, Punjab and West Bengal.

4.2 DATABASE AND METHODOLOGY:

This study basically deals with district level picture of child sex ratio in 2001 and 2011. Hence, those possible determinants have been taken into account for which district level secondary data are available approximately for these two years. The following table (Table-4.A) gives a broad picture of possible determinants:

Table-4.A: Determinants of Child Sex Ratio in Relevant Literature

DETERMINANT	AUTHOR (YEAR OF PUBLICATION)
Sex Ratio at Birth	Premi and Raju (1998); Griffiths *et al* (2000)
Excess female mortality	Krisnaji (1987); Basu (1988); Mayer (1999); Griffiths *et al* (2000); Agnihotri (2001b); Guimoto (2008); Visaria (2008);
Neglect of girl child	Sen (1990); Premi and Raju (1998); Vindhya and Dev (2011); Perwez, Jeffrey and Jeffrey (2012)
Sex-selective abortion	Mayer (1999); John (2011); Perwez, Jeffrey and Jeffrey (2012)
Education and Workforce Participation Rate	Krisnaji (1987); Arokiasamy and Goli (2012)
Landholding	Arokiasamy and Goli (2012)
Son preference	Rajivan (2006); Guilmoto (2008)
Female infanticide	Premi and Raju (1998)

Source: compiled from different references, as cited in Bibliography section

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After getting the possible determinants from above table, emphasis has been laid on searching suitable variables for which district level secondary data are available approximately for 2001 and 2011. Given the limitations of data availability, following determinants have been chosen for the analysis of child sex ratio:

Table-4.B: Determinants for Analytical Study

DETERMINANTS	DATA SOURCE	YEAR
Level of Urbanization (%)	Census of India	2001 and 2011
Female Literacy Rate	Census of India	2001 and 2011
Female Workforce Participation Rate (Main Worker)	Census of India	2001 and 2011
Sex Ratio at Birth (SRB)	Civil Registration System	2008
Age at Marriage of females below 18 years	(A) Census of India and (B) DLHS-3	(A) 2001 and (B) 2008
Average Operational Landholding (Female owned)	Agricultural Census	2000-01 and 2005-06
Infant Mortality Rate (IMR)	Rajan *et. al*	2008
District Domestic Product (at constant prices, 2004-05)	Statistical Abstract of Andhra Pradesh, 2009; District Domestic Product of Punjab; State Domestic Product and District Domestic Product of West Bengal	Andhra Pradesh (2009); Punjab (2004-05 to 2009-10); West Bengal (2011)

Source: Compiled from different sources and different years

Another major problem is data availability in specific years. For example, IMR data of 2011, SRB data corresponding to 2001, Average Operational Landholding data after 2005-06 are not available.

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Bi-variate mapping technique has been used to correlate whether districts with low SRB are also characterized by low CSR. Apart from this, multiple linear regressions has been done to see whether above variables can partially explain child sex ratio variations in districts of Andhra Pradesh, Punjab and West Bengal. Due to limited availability of data, it has not been possible to include all variables within regression models of 2001 and 2011. But, as various research works have pointed out, higher female literacy and female workforce participation rate influence women's autonomous choice in providing female children with good nutrition and health care. To capture patriarchy, two variables, namely 'Age at marriage of females below 18 years' and 'Female-owned average operational landholding' have been taken. Income, as measured through District Domestic Product, is also an important variable, as higher income households can provide better nutrition and health care to female children. Level of urbanization is also significant in the sense that urban dwellers have access to good health care facilities. However, these variables have negative effects too. Higher income and urban households have a larger possibility to access pre-birth sex determination clinics. In any case, these variables seem to be quite relevant. In the following two sections, the association between CSR and SRB as well as CSR and IMR has been dealt in detail.

4.3 DETERMINANTS:

4.3.1 SEX RATIO AT BIRTH:

Sex Ratio at birth refers to the number of males to number of females at the time of birth of a population of a period. If sex ratio at birth is skewed in a population, it will have an effect on the child sex ratio of that population. Different studies consider that sex ratio at birth is the most significant factor behind age sex structure of 0-6 population of a region. (Griffiths *et al,* 2000, Premi and Raju 1998). If in a region sex selective abortion, or sex selective discrimination is practiced than its effect can be seen on child sex ratio. For several interrelated factors like patriarchal society, son preference, dowry system, social responsibility of a girl makes her 'unwanted'. Thus it drives the parents for sex selection of unborn foetus. If girl foetus have been eliminated by sex selection in a region than the sex ratio at birth will be skewed. And their cascading effects will imbalance the child sex ratio.

Since 1994, Pre Natal Diagnostic Technique Act has been taken by the Government of India to prevent sex selective abortion. In 1996, it was enforced for the first time. Then again in 2002 and 2003, it was modified. After observing the recent trend of child sex ratio, one can question the efficacy of this act on ground reality. In this study, sex ratio at birth has been taken from Civil Registration System, 2008.

SEX RATIO AT BIRTH AND CHILD SEX RATIO:

Variation in sex ratio at birth and differential mortality can affect age and sex structure of 0-6 population. Therefore, the variation in child sex ratio can be affected by sex ratio at birth. If sex ratio at birth is very high but child sex ratio is comparatively low, it can be assumed that the sex selective discrimination is perhaps done after the birth by infanticide, differential care. Perwez, Jeffery and Jeffery (2012) have cited on Kelly (1975) that the main cause of low child sex ratio is neglect of the girl child, providing her less care in early childhood with low levels of nutrition and therefore leading to death. In a study on West Bengal, Sen (1985) cited by Mayer (1999) that villages in West Bengal, girls are undernourished than boys. Premi and Raju (1998) confirm that female infanticide is community specific Gurjar, Yadav and Rajput.

If sex ratio at birth is low as well as child sex ratio is low, it can be again assumed that may be sex selective discrimination has done before birth by different techniques like sex selective abortion, foeticide by determination of sex of fetus before birth. Perwez, Jeffery and Jeffery (2012) have also cited on Kishwar's (2011) study that increasing number of sex determination and followed by sex selective abortion is the main cause of declining child sex ratio.

Districts with high sex ratio at birth but comparatively low child sex ratio:

In Andhra Pradesh, Hyderabad, Rangareddy, Adilabad, Chittoor, Warangal, Sri Potti Sriramulu Nellore, Karimnagar and Guntur have significant difference between sex ratio at birth and child sex ratio. For example, Hyderabad, Rangareddy and Adilabad have SRB of

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1059, 1002 and 999, respectively. On the other hand, they have comparatively less child sex ratio.

Districts with low sex ratio at birth and low child sex ratio:

In Andhra Pradesh, Nalgonda has low sex ratio at birth 933, and the child sex ratio is also low (923).

In Punjab and west Bengal no such definite pattern found. Most of the districts in those states have low sex ratio at birth compared to child sex ratio. Perhaps, the cascading effect of low sex ratio at birth will affect CSR in future.

Fig-4.1: Child Sex Ratio (2011) and Sex Ratio at Birth (2008) in Andhra Pradesh
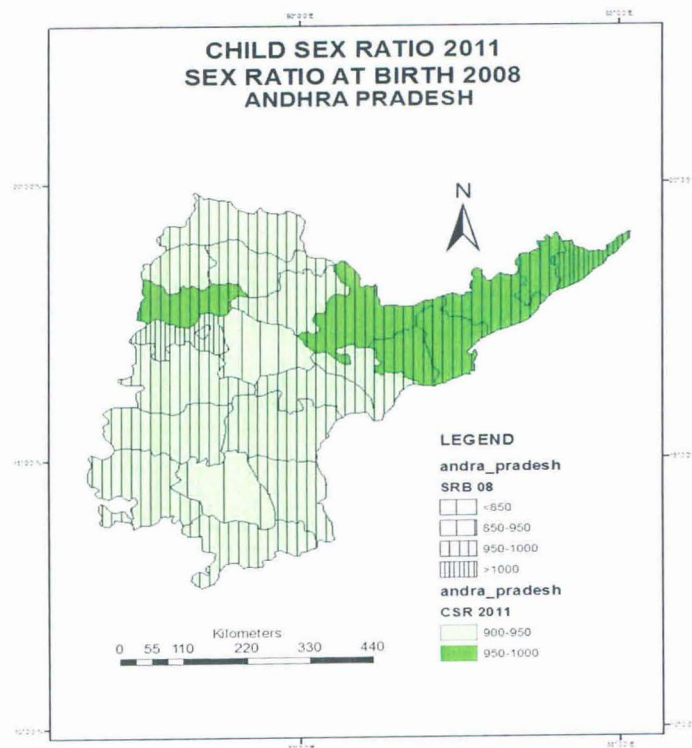
Fig-4.2: Child Sex Ratio (2011) and Sex Ratio at Birth (2008) in Punjab
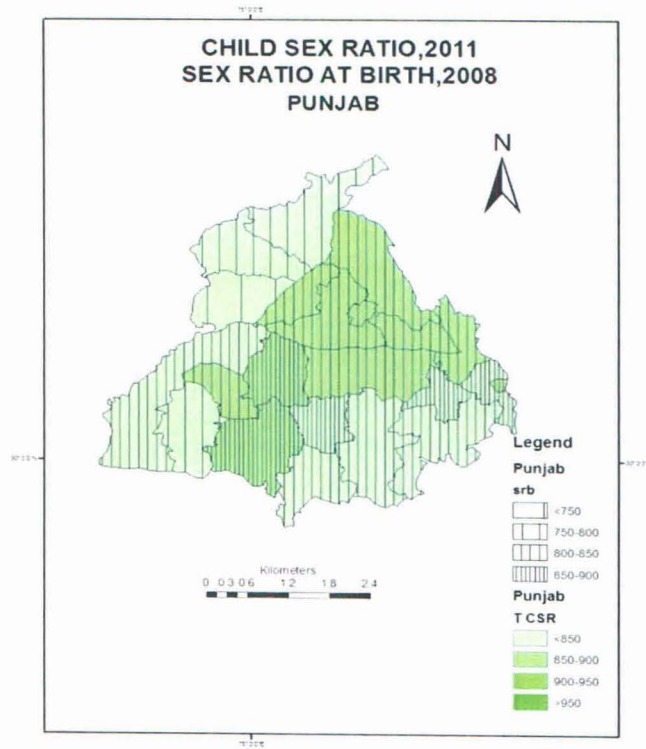
Fig-4.3: Child Sex Ratio (2011) and Sex Ratio at Birth (2008) in West Bengal

49
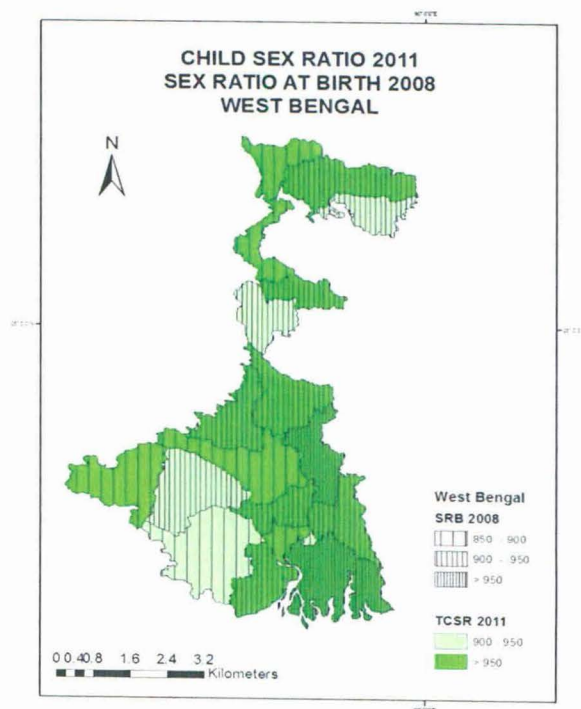
4.3.2 INFANT MORTALITY RATE:

Mortality is usually a natural and inevitable phenomenon, but sometimes exception in mortality can be seen due to human or natural interference. Age-old son preference, patriarchal structure and their effect on society are reasons behind a female child to become 'unwanted'. It then creates several other simultaneous discrimination or social crimes against women like infanticide, neglect of female child in terms of health and hygiene, nutritional and medical care and also emotional attachment. All these are enough reasons to create survival disadvantage of a girl child which results morality of girl child prior to boys. Excess female mortality in 0-6 age group is a factor which affects the imbalance of child sex ratio [Krisnaji (1987); Basu (1988); Mayer (1999); Griffiths et al (2000); Agnihotri (2001b); Guimoto (2008); Visaria (2008)]. For this study estimated infant mortality is taken from Sample registration System in India.

INFANT MORTALITY RATE – MALE-FEMALE DIFFERENTIAL:

Agnihotri (2001a) has done analysis of male and female IMR differentials in India. Taking a long-term data, he has tried to explain variations of female IMR through the changes in male IMR. In this linear regression exercise, he has considered female IMR as 'dependent variable' and male IMR as 'independent variable'. Based on the analysis of 'constant' and 'slope', he has interpreted male and female IMR differentials across major states in India.

As his analysis is limited up to 1997, this section has attempted to extend it with the available data up to 2011. Using 1982-2011 data (Appendix-II), the simple linear regression analysis has produced following results:

Table-4.C: IMR: Male and Female Differential

State	Constant	Slope	Adjusted R Square
Andhra Pradesh	21.023***	0.640***	0.813
Punjab	22.299***	0.706***	0.574
West Bengal	6.825**	0.809***	0.895

Source: calculated from sample registration system.

Significance level: 1% (.000-<.050)=***, 5%(.050-<.1)=**,10%(>.05-.1)=*

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Andhra Pradesh and Punjab have shown high constant and low slope values, which Agnihotri has called 'worrying pattern'. For example, the female and male IMR relationship for Andhra Pradesh is:

$IMRf = 21.023 + 0.640\ IMRm$

Low slope value of Andhra Pradesh indicates that if male IMR declines by 10 points, female IMR decreases by 6.4 points. That means even if male IMR approaches zero, high constant terms of female IMR will continue to exist. On the other hand, West Bengal has relatively lower constant value and relatively higher slope. It suggests that gender bias against girl children is not very high.

Table-4.D: IMR: Male and Female Differential in Rural and Urban Areas

State	Rural			Urban		
	Constant	Slope	Adjusted R Square	Constant	Slope	Adjusted R Square
Andhra Pradesh	28.547***	0.564***	0.644	19.319***	0.515***	0.433
Punjab	25.760***	0.711***	0.542	28.432***	0.294*	0.077
West Bengal	9.277**	0.773***	0.855	32.808***	0.215	0.048

Source: calculated from sample registration system.

Significance level: 1% (.000-<.050)=***, 5%(.050-<.1)=**,10%(>.05-.1)=*

The same pattern, as stated above, is also applicable to rural areas in these three states. Even so-called modern and well facilitated urban areas also show the same pattern. In the line of Agnihotri's argument, one can say urban poor cannot afford loss of male child, who is traditionally supposed to earn livelihoods and sustains family in future. In case of female children, there may be negligence in terms of nutritional care, which ultimately leads to their deaths during infancy. The rural-urban differential is conspicuous. In urban West Bengal, even if male IMR reaches zero, female IMR will decline by 2.1 points. Moreover, the high constant term spells out the gender bias against female children.

