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INCOME DISTRIBUTION AMONG FOREST-DEPENDENT RURAL HOUSEHOLDS IN DELTA STATE, NIGERIA

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Abstract
The study analysed income distribution among forest-dependent rural households in Delta State, Nigeria. A multi stage random sampling techniques were used to select 198 forest-dependent rural households using cross sectional data. Data were analysed using descriptive statistics and Gini Coefficient. The results were presented in 3 categories using the entire income of the forest-dependent rural households, income of forest resource owners and lastly non-owners of forest resources. Results gave a Gini index of 0.54 for the entire sample indicating that size distribution of forest-dependent rural household income was quite inequitable in pattern. However, the income of forest resource owners gave a Gini index of 0.34 indicating that there was low inequality in income distribution among them. The non-owners of forest resources had a Gini index of 0.55 which showed high income inequality. About 20% of the population of non-owners of forest resources earn less than 3% of the income while 60% of the population earn less than 20% of the income. The study therefore calls for policy shift that will allow non-owners of forest resources in the rural areas access to both government and private owned forest reserves for the collection of products. Education and enlightenment of rural households is necessary to help sustain availability of forest products, harvesting, processing and marketing for better value and income. Rural households should participate in the formulation of forest policies and programmes.

Keywords: Income distribution, Forest-dependent, and Rural households

Introduction

Income distribution measures the inequality in income among the population or region. Income is distributed in rural areas through farm and non-farm activities. Farm activities are crop and animal husbandry, while non-farm activities are primary off-farm activities like forestry, fisheries, or hunting and gathering on common property resources. Secondary activities based in rural areas include: artisanship, trades, public and private sector activities. Non-farm activities also include; earned and in-kind income received by rural people from the urban and international economy through temporary migration, remittances, welfare, pensions, and interest (Davis and Bezemer, 2004). The role of agricultural income in the rural areas is not in doubt. Praburaj (2018) identified agricultural income as the main source of income in a rural economy. However, there is now a growing recognition that rural households also receive income from the rural non-farm sector. In some cases, the rural non-farm sector is now providing the bulk of income in rural households (Rantso, 2016). Nations strive to reduce income inequality in order to reduce the gap between the wealthy and the poor. In rural areas, focusing directly on the rural non-farm sector might provide a better option for increasing the income of the rural farm households and thereby reduce inequality. In this view, income earned in the rural non-farm sector represents the agent of positive change for the poor in the rural economy, rather than income earned from the traditional agricultural sector (Rantso, *ibid*). This study examined income from forest resources, which is one of the off-farm activities and a veritable source of rural non- farm income (RNFI), and how the income is distributed among forest-dependent rural households. Forest is defined in this context as cultivated plantations, natural forest and trees outside forest. Trees outside forest include isolated trees in landscape, windbreaks, shelter belts, trees along roads and rivers, trees in agricultural systems and trees in urban environment (FAO, 2013). In Nigeria, timber and pulpwood industries from the forest contribute about 3% of agriculture's share of Gross Domestic Product – GDP (Idumah, *et al.,* 2019). This contribution is not the largest contribution of forest to the economy as numerous other products and services not accounted for in GDP are of great importance in the daily lives of the

majority of Nigerians. The most significant of these is fuelwood, on which most households depend on for cooking. About 60 -70% of domestic energy supply comes from forests in Nigeria (AIAE, 2006). Cheng *et al*., (2019), revealed that forest serve 3 primary roles to support livelihoods: subsistence, safety nets and pathways to prosperity, which implies that forest products diversify the diet, provide minerals and nutrients, medicine, fodder for livestock, and cash income. They provide critical support to agricultural production, help provide seasonal balance in food supplies and represent assets, which can be liquidated in hard times. Thus, directly or indirectly many forest activities are integral part of rural livelihood (Idumah *et al.,* 2019). In Nigeria, reliable data does not yet exist to allow an analysis of the changes over time on income distribution especially in the rural areas. However, National Bureau of Statistics (2004 and 2012), with the help of World Bank analysed income distribution in Nigeria in 2004 and 2010 respectively. Results show overall and rising income inequality in Nigeria. Measured with Gini coefficient, income inequality was 0.42 in 2004. In 2010, income inequality rose to 0.447. Results also showed that income inequality was higher in the rural areas than in the urban areas. Income inequality was 0.4239 and 0.4154 for rural and urban areas respectively in 2004 but rose to 0.4334 and 0.4253 for rural and urban areas respectively in 2010 (NBS, 2012). Since forest income is the second largest in the rural economy after agriculture (Nwandu, 2019), the study attempted to analyse how income is distributed among the forest- dependent rural households.

