

## Spatial Analysis Of Changing Fertility And Mortality In Solapur District

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### Abstract

Today the most important problem before the country is population explosion. World population increased from 238 million in 1901 to 1021 million in 2011. Solapur district also during the same period experienced enormous increase in the total population which increased from 0.87 million in 1901 to 3.8 million in 2001 and reaches up to 4.9 million in the year 2011. Because of differences in social economic, cultural political and geographical system, the problems of developing regions relating to population differ. The knowledge of population density, distribution, size growth and composition, finding out the disparities associated with socio-economic development in a particular region is necessary because of it is highly useful for the socio-economic and political development of a region. An attempt has been made in the present research paper to study the disparities in fertility and mortality in solapur district. Disparities in the levels of population change are an important topic to the geographer to know the causes for disparities and at what level the disparities occur in a study area. Change of population influenced by fertility mortality and migration. The basic determinant of fertility includes fecundity, age of marriage, duration of marriage, sexual habit and divorce etc.

Study of fertility, mortality is necessary for to make the population policy, planning for education need, infrastructural development and to control the population explosion. Disparities in fertility and mortality gives an indication to the planner as to how the rapidly increasing population adjusted according to health service, housing need and planning for different constrains regarding social life. Fertility and mortality rate of solapur district has been studied with the help of geometric formula of crude birth rate and death rate.

Concerning to research theme of solapur district, it is observed that in the year 2011 the crude birth rate is very high and low respectively North Solapur and South solapur tahsil. While death rate is very high in North solapur followed by Barshi and very low occur in Karmala tahsil. The results of the studies are brought out through map and diagrams.

**Key words:** Fertility, Mortality, Marriage, Health, Disparities

### Introduction:

Today the most important problem before the country is population explosion. World population increased from 238 million in 1901 to 1021 million in 2011. Solapur district also during the same period experienced enormous increase in the total population which increased from 0.87 million in 1901 to 3.8 million in 2001 and reaches up to 4.9 million in the year 2011. Because of differences in social economic, cultural political and geographical system, the problems of developing regions relating to population differ. The knowledge of population density, distribution size growth and composition, finding out the disparities associated with socio-economic development in a particular region is necessary because of it is highly useful for the socio-economic and political development of a region.

The knowledge associated with the spatial and temporal distribution of a population growth and

composition helps planners to assess the existing pressure of population on available facilities and may plan for the future oriented development programme to solve the existing problem in that region. In fact the growth of population in any region is an index of its economic development, social development and many other characters. Population change is the result of migration, fertility and mortality. The purpose of this paper is to examine the dynamics of population in relation to fertility and mortality. An attempt has been made in the present research paper to study the disparities in fertility and mortality in solapur district. Disparities in the levels of population change are an important topic to the geographer to know the causes for disparities and at what level the disparities occur in a study area. Change of population influenced by fertility mortality and migration. The basic determinant of fertility includes fecundity, age of marriage, duration of marriage, sexual habit and divorce etc.

Study of fertility, mortality is necessary for to make the population policy, planning for education need, infrastructural development and to control the population explosion. Disparities in fertility and mortality gives an indication to the planner as to how the rapidly increasing population adjusted according to health service, housing need and planning for different constrains regarding social life. Fertility and mortality rate of solapur district has been studied with the help of geometric formula of crude birth rate and death rate.

