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OUT-MIGRATION FROM TIKAMGARH DISTRICT: SOME STATISTICAL RESULTS ON PATTERNS AND DETERMINANTS

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Abstract

Bundelkhand region has been facing severe drought problems from last decade (since 2007). A Zone which was previleged for Agriculture and food security has now become a symbol of insecurity and migration due to adverse climatic conditions. Migration is continuously increasing in recent years because of famine (rainfall deficit) in the region. Keeping this fact in view a detailed study was conducted in Tikamgarh district to determine the patterns and determinants of out-migration from the district. The study suggests that category-wise higher migration rate was found in ST, followed by SC, OBC and General. On the basis of landholding sizes highest migration rate was found in marginal farmers followed by landless labourers. Out of total land holdings in the district, 70% farmers come under small and marginal class. On the basis of age group highest migration rate was found in 25-29 age group followed by 30-34. Migration in the lower age group (<15 and 15-19) was associated migration with their families. In all the determinants of migration, rainfall is the most important one who forced people to migrate. Binary logistic regression analysis technique is used to find out the statistical significance of the factors (Category, landholding size, irrigation, age, livestock, economic index and number of recent and remote past prior number of migrant) to the process of migration. The Hosmer–Lemeshow test results ($\chi 2$ = 7.586, 8 d.f., P = 0.475) suggest that the proposed model is a reasonable approximation to the situation under consideration.

Keywords:

Migration;
Migration Rates;
Logistics Regression;
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1. Introduction

As per 2011 census, sixty nine percent population of India live in rural areas. The proportion of rural population declined from 72.19 % to 68.84 % resulting an absolute increase in population in urban areas first time since independence. Sainath (2011) in his study revealed that because of distressed condition of agriculture there has been a high migration rate in recent years to urban areas as compared to the earlier inter census period. One of the basic reason is that people do not find sufficient economic opportunities in rural areas and move towards towns and cities for better livelihood. There are so much diversity in the magnitude and variety of internal migration flows in India, as well as the distresses associated with them. Migration can be classified as intradistrict, interdistrict or interstate or may also be further be classified on the basis of streams like rural to rural, rural to urban, urban to urban and urban to rural. Lusme and Bhagat (2006) in his study of trend and pattern of internal migration in India during 1976-2001 revealed that intradistrict, interdistrict or interstate migration streams contribute almost equally

in the net rural to urban male migration over the period under consideration whereas the proportion of net rural to urban lifetime migration of females however decreased with increasing distance. Migrations take place because of combination of push and pull factors. Poverty, unemployment, natural calamities, old rituals, lack of medical facilities, agricultural uncertainty and under development of the origin place etc. are the major push factors whereas the employment opportunities, education and health care facilities and new economic opportunities are the pull factors.

Bundelkhand region has been facing severe drought problems from last decade (since 2007). Migration from the region is in research highlights. In the villages of UP and MP approximately 75 % households are repored under seasonal migration (Gopal, 2013). The process of migration has dual effect on the migrated people, on one side it benefits the people in monetary term but on the other side it affects his life adversely (establishment, education and other problem) specially in case of labour migration. Deshingkar *et al* (2003), in his study also reported that migration rates were extremely high from villages which were remote and located in dry areas without assured irrigation and prolonged drought conditions. Keeping this fact in view a detailed study was conducted in Tikamgarh district to determine the patterns and determinants of out-migration from the district.

2. Research Methodology

A close ended questionnaire was developed, tested and finalized before conducting the final survey work. The questions in the questionnaire cover the general data on household, their demographic composition, age, gender and marital status of the household members, ownership of livestock and consumer goods and the income of household members. It also covers the migrant information like where the migration occurs, the reason of migration, date/years of migration, whether temporary/permanent migration, duration to comeback home and period of staying.

As the Tikamgarh district comprises of 6 blocks/ tehsils and each tehsil comprises of number of villages. The category wise proportion of population in the district is 5 % ST population, 25 % SC population and 58 % of OBC and 13 % General population (District Census Handbook, 2011). For survey work we select at least three villages from each of the tehsil/block and then samples are selected in such a way from each village so that we get a category-wise representative sample from each of the block. The reference period for the survey was November 2015 (Deepawali). A total of 110 -115 households were selected from each of the block and samples were selected from each of the village on the basis of probability proportional to size sampling. So a total of 675 households comprising a population of 4115 were surveyed consisting of 68 ST, 194 SC, 332 OBC and 81 General households. A person is considered as migrant if from last five consecutive years he migrates at least in three years and stayed away for more than 90 days in a year from his usual place of residence for the purpose of employment.

