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Analyzing Socio-economic Characteristics of Households in Plateau State, Nigeria

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This study aims at understanding the differences in the socio-economic characteristics of households focusing on the relationship between environmental degradation and poverty as a result of tin mining activity on environment and livelihood in Plateau state. The objectives of the study are to investigate the relationship between environmental degradation and poverty of households, identify the effects of environmental degradation and the consequences of tin mining activity on poverty and examine the differences in the socio-economic characteristics of households in the study area. The hypotheses tested in the study are that there are differences (null H_0) and there no differences (alternate H_1) in the socio-economic characteristics of households in Plateau state. The research method was based on primary data which were generated through a structured questionnaire administered to 1,600 households in the study area. The scope of the study covered 8 out of the 17 local government areas in the state. A total of 1,600 households were randomly selected out of which 1,540 questionnaires were retrieved and valid for the analysis, while 60 were not retrieved. The methods of data analysis were descriptive using frequency distributions, percentages and inferential method that employed the use of Pearson Chi-Squares (X^2) method. The result of the analysis indicated that there were no significant differences in some socio-economic characteristics namely gender, age and marital status while in some such as level of qualification and composition of community-based association there were none. Furthermore, findings of the study revealed that the Chi-Squares analysis of the socio-economic characteristics and the relationship between environmental degradation and poverty were all significant at 5% level. In conclusion, the study examined the relationship between environmental degradation and poverty, and the effects of tin mining activity on households in Plateau state. Aside from the theoretical explanations of what households perceive as causes of environmental degradation and poverty based on the differences in their socio-economic characteristics, a number of explanatory variables that relate to the environment were captured to explain the effects of tin mining activity such as farmland size, demand for land, farmland fertility, mine pits, ponds and dams as well as the creation of gully erosion in the study area. The study recommended the need for government at all levels and the private sector to address the issue of such differences with a view to promoting environmental safeguards and ameliorating the poverty level of households in the state.

Keywords: Analysis, socio-economic, characteristics, households, Plateau, State.

Introduction

Plateau State, Nigeria is richly endowed with human population of 3,178,712 with a projection of 3,670,000 people and a variety of natural resources that include land, water as well as solid mineral deposits, namely, tin and columbite **(**National Population Commission, 2006; 2011). In 1998, Olaniyan and Haruna reported that the leading global natural and environmental resources of the nineteenth and twentieth centuries were tin and petroleum both of which formed the foundation of Nigeria's economy. Tin as a solid mineral also known as cassterite was first discovered in Nigeria in the early 1900s dominated most of the world's commodity production and commerce for well over half a century. Because of its economic importance and new discoveries of its wide range uses

especially beginning from the early twentieth century, it became a classical example of a nation-building comparative advantage around its resource base for which geographic linkages between it and many industries became substantially strong. More importantly is the phenomenon of globalization which has successfully captured the public imagination and attention and unsettling environmental change resulting to knowledge-intensive high-technology enterprise and the high demand for tin (Zogore, 2014; 2017). This development resulted to the devastating of the Jos Plateau environment as its landscape was altered by open-cast tin mining that created paddocks, mine pits, ponds and dams, gully erosion, farmland fertility and shortage of farmland thus affected people's livelihoods.

Literature Review

The relationship between environmental degradation and poverty can be complex and multi-dimensional. This also applies to their concepts as perceived by many people (Sen, 1999; Sachs, 2006; Zogore, 2012). In Plateau State in particular and Nigeria in general, the implication of environmental degradation on productivity on available natural resources such as water, fuel wood and other forest products have proven to have negative effects on people's economic activities. Greenwood and Holt (2010) asserted that the dynamics of changes in the availability and use of natural and environmental resources have adversely affected the environment and people's livelihoods.

