

## Trends and Factors affecting Female Literacy-An inter-district study of Maharashtra

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### Abstract

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Education has always been recognized as a powerful tool to empower the marginalized sections of any society. In developing country like India where the fruits of economic growth are being reaped it has also been realized that the growth become inclusive and the benefits shared by all. Female literacy rate is viewed as one of the effective tool that can be used to percolate the benefits of the developed society to the women population and in turn empower the women of the country. The paper examines the trends in female literacy in Maharashtra which is one of the most developed states of India. The paper uses the data of last two census in India and calculates the trends in Female literacy in all the districts of Maharashtra, gap in female and male literacy in these districts and also identifies the socio-economic factors that have a significant impact on female literacy in the districts of Maharashtra.

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**Keywords:** Female literacy, Maharashtra, achievement index, disparity index, multiple regression

### 1. Introduction

*Women empowerment* is an affirmative action which has gathered considerable momentum and can be effectively used to achieve gender equality. It has also been recognised as one of the Millennium Development Goals by UNDP.

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“But how do we empower our women?” – is a question worth pondering on. The simplest way to empower women is by giving three Ms to women i.e. *muscle, money and mobility*. All the three Ms to a large extent can be achieved if a country educates its female population. It is rightly said that when you educate a woman we educate the whole family. Government at both the Central and State level have taken measures to increase the female literacy rate in India and has been successful in achieving its targets to a large extent. Literacy rate is estimated as the percentage of people educated to the respective total population and female literacy is the percentage of literate women to the total female population.

Maharashtra is one of the most developed states of India. Maharashtra is the second largest state in terms of size of population after Uttar Pradesh. The population of the State was 11.24 crores, which was 9.3 per cent of the total population of India (121.02 crore) as per census 2011. The state has made significant progress in providing education to its population with the literacy rate growing from 35.1% in 1961 census to 83% in 2011 census. There are 35 districts in Maharashtra, however District-wise area, population density, sex ratio, proportion of scheduled castes, scheduled tribes, female literacy rate, infant mortality rate (IMR), total Fertility Rate and Mean Age of Marriage shows inter-district inequalities of the region.

This research paper is an attempt to evaluate the educational development among females of the various districts of Maharashtra, measuring inter-districts inequalities in female education and assessing the impact of various socio-economic - demographic variables on female literacy in Maharashtra. The objectives of the paper as follows:

- 1.To calculate the achievement index for total, male and female literacy level in various districts of Maharashtra as per census 2001 and 2011 and rank them on the basis of this index.
- 2.To calculate the disparity between male and female literacy rate in various districts of Maharashtra and rank them accordingly.
- 3.To assess the impact of various socio economic variables on the female literacy rate in Maharashtra and present a suitable model.

## 2. Methodology for Research

The data on various socio-economic measures to be used in analysis and the literacy rates is obtained from Government of India Census reports of 2001 and 2011 and Economic Survey of Maharashtra 2012-13.

The data analysis shall be done by using multiple regression analysis to find out various significant factors having an impact on female literacy in Maharashtra.

The factors that shall be considered to have an impact on female literacy are- male literacy rate, Number of female headed households, Age at marriage and female workforce participation rate. The achievement index shall also be calculated for each district and the ranking of the districts shall be done. It shall help to know the change in literacy rate in the districts in Maharashtra and their relative performance. Disparity index that is a measure to find the gap between female and male literacy is another proposed tool of this research.

SPSS is used to carry the data analysis obtained from the above mentioned resources.

## 3. Review of Literature

Sundaram A, Vanneman R (2008) have found that a widening gender gap in education is associated with higher proportions of women in the labour force. There is negative relationship between female workforce participation on female literacy rate.

Sharmila N, A.C.Dhas (2010) in their research have revealed that there had been significant progress in the performance of women education revealed from female literacy levels and its change over time. Through multiple regression model, they have observed that rural poverty acts as a push factors for women's education, urbanization had been playing a beneficial role in the attainment of women's education in India and the drop-out rate has a negative effect on women's education.

A study in different districts of rural and urban Maharashtra (Jindal Asha, Pandey, 2011) revealed that male literacy rate, female work participation as marginal and main worker, decreasing Mean number of births, Percentage of Muslim Population and child mortality rate are having significant effect on Female Literacy Rate in urban Maharashtra whereas factors responsible for increase in female literacy rate are increasing male literacy rate, slowly decreasing female work participation as marginal and main worker, decreasing percentage of Muslim Population in rural Maharashtra.

