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SLOW PACE OF FERTILITY DECLINE IN BIHAR: AN EXAMINATION OF UNMET NEED

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ABSTRACT

Contraceptive prevalence rate is far behind in Bihar in comparison to national average. Unmet need of family planning is high in Bihar against national average. Population control in a situation of low prevalence of contraceptive use and high unmet need is the biggest challenge for Bihar. The two broad objectives of the study are; to examine the socio-economic, demographic and cultural factors affecting unmet need of family planning and; to evaluate the government policies and programmes in relation to unmet need in Bihar. Secondary sources data from Annual Health Survey, Census, NFHS and SRS has been used. Quantitative methods like univariate, and multi variate analysis has been done along with some cartographic techniques. The result reveals that women's educational level, their age at marriage and employment status play positive role in society in terms of obtaining desired result in demographic goals. The community level participation is must in present scenario to achieve better result as lots of community has cultural issues which make obstacles in using family planning measures. Providing more incentives and counseling of beneficiaries will helpful in promotion of contraceptive use. The districts like Siwan, Gopalganj, Kishanganj, Katihar, Araria need special attention as these districts have highest unmet need for family planning in terms of spacing as well as limiting.

Keywords: Unmet Need, Spacing, Limiting, Family Planning, Fertility**.**

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1. INTRODUCTION

Bihar fertility is still high in spite of declining fertility rate as well as population growth rate in comparison to national average and including data of various other states and UTs. The present data indicates that contraceptive prevalence rate in Bihar is still low and this reflected through high unmet need of family planning methods, both in terms of spacing as well as

limiting. These indicators affect directly and indirectly to the demographic and health scenario of the state.

More than 100 million women in less developed countries or about 17 percent of all married women, would prefer to avoid a pregnancy but are not using any form of family planning (Ross and Winfrey, 2002). Unmet need for contraception can lead to unintended pregnancies, which pose risks for women, their families, and societies. In less developed countries, about one-fourth of pregnancies are unintended that is, either unwanted or mistimed (Haub and Herstad, 2002). One particularly harmful consequence of unintended pregnancies is unsafe abortion:

An estimated 18 million unsafe abortions take place each year in less developed regions, cause high rates of maternal death and injury in these regions (Murray and Lopez, 1998). The importance of unmet need was highlighted during the Programme of Action of the 1994 International Conference on Population and Development, a landmark conference, states, "Government goals for family planning should be defined in terms of unmet needs for information and services"(UN, 2002).

Annual Health Survey (AHS) elaborate unmet need as currently married women who are not using any method of contraception but who do not want any more children are defined as having an unmet need for limiting and those who are not using contraception but want to wait for two years or more before having another child are defined as having an unmet need for spacing. The sum total of unmet need for limiting and spacing is the total unmet need for family planning. For working out the estimates on unmet need, the unmet need for spacing has been calculated as the "proportion of pregnant currently married women (CMW) whose pregnancy was mistimed; CMW in lactational amenorrhoea who are not using any family planning method and whose last birth was mistimed, or whose last birth was unwanted but now they say they want more children; fecund CMW who are neither currently pregnant nor in amenorrhoea, and who are not using any family planning method and say that they want to wait for two or more years for the next birth, including those who say that they are unsure whether they want another child , or want another child but are unsure when to have the birth".

The unmet need for limiting has been worked out as the "proportion of pregnant CMW whose pregnancy was unwanted; CMW in lactational amenorrhoea who are not using any family planning method, whose last child was unwanted and who do not want any more children; and fecund CMW who are neither pregnant nor in amenorrhoea who are not using any method of family planning and who want no more children". Using the met demand for contraception (Current contraceptive users) and the unmet need for contraception, the total demand for family planning as well as the percentage demand satisfied can be assessed.

2. LITERATURE REVIEW

Invention of modern contraceptives methods play very crucial role in population stabilization, directly and indirectly it influences reproductive and child health, played important role in decline in maternal and infant death and slow the pace of population growth in worldwide with varying magnitude. Use of contraception is one of the proximate determinants of fertility (Sibanda et al., 2003; Karki and Krishna, 2008; Bogaarts et al., 1984). It has been observed through many researches that use of contraceptive has played decisive role in fertility decline.

India alone depicts the highest proportion of fecund married women of around 20 percent numbering around 31 million with an unmet need for contraception (Packard Foundation, 1998). Unmet need of contraception has drawn the attention of public health policy makers and reproductive health program planners all over the world since 1970, especially in the

developing countries where about one fourth of pregnancies are unintended-that is, either unwanted or mistimed (Haub and Herstad, 2002).

It has been found through various researches that lack of accessibility to family planning methods leads to high fertility as well as millions of unintended pregnancies, unsafe abortions and maternal deaths (Bradley et al., 2012). The unmet need for family planning is defined as the proportion of married women of reproductive age who are not using any method but would like to postpone the next pregnancy i.e. unmet need for spacing or who do not want any more children i.e. unmet need for limiting (Westoff, 1988).

From a policy perspective, reducing the unmet need for family planning is important for both achieving demographic goals and enhancing individual rights. From a demographic standpoint, reducing unmet need can not only lower fertility in countries struggling to cope with rapid population growth but is also important for helping couples achieve their reproductive goals. Reducing unmet need and serving current users of contraceptive well can help reduce unintended pregnancies that lead to abortions and unwanted births both of which are unacceptably high in many countries (Becker, 1999). It has been found in developing countries that number of individuals desire to use family planning methods but they do not have proper access to modern contraceptive and so unmet need for family planning is still high (Subash, 2013; Laya, 2012. It has been observed that the educated women have high contraceptive prevalence rate, smaller family size, and lower levels of unmet need (Ferdousi et al., 2010; Bernstein et al., 2007; Kamau et al., 1996). Women work status also associated with unmet need as it has been observed that women who are working other than home chores have a lower probability of having unmet need than those who work at home or indoors (Oluwasanmi et al., 2011).

3. OBJECTIVES, DATA BASE AND METHODOLOGY

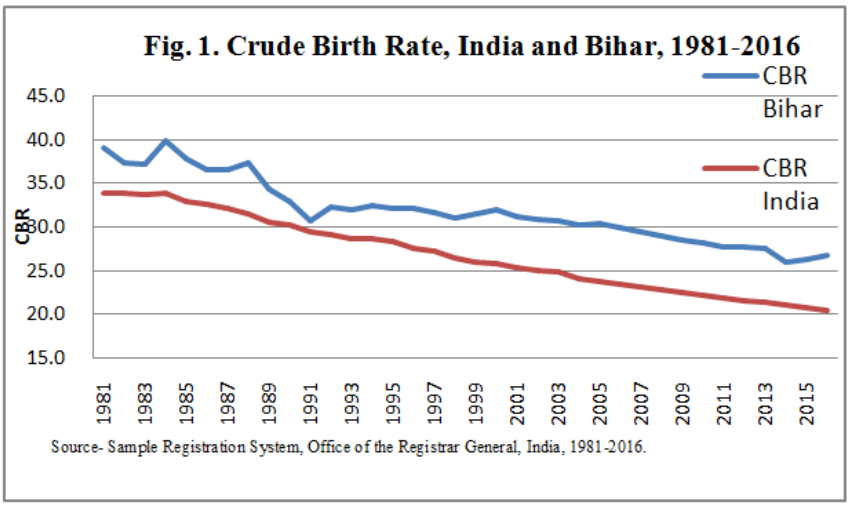
The two broad objectives of the study are; to examine the socio-economic, demographic and cultural factors affecting unmet need of family planning and; to evaluate the government policies and institutions role in relation to unmet need in Bihar.

The entire study is based on secondary sources data which comprise data from Annual Health Survey (2010-11, 2011-12, and 2012-13), DLHS-4 (2012-13) NFHS-2, 3 and 4 (1998-99, 2005-06 and 2015-16)), Census (2001 and 2011), SRS (1981-2016) has been used in the study. The data for poverty head ratio (PHR) has been taken from the paper "Estimates of Poverty and Inequality in the Districts of India, 2011-2012" (Mohanty et.al. 2016). Quantitative methods in terms of univariate, bivariate and multivariate analysis have been used. The scatter graphs plots have been used for identifying association between dependents and independents variables. There has been linear regression model used for the analysis of net effect of independent variables over dependent variables. Apart from these things, some cartographic maps have been drawn to show the district level analysis with the help of Arc GIS map.

The three dependent variables comprises; Total Unmet Need in Bihar, Unmet Need for Spacing in Bihar, and Unmet Need for Limiting in Bihar and ten independent variables from socio-economic and demographic background i.e. Total Fertility Rate (TFR), Under Five Mortality Rate, Effective Literacy Rate Female (ELR Female), Mean Age at Marriage (MAM) Female, Percentage of Scheduled Caste (SC), Percentage of Muslim, Percentage of Poverty Head Ratio (PHR) Percentage of Urban Population, Work Participation Rate Female (15 Years and above), Family Planning Practices (Percentage of Currently Married Women aged 15-49 years use any method) have been taken for linear regression analysis.

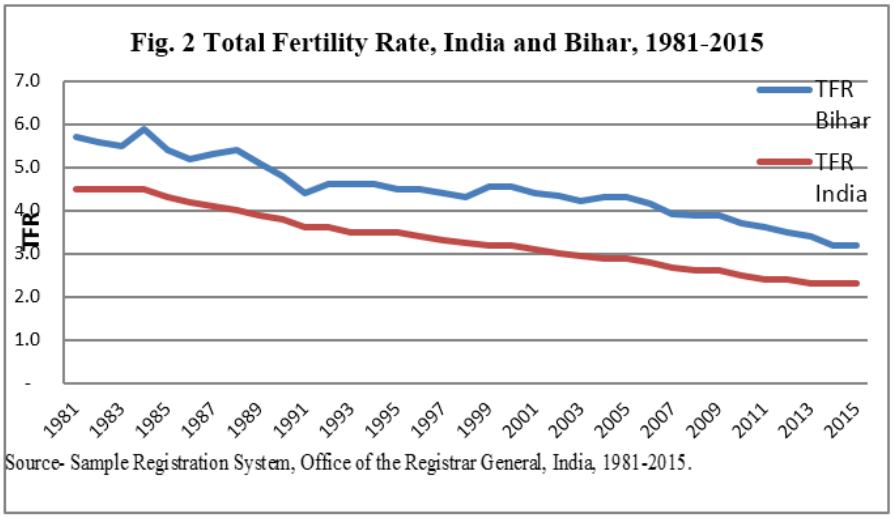
4. RESULTS

Bihar is one of the underdeveloped states in socio-economic and demographic parameters in comparison to other states and union territories of India. The Bihar even occupied bottom position among Empowered Action Group (EAG) States of India in developmental parameters. It has been observed that the one of the biggest cause of this miserable condition of Bihar is its haphazardly grown up population. Although, the trend of population growth is declining, but due to large chunk of unskilled population falls under reproductive age group and they maintain the state's population momentum high and contributed huge population in every year. Bihar has surpassed West Bengal (Census, 2011) and now it is the most densely state (1102 persons per sq km) of India. The decadal growth of population is still 25.07 percent which is 7.43 percentage points ahead to the national average (17.64 percent). According to SRS (2016) data, the crude birth rate (CBR) of Bihar is still 26.8 which are 6 points more to the national average of 20.4 (Fig.1). It was observed that total fertility rate (TFR) was showing declining trend over the period of time, although it exists above the national average. The pace of fertility decline is slow in Bihar in comparison to national level. The TFR in Bihar was 3.2 in 2015 (SRS) while it reached to 2.3 at the national level during the same year. It shows that reproductive age women (15-49 years of age group) in Bihar reproduce one child more in their reproductive life span in comparison to country as a whole. The TFR trends can be observed through figure 2. Map-1 of Appendix also shows level of TFR in Bihar where one can observe the district level variation in TFR.



