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Development Impact of Rubber Estates on Fringe Communities in Nigeria

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Abstract

Economic development is the core objective for establishing rubber industry in Nigeria. The objective that was set for this study was to find out whether or not the establishment of rubber estates in some parts of Nigeria has contributed to social and economic development of the host(fringe) communities. A simple random sampling technique was used to select a sample size of 210 respondents. Well-structured questionnaires and interview schedule were used to collect primary data. Descriptive statistics (mean, mode, frequency, percentage and tables) and inferential statistics (Logit regression model) were used to analyze the information that were collected on the opinion of the people with respect to the social and economic impact of rubber estates in the communities. We found out that the major social impact of rubber estate on fringe communities were identified to be mass migration (influx) of people into the communities ($p<0.01$) and provision of education facilities ($p<0.05$). Economic impact of rubber estate on fringe communities were, establishment of auxiliary industries ($p<0.01$) and provision of employment ($p<0.05$). The employment and income multiplier index of the rubber estate on fringe communities were computed to be 30.53% and 45.84% respectively. We recommend that Government and development agencies should establish more rubber estates for community and national development. Measures should be put in place to ensure that rubber estates provide due benefits to fringe communities as a form of social responsibility.

Keywords: Social, economic, impact assessment, rubber estates, fringe communities.

Nijerya'da Kauçuk Arazilerin Kenar Topluluklarına Etkilerinin Geliştirilmesi

Öz

Ekonomik gelişme Nijerya'da kauçuk endüstrisi kurmanın temel amacıdır. Bu çalışma için belirlenen amaç, Nijerya'nın bazı bölgelerinde kauçuk sitelerin kurulmasının, ev sahibi (saçak) topluluklarının sosyal ve ekonomik gelişimine katkıda bulunup bulunmadığını bulmaktı. 210 kişiden oluşan örneklem büyüklüğünü seçmek için basit bir rastgele örnekleme tekniği kullanılmıştır. Birincil verileri toplamak için iyi yapılandırılmış anketler ve görüşme programı kullanılmıştır. Tanımlayıcı istatistikler (ortalama, mod, sıklık, yüzde ve tablolar) ve çıkarımsal istatistikler (Logit regresyon modeli), topluluklardaki lastik sitelerin sosyal ve ekonomik etkilerine ilişkin olarak halkın görüşü üzerine toplanan bilgileri analiz etmek için kullanılmıştır. Kauçuk sitenin, saçak topluluklar üzerindeki ana sosyal etkisinin, insanların topluluklara toplu göç (akınım) ($p <0.01$) ve eğitim tesislerinin sağlanması ($p <0.05$) olduğunu tespit ettik. Kauçuk sitelerinin saçak toplulukları üzerindeki ekonomik etkisi, yardımcı sanayilerin kurulması ($p <0.01$) ve istihdam sağlanmasıdır ($p <0.05$). Saçak topluluklardaki kauçuk mülkün istihdam ve gelir çarpanı endeksi sırasıyla% 30,53 ve% 45,84 olarak hesaplanmıştır. Hükümet ve kalkınma ajanslarının, toplum ve ulusal kalkınma için daha fazla kauçuk alan oluşturmasını tavsiye ediyoruz. Kauçuk sitelerin, sosyal sorumluluk alanı olarak saçaklı topluluklara gerekli yararlar sağladığından emin olmak için önlemler alınmalıdır.

Anahtar Kelimeler: Sosyal, ekonomik, etki değerlendirmesi, kauçuk arazileri, kenar topluluklar.

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1. Introduction

Rubber (*Hervea brasiliensis*) is a perennial dicotyledonous plant which belong to the family Euphorbiaceae and grown commercially over millions of hectares and capable of being exploited for 35 years (Aghimen, et. al 1997). Natural rubber derives from the Pará rubber tree, is also referred to as the rubber tree. Natural rubber is often known and called the India Rubber.

Fig. 1: A natural rubber tree.

It is an elastomer mostly derived from latex, a milky colloid produced by rubber tree. It has many industrial uses due its natural features of being highly waterproof, resilient, and elasticity. As a result, many nations tend to develop their rubber industries or depend on other countries in as to satisfy their domestic demand for natural rubber (Statistica, 2018).