Methodology

The study area was the rural areas of Delta State. The state covers a landmass of about 18050 km^2 (6970sqm) of which 60% is land. The state lies approximately between Longitude 5^0 00 and 6^0.45 East and Latitude $5^0$00 and 6^0 30 North. The climate of the state is tropical and marked by two distinct seasons: dry and rainy. Average rainfall ranges from about 267cm in coastal areas to 191cm in the northern areas. The State has a minimum temperature of 28°C and a maximum of 34°C. Delta State has relatively moderate forest resources in existence (Delta State Ministry of Environment, 2009). It is estimated that 70% of the State population is rural of which 75% are engaged in one form of farming or the other. The total number of farm families is estimated at 176,256 (Delta State of Nigeria, 2014). Apart from agriculture majority of the rural population are engaged in off-farm activities including forest activities. The State is divided into 3 Agricultural Zones with 25 Local Government Areas (LGA). The 3 Agricultural Zones include Delta North (9 LGAs), Delta Central (8 LGAs) and Delta South (8 LGAs). A multistage sampling technique was used for the study. The first stage was the purposive selection of 3 LGAs each from the 3 Agricultural Zones, which have forest, giving a total of 9 LGAs used for the study. The next stage was the randomized selection of 2 rural villages from each of the LGAs from the list of villages compiled by the Delta State Ministry of Lands and Survey, Asaba. This selection gave a total of 18 villages. The list of the total number of households in each village was compiled with the assistance of the village heads. There were 1064 rural farm households in the 18 villages selected. Households formed the final sampling stage. Selection of households was made through simple random sampling. Eleven (11) households were randomly selected from each of the 18 villages, giving a total of 198 rural farm households used for the study. Cross-sectional data were collected with the use of structured questionnaire to elicit information from rural households on household socio-economic and institutional characteristics, community institutions, demographic features, and farm and non-farm production activities. Semi-structured or open-ended questionnaire were constructed to elicit responses from rural households on the income from forest activities. The data were collected on daily basis and collated into weeks, months and finally annually. The semi-structured questionnaire was in form of a check list kept to be completed daily by the rural households. The rural households recorded their daily earnings from the farm and non- farm activities including the forest, quantity of products bought for consumption and own consumption. Out of the 198 questionnaires administered, 19 copies were incomplete and were discarded, while 179 were duly completed and used for analyses. This exercise was carried out for a year (October 2017 to September 2018). Data were analyzed with descriptive statistics like percentages and means. Measuring and analysing income distribution was achieved using Gini coefficient. Gini coefficient was used to determine inequality in forest incomes among forest-dependent rural households, which was also related to inequality in levels of resource ownership.

The source decomposition of the Gini coefficient is given as;

$$G_{i=1}^{K} = \Sigma R_K G_K S_K \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

G = is the Gini coefficient of aggregate household income.