The TFR gap between Bihar and India as a whole also observed through the data of National Family Health Survey (NFHS). The latest round so far (NFHS-4, 2015-16) shows that TFR in Bihar was 3.4 while it comes to 2.2 at national level. Since Bihar is facing lots of anomalies and backwardness in socio-economic and other developmental parameters historically but in contemporary situation, the low prevalence of contraceptive use and high unmet need of family planning methods are among the biggest cause of slow pace of fertility decline in Bihar. Map-2 of appendix depicts the picture of level of prevalence of contraceptive use in Bihar during 2012-13.

It has been observed through many data sources that unmet need of family planning in Bihar is still high. The latest round of NFHS-4 (2015-16) shows that total unmet need (spacing and limiting) in Bihar is still 21.2 percent.



It has been observed from table 1 of AHS data that unmet need for spacing is least recorded in Patna (16.1) district while Araria (30.8) has recorded highest unmet need for spacing during 2010-11. There are 14 percentage points difference among highest and lowest value of unmet need for spacing at district level.

In case of unmet need for limiting, Patna district (8.5) has recorded lowest unmet need for limiting while Siwan district (35.1) has highest unmet need for limiting during 2010-11. The difference between highest and lowest value of unmet need for limiting are 26 percentage points which is more in comparison to difference in unmet need for spacing values at district level.

The data depicts that overall unmet need for family planning is highest in Kishanganj (52.5) and lowest in Patna (24.6) which shows 28 percentage points difference between highest and lowest value at district level during 2010-11 in the state.

As per data of AHS 2011-12 (Table 1), unmet need for spacing is highest in Katihar (28.2) district and lowest in Patna district (11.7) which shows 16 percentage points gap between highest and lowest value of spacing in the state.

In case of unmet need for limiting, the data shows that Gopalganj district (25.5) has recorded highest unmet need for limiting while Patna district (8.5) recorded lowest in the similar period. So the gap between highest and lowest values of unmet need in limiting methods is 17 percentage points.

The overall total unmet need data shows that Katihar district (46.5) has highest unmet need for contraceptive use while Patna district (20.2) has recorded least total unmet need during the same period which shows 26 percentage points gap between highest and lowest value of total unmet need.

The table 1 shows that Araria district (27.9) has highest unmet need for spacing while Patna district (11.4) has lowest unmet need for spacing among all the districts of Bihar during 2012-13. The gap between highest and lowest value is 16 percentage points.

In case of unmet need for limiting, Siwan district (33.8) recorded highest unmet need for limiting while Patna district (9.3) has lowest unmet need for limiting which reflects 24 percentage points gap between highest and lowest value in the state during the same period.

The overall scenario in the state shows that total unmet need is highest in Siwan district (56.4) while least total unmet need recorded in Patna district (20.7). So the 35 percentage points gap-Map:3

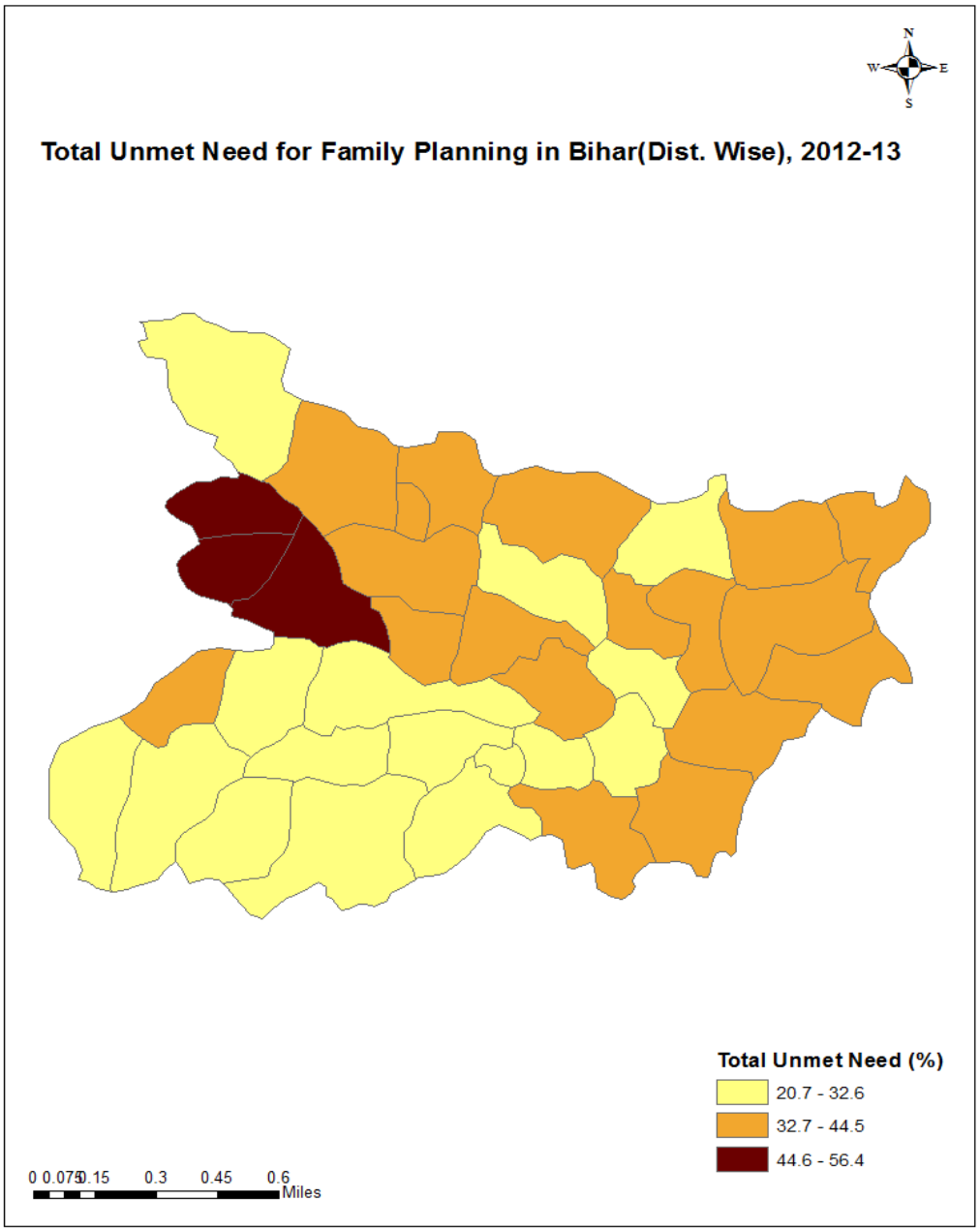


Figure 3 Map 3

Remain between highest and lowest value in total unmet need in the state districts during 2012-13. It can be observed through map 3 which shows that the Siwan and Goplaganj have highest unmet need during 2012-13. The most of the district which have high total unmet need are concentrated in northern and eastern Bihar. The least total unmet need for family planning districts are located in southern and southwestern part of Bihar. Unmet need for spacing mostly exists in north-western parts of the state comprises Purba Champaran, Gopalganj, Siwan, Saran, Muzaffarpur, Sitamarhi, Samastipur, Saharsa, Araria and Katihar district of state (map 4). The map 5 shows that the highest unmet need for limiting is recorded in Siwan district followed by Gopalganj during 2012-13.

Table 2 shows that gap between highest value and lowest value has been widen in total unmet need of contraception in Bihar from 2010-11 to 2012-13. Although, the gap between

highest and lowest value of unmet need for limiting from 2010-11 to 2012-13 has slightly reduced from 26.6 to 24.5. In other hand, the gap between highest and lowest value of unmet need for spacing has slightly increased from 14.7 to 16.5 during the same period.

Patna has recorded least unmet need in both spacing as well as limiting among different districts of state. The districts which have recorded highest value of unmet need in spacing as well as limiting are belongs to Northern Bihar. The districts Araria and Katihar have highest unmet need for spacing while Siwan and Gopalganj districts have recorded highest unmet need for limiting in the state during 2010-11 to 2012-13 respectively. The highest value in total unmet need is recorded in Kishanganj, Katihar and Siwan districts during 2010-11, 2011-12 and 2012-13 respectively. Therefore, unmet need is more prevalent in northern Bihar. Map: 4

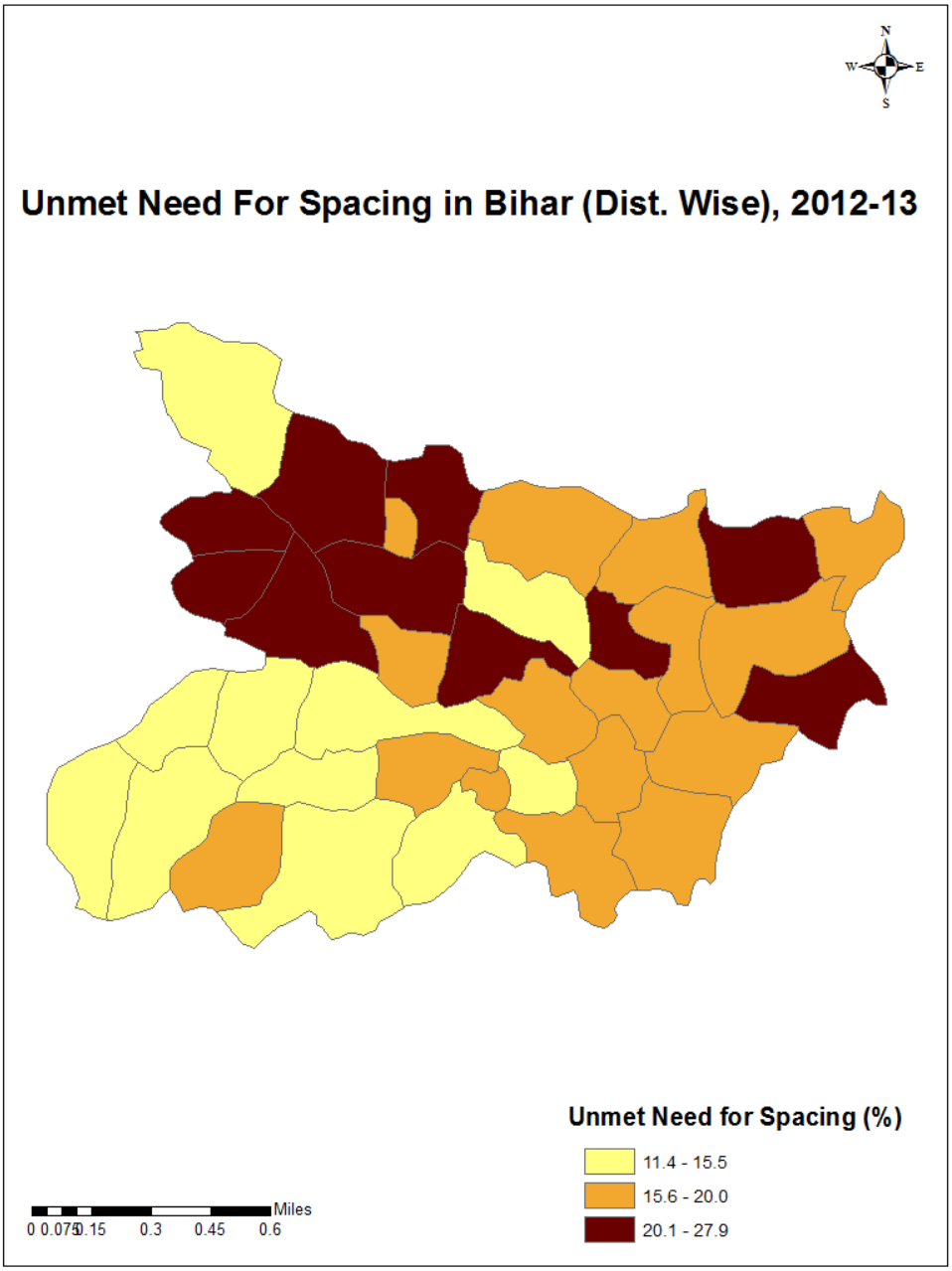


Figure 4 Map 4

Table 1: Unmet Need in Bihar (District Wise), AHS, 2010-11, 2011-12 and 2012-13.