Basak P, Mukherji S (2012) in their study in West Bengal found that socio economic variables like Asset holding, Occupational Diversification, Female Work Participation Rate (WPRF), Banking Facility, Banking Facility and School Availability explaining the literacy rate in the State. The regression result indicates that literacy rate will have a decreasing trend if the proportion of agricultural worker (AGRLB) in total work force increases and vice-versa. Availing banking facility (HHBNK) has been remaining as a positive explanatory variable for the development of literacy rate for both male and female literacy rate at block level. It may therefore be said that economic consciousness also leads to educational consciousness too.

#### 4. Trends in Literacy Rate in Districts of Maharashtra

The literacy rate in Maharashtra as per the last four census show a consistent growth in both male and female literacy. The literacy rate of Maharashtra has remained above the average literacy rate in India. As per the census of 2011 the literacy rate on Maharashtra was 82.9% as compared to literacy rate of India of 74%.

**Table 1: Literacy Rate of Maharashtra**

Census	Total	Male	Female
1981	57.24	70.06	43.50
1991	64.87	76.56	52.32
2001	76.88	85.97	67.03
2011	82.91	89.82	75.48

Source: Government of India, Census 2011

A district wise study of the literacy rate in Maharashtra reveals disparity in education at all levels.

In order to understand the level of change in level of literacy rate in last two census i.e. 2001 and 2011, the ranking of districts of Maharashtra is done on the basis of *achievement index*. As per the census of 1981, a little more than half of the population of the state was literate and around 43% women were literate. While in 2011, more than eighty percent of the total population (7+ age group) was found to be literate in the state & almost three fourth women were literate. Over the last 40 years almost all the districts has made a literacy jump of more than 30%, but some of the districts recorded a higher jump than the others.

A heterogeneous increase is being observed across the districts of the state. In order to understand the development aspect which cannot be taken as a simple difference between a particular period of time and also if the simple method of measuring the growth rate [viz.  $(Y_1 - Y_0) / Y_0 \times 100$ ] is considered, some of the least developed districts (e.g. Nandurbar, Gadchiroli) may even register higher rate of growth than the mostly developed districts (e.g. Mumbai Suburbs, Nagpur). In order to get rid of the problem of measurement, the UNDP Methodology of Range Equalization [UNDP 1990, Haldar, 2008], has thus been adopted.

The following formula in measuring the progress of relative achievement of literacy rate is considered-  $Z_i = [\text{Actual } X_i - \text{Min } X_i] / [\text{Max } X_i - \text{Min } X_i]$ , and shall be called as the ***achievement index***, where  $X_i$ =Literacy Rate of the i-th district for a particular time point.  $Z_i$  is an index that measures the relative position of a particular district.

Ranking of the districts for all the three types of literacy measures i.e. total literacy, male literacy rate and female literacy rate shall be done using the achievement index. The data from census 2001 and census 2011 on the literacy measures of various districts of Maharashtra is used to derive the results.

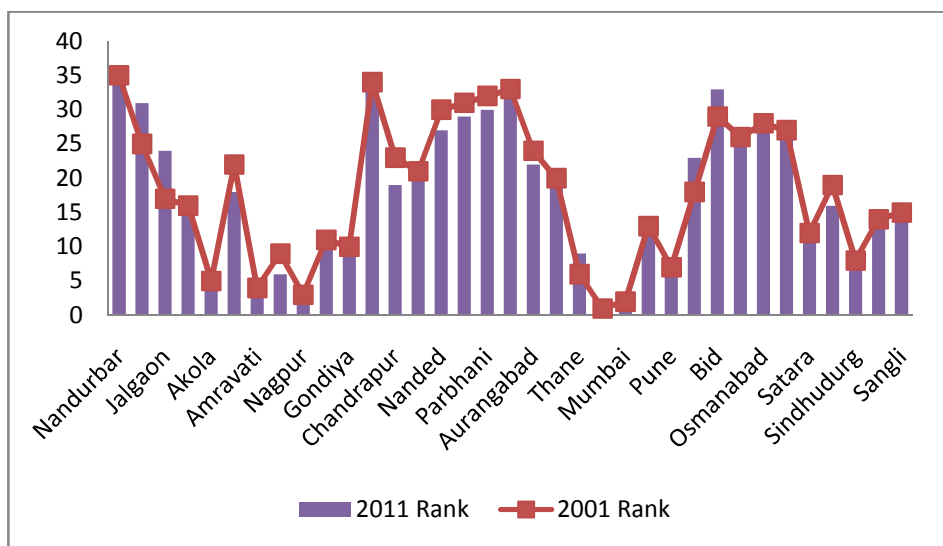
As can be seen a few districts of Maharashtra have been able to maintain their ranks in last two census. The first rank is taken by Mumbai suburban in both the census followed by Nagpur and Mumbai. Nandurbar which a district dominated by tribal population ranks last in all the districts, preceded by Gadchiroli at 34<sup>th</sup> rank, have not been able to make any progress in its literacy rate compared to the other districts of Maharashtra.