For data analysis purpose, migration rates and binary logistic regression technique were used. The formula for migration rates is defined as the ratio of total no. of migrant to the total surveyed population in a given period, expressed per hundred.

$$\text{Migration Rate} = \frac{Total\ number\ \ of\ migrants}{Total\ surveyed\ \ population\ \ under\ \ respective\ \ criterion} \text{ x } 100$$

In order to determine the statistical significance of the factors responsible towards migration decision binary logistic regression analysis technique (Bewick *et al*, 2005) is used. It is one of the important statistical modeling technique for a binomial outcome (takes the value 0 or 1 like migrant or non-migrant) with one or more explanatory variables. The exponential of coefficients corresponds to odd ratios for the given factor. Binary logistic regression doesnot assume a linear relationship between the dependent variable and the independent variables, but it does assume linear relationship between the logit of the response and the explanatory variables; $logit(\pi) = \beta_0 + \beta X$.

In the present study we are estimating the proportion of migrated persons $\pi_i = Pr\,(Y_i = 1|X = x_i)$ in the population. Here we consider the factors associated with migration process are category, land holding size, irrigation facility, age, livestock, economic status and recent (2006-2011) and remote past (<=2005) prior number of migrants in the period under consideration of the family etc. Hence the regression model for the above said situation can be defined as :

Let Y be a binary response variable

$Y_i = 1$ if a person is migrated from the family i , $Y_i = 0$ if there is no migration from family i

$X = (X_1, X_2, ..., X_k)$ be a set of explanatory variables which can be discrete, continuous, or a combination.

x_i is the observed value of the explanatory variables for observation i.

Model: $\pi i = \Pr(Yi = 1|Xi = xi) = \frac{\exp(\beta 0+\beta 1xi)}{1+\exp(\beta 0+\beta 1xi)}$ Or $\text{logit}(\pi i)=\log\frac{(\pi i)}{(1-\pi i)} = \beta_0+\beta_1 xi$

$$= \beta_0+\beta_1 x_{i1}+\ldots+\beta_k x_{ik}$$

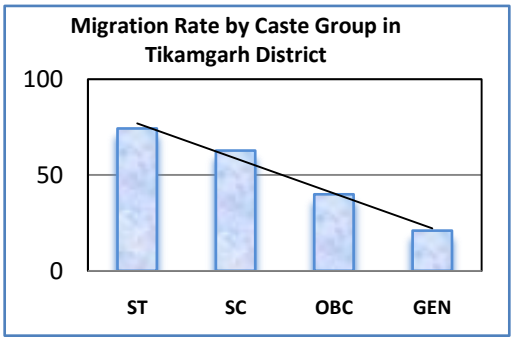
The significance of the parameters is tested by log likelihood value (probability the data given the parameter estimates) of the model. Here we are interest in finding the values for the parameters (coefficients) that

maximize value of the likelihood function. The log likelihood will always be negative with higher values (closer to 0) indicating a better fitting of the model.

Goodness of Fit test: The goodness of the fit of the proposed model is tested by Hosmer and Lemeshow (1980) test. In this test the cases are grouped together on the basis of their predicted values from the Logistic regression model. The predicted values are arrayed from lowest to highest and then separated into several groups (standard recommendation: 10 groups) of approximately equal sizes. For each group, the observed and expected number of migrant and non migrant were calculated. The expected number of migrants is sum of the predicted probabilities for all the individuals in the group and expected number of non-migrant is the group size minus the expected number of migrants. After that the chi square test (d.f.= number of groups – 2) is applied to compare the observed and expected frequency on migrant and non migrant data. The higher p values suggest the acceptance of the proposed model.

3. Analysis and Results

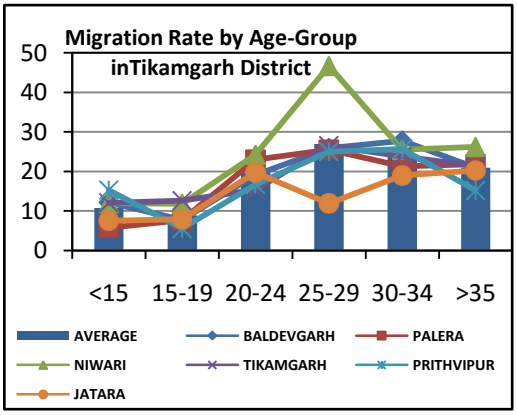
The statistical analysis of the data revealed that highest migration rate was found in ST followed by SC, OBC and General. Out of total surveyed family's (323 out of 675 household surveyed) approximately 47-48 % families in the district having atleast one person who is doing annual seasonal migration in a year. Gopal (2013), in his study also reported regular seasonal migration of SC/ST households in the Tikamgarh district for their survival.



