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A STUDY OF SOCIAL DETERMINANTS AFFECTING POPULATION GROWTH IN RAJASTHAN

***Pankaj Nagar*[1] *& Manaram Jakhar*[2]**

[1]*Associate Professor, Department of Statistics, University of Rajasthan, Jaipur, India*

[2]*Research Scholar, Department of Statistics, University of Rajasthan, Jaipur, India*

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ABSTRACT

Several effective steps have been taken by the government of India to control population growth from time to time. In this step, the government of India announced the Population Policy 2000 on February 15, 2000. Under this policy, 14 national social demographic goals have been set. In which the goal of reducing infant mortality and the maternal mortality rate was also determined. Population growth rate depends on various social economic and cultural determinants. In this article, a study of population growth of the desert area of Rajasthan (total and rural) which are factorized on various socioeconomic variables, are referred here. The major finding reveals that CBR(crude birth rate), CDR(crude death rate), IMR(infant mortality rate), MMR(maternal mortality rate)and SR(sex ratio) have influence over population growth rate in the desert area of Rajasthan. The result shows that if Population Policy is implemented effectively and CBR, CDR, IMR, and MMR be decreased then population growth rate may be decreased to great extent in the desert area of Rajasthan.

KEYWORDS: *Population Growth Rate, CBR, CDR, IMR, MMR and SR*

INTRODUCTION

The population growth rate varies from country to country, and even within the country, each caste is different in the class, and different areas. This difference in population growth rate is directly and indirectly for many reasons. Some major reasons are social, economic, cultural and political. Due to the fast-growing population growth rate, many problems arise, such as the pressure on the basic institutions of education and health, increasing pressure on availability of food, increasing pressure on availability of land, increasing temperature, etc.

The population growth trend has become a subject of discussion by the researcher's policy-maker and mass media. The size of the population is affected by the following two reasons :(a) birth and death rate (b) population mobility also influences population growth. Mobility in population is done by two factors immigration and emigration. Immigration increases the country's population even if there is no change in birth rate. Emigration reduces the country's population.

To explain population change Warren Thompson (1929), Notestin (1945) and Blacker (1947) gave the theory of demographic transition. Generally, there is four stages of population growth under population transition theory. Both birth and death rate is high in the first stage in which population growth is stable. In the second stage, the birth rate is high but the mortality decrease due to the expansion of medical facilities. In this stage, the population often increase rapidly. Due to the high birth rate and low death rate, this stage is called the stage of the explosion of population. The birth rate falls in the

third stage but the population continues to grow, because of the high reproduction in the previous generation, the number of people in the reproductive age group is high. India has the third stage of population growth at this time. Due to the low birth rate and death rate in the fourth stage population growth rates are stable.

The birth rate is influenced by many factors according to Prof. Donald Bog, the factors influencing the birth rate are age follows Marital status, educational level, regional distribution, environmental, economic level, employment, income, and religious views etc. A government of India has brought population policy from time to time to control the population growth. The latest population policy was announced on February 15, 2000. The main goal of the population policy is the population stabilization, encouraging the concepts of small families to achieve thelevel of total fertility rate and making school education free and compulsory till the age of 14 years. Rajasthan is situated on the northern western part of India. It extends from 23°03'30'' to 30°11'54'' north latitudes and from 69°29'05'' to 78°16'24'' east longitudes. It is the largest state in the country with a total area of 3.42 lakh sq. km. It is the eighth largest state in the country with a total population 68548437 carried out on March 2011.The Aravali hills from a linear tract across the State running roughly from north Gujarat to Delhi Ridge. There are two natural divisions of Rajasthan. The north-west tract is sandy and unproductive with little water but improves gradually from desert land in the far west and north-west to comparatively fertile and habitable land towards the east. The geographical environment in terms of physical and economic elements is so varied in different parts of the state that it may be divided into the following seven regions: Western Arid region, semi–arid region, canal region, Aravali Region, Southern Agriculture Region, Chambal Ravine region.

MATERIAL AND METHODS

Source of Data

Secondary data used in this study. The data for CBR, CDR, IMR, SR and MMR across all desert district of Rajasthan were drawn from primary census abstract, census of India 2011,economic review Rajasthan, estimates of district domestic products, annual health survey 2011-12 fact sheet, socio-economic statistics Rajasthan, regular publication of directorate of economics and statistics Govt of Rajasthan. District wise CBR, CDR, IMR, SR, and MMR are taken as an explanatory variable. District wise population growth rate is taken as a depended variable. CBR, CDR, IMR, SR, and MMR are social factors. All computation have been executing in statistical parts were SPSS20.0.