4.3.3 URBANIZATION:

Level of urbanization is usually measured by proportion of urban population to total population in a region. In urban areas, access to education, employment opportunities, information, technology and overall infrastructural development, standard of living and some other facilities are better than rural areas. For this reason, it can be assumed that child sex ratio should be balanced as all such modern facilities present in urban areas, but several studies has found that child sex ratio is imbalanced in urban areas in India than rural areas. As a reason, studies have found technological development, access to information and ultrasound clinics have make it easier to sex selection and abortion of girl foetus. In this study, percentage urbanization is taken from Census of India, 2001 and 2011.

Fig-4.4: Level of Urbanization (%) and Child Sex Ratio in Andhra Pradesh, 2011

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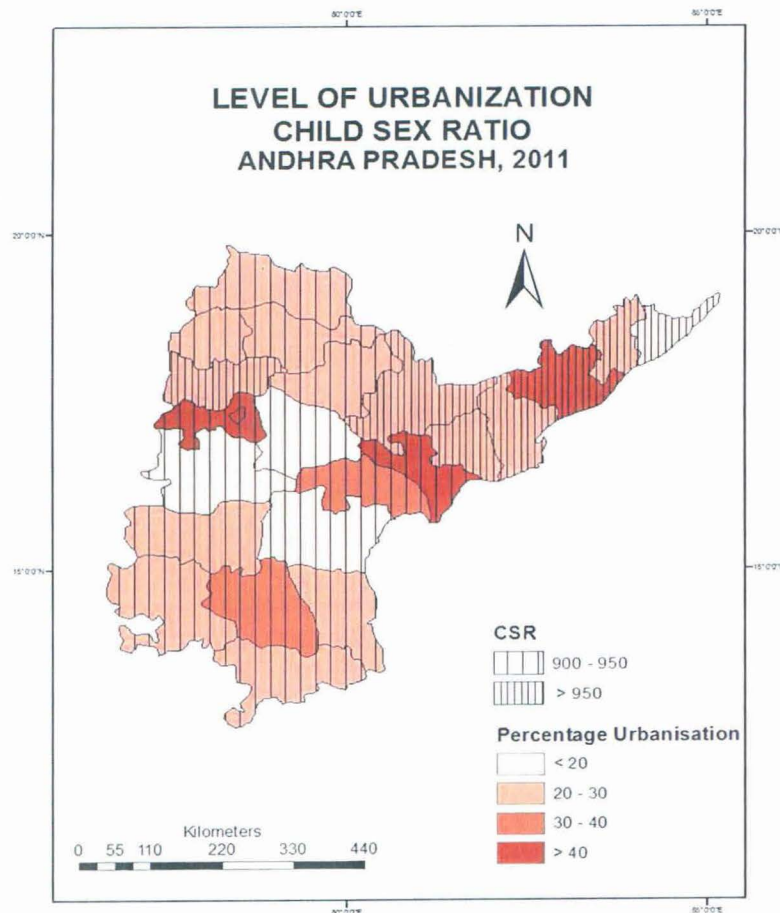
East Godavari, West Godavari, Visakhapatnam, Vizianagaram, Khammam, Srikakulam and Medak have child sex ratio above 950 i.e. generally accepted balanced sex ratio. Except Visakhapatnam all these districts have less than 25 percent level of urbanization.

Fig-4.5: Level of Urbanization (%) and Child Sex Ratio in Punjab, 2011
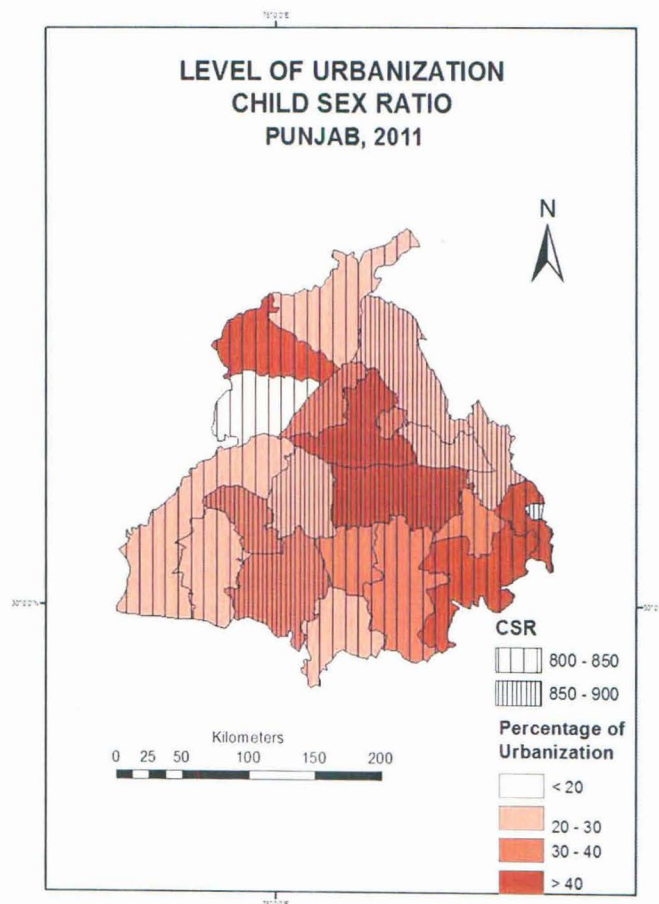
Punjab:

The level of urbanization high and child sex ratio also high: In Jalandhar, Ludhiyana and Amritsar, child sex ratio is from 850-900 and urbanization is above 40 percent. Here urbanization does not seem to affect negatively on the child sex ratio.

The level of urbanization high and low child sex also ratio: In Patiala and Sahibzada Ajit Singh Nagar, it may be because of higher technological progress and easy accessibility the sex selective abortions are easy to access in these districts.

There are some districts where the level of urbanization is moderate and child sex higher than 850 which is quite satisfactory compared to the other districts of Punjab. The districts are Rupnagar, Moga, Hoshiarpur and Shahid Bhagat Singh Nagar.

The level of urbanization is moderate and child sex ratio less than 850 in some districts like Gurdaspur, Muktsar, Firozpur and Mansa.

Only in Tarn Taran, child sex ratio and urbanization both belong to the lower category.

Fig-4.6: Level of Urbanization (%) and Child Sex Ratio in west Bengal, 2011
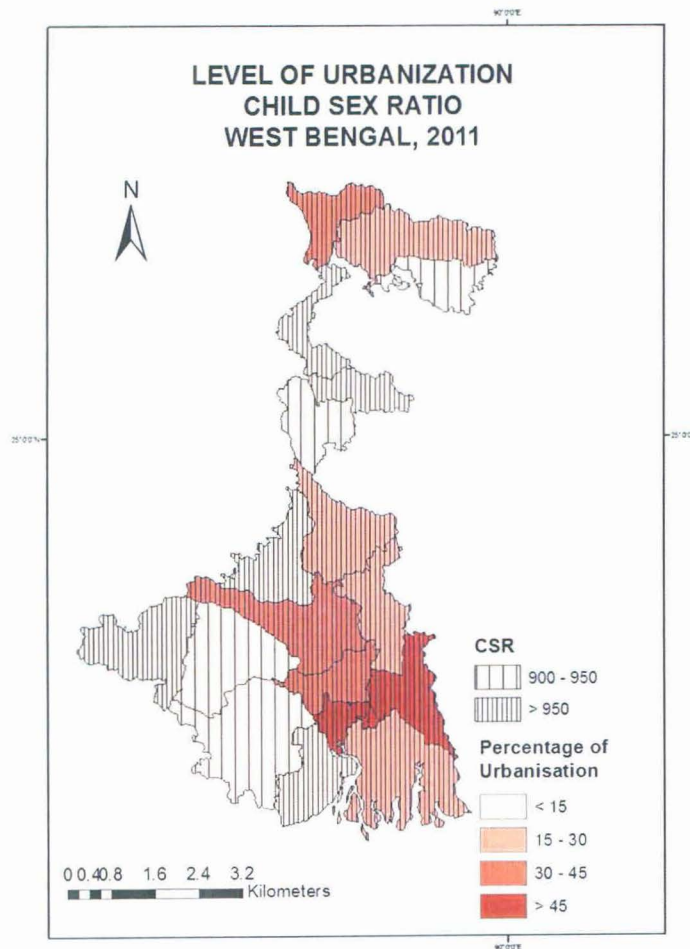
Level of urbanization and child sex ratio, West Bengal, 2011:

Bankura, Koch Bihar and Purba Medinipur are three districts which have lowest percentage of urbanization viz. 8.3, 10.3 and 11.6 respectively. Interestingly, these three districts belong to those which have child sex ratio below 950. As mentioned in the earlier chapter, Raju

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(2011) has pointed out that 'generally accepted' CSR is 950 girls per 1000 boys. Therefore, these three districts have lower percentage of urbanization as well as low child sex ratio.

Kolkata is 100 percent urbanized with the lowest child sex ratio (933) of West Bengal in 2011.

Haora (63.4%), North Twenty Four Parganas (57.3), Barddhaman (39.9), Darjiling (39.4) and Hugli (38.6%) have high level of urbanization with balanced child sex ratio.

4.3.4 FEMALE LITERACY:

Woman education is an important and significant factor for the development and society. Where Female education is better child sex ratio should be balanced, but different studies [Krisnaji (1987); Arokiasamy and Goli (2012)] have found that female education is negatively associated with child sex ratio. In this study, percentage female literacy has been taken from Census of India, 2001 and 2011.

Fig-4.7: Female Literacy Rate (%) and Child Sex Ratio in Andhra Pradesh, 2011
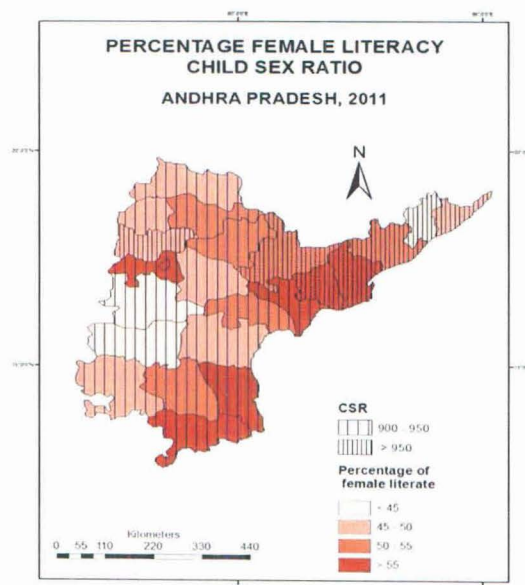
Percentage of female literacy and child sex ratio, Andhra Pradesh, 2011:

Hyderabad, West Godavari, Krishna, Rangareddy, East Godavari, Chittoor, Sri Potti Sriramulu Nellore, Guntur, Visakhapatnam, Khammam, Warangal and Y.S.R. (57 percent districts) have more than 50 percent literate female. Among them, Hyderabad has highest

female literacy of 70 percent and lowest child sex ratio. Along with Hyderabad; Warangal, Guntur, Chittoor, Krishna, Rangareddy, Sri Potti Sriramulu Nellore and Y.S.R also have declining child sex ratio of below 950.

Fig- 4.8: Female Literacy Rate (%) and Child Sex Ratio in Punjab, 2011
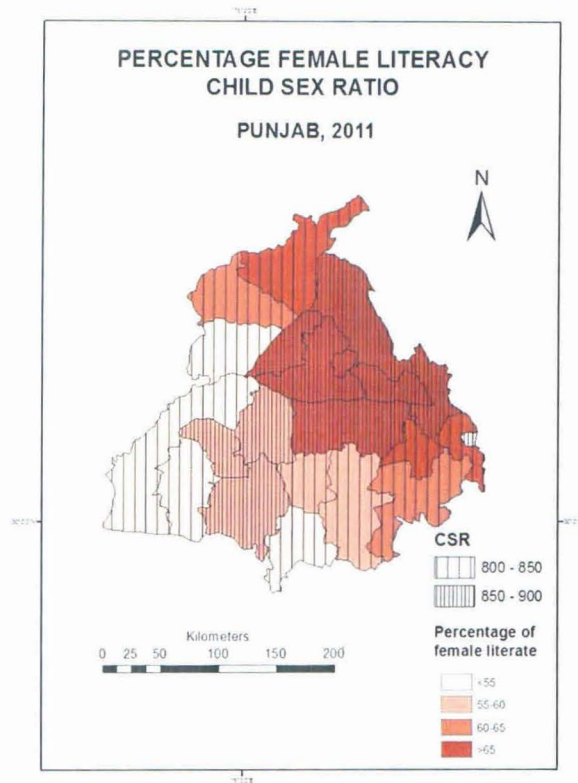
Percentage Female Literacy and Child Sex Ratio, Punjab, 2011:

In Punjab, the highest percentage of literate females is in Hoshiarpur. Other districts with high percentage of female literacy in 2011 are Jalandhar, Sahibzada Ajit Singh Nagar, Ludhiana, Rupnagar, Fatehgarh Sahib, Gurdaspur, Kapurthala and Shahid Bhagat Singh Nagar. Among them, except Gurdaspur, Sahibzada Ajit Singh Nagar and Fatehgarh Sahib all have child sex ratio above 850 i.e. the highest category of child sex ratio in the districts of Punjab.

Mansa, Bathinda, Tarn Taran, Firozpur and Muktsar has female literacy rate below and equal to 55 percent. This is the lowest category of female literacy in Punjab. Except Bathinda all the districts have 800-850 child sex ratio which is also the lowest category of child sex ratio.

Fig-4.9: Female Literacy Rate (%) and Child Sex Ratio in West Bengal, 2011
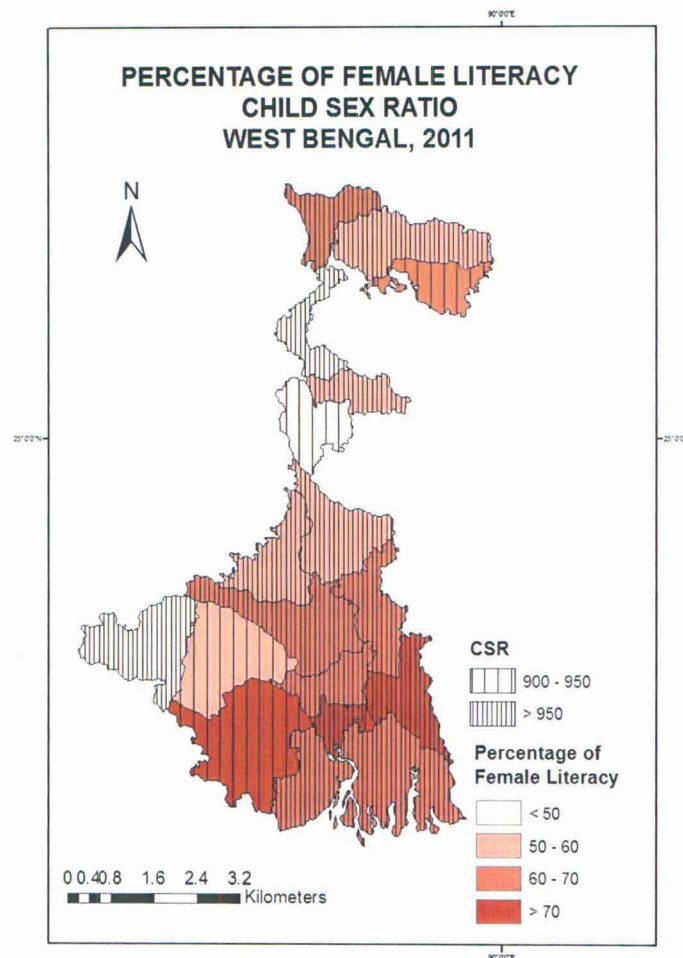
Percentage of female literacy and child sex ratio, West Bengal, 2011:

In West Bengal, 11 districts (58 percent) out of 19 districts have female literacy above 60 percent. They are Kolkata, North Twenty Four Parganas, Purba Medinipur, Haora, Hugli, Darjiling, Nadia, South Twenty Four Parganas, Paschim Medinipur, Barddhaman and Koch Bihar. Among these districts, except Kolkata, Purba Medinipur and Koch Bihar, all districts have CSR above 950.