On the basis of Age-group highest migration rate was found in the population of 25-29 age-group followed by 30-34 and >35 age group. Less migration rate was found in 15-19 age-group followed by <15 age group. Narayan *et al* (2015) in his study of eastern UP also reported that the higher migration rate was found among the people belonging to the 25-29 age group followed by 30-34 age group.Age group wise classification of migrated population is given below.

Table1: Migration Rate by Age-group in Tikamgarh district

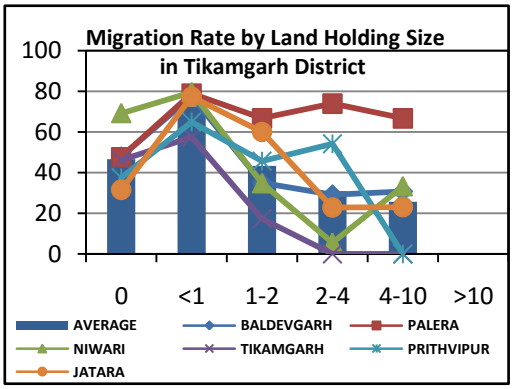
Age Group	Name of the Block/Tehsil						
	Baldevgarh	Palera	Niwari	Tikamgarh	Prithvipur	Jatara	Average migration rate
<15	12.1	5.7	12.0	12.0	15.2	7.5	10.7
15-19	7.77	7.69	11.8	12.6	5.56	7.87	8.89
20-24	19.1	22.9	24.2	15.3	16.6	19.7	19.6
25-29	25.9	25.4	46.6	26.5	25.0	11.9	26.9
30-34	27.7	21.2	25.4	23.8	25.6	18.9	23.8
>35	20.9	21.7	26.2	21.3	15.1	20.2	20.9



In Tikamgarh District on the basis of landholding size (in ha), the farmers were classified as marginal (<1), small (1-2), semi-medium (2-4), medium (4-10) and large (>10). Highest migration rate was found in marginal farmers followed by farmers with no land and small farmers. Less migration rate was found in medium and semi-medium farmers. Sharma (1987) in his study also reported that out-migrants are small cultivators, after doing the work in their field they goto urban places to earn some money and return to their villages at some regular interval of time. Landholding size wise classification of migrated population is given below.

Table2: Migration Rate by Land-holding size in Tikamgarh district

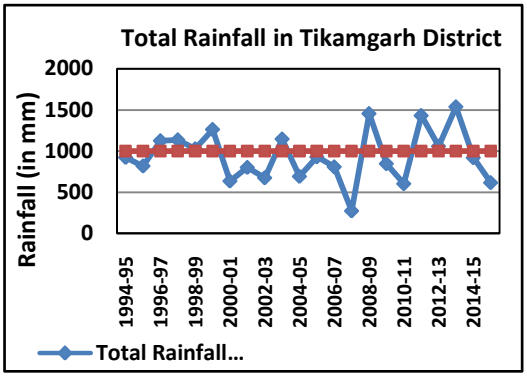
Land Holding Size	Name of the Block/Tehsil						
	Baldevgarh	Palera	Niwari	Tikamgarh	Prithvipur	Jatara	Average migration rate
0	48	48	69	46	38	32	47
<1	77	79	80	57	65	77	73
1-2	35	67	35	17	46	60	43
2-4	29	74	6	0	54	23	31
4-10	31	67	33	0	0	23	26
>10	-	-	-	-	-	-	-



Destination of Migrants: The most preferred destination place from the migrants of Tikamgarh district is Delhi (>65-70 %), followed by Gwalior, Jhansi, Agra, Mathura, Punjab, Haryana and Noida.

Determinants of Migration:

In all the determinants of migration in Tikamgarh the most important one is the total annual rainfall of the district. The average annual rainfall of Tikamgarh district is 1001.1 mm. Graph shows that in last decade, most of the years rainfall was below normal which affect the crop production in huge and force the people to migrate for survival or better livelihood.Besides the rainfall other factors which are associated with the process of migration are caste, landholding size, irrigation facilities, age, livestock economic index and recent and remote past prior number of migrant in the family.



Here education is not considered as a determinant of migration because during survey it was found that most of the adult population in rural area is not continued their study atleast up to the middle. A large number of students either do not enter into the school system or drop out before reaching to class five. The region has a large proportion of people who migrate to other states along with their families for livelihood. So their children remain out of school.The statistical analysis of the selected variables is done with the help of SPSS 20.0 and results are presented below in the Table. In case of more than one explanatory variable in the model, the interpretation of the odds ratio for one variable depends on the values of other variables being fixed.