**Study Area**

The Solapur district of Maharashtra has been selected as an area for this research theme. It is situated on the south east fringe of Maharashtra state. It lies between 17° 10' to 18° 32' north latitude and 74° 42' to 76° 15' east longitude. The district is bounded on the north by Ahmednagar and Osmanabad districts, on the east by Gulbarga districts (Karnataka state), on the south by Sangali and Bijapur (Karnataka state) and on the west by Satara and Pune districts. It comprises about 14895 sq.kms along with eleven tahsil out of which 338.8 sq.km. is urban (2.28%) and 14505.8 sq.kms. (97.72%) is rural area. Agro climatically entire district comes under rain shadow area. Average rainfall of the district is 545.4 mms. The monsoon period is from second fortnight of June to end September bringing rains from south-west monsoon. The maximum temperature of the district is 40.1° C while minimum is 16.1° C respectively. (Socio-economic Abstract of Solapur District 2011-12). The underline basalt on disintegration and decomposition brought varieties agencies had yielded three kinds of soil viz. deep black, medium deep and shallow soils. The district is provided with Bhima right bank canal and Neera and Man left bank canals. The total population of Solapur district is 4317756 (2011) out of total population 68.17 per cent population lives in rural area and 31.83 per cent population lives in urban area. Density and literacy of population of Solapur district is 290 persons per sq.km. and 71.2 percent respectively.

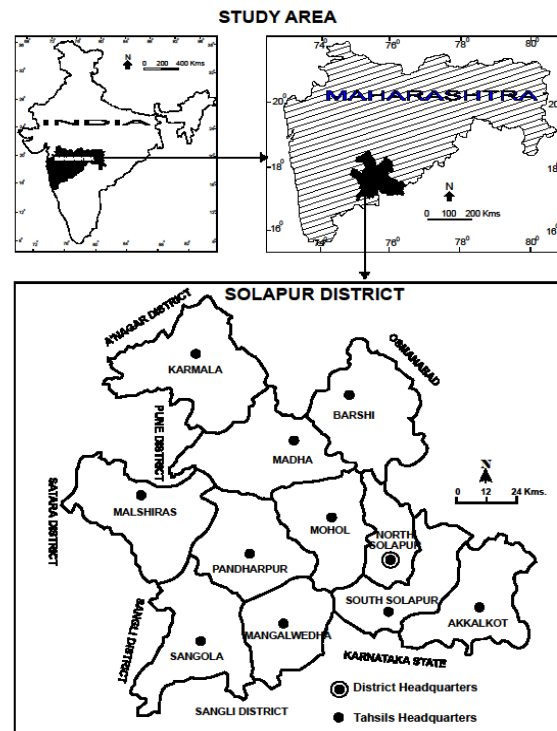


Fig. No. 1

**Objectives**

The major objectives of this paper are to assess the changing spatial pattern of fertility and mortality in Solapur district.

**Database And Methodology**

Present study mostly relies on the secondary data collected through Socio-economic abstract of Solapur District. For the present investigation, district is selected as in general and tahsils in particular. Statistical formula has used to calculate the crude birth rate and crude death state in present study. Changes in birth and death rate in rural area and urban area is varies from region to region in whole solapur district. In order to assess, changing pattern of fertility and mortality rate affect the population change. The results of the studies are brought out through maps and diagrams. The following formula has been adopted.

**Formula**

$$C.B.R. = \frac{B_1}{P}$$

Where,

**B1**= Number of live births in an area during a year

**P** = Total mid Year Population.

$$D.R. = \frac{D_1}{P}$$

Where, **D1** = Total Number of death in an area during a year

**P** = Total mid Year Population

**Birth Rate In Solapur District**

Birth rate is one of the most important factors affecting growth of population in any region. In early day’s birth rate was very high only on account of high death rate. This was due to the security point of view for parents in old age. Since, children become the only supporting means for parents. In ancient period both births as well as death rates were high due to insufficient medical facilities as well as insufficient availability of nutritious food.

Now days, both as well as death rates have come down due to improvement in better medical facilities and improved food supply. If, there is a close region, than the birth rates becomes the only factor influencing the growth of population. In order to understand the contribution made by birth rate in solapur district towards growth of population. The birth rates for different periods and various tahsil have been calculated for the year, 1991, 2001 and 2011.