	AHS 2010-11			AHS 2011-12			AHS 2012-13		
Bihar Districts Name	UN for S	UN for L	TUNeed	UN for S	UN for L	TUNeed	UN for S	UN for L	TUNeed
Araria	30.8	16.0	46.8	23.7	16.4	40.1	27.9	15.3	43.2
Aurangabad	24.1	17.2	41.3	16.4	15.5	31.9	16.0	11.9	27.9
Banka	23.1	15.4	38.5	19.3	16.7	36.0	18.4	16.0	34.4
Begusarai	19.3	20.5	39.8	16.6	15.6	32.2	17.8	15.5	33.3
Bhagalpur	23.0	15.8	38.8	17.1	16.2	33.3	18.2	15.9	34.1
Bhojpur	16.9	18.0	34.9	13.0	14.7	27.6	13.3	16.3	29.6
Buxar	17.1	17.6	34.7	15.5	17.9	33.4	15.5	17.9	33.5
Darbhanga	26.8	15.3	42.1	15.9	14.9	30.8	14.7	16.5	31.2
Gaya	17.9	20.7	38.6	14.5	16.8	31.4	14.8	14.2	29.0
Gopalganj	20.0	24.0	44.0	15.3	25.5	40.7	26.2	27.5	53.7
Jamui	23.1	27.9	51.0	17.6	17.1	34.6	16.4	17.6	34.0
Jehanabad	20.0	22.3	42.3	12.0	13.9	25.9	12.1	13.8	26.0
Kaimur (Bhabua)	19.0	20.3	39.3	15.5	16.7	32.2	13.0	16.1	29.1
Katihar	29.0	21.2	50.2	28.2	18.3	46.5	23.5	15.7	39.2
Khagaria	21.0	14.2	35.2	18.2	13.1	31.3	19.4	12.8	32.2
Kishanganj	26.3	26.2	52.5	23.4	22.0	45.4	19.7	19.0	38.7
Lakhisarai	19.8	23.5	43.3	15.8	17.0	32.8	14.9	17.2	32.1
Madhepura	24.1	14.1	38.2	20.1	16.2	36.3	17.4	17.3	34.7
Madhubani	17.6	19.2	36.8	16.3	18.8	35.0	16.9	17.9	34.8
Munger	17.4	17.7	35.1	15.8	13.5	29.3	16.8	15.1	31.9
Muzaffarpur	18.0	11.4	29.4	17.8	14.6	32.4	22.4	13.3	35.7
Nalanda	24.2	17.3	41.5	16.2	14.0	30.2	16.2	13.2	29.4
Nawada	24.0	23.4	47.4	16.7	22.6	39.3	14.7	17.8	32.5
Pashchim Champaran	17.3	20.8	38.1	14.4	15.9	30.3	12.7	18.6	31.3
Patna	16.1	8.5	24.6	11.7	8.5	20.2	11.4	9.3	20.7
Purba Champaran	24.4	20.4	44.8	13.0	18.6	31.6	23.6	16.7	40.3
Purnia	29.8	19.3	49.1	25.7	18.9	44.7	19.3	17.6	36.9
Rohtas	18.1	15.0	33.1	12.9	11.4	24.3	13.4	13.1	26.5
Saharsa	25.9	13.0	38.9	22.8	13.4	36.2	22.3	12.3	34.6
Samastipur	18.2	15.4	33.6	20.6	14.4	35.0	25.2	12.8	38.0
Saran	19.1	23.6	42.7	19.6	17.2	36.8	24.4	21.0	45.3
Sheikhpura	22.3	19.2	41.5	16.7	19.2	35.8	15.9	15.3	31.2
Sheohar	26.5	19.4	45.9	19.5	22.1	41.6	20.0	18.7	38.7
Sitamarhi	20.0	13.9	33.9	18.0	22.2	40.1	22.7	17.9	40.6
Siwan	16.9	35.1	52.0	19.7	24.5	44.2	22.6	33.8	56.4
Supaul	24.2	13.5	37.7	19.5	9.8	29.3	17.3	11.2	28.5
Vaishali	18.7	12.3	31.0	14.2	11.7	25.9	19.0	15.8	34.8

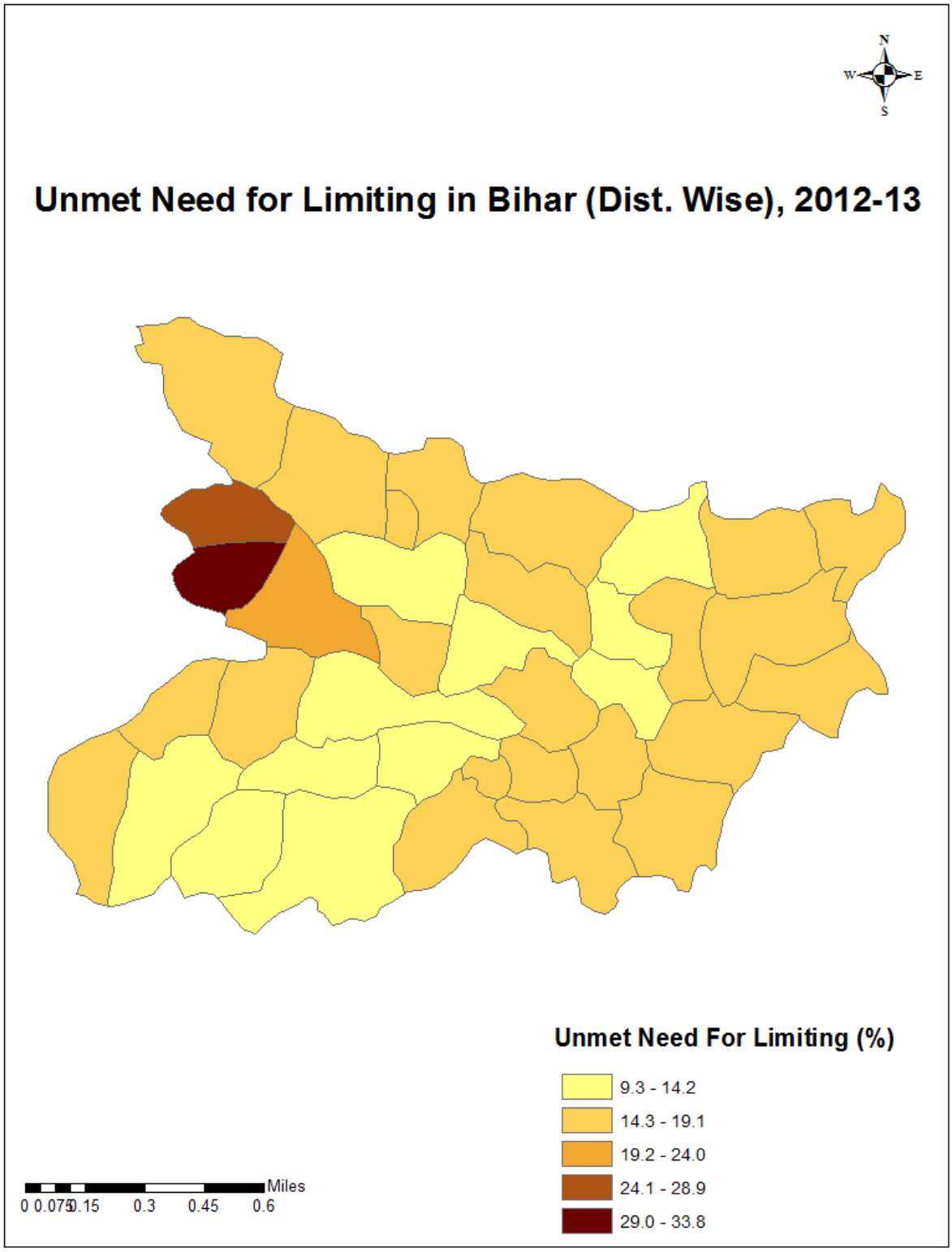


Figure 5 Map 5

Table 2 Gap between Unmet Need (Total, Spacing and Limiting), Bihar, 2010-11, 2011-12 and 2012-13.

Year		Unmet Need for Spacing					Unmet Need For Limiting					Total Unmet Need			
	Dist. Name	Highest Value	Dist. Name	Lowest Value	Gap	Dist. Name	Highest Value	Dist. Name	Lowest Value	Gap	Dist. Name	Highest Value	Dist. Name	Lowest Value	Gap
2010-11	Araria	30.8	Patna	16.1	14.7	Siwan	35.1	Patna	8.5	26.6	Kishanganj	52.5	Patna	24.6	27.9
2011-12	Katihar	28.2	Patna	11.7	16.5	Gopalganj	25.5	Patna	8.5	17	Katihar	46.5	Patna	20.2	26.3
2012-13	Araria	27.9	Patna	11.4	16.5	Siwan	33.8	Patna	9.3	24.5	Siwan	56.4	Patna	20.7	35.7

Source: Computed from AHS, RGI, 2010-11, 2011-12 and 2012-13.

The table 3 (appendix table 4) shows the changes take place among different districts of Bihar's total unmet need, unmet need for spacing and unmet need for limiting during 2010-11 to 2012-13. The highest change in terms of decline in total unmet need during 2010-11 to 2012-13 was recorded in Jamui district followed by Jehanabad, Nawada, Kishanganj, Auranagabad and Purnia. While some districts have observed negative change which means these districts have observed enhancement in total unmet need during 2010-11 to 2012-13. The highest (negative) change in total unmet need during the same period has been observed in Gapalganj followed by Sitamarhi, Muzaffarpur, Siwan, Samastipur and Vaishali districts of Bihar.

It has been observed that Darbhanga district has recorded highest change in unmet need for spacing followed by Purnia, Nawada, Aurangabad, Nalanda and Jehanabad district during 2010-11 to 2012-13 (table 3 and appendix table 4). The highest change (negative) in unmet need for spacing were observed in Samastipur followed by Gopalganj, Siwan, Saran and Muzaffarpur district during the same period.

On the basis of table 3 (appendix table 4), Jamui district has recorded highest changes in unmet need for limiting followed by Jehanabad, Kishanganj, Gaya, Lakhisarai and Nawada districts during 2010-11 to 2012-13. The highest change (negative) in unmet need for limiting was observed in Sitamarhi district followed by Vaishali, Gopalganj, Madhepura, Muzaffarpur and Darbhanga during the same period. The changes in total unmet need, unmet need for spacing and unmet need for limiting during 2010-11 to 2012-13 can be visualize through Map 6, 7 and 8.

Table 3 Change in Unmet Need in Bihar (Dist. Wise), 2010-11, 2011-12 and 2012-13.