Only Bankura has low Percentage of female literacy (53.1percent) as well as low child sex ratio (949).

4.3.5 FEMALE WORKFORCE PARTICIPATION RATE:

Female workforce participation is an important factor which is associated with child sex ratio. Different studies [Krisnaji (1987); Arokiasamy and Goli (2012)] have found that female workforce participation rate is positively affecting child sex ratio. Exposure of outside world imparts some autonomy among working women, and they take relatively better care of children in terms of health and education. In this study, female workforce participation rate is taken from Census of India, 2001 and 2011.

Female work participation rate and Child sex ratio, Andhra Pradeh, 2011:

Mahbubnagar, Nizamabad, Khammam, Nalgonda, Kurnool and Karimnagar have more than 35 percent female work participation rate (main worker) but except Khammam, all these districts have imbalanced child sex ratio.

Fig-4.10: Female Workforce Participation Rate and Child Sex Ratio, Andhra Pradesh, 2011
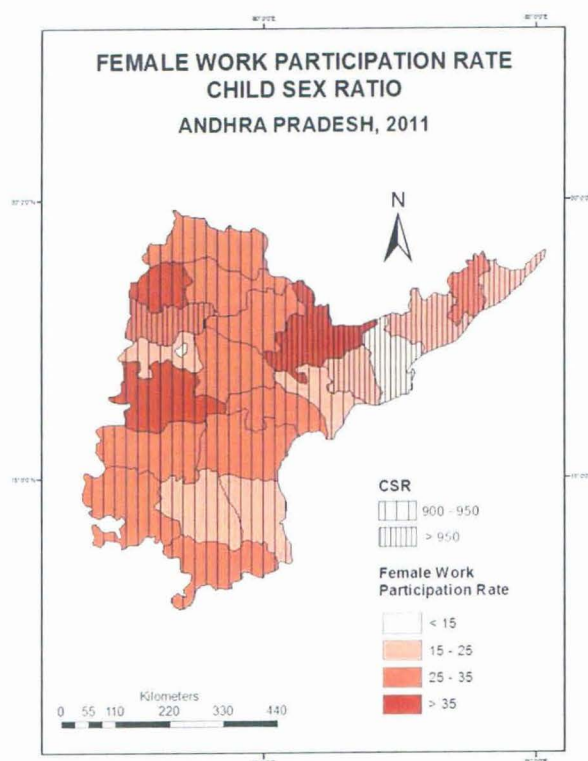
Fig-4.11: Female Workforce Participation Rate and Child Sex Ratio, Punjab, 2011
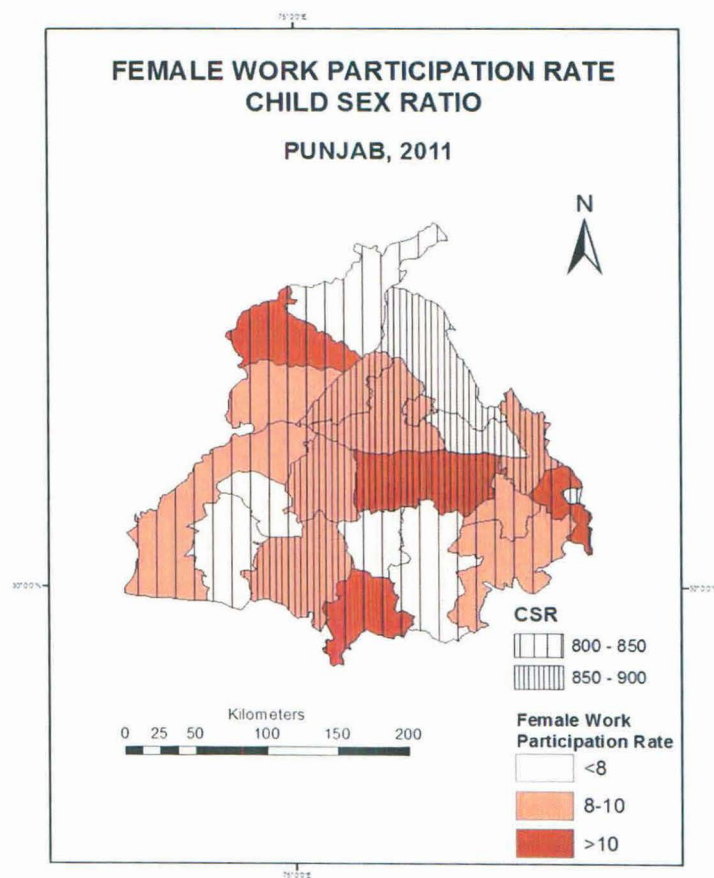
Percentage female workforce participation rate and child sex ratio, Punjab 2011:

Sahibzada Ajit Singh Nagar, Mansa, Amritsar districts in 2011 have high female workforce participation rate (main worker) respectively. All these three districts have low child sex ratio that is less than 850.

Shahid Bhagat Singh Nagar, Faridkot, Muktsar and Hoshiarpur less female workforce participation rate of less than 8 percent but these districts have child sex ratio above 850.

Female work participation rate and Child sex ratio, West Bengal, 2011:

Work participation rate of main worker is comparatively high in Darjiling, Kolkata, Jalpaiguri, Dakshin Dinajpur, Murshidabad and Maldah. All these districts, except Kolkata, have generally accepted balanced child sex ratio of above 950.

Fig-4.12: Female Workforce Participation Rate and Child Sex Ratio, West Bengal, 2011
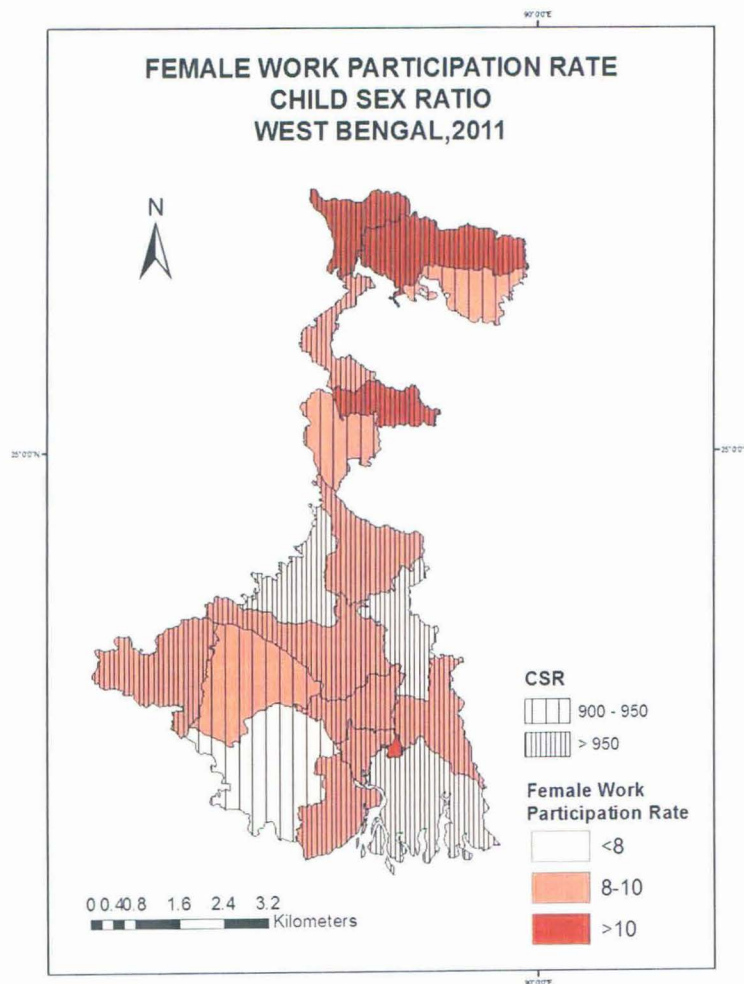
4.3.6 FEMALE MARRIED BELOW LEGAL AGE AT MARRIAGE:

Percentage of female married below legal age at marriage is taken to show the effect of patriarchal system, son preference and dowry. Dowry is a system of giving assets as gift to the family of groom from the parents of bride during marriage. In ancient society, daughter's parents used to give assets to help the new couple for starting their new conjugal life. Now, it has turned into a crime committed by the groom's family by forcefully asking for assets or

money as dowry for marriage, and a social burden when bride's family gives it as gift showing affection for their daughter.

Therefore, females became 'burden' in a society. There are several other aspects of patriarchy for which females are married below the legal age at marriage. Patriarchal society is one the important factor for which the phenomena of imbalanced child sex ratio can be seen in Indian society. In this study, percentage of female married below the legal age at marriage has been calculated from Census of India, 2001 and for 2007-08, percentage of female married below the legal age at marriage has been taken from District Level Household and Facility Survey (DLHS)-3.

Percentage of women married below legal age at marriage and child sex ratio, Andhra Pradesh, 2007-08:

Mahbubnagar, Nalgonda, Khammam, Prakasam, Srikakulam, Anantapur, Kurnool and Guntur districts have above 30 percent of woman married below legal age at marriage. All these districts, except Khammam and Srikakulam, belong to imbalanced child sex ratio category of less than 950 CSR.

Fig-4.13: Women married below Legal Age at Marriage (%) and Child Sex Ratio, Andhra Pradesh, 2011

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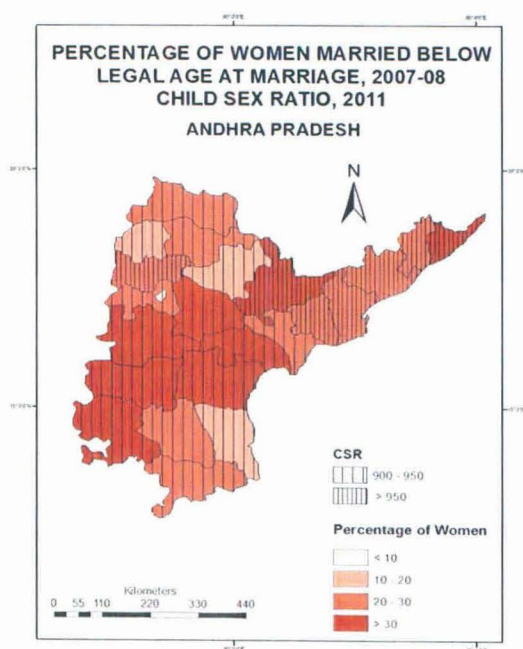
Fig-4.14: Women married below Legal Age at Marriage (%) and Child Sex Ratio, West Bengal, 2011

PERCENTAGE OF WOMEN MARRIED BELOW LEGAL AGE AT MARRIAGE, 2007-08 CHILD SEX RATIO, 2011 PUNJAB
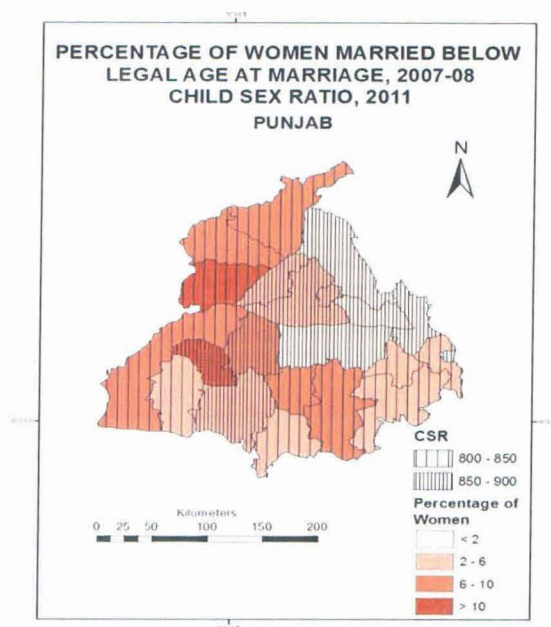
Percentage of woman married below legal age at marriage and child sex ratio, Punjab 2007-08:

The interesting pattern is, Shahid Bhagat Singh Nagar, Hoshiarpur, Rupnagar and Ludhiana have very low percentage of percentage of woman married below legal age at marriage i.e. 0.70, 1.30, 1.70 and 1.90 percent, respectively. Shahid Bhagat Singh Nagar has the highest child sex ratio (885) along with the lowest percentage of woman married below legal age at marriage i.e. 0.70. Hoshiarpur (865), Rupnagar (863) and Ludhiana (860) also have high child sex ratio as compare to the other districts of Punjab.

Percentage of woman married below legal age at marriage is comparatively very high in Faridkot (17. 60 percent) and Tarn Taran (17 percent). After these two districts Barnala has 10 percent of woman married below legal age at marriage. On the other hand child sex ratio is also found to be low in these districts. Specially Tarn Taran (820) which has the lowest child sex ratio in Punjab in 2011.

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Percentage of women married below legal age at marriage and child sex ratio, West Bengal, 2007-08:

Bankura, Koch Bihar and Purba Medinipur have low child sex ratio and high percentage of women married below legal age at marriage viz. 49.7, 46.4 and 45.8 percent respectively.

Murshidabad has the highest child sex ratio in 2011 as well as the highest Percentage of women married below legal age at marriage. Along with Murshidabad; Birbhum, Maldah and Puruliya districts have above 50 percent of women married below legal age at marriage but all these districts have balanced child sex ratio.