In 2010 Koko argued that because the production and consumption processes of the natural and environmental resources have led to most of the problems and their effects which are not confined to sources of their origin alone have been aggravated by over exploitation of natural resources such as tin and columbite in the study area. The result of this is that the people of Plateau State have become more vulnerable to such shocks that threaten their livelihoods thus undermining their food security. Environment-poverty relationship is usually dynamic and context specific, notably in terms of geographic location, household composition and social groups, gender and age of the head of the household, social and cultural characteristics of individuals as well as the scale and economic status. These are factors that influence environment-poverty linkages and socio-economic characteristics of households.

Wright and Czelusta (2007) argued that there exists a causal relationship between resource "curse" and poverty. The main perception behind the resource "curse" theory is that natural and environmental resources such as tin, oil and gas abundance generates negative development outcomes. According to Di John (2010), these outcomes include poor economic performance, growth collapses, environmental degradation, and high level of corruption, poor governance and greater political violence. These outcomes have resulted to high unemployment and poverty rates in resource-dependent countries such as Nigeria, Angola and Venezuela. Sachs and Warner (2005) indicated that studies based on post-war experiences argued that the "curse" of natural and environmental resources is a demonstrated empirical fact, as almost without exception, the resource abundant countries have stagnated in economic growth since the early 1970s.

Aside from assessing the socio-economic characteristics of households, the empirical research undertaken for the study included investigating the relationship between environmental degradation and poverty focusing on degraded land as a result of tin mining activities in the study area. The existing relationship between environmental degradation and poverty is not contestable because many studies have confirmed this relationship (Sachs, 2006, 2008; Debie, 2012; Zogore, 2012; 2017; Gore, 2013). This relationship is complex and multifaceted because of the definition and processes involved in improving environmental quality and alleviating poverty. According to Pearson (2013), the

implications of environmental degradation could be expected on reduced productivity of soils. A research study carried out by Zogore (2017) indicated that the total estimated areas affected by sheet and rill erosion and major gully sites in the study area were 6, 078.36km^2. Plates 1 and 2 depict the various processes and types of environmental degradation sites in the study area.

Plate 1: A Quarry Site, Jos South Local Government Area

Plate 2: Gully Erosion Site, Bassa Local Government Area

Methodology and Method of Data Analysis

The Study Area, Sampling Technique, Procedure and Data Collection

Plateau State is located in the north central geo-political region of Nigeria as shown in Figure 1 (Map of Nigeria). According to the National Population Commission (2006), the population and demographic characteristics of the State show that it made up of 17 local government areas with a population of 3,178,712 people. Out of this figure, the study area which consists of 8 local government areas, namely Barkin Ladi, Bassa, Bokkos, Jos East, Jos North, Jos South, Mangu and Riyom has a population of 1,788,686 people which represents 56.27% of the State's population. Figure 2 (Map of Plateau State) shows the study area.

The research **s**ampling which is a process of examining a representative set of a specific area. This is because the objectives of the study are to gain an understanding of some attributes of the sampled households in the study area based on their socio-economic characteristics, economic-poverty related factors, effects of environmental degradation on poverty and the consequence of tin mining on environment. For this study, a multistage stratified sampling technique which implies that sampled households can be divided into strata or group(s), for instance, males, females, age and gender through a random sampling procedure was used to select a sample of 200 households from each of the 8 local government areas as respondents. This gave a total of 1,600 households-a sample considered to be sufficient for the scope of this study. The study used mainly data which were generated through a structured questionnaire and administered to 1,600 households in the study area.

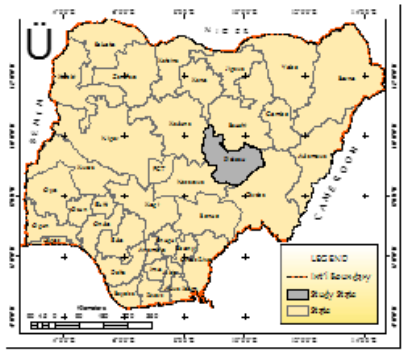

Figure 1: Map of Nigeria Showing Plateau State. -----

--Figure 2: Map of Plateau State Showing the Study Area.

