

The Impact of Literacy on Fertility and Mortality Pattern in Coimbatore District, Tamil Nadu, India – A Geospatial Study

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Abstract

This paper is an attempt to geographical analysis of the correlation between literacy, fertility and mortality pattern in Coimbatore district, Tamil Nadu. The study of human fertility occupies a central position in the study of population for several reasons. This study is carried out for the period of ten years that is from 2005-06 and 2015-16. Fertility which refers to the occurrence of birth. In Coimbatore district the birth rates varied consider from one block to another. Sarcarsamakulam block as the lowest birth and highest is in the Perianaickanpalayam block. Mortality occurrence of death. Mortality has played dominant role in determining the growth of population. At the block level the crude death rate is highest in Kinathukadavu and lowest in Sarcarsamakulam block both the years. The study has been conducted in Coimbatore district of Tamil Nadu state is surrounded by the Western Ghats mountain range on the West and North, with reserve forests and the Nilgiri Biosphere Reserve on the Northern side. The district is located at North Latitude between 10° 10' and 11° 30' and East Longitude between 76° 40' and 77° 30'. The total geographical area of Coimbatore is 472322 ha. The population of Coimbatore district increased from 29.17 lakh in 2001 to 34.58 lakh in 2011, registering a 19 per cent decennial growth. The literacy rate of the district is 83.98 per cent compared to the literacy rate of 80.09 per cent in the State in 2011. The male literacy rate is 84.75 per cent as against the female literacy of 78.92 per cent. Crude Birth Rate (CBR) indicates the number of live births occurring during the year, per 1,000 population estimated at midyear. Subtracting the crude death rate from the crude birth rate provides the rate of natural increase, which is equal to the rate of population change in the absence of migration. CBR in Coimbatore is 14 which is lower than the CBR of Tamil Nadu (15.9) in 2015-16. The high difference between CBR and CDR indicates the potential for high population growth. This study mainly based on secondary data. Three variables – literacy, fertility and mortality of Coimbatore has been taken into study. The primary aim of the present investigation is to analyze and evaluate the effect of literacy rate, fertility and mortality and correlate them. Arc GIS 10.2 software is used for preparing map. The Pearson correlation method has been adopted to find out the correlation between literacy rate, fertility and mortality.

Keywords: 1.CBR, 2.Fertility, 3.Literacy rate, 4.CDR, Mortality, 5.Correlation

I. INTRODUCTION

The concept of literacy, which varies from country to country, generally refers to minimum level of literacy skill. It is an important indicator of socio cultural development and political consciousness. In fact, it is the vehicle of the socio economic transformation as it facilitates the acquisition of specific skill, and occupational competence, and accelerate social change. According to 2001 census literacy has been defined as the ability to read and write with understanding. Literacy reflects the socio economic and cultural setup of a nation, ethnic group and social

community (Majid Hussain, 2008 p.13.58). The study of human fertility occupies a central position in the study of population for several reasons. Fertility which refers to the occurrence of birth. Human fertility is responsible for biological replacement and for the maintenance of the human society. Fertility is measured by crude birth rate (CBR), general fertility rate (GFR, age specific fertility rate (ASFR) etc. mortality occurrence of death. Mortality has played a dominant role in determining the growth of population. The study of mortality is useful for analyzing current demographic conditions as well as for determining the prospects of potential changes in mortality conditions of the future. It is of course possible to study mortality, from several angles, for various biological social economic and cultural factors affect the health of an individual and consequently the mortality rate in society. Various measures are employed in the analysis of mortality.

II. OBJECTIVES

The main objectives of present paper is,

- To study the spatial pattern of literacy, fertility and mortality in the study area.
- To analysis the effect of literacy rate, CBR and CDR in Coimbatore district.