Available statistics show the aggregate global production of natural rubber from 2000 to 2018. A total of 6.8 million metric tons of natural rubber were produced globally in the year 2000. Global production of natural rubber followed consumption patterns. In 2016, some 12.4 million metric tons of natural rubber was produced worldwide, a considerable increase since 2000, when the global natural rubber production was 6.8 million metric tons (Statistica, 2018).

Until 2017, this amount rose to more than 13.5 million metric tons. In the first quarter of 2018, the production figure stood at 3.23 million metric tons. This statistic shows the leading countries worldwide by consumption of natural rubber from 2013 to 2017. Japan ranked fifth in 2017, where around 679,000 metric tons of natural rubber was consumed that year. The United States is the world's third largest consumer of natural rubber.

Accordingly, the global consumption of natural rubber is considerable. In 1995, natural rubber consumption amounted to 5.95 million metric tons, and in 2016, it reached a peak of nearly 12.6 million metric tons, which shows a doubling of consumption in 21 years (Statistica, 2018). China has been reported as the largest consumer of natural rubber worldwide, consuming up to 5.3 million metric tons in 2017. China has a variety of manufacturing uses of natural rubber such as automobile tire. China however produces only a portion (1/4) of their natural rubber consumption. In 2016, China produced 774 thousand metric tons. It is estimated that China will scale up the production of natural rubber to 1.4 million metric tons by 2020. As it stands, China is investing substantially in research and development of rubber product manufacturing (Statistica, 2018).

In Nigeria, rubber estate was first established in Sakponba in Edo state, Nigeria in 1906.The second estate was located at Adiaba in Cross River state, Nigeria between 1948 and 1967 there was already a strong nucleus of plantations (1150, 000Ha). This was complemented by a large small holder sector (111,205,000ha). Rubber is an important cash crop which contributed sustainably to the Nigerian economy prior to the oil boom (Aghimien, 1997).

In Nigeria rubber is grown in Edo, Delta, Ondo, Ogun, Abia, Anambra, Akwa Ibom, Cross River, Rivers, Ebonyi, and Bayelsa States where the amount of rainfall is between 1,800 mm and 2,000 mm per annum (Aigbekaen, et. al. 2000; Abolagba, et. al. 2003.). The products serve not only as raw materials for local and foreign industries but also as a source of local revenue and foreign exchange (Ogowewo 1987).

Nigeria was the biggest producer of natural rubber in Africa and ranked sixth in the world contributing about 159,264 tons annually (3 percent of the world output) (FAOSTAT, 2017). Consequently it contributed immensely to the Nigeria economy within these periods. However there has been a general decline in rubber production in Nigeria over the past two decades both in the area under cultivation and total output. Rubber is one of the main agricultural commodities boosting Nigeria's agricultural exports. Though, the rubber plantations in Nigeria, contributed a lot to the economy, there are controversies as to its social impact, economic impacts, employment and income multiplier effects on the cash economy of fringe communities.

Underdevelopment of fringe communities is characterized by low low per capita income, low literacy and lack of basic social amenities. Industrialization through rubber estates could reverse the process of underdevelopment in fringe communities. Neoliberal development theory emphasizes gradual peole-centred industrialization which trickle down to benefits to all groups and classes (URL-1, 2018).

Development needs to be viewed as "qualitative improvements, and it must include social, economical measures (Manning 1990,). The rural-urban fringe is well recognized as a region of ambiguity {Bunce, 1981). A fringe society is an area characterized by an existing degree of rurality associated with agriculture and small communities, a social and economic landscape markedly different from the city (Beesley, 1993). The various features of fringe society include actors, e.g., farmers and non-farmers, urban and rural inhabitants, plan makers, local administrators, special interest groups, and individuals. conservationists and developers (Beesley, 1993).

Sustainable development of fringe society requires a synergy attained through concurrent and directed actions at local scales. The development dimension of fringe community is environmental, economic, social, and employment growth (Beesley,1993).

Crombie (1990) opined that for human life to be complete, it needs the city, food and raw materials gained from the country. It emphasized the unity of people, industry and the land.