Change in AHS Unmet Need	**2010-11 to 2012-13**	**2010-11 to 2012-13**	**2010-11 to 2012-13**
Bihar Districts Name	**Change in Total Unmet Need**	**Change in Unmet need for Spacing**	**Change in Unmet need for Limiting**
Araria	3.6	2.9	0.7
Aurangabad	13.4	8.1	5.3
Banka	4.1	4.7	-0.6
Begusarai	6.5	1.5	5.0

Bhagalpur	4.7	4.8	-0.1
Bhojpur	5.3	3.6	1.7
Buxar	1.2	1.6	-0.3
Darbhanga	10.9	12.1	-1.2
Gaya	9.6	3.1	6.5
Gopalganj	-9.7	-6.2	-3.5
Jamui	17.0	6.7	10.3
Jehanabad	16.3	7.9	8.5
Kaimur (Bhabua)	10.2	6.0	4.2
Katihar	11.0	5.5	5.5
Khagaria	3.0	1.6	1.4
Kishanganj	13.8	6.6	7.2
Lakhisarai	11.2	4.9	6.3
Madhepura	3.5	6.7	-3.2
Madhubani	2.0	0.7	1.3
Munger	3.2	0.6	2.6
Muzaffarpur	-6.3	-4.4	-1.9
Nalanda	12.1	8.0	4.1
Nawada	14.9	9.3	5.6
Pashchim Champaran	6.8	4.6	2.2
Patna	3.9	4.7	-0.8
Purba Champaran	4.5	0.8	3.7
Purnia	12.2	10.5	1.7
Rohtas	6.6	4.7	1.9
Saharsa	4.3	3.6	0.7
Samastipur	-4.4	-7.0	2.6
Saran	-2.6	-5.3	2.6
Sheikhpura	10.3	6.4	3.9
Sheohar	7.2	6.5	0.7
Sitamarhi	-6.7	-2.7	-4.0
Siwan	-4.4	-5.7	1.3
Supaul	9.2	6.9	2.3
Vaishali	-3.8	-0.3	-3.5

Source: Computed from AHS, RGI, 2010-11, 2011-12 and 2012-13.

Map: 6

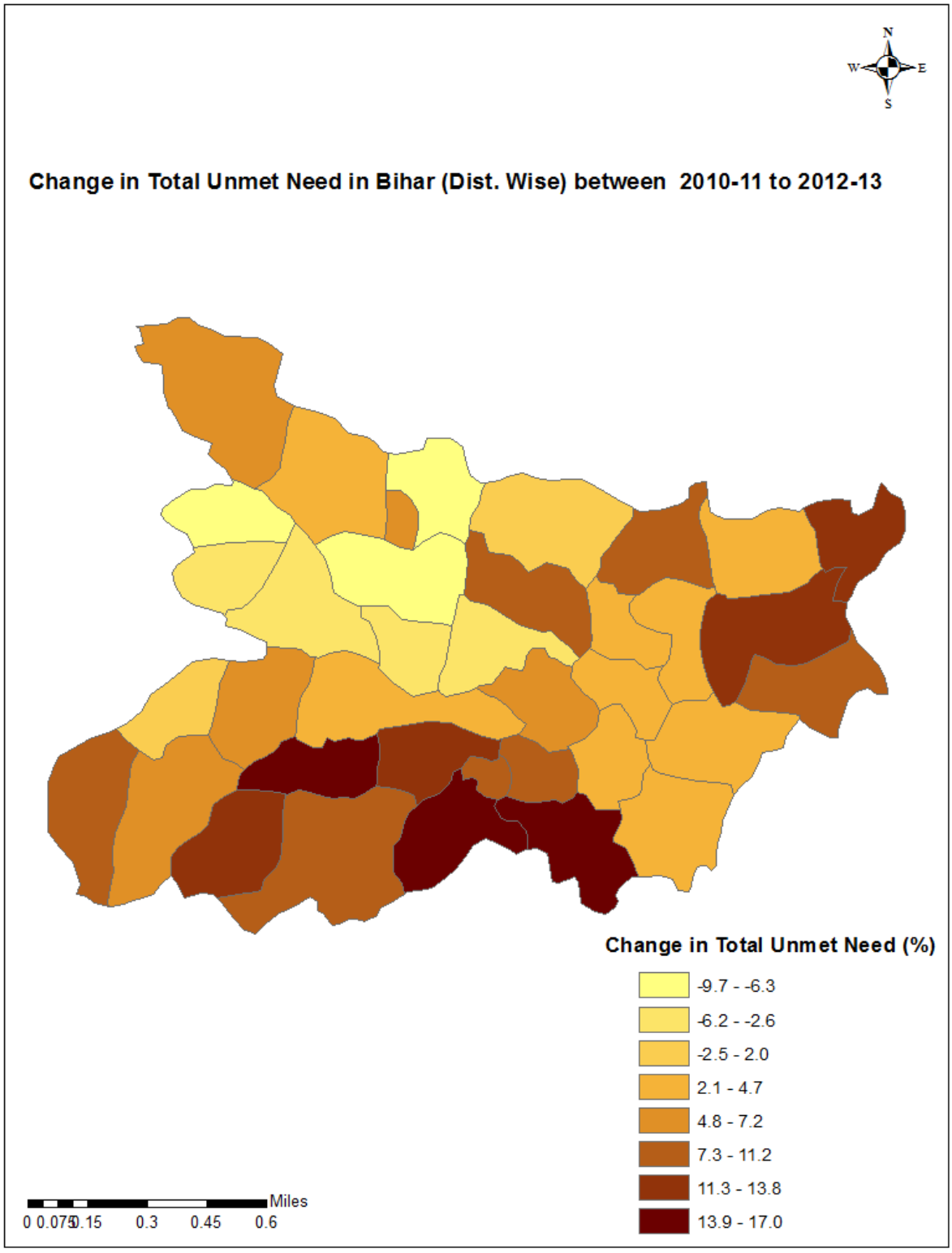


Figure 6 Map 6

Map: 7

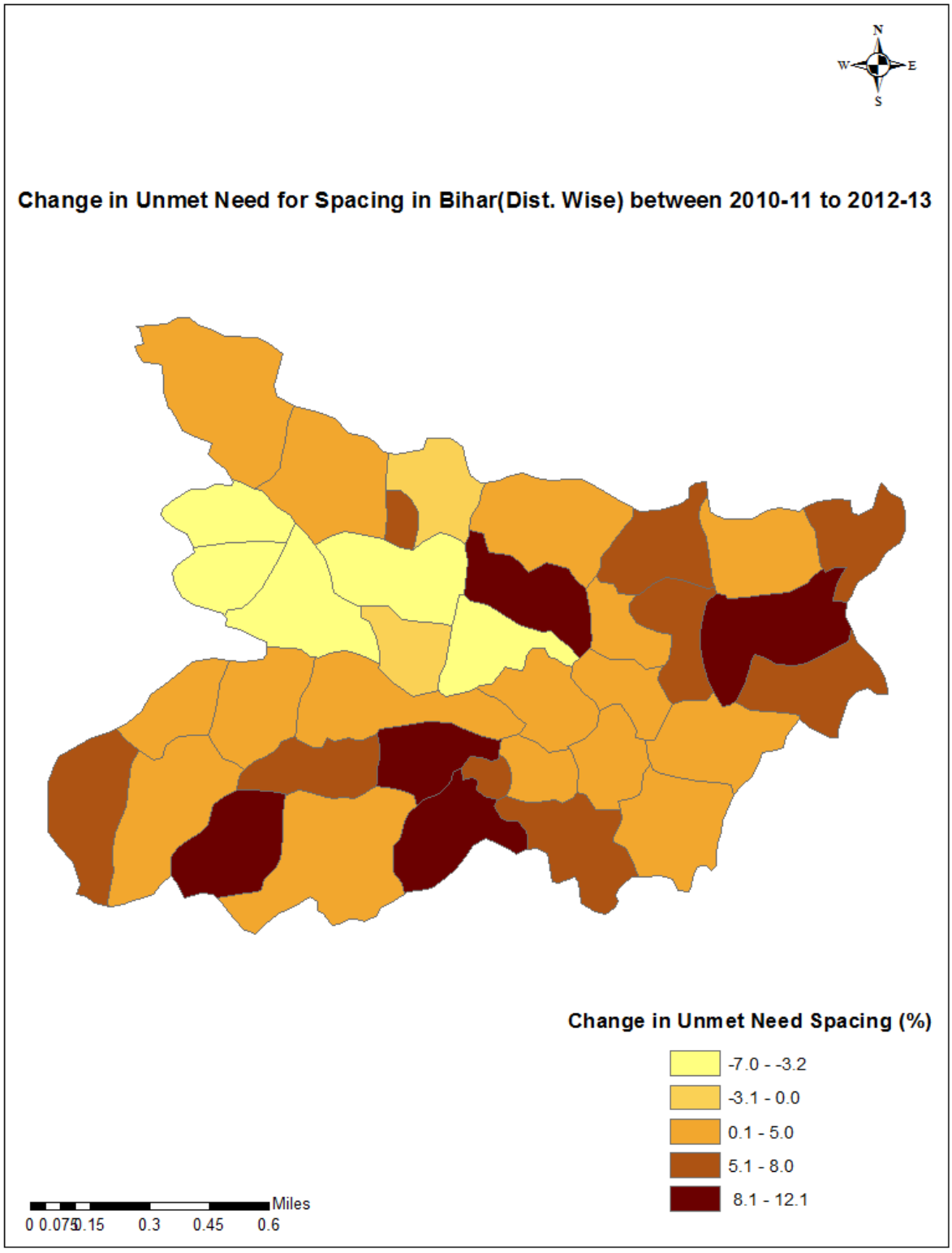


Figure 7 Map 7

Map 8

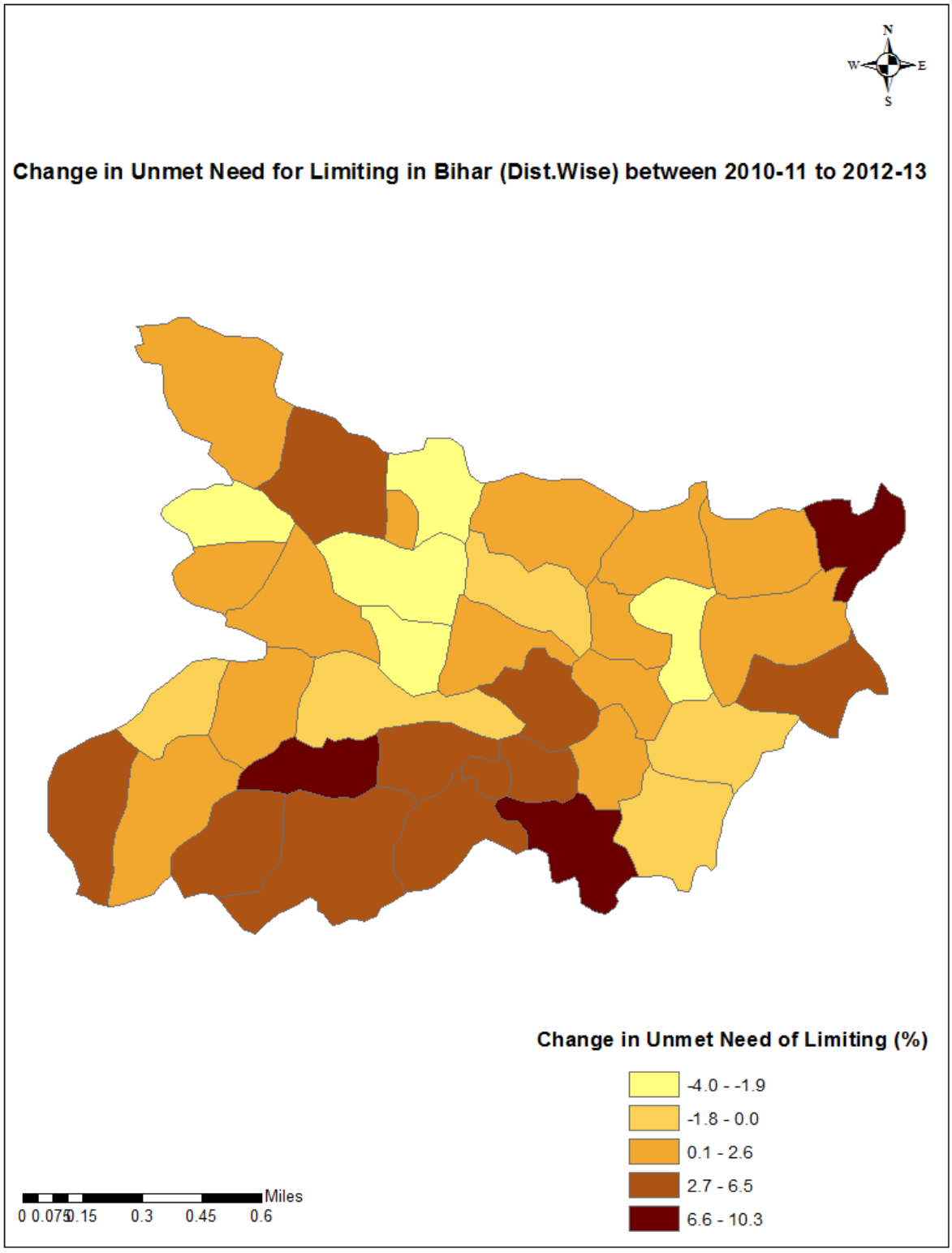


Figure 8 Map 8

Association with unmet need of spacing, limiting and total has been shown with various socio-economic and demographic variables with the help of scatter graphs with fit plot in Bihar during 2010-11 and 2012-13. Figure 4 (appendix) shows the association between unmet need for spacing and total fertility rate (TFR) shows positive and strong association in Bihar during 2010-11 and 2012-13. This association explains that unmet need for spacing increases with rise in TFR level. Although, the association between unmet need for limiting and TFR were found weak during similar corresponding years.