Sk= is the share of source **k** of income in total household income. (The sources of income **k** in this study were grouped into agriculture, agricultural labour, business, public and private sector employee, artisan, transfer and

forest. Other sub-groups or sources include owners of forest resources and non-owners of forest resource.
Gk = is the Gini coefficient measuring the inequality within the sample of income from source **k.**
R = measures the correlation between source **k** income and total household income

Gini coefficient is based on the familiar Lorenz curve which relates income to the percentage of income recipients in different income brackets. Lorenz curves are an effective way of showing inequality of income within and between distributions. The cumulative percentage of the population or source of income is plotted along the horizontal axis while the cumulative percentage of income is plotted along the vertical axis. The curve shows the actual relationship between the percentage of income recipients and the percentage of income that was actually received. The 45 degree line shows the situation when there is an even distribution of income. This is called line of absolute equality. The closer the Lorenz curve of a distribution is to 45 degree line, the more equal the distribution of income is (Adams and He, 1995).

Results and Discussion

Income Distribution among Forest-Dependent Rural Households

Table 1 shows the income distribution of forest-dependent rural households. Results showed that majority of the forest-dependent rural households earn between N200,001 to N500,000 and N100,001 to N200,000, constituting about 30.2% and 22.3% of total income respectively. A small proportion (7.3%) earn above N1,000,000 per annum. This result showed how important forests were to the livelihood of the rural households. The Gini co-efficient was also calculated for income inequalities among these forest-dependent rural households with a view to determine the extent of inequalities among them. The outcome was illustrated in Figure 1 with a Gini index of 0.54 for the entire sample. The Gini index of 0.54 indicates that size distribution of forest timber products-dependent rural household income was quite inequitable in pattern. This finding was in line with evidence of research which showed that Gini indices for developing countries range from 0.5 to 0.7, and sometimes even more (Weinstein, 2004).

Income Distribution of Owners and Non-Owners of Forest Resources

The inequality in income of the rural household was further examined by determining the income distribution of owners of forest resources and non-owners. Table 2 examined the income distribution among owners of forest resources. This further step was taken to trace the sources of inequalities among the forest-dependent rural households. Results revealed that owners of forest resources earned higher income. Majority (76.9%) earned between N200,001 and N1,000,000 per annum, followed by few proportion (12.3%) that earned above N1,000,000 per annum, which was significant. Only very few earned below N200,000. This result was further illustrated with Gini coefficient and Lorenz curve in Figure 2. Findings showed that the income of forest resource owners gave a Gini index of 0.34, indicating that there was low inequality in income distribution. The curve also revealed that 20% of owners of forest resources earned about 10% of the income and 40% t about 20%. This result has highlighted the need for more access to the forest for forest-dependent rural households. The results also highlighted the importance of tree planting by the rural households in order to have more products. These findings are supported by research study of Aung (2015), who indicated that better-off households receive more forest income than medium and poor households.

Income Distribution of Non-Owners of Forest Resources

The result in Table 3 shows income distribution of non-owners of forest resources. Findings revealed that non-owners of forest resources earned less than their counterparts (owners of forest resources). Majority (82%) of them earned between N50,000 and N500,000 per annum. Only 7% earned N500,001 and above N1,000,000. The results also showed that most income inequalities among forest-dependent rural households were accounted for by non-owners of forest resources. The finding is in line with *a priori* expectations since non-owners of forest resources were denied access to some forests like privately owned forests and plantations. Even if they were allowed access in these forests, they were restricted in the kind of products they collect. The Lorenz curve in Figure 3 further illustrated the income inequality of non-owners of forest resources. The Gini index of 0.55 showed a high income inequality among non-owners of forest resources. This finding contrasts sharply with the result of owners of forest resources. Here, 20% of the population of non-owners of forest resources earned less than 3% of the income, while 60% of the population earned less than 20% of the income.