Even though most of the districts have maintained their ranks in terms of imparting education the following districts have descended from higher ranks implying a decrease in their achievement index:

**Table 2: Change in District Ranks as Per Achievement Index**

Name of the district	Rank as per Census 2001	Rank as per Census 2011
Dhule	25	31
Jalgaon	17	24
Beed	29	33

**Figure 1: Ranks of Districts as Per Achievement Index of Total Literacy**



A comparative analysis of ranking of districts in terms of male and female literacy shows that there is a disparity in relative performance of the districts in the growth of male literacy rate and female literacy rate. The districts like Aurangabad, Amravati and Buldhana rank high in terms of male literacy but are ranking low in educating the women of the district. This trend can be observed in these districts for both the census i.e. 2001 and 2011. This is particularly of concern as these districts barring Aurangabad have sex ratio above the state average of 929.

As per the census abstract of 2011 the sex ratio is 951 for Amravati, 999 for Gondiya, 934 for Buldhana and 923 in case of Aurangabad which is inferring that even though these districts have greater number of women vis-a-vis men compared to the state but the rate of growth of female literacy rate is less than the growth of male literacy rate in these districts.

**Table 3: Comparative District Ranks**

Name of district	Rank for female literacy		Rank for male literacy	
	2001	2011	2001	2011
Amravati	7	8	4	4
Gondiya	13	10	5	4
Buldhana	20	19	14	14
Aurangabad	25	24	21	19

Rank analysis of all the districts of Maharashtra in the last two census shows that certain districts have lagged behind in both the census. The bottom five districts in female literacy are given in the Table 4:

**Table 4: Bottom Five Districts in Female Literacy**

Name of the district	2001		2011	
	Achievement Index	Rank	Achievement Index	Rank
Parbhani	0.19	31	0.31	31
Beed	0.26	29	0.25	32
Jalna	0.11	33	0.22	33
Gadchiroli	0.08	34	0.2	34
Nandurbar	0	35	0	35

As can be analysed from Table 4 the five districts of Maharashtra i.e. Parbhani, Beed, Jalna, Gadchiroli & Nandurbar have been bottom ranking in both the census. However, the female literacy but the rank of Beed district has fallen from 29<sup>th</sup> to 32<sup>nd</sup> rank in one decade.

Thus the policy measures that have been taken to increase the female literacy rate in this district do not appear to yield any positive result.

Another important observation is made that these districts also lag behind in *per capita income* of the district as compared to the per capita income of the state. The per capita income of these bottom five districts as per the economic survey of Maharashtra 2012-13 is way below the state average per capita income of Rs.95,339. The per capita income of the last ranking district, Nandurbar in female literacy achievement index is Rs.46156, preceded by Gadchiroli with Rs. 48311, Jalna at 33<sup>rd</sup> rank has per capita income of Rs. 55067, Bid with 32<sup>nd</sup> rank has per capita income of Rs. 55139 and Parbhani at 31<sup>st</sup> rank in female literacy achievement index has per capita income of Rs.58152. Hence there appears to be a significant relation between the income of the people of a district and the female literacy rate. It appears that as the income increases the awareness about literacy also increases.