Irrespective of the significance of rubber industry at national level, its impact on the fringe communities (neighboring communities) is not yet clear as noted in different articles, publications and debates (Mihirlal et al. 2014; Abhik et al. 2014; Okuneye et al.1998). The essence of this study was to examine the linkage between the establishment of rubber estates and development of rural fringe.

This study provided answers to the following pertinent questions: What are the social impacts of rubber estate on fringe communities? What are the economic impacts of rubber estate on fringe communities? What is the employment multiplier effect of rubber estate on the fringe communities?

The broad objective set for the study was to assess the impact of rubber estate on fringe community while the specific objectives are to:

i. assess the social impact of rubber estate in fringe communities;
ii. ascertain the economic impact of rubber estate in fringe communities;
iii. determine the employment multiplier effect of the rubber estate on fringe communities in the study area.
iv. evaluate the income multiplier effect of the rubber estate on fringe communities in the study area.

2. Materials and Methods

2.1. Description of Study Area and Sampling Technique and Sample Size

This study was carried out in the fringe communities of rubber estate comprising of Oghara (Ethiope-West Local Government Area), Amukpe (Okpe Local Government Area), Umutu and Otagba- Unor (Ndokwa- West Local Government Area) in Delta state, Nigeria (Fig. 1). This area was chosen for the study area because of the existence of Rubber estates and their influence on the livelihoods of the community people. Simple random sampling technique was used in composing the sample for the study. The sample size was 210 respondents.

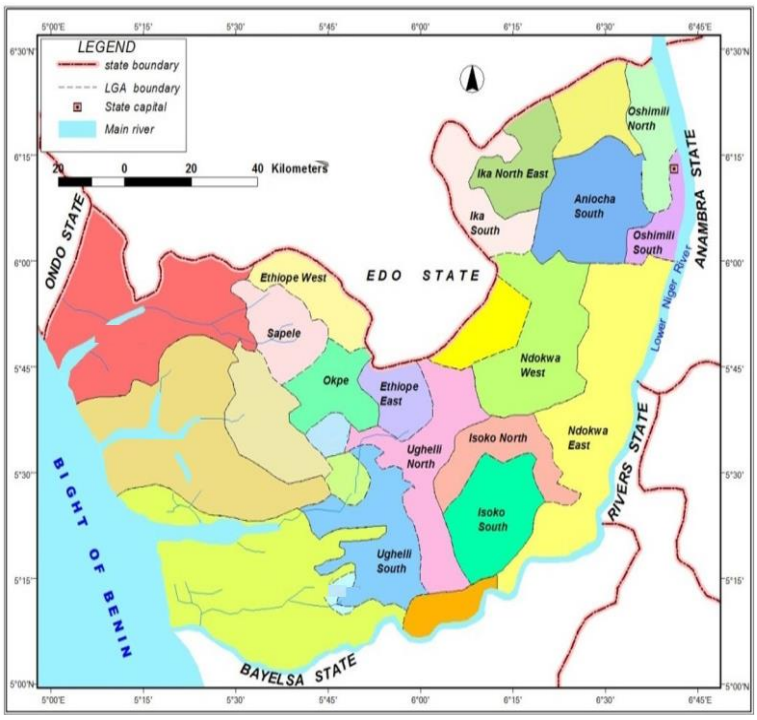

Fig. 2 The map of Delta state showing the study area.

The overall sample size was obtained using Yamane's formula (Yamane, 1973). It is stated as:

$$n = \frac{N}{1+N(e)^2}$$

Where:
n = sample size to the nearest whole number
N= sample frame (3 LGAs (Communities) x 160 persons = 480 people)
E = tolerable error term (0.05) or error margin of 5% or confidence level of 95%.

$$n = \frac{480}{1 + 480(0.05)^2}$$

N = 218 respondents.

That is 45% of the population. A total of 218 copies of the questionnaire were administered to respondents but 210 copies were correctly filled and used for analysis. Hence respondents' response performance is 96%. The sample was divided into 2 groups (i.e staff of rubber estates and indigenes). A total of 50 workers of rubber estates and 160 indigenes of the fringe communities around the rubber estates were involved in the study.