It has been observed that effective literacy rate of female have strong negative association with unmet need for spacing during 2010-11 and it this association also persist during 2012-13 but the strength of the association is not as much strong as it found during 2010-11. It shows that with the enhancement of effective literacy of female their unmet need for spacing get reduced.

It has been observed through figure 5 (appendix) that unmet need for spacing and under five mortality rate (U5MR) is positively associated with each other during 2010-11 and 2012-13. However, this association did not reflect with unmet need for limiting during the similar years.

In case of association between unmet need for spacing and limiting with mean age at marriage of female, figure 5 (appendix) shows that initially there were no association persists during 2010-11. However the association between these two variables gets positively strong during 2012-13. It means that with increase of mean age at marriage of female their unmet need for spacing and limiting also increased.

It has been noticed that (figure 6, appendix) there is no association exists between unmet need for spacing and limiting with poverty head ratio during 2010-11 and 2012-13.

As per the figure 6 (appendix) ,the result shows that the unmet need for spacing and limiting have negative association with urbanization. It is observed that unmet need for spacing and limiting decreased with the increase in percentage of urban population in Bihar during 2010-11 and 2012-13.

There are no strong association visible (figure 7, appendix) between female work participation rate (15 years and above) and unmet need for spacing and limiting during 2010-11 and 2012-13.

The women who are currently using contraceptive methods to control their fertility have negative association with unmet need for spacing and limiting during 2010-11. Although it has been observed through figure 7 (appendix) that, this negative association has been weaken during 2012-13.

The association between unmet need for spacing and limiting with Muslim is strong and positive during 2010-11 and 2012-13 (figure 8, appendix). It reflects that unmet need for spacing and limiting has been increasing with percentage increase in Muslim population in Bihar.

In other hand, the association between Scheduled Caste (SC) and Unmet need for spacing and limiting are seems strongly negative during same period. The figure 8 (appendix) reflects that the unmet need for spacing and limiting decreases with percentage increase in SC population during 2010-11 and 2012-13.

Linear regression method has been applied to see the net effects of various explanatory variables from socio-economic and demographic background on dependent variables of ‘unmet need for spacing’, ‘unmet need for limiting’ and ‘total unmet need’ for family planning in Bihar during 2012-13. The ten explanatory variables included in the analysis are Total Fertility Rate (TFR), Under Five Mortality Rate (U5MR), Effective Literacy Rate Female (ELR Female), Mean Age at Marriage Female (MAM Female), Scheduled Caste

(SC), Muslim, Poverty Head Ratio (PHR), Urban, Work Participation Rate Female (WPR Female) and Family Planning Practices or Contraceptive Prevalence Rate (FP Practices).

There has been four models incorporated in the analysis with variations in group of independent variables in each model to see the net effect of each individual explanatory variable after controlling other variables in that particular model.

It has been observed that (Table 5), only mean age at marriage of female (MAM Female) is positively significant after controlling all other variables (Model 1) which shows that unmet need for spacing enhance with enhancement of female MAM.

In case of Model 2, it is visible that TFR and female MAM is positively significant at 5 percent and 1 percent level of significance after controlling other variables.

Table 5 shows that female ELR and female MAM variables are significant in model 3 after controlling other variables. The female effective literacy rate is negatively significant which shows that after rise in effective literacy rate of female; their unmet need for spacing get declined during 2012-13.

It is observed that female MAM and percentage of urban population are significant variables after controlling other variables in model 4 of the table 5. The result reveals that people living in urban areas have less unmet need for spacing.

Table 5 Regression Result of Unmet Need for Spacing with Socio-economic and Demographic Variables, Bihar, 2012-13.

	Model 1	**Model 2**	**Model 3**	**Model 4**
UN for S	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**
TFR	1.986 (0.402)	3.785** (0.049)		2.240 (0.226)
U5MR	.031 (0.683)			
ELR Female	-.258 (0.219)	-.276 (0.154)	-.483** (0.012)	-.228 (0.194)
MAM Female	3.796** (0.037)	3.741*** (0.006)	4.462*** (0.009)	3.453*** (0.005)
SC	.019 0.919)		-.0170 (0.928)	
Muslim	-.022 (0.761)	-.031 (0.597)	.001 (0.976)	
PHR	-.049 (0.451			-.042 (0.449)
Urban	-.123 (0.126)			-.133* (0.070)
WPR Female	-.001 (0.993)			
FP Practices	-.116 (0.243)	-.101 (0.271)	-.031 (0.727)	-.099 (0.258)
_Cons	-43.235 (0.187)	-49.410 (0.020)	-41.755 (0.144)	-37.887 (0.067)
No. of Obser.	37	37	37	37
Prob>F	0.0095	0.0006	0.0037	0.0004
R-Squared	0.5455	0.4855	0.4161	0.5404

Numbers in Parenthesis are p-values. Note: ***, **,* indicates 1%, 5% and 10% level of significance respectively.

Source: Computed from AHS, RGI, 2012-13.

Table 6 shows the linear regression result of unmet need for limiting with various explanatory variables. The result of model 1 reveals that female MAM, poverty head ratio (PHR), urban and family planning practices are significant factors after controlling all other variables which affect unmet need for family planning in Bihar during 2012-13. The results show that poverty head ratio (PHR), percentage of urban population and family planning practices are negatively significant while female MAM is positively significant with unmet need for limiting.

In case of model 2 of table 6 results show that effective literacy rate of female, percentage of urban population and family planning practices are negatively significant after controlling other factors while female MAM are positively significant.

It has been observed that after controlling other variables, effective female literacy rate, female MAM, percentage of urban population and family planning practices are significant factors in model 3 which affect unmet need for limiting.

The results (table 6 model 4) depict that female effective literacy rate, female MAM, percentage of urban population and family planning practices are significant variables after controlling other factors.

Table 6 Regression Result of Unmet Need for Limiting with Socio-economic and Demographic Variables, Bihar, 2012-13.

	Model 1	**Model 2**	**Model 3**	**Model 4**
UN for L	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**
TFR	**-.288 (0.878)**	**.849 (0.599)**		
U5MR	**.0532 (0.396)**			
ELR Female	**-.270 (0.111)**	**-.271* (0.089)**	**-.309** (0.029)**	**-.221* (0.051)**
MAM Female	**3.245** (0.026)**	**3.897*** (0.001)**	**4.052*** (0.000)**	**3.178*** (0.001)**
SC	**-.0101 (0.946)**			
Muslim	**-.049 (0.394)**	**-.0634 (0.200)**	**-.055 (0.233)**	
PHR	**-.088* (0.097)**			
Urban	**-.1367* (0.038)**	**-.138** (0.029)**	**-.149** (0.012)**	**-.152** (0.011)**
WPR Female	**-.131 (0.324)**			**-.097 (0.358)**
FP Practices	**-.482*** (0.000)**	**-.454*** (0.000)**	**-.440*** (0.000)**	**-.428*** (0.000)**
_Cons	**-6.325 (0.806)**	**-27.032 (0.109)**	**-25.541 (0.119)**	**-13.380 (0.432)**
No. of Obser.	**37**	**37**	**37**	**37**
Prob>F	**0.0001**	**0.0000**	**0.0000**	**0.0000**

R-Squared	**0.7168**	**0.6812**	**0.6782**	**0.6721**

Numbers in Parenthesis are p-values. Note: ***, **,* indicates 1%, 5% and 10% level of significance respectively.

Source: Computed from AHS, RGI, 2012-13.

Table 7 shows result of linear regression of total unmet need with various socio-economic and demographic variables in Bihar during 2012-13. It has been observed in model 1 that after controlling all other variables, female effective literacy rate, female MAM, poverty head ratio (PHR), percentage of urban population and family planning practices are significant factors which affect total unmet need in Bihar during 2012-13.

It has been found in model 2 after controlling other variables that female effective literacy rate, female MAM, percentage of urban population and family planning practices are significant factors in affecting total unmet need. It is also observed that similar sets of variables are significant in model 3 and model 4 as in case of model 2 after controlling others factors.

Table 7 Regression Result of Total Unmet Need with Socio-economic and Demographic Variables, Bihar, 2012-13.

	Model 1	**Model 2**	**Model 3**	**Model 4**
UN for S+L	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**	**Coef. (p-value)**
TFR	**1.698 (0.539)**	**3.002 (0.203)**		**2.130 (0.342)**
U5MR	**.0853 (0.353)**			
ELR Female	**-.528** (0.037)**	**-.542** (0.021)**	**-.592*** (0.004)**	**-.443** (0.042)**
MAM Female	**7.027*** (0.002)**	**7.373*** (0.000)**	**7.862*** (0.000)**	**6.656*** (0.000)**
SC	**.009 (0.967)**		**.032 (0.877)**	
Muslim	**-.071 (0.401)**	**-.084 (0.234)**		
PHR	**-.138* (0.078)**	**-.106 (0.120)**		**-.103 (0.132)**
Urban	**-.260*** (0.009)**	**-.275*** (0.003)**	**-.312*** (0.001)**	**-.290*** (0.002)**
WPR Female	**-.133 (0.493)**			
FP Practices	**-.599*** (0.000)**	**-.575*** (0.000)**	**-.485*** (0.000)**	**-.547*** (0.000)**
_Cons	**-49.351 (0.197)**	**-57.878 (0.029)**	**-65.125 (0.050)**	**-48.742 (0.053)**
No. of Obser.	**37**	**37**	**37**	**37**
Prob>F	**0.0000**	**0.000**	**0.0000**	**0.0000**
R-Squared	**0.7705**	**0.7609**	**0.7166**	**0.7487**

Numbers in Parenthesis are p-values. Note: ***, **,* indicates 1%, 5% and 10% level of significance respectively.

Source: Computed from AHS, RGI, 2012-13.