## 5. Disparity Index

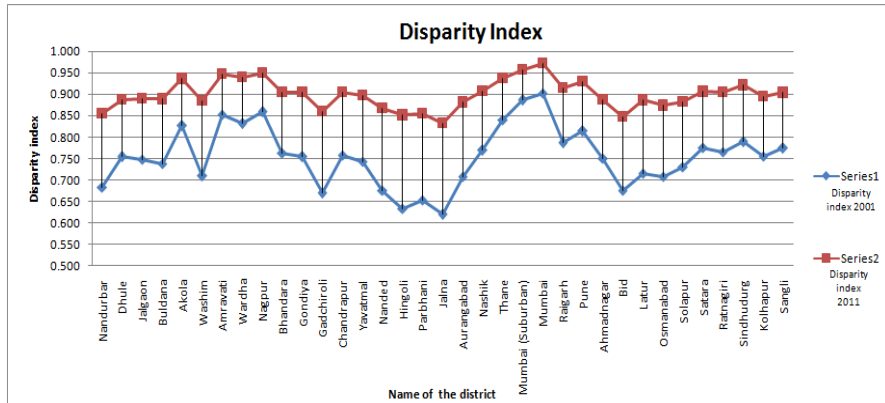
Another way of understanding the trends in female literacy is to understand the gap between male female educational disparity in districts of Maharashtra state. To measure this, the tool suggested by Mahalanobis and Rao to Kothari Commission is used i.e.

Disparity Index =  $FLR / MLR$ ; where FLR = female literacy rate, MLR = male literacy rate

In case there is no disparity, the value is unity. Any deviation from the value of one is a measure of disparity. If the value is less than one, the disparity is in favour of males, which is generally observed. A value larger than one shows disparity in favour of females. Hence, it may be said that a higher degree of inequality corresponds to a lower level of social welfare. Figure 2 shows the gap in disparity index of these districts of Maharashtra:



**Figure 2: Gap in Disparity Index of the Districts**



The female literacy level has increased by 8.45 percent in Maharashtra from 67.03 percent in 2001 to 75.48 percent in 2011, whereas the male literacy rate is up from 85.97 to 89.82 percent an increase of 3.85 percent showing a decline in disparity in male and female literacy in the state in one decade. The disparity index of the thirty five districts is shown in the above figure. A value of index close to one shows lesser inequality in male and female literacy rate. A larger gap in the two lines in the above graph shows a greater disparity in the district. As can be seen there is large disparity in female literacy in the district of Hingoli, Parbhani and Jalna. Even though Nandurbar rank lowest in literacy rate but there has been marked improvement in disparity index with the value being 0.633 in 2001 rising to 0.855 in 2011, showing that the female literacy rate has increased more than the male literacy rate in this district. It also ranks 31<sup>st</sup> in the district, four places above the last place it occupied in the achievement index amongst all the districts.

### 6. Socio Economic Factors Affecting Female Literacy Rate

An important part of this research is to ascertain those variables that can significantly influence the female literacy rate. There are large numbers of socio-economic variables that are known to have an impact on the level of female literacy rate. For the purpose of this study a set of seven independent variables was considered.

These independent variable were: male literacy rate (MLR), Women participation in workforce both main and marginal workers (WPR), Age at marriage (AGE) and number of Female Headed Households (FHH), Per capita income of the district (PCI), Average size of the household (ASHH) and percentage of urban population in a district (UP).

Out of these seven explanatory variables four variables i.e. male literacy rate (MLR), Women participation in workforce both main and marginal workers (WPR), Age at marriage (AGE) and number of Female Headed Households (FHH) were found to have significant impact on the female literacy rate. Therefore the following model of good fit is developed through multiple regression to explain the independent variables which have a significant impact on the female literacy rate in the districts of Maharashtra:

$$FLR = -74.936 + 1.269 MLR - 0.544 FHH + 2.48 AGE - 21.225 WPR$$

The summary of the regression results is provided in the following tabular form. Since the p-value of the predictors is found to be less than 0.05, hence the result is found to be significant for the model.

#### Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-74.936	9.480		-7.904	.000
Male lit	1.269	.094	.731	13.566	.000
FHH	-.544	.142	-.277	-3.820	.001
Age at marriage	2.480	.448	.446	5.538	.000
Women participation	-21.225	5.350	-.205	-3.968	.000

a. Dependent Variable: female literacy rate

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.965 <sup>a</sup>	.932	.922	2.18896

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a. Predictors: (Constant), Women participation in workforce, Male literacy rate, Number of Female Headed Households, Age at Marriage.