2.2.Methods of Data Collection and Data Analysis

Structured questionnaire and interviews scheduled were adopted as instruments for data collection and were written in English and some questions were translated to the native languages by the researcher and answer given were filled into the questionnaires in order to communicate with those persons that can neither read nor write. Hence primary data were used for the study, while secondary data were obtained from published and unpublished material.

Collected data were analyzed using frequency distribution, percentage and logit model or probit regression which is a type of regression where the dependent variables can take only two values, for example married or not married. Hence it was used to determine the socio economic characteristics of people in the fringe communities.

The logit model is stated in implicit form as:

IMP=F $(X_1X_2X_3X_4X_5X_6)$ Equation 1

Where: IMP= impact; F function; Xi= independent or explanatory variables

$$logitmodel = In\left(\frac{Pi}{1-pi}\right) = \sum_{x=0}^{x=n} \beta\, xXix \quad \text{Equation 2}$$

Standard logistic distribution of errors

logit model specification:

$$p_{1\_} = B_0 + B_1X_1 + B_2X_2 + \ldots\ldots\ldots\ldots + B_6X_6 + e_i \quad \text{Equation 3}$$

$$\Phi^{-1}(p_1) = \sum_{x=0}^{x=n} \beta\, xXix \quad \text{Equation 4}$$

P denotes probability
Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution.
The parameters β are typically estimated by maximum likelihood.

2.2.1. Model Specification
2.2.1.2. Social Impact

The model for calculating the social impact is stated below;

P=F (PPW, M, HCF, PS, EF, PR) + ei Equation 5

P=Probability that an impact was created; PPW=Provision of pipe borne water; E= Emigration; HCF= Health care facilities; PS= Provision of scholarship; EF= Educational facilities; PR= Provision of roads.

The equation is explicitly expressed as;

$$p_{1\_} = B_0 + B_1X_1 + B_2X_2 + \ldots\ldots\ldots\ldots + B_6X_6 + e_i \quad \text{Equation 6}$$

Where = $B_0 + B_6$ is regression co-efficient to be estimated.

B_0=intercept term; e_i= error term; P= Probability that an impact was created
X_1= provision of pipe borne water; X_2= Emigration; X_3= health care facilities

X_4=Provision of scholarship; X_5= Educational facilities; X_6=Provision of roads

2.2.1.3. Economic Impact Model

The model for calculating the economic impact is stated below;

P=F (E, AI, PE, RWG, AI, ISL) + ei Equation 7

P=Probability that an impact was created; AM= Availability of market; AI=Auxiliary industries; PE= Provision of employment; RWG= Recycle waste generated; AI= Attract investors; ISL=Improve standard of living.

The equation is explicitly expressed as;

$$p_{1\_} = B_0 + B_1X_1 + B_2X_2 + \ldots\ldots\ldots\ldots + B_6X_6 + e_i \quad \text{Equation 8}$$

Where = B1-B6 is regression co-efficient to be estimated;
B_0=intercept term; e_i= error term
P= Probability that an impact was created; X_1= Availability of market; X_2= Auxiliary industries; X_3=Provision of employment; X_4=recycle wastes generated; X_5= Attract investors; X_6=Improve standard of living.

2.2.1.4. Determination of Employment Multiplier Index (EMI) of rubber estate in fringe communities

Employment multiplier index (EMI) of rubber estate on fringe communities was analyzed using the percentage difference in total employment. The EMI model is specified as:

$$EMI = \frac{\sum CMER \times 100}{\sum \mathbf{E}} \qquad \text{Equation 9}$$

Where:
$\sum$CMER= number of community members employed outside rubber estate;
$\sum \mathbf{E}$ = number of community members employed outside rubber estate + number of community members employed in rubber estate.

2.2.1.5. Income Multiplier Index (IMI) of rubber estate in fringe communities

Income Multiplier Index (IMI) of rubber estate in fringe communities was analyzed using the income of employee of rubber estate as a proportion of total income earned by all employees in the fringe communities. The IMI model is specified as:

$$\mathbf{IMI} = \frac{\sum \mathbf{IER}}{\sum \mathbf{IAEC}} + \frac{100}{1} \qquad \text{(Okunomo and Achoja (2010)} \qquad \text{Equation 10}$$

Where:
IMI = Income Multiplier Index;
$\sum \mathbf{IER}$ == Total income of employees of rubber estate;
$\sum \mathbf{IAEC}$= Total income of all employees in the communities.
The following null hypotheses were tested to guide the study:
Ho_1: The rubber estate did not create significant social impact on fringe communities.
Ho_2: Rubber estate did not create significant economic impact on fringe communities.