Objective of Study

This study provides an answer to the following research questions.

What is the magnitude of the effect of CBR, CDR, IMR, SR, and MMR on population growth rate?

The main objective of this research paper is to examine the effect of CBR, CDR, IMR, SR and MMR on population growth of Rajasthan. To observe the effect of CBR, CDR, IMR, SR and MMR following hypothesis has been considered to test:

H_{01} : $B_i = 0$ (CBR, CDR, IMR, SR and MMR have no significant effect on population growth rate)

Here, the $B_i$are regression coefficient of PGR on CBR, CDR, IMR, SR and MMR

The research instrument employed in the courses of this analysis based on regression analysis (linear and nonlinear) and corresponding significance tests for its regression coefficients.

Following are the regression models which are considered to test best fit for observing the relationship of PGR with CBR, CDR, IMR, SR, and MMR

Linear Regression Model

$$PGR= b_0+b1*CBR+b_2*CDR+b_3*IMR+b_4*SR+b_5*MMR + u_i..... \quad 1)$$

Exponential method

$$PGR=b_0*\exp(b1*CBR+b_2*CDR+b_3*IMR+b_4*SR+b_5*MMR+u_i)\ldots\ldots \quad .....(2)$$

Evaluation and Decision Rules

Evaluation is based on statistical criteria like; R^2 value, t-tests, ANOVA(F-test).The term R^2-explains the total variation in the response variable (PGR)due to variation in the regressor i.e. CBR, CDR, IMR, SR, and MMR. It is basically computed as follows:

R-squared = 1 - (Residual Sum of Squares) / (Corrected Sum of Squares)

Later, a t-test is used to test whether the variables (Regressors), included in the model, are individually statistically significant. The null hypothesis to be tested is, H_0: $\beta_i=0$ (The parameter estimated is not statistically significant at α= 5% with n-k df. Here, 'n' is a number of observation and 'k' is number of parameter estimates. Theα denotes the level of significance. We reject H_0 if p-value of the test is smaller than α. We can say that the variables (CBR, CDR, IMR, SR and MMR)is significant at the 5% significance level. Thus they have a significant impact on population growth rate. The Analysis of Variance (ANOVA or F-test) is used to determine the overall significance of the regression model. The null hypothesis is stated thus: H_0:$\beta_i=0$(the model is not significant), and being tested at α=5% with (k-1) and (n-k) df. We reject H_o if $F_{cal}>F_{\alpha\%}(k-1,n-k)$. In other words, we reject H_0 if the p-value of F_{cal} is sufficiently low (<0.05).

RESULTS AND DISCUSSIONS

MODEL1 (Linear Model)

While we considering the linear relationship between CBR, CDR, IMR, SR and MMR, and population growth rate total, the R^2-value is 0.805 which reveals that these variables jointly explain more than 80.5present variability which may be considered satisfactory for study.

The linear regression model for PGR with respect to CBR, CDR, IMR, SR and MMR, is explained in **Table 1**. The regression coefficient of CBR on PGR is 4.784(positive) which means the CBR has a positive impact on PGR. That is as CBR decrease/increases the PGR is towards decreasing/increasing side. The regression coefficient of CDR on PGR is 14.731 (positive) which means the CDR has a positive impact on PGR. That is as CDR decrease/increases the PGR is towards decreasing/increasing side. The regression coefficient of IMR, MMR, AND SR on PGR is -1.002,-0.062and -0.024 (negative) respectively which means the IMR, MMR, AND SR has a negative impact on PGR. That is as IMR, MMR and SR decrease/increases the PGR is towards increasing/decreasing side Hence, it may be concluded that as the population growth can be controlled with respect to CBR, CDR, IMR, SR, and MMR.

The linear regression model is

PGR=-97.734+4.784*CBR+14.731*CDR-1.002*IMR-0.024*SR-0.062*MMR……..(3)

The p-value of the regression coefficient of CBR, CDR, IMR, SR and MMR on PGR is 0.03 (**Table-1**). Thus the null hypothesis (H_{01}:β_{1T}=0) is to be rejected and it can be concluded that CBR, CDR, IMR, SR, and MMR have a significant and positive and negative impact on PGR.