As far as government programmes and policies are concerned Bihar is highly concerned about the rapidly growing population of the state. Hence, it has started many family welfare programmes in which sterilisation is one of the leading one in the list. The government knows that for attaining high levels of development, the rapid population growth rate needs to be curbed down. Apart from government hospital/facilities, the government has nominated 110 private nursing homes (Annual report 2011-12, Health, Bihar) for achieving desired sterilization goals. For the promotion of Copper-T method through family welfare programmes, trainers have been trained at state level to impart training to all medical officers and ANMs at the district level. ASHAs are facilitated by 'Hindustan Latex' to check pregnancies. The information of spacing methods of birth control is available in each health centre of the state. The government health department expects ASHAs to manage at least one IUD and one tubectomy/vasectomy per month that will benefit the state in lowering the population growth rate.

5. DISCUSSION

It has been observed through result analysis that Bihar has still high unmet need which remains the cause of concern for policy maker and programme implementer. After viewing the overall situation of Bihar, it has been found that the unmet need for family planning situation is more visible in northern Bihar in comparison to southern Bihar. The capital district of Bihar i.e. Patna is performing well and recorded lowest unmet for spacing as well as limiting in family planning among all the districts. The highest unmet need for family planning in terms of spacing as well as limiting and total is observed in Siwan, Araria, Katihar, Gopalganj, and Kishanganj districts of Bihar during 2010-11 to 2012-13 in AHS data. The highest change in unmet need for spacing has been observed in Darbhanga district during 2010-11 to 2012-13, while highest negative change in unmet need for spacing was recorded in Samastipur district. It shows that Samastipur district observed enhancement in unmet need for spacing during the similar period. In other hand Jamui district which is adjacent to the Jharkhand state border and located in southern Bihar has shows highest decline in unmet for limiting during 2010-11 to 2012-13. Sitamarhi district of North Bihar has observed highest enhancement during the same period among the districts of Bihar. The association between unmet need for spacing and limiting with various variables found positive as well as negative and the strength of association also changed during 2010-11 to 2012-13. The association between TFR and unmet need is positive while female effective literacy rate is negatively associated with the unmet need for family planning. Therefore it shows that enhancing educational status of women will play decisive role in lowering the unmet need for family planning in Bihar. There are also positive association between under five mortality rate and unmet need for spacing. The Female MAM is also positively associated with unmet need for spacing as well as limiting. It has been observed that urbanisation is negatively associated with unmet need for spacing and limiting during 2010-11 and 2012-13. It shows that the unmet need decreases with the urbanisation. It has been also noticed that those who are currently using contraceptive methods have no or less unmet need for both spacing as well as limiting methods. The result revealed that the association between Muslim and unmet need for spacing and limiting are strong as it shows that Muslim community have high unmet need for family planning in Bihar. Although, in other hand the association between SC and unmet need for family planning is negative and it shows that SC community have no as such high unmet need.

Results of linear regression models show that Female MAM, TFR, is strongly positive significant after controlling other factors in unmet need for spacing while female effective literacy rate and percentage of urban population is negatively significant after controlling other factors with unmet need for spacing during 2012-13.

In case of unmet need for limiting, the linear models result reveal that poverty head ratio, (PHR), female effective literacy rate, percentage of urban population and family planning practices are negatively significant while female MAM is positively significant after controlling other variables during 2012-13.

It has been noticed that female effective literacy rate, female MAM, poverty head ratio (PHR) percentage of urban population and family planning practices are significant factors after controlling other variables in case of total unmet need in Bihar during 2012-13.

6. CONCLUSION

Fertility in Bihar is showing declining trend which is a good sign for the achievements of overall demographic goal but the pace is still slow in comparison to national average. The similar situation also persists with unmet need for family planning in both unmet need for spacing and limiting. The unmet need for contraceptives is remain high in Bihar, which should be dealt with taking care of holistic approach as lots of socio-economic and demographic factors playing decisive role in fulfilling met and unmet need of family planning. It is the need of hour to enhance women's educational level their age at marriage and employment status for positive change in society as well as obtaining desired result in demographic goals. Poverty is one of the hurdle and cause of concern in Bihar as lots of people are falls under 'vicious cycle of poverty' which also affect their overall well being and choosing proper decision. Urbanisation is one of the indicators of development which is also very low in Bihar. The community level participation is must in present scenario to achieve better result as lots of community has cultural and religious issues which make obstacles in using family planning measures. It should be dealt with proper mobilisation through community and religious leader and preacher. Contraceptive prevalence rate should be enhance by the government through providing more incentives in family planning, people's counselling in general and women in particular for better promotion of contraceptive use. The districts like Siwan, Gopalganj, Kishanganj, Katihar, Araria need special attention as these districts have highest unmet need for family planning in terms of spacing as well as limiting. Government should put more efforts towards fulfilling family planning desires of individuals and couples in the state which ultimately curb the high fertility and change the prevailing high unmet need status to met need of family planning.

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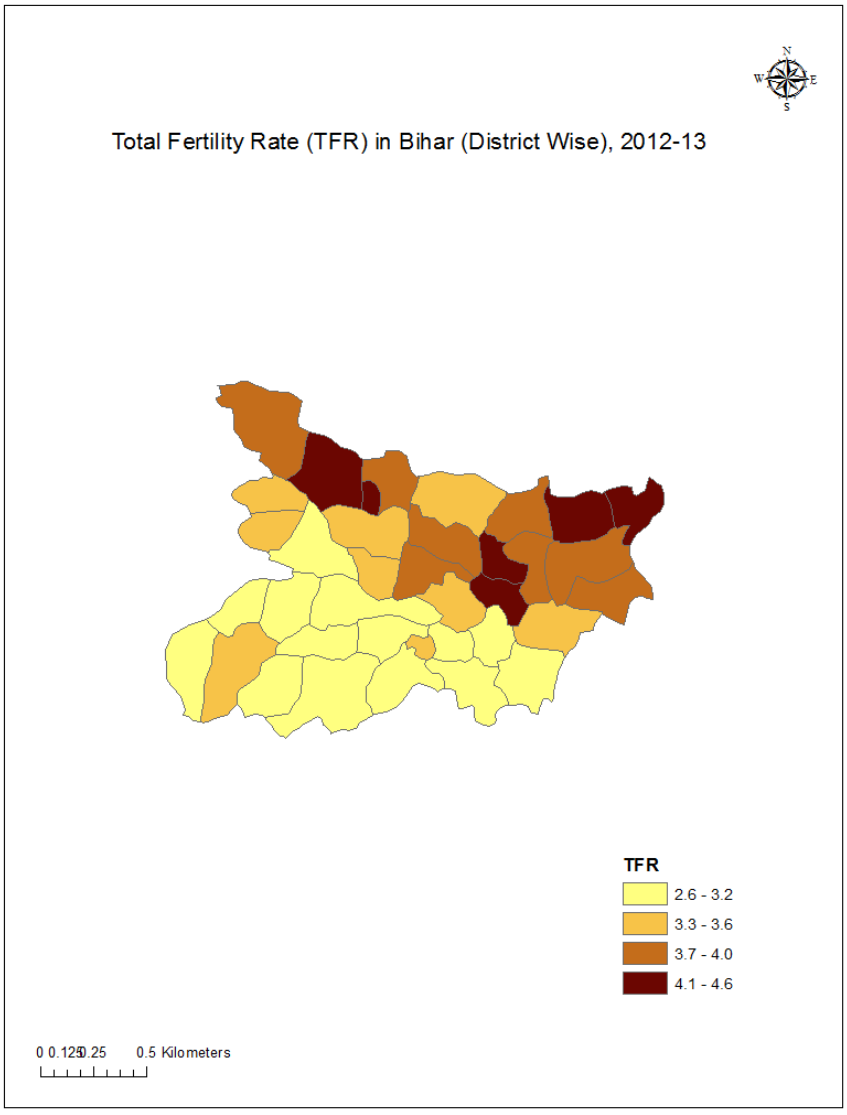
APPENDIX

Table 4 Change in Unmet Need in Decreasing Order, Bihar, AHS, 2010-11 to 2012-13.

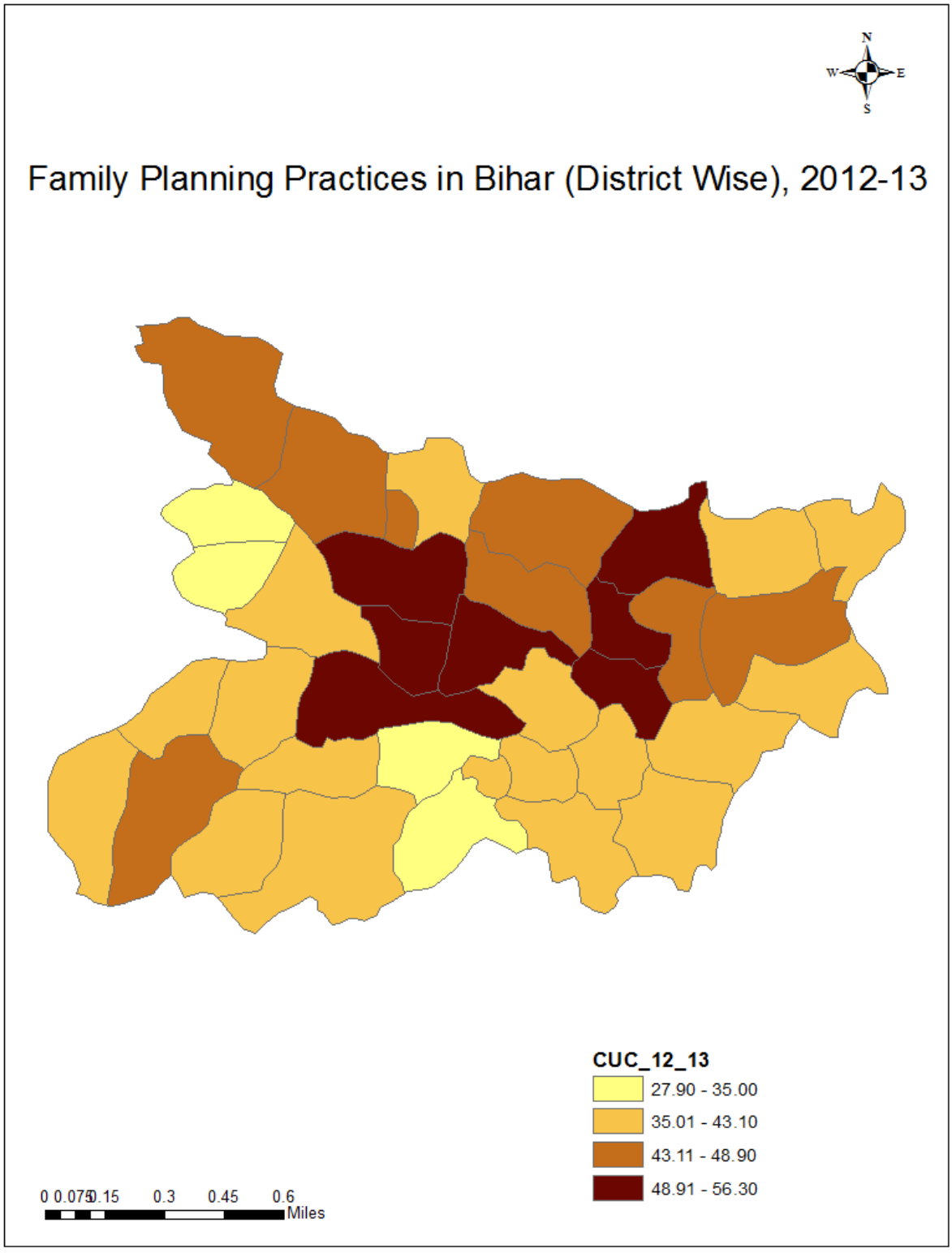
Change in AHS Unmet Need	**2010-11 to 2012-13**		**2010-11 to 2012-13**		**2010-11 to 2012-13**
Bihar Districts Name	Change in Total Unmet Need	Bihar Districts Name	Change in Unmet need for Spacing	Bihar Districts Name	Change in Unmet need for Limiting
Jamui	17.0	Darbhanga	12.1	Jamui	10.3
Jehanabad	16.3	Purnia	10.5	Jehanabad	8.5
Nawada	14.9	Nawada	9.3	Kishanganj	7.2
Kishanganj	13.8	Aurangabad	8.1	Gaya	6.5
Aurangabad	13.4	Nalanda	8.0	Lakhisarai	6.3
Purnia	12.2	Jehanabad	7.9	Nawada	5.6
Nalanda	12.1	Supaul	6.9	Katihar	5.5
Lakhisarai	11.2	Jamui	6.7	Aurangabad	5.3
Katihar	11.0	Madhepura	6.7	Begusarai	5.0
Darbhanga	10.9	Kishanganj	6.6	Kaimur (Bhabua)	4.2
Sheikhpura	10.3	Sheohar	6.5	Nalanda	4.1
Kaimur (Bhabua)	10.2	Sheikhpura	6.4	Sheikhpura	3.9
Gaya	9.6	Kaimur (Bhabua)	6.0	Purba Champaran	3.7
Supaul	9.2	Katihar	5.5	Munger	2.6
Sheohar	7.2	Lakhisarai	4.9	Samastipur	2.6
Pashchim Champaran	6.8	Bhagalpur	4.8	Saran	2.6
Rohtas	6.6	Banka	4.7	Supaul	2.3
Begusarai	6.5	Patna	4.7	Pashchim Champaran	2.2
Bhojpur	5.3	Rohtas	4.7	Rohtas	1.9
Bhagalpur	4.7	Pashchim Champaran	4.6	Bhojpur	1.7
Purba Champaran	4.5	Bhojpur	3.6	Purnia	1.7
Saharsa	4.3	Saharsa	3.6	Khagaria	1.4
Banka	4.1	Gaya	3.1	Madhubani	1.3
Patna	3.9	Araria	2.9	Siwan	1.3
Araria	3.6	Buxar	1.6	Araria	0.7