Data Analysis and Results

Both descriptive and quantitative methods using Pearson Chi-Squares (X^2) distribution model were employed to analyze the data generated from the field**.** The descriptive analysis is contained in Tables 1 and 2**.** Table 1 show that a total of 1016 people or 66% and 524 or 34% were males and females, respectively. With respect to age, those within the age groups of 26 and 30 constitute 35.1%, while the least were those within the age group of 46 years and above. In an agrarian economy such as that of Plateau state, those households who fell within 18-25 and26-30 age brackets could be considered to be young and have implications for household labour which could lead to increased income and food supplies in the households. Analysis of the family size indicates that a total of 1324 people were married, while those in the category of single and separated were 108 or 7% in each case. With regard to the level of qualification, a total of 1005 or 65.26% were those who had primary qualification, while 200, 175, 105 and 55 were those who had non-formal, tertiary, secondary and koranic qualification. In terms of occupation, civil servants were the highest (1108), while farmers and others were the lowest (432).

With regard to the quantitative method, inferential analyses, the results of Pearson Chi-Squares statistics are presented in Tables 2, 3 and 4, respectively. The result in Table 2 reveals that there were no significant differences in the characteristics with regard to gender, age, marital status, school attendance, sources of water in the dry season and source of domestic fuel for lighting. As also portrayed in Table 2, the above characteristics were significant at 5% level. This is because the probability values of the respective Pearson Chi-Squares statistics were greater than 0.05. Hence, the null hypotheses for each of the aforestated variables were accepted and the alternate rejected at 5% level of significance. Furthermore, findings of the study as portrayed in Table 2 reveal that the above listed socio-economic characteristics were all significant at 5%level of significance. With regard to gender, for example, the calculated X^2 is 32.797, while the tabulated value is 14.1. Since the calculated X^2 is more than the tabulated value, the null hypothesis (H_0) is rejected and the alternate (H_1) is accepted. Hence, there is a significant difference in the socio-economic characteristics of households in terms of gender which is confirmed by the asymptotic significant value of 0.000 which is less than 0.05. This result is also applicable to age, marital status, school attendance, source of water in dry season as well as source of domestic fuel for lighting and other uses. However, there were no significant differences in the socio-characteristics with respect to the level of qualification and tin mining community-based association because the calculated Chi-Squares values of 4.768 and 12.576, and the tabulated Chi-Squares values of 14.1 in each case (Appendix 1).

Findings of the study as shown in Table 3 reveal that the calculated Pearson Chi-Squares analyzed values were greater than the tabulated Chi-Squares values at 5% level of significance since the tabulated Chi-Squares values at 5% level of significance are 23.7 at 14 Df, and 32.7 at 21 Df, respectively. The implication of this result is the rejection of the null (H_1) hypothesis while the alternate (H_0) was accepted which is related to the variables analyzed.

Table 1: Socio-economic Characteristics of Households

Characteristics	Frequency	Percentage
Gender		
Male	1016	66.0
Female	524	34.0
Age		
18-25 years	200	13.0
26-30 years	540	35.1
31-35 years	400	26.0
36-45 years	292	19.0
46 years and above	108	7.0
Marital Status		
Married	1324	86.0
Single	108	7.0
Separated	108	7.0
Family Size		
Below 2	324	21.0
2-4	900	58.4
5-6	92	6.0
7-8	224	14.5
Level of Qualification		
Non-formal	200	12.98
Primary	1005	65.26
Koranic	55	3.57
Secondary	105	6.82
Tertiary		
Occupation	175	11.36
Farming	216	14.05
Civil Servant	1108	71.90
Others	216	14.05

Table 2: Result of Socio-economic Characteristics of Households: Pearson Chi-square (X^2) Test Result I