**Table 1. Tahsilwise Birth Rate in Solapur District**

Sr.No	Tahsil	1991	2001	2011
1	Akkalkot	22.42	18.19	15.36
2	Barshi	25.10	23.72	22.39
3	Karmala	16.96	18.07	15.71
4	Madha	18.34	21.40	16.61
5	Malshiras	15.81	14.42	23.11
6	Mangalwed	17.20	19.85	23.08
7	Mohol	19.81	16.73	18.40
8	N.Solapur	31.76	31.31	24.48
9	Pandharpur	23.30	20.05	19.05
10	Sangola	18.84	17.79	22.29
11	S.Solapur	19.38	16.23	14.22
<b>District Average</b>		<b>22.64</b>	<b>22.61</b>	<b>20.58</b>

*Source: socio-economic abstract of Solapur district. (2001-2011)*

In 1991, birth rates for solapur district were 22.64 percent, which slightly declined and became 22.61 percent in 2001. During 2010-2011 periods, it substantially declined and became as low as 20.58 percent. This decline may be attributed to increase in

literacy rate and impact of family planning programmes, such as the age at marriage has been increased both for male and female during the recent period, as well as, the awareness, among the people created by the Government, planners and local reformers.

Similarly, the birth rates were calculated for the tahsils of solapur district. The birth rates within the solapur district vary enormously within the district the highest rates were for the North Solapur tahsil during the last three decades. It may be due to the availability of maternity hospital in the Solapur city while from other tahsils, generally, people come to the city, of Solapur for delivery, in order to avoid any complications during the delivery period. Due to this reason, the highest birth rates for the North solapur have been recorded for 1991 2001, 2011.period. (Table1).

On the other hand, the lowest birth rate was calculated for Malshiras tahsil, due to entirely rural region. The number of maternal hospital and lack of other medical facilities the birth rate are recorded lower for this tahsil during 1991-2001. But it increased substaintially during the 2010-2011 period, the reason behind it, may be ,tne increase in the medical facilities and number of maternity hospitals.

The average birh rate for the solapur district was 22.61 percent in the year 1991 and Karmala.Maadha,Mohol,malshiras,sangola Mangalwedha and South Solapur have shown ,birth rates below from the district average.while North solapur Barshi,and Pandharpur have shown places like Solapur Barshiland Pandharpur have better maternity facility. During the 1991-2001 periods, the birth rate remains by and large the same for the district and there has been slight fluctuation, in birth rates within the district. Again, north Solapur tahsil was on the first rank and Malshiras in the last as per as the birth rates are concerned.

It is a matter of surprise, that cumulative effect made by the Government, planners, and social workers have reflected in the awaking the people in the 2010-11 period. It is clear form fact, that the birth rate for the district as a whole was as low as 20.58 percent in 2011. For the similar reasons, again, North Solapur recorded the highest birth rates while on the other hand, South Solapur recorded lowest birth rate.

Most of the people from South Solapur use the medical facilities from the Solapur city which is in close proximity.

Hence, most of the high birth rates are recorded from the South Solapur in the city of Solapur. The tahsils which have recorded birth rates lower than the district average are Karmala, Madha, Mohol, Pandharpur, South Solapur and Akkalkot. On the other hand, tahsil which have shown higher birth rate than the region average are North Solapur, Barshi, Malshiras, Sangola and Mangalwedha. It might be due to wide spread, of medical facilities in different parts of the district by the government.

**I. Birth Rate for Rural Areas:**

The rural and urban pattern of birth rates are different, as the nature of living, occupation structure, literacy pattern, per capita income are also different within the two areas. India is a predominantly agricultural country, where more than 70 percent people are still engaged in primary activities. Hence, the mode of life, actually differ from rural to urban areas. It is generally, expected, that the birth rates are higher in the rural areas on one hand and lower in urban areas on the other due to relatively developed society. In order to understand, the contribution made by rural and urban areas towards the growth of population in Solapur district, the birth rates were calculated for both rural as well as urban sectors for different tahsil during 2001-2011 period (Table 3.4). Contrary to expectation, surprisingly, the birth rates for urban areas were found much higher than the rural areas for 2001-2011 periods, for region as a whole. If, we compare the birth rate for rural areas with that of urban areas then we find, that there is a tremendous difference as regard to birth rate.