3. Results

3.1. Social Impact of Rubber Estate in Fringe Communities

The social impact of the rubber estate in fringe communities in the study area was investigated using Pseudo R2(0.23). This implies that about 23.0% of the variation in fringe communities was explained by the independent variables included in the model. The remaining variation 76.7% was as a result of non-inclusion of some important explanatory variables or due to error. The chi-square test of the regression model was significant at alpha level of 1% and this means that social impact variables have significant composite effect in explaining the impact of rubber estate in fringe communities. From Table 1 the test of beta coefficient of the predicting variables in the model shoes that “migration” “educational facilities”. And Provision of roads were significant at 5% and 10% probability level in explaining the probability of rubber estate social benefit to fringe communities.

Migration:This was found to be inversely related to farmers welfare in fringe communities. This implies that the lower the rubber estate, the more the fringe communities benefits derived will be affected.
Provision of Educational facilities: This was significant and positively related to fringe communities benefits. However, the educational facilities conform to the apriori expectation in the model. The implication of this is that as educational facilities increases the benefits derived increases and the farmer would not consider the

negative effect but rather appreciate the individuals the individuals of the rubber estate around their community. This agrees with IUCN and NERI (2011) study which identified provision of school facilities as an impact of dak lak rubber plantation in saravan province of Laos.

Provision of roads: The coefficient of the provision of road is statistically significant and positively related to rubber estate in fringe communities. This conforms to apriori expectation and it implies that as provision of roads increases the tendency to benefit from rubber as rubber estate by fringe communities increases. IUCN and NERI (2011) also identified provision of road as an impact in saravan province.

Table 1: logistic regression on social impact variables of rubber estate on fringe communities.

Variable	Coefficient	Standard Error	Z	P>/Z/
Provision of pipe borne water	0.3138723	0.6929839	0.45	0.651
Emigration	-2.28389	0.7138189	-3.20	0.001**
Health care facilities	-0.1226622	0.7284669	-0.17	0.866
Educational facilities	1.354717	0.673193	2.01	0.044**
Provision of scholarship	0.2093454	0.14725	1.42	0.156
Provision of road	1.228647	0.6483082	1.90	0.058*
constant	-1.095593	0.5689114	-1.93	0.054

Pseudo R2 = 0.2328, LR CW2 (6) = 30.24, log likelihood = 49.836656
* = p< 0.05 and ** = p = 0.01

3.1.2.Marginal Effect of Social İmpact Variables of Rubber Estate on Fringe Communities

The marginal effect of the independent variable in the binary logistic regression analysis is presented in Table 2. The marginal effect (ME) explained by how many units the benefits of farmers of fringe communities changes if explanatory values selected changes by one unit.

Table 2 marginal effect of social impact variables on fringe communities.

Variable	Marginal (dy/dx)	Standard Error	Z	P>/Z/
Provision of pipeborne	0.0753468	0.16609	0.45	0.650
Emigration	-0.5089583	0.12195	-4.17	0.000**
Health care facilities	-0.0294761	0.17528	-0.17	0.866
Provision of scholarship	0.2093454	0.14748	1.42	0.156
Educational facilities	0.3177263	0.14725	2.16	0.031*
Provision of road	0.2757664	0.13045	2.11	0.035**

* = p< 0.05 and ** = p = 0.01).

3.2. Economic Impacts of the Rubber Estate on fringe Communities

Logit regression analysis using stata software package shows that most of the coefficient are consistent with the hypothesized relationships and their test of significance help to indicate their importance in explaining the economic impact of the rubber estate to the farmers in fringe communities. The parameters estimate for the model was evaluated at 1% level of significance.

The result for Logit regression (Table 3) revealed that apart from availability of markets" auxiliary firms attracted investors and recycling of waste generated which were found not statistically significant in explaining economic impact on fringe communities.