III. STUDY AREA

Coimbatore district is surrounded by the Western Ghats mountain range on the West and North, with reserve forests and the Nilgiri Biosphere Reserve on the Northern side. The Noyyal River runs through the district and the city is in the Noyyal's basin area. The district has an extensive tank system fed by river and rain water. The major rivers flowing through the district are Bhavani, Noyyal and Aliyar. The Siruvani dam is the main source of drinking water for Coimbatore. The total geographical area of Coimbatore is 472322 ha. The district is located at North Latitude between 10° 10' and 11° 30' and East Longitude between 76° 40' and 77° 30'. The region is bounded by Kerala state on the West and is surrounded by Tirupur, Nilgiris, and Erode districts. The headquarters of the district is the Coimbatore city. The population of Coimbatore district increased from 29.17 lakh in 2001 to 34.58 lakh in 2011, registering a 19 per cent decennial growth.

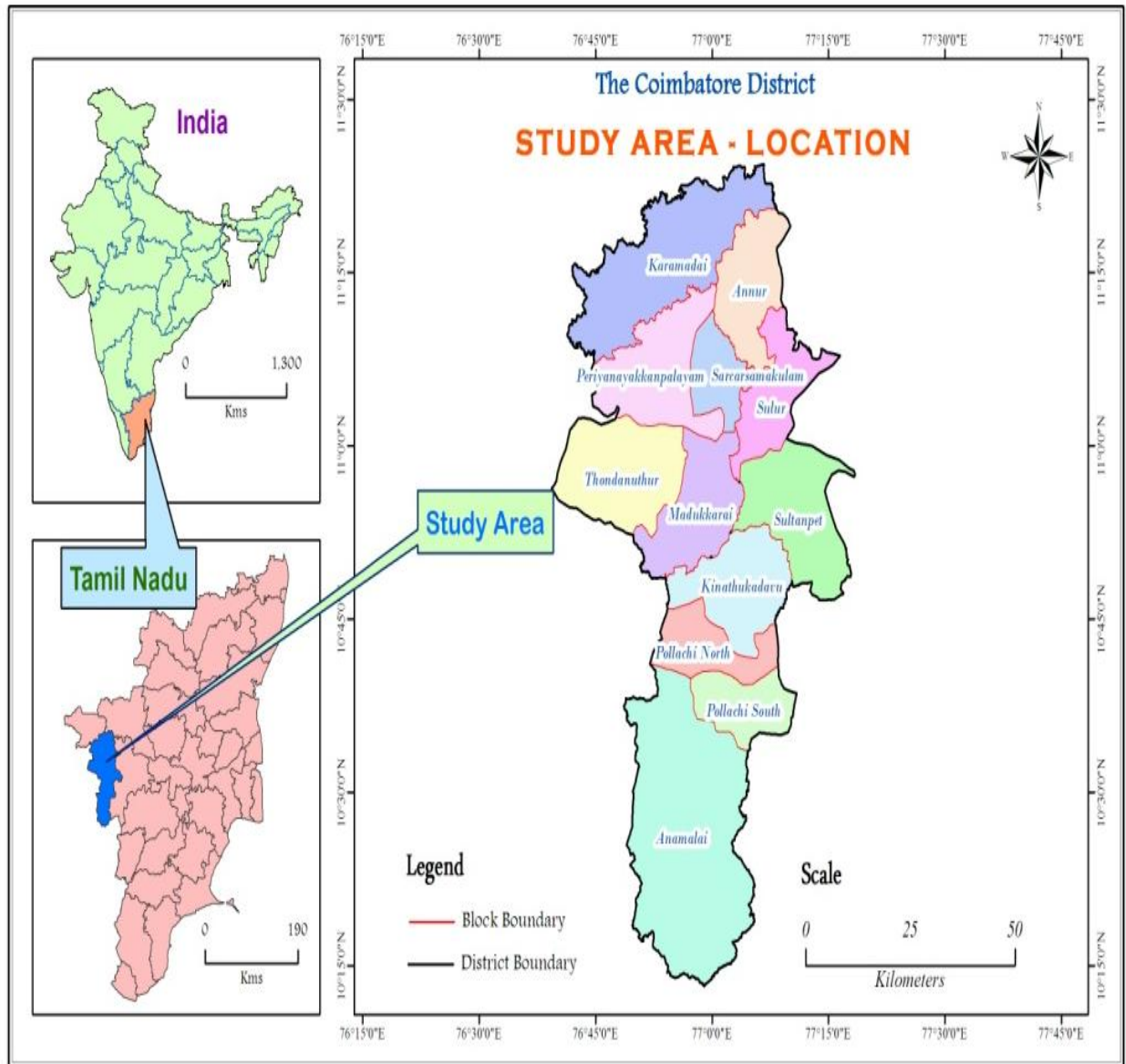


Fig: 1

IV. DATABASE AND METHODOLOGY

Base map prepared from Toposheets, 1:50,000 scale. The Secondary data and other statistical data were collected from directorate of deputy health service and family welfare office, census reports, and other Government offices. Literacy data collected from census of India 2001 and 2011. Three variables i.e. literacy, CBR and CDR of Coimbatore have been taken for the study. For this purpose two important techniques were used in the present study are statistical techniques and cartographic techniques. With the help of which the data analysed and obtained results are spatially represented in the form of maps with the help of Arc GIS 10.2 software and SPSS software were using the method of pearson's correlation data analysis to assess the strength of relationships between the study variables.

Correlation analysis

The methodology adopted to achieve the aim is Pearson's correlation statistical method, Pearson's Correlation Coefficient. Correlation is a technique for investigating the relationship between two quantitative, continuous variables, for example, literacy and mortality. Pearson's correlation coefficient (r) is a measure of the strength of the association between the two variables. Pearson's correlation is a statistical measure of the strength of a monotonic relationship between paired data.

Interpretation of the correlation coefficient