**Table 2. Rural Urban Birth Rate (2001-2011)**

Sr.No	Tahsil	Birth Rate for rural Areas		Birth Rate for Urban Areas	
		2001	2011	2001	2011
1	Akkalkot	16.40	11.76	26.31	28.54
2	Barshi	17.79	12.03	37.97	45.72
3	Karmala	15.22	9.95	43.69	71.23
4	Madha	18.22	13.37	38.57	55.09
5	Malshiras	4.42	23.11	-	-
6	Mangalwedha	23.21	15.84	24.51	43.21
7	Mohol	16.73	18.04	-	-
8	N.Solapur	9.71	5.47	37.00	25.69
9	Pandharpur	12.41	11.84	42.78	43.63
10	Sangola	17.03	20.22	25.05	40.19

11	S.Solapur	16.39	14.22	-	-
<b>District Average</b>		<b>16.82</b>	<b>15.50</b>	<b>39.95</b>	<b>31.46</b>

**Source:** Compiled by Researcher

For 2001, the comparison between rural and urban areas clearly indicates that for urban it is more than two times than the rural areas. In 2001, the birth rate for rural areas for district as a whole was 16.82 percent and for the urban areas it was 36.95 percent during the same period. The highest birth rate for rural sector was for Mangalwedha tahsil while the lowest was for the Malshiras tahsil. Other than this two extremes tahsils, the birth rate varies from tahsil to tahsil; the tahsils which have recorded lower birth rates than average for the region are the Karmala, North Solapur, Pandharpur, Malshiras, South Solapur and Akkalkot. On the other hand tahsils, which have shown higher birth rate, are Mangalwedha and Barshi tahsils. These fluctuations in the birth rates, for rural areas within the various tahsils are due to recording of the birth rate in non-authentic way. It shows that the birth rates are not recorded properly in Solapur district. For 2001, the average birth rate was 15.50 percent being highest for Malshiras, while the lowest for North Solapur. North Solapur tahsil is dominated by the city of Solapur and Malshiras is entirely rural tahsil in Solapur district. More or less the year 2011, also represent the same picture as it was in 2001.

**II. Birth Rate for Urban Areas:**

As a matter of fact, the birth rate for urban areas are lower than, the birth rate of rural areas in general. This is, because that the urban areas have better educational, medical and employment opportunities. Apart from this, the recreational facilities, are also much more in urban areas than the rural sectors. However, it is a matter of astonishment that the maintenance of proper records of the birth rate is not maintained in rural sectors properly. This has resulted in against of expectation, higher birth rate in all the tahsils in Solapur district. In urban areas, the records of birth rate are properly maintained.

In the year 2011, the urban birth rate was 31.46 percent for district as a whole, the highest for the Karmala and lowest for the North Solapur. The North Solapur tahsil is predominantly occupied by the Solapur city. Taking into consideration all dimensions of social and economic developments,

the birth rate is lowest for Solapur city, as it is expected. Except, Akkalkot and North Solapur tehsils, all other tahsils in the Solapur district have shown substantially higher birth rate in 2001.

**III. Death Rate In Solapur District:**

Death rate is another important factor, influencing the growth of population in a particular region. If, death rates are higher in a region, it results in the lower growth rate. If, the net migrant are not taken into consideration then death rate becomes most important component in the decreasing of the growth rate of population. In view of this, an attempt has been made to understand, the impact made by death rate on the population growth. For this analysis, the death rates have been calculated per thousands of population for the year 1991, 2001 and 2011. (Table 3.5).