	Value	Df	Asymp. Sig. (2-sided)
Gender:			.000
Pearson Chi-Square	32.797[a]	7	.000
Likelihood Ratio	33.177	7	.797
Linear-by-Linear Association	.066	7	
Age:			
Pearson Chi-Square	78.877[a]	28	.000
Likelihood Ratio	80.551	28	.000
Linear-by-Linear Association	3.328	1	.068
Marital:			
Pearson Chi-Square	24.130[a]	14	.044
Likelihood Ratio	25.169	14	.033
Linear-by-Linear Association	.313	1	.576
Level of Qualification:			
Pearson Chi-Square	4.768[a]	7	.688
Likelihood Ratio	4.747	7	.691
Linear-by-Linear Association	.243	1	.622
Currently Attending School:			
Pearson Chi-Square	40.811[a]	7	.000

Likelihood Ratio	40.957	7	.000
Linear-by-Linear Association	6.053	1	.014
Tin Mining Community-based Association:			
Pearson Chi-Square	12.576[a]	7	.083
Likelihood Ratio	12.664	7	.081
Linear-by-Linear Association	.696	1	.404
Sources of Water in Dry Season:			
Pearson Chi-Square	101.825[a]	28	.000
Likelihood Ratio	102.536	28	.000
Linear-by-Linear Association	2.711	1	.100
Source of Domestic fuel for lighting and other uses:	45.352[a]	7	.000
Pearson Chi-Square	46.942	7	.000
Likelihood Ratio	10.917	1	.001
Linear-by-Linear Association			

Source: *Author's Analysis, 2017*

Table 3: Result of the Differences in Socio-economic Characteristics of Households: Pearson Chi-square (X^2) Test Result II

	Value	**Df**	**Asymp. Sig. (2-sided)**
Family Size:			
Pearson Chi-Square	76.210a	21	.000
Likelihood Ratio	82.892	21	.000
Linear-by-Linear Association	.024	1	.876
Year of Commencement of Tin Mining Activity			
Pearson Chi-Square	75.140[a]	14	.000
Likelihood Ratio	74.015	14	.000
Linear-by-Linear Association	1.400	1	.237
Vocational Training:			
Pearson Chi-Square	50.742[a]	7	.000
Likelihood Ratio	51.750	7	.000
Linear-by-Linear Association	1.337	1	.248
Environmental Resource use:			
Pearson Chi-Square	88.541[a]	14	.000
Likelihood Ratio	87.064	14	.000
Linear-by-Linear Association	3.438	1	.064
Occupation:			
Pearson Chi-Square	63.766[a]	14	.000
Likelihood Ratio	66.230	14	.000
Linear-by-Linear Association	1.111	1	.292
Sources of Water in Rainy Season:			
Pearson Chi-Square	109.150[a]	21	.000
Likelihood Ratio	117.252	21	.000
Linear-by-Linear Association	.806	1	.369
Employment Status:			
Pearson Chi-Square	136.843[a]	21	.000
Likelihood Ratio	133.529	21	.000
Linear-by-Linear Association	3.122	1	.077
Source of Domestic fuel for cooking and heating:			
Pearson Chi-Square	132.389[a]	28	.000
Likelihood Ratio	138.655	28	.000
Linear-by-Linear Association	2.361	1	.124
Age Group of Miners:			
Pearson Chi-Square	119.994[a]	21	.000
Likelihood Ratio	112.833	21	.000
Linear-by-Linear Association	2.511	1	.113

Source: *Author's Analysis, 2017*

The result of the study as depicted in Table 4 shows that there is a significant relationship between environmental degradation and poverty incidence of households as indicated by the asymptotic significant probability value of 0.000 in all the cases.

Table 4: Result of Chi-square (X^2) Test III Showing the Relationship between Environmental Degradation and Poverty

	Value	Df	Asymp. Sig. (2-sided)
Effect of Tin Mining on Farmland Size:			.000
Pearson Chi-Square	2071.367[a]	12	.000
Likelihood Ratio	2067.000	12	.000
Linear-by-Linear Association	142.141	1	
Effect of Tin Mining on Demand for Land:			
Pearson Chi-Square	1433.441[a]	12	.000
Likelihood Ratio	1503.933	12	.000
Linear-by-Linear Association	19.399	1	.000
Effect of Tin Mining on Farmland Fertility:			
Pearson Chi-Square	2177.480[a]	12	.000
Likelihood Ratio	2364.788	12	.000
Linear-by-Linear Association	42.451	1	.000
Effect of Tin Mining on Mine pits, ponds and dams:			
Pearson Chi-Square	1373.806a	8	.000
Likelihood Ratio	1524.368	8	.000
Linear-by-Linear Association	341.144	1	.000
Effect of Tin Mining on Gully Erosion:			
Pearson Chi-Square	2368.5858[a]	12	.000
Likelihood Ratio	2336.325	12	.000
Linear-by-Linear Association	195.612	1	.000