Fig-4.15: Women married below Legal Age at Marriage (%) and Child Sex Ratio, West Bengal, 2011
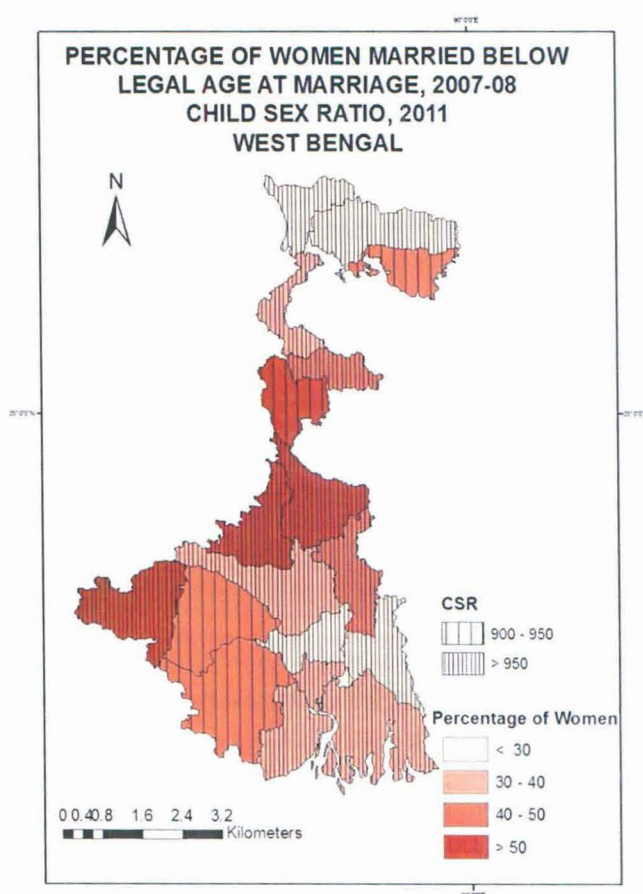
4.3.7 AVERAGE OPERATIONAL LANDHOLDING:

In patriarchal society, man is thought to be the bread earner, the master or head in every unit of population (i.e. family and household). Patriarchal nature of society makes the man powerful, who enjoys the power in every sphere of life, especially in case of economic power, autonomy and decision making. Patriarchy gives birth to son preference. Society and economy needs man power as it is considered to be most productive, fruitful and powerful mass. Son takes the inheritance of land, property, assets and skills. In performing rituals, presence of son is also necessary. Son remains with family after marriage and is expected to take all the responsibilities of his parents. This web of socio-economic and cultural issues creates unavoidable need of son in Indian family structure. Arokiasamy and Goli (2012) have used average landholding as a proxy indicator of patriarchal system and son preferences. Female average operational landholding has been calculated from Agricultural Census of India, 2000-01 and 2005-06.

Fig-4.16: Female Average Operational Landholding (2005-06) and Child Sex Ratio (2011), Andhra Pradesh
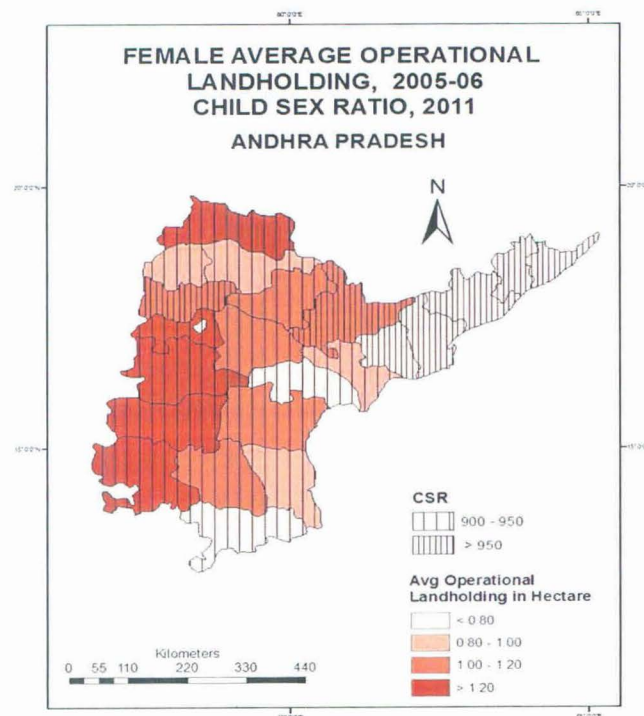
Female average operational landholding and child sex ratio, Andhra Pradesh, 2005-06:

Female average operational landholding is very low in all districts of Andhra Pradesh. Among them Chittoor, Guntur, Vizianagaram, West Godavari, Visakhapatnam, East Godavari and Srikakulam have less than 0.80 percent of average female operational landholding. And 5 districts (71 percent) out of total 7 districts which have balanced CSR, belong to such low average female operational landholding category.

Fig-4.17: Female Average Operational Landholding (2005-06) and Child Sex Ratio (2011), Punjab
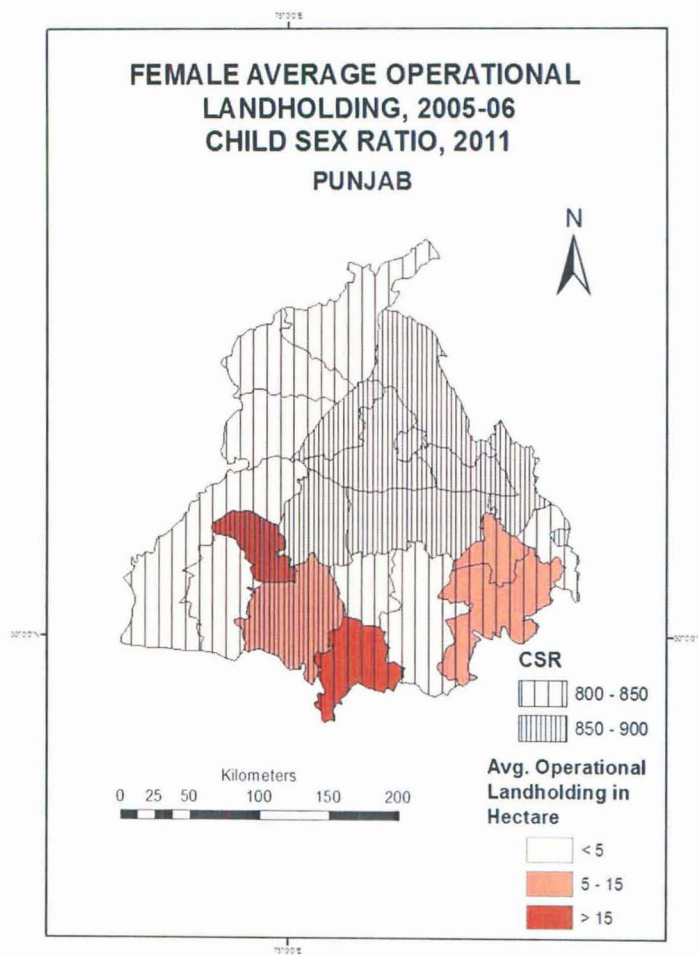
Average female operational landholding 2005-06 and child sex ratio, Punjab,:

Faridkot, Mansa and Fatehgarh Sahib have higher average female operational landholding than other districts; but only Fatehgarh Sahib has comparatively high child sex ratio.

Tarn Taran (820), Gurdaspur (821) and Muktsar (831) have low child sex ratio along with low average operational landholding by females i.e. 2.89, 1.31 and 0.31 hectares respectively.

Female average operational landholding and child sex ratio, West Bengal, 2005-06:

Female average operational landholding is very low in all districts of West Bengal. Among them Pashim Medinipur, Nadia, Jalpaiguri, South Twenty Four Parganas, North Twenty Four Parganas, Hugli, Haora and Purba Medinipur have less than 0.45 of average female operational landholding but balanced child sex ratio of above 950.

Fig-4.18: Female Average Operational Landholding (2005-06) and Child Sex Ratio (2011), West Bengal
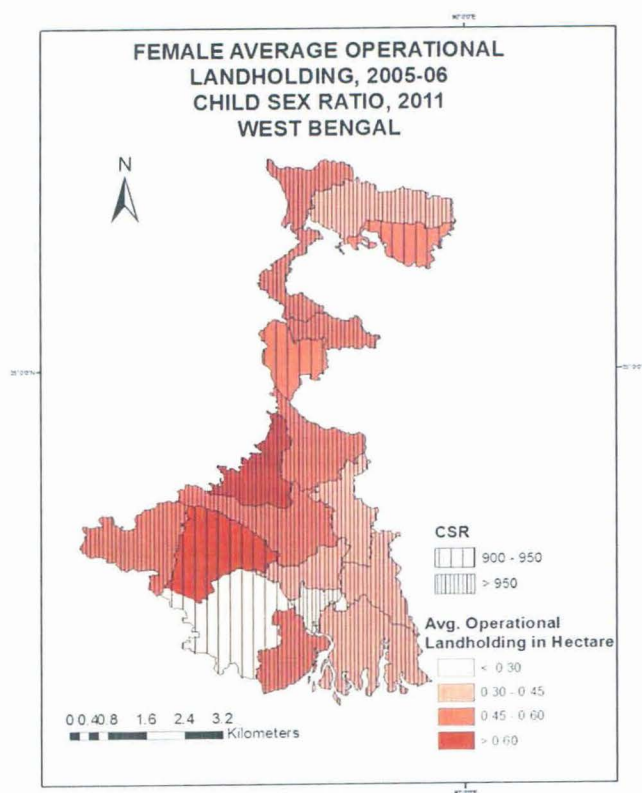
4.3.8 GROSS DOMESTIC PRODUCT:

Gross Domestic Product of states is taken in this study to show the income and economic status of the population in districts of study area. Income can be an important aspect for the differential child sex ratio. As this has an effect on standard of living and access to new technologies. GDP has been taken from Statistical Abstract of Andhra Pradesh, 2009; District Domestic Product of Punjab (2009); State Domestic Product and District Domestic Product of West Bengal (2011).

Fig-4.19: Gross Domestic Product (2006-07) and Child Sex Ratio (2011)

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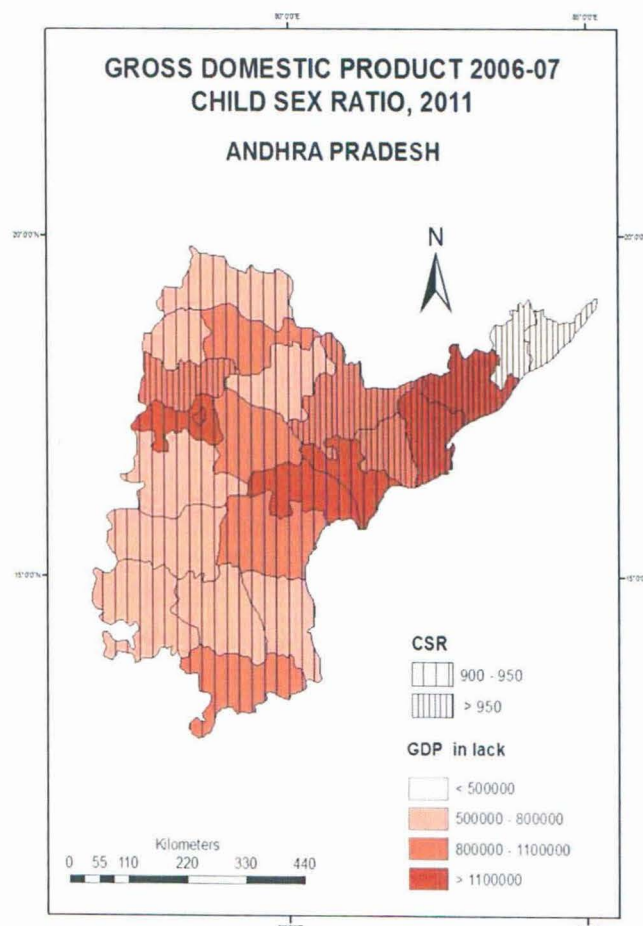
Gross Domestic Product and child sex ratio, Andhra Pradesh, 2009-10:

Hyderabad, Visakhapatnam, Rangareddy, East Godavari, Krishna, Guntur, West Godavari and Karimnagar (35 percent districts) have more than 1000000 GDP in lakh and among these districts, except Visakhapatnam, West Godavari and East Godavari, all have imbalanced child sex ratio of less than 950.

Fig- 4.20: Gross Domestic Product (2009-10) and Child Sex Ratio (2011)
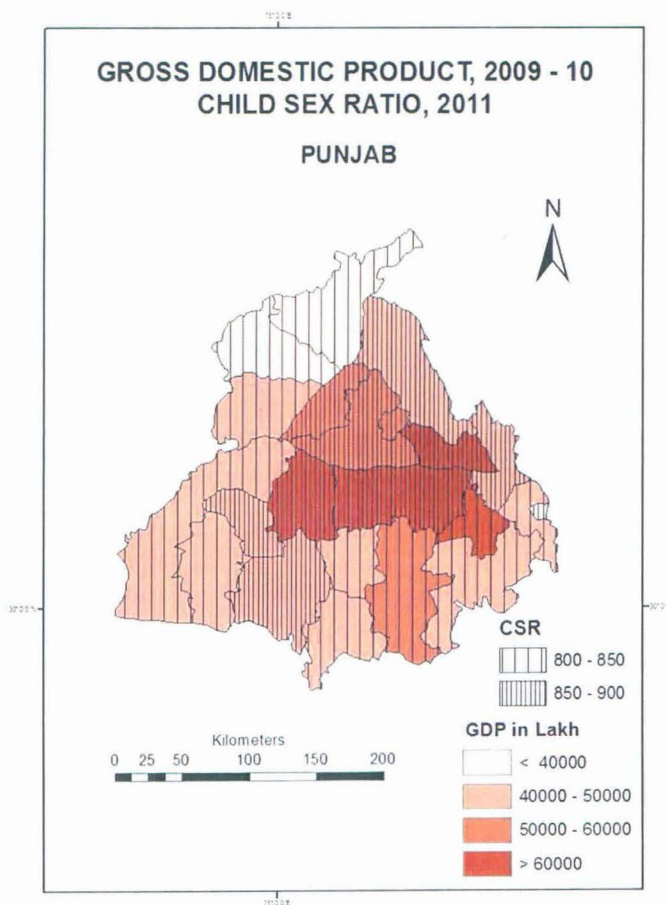
Gross domestic product (GDP) and child sex ratio, 2009-10, Punjab:

Shahid Bhagat Singh Nagar, Moga, Fatehgarh Sahib and Ludhiana are four districts having highest GDP in Punjab. Except Fatehgarh Sahib, all these districts have high child sex ratio. Shahid Bhagat Singh Nagar has the highest GDP and CSR in 2011.

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Tarn Taran, Mansa, Firozpur, Amritsar and Gurdaspur have low GDP with low child sex ratio.

Gross domestic product and child sex ratio, west Bengal, 2009-10:

North Twenty Four Parganas, Barddhaman and Kolkata are three districts which have the highest GDP in West Bengal respectively. Except Kolkata aforesaid districts have balanced child sex ratio.

Bankura and Koch Bihar have 9215.55 and 6641.99 GDP in lack respectively which is comparatively low from other districts with higher GDP. And these two districts also have imbalanced child sex ratio.