Table 1: Income Distribution of FTPs- Dependent rural Households

Income Group	Population	Percentage (%)
20, 001 – 50,000	7	3.9
50,000 – 100,000	39	21.8
100,001 – 200,000	40	22.3
200,001 – 500,000	54	30.2
500,001 – 1,000,000	26	14.5
Above 1, 000,000	13	7.3
Total	179	100.0

Source: Field survey, 2017/2018

Table 2: Income Distribution of Owners of Forest Resources

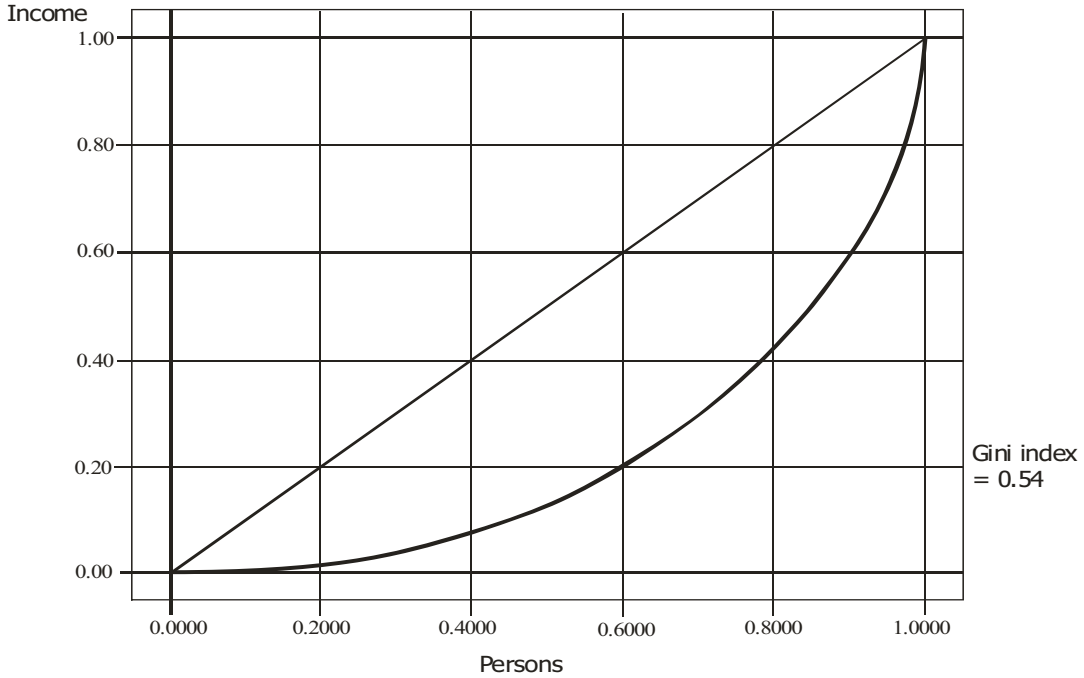
Income Group	Population	percentage (%)
20, 001 – 50,000	1	1.5
50,001 – 100,000	4	6.2
100,001- 200,000	2	3.1
200,001 –500,000	28	43.1
500,001- 1,000,000	22	33.8
Above 1,000,000	8	12.3
Total	65	100.0