Source: *Author's Analysis, 2017.*

Conclusion and Recommendations

In conclusion, the study assessed socio-economic characteristics and the relationship between environmental degradation and poverty of households due to tin mining activities in Plateau State, Nigeria. The study also analyzed the socio-economic characteristics of households and revealed that human-cause such as tin mining activity and natural-induced cause such as ecological erosion have resulted in the growing differences in the socio-economic characteristics of households in Plateau state. The result of the analysis is depicted by the various dimensions of environmental degradation in plates 1 and 2. Based on the analysis, the result showed that there were no significant differences in some of the socio-economic characteristics like gender, age, marital status, school attendance, and source of water in the dry season, source of domestic fuel for lighting and other uses. However, there was a significant relationship between environmental degradation and poverty incidence of households in the study area because of the effects of tin mining activities on farm land size, demand for land, farmland fertility, mine pits, ponds and dams as well as gully erosion.

Based on the findings of the study, it is recommended that environmental concerns relating to the activities of various sectors of the economy through advocacy should capture and address the essential linkages between ecological and poverty problems, their causes, effects and solutions. A law regulating mining must be enacted for the protection of the environment to ensure the restoration of the mined land by reclaiming and re-vegetating all the areas of the soils that have been devastated by the mining activities for the economic uses of the mined areas. It is further recommended that there should be proper management of the

environment by the natural resource mining actors under the strict supervision of government at all levels where such a project is being undertaken with a view to balancing the local communities' needs of lifting them out of poverty against the carrying capacity of the environment.

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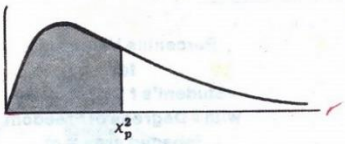
Appendix I

Percentile Values (χ^2_p)
for
the Chi-Square Distribution
with ν Degrees of Freedom
(shaded area = p)