r is always between -1 and 1. $r = -1$ means there is a perfect negative linear correlation and $r = 1$ means there is a perfect positive correlation. The closer r is to 1 or -1, the stronger the correlation. The closer r is to 0, the weaker the correlation. $r = 0$ does not mean there is no correlation. It just means there is **no linear correlation**. There might be a very strong curved pattern. Correlation is an effect size and so we can verbally describe the strength of the correlation using the following guide for the absolute value of: 0.00-0.19 "very weak", 0.20-0.39 "weak", 0.40-0.59 "moderate", 0.60-0.79 "strong" and 0.80-1.0 "very strong".

Spatial pattern of literacy rate

A person aged seven and above, who can both read and write with understanding in any language is treated as literate. The census 2001 reveals that the literacy rate of Coimbatore district is 78.50 and as per 2011 census 83.98 as increased in literacy.

LITERACY RATE IN COIMBATORE DISTRICT			
Sl.No.	Block wise/District /State	2001	2011
1	Perianaickanpalayam	79.77	83.53
2	Saracarsamakulam	75.96	75.77
3	Madukkarai	79.20	80.06
4	Thondamuthur	72.82	76.10
5	Annur	64.51	72.54
6	Karamadai	71.90	78.03
7	Sulur	76.56	82.94
8	Sulthanpet	64.00	71.93
9	Pollachi north	75.65	81.40
10	Pollachi south	72.46	77.32
11	Kinathukadavu	65.57	72.13
12	Anaimalai	71.68	75.33
13	Corporation	88.22	90.79
14	Coimbatore district	78.50	83.98
15	Tamil Nadu state	73.45	80.09
16	India	64.84	74.04

Table 1: Literacy Rate in Coimbatore District

According to the census 2001 and 2011, Perianaickanpalayam Block (79.77 and 83.53) shows higher the literacy rate. Literacy rate in most of the blocks are above national and state average. The highest literacy rates are recorded in Perianaickanpalayam, Madukarai, sulur, pollachi north, and Sarcarsamakulam blocks, where the literacy rate is above 75 %. According to 2001 census, the Annur block (64.51) is below 65 % and 2011 census Sulthanpet block has lowest literacy rate is moderate 65 - 75 %. In 2011 there are no blocks of this district have less the 65 % of the literacy rate. The literacy rate of the district is 83.98 per cent compared to the literacy rate of 80.09 per cent in the State in 2011. The male literacy rate is 84.75 per cent as against the female literacy of 78.92 per cent. Overall the Coimbatore district stands one of the literacy rate districts among the Tamil Nadu and India.