Fig-4.21: Gross Domestic Product (2009-10) and Child Sex Ratio (2011)
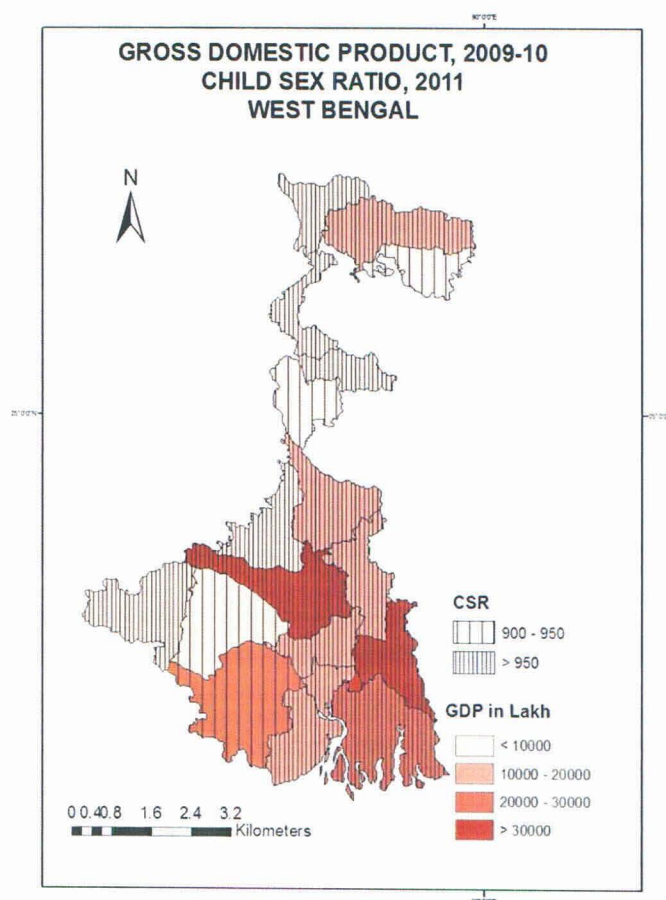
4.4. CORRELATION MATRIX:

Before going into multiple linear regressions, correlation matrix of three states of 2001 and 2011 has been formed to see the association between variables and child sex ratio. In 2001, majority of the variables in three states show weak correlation with CSR. Only Average operational landholding of female in Andhra Pradesh has moderately strong and negative correlation with CSR. Besides, female IMR and female literacy rate has moderately strong and negative correlation with CSR in West Bengal.

Table-4.E: Correlation matrix of variables, Andhra Pradesh, 2001

	Urbanisa tion (%)	Female literacy (%)	Female work force participati on rate (%)	Female infant mortality rate	Female below legal age at marriage (%)	Avg. operation al landholdi ng female	Child sex ratio
Urbanisation (%)	1	0.45*	-0.46*	-0.28	-0.31	0.08	0.15
Female literacy (%)	0.45*	1	-0.76**	-0.54**	-0.28	-0.48*	0.22
Female workforce participation rate (%)	-0.46*	-0.76**	1	0.17	0.50*	0.45*	-0.40
Female infant mortality rate	-0.28	-0.54**	0.17	1	-0.26	0.22	0.17
Female below legal age at marriage	-0.31	-0.28	0.50*	-0.26	1	0.11	-0.13
Avg operational landholding female	0.08	-0.48*	0.45*	0.22	0.11	1	-0.51*
Child Sex Ratio	0.15	0.22	-0.40	0.17	-0.13	-0.51*	1

Source: Calculated from Different Dataset

Note: ** *Correlation is significant at the 0.01 level (2-tailed);* * *Correlation is significant at the 0.05 level (2-tailed)*

Table-4.F: Correlation matrix of variables, Punjab, 2001

	Urbanisation (%)	Female literacy (%)	Female work force participation rate (%)	Female infant mortality rate	Female below legal age at marriage (%)	avg. operational landholding female (%)	Child sex ratio
Urbanisation (%)	1	0.26	-0.38	-0.22	-0.06	-0.22	0.03
Female literacy (%)	0.26	1	0.02	-0.75**	-0.70**	-0.65**	0.03
Female workforce participation rate (%)	-0.38	0.02	1	-0.03	0.16	0.10	0.09
Female infant mortality rate	-0.22	-0.75**	-0.03	1	0.68**	0.58*	-0.14
Female below legal age at marriage	-0.06	-0.70**	0.16	0.68**	1	0.58*	-0.09
Avg operational landholding female	-0.22	-0.65**	0.10	0.58*	0.58*	1	-0.02
Child Sex Ratio	0.03	0.03	0.09	-0.14	-0.09	-0.02	1

Source: Calculated from Different Dataset

Note: ** *Correlation is significant at the 0.01 level (2-tailed);* * *Correlation is significant at the 0.05 level (2-tailed)*

Table-4.G: Correlation matrix of variables, West Bengal, 2001

	Urbanisation (%)	Female literacy (%)	Female work force participation rate (%)	Female infant mortality rate	Female below legal age at marriage (%)	avg. operational landholding female	Child sex ratio
Urbanisation (%)	1	0.77**	-0.38	0.77**	-0.50*	-0.52*	-0.35
Female literacy (%)	0.77**	1	-0.51*	1.00**	-0.22	-0.40	-0.49*
Female workforce participation rate (%)	-0.38	-0.51*	1	-0.51*	-0.35	0.12	0.27
Female infant mortality rate	0.77**	1.00**	-0.51*	1	-0.22	-0.40	-0.49*

Female below legal age at marriage	-0.50*	-0.22	-0.35	-0.22	1	0.32	0.10
Avg operational landholding	-0.52*	-0.40	0.12	-0.40	0.32	1	0.17
Child Sex Ratio	-0.35	-0.49*	0.27	-0.49*	0.10	0.17	1

Source: Calculated from Different Dataset

Note: ** *Correlation is significant at the 0.01 level (2-tailed);* * *Correlation is significant at the 0.05 level (2-tailed)*

In some of the cases, correlations between CSR and variables are weak in 2011. There are spatial variations too, for example, moderately strong correlation between Average operational landholding of females and CSR in Andhra Pradesh (2011); SRB and female below legal age at marriage with CSR in Punjab (2011). For all three states, Female Workforce Participation Rate (Main Worker) has negative correlation with CSR. On the other hand, for all three states, female literacy rate and SRB have positive relations with CSR.

Table-4.H: Correlation matrix of variables, Andhra Pradesh, 2011

	Urbani sation (%)	Female literate (%)	FWPR (main worker)	SRB (birth last year)	Female below legal age at marriag e (%)	Avg. operatio nal landhol ding female	GDP 09-10 in lakh	Child Sex Ratio
Urbanisation (%)	1	0.50*	-0.46*	0.06	-0.48*	0.11	-0.10	-0.11
Female literate (%)	0.50*	1	-0.71**	0.07	-0.44*	-0.41	0.04	0.27
FWPR (main worker)	-0.46*	-0.71**	1	-0.10	0.38	0.46*	-0.04	-0.40
SRB (birth last year)	0.06	0.07	-0.10	1	-0.17	-0.24	-0.03	0.45*
Female below legal age at marriage (%)	-0.48*	-0.44*	0.38	-0.17	1	0.31	-0.02	-0.13
Avg. operational landholding female	0.11	-0.41	0.46*	-0.24	0.31	1	-0.12	-0.60**
GDP 09-10 in lakh	-0.10	0.04	-0.04	-0.03	-0.02	-0.12	1	0.18
Child Sex Ratio	-0.11	0.27	-0.40	0.45*	-0.13	-0.60**	0.18	1

Source: Calculated from Different Dataset

*Note: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)*

Table-4.I: Correlation matrix of variables, Punjab, 2011

	Urbanisation (%)	Female literate (%)	FWPR (main worker)	SRB (birth last year)	Female below legal age at marriage (%)	Avg. operational landholding female	GDP 09-10 in lakh	Child sex ratio
Urbanisation (%)	1	0.42	.54*	0.15	-0.16	-0.13	0.04	0.05
Female literate (%)	0.42	1	0.21	0.27	-.48*	-0.34	0.34	.46*
FWPR (main worker)	.54*	0.21	1	0.32	-0.26	0.05	-0.01	0.10
SRB (birth last year)	0.15	0.27	0.32	1	-0.38	0.08	.58**	.61**
Female below legal age at marriage (%)	-0.16	-.48*	-0.26	-0.38	1	0.38	-0.37	-.48*
Avg. operational landholding female	-0.13	-0.34	0.05	0.08	0.38	1	-0.17	-0.08
GDP 09-10 in lack	0.04	0.34	-0.01	.58**	-0.37	-0.17	1	.61**
Child sex ratio	0.05	.46*	0.10	.61**	-.48*	-0.08	.61**	1

Source: Calculated from Different Dataset

*Note: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)*

Table-4.J: Correlation matrix of variables, West Bengal, 2011

	Urbanisation (%)	Female literate (%)	FWPR (main worker)	SRB (birth last year)	Female below legal age at marriage (%)	Avg. operational landholding female	GDP 09-10 in lakh	Child Sex Ratio
Urbanisation (%)	1	.65**	0.11	-0.28	-.649**	-0.425	.61**	0.23
Female literate (%)	.65**	1	-0.10	0.07	-.532*	-.631**	.62**	0.05
FWPR (main worker)	0.11	-0.10	1	-0.09	-0.34	0.36	-0.37	-0.06
SRB (birth last year)	-0.28	0.07	-0.09	1	0.09	0.09	-0.04	0.34
Female below legal age at marriage (%)	-.649**	-.532*	-0.34	0.09	1	0.39	-0.29	0.09
Avg. operational landholding female	-0.425	-.631**	0.36	0.09	0.39	1	-0.40	-0.08
GDP 09-10 in lakh	.61**	.62**	-0.37	-0.04	-0.29	-0.40	1	0.13
Child Sex Ratio	0.23	0.05	-0.06	0.34	0.09	-0.08	0.13	1

Source: Calculated from Different Dataset

4.5 MULTIPLE LINEAR REGRESSIONS:

Multiple linear regressions have been done to show variables which partially explain variations in child sex ratio in these three states (see Appendix-III for details).

Table-4.K: Regression Table of Andhra Pradesh, 2001

Variables	Beta	Sig.
Urbanisation (%)	-0.54	0.09
Female literacy (%)	0.02	0.97
FWPR (%)	-0.50	0.30
Female IMR	0.28	0.37
Female below legal age at marriage (%)	0.25	0.43
Avg. operational landholding female	-0.21	0.45

Dependent Variable: Child sex ratio

The above table suggests that if level of urbanisation (%) increases by one unit, child sex ratio will decline by 0.54 units (2001). In 2011 also, level or urbanization significantly influences CSR. If level of urbanisation (%) increases by 1 unit, child sex ratio will decline by 0.82 units in Andhra Pradesh. Perhaps, this indicates access to pre-birth sex determination techniques and small family preference of urban dwellers, which eventually gives more weightage to male children over females.

Table-4.L: Regression Table of Andhra Pradesh, 2011

Variables	Beta	Sig.
Urbanisation (%)	-0.82	0.02
Female literacy (%)	0.09	0.78
FWPR (main worker)	-0.46	0.16
SRB (birth last year)	0.36	0.11
Female below legal age at marriage (%)	0.03	0.92
GDP 09-10 in lakh	0.14	0.47
Avg. operational landholding female	-0.11	0.68

Dependent Variable: Child sex ratio

Table-4.M: Regression Table of Punjab, 2001

Variables	Beta	Sig.
Urbanisation (%)	0.11	0.77
Female literacy (%)	-0.26	0.65
FWPR (main worker)	0.16	0.68
Female IMR	-0.22	0.67
Female below legal age at marriage (%)	-0.17	0.75
Avg. operational landholding female	0.04	0.92

Dependent Variable: Child sex ratio

Table-4.N: Regression Table of Punjab, 2011

Variables	Beta	Sig.
Urbanisation (%)	-0.16	0.43
Female literacy (%)	0.46	0.05
FWPR (main worker)	0.01	0.99
SRB (birth last year)	0.31	0.22
GDP 09-10 in lakh	0.37	0.17
Female below legal age at marriage	0.00	0.99
Avg. operational landholding female	0.03	0.89

Dependent Variable: Child sex ratio

In Punjab (2001), no variable is found to be significantly influencing CSR. In 2011, the situation has slightly changed. Female literacy rate is positively affecting CSR at 10 percent level of significance. When female literacy rate increases by 1 point, CSR improves by 0.46 unit.

Table-4.O: Regression Table of West Bengal, 2001

Variables	Beta	Sig.
Urbanisation (%)	0.09	0.86
Female Workforce Participation Rate (FWPR)	0.06	0.89
Female Infant Mortality Rate	-0.53	0.26
Female below legal age at marriage (%)	0.06	0.89

Avg. operational landholding female		-0.02	0.96

Dependent Variable: Child sex ratio

Table-4.P: Regression Table of West Bengal, 2011

Variables	Beta	Sig.
Urbanisation (%)	1.29	0.02
Female literacy (%)	-0.43	0.29
FWPR (main worker)	-0.25	0.81
SRB (birth last year)	0.85	0.02
GDP 09-10 in lakh	0.02	0.95
Female below legal age at marriage (%)	0.64	0.08
Avg. operational landholding female	-0.36	0.26

Dependent Variable: Child sex ratio

In 2001, no variable is found to be significantly influencing CSR variations in West Bengal. In 2011, level of urbanization (%), SRB and Female married below legal age (%) have significantly influenced child sex ratio. All these three determinants positively influence CSR. If level of urbanization increases by one unit, CSR increases by 1.29 units. If SRB increases by 1 unit, CSR will improve by 0.85 units. If female married below legal age increases by 1 unit, CSR will improve by 0.64 units.

4.6 INFANTICIDE AND FOETICIDE TRENDS:

Infanticide and foeticide, within the body of literature, have often been cited as an important determinant of child sex ratio variations in India. Secondary data on such sensitive issue is not widely available, thus compelling researchers to depend on the data published by the National Crime Records Bureau. This agency publishes annual statistical volume titled as *'Crime in India'* where reported incidence and rate of infanticide and foeticide is available. But, this data set has few inherent problems. Firstly, the whole dataset is entirely dependent on reporting of crime (i.e. infanticide and foeticide in this case). Usually, households do not report so-called personal family issues like infanticide and foeticide in the concerned Police Station. Secondly, infanticide and foeticide data is not cross-classified by two categories of sex (i.e. male and female). Even if one assumes, based on available literature, that females

are more prone to infanticide and foeticide, the under-reporting issue dampens any scope of research on these crimes. Thirdly, reporting is so less that infanticide and foeticide rates often come zero across states, because crime rates are calculated after taking human population into account.

Still, it would be better if the trends of infanticide and foeticide in Andhra Pradesh, Punjab and West Bengal are taken into consideration (Fig-4.22, 4.23 and 4.24). To some extent, it has to be maintained that even if few incidence of crimes are being reported then something is really wrong at ground reality. West Bengal, which has considerably balanced CSR, also reports negligible incidence of infanticide and foeticide over 1994-2012. The situation is not so good in Andhra Pradesh and Punjab. In Andhra Pradesh, the trend of infanticide is slowly declining, and incidence of foeticide is not very frequent. However, Punjab shows disappointing trends in infanticide, more so in foeticide. Over these years, infanticide trend is slightly upward, while foeticide is sharply increasing.