**Table 3. Tahsil wise Death Rate of Solapur District**

Sr.No	Tahsil	1991	2001	2011
1	Akkalkot	6.96	5.7	5.31
2	Barshi	7.44	6.02	6.77
3	Karmala	5.27	3.19	3.68
4	Madha	5.59	4.10	4.69
5	Malshiras	3.94	1.35	4.09
6	Mangalwedha	5.55	8.24	4.89
7	Mohol	5.88	3.98	4.31
8	N.Solapur	6.99	7.18	6.78
9	Pandharpur	4.77	4.800	4.23
10	Sangola	6.11	4.09	5.04
11	S.Solapur	6.55	5.07	5.31
<b>District Average</b>		<b>6.22</b>	<b>5.08</b>	<b>5.35</b>

*Source: Socio-economic abstract of Solapur district.*

For the district of Solapur as a whole, the death rate was calculated to 6.22 percent per thousand populations. At the same time, the death rates were calculated for various tahsils for the same period. It is here, worth mentioning that the highest death rate was recorded for Barshi on one hand and lowest of 3.94 percent for the Malshiras tahsil on the other. Except, four tahsils namely Barshi, North Solapur, South Solapur and Akkalkot, rest other tahsils have shown death rates lower than the district average in the year 1991 (Table 3). Similarly, in the year 2001, the death rates were calculated for all the tahsils in Solapur district, the average death rate was 5.08 percent for the region as a whole while; highest death rate was recorded for Mangalwedha and lowest for Malshiras tahsil. Except, North Solapur, Barshi

and Mangalwedha tahsils all other tahsils have shown death rate much lower than the region average. Though, the death rate varies enormously within the region during 2001 period.

Death rate was also calculated for the year 2011 for all the tahsils in the Solapur district. The average death rate was found 5.35 percent for the region as a whole. In comparison to previous two decades of 1991 and 2001, the year 2011, does not show a much significant variation in death rate within various tahsils in Solapur district. The highest death rate was recorded to 6.78 percent for North Solapur tahsil and the lowest death rate of 3.68 percent was observed in Karmala Tahsils. Except, Akkalkot, North Solapur, and Barshi tahsils all the other tahsils have shown death rate much lower than the region average. The causes for this variation may be the same as mentioned earlier.

**IV. Death Rate for Rural Areas:**

Death rates are responsible for loosing as well as for gaining the population, affecting the positive and negative growth rate. Rural as well as Urban death rates are different due to the variations in medical facilities. Urban and rural areas also vary in occupation, per capita income and illiteracy. For the year 2001 and 2011, the rural death rates differ enormously in different tahsils in Solapur district. These were calculated to understand the spatial pattern of death rates, which in turn reflect the growth of population in a particularly region. (Table 4)

**Table 4. Tahsilwise Rural Urban Death Rate in Solapur District 2001-2011**

Sr.No	Tahsil	Death rate for rural areas		Death rate for urban areas	
		2001	2011	2001	2011
1	Akkalkot	5.09	5.56	5.50	6.84
2	Barshi	3.67	5.18	8.58	10.34
3	Karmala	3.05	3.21	4.45	8.20
4	Madha	3.67	4.08	11.90	11.94
5	Malshiras	1.35	4.09	-	-
6	Mangalwed	8.44	4.27	6.91	9.21
7	Mohol	3.98	4.31	-	-
8	N.Solapur	3.20	4.37	8.22	7.03
9	Pandharpur	3.25	3.29	9.42	7.40
10	Sangola	4.18	5.07	3.21	4.80
11	S.Solapur	4.87	5.31	-	-
<b>District Average</b>		<b>3.88</b>	<b>4.38</b>	<b>8.06</b>	<b>7.43</b>

*Source: Socio-economic abstract of Solapur district. (2001-2011)*

For the year 2001, the average death rate for the district as a whole, was 3.88 percent per 1000 of population. Surprisingly, it increased to 4.38 percent for the year 2011, in rural areas of Solapur district. The spatial pattern of rural death rate varies enormously for the year 2001. The high death rate was for the Mangalwdha tahsil, while, lowest for Malshiras tahsil in the south western part of the Solapur district. Tahsils, which have recorded death rate lower than the district average, are Karmala, Madha, North Solapur, Pandharpur and Malshiras. Rest, other tahsils have shown death rate higher than district average.