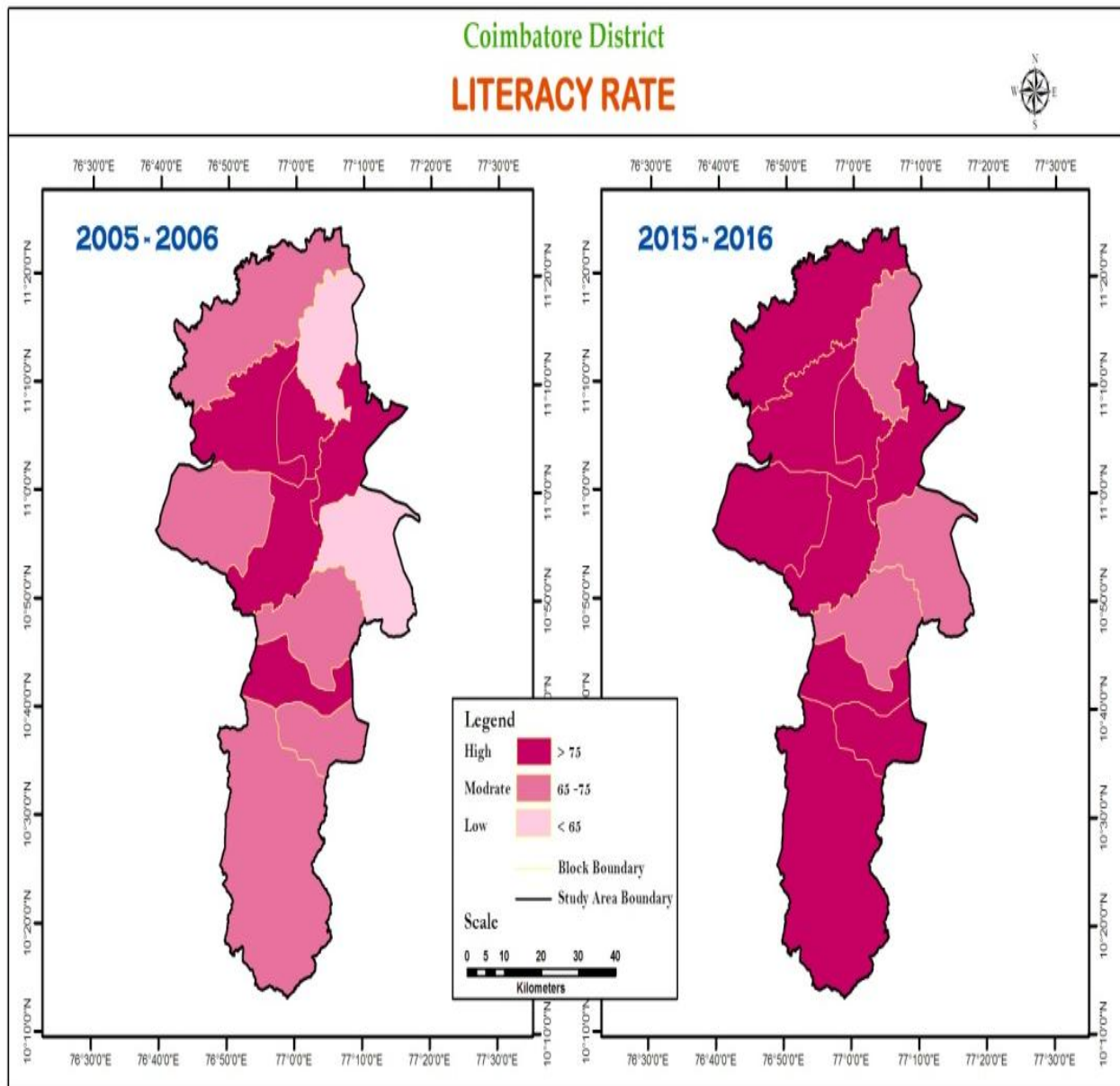


Fig. 2

Spatial pattern of fertility

Fertility which refers to occurrence of birth. The study of human fertility occupies a central position in the study the responsible of population for several reasons. Human fertility is for biological replacement and for maintenance of the human society. There are number biological and economic factors which influence the fertility level.

Crude birth rate

Crude Birth Rate (CBR) indicates the number of live births occurring during the year, per 1,000 population estimated at midyear. Subtracting the crude death rate from the crude birth rate provides the rate of natural increase, which is equal to the rate of population change in the absence of migration. CBR in Coimbatore is 13.26 which is lower than the CBR of Tamil Nadu (15.9) in 2015-16. According to the available data of fertility in Coimbatore district, crude birth rate is calculated by following formula.

$$\text{Crude Birth Rate} = B \times K / P$$

Whereas:

B is the total number of live birth during a year

P is the total population in the middle of the year.

K is 1000

This is the most common, the most easily calculated and the most easily understood measured of fertility. The crude birth rate is calculated for all the blocks and as whole the district. The crude birth rate in Coimbatore district is 15.03 in 2005-06. The crude birth Rate which in considerably from one block to another block. The table shows that Pollachi north has the lower 11.00 during the year 2005-06.

This decline in the CBR has been achieved through changes in several social-economic and demographic variables over time. Many of these factors related to women's unequal status in society and by improvement in the following parameters translate into an improvement not just in the CBR but in many other health indicators as well: women's age at marriage, their education levels, their participation in non-agricultural sector and per capita income. In addition an improvement in medical facilities at different one stage as there has been considerable expansion of health levels institution and staff in both public and private sector.