Table 3: Determinants of Migration by using Binary Logistic Regression analysis and their Significance

Determinants	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
category								
Gen #			27.22	3	.000			
ST	1.75	0.42	17.42	1	.000	5.80***	2.54	13.23
SC	1.22	0.33	13.16	1	.000	3.39***	1.75	6.56
OBC	0.52	0.32	2.65	1	.103	1.68	0.90	3.15
Land Holding Sizes								
Landless #			30.65	4	.000	1.00		
Marginal (<1ha)	0.75	0.27	7.56	1	.006	2.12***	1.24	3.63
Small (1-2 ha)	-0.09	0.32	0.08	1	.776	0.91	0.47	1.73
Semi medium (2-4 ha)	-0.67	0.36	3.51	1	.061	0.50*	0.25	1.03
Medium+Large (>4ha)	-0.77	0.49	2.48	1	.115	0.46	0.17	1.20
Irrigation Facilities								
No irrigation #						1.00		
Irrigation Available	-0.03	0.25	0.01	1	.085	0.97*	0.58	1.60
Economic Status								
Low #			9.66	2	.008	1.00		
Medium	-0.52	0.20	6.58	1	.010	0.59**	0.39	0.88
High	-1.31	0.55	5.60	1	.018	0.27**	0.09	0.79
Prior No. of Migrant								
Remote past#						1.00		
Recent past	0.42	0.22	3.50	1	.061	1.52*	0.98	2.38
Non-categorical var.								
age	-0.36	0.09	15.24	1	.000	0.69***	0.57	0.83
livestock	-0.05	0.04	1.53	1	.216	0.94	0.86	1.03
Constant	0.80	0.65	1.48	1	.223	2.22		

 # represent reference category, * indicate significance at .01 , ** indicate significance at .05, * indicate significance at .10**

The result of binary logistic regression analysis suggest that out of the four caste category as compared to General ST (5.80), SC (3.39) and OBC (1.68) are more likely to migrate. As compared to landless laborers farmers owing land less than 1 ha or marginal farmers are more likely to migrate. Availability of irrigation and livestock shows the non significant negative correlation with migration whereas age shows the significant negative correlation with migration. Economic status of the family plays a very vital role in migration decision. The regression analysis suggests that families with middle and high economic index are less likely to migrate as

compared to families with lower economic index. Most of the migration takes place in recent past as compared to remote past however the level of significance is low (<0.10). Singh (2005) in his study also revealed that the prior migrants are best predictor for migration at micro level whereas education level of the village is not so significant in the models.

Table 4: Contingency Table for Hosmer–Lemeshow test

Classes	migrant = 0		migrant = 1		Total
	Observed	Expected	Observed	Expected	
1	64	60.21	4	7.78	68
2	55	55.35	13	12.64	68
3	47	50.24	21	17.76	68
4	43	44.09	25	23.90	68
5	38	39.34	31	29.65	69
6	30	32.65	39	36.34	69
7	35	27.57	33	40.42	68
8	19	22.11	49	45.88	68
9	16	16.18	51	50.81	67
10	9	8.20	53	53.79	62
Total					675

Statistical Significnance Result	
-2 Log likelihood	767.10
Nagelkerke R Square	0.30
Chi-square	7.58
df	8
Signi-ficance	0.47

The Hosmer–Lemeshow test results ($\chi 2$ = 7.586, 8 degrees of freedom, P = 0.475) indicate that the goodness of fit is satisfactory. The Nagelkerke R^2 value was 0.30, indicating that the model is a reasonable approximation for predicting out-migration. The contribution of the explanatory variables in the prediction is statistically significant; however the lower R^2 indicates the effect size may be small. The reason of this may be the multicollinearity of the variables or the combination of categorical and continuous variables as explanatory variables in the model.

4. Conclusion

Category as well as landholding size along with less rainfall are the major factors found to be associated with the process of migration. In Bundelkhand region from rural areas, education which is one of the important determinants of migration in other studies of the different regions does not reflect any effect towards migration decision in lower or middle caste. During study it was found that the main reason of out-migration in the district is livelihood stress because of low agriculrural productivityof the crops due to erratic rainfall pattern. If the efforts has been made by the Government towards the strengthening of agriculture in the district by using improved technologies (less water intensive crops, new varieties) , changes in cropping system or the industrialization of the district to provide the employment opportunities to landless or unemployed than only the migration from Bundelkhand can be minimized.

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