Fig-4.22: INFANTICIDE TRENDS IN ANDHRA PRADESH, 1994-2012
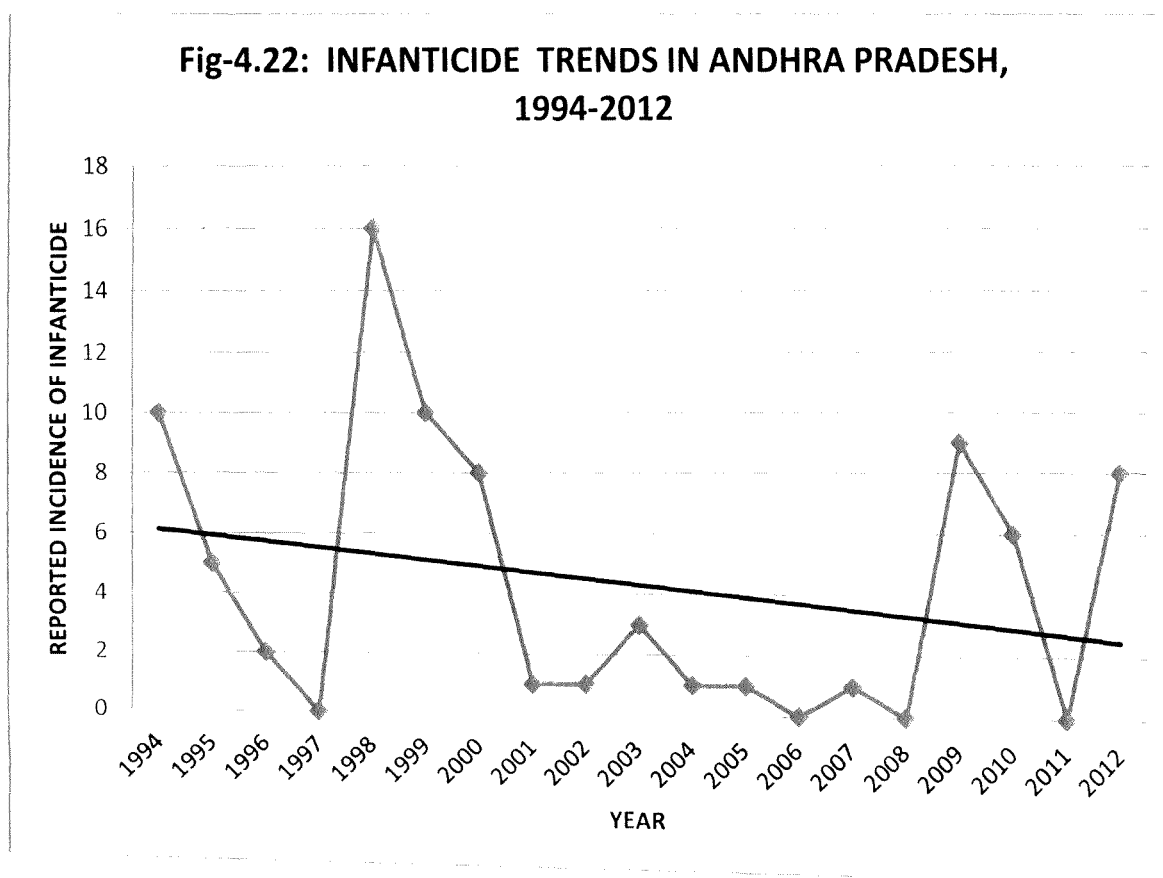
Fig-4.23: INFANTICIDE TRENDS IN PUNJAB, 1994-2012
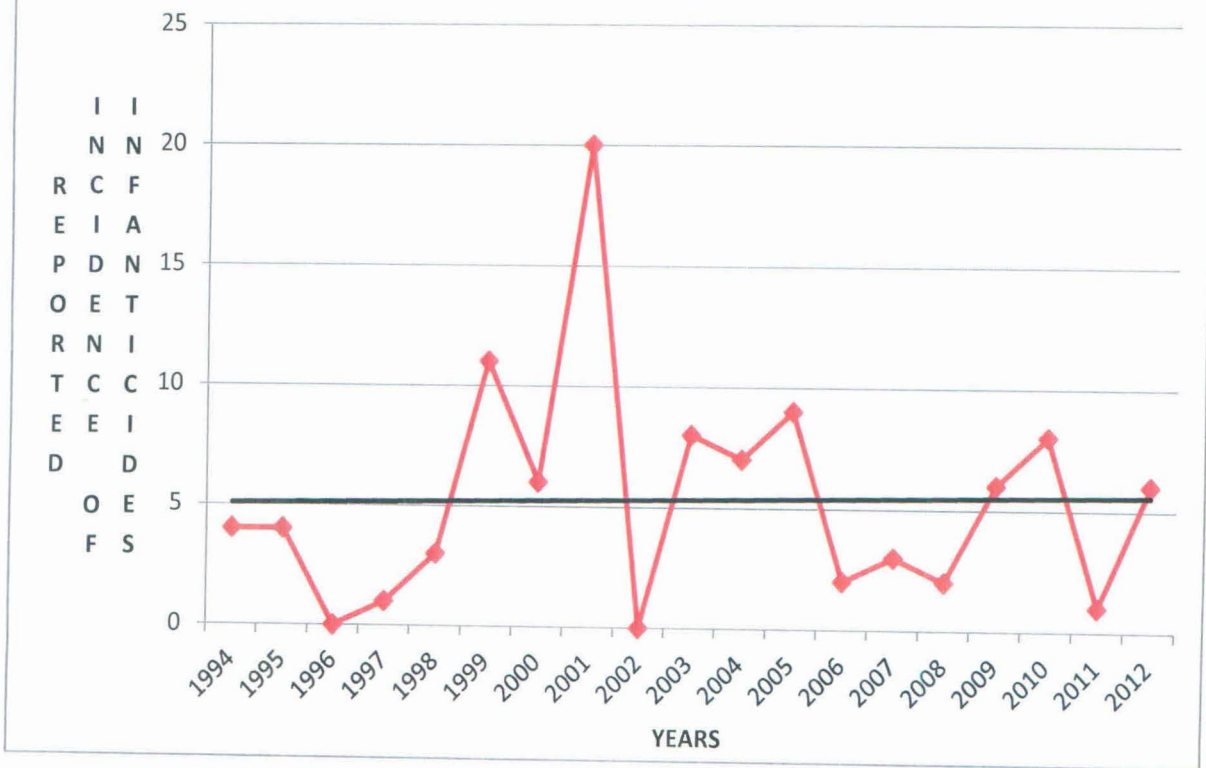
Fig-4.24 FOETICIDE TRENDS IN PUNJAB, 2012
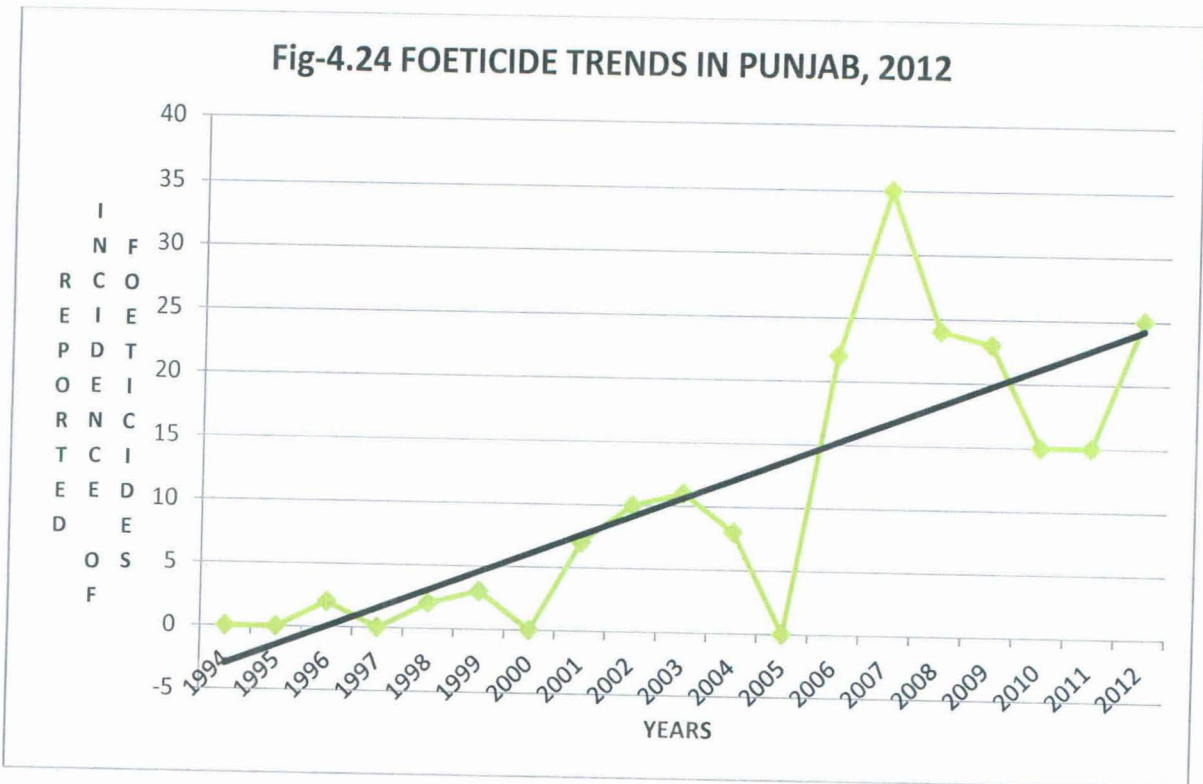
Chapter-V
Summary of Findings and Conclusion

5.1 INTRODUCTION:

In the preceding chapters, an attempt has been made to showcase the scenario of child sex ratio in Andhra Pradesh, Punjab and West Bengal. Child sex ratio has varied not only between these three states, but also within the states. After literature review, different variables have been taken into account to explain such variations. However, very little explanation leads to a pertinent question why child sex ratio might still be determined by other non-measureable factors like son preference and secrets like infanticide and foeticide.

5.2 SUMMARY OF FINDINGS:

In the first chapter, a brief discussion has been made on relevance of study and study area. Then a conceptual framework has been designed which shows that variations in child sex ratio is basically related to discrimination of girl child, both before and after birth. This designed framework leads to formation of pertinent objectives and research questions. The study not only looks at trends and patterns of CSR but also attempts to trace out possible determinants. To fulfill the objectives, relevant data has been collected from different secondary sources. In the methodological part, data has been tabulated and statistically analysed and presented through maps and tables.

The second chapter, titled as 'Literature Review', has brought out some correlates of child sex raio. These include sex ratio at birth, excess female mortality, female infanticide and foeticide, neglect of girl child in terms of health care and nutrition, dowry, son preference, patriarchy, female education, female workforce participation rate and so on.

The third chapter, entitled as 'Trends and Patterns of Child Sex Ratio', firstly looks at the scenario of India. In 2001, imbalanced child sex ratio has been a problem mainly in north-western and western India. In 2011, the problem is mainly restricted within Haryana, Punjab, Jammu & Kashmir, Madhya Pradesh and Rajasthan. The scenario becomes clear when disaggregated rural-urban shares are analysed. In rural areas of Punjab, Haryana and Jammu and Kashmir, child sex ratio is found to be quite imbalanced. In case of urban CSR in 2011, Haryana, Jammu & Kashmir, Punjab and Uttarakhand have disappointing scenario. Urban CSR presents a mixed picture; it is relatively imbalanced not only in highly urbanized districts like Gurgaon, Surat, Ahmedabad, Faridabad, Gwalior, Ghaziabad but also in less

urbanized districts like Mahendergarh, Bilaspur, Shupian, Nayagarh, Tarn Taran, Uttarkashi, Rudraprayag etc. In Andhra Pradesh, child sex ratio has declined in most of the districts except north-eastern part during 2001-2011. Although Punjab has really improved from a very poor level of 2001, as many as eleven districts have CSR below 800. Therefore, over the decade of 2001-2011, decline of CSR is evident both in rural and urban areas. More or less, West Bengal shows a balanced picture of CSR in 2001 and 2011. Over the decade of 2001-2011, decline of CSR is evident both in rural and urban areas of West Bengal.

The chapter four, entitled as 'Determinants of Child Sex Ratio', firstly looks at the relationship between SRB and CSR. In Andhra Pradesh, A definite pattern has been found. Hyderabad, Rangareddy and Adilabad have SRB of 1059, 1002 and 999, respectively. On the other hand, they have comparatively less child sex ratio. Nalgonda has low sex ratio at birth 933, and the child sex ratio is also low (923). In Punjab and West Bengal, no such definite pattern is found. In terms of male-female variations in infant mortality, Andhra Pradesh and Punjab have shown high constant and low slope values. That means even if male IMR approaches zero, high constant terms of female IMR will continue to exist. On the other hand, West Bengal has relatively lower constant value and relatively higher slope. It suggests that gender bias against girl children is not very high. In 2001, majority of the variables in three states show weak correlation with CSR. In 2011, there is slight change, as just in some of the cases, correlations between CSR and variables are weak. For all three states, Female Workforce Participation Rate (Main Worker) has negative correlation with CSR. On the other hand, for all three states, female literacy rate and SRB have positive relations with CSR. The results of multiple linear regression have not been able to throw much light on CSR variations. Level of urbanization has positively influenced CSR in West Bengal and negatively influenced CSR in Andhra Pradesh. In Punjab (2011), improvement in female literacy rate has positive bearing on CSR. In West Bengal, SRB and age at marriage has some positive and negative influence, respectively.

5.3 CHILD DEVELOPMENT POLICIES IN STUDY AREA:

PUNJAB:

Balika Samridhi Yojana: The scheme is encouraging education of girls belonging to BPL families. Girl child born on or after 15.08.97 in aforesaid families get scholarship under this scheme. Beneficiaries from class I to class X get the scholarship from Rupees 300 to 1000 per annum according to class.

Under Social security scheme, *Kanya Jagriti Jyoti Scheme* is for the girl child born after 26.01.96 in the below poverty line families and families with income below 20,000/- per annum. The family should adopt two-child norm and the beneficiary will also have to study upto matric. The beneficiary will get 5000/- through LIC. The scholarship is given in installments. First, when the girl is six to twelve year old, she gets a scholarship of Rs.1200/- per annum for each year. Lastly, when the girl is 12 to18 years old, she will get a scholarship of 2400/- per annum each year for her studies. There are 26200 beneficiaries who have been getting the scholarship upto 31.3.2006 and 4000 more beneficiaries upto 2005-2006.

Kishori Shakti Yojana: The scheme is for 11 to 15 year girls for the improvement of their health and nutritional status by non-formal stream of education through anganwadi. 148 blocks of Punjab have been covered under this scheme for spreading awareness on health, hygiene and nutrition of the adolescence girls.

Mahila Jagrit Yojana (State sponsored): This scheme was launched on International Women Day (8th March, 1999) for economic and social upliftment of women and to generate awareness about all the schemes for their benefits. To solve their problem, self-help groups of women are formed.

