Assessment of Livelihood Strategies among Households in Forest Reserve Communities in Ondo State, Nigeria

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Abstract— This study assessed livelihood strategies among households in forest reserve communities in Ondo State. A multi-stage sampling technique was used. Two forest reserve communities were purposively selected based on tree species richness, size and the high rate of economic activities being carried out. 60 respondents were randomly selected from each reserve, thus, making a total of 120 respondents. Primary data was collected through the aid of well-structured questionnaire information for the study was obtained. Descriptive statistics such as frequency table and percentage were used to examine the socioeconomic characteristics of the respondents, resources available to households and major livelihood strategies among households in the study area. Multinomial logit regression analysis was used to analyze factors influencing respondents' choice of livelihood strategies in the study area. The respondents in the study area were arable farmers, small business persons (petty traders), hunters, fisher men, fish sellers, artisans, non-timer forest product gatherers, timber logger/ Merchant, bee keeper, carpenter, fuel wood/ Charcoal seller, labourers, farm produce processors and palm wine tappers. The major resources identified were food crops, cash crops, fruits and vegetables. The analysis indicated that most of the explanatory variables considered were statistically significant at 5%. Age, educational level, marital status, distance to the nearest rural/ urban market and household income were significant factors influencing choice of livelihood strategies among residents of forest communities of Ondo State, Nigeria.

Index Terms— , Assessment, , forest reserve communities, forest resources,households, livelihood strategies,multinomial logit,natural resources.

1 INTRODUCTION

It has long been stated within Nigeria and internationally, that forests (in the broadest sense of the word, which includes savannas and plantations) offer numerous benefits to adjacent communities and society at large [1]. Such benefits include consumptive resources, spiritual and aesthetic needs, employment generation, and ecological services such as carbon sequestration and water provision.

Forests provide home and livelihood for people living in and around them and serve as vital safety nets for the rural poor. In Nigeria, forest resources are being depleted at alarming rates due to overexploitation.

Over two-thirds of Africa's 600 million people rely directly and indirectly on forests for their livelihoods, including food security. Wood is the primary energy source of at least 70% of households in Africa [2].

Forest communities are largely agrarian but rely heavily on forest resources as a source of livelihoods. People living in these forest communities depend on products from the forest for a variety of goods and services. These includes collection of edible fruits, flowers, tubers, roots and leaves for food and medicines; firewood for cooking (some also sell in the market); materials for agricultural implements, house construction and fencing; fodder (grass and leave) for livestock and grazing of livestock in forest; and collection of a range of marketable non-timber forest products. Therefore, with such a huge population and extensive dependence pattern, any over exploitation and unsustainable harvest practice can potentially degrade the forest. Moreover, a significant percentage of the country's underprivileged population happens to be living in its forested regions [3]. The majority of forests, by their very nature, are located within rural and frequently remote areas. Typically this means that such areas are underdeveloped in terms of infrastructure, government services, markets and jobs. It is not surprising, therefore, that communities living in and adjacent to savannahs and forests are characterised by seemingly high levels of poverty and limited livelihood opportunities [4].

The long-term contribution of forest resources to the livelihood strategies of the rural poor had long been appreciated as significant [5],[6],[7],[8]. In the forestry context, forest or trees resources that the rural poor can freely access might form a critical part of their lives. A primary role of forest or tree resources in the lives of the rural poor is thus as a "safety net", as one of many strategies to avoid falling into destitution [9]. In the context of Africa, forests are vital for the welfare of millions of people, especially the rural poor and marginalised, and their wise use could improve livelihoods and quality of life.

Although, biodiversity and tree based assets are undervalued in national statistics and accounting, and grossly under-invested in development decision making, the potential contributions of forests to the national economy cannot be over emphasized. [10] stated that some researchers have reported the potentials of tree and animal species in the forest ecosystems and over 150 indigenous woody plants have been noted for their edible products for human and livestock consumption. It is estimated that more than 15 million people in Sub-Saharan Africa earn their cash income from forest-related enterprises such as fuelwood and charcoal sales, small-scale saw-milling, commercial hunting and handicraft. In addition, between 200,000 and 300,000 people are directly employed in the commercial timber industry [11].

2. METHODOLOGY

2.1 Population

The population of the study was made up of community members from selected forest reserves in Ondo State. They are Oluwa forest reserve and Owo forest reserve.

2.2 Sampling Technique

A multi-stage sampling technique was used to select the study area based on size, tree specie richness and high rate of economic activities in terms of forest resources exploitation. Two forest reserves were purposively selected which are Owo forest reserve and Oluwa forest reserve in Owo and Odigbo LGAs. 60 respondents were randomly selected from each reserve; thus making a total of 120 respondents.