Madhepura	3.5	Khagaria	1.6	Saharsa	0.7
Munger	3.2	Begusarai	1.5	Sheohar	0.7
Khagaria	3.0	Purba Champaran	0.8	Bhagalpur	-0.1
Madhubani	2.0	Madhubani	0.7	Buxar	-0.3
Buxar	1.2	Munger	0.6	Banka	-0.6
Saran	-2.6	Vaishali	-0.3	Patna	-0.8
Vaishali	-3.8	Sitamarhi	-2.7	Darbhanga	-1.2
Samastipur	-4.4	Muzaffarpur	-4.4	Muzaffarpur	-1.9
Siwan	-4.4	Saran	-5.3	Madhepura	-3.2
Muzaffarpur	-6.3	Siwan	-5.7	Gopalganj	-3.5
Sitamarhi	-6.7	Gopalganj	-6.2	Vaishali	-3.5
Gopalganj	-9.7	Samastipur	-7.0	Sitamarhi	-4.0

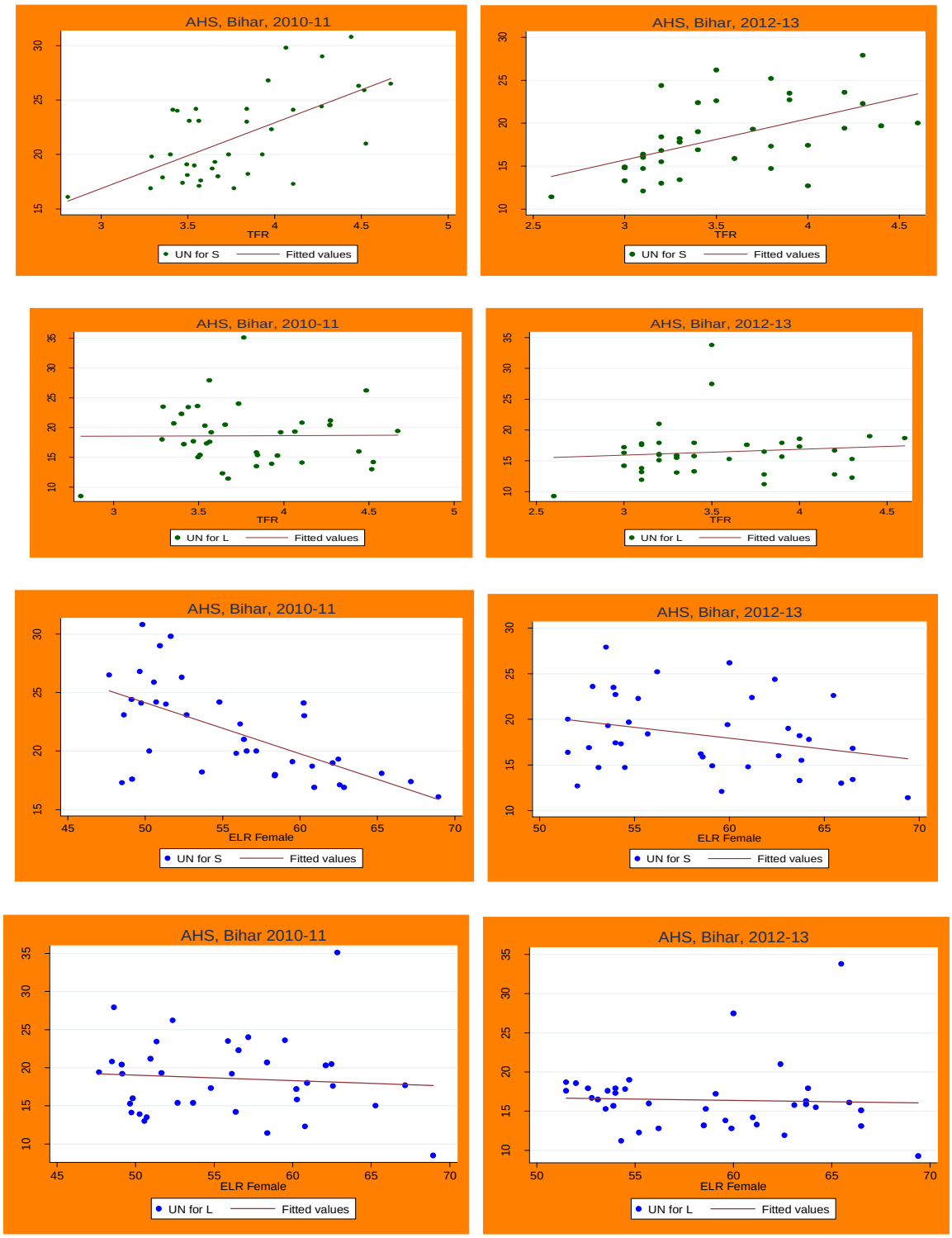
Source: Computed from AHS, RGI, 2010-11, 2011-12 and 2012-13.



Map 1


N
W
E
S
Family Planning Practices in Bihar (District Wise), 2012-13
CUC_12_13
27.90 - 35.00
35.01 - 43.10
43.11 - 48.90
48.91 - 56.30
0 0.075 0.15 0.3 0.45 0.6
Miles

Map 2



. **Figure 4** Association of Unmet Need for Spacing and Limiting with Various Socio-economic and Demographic Characteristics in Percentage, AHS, Bihar, 2010-11 and 2012-13.

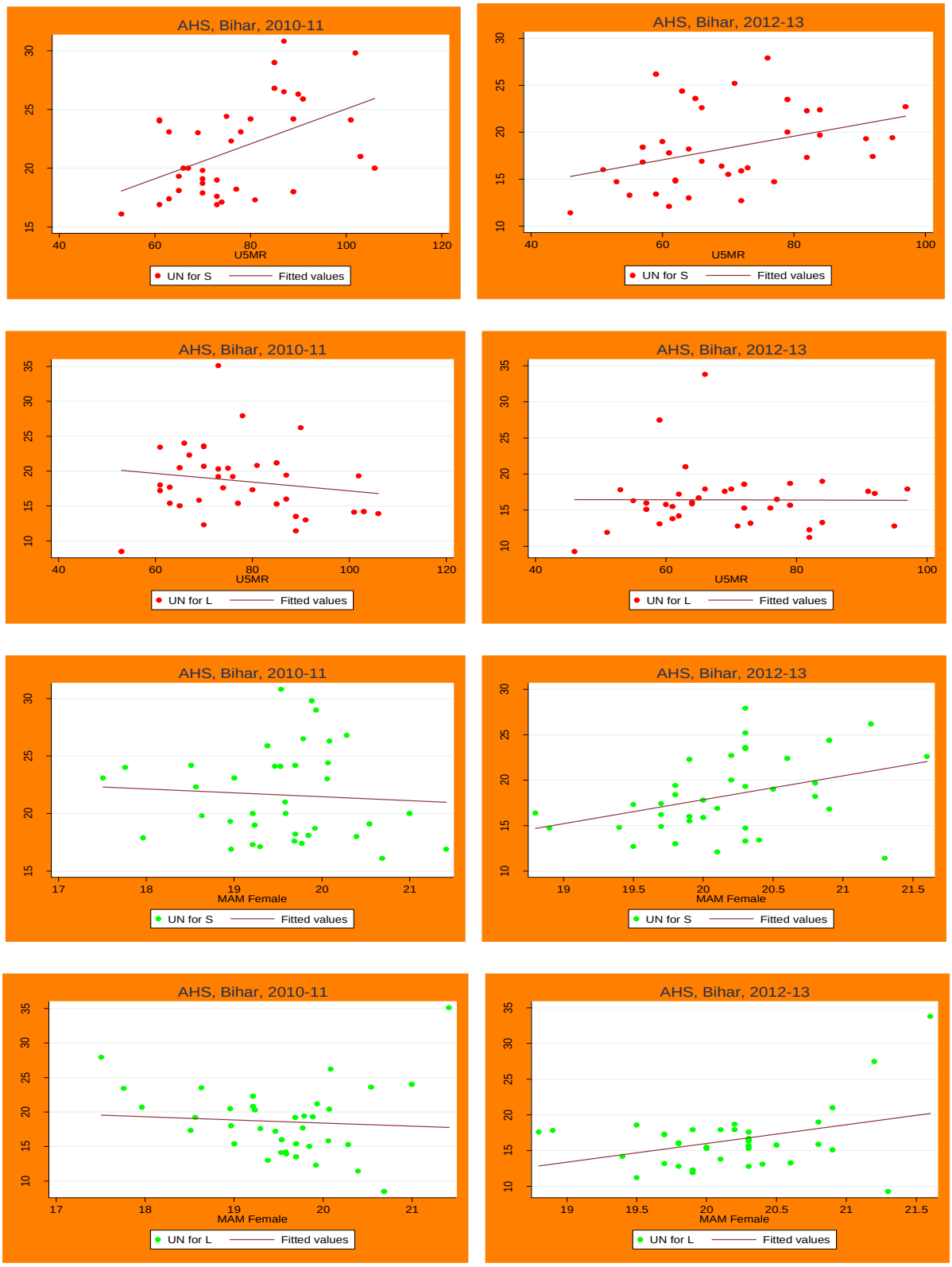


Figure 5 Association of Unmet Need for Spacing and Limiting with Various Socio-economic and Demographic Characteristics in Percentage, AHS, Bihar, 2010-11 and 2012-13