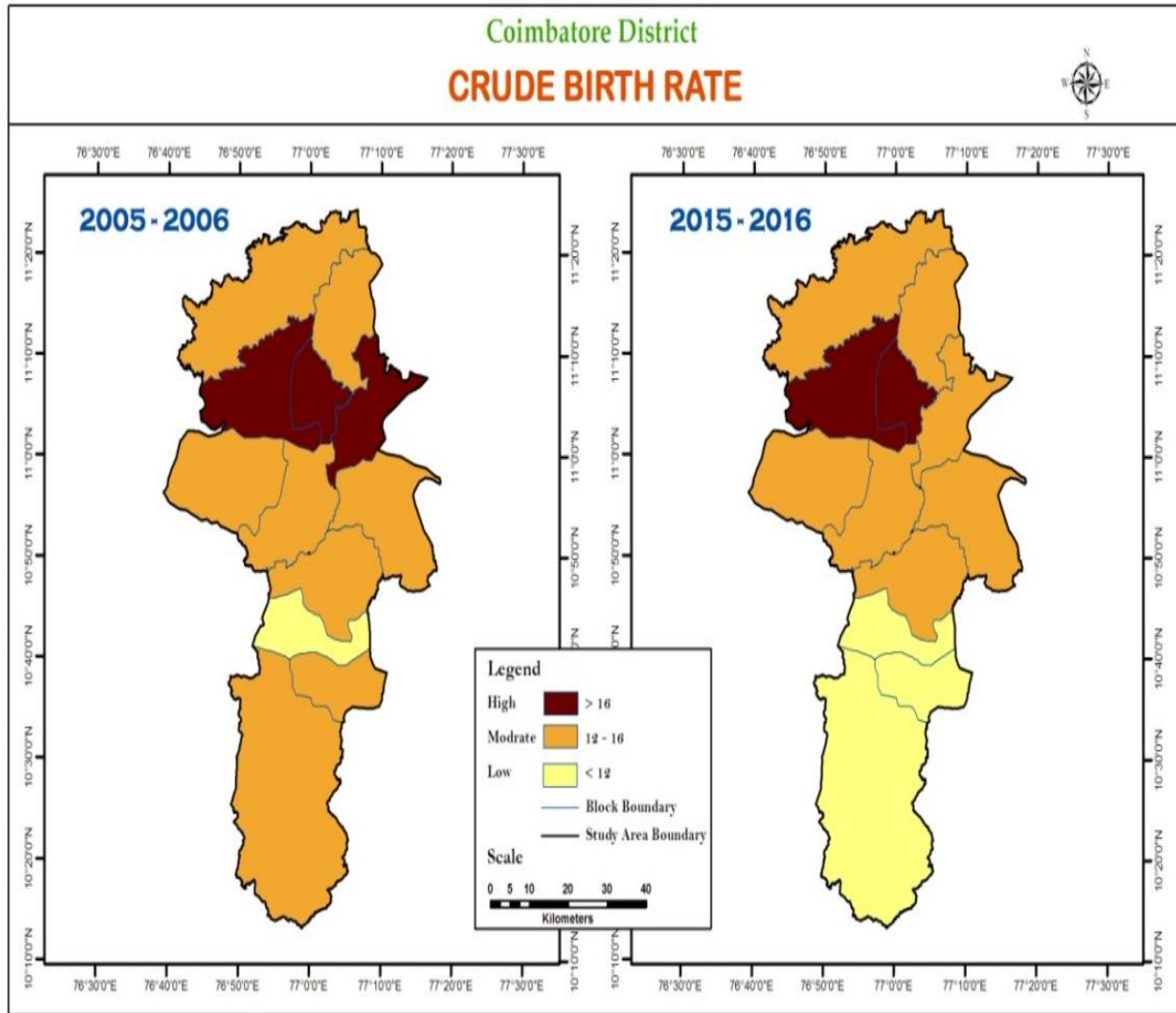


Fig. 3

Among 12 Blocks in the district, show in 2005-06 Low (less than 12) CBR in the pollachi north block, and Moderate (12-16) level of the following blocks are Madukkarai, Thondamuthur, Annur, Karamadai, Sulthanpet, Pollachi south, Kinathukadavu and Anaimalai. The High (greater than 16) CBR have been three blocks are Perianaickanpalayam, Saracarsamakulam and Sular.

In 2015-16 the CBR Low in this period, the blocks are pollachi north, Pollachi south and Anaimalai. Moderate values 12 to 16 is found seven blocks like Madukkarai, Thondamuthur, Annur, Karamadai, Sulthanpet, Kinathukadavu and Sular respectively. Crude birth rate is High in two blocks are Perianaickanpalayam and Saracarsamakulam. Here CBR is far lower than national and state average.

CRUDE BIRTH RATE AND CRUDE DEATH RATE IN COIMBATORE DISTRICT					
Sl.No.	Block wise/District	2005-06		2015-16	
		Crude Birth Rate	Crude Death Rate	Crude Birth Rate	Crude Death Rate
1	Perianaickanpalayam	17.00	4.20	16.80	4.70
2	Saracarsamakulam	17.00	4.20	16.10	3.90
3	Madukkarai	16.00	3.80	14.90	4.50
4	Thondamuthur	16.00	5.40	12.80	4.00
5	Annur	16.00	4.80	13.20	5.20
6	Karamadai	14.00	4.50	13.60	5.20
7	Sulur	18.00	5.60	15.00	4.60
8	Sulthanpet	14.00	4.70	12.10	6.30
9	Pollachi north	11.00	5.50	10.10	5.40
10	Pollachi south	13.00	5.10	10.60	4.60
11	Kinathukadavu	14.00	5.80	12.10	6.00
12	Anaimalai	13.00	4.00	10.40	4.90
13	Corporation	16.51	5.72	14.80	2.60
14	Coimbatore district	15.03	4.87	13.26	4.76

Table 2: Crude Birth Rate and Crude Death Rate in Coimbatore district

Spatial pattern of Mortality

Mortality is one of the three components of population changes, the other two being fertility and migration. The study of mortality is useful for analyzing current demographic conditions as well as for determining the prospects of potential changes in mortality conditions of the future. Various measures are employed in the analysis of mortality. To study the mortality rate of Mysore district the following formula is used.