Integrated Child Development Scheme: It is a centrally sponsored scheme for providing supplementary nutrition, pre-school education, immunization, health check-up, and health and nutrition education for 0-6 age grouped children, pregnant woman and lactating mother.

Concessional Bus Travel Facility to Women (State sponsored): to provide social security among the aged woman above age 60 years by giving 50% fare concession to the eligible woman who have identity card issued by the child development project officers.

Swayamsidha (Centrally sponsored): By this schemes self help groups are form to uplift their social and economic status of woman.

ANDHRA PRADESH:

Girl Child Protection Scheme:

This scheme has been launched on 8th March, 2005. It aims to make intensive care of girl child in terms of education, empowerment and healthy life. It also aims to help orphans, impoverished and disabled girls. Another set of aim is the positive change among parents' attitude in terms of two-girl family, legal age of marriage and status of girls. In the eligibility criteria, this scheme prioritizes poor, disabled, single, destitute girl child in the enrollment process.

WEST BENGAL:

In West Bengal, where child sex ratio reports quite balanced so far, no such girl child policy or girl child centric development scheme is present. Through Integrated Child Development Scheme (ICDS), emphasis has been laid upon education, health and nutrition of both male and female children. Apart from this, West Bengal has specific scheme for street children. But, in a recently released report ('Children in India', 2012) of Central Statistics Office, West Bengal shows some points of concern. In terms of minor girl procuration, buy of girls for prostitution and child labour, West Bengal has shown disappointing statistics. Therefore, even if child policy does not exist, attention of Government on girl children is much needed. In West Bengal, it is found that Government schemes are broadly restricted within empowerment of Self-Help Groups (SHGs), employment training and construction of working women hostel.

5.4 CONCLUDING REMARKS:

The concluding section of the study highlights on some issues regarding child sex ratio on the study area. The purpose of the study will be fulfilled if it throws some light on the present scenario of declining child sex ratio. Some of the concluding remarks are-

- After calculating the child sex ratio from available data (2011 and 2001). It is observed that in 2011, out of 635 districts, 45 districts (7%) have 'Highly Imbalanced' CSR (<850) and in 2001 out of 588 districts, 49 districts (8%) have 'Highly Imbalanced' CSR. That means, there is one percent of slight improvement in child sex ratio in the districts having 'Highly Imbalanced' child sex ratio. On the other hand, the percentage of districts having balanced child sex ratio is declined. From available data (2011 and 2001), in 2011, out of 635 districts, 208 districts (33%) have balanced 'generally accepted' balanced CSR of 950. In 2001, there are 260 districts (44%) out of 588 districts in India. Therefore, the percentage of districts with balanced CSR has declined to 10 percent from 2001 to 2011. Lastly, it can be remarked that though the 'Highly Imbalanced' CSR districts are reducing in number, but there is also a spread of the phenomena of 'imbalanced child sex ratio' (i.e. CSR < 950) in the districts of India in 2011.

- Punjab has improved in the aspect of child sex ratio from 2001 to 2011. Several policies on girl child for improving CSR, taken by the Punjab Government may have a positive impact on this improvement. In Andhra Pradesh, the districts with imbalanced child sex ratio is more in 2011, of 23 districts, 16 (i.e. 70 percent) have less than 950 CSR. In 2001, only one district (Hyderabad) had CSR below 950. Perhaps, only Girl Child Protection Scheme is not enough to combat with such depressing phenomena. Hence, Andhra Pradesh Government should take some more steps to improve CSR. West Bengal has comparatively better scenario on CSR but in 2001 only Kolkata has imbalanced CSR, but in 2011, 4 districts (21%) out of 19 districts have imbalanced CSR. Government of West Bengal should also take some necessary steps to avert future decline in CSR.

- In Andhra Pradesh and Punjab (2001), even if the male infant mortality comes to zero, female IMR will continue to be higher as the aforesaid states are characterized by high constant and low slope values.

- In Andhra Pradesh, level of urbanization (%) is negatively influencing child sex ratio in 2001 and also in 2011. Female literacy rate (%) is positively

influencing child sex ratio in Punjab (2011). In West Bengal (2011), level of urbanization (%), sex ratio at birth and female married below legal age (%) have positive and significant influence on child sex ratio.

Appendix-I

Table- Data for computation of Composite Development Index, 2001

State	1	2	3	4	5	6	7	8	9
Andhra Pradesh	17195	15947	27.3	60.5	63.5	73.4	67.2	48.1	33.0
Assam	12803	12839	12.9	63.3	57.9	204.5	24.9	9.2	64.6
Bihar	6415	72926	24.8	47.0	60.8	83.6	10.3	3.7	19.2
Chhattisgarh	10744	249277	20.1	64.7	56.9	53.8	53.1	15.5	14.2
Gujarat	18392	1685587	37.4	69.1	63.4	72.8	8.4	62.3	44.6
Haryana	25583	557054	28.9	67.9	65.2	64.5	82.9	48.1	44.5
Himachal Pradesh	22795	130789	9.8	76.5	65.9	57.5	94.8	84.1	33.4
Jharkhand	10345	404447	22.2	53.6	60.8	14.3	24.3	12.6	19.7
Karnataka	18344	830163	34.0	66.6	64.5	104.1	78.6	58.9	37.5
Kerala	20094	355381	26.0	90.9	73.5	359.2	70.2	20.4	84.0
Madhya Pradesh	11862	620834	26.5	63.7	56.9	53.5	70.0	25.3	24.0
Maharashtra	22777	3126098	42.4	76.9	66.2	88.2	77.5	64.1	35.1
Orissa	10453	235168	15.0	63.1	58.5	136.8	26.9	8.7	14.9
Punjab	27881	430080	33.9	69.7	68.5	79.5	91.9	33.6	46.8
Rajasthan	13020	525802	23.4	60.4	61.1	41.0	54.7	35.3	29.0
Tamil Nadu	20972	1653632	44.0	73.5	65.2	128.8	78.2	62.5	35.2
Uttar Pradesh	9828	957702	20.8	56.3	59.1	107.9	31.9	23.7	31.4
Uttarakhand	15285	96136	25.7	71.6	59.1	64.9	60.3	65.9	45.2
West Bengal	16583	569917	28.0	68.6	63.9	99.7	37.5	21.4	43.7
Average	16388	659462	26.5	66.5	62.7	99.4	54.9	37.0	36.8
Standard Deviation	5933.77	767862.41	9.13	9.60	4.31	75.29	27.50	24.03	17.03

Note:

1: Per Capita State Domestic Product; 2: Industrial Output; 3: Level of Urbanization (%); 4: Literacy Rate (%); 5: Life Expectancy at Birth (1998-2002); 6: Road Density per hundred sq.km (2003); 7: Percentage of Households with Electricity; 8: Percentage of Households with Tap water; 9: Percentage of Households with Latrine Facilities

Source:

1: Central Statistics Office as on 08.03.2011; 2: Annual Survey of Industries, MoSPI; 3, 4, 7, 8 and 9: Census of India, 2001; 5: http://www.iipsindia.org/pdf/05_b_09cchep5.pdf (as viewed on 07.04.2013); 6: Infrastructure Statistics (2010), MoSPI, Government of India;

Table- Composite Development Index (C.D.I) across States, 2001

States	Standard Scores									CDI
	1	2	3	4	5	6	7	8	9	
Andhra Pradesh	0.14	-0.84	0.09	-0.63	0.19	-0.34	0.45	0.46	-0.23	-0.08
Assam	-0.60	-0.84	-1.49	-0.34	-1.11	1.40	-1.09	-1.16	1.63	-0.40
Bihar	-1.68	-0.76	-0.18	-2.03	-0.44	-0.21	-1.62	-1.39	-1.04	-1.04
Chhattisgarh	-0.95	-0.53	-0.70	-0.19	-1.34	-0.61	-0.07	-0.90	-1.33	-0.73
Gujarat	0.34	1.34	1.19	0.27	0.17	-0.35	-1.69	1.05	0.46	0.31
Haryana	1.55	-0.13	0.27	0.14	0.58	-0.46	1.02	0.46	0.45	0.43
Himachal Pradesh	1.08	-0.69	-1.83	1.04	0.75	-0.56	1.45	1.96	-0.20	0.33
Jharkhand	-1.02	-0.33	-0.46	-1.35	-0.44	-1.13	-1.11	-1.02	-1.01	-0.87
Karnataka	0.33	0.22	0.82	0.01	0.42	0.06	0.86	0.91	0.04	0.41
Kerala	0.62	-0.40	-0.06	2.54	2.51	3.45	0.56	-0.69	2.77	1.26
Madhya Pradesh	-0.76	-0.05	0.00	-0.29	-1.34	-0.61	0.55	-0.49	-0.75	-0.42
Maharashtra	1.08	3.21	1.75	1.08	0.82	-0.15	0.82	1.13	-0.10	1.07
Orissa	-1.00	-0.55	-1.26	-0.36	-0.97	0.50	-1.02	-1.18	-1.29	-0.79
Punjab	1.94	-0.30	0.82	0.33	1.35	-0.26	1.35	-0.14	0.59	0.63
Rajasthan	-0.57	-0.17	-0.34	-0.64	-0.37	-0.78	-0.01	-0.07	-0.46	-0.38
Tamil Nadu	0.77	1.29	1.92	0.73	0.58	0.39	0.85	1.06	-0.10	0.83
Uttar Pradesh	-1.11	0.39	-0.62	-1.06	-0.83	0.11	-0.84	-0.55	-0.32	-0.54
Uttarakhand	-0.19	-0.73	-0.09	0.53	-0.83	-0.46	0.20	1.20	0.49	0.01
West Bengal	0.03	-0.12	0.16	0.22	0.28	0.00	-0.64	-0.65	0.40	-0.03

Note:

Standard Score (Z-score) = $(x-\mu)/\sigma$, where x = Indicator value, μ = Mean and σ = Standard Deviation

C.D.I = ($\sum$Standard Scores of Infrastructural Indicators/Number of Indicators)

Table- Data for computation of Composite Development Index, 2011

State	1	2	3	4	5	6	7	8	9
Andhra Pradesh	51025	3145778	33.5	67.7	74.0	86.5	92.2	69.9	49.6
Assam	27197	327473	14.1	73.2	58.9	308.3	37.1	10.5	64.9
Bihar	16119	115947	11.3	63.8	61.6	138.7	16.4	4.4	23.1
Chhattisgarh	38059	37104	23.2	71.0	58.0	69.5	75.3	20.7	24.6
Gujarat	63961	6210755	42.6	79.3	64.1	79.7	90.4	69.0	57.4
Haryana	78781	1827000	34.8	76.6	66.2	94.4	90.5	68.8	68.6
Himachal Pradesh	50365	1125555	10.0	83.8	67.0	86.2	96.8	89.5	69.1
Jharkhand	30719	2062175	24.1	67.6	58.0	30.0	45.8	12.9	22.0
Karnataka	50676	3465815	38.6	75.6	65.3	146.9	90.6	66.1	51.2
Kerala	59179	592824	47.7	93.9	74.0	517.8	94.4	29.3	95.2
Madhya Pradesh	27250	1422273	27.6	70.6	58.0	64.0	67.1	23.4	28.8
Maharashtra	74027	11053762	45.2	82.9	67.2	133.4	83.9	67.9	53.1
Orissa	33226	1351150	16.7	73.5	59.6	166.2	43.0	13.8	22.0
Punjab	62153	1416746	37.5	76.7	69.4	167.2	96.6	51.0	79.3
Rajasthan	34189	1224435	24.9	67.1	62.0	70.5	67.0	40.6	35.0
Tamil Nadu	62499	3934122	48.5	80.3	66.2	147.9	93.4	79.8	48.3
Uttar Pradesh	23132	2574292	22.3	69.7	60.0	162.0	36.8	27.3	35.7
Uttarakhand	55877	831520	30.6	79.6	60.0	92.1	87.0	68.2	65.8
West Bengal	41469	1417593	31.9	77.1	64.9	337.1	54.5	25.4	58.8

Note:

1: Per Capita State Domestic Product (2009-10); 2: Industrial Output (2007-08); 3: Level of Urbanization (%); 4: Literacy Rate (%); 5: Life Expectancy at Birth (2011); 6: Road Density per hundred sq.km (2011); 7: Percentage of Households with Electricity; 8: Percentage of Households with Tap water; 9: Percentage of Households with Latrine Facilities

Source:

1: Central Statistics Office as on 08.03.2011; 2: Annual Survey of Industries, MoSPI; 3, 4, 7, 8 and 9: Census of India, 2011; 5: India Human Development Report, Planning Commission; 6: Basic Road Statistics of India, 2008-09, 2009-10, 2010-11, MoRTH, Government of India;

Table- Composite Development Index (C.D.I) across States, 2011

State	Standard Scores									
	1	2	3	4	5	6	7	8	9	CDI
Andhra Pradesh	0.26	0.32	0.31	-1.05	2.00	-0.56	0.82	0.95	-0.03	0.34
Assam	-1.07	-0.77	-1.31	-0.29	-1.00	1.32	-1.37	-1.24	0.70	-0.56
Bihar	-1.68	-0.85	-1.54	-1.59	-0.46	-0.12	-2.19	-1.46	-1.28	-1.24
Chhattisgarh	-0.46	-0.88	-0.54	-0.59	-1.18	-0.70	0.15	-0.86	-1.21	-0.70
Gujarat	0.98	1.50	1.08	0.56	0.04	-0.62	0.75	0.91	0.34	0.62
Haryana	1.81	-0.19	0.42	0.19	0.45	-0.49	0.75	0.91	0.88	0.52
Himachal Pradesh	0.23	-0.46	-1.65	1.18	0.61	-0.56	1.00	1.67	0.90	0.32
Jharkhand	-0.87	-0.10	-0.48	-1.06	-1.18	-1.04	-1.02	-1.15	-1.33	-0.91
Karnataka	0.24	0.44	0.74	0.05	0.28	-0.05	0.76	0.81	0.05	0.37
Kerala	0.72	-0.67	1.51	2.58	2.00	3.10	0.91	-0.54	2.13	1.30
Madhya Pradesh	-1.06	-0.35	-0.18	-0.65	-1.18	-0.75	-0.18	-0.76	-1.01	-0.68
Maharashtra	1.55	3.36	1.30	1.06	0.65	-0.16	0.49	0.87	0.14	1.03
Orissa	-0.73	-0.37	-1.09	-0.24	-0.86	0.12	-1.13	-1.11	-1.33	-0.75
Punjab	0.88	-0.35	0.65	0.20	1.09	0.12	1.00	0.25	1.38	0.58
Rajasthan	-0.68	-0.42	-0.41	-1.13	-0.38	-0.70	-0.18	-0.13	-0.72	-0.53
Tamil Nadu	0.90	0.62	1.57	0.70	0.45	-0.04	0.87	1.31	-0.09	0.70
Uttar Pradesh	-1.29	0.10	-0.62	-0.77	-0.78	0.08	-1.38	-0.62	-0.68	-0.66
Uttarakhand	0.53	-0.57	0.07	0.60	-0.78	-0.51	0.61	0.88	0.74	0.18
West Bengal	-0.27	-0.35	0.18	0.25	0.20	1.56	-0.68	-0.69	0.41	0.07