Source: Field Survey, 2017/2018

Table 3: Income Distribution of Non-Owners of Forest Resources

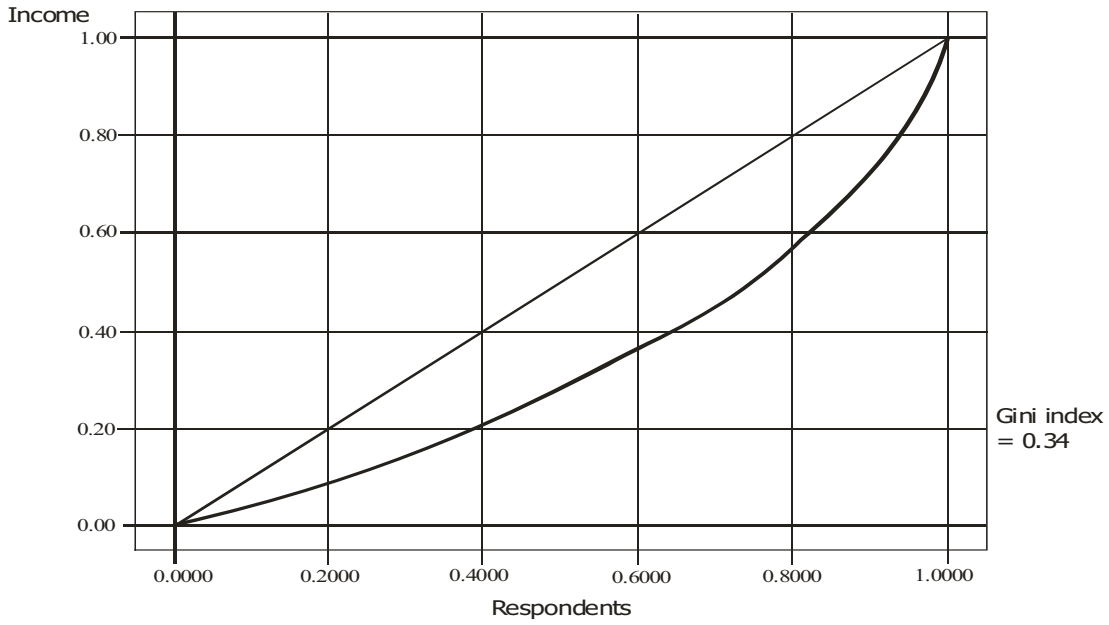
Income Group	Population	Percentage (%)
20, 001 – 50,000	7	6.2
50,001 -100,000	34	29.8
100,000 – 200,000	39	34.2
200,000 – 500,000	26	22.8
500,000 – 1,000, 000	4	3.5
Above 1,000,000	4	3.5
Total	114	100.0

Source: Field Survey, 2017/2018

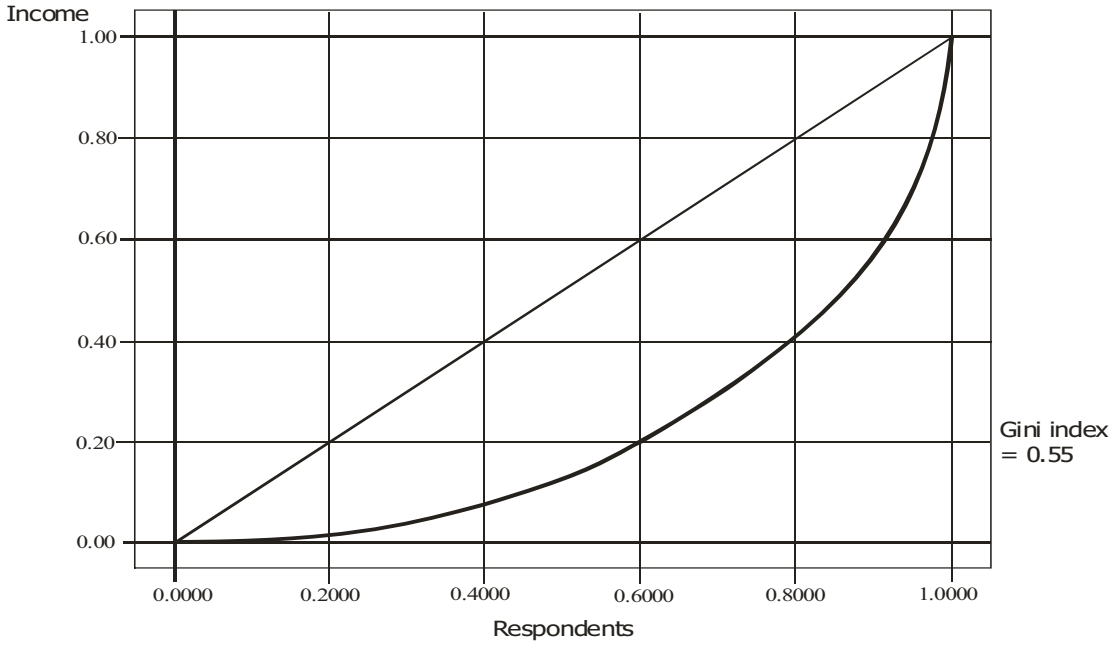


Source: Field Survey 2017/2018

Figure 1: Lorenz Curve of Income of Forest-Dependent Rural Households



Source: Field Survey 2017/2018
Figure 2: Lorenz Curve of Income of Owners of Forest Resources