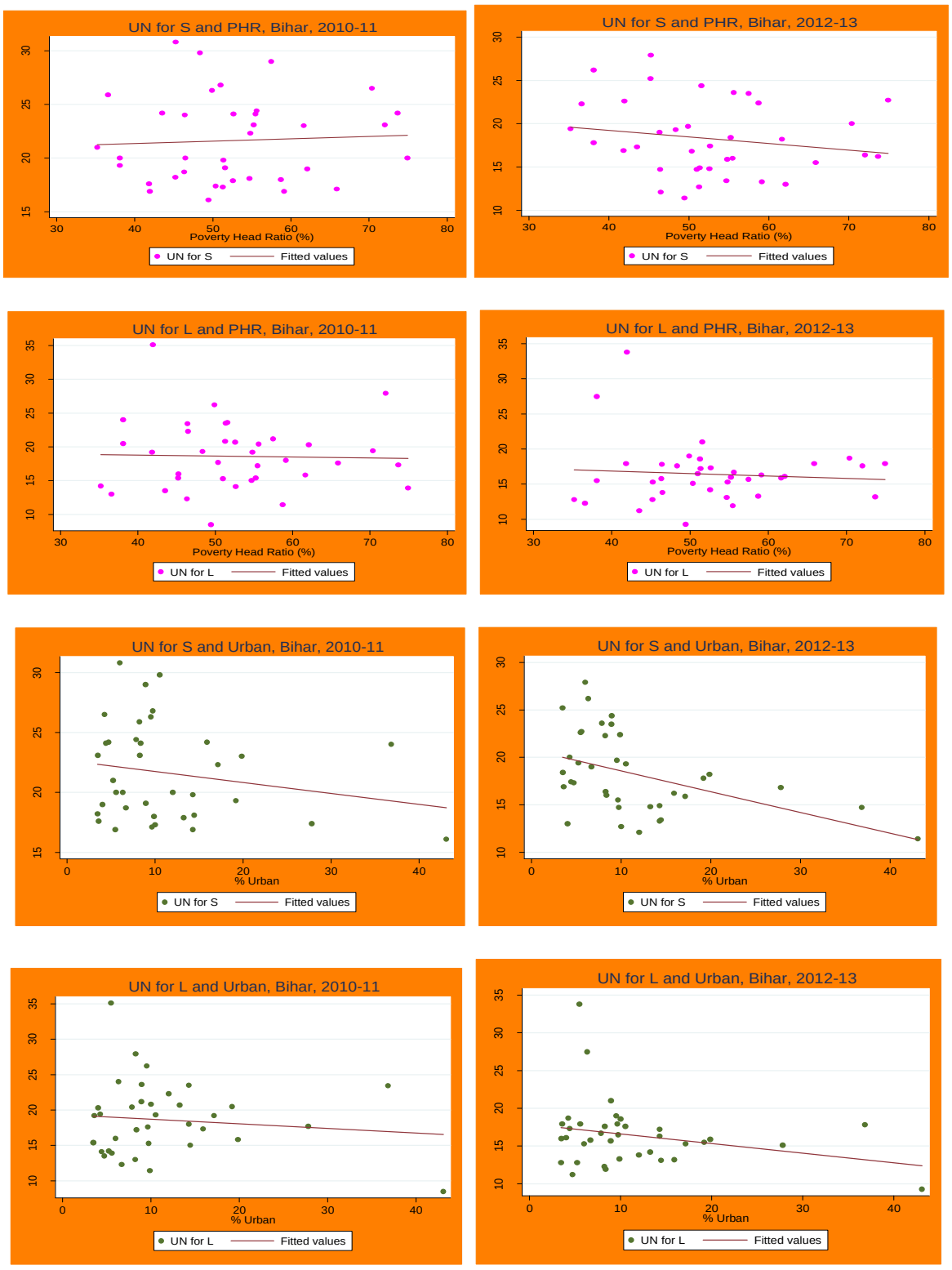


Figure 6 Association of Unmet Need for Spacing and Limiting with Various Socio-economic and Demographic Characteristics in Percentage, AHS, Bihar, 2010-11 and 2012-13.

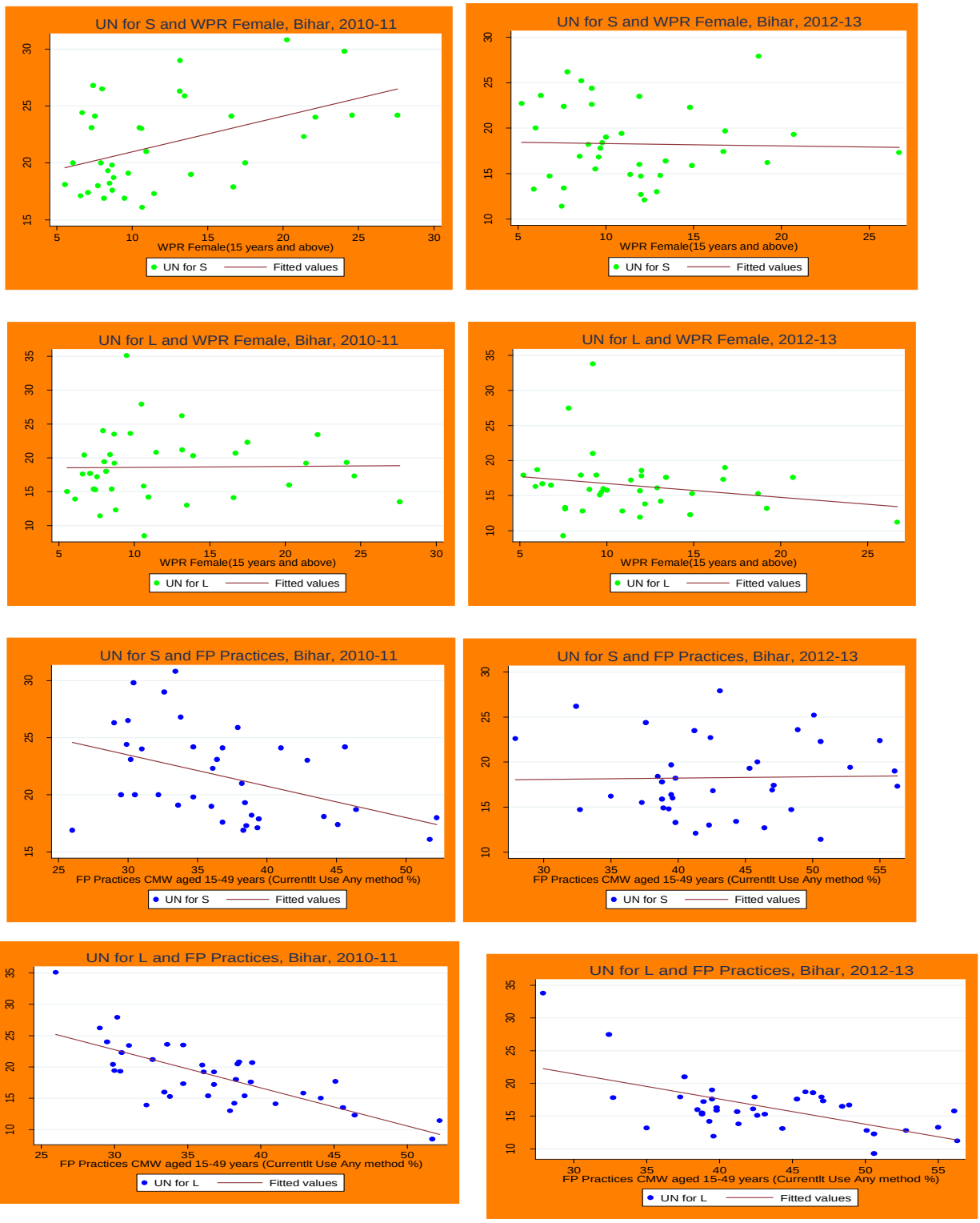


Figure 7 Association of Unmet Need for Spacing and Limiting with Various Socio-economic and Demographic Characteristics in Percentage, AHS, Bihar, 2010-11 and 2012-13.

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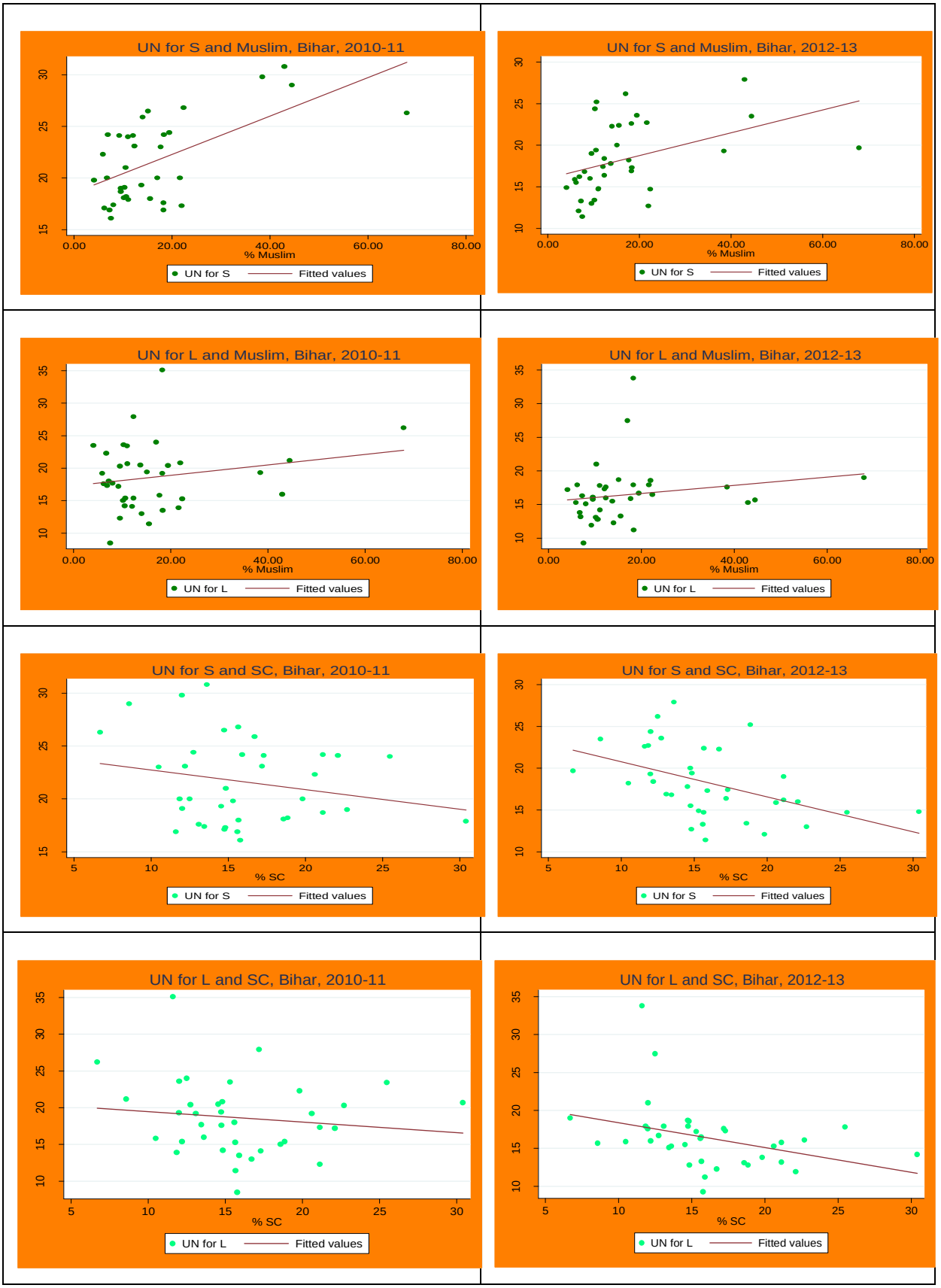

Figure 8 Association of Unmet Need for Spacing and Limiting with Various Socio-economic and Demographic Characteristics in Percentage, AHS, Bihar, 2010-11 and 2012-13