The above model is can be considered as the model of good fit as the value of R square is calculated as 0.932 which implies that these four independent variables explain the 93.2 percent of the variation in female literacy rate of the thirty five districts of Maharashtra. This value is also greater than the critical value (0.336) in the R Square table.

The above model predicts a positive impact of male literacy rate and age at marriage to the female literacy arte in the districts of Maharashtra and women workforce participation rate and number female headed households to have negative impact on the female literacy rate in these districts.

A study of ANOVA shall help us in deciding whether the model should be retained or not. As seen from the table given below since the p value is 0.000 which is less than the critical value of 0.05 the results from the analysis can be accepted and stated that there exists a predictive relationship between the Female literacy rate and the above mentioned four explanatory variables.

## ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1954.863	4	488.716	101.996	.000a
Residual	143.746	30	4.792		
Total	2098.609	34			

a. Predictors: (Constant), women participation in workforce, male literacy rate , number of Female Headed Households, Age at marriage

b. Dependent Variable: female literacy rate

## 7. Concluding Observations

The above model brings to our attention very important observations which need to be understood from an analytical viewpoint. The model predicts that the male literacy level has a positive impact on the female literacy rate with its coefficient being 1.269. Thus holding other variables as constant it is estimated that one unit percent in the male literacy shall increase the female literacy rate by 1.269 percent. This is further corroborated by the Hashmi, N. et al (2009) who mentioned that whenever male literacy rate is high the female literacy rate are also high. In their study in rural Pakistan it was found that rural areas of Pakistan are mostly male dominated and fathers took decision for mobility of daughters. So father education is relatively more important than their counterparts.

The other variable in the model which has positive impact on female literacy rate is the age at marriage. It is estimated by the model that an increase in the age of women raises the female literacy rate. Khan(1985), Field( 2005) in their research have shown that age at marriage has a positive effect on the female literacy rate. It has been observed that those countries or communities which believe in educating the girl child get their daughters married at a higher age.

A significant negative impact on female literacy rate is observed for women participation in workforce and the number of female headed households.

The negative relationship between the female literacy rate and Workforce participation rate has been established by most of the Indian studies (Pandey, 1990; Jeejeebhoy, 1993; Krishnaji, 2001 and Mukhopadhaya, 1994). This is partly because the daughters have to shoulder the responsibilities of household chores and sibling care and partly because the lack of maternal attention and supervision discourages children's schooling. Some other studies established it as a positive enhancing factor. It may be due to the fact that the additional resources from mothers' earnings can overshadow the negative impact of mothers' absence from home (Psacharopoulos et al, 1989; Tansel, 1997).

The other factor having negative impact on female literacy rate is the number of female headed households. The definition of female-headed household adopted for this study, is the one given by International Labour Organization (ILO): Household where either no adult males are present, owing to divorce, separation, migration, non-marriage or widowhood, or where men, although present, do not contribute to the household income. (The ILO Thesaurus, 2005). In developing countries, the majority of households that are headed by women have many economic and social problems. Female Headed Households often faced with issues such as cultural discrimination, lack of access to job opportunities, low literacy and lack of regular income. Socio-Economic factor of poverty directly and indirectly affects on the cultural, social and ecological condition of Female Headed Households.

It has been found in many empirical researches that the Female Headed Households have a higher incidence of poverty particularly in developing countries. Two African scholars asserted that there exists a strong relationship between female headed households and the incidence of poverty. There are several persuasive factors that attribute to the prevailing perception of feminization of poverty (Kimenyi & Mbaku, 1995). A higher incidence of poverty in these households leads to sacrificing educating the females of these households.

The decadal comparison of change in female literacy rate in the various districts of Maharashtra using the achievement index and the disparity index points out to a skewed development of the female literacy in the state. The fruits of economic growth seem to get limited to only a few districts of Maharashtra like Mumbai, Mumbai suburban and Nagpur which have been doing well in both the census.

There doesn't appear to be much change in the status of female literacy in the rest of the districts. Even though various reports and plans the state government talk about the measures that have been taken to increase the rate of female education but certain districts are stagnant and certain have rather shown a decline in their performance. Hence it can be concluded that the government policies instead of just focusing on increasing the number of educated female population should start looking at it as dependent variable of other socio- economic factors that have an impact on the female literacy rate. An improvement in these independent variables as discussed above shall have more encouraging results rather than enrolling more girl students in the schools.

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