Table.3: Logistic regression on economic variables of rubber estate on fringe communities.

Variable	Coefficient	Standard Error	Z	P>/Z/
Availability of markets	0.4401069	0.542308	0.77	0.442
Auxiliary industry	-1.559144	0.6162635	-2.53	0.011*
Provision of employment	2.873671	1.077043	2.67	0.008*
Attract investors	0.141809	0.5911792	0.24	0.810
Improve standard of living	0.9183916	0.5562197	1.65	0.099
Recycle waste	0.001724	0.6066282	0.00	0.998
Constant	-3.458721	1.092009	-3.17	0.002*

Pseudo R2 = 0.2383, LR CHI2(6) = 27.86, log likelihood = -44.521754.
* = p< 0.05 and ** = p = 0.01

3.2.1. Marginal Effect of Economic Variables on Fringe Communities

The marginal effect of the independent variables in the binary logistic regression analysis is represented in Table 4. The marginal effect (ME) explained by how many units of benefit of farmers in the fringe communities changes if the explanatory variables selected changes by one unit.

Table.4: Marginal effect of Economic variables on fringe communities

Variable	Marginal (dy/dx)	Standard Error	Z	P>/Z/
Availability of market	0.0740116	0.0956	0.77	0.439
Auxiliary industry	-0.2358096	0.08791	-2.68	0.007*
Provision of employment	0.3447128	0.07278	4.74	0.000**
Attract investors	0.0242637	0.10182	0.24	0.812
Improve standard of living	0.1635347	0.10495	1.56	0.119
Recycle	0.0003043	0.103	0.00	0.998

* = p< 0.05 and ** = p = 0.01.

3.2.2. Employment Multiplier Index of Rubber Estate on Fringe Communities

$$EMI = \frac{\sum CMER \times 100}{\sum E \quad 1}$$

Where;
Total employment = not a staff of rubber estate + staff of rubber estate

$$= \frac{29}{29+66} \times \frac{100}{1}$$

$$= \frac{29}{95} \times \frac{100}{1} \quad = \quad 30.53\%$$

The result of the study indicates that the Employment Multiplier Index (EMI) of the Rubber Estate in the study area is 30.53%.

3.2.3. Income Multiplier Index (IMI) of Rubber Estate in Fringe Communities

Table 5 shows the result of statistical distribution of monthly income of respondents. The finding shows that the mean income for employees of rubber estate is #33,050, while that of other employees is #39,050.

Table 5: Statistical distribution of monthly income of respondents.

Income class (#)	Employees of rubber estate n = 50		Other employees n = 160	
	frequency	percentage	frequency	percentage
18,000 – 24,000	7	14.00	30	18.75
24,100 – 30,000	6	12.00	32	20.00
30,100 – 36,000	10	20.00	31	19.37
36,100 – 42,000	8	16.00	36	22.50
42,100 – 48,000	7	14.00	11	6.88
48,100 – 54,000	7	14.00	12	7.50
>54,000	5	10.00	8	5.00
Total	50	100	160	100

The Income Multiplier Index was computed as:

$$\mathbf{IMI} = \frac{\mathbf{33050}}{\mathbf{72100}} + \frac{\mathbf{100}}{\mathbf{1}}$$

= 45.84%.

This implies that the proportion of total income earned (45.84%) in the designated area was generated by employees of rubber estate. This is the income multiplier index of rubber estates in the study area.

4.Discussion

On the response scale, it was observed that migration had an inverse relationship with fringe communities. This suggests that if the migration of fringe communities increase by one unit, the benefit of farmer in fringe communities tends to decrease by -0.5089 units. This is highly significant with a Z value of 4.1 on the response scale for educational facilities the marginal effect has a positive value of 0.3177. This implies that an increase in the educational facilities of the fringe communities increases by one unit, the social impact will increase by 0.32% units. This is significant with Z value of 2.16.

The variable (provision of road) entered the model with a positive sign and is significant ($p<0.05$) with a Z value of 2.11. This shows that as the provision of roads increases by one unit, social impact derived by fringe communities increases by 0.2757 units.

Auxiliary industry, provision of employment and improved standard of living were statistically significant at 5% and 10% level.