Table 2 explain ANOVA table related to the fit of the model. The p-value of the regression model (3), is less than 0.05. It means the null hypothesis (H_{01}:β_i=0) that the regression model as mention in (3), does not fit, is rejected.

MODEL 2 (Exponential Model): While we considering the Non-linear relationship between CBR, CDR, IMR, SR and MMR, and population growth rate total, the R^2-value is 0.793. Both variables jointly explain 79.3% variability which may be considered satisfactory for study.

The non- linear regression model for PGR with respect to CBR, CDR, IMR, SR, and MMR is explained in **Table-** The regression coefficient of CBR, CDR, IMR, SR, and MMR on PGR are 0.223, 0.793(positive), -0.048, -0.001, -0.003(negative) respective which means the CBR, CDR have a positive impact on PGR and IMR,SR and MMR negative impact on PGR. It may be concluded that as the population growth can be controlled with respect to CBR, CDR, IMR, SR, and MMR.The non-linear exponential regression model is

PGR=0.055*exp(0.223*CBR+0.793*CDR-0.048*IMR-0.001*SR-0.003*MMR)……(4)

The p-value of the regression coefficient of CBR, CDR, IMR, SR, and MMR are 0.0001.Thus null hypothesis (H_{01}:β_{1T}=0) is to be rejected and it can be concluded that CBR, CDR, IMR, SR, and MMR have a significant impact on PGRT.

The **Table-4**explain ANOVA table related to the fit of the model the p-value of regression model mention in equation 2, is less than 0.05. It means the null hypothesis (H_0:β_i=0)that the regression model as mention in (4) does not fit, is rejected so there for the regression model as mention in (4) fits in the data.

CONCLUSIONS

We therefore, draw the following conclusions based on the results as mentioned above:

For the hypothesis, we reject the null hypothesis that CBR, CDR, IMR, SR, and MMR have no significant effect on population growth rate and accept the alternative hypothesis.

This study examine the impact of CBR, CDR, IMR, SR, and MMR on population growth rate and conclude that the population growth rate formed a significant relationship with CBR, CDR, IMR, SR, and MMR. It can be concluded by results that CBR, CDR, IMR, SR and MMR have influence over the population growth rate in desert area of Rajasthan. On the basis of results, it can be concluded that if CBR, CDR, IMR, SR, and MMR are controlled then the population growth may be decreased in the dessert area of Rajasthan. Thus, if Government of Rajasthan, conducts any efficient family welfare programme in the state of Rajasthan, the population growth may be controlled to a great extent. Authors also realised that by controlling CBR, CDR, IMR, SR, and MMR, cent present population growth rate cannot be decreased because there are some socio-economic and cultural factors which are also responsible for population growth rate in the desert area of Rajasthan.

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Appendix-A

Linear Regression Model

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.897	0.805	0.643	4.63636

Predictors: (Constant), MMR, CBR, CDR, SR, IMR

Model 1: (Linear Regression Model)

Coefficients

Table 1

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-97.734	57.210		-1.708	.138
CBR	4.784	1.192	1.642	4.014	.007
CDR	14.731	6.033	.711	2.442	.050
IMR	-1.002	.466	-1.147	-2.152	.075
SR	-.024	.039	-.167	-.607	.566
MMR	-.062	.127	-.111	-.492	.640

Dependent Variable: PGR

ANOVA Table (Model 1)

Table 2

	Sum of Squares	df	Mean Square	F	Sig.
Regression	533.918	5	106.784	4.968	.038[b]
Residual	128.975	6	21.496		
Total	**662.892**	**11**			

Dependent Variable: PGR

Predictors: (Constant), MMR, CBR, CDR, SR, IMR

Exponential Model

Model 2: (Exponential Model)

Parameter Estimates

Table 3

Parameter	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
b0	.055	.190	-.410	.521
b1	.223	.069	.054	.392
b2	.792	.300	.057	1.527
b3	-.048	.026	-.112	.016
b4	-.001	.002	-.006	.003
b5	-.003	.007	-.021	.015

ANOVA Table (Model 2)

Table 4

Source	Sum of Squares	df	Mean Squares	F -value	p-value
Regression	5775.585	6	962.598	42.1655	0.0001
Residual	136.972	6	22.829		
Uncorrected Total	5912.558	12			
Corrected Total	662.892	11			

Dependent variable: PGR

R squared = 1 - (Residual Sum of Squares) / (Corrected Sum of Squares) = 0.793.