Note:

Standard Score (Z-score) = $(x-\mu)/\sigma$, where x = Indicator value, μ = Mean and σ = Standard Deviation

C.D.I = ($\sum$Standard Scores of Infrastructural Indicators/Number of Indicators)

Appendix-II

Infant Mortality Rates – Males and Females (1982-2011)

Source: Compendium of India's Fertility and Mortality Indicators (1971-2007): Based on the Sample Registration System (SRS), Registrar General and Census Commissioner of India, First edition, 31st Dec, 2010; SRS (2008-2011)

Table- IMR in Andhra Pradesh, 1982-2011

Year	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1982	79	84	75	86	92	81	50	50	49
1983	77	78	76	83	84	81	54	56	53
1984	78	83	72	81	88	73	66	66	65
1985	83	86	79	90	91	89	57	68	47
1986	82	83	80	87	88	87	59	64	55
1987	79	80	77	84	92	77	58	68	47
1988	83	91	76	89	99	78	63	59	67
1989	81	89	73	88	98	77	53	51	54
1990	70	72	68	73	74	73	56	65	47
1991	73	76	70	77	78	75	56	65	47
1992	71	73	68	78	80	75	42	43	40
1993	64	70	57	70	76	64	46	53	38
1994	65	73	56	69	81	57	52	50	56
1995	67	65	69	74	71	79	43	43	42
1996	65	67	63	73	73	72	38	44	32
1997	63	64	62	70	72	69	37	37	38
1998	66	65	68	75	74	76	38	36	40
1999	66	69	64	75	79	71	37	35	40
2000	65	66	64	74	76	73	36	34	37
2001	66	65	68	74	74	75	40	37	42
2002	62	64	60	71	69	72	35	47	23
2003	59	59	59	67	65	68	33	36	30
2004	59	59	58	65	64	66	39	42	35
2005	57	56	58	63	62	64	39	38	40
2006	56	· 55	58	62	61	63	38	37	41
2007	54	54	55	60	60	61	37	36	38
2008	52	51	54	58	56	60	36	36	37
2009	49	48	50	54	53	55	35	34	37
2010	46	44	47	51	50	51	33	29	36
2011	43	40	46	47	45	50	31	28	35

Table- IMR in Punjab, 1982-2011

Year	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1982	75	78	73	82	82	82	53	63	43
1983	80	80	81	84	83	86	69	71	67
1984	66	66	67	77	75	79	35	37	32
1985	71	67	76	78	70	86	51	55	46
1986	68	62	75	72	66	79	55	49	63
1987	62	60	66	62	57	68	63	68	58
1988	62	58	66	63	57	69	59	61	56
1989	64	72	56	71	81	61	44	45	43
1990	61	52	71	66	58	75	45	33	59
1991	53	55	51	58	60	56	40	41	38
1992	56	54	60	61	56	68	41	46	34
1993	55	49	62	60	52	70	39	40	38
1994	53	47	60	59	52	68	36	34	38
1995	54	49	62	58	51	67	39	40	38
1996	51	47	57	54	49	61	40	39	41
1997	51	48	54	54	51	58	38	38	38
1998	54	53	56	58	52	67	40	57	18
1999	53	51	56	57	49	67	39	56	16
2000	52	45	61	56	47	68	38	39	36
2001	52	43	63	56	47	67	38	29	49
2002	51	38	66	55	41	73	35	28	43
2003	49	46	52	53	49	57	34	33	36
2004	45	37	55	50	42	60	36	28	46
2005	44	41	48	49	46	51	37	32	43
2006	44	39	50	48	41	57	36	34	38
2007	43	42	45	47	45	50	35	35	36
2008	41	39	43	45	44	48	33	31	35
2009	38	37	39	42	41	43	31	29	33
2010	34	33	35	37	36	39	28	27	29
2011	30	28	33	33	31	35	25	22	28

Table- IMR in West Bengal, 1982-2011

Year	Total			Rural			Urban		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1982	86	90	81	93	98	87	52	55	49
1983	84	85	84	93	92	94	48	55	40
1984	82	85	78	88	89	87	55	67	42
1985	74	80	67	80	99	65	46	33	77
1986	71	76	67	75	79	72	55	64	46
1987	71	73	68	77	81	73	43	38	48
1988	69	74	65	76	81	71	43	44	41
1989	77	83	71	83	90	75	53	52	54
1990	63	64	62	68	68	68	41	45	37
1991	71	72	69	76	79	73	47	44	49
1992	65	67	62	71	74	67	38	34	41
1993	58	57	59	64	63	66	33	34	31
1994	62	60	65	64	63	65	52	43	63
1995	58	58	58	61	61	61	45	43	47
1996	55	60	50	58	63	52	44	47	41
1997	55	59	51	58	62	54	43	46	40
1998	53	59	48	56	59	53	41	56	25
1999	52	61	43	55	62	47	40	55	24
2000	51	54	47	54	56	51	37	45	28
2001	51	53	49	54	57	52	38	37	38
2002	49	53	45	52	55	49	36	45	25
2003	46	45	46	48	48	48	34	32	35
2004	40	45	34	42	48	35	32	33	32
2005	38	38	39	40	40	40	31	28	35
2006	38	37	40	40	39	42	29	27	31
2007	37	36	37	39	38	39	29	29	29
2008	35	34	37	37	36	38	29	27	31
2009	33	33	33	34	34	35	27	26	28
2010	31	29	32	32	31	33	25	24	27
2011	32	30	34	33	31	36	26	26	27

Appendix-III

Table: Data for Multiple Linear Regression, Andhra Pradesh, 2001

District	1	2	3	4	5	6	7	8
Adilabad	27	34	27	40	948	54	1.47	962
Anantapur	25	38	28	51	950	42	1.70	959
Chittoor	22	49	26	38	947	41	0.81	955
Cuddapah	23	43	21	40	930	38	1.11	951
East Godavari	24	53	13	34	973	54	0.63	978
Guntur	29	47	30	29	944	57	0.79	959
Hyderabad	100	64	8	36	978	29	0.00	943
Karimnagar	19	37	34	29	953	68	0.96	962
Khammam	20	41	30	41	969	60	1.23	971
Krishna	32	56	21	26	960	54	0.84	963
Kurnool	23	34	33	43	918	49	1.66	958
Mahbubnagar	11	27	35	54	915	63	1.43	952
Medak	14	33	31	36	937	64	1.13	964
Nalgonda	13	38	30	46	934	72	1.25	952
Nellore	22	50	22	36	947	47	0.96	954
Nizamabad	18	34	35	35	947	62	0.91	959
Prakasam	15	39	32	37	943	53	1.13	955
Rangareddi	54	49	21	35	964	49	1.45	959
Srikakulam	11	38	22	48	956	43	0.59	967
Visakhapatnam	40	44	20	47	987	48	0.67	976
Vizianagaram	18	35	29	61	966	45	0.77	980
Warangal	19	39	30	38	937	68	1.16	955
West Godavari	20	61	20	35	960	54	0.76	970

Table- Data for Multiple Linear Regression, Punjab, 2001

District	1	2	3	4	5	6	7	8
Amritsar	40	53	10	42	788	14	3	790
Bathinda	30	47	15	51	777	20	4	785
Faridkot	35	48	14	44	804	20	4	812
Fatehgarh Sahib	28	60	14	45	766	17	4	766
Firozpur	26	44	10	48	795	20	5	822
Gurdaspur	25	59	7	35	757	13	3	789
Hoshiarpur	20	67	10	46	831	14	2	812
Jalandhar	47	65	9	36	814	14	3	806
Kapurthala	33	60	10	36	806	12	3	785

Ludhiana	56	63	13	42	826	17	3	817
Mansa	21	39	13	59	761	23	4	782
Moga	20	51	16	41	791	14	3	818
Muktsar	26	44	14	50	777	19	4	811
Nawanshahr	14	62	28	37	768	15	4	808
Patiala	35	55	11	43	763	19	4	777
Rupnagar	32	63	20	32	771	18	2	794
Sangrur	29	47	17	58	757	18	4	786

Table- Data for Multiple Linear Regression, West Bengal, 2001

District	1	2	3	4	5	6	7	8
Bankura	7	42	12	42	922	55	1.07	953
Barddhaman	37	53	8	53	960	49	1.06	956
Birbhum	9	43	8	43	956	57	1.06	964
Dakshin Dinajpur	13	45	12	45	961	53	0.98	966
Darjiling	32	55	15	55	1032	29	0.77	962
Haora	50	61	6	61	1004	44	0.44	956
Hugli	33	59	9	59	975	48	0.66	951
Jalpaiguri	18	44	13	44	1128	39	0.82	969
Koch Bihar	9	47	9	47	1040	54	2.11	964
Kolkata	100	70	11	70	1005	30	-	927
Maldah	7	33	13	33	958	55	0.83	964
Medinipur	10	55	8	55	935	56	0.66	951
Murshidabad	12	39	10	39	985	60	0.75	972
Nadia	21	52	9	52	974	57	0.89	972
North Twenty Four Parganas	54	63	7	63	976	45	0.67	958
Puruliya	10	31	12	31	937	50	0.87	964
South Twenty Four Parganas	16	50	5	50	977	52	0.61	964
Uttar Dinajpur	12	29	11	29	938	41	0.95	965

Note:

1: Level of Urbanization (%); 2: Female Literacy Rate (%); 3: Female Workforce Participation Rate (Main); 4: Female IMR; 5: Sex Ratio at Birth; 6: Percentage of female married below legal age; 7: Average Operational Landholding of Females; 8: Child Sex Ratio

Source:

1, 2, 3, 6 and 8: Census of India, 2001; 4: Rajan *et. al.* (2008); 5: Civil Registration System, 2008; 7: Agricultural Census of India;

Table- Data for Multiple Linear Regression, Andhra Pradesh, 2011

District	1	2	3	4	5	6	7	8
Adilabad	28	46	31	999	627391	29.1	1.42	934
Anantapur	28	48	30	962	767628	31.4	1.66	927
Chittoor	30	57	28	978	844689	29.3	0.80	931
East Godavari	25	61	14	975	1442263	28.6	0.62	968
Guntur	34	54	32	987	1167449	30.3	0.79	945
Karimnagar	25	50	35	978	1037525	24.8	0.93	935
Khammam	23	52	35	954	815131	33.6	1.17	958
Krishna	41	63	25	971	1391440	20.6	0.82	935
Kurnool	28	44	35	963	772937	30.6	1.56	938
Mahbubnagar	15	39	39	962	753794	47	1.34	925
Medak	24	45	31	969	944650	28.9	1.06	952
Nalgonda	19	49	35	933	833356	37.5	1.19	923
Nizamabad	23	46	36	976	513300	17.6	0.85	948
Prakasam	20	47	33	959	860598	31.7	1.10	932
Rangareddy	70	61	20	1002	1515341	22.5	1.38	933
Sri Potti Sriramulu Nellore	29	56	21	984	716294	19.6	0.94	939
Srikakulam	16	47	23	1029	484205	31.5	0.58	954
Visakhapatnam	47	53	20	990	1623653	22.6	0.67	961
Vizianagaram	21	45	30	999	450603	28.6	0.75	960
Warangal	28	50	33	968	698690	17.5	1.08	923
West Godavari	21	65	22	968	1068154	28.4	0.75	964
Y.S.R.	34	50	24	817	575001	28.6	1.10	918
Hyderabad	100	70	12	1059	1709874	5	-	914

Table- Data for Multiple Linear Regression, West Bengal, 2011

District	1	2	3	4	5	6	7	8
Amritsar	54	64	11	782	39970	9.6	1.85	826
Barnala	32	57	8	862	47534	10	0.00	843
Bathinda	36	55	10	851	42352	2.5	5.33	854
Faridkot	35	57	8	842	45050	17.6	30.12	851
Fatehgarh Sahib	31	67	9	877	61932	2.4	11.85	842
Firozpur	27	54	8	807	40316	6.2	3.69	847
Gurdaspur	29	67	7	767	37386	6.6	1.33	821
Hoshiarpur	21	72	8	844	46240	1.3	0.77	865
Jalandhar	53	71	10	832	52868	5	0.83	874
Kapurthala	35	67	9	831	52397	3.9	4.15	871

Ludhiana	59	69	10	846	60501	1.9	0.00	860
Mansa	21	50	11	812	40836	4.9	20.67	836
Moga	23	59	10	895	63082	8	0.00	860
Muktsar	28	53	8	794	45859	4.8	0.32	831
Patiala	40	62	9	825	47420	5.5	5.69	837
Rupnagar	26	69	10	848	47521	1.7	3.27	863
Sahibzada Ajit Singh Nagar	55	70	12	851	49089	3	2.52	841
Sangrur	31	56	7	807	58061	6.1	1.80	840
Shahid Bhagat Singh Nagar	20	67	8	838	70480	0.7	2.96	885
Tarn Taran	13	55	8	747	42170	17	2.90	820

Table- Data for Multiple Linear Regression, West Bengal, 2011

District	1	2	3	4	5	6	7	8
Bankura	8	53	9	932	9215.55	49.7	0.66	949
Barddhaman	40	62	9	876	30379.09	38.9	0.58	951
Birbhum	13	56	7	940	8149.54	57.2	0.63	959
Dakshin Dinajpur	14	59	12	916	3913.92	48.7	0.52	957
Darjiling	39	66	15	895	7553.89	22.7	0.57	953
Haora	63	71	8	875	16304.79	30.7	0.26	962
Hugli	39	69	9	903	19219.52	26.1	0.37	952
Jalpaiguri	27	58	12	940	11085.66	17.1	0.43	955
Koch Bihar	10	60	10	932	6641.99	46.4	0.47	948
Kolkata	100	78	13	881	30006.47	19.1	-	933
Maldah	14	48	10	901	9399.23	55.1	0.51	950
Murshidabad	20	54	10	929	16981.92	61.6	0.51	968
Nadia	28	64	8	965	14544.99	40.4	0.43	960
North Twenty Four Parganas	57	73	9	910	37324.49	27.1	0.40	956
Paschim Medinipur	12	62	9	921	15154.31	38.9	0.45	963
Purba Medinipur	12	72	5	899	21419.76	45.8	0.25	946
Puruliya	13	43	8	859	6433.33	51.9	0.54	953
South Twenty Four Parganas	26	62	6	959	23898.55	39.9	0.42	963
Uttar Dinajpur	12	44	9	900	5532.52	38.2	0.52	953

P.T.O

Note:

1: Level of Urbanization (%); 2: Female Literacy Rate (%); 3: Female Workforce Participation Rate (Main); 4: Sex Ratio at Birth; 5: Gross Domestic Product (2006-07 for Andhra Pradesh and 2009-10 for Punjab and West Bengal); 6: Percentage of female married below legal age; 7: Average Operational Landholding of Females, 8: Child Sex Ratio

Source:

1, 2, 3 and 8: Census of India, 2011; 4: Civil Registration System, 2008; 5: respective state reports as mentioned in Table 4.B; 6: DLHS-3, 2007-08; 7: Agricultural Census, 2005-06

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