Crude Death Rate

The crude death rate is the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year.

$$\text{Crude Death Rate} = D \times P/K$$

Whereas,

D is the total number of death registered during a calendar year (January to December 31)

P is the total population at the middle of the year (July 1)

K is 1000

It is the most simple and the most commonly used measure of mortality which can be quickly and the time easily understood. By using this formula the crude death rate is for all the blocks and as well as the whole district. The crude death rate this is district is 4.87 in the 2005-06 and 2015-16 the death rate is 4.76. Coimbatore district has declining in Crude death rate during the last and also birth rate declined. The high difference between CBR and CDR indicates the potential for high population growth.

Above table 2. shows in 2005-06 the Low (less than 4) CDR found two blocks are Anaimalai and Madukkarai. The Moderate (4 – 5) values of CDR having five blocks are Annur, Karamadai, Sulthanpet, Perianaickanpalayam and Saracarsamakulam. Another five blocks have High (greater than 5) CDR is Thondamuthur, pollachi north, Pollachi south, Kinathukadavu and Sulur in the district.

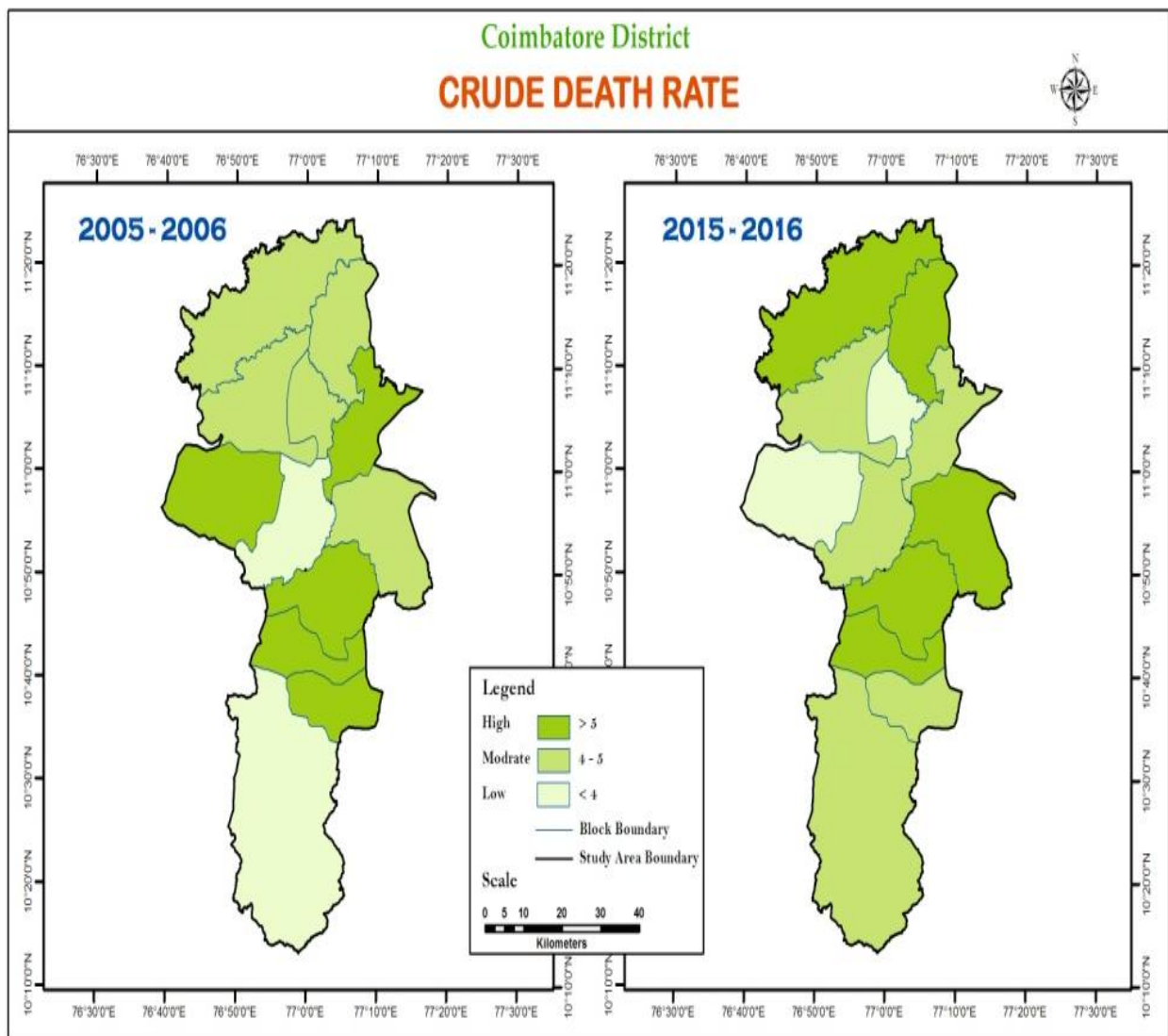


Fig: 4

The period of 2015-16 the Low (less than 4) CDR have two blocks like Saracarsamakulam and Thondamuthur in the district. The Moderate (4 – 5) values of CDR having five blocks are Madukkarai, Pollachi south, Anaimalai,

Sulur and Perianaickanpalayam. In Annur, Karamadai, pollachi north, Sulthanpet

Correlation Coefficient – the effect of Literacy on CBR and CDR			
Pearson Correlation (** Correlation is significant at the 0.01 level (2-tailed).)	Variables	2005-06	2015-16
	CBR	0.308**	0.382**
	CDR	- 0.317**	- 0.426**

and Kinathukadavu blocks mark the high (greater than 5) CDR in the district.

Correlation analysis:

Table 3: Correlation Coefficient between Literacy Rate, Crude Birth Rate and Crude Death Rate in Coimbatore district.

Pearson method is used for the calculation literacy rate and crude birth rate in Coimbatore District. It is clear that in 2005-06 ($r = 0.308^{**}$) and 2015-16 ($r = 0.382^{**}$) both the years there is a weak and positive correlation between the literacy rate and crude birth rate in Coimbatore District.

And the correlation analysis of literacy rate and crude death rate, It is clear that in 2005-06 ($r = - 0.317^{**}$) there is a weak and negative correlation and 2015-16 ($r = - 0.426^{**}$) there is a moderate and negative correlation between the literacy rate and crude death rate in Coimbatore District.

V. MAJOR FINDINGS

Major findings are:

- Literacy rate is higher than national and state average both the period 78.50 & 83.98.
- Literacy rate and CBR have weak positive correlation between each other in 2005-06 ($r = 0.308^{**}$) and 2015-16 ($r = 0.382^{**}$) both the years.
- Literacy rate and CDR have weak positive correlation between each other in in 2005-06 ($r = - 0.317^{**}$) there is a weak and negative correlation and 2015-16 ($r = - 0.426^{**}$) there is a moderate and negative correlation.

VI. CONCLUSION

The present study analyzed the role of Literacy, CBR and CDR is considered as the important aspect of population and medical geographical study. Education is necessary for personal and national development. It's found that there is strong relationship between literacy and fertility and mortality of the country. In Coimbatore, there is no much disparity between fertility, mortality and literacy rate. The census 2001 reveals that the literacy rate of Coimbatore district is 78.50 and as per 2011 census 83.98 as increased in literacy. Hence it is very clear that literacy rate, fertility and mortality have weak and moderate correlation between each other.

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