Provision of employment: The positive sign and significant of the provision of employment variable implies that provision of employment is an important factor that will promote economic benefit to the farmers in fringe communities as a result of the rubber estate in the study area. This finding agrees with similar result by Okunomo and Achoja (2010) that African Timber and Plywood Company created positive impact on Sapele community through the creation of job opportunities and scholarship to the indigenes.

Improve standard of living: The study revealed that the rubber estate significantly improved standard of living of the people. This implies that the longer the rubber estate exist the more the corresponding increase in the welfare of people in the fringe communities. IUCN and NERI (2011) had earlier identified increased standard of living as dimension of impact rubber in the saravan province of Laos.

Auxiliary industry: was found to be negative and statistically significant. This sign is contrary to a prior expectation and implies that on inverse relationship exist between rubber estate and fringe communities in terms of economic benefits availability of markets and auxiliary industry and recycle of waste generated by the industry though not statistically significant has a positive correlation with the fringe communities. This sign is confirming to a prior expectation that direct relationship exist between availability of market and auxiliary industry and factories to recycle waste generated in the fringe communities. The implication of these findings is that communities close to industries (rubber estate) tend to derive sustainable positive economic benefit to improve their standard of living.

On the response scale, it was observed that auxiliary industries had an inverse relationship with the fringe communities. This suggests that if the auxiliary industry of fringe communities increases by one unit, the benefit of the farmer in fringe communities tend to increase by -0.23 units. This is significant with Z value of -2.68.

On the response scale for provision of employment the marginal effect has a positive of 0.34. This implies that as the provision of employment in the fringe communities increases by one unit, the benefit or welfare of the community people increases by one unit. That is, the benefits or welfare of the farmers increases by 0.34 units. This is highly significant with Z value of 4.74.

This finding implies that the Rubber Estate created 30.53% of the total employment in the fringe communities. In other words, 30.53% of the total number of employed would have been unemployed if the rubber estate were not located in the study area. This finding is attributed to the fact that the employment of members of the host communities is one on the social responsibility of an organization. Unemployment is a serious social problem in Nigeria, particularly, in Delta state. Through job creation, the rubber estate has accordingly reduced the social problem of unemployment in the fringe communities by 30. 53%.

The income multiplier index of rubber estates (45.84%) is relatively high. Okunomo and Achoja (2010) had similar finding by reporting 48% income multiplier index for African Timber and Plywood (AT&P) company in Sapele community, Nigeria. The high level of income generated from rubber estates by the employees of rubber estates is an indicator that cash flow from rubber estates can boost the money in circulation and economic activities in the rural cash economy. The volume of money in circulation determines the level of development in an economy. The establishment of rubber estates in the rural areas will contribute to overall economic development.

In this study, job creation, provision of social amenities, attraction of auxiliary industry, migration of people into the designated communities (Oghara, Amukpe, Umutu and Otagba- Unor) are the indicators that main-streamed development impact into the fringe communities where rubber estates operating in Delta state, Nigeria. And the dimensions of development impact of rubber industry on the fringe communities have been clearly identified and classified into social and economic impacts. The employment and income multiplier index of rubber industry on fringe communities were also determined. While some dimensions of social and economic impact were found to be significant, there were evidence of gaps in terms of provision of scholarship and health care facilities (social impact), improved standard of living and availability of markets (economic impacts).

It can be concluded that the rubber estates created some social and economic impact that improved the living conditions of the people in host communities in Delta State and Nigeria at large. The community people are now more literate and gainfully employed with spiral multiplier or spread effects on the national economy in terms of increased income, savings and alternative investments in Delta State and Nigeria at large. As a result, we recommend that Government of Nigeria should collaborate with countries such as China that has high demand for natural rubber to establish more rubber estates in Nigeria. This could serve as raw material base for manufacturing companies. Development Agencies should establish rubber estates as strategy to develop rural areas whose soils can support industrial-scale of natural rubber production.

Due to time and resources scarcity the present study was limited to the investigation of social and economic impact assessment of rubber estates in Delta state, Nigeria. Further studies should be conducted to investigate the environmental impact of rubber estates in host communities in Nigeria.

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