2.3 Data and Sources of Data

Primary data were collected and used for the study with the aid of structured questionnaire which was administered to obtain information for the study. The structured interview schedule covered four sections namely; socio economic characteristics of the respondents, data on community livelihoods, forest resources exploitation, production and productivity.

2.4 Data Analysis

Descriptive statistics were used to examine socio-economic characteristics of the respondents such as age, household size, gender, marital status, educational level, farming experience, farm size, household income, household domestic energy, type of crop enterprise, sources of labour used, distance to market and access to health centre; resources available to households and major livelihood strategies among households in the study area. Multinomial logit regression analysis was therefore used to analyze factors influencing respondents' choice of livelihood strategies in the study area. The dependent variables were major livelihood strategies while explanatory variables were socioeconomic characteristics.

3.0 RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics of the Respondents

The respondents socio-economic characteristics analysed for this study were age, marital status, household size, farming experience, gender, access to credit, educational level, farm size, sources of farm labour used,type of cropping enterprise, household income,household domestic energy,distance to market,access to health centre.

A total of 120 respondents were interviewed using quantitative questions. Table 1 shows that the modal class is 31-40years while the mean age of the respondents was 43.30 years, this shows that that population is active and that the older farmers have younger farmers who could replace them when they can no longer farm. There was an average number of 7 persons per household.

The findings revealed that 75% of the respondents were males while 25% were females which implies that males dominated the farming occupation in the study area and this has been in line with many studies carried out in Ondo State. It was also shown that over 85% of the sampled respondents are married which implies that most of the respondents were mature and responsible to cater for their households as well as have clear knowledge of their wellbeing. A considerable 60% are migrants to the area only 40% are born in the community. In both areas, education levels are low for the majority of the communities. An overwhelming 77.5% of respondents either have had no education at all or only have primary level education to different degrees. 1.7 % was educated to Standard six. The reason for this has been a lack of insufficient education facilities in the past and difficulty accessing education in the rural areas. The mean year of farming experience is about 19 years indicating that the farming households had spent a good number of years on farming practices.it is generally believed that the more the years the farmer the better the ability for such farmer to make decisions. Majority of the respondents (38.3%) fall in year bracket of 11 and 20 and only one respondent has been farming for over 51 years in the study area. The farm size still confirms the peasant nature of the farmers in the study area where majority of the respondents (90.8%) farmed on less than 3ha of land with the mean farm size of 1.14ha Income has been a vital tool in accessing human wellbeing About 93.4% of the sampled households earn less than ₦100,000.00 per annum, while only eight respondents earned over a million in the last season. This shows that respondents depend on forest products as they derive their source of income from the sale of its products.The average household income was ₦258,631.67. Majority of the respondents (94.2%) use firewood or charcoal as their household domestic energy, 4.2% use kerosene while 1.6% were others who use other sources for their domestic energy. This clearly indicates a very strong dependence of the people on the forest resources for domestic energy. The study further gave insight to the type of farm enterprise ventured into in the study area using multiple responses. It was revealed that the respondents who cultivated arable crops were 31.7%, 13.3% of them cultivated cash crops, while 55.0% cultivated both cash crops and arable crops. The table shows that 15.0% used family labour, 16.7% claimed they used hired labour while most 68.3% used both family and hired labour. Some of the farmers hired labourers to work on their farms and also used their family members as well. Farmers who had a larger expanse of land used both sources of labour. Here, those who had a larger household size had an advantage in the case where they could use their family members to work on their farms in the study area. The table also shows that 38.3% of the respondents do not need to go too far to the nearest market as they had to move through a distance of less than 5km to sell their products, 61.7% of the respondents had to move through a distance above 5km. Forest products which are sold very near to the market were cheaper than those which were sold far from the market. It was shown that 53.5 % had access to health centres while 41.7% had no access to health centres and used the herbs as a form of treatment.

A good number of the household (83.3%) had no access to loan, 16.7% had access to loan from friends or relatives. Access to microcredit in rural areas is difficult. The vast majority who do not have no access to credit or do not know how to access it was because of the distance from the institutions, lack of awareness, high interest rates, lack of groups being formed to share loans together and lack of collateral, as well as scare stories about people losing everything when they are unable

to pay, make many respondents sceptical about success.

3.2: Observed livelihood Strategies

The observed livelihood strategies in the study area are presented in Table 2. A good number of the respondents (35%) were farmers, this shows that the respondents are predominantly farmers,it is also an indication of encroachment because they are not meant to farm in the forest reserves. 10.83% were timber loggers showing that logging activities are still being carried out but by only few people this may be due to the level of degradation in the forest area, 10% were fuelwood sellers, the percentage of these respondents can be increased if those living in the communities are actively involved in community based forest management and agroforestry, 9.17 were beekeepers 6.67% were small business persons(petty traders),5.83% were artisans, 5% were hunters the hunters were few and this may be because a lot of animals have gone into extinction,5% were non timber forest product gatherers, 4.16% were fish sellers,3.33% were fishermen,3.34% were labourers and carpenters others were palm wine tappers and farm produce processors.