ν	$\chi^2_{.995}$	$\chi^2_{.99}$	$\chi^2_{.975}$	$\chi^2_{.95}$	$\chi^2_{.90}$	$\chi^2_{.75}$	$\chi^2_{.50}$	$\chi^2_{.25}$	$\chi^2_{.10}$	$\chi^2_{.05}$	$\chi^2_{.025}$	$\chi^2_{.01}$	$\chi^2_{.005}$
1	7.88	6.63	5.02	3.84	2.71	1.32	.455	.102	.0158	.0039	.0010	.0002	.0000
2	10.6	9.21	7.38	5.99	4.61	2.77	1.39	.575	.211	.103	.0506	.0201	.0100
3	12.8	11.3	9.35	7.81	6.25	4.11	2.37	1.21	.584	.352	.216	.115	.072
4	14.9	13.3	11.1	9.49	7.78	5.39	3.36	1.92	1.06	.711	.484	.297	.207
5	16.7	15.1	12.8	11.1	9.24	6.63	4.35	2.67	1.61	1.15	.831	.554	.412
6	18.5	16.8	14.4	12.6	10.6	7.84	5.35	3.45	2.20	1.64	1.24	.872	.676
7	20.3	18.5	16.0	14.1	12.0	9.04	6.35	4.25	2.83	2.17	1.69	1.24	.989
8	22.0	20.1	17.5	15.5	13.4	10.2	7.34	5.07	3.49	2.73	2.18	1.65	1.34
9	23.6	21.7	19.0	16.9	14.7	11.4	8.34	5.90	4.17	3.33	2.70	2.09	1.73
10	25.2	23.2	20.5	18.3	16.0	12.5	9.34	6.74	4.87	3.94	3.25	2.56	2.16
11	26.8	24.7	21.9	19.7	17.3	13.7	10.3	7.58	5.58	4.57	3.82	3.05	2.60
12	28.3	26.2	23.3	21.0	18.5	14.8	11.3	8.44	6.30	5.23	4.40	3.57	3.07
13	29.8	27.7	24.7	22.4	19.8	16.0	12.3	9.30	7.04	5.89	5.01	4.11	3.57
14	31.3	29.1	26.1	23.7	21.1	17.1	13.3	10.2	7.79	6.57	5.63	4.66	4.07
15	32.8	30.6	27.5	25.0	22.3	18.2	14.3	11.0	8.55	7.26	6.26	5.23	4.60
16	34.3	32.0	28.8	26.3	23.5	19.4	15.3	11.9	9.31	7.96	6.91	5.81	5.14
17	35.7	33.4	30.2	27.6	24.8	20.5	16.3	12.8	10.1	8.67	7.56	6.41	5.70
18	37.2	34.8	31.5	28.9	26.0	21.6	17.3	13.7	10.9	9.39	8.23	7.01	6.26
19	38.6	36.2	32.9	30.1	27.2	22.7	18.3	14.6	11.7	10.1	8.91	7.63	6.84
20	40.0	37.6	34.2	31.4	28.4	23.8	19.3	15.5	12.4	10.9	9.59	8.26	7.43
21	41.4	38.9	35.5	32.7	29.6	24.9	20.3	16.3	13.2	11.6	10.3	8.90	8.03
22	42.8	40.3	36.8	33.9	30.8	26.0	21.3	17.2	14.0	12.3	11.0	9.54	8.64
23	44.2	41.6	38.1	35.2	32.0	27.1	22.3	18.1	14.8	13.1	11.7	10.2	9.26
24	45.6	43.0	39.4	36.4	33.2	28.2	23.3	19.0	15.7	13.8	12.4	10.9	9.89
25	46.9	44.3	40.6	37.7	34.4	29.3	24.3	19.9	16.5	14.6	13.1	11.5	10.5
26	48.3	45.6	41.9	38.9	35.6	30.4	25.3	20.8	17.3	15.4	13.8	12.2	11.2
27	49.6	47.0	43.2	40.1	36.7	31.5	26.3	21.7	18.1	16.2	14.6	12.9	11.8
28	51.0	48.3	44.5	41.3	37.9	32.6	27.3	22.7	18.9	16.9	15.3	13.6	12.5
29	52.3	49.6	45.7	42.6	39.1	33.7	28.3	23.6	19.8	17.7	16.0	14.3	13.1
30	53.7	50.9	47.0	43.8	40.3	34.8	29.3	24.5	20.6	18.5	16.8	15.0	13.8
40	66.8	63.7	59.3	55.8	51.8	46.6	39.3	33.7	29.1	26.5	24.4	22.2	20.7
50	79.5	76.2	71.4	67.5	63.2	56.3	49.3	42.9	37.7	34.8	32.4	29.7	28.0
60	92.0	88.4	83.3	79.1	74.4	67.0	59.3	52.3	46.5	43.2	40.5	37.5	35.5
70	104.2	100.4	95.0	90.5	85.5	77.6	69.3	61.7	55.3	51.7	48.8	45.4	43.3
80	116.3	112.3	106.6	101.9	96.6	88.1	79.3	71.1	64.3	60.4	57.2	53.5	51.2
90	128.3	124.1	118.1	113.1	107.6	98.6	89.3	80.6	73.3	69.1	65.6	61.8	59.2
100	140.2	135.8	129.6	124.3	118.5	109.1	99.3	90.1	82.4	77.9	74.2	70.1	67.3

Source: Catherine M. Thompson, *Table of percentage points of the χ^2 distribution*, Biometrika, Vol. 32 (1941), by permission of the author and publisher.