For the year 2011, as stated earlier, the average death for the district as a whole was 4.38 percent per 1000 of population. The highest death rate was found in Akkalkot tahsil, while it was lowest for Karmala tahsil within district of Solapur. It also varies from one tahsil to another due to different socio-economic reasons.

#### **V. Death Rate for Urban Areas:**

The rural urban differential for the death rate is obvious from the higher death rate in different areas of Solapur. It is a matter of surprise, that in spite of, influencing availability of medical facilities, the death rate for urban areas has been higher subsequently, for the year 2001 and 2011. It is clear from the fact, that it was 8.06 percent in 2001 for the Solapur district as a whole. There are three tahsils namely Mohol, Malshiras and south Solapur where there are no urban settlements. The highest death rate for urban areas was recorded for Madha tahsil, while the lowest was for the Sangola tahsil. There are four tahsils, constiting of Karmala, Sangola, Mangalwedha and Akkalkot, where the death rate for urban areas was much lower than the district average. Remaining other tahsils namely Madha, Barshi, North Solapur and Pandharpur have recorded the death rate for urban areas, higher than the district average. This variation may be attributed, to various social-economic and geographical reasons within the tahsils.

Similarly, the death rates for urban areas were also calculated for the year 2011. The average death rate of Solapur district as a whole was 7.43 per 1000 of population. Due to improvement in better medical facilities and secured food supply, has

resulted in decline death rate in 2101. The highest death rate was recorded for Madha tahsil, while the lowest for Sangola in the year 2011. There are number of tahsils which have shown death rate above the region average. These are Karmala, Madha, Barshi and Mangalwedha, while rest of tahsils in Solapur district, have shown death rate below average. The causes behind this may be different in the standard of living of the people and different in the medical facilities.

#### **Conclusion**

Birth-rate is one of the most important factors influencing growth of population in a particular region. Now days, both, birth rate as well as death rate have come down due to improvement in better medical facilities and secured food supply. If there is close region, then the birth-rate becomes the only factor influencing growth of population. The birth rate has declined from 22.64 in 1991 to 20.58 in the year 2011, for Solapur district as whole. This decline may be attributed to increase in literacy rate and impact of family planning programs. The age at marriage has been increased by Government authorities both for male and females during the recent period. Awareness created by Government, planners and local reformers have also influenced in lowering the birth rate. The births were also influenced by these factors for the various tahsils of Solapur district during the last decades. The rural urban patterns of birth rate are different as the nature of living, occupational structure, literacy pattern, per capita incomes are also different within different areas. On the contrary with exception of the birth rate for urban area much higher than the rural areas for the region as whole. For the Solapur district as whole the birth rate has declined for the rural area from 16.82 in 1991 to 15.50 in the year 2011. The higher birth rates for urban areas, both for district as well as its various tahsils are higher perhaps due to the proper recording or registration of the birth in various hospitals in urban areas. For lower birth rate in rural areas probably are not recorded or not registered properly due to lack of dispensaries and hospitals.

Death rates have been calculated for the years 1991, 2001 and 2101. Death rate has also declined from 6.22 percent in 1991 to 5.35 in 2011. Similarly, the declining trends of death rate have also

been observed in various tahsils of Solapur district. Rural-urban differential in death rates are also influenced by the various factors such as the availability of medical facilities, nature of occupation and literacy pattern. The average death rate for district as a whole has increased from 3.88 to 4.38 during 2001 to 2101 for rural areas of the district. The highest death rate was found in Akkalkot tahsil while lowest for Karmala in the year 2001. It also varies from one tahsil to another due to different socio-economic reasons. The death rate for urban areas has slightly declined from 8.06 in 2001 to 7.43 in the year 2011 in Solapur district. Due to improvement in better medical facilities and secured food supply has resulted declined of death rate in 2001. The highest urban death rate was recorded for Madha and lowest for Sangola tahsil in 2011. Within the tahsil of the district the death rate substantially vary from one tahsil to another.

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