Source: Field Survey 2017/2018
Figure 3: Lorenz Curve of Income of Non-Owners of Forest Resources

Conclusion

Results confirmed inequalities in income among forest-dependent rural households. However, income from forests helped reduce income inequalities. The results call for policies aimed at non-owners of forest resources in the rural areas access to both government and privately owned forest reserves for the collection of non-timber forest products (NTFPs). This policy will help improve their income and reduce income inequality. Their willingness to pay could be attached to in-situ planting of trees and endangered species of the NTFPs including the participation in the management of the forest. Education and regular enlightenment will help in reducing undue pressure on the forest and improve sustainability of forest products which will in turn yield income on regular basis among the rural households. There should be participation of the rural households in forest policy formulation and execution. This will help in product collection and management of the forest.

References

Adams, R. H. and He. J.J. (1995). *Sources of Income Inequality and Poverty in rural Pakistan*. Research Report 102. Washington D.C. International Food Policy Research Institute. 92pp.

AIAE (2006). African Institute for Applied Economics. Renewable Natural Resources Sustainable Economic Growth and Poverty Reduction in Nigeria. A.I.A.E. Research Paper I, Enugu: A.I.A.E. 46pp

.Aung, P. S., Adam, Y. O. , Pretzsch, J. and Peters, R. (2015). Distribution of forest income among rural households: a case study from Natuna Taung National Park, Myanmar. *Forest, Trees and Livelihoods*, 24(3):24 – 36.

Cheng, S. H., Ahiroth, S., Onder, S., Shyamsundar, P. And Garside, R. (2019). What is the evidence for contribution of forest to poverty alleviation? A systematic map protocol. *Environmental Evidence*, 6(10):35 – 45.

Davis, J.R. and Bezemer, D.J. (2004). Department for International Development. The Development of the Rural Non-Farm Economy in Developing Countries and Transition Economies: Key Emerging and Conceptual Issues. Chatham, UK: Natural Resources Institute. London: DFID. 46pp

Delta State of Nigeria (2014). Delta State Development Performance, Agricultural Sector Report, 1991 – 2014. Abuja: United Nation Country Office in Nigeria.76pp.

Delta State Ministry of Environment (2009). Delta State Forest-Status. Asaba: Delta State Government.

FAO (2013). Food and Agricultural Organisation. Towards assessment of trees outside forest, why, what and how. FAO working paper No. 183. 124pp.

Idumah,F., Owombo, P., Mangodo, C. and Igodaro,U. B. (2019). Contribution of forestry sub-sector to the Nigerian economy: A co-integration approach. *Journal of forest science and environment, 1*(7):336 – 340.

NBS (2012). National Bureau of Statistics. Nigeria Living Standard Survey (LSMS) 2009/2010, Abuja: FGN/ National population commission -NPoPC. Available at https://www.nigerianstat.gov.ng/nada/index.php/catalog/38

NBS (2004). National Bureau of Statistics. Nigeria Living Standard Survey (LSMS) 2003/2004. Abuja: FGN/NPoPC. Available at https://www.nigerianstat.gov.ng/nada/index.php/catalog/38

Nwandu, P. I. (2019). Roles of forest and tree products in employment creation and poverty reduction in rural areas of Delta State. *Nigerian Agricultural Journal*, 50(1):77 – 84.

Praburaj, L. (2018). Roles of agriculture in the economic development of a country. *Shanlas International Journal of Commerce*, 6(3):1 – 5.

Rantso, T. (2016). The role of the non – farm sector in rural development in Lesotho. *Journal of Modern African Studies*, 54(2):317 – 338.

Weisstein, E. W. (2004). Lorenz Curves and Gini Coefficients *Math world. Retrieved from http: mathworld.wolfram.com*.