3.3 Existing Natural Resources

The existing natural resources identified in the study area are presented in Table 3 and they were food crops, cash crops, fruits, vegetables and tree species.They include Bush mango, Plantain, cocoa, cassava, yam, groundnut, banana, pineapple, vegetables, melon, guava, pear,cashew, tomato, okro, maize, pepper, mango, guinea corn, cocoyam, potato,groundnut,melon, pawpaw, ogbolo (Irvingia gabonensis), Water leaf (*Talinum triangulare*). and mushroom, kola, Indian hemp(*Cannabis)* ,sponge and chewing stick is peculiar to Owo , oil palm and so on. Tree species that were identified include *Lovoa trichiliodes, Euclea divinorum, Tectona grandis, Terminalia superba, Melisia excelsa, Diosyros spp, Nauclea spp, Triplochiton scleroxylon, Ceiba pentandra, Cordia milleni, Afzelia Africana,Gmelina arborea and so on.*

3.4 Determinants of Household's Choice of Livelihood

Multinomial logit (MNL) regression model was used for the analysis. The table above presents the estimated marginal effects and standard error from the MNL model. The results show that most of the explanatory variables considered are statistically significant at 5%. This study uses farming livelihood as the base category for no livelihood strategy and evaluates the other choices as alternatives to this option. The likelihood ratio statistics as indicated by chi-square statistics (80.28) are highly significant ($P< 0.0002$), suggesting the model has a strong explanatory power. As indicated earlier, the parameter estimates of the MNL model provide only the direction of the effect of the independent variables on the dependent variable: estimates do not represent actual magnitude of change or probabilities.

Thus, the marginal effects from the MNL, which measure the expected change in probability of a particular choice being made with respect to a unit change in an independent variable, are reported and discussed.

Age of the respondent is positive and statistically significant in influencing household livelihood strategies in the study area. A unit increase in the age of the respondent results in 0.7% increase in the probability of choosing other livelihood strategies apart from farming. The educational level of the respondent shows a positive coefficient and is significant at 5% level of probability. It means that the higher the level of education of the respondent, the more the likelihood of choosing other livelihood strategies apart from farming. A year increase in the years of education attained will increased the chance of engaging in other livelihood strategies by 8.9%. The marital status of the respondents has a positive coefficient and significant at 5% level of probability. It means that households who were married were 23.4% more likely to engage in other livelihood strategies apart from farming. The distance to the nearest rural/urban market is also statistically significant at 5% level of probability in explaining livelihood strategies among respondents in the study area. It means the longer the distance to the market the more the chance of involving in different livelihood strategies. A unit increase in the distance (Km) to the market from the settlement results in a 23.6% increase of the probability of engaging in livelihood strategies other than farming. The household income was negative but significant at 1% level of probability in explaining the choice of livelihood strategies being undertaken by the respondents. It means that a unit increase in household income (Naira) results in decrease in the likelihood of switching to other livelihood strategies other than farming. If Government takes steps to reduce the factors which put pressure on the forests such as actively encouraging and supporting investment in industrial development, deliberately supporting employment and alternative income generating activities such as piggery, poultry, rabbitry, agroforestry, nursery practices and others, the respondents will be willing to switch to other livelihood strategies apart from farming.

The access to loan was not statistically significant but has a positive coefficient. It can be inferred that it has a positive relationship in explaining the kind of livelihood strategies chosen by the respondents in the study area.

Table 1: Socioeconomic Characteristics of the Respondents in the Study Area.

Socio-economic characteristics	Frequency	Percentage
Age in years		
= 20	5	4.1
21 – 30	20	16.7
31 – 40	32	26.7
41 – 50	26	21.7
51 – 60	25	20.8
61 – 70	8	6.7
71 and above	4	3.3
Household size in numbers		
1 – 5	43	35.8
6 – 10	53	44.2
11 and above	24	20.0
Gender		
Male	90	75.0
Female	30	25.0
Marital Status		
Single	12	10.0
Married	103	85.8
Divorced	1	0.8
Widowed	4	3.3
Residential Status		
Migrant	72	60.0
Native	48	40.0
Educational Level		
No formal education	44	36.7
Primary school education	49	40.8
Secondary school education	22	18.3
Tertiary education	3	2.5
Others	2	1.7
Farming experience in years		
= 10	54	45.0
11 – 20	46	38.3
21 – 30	10	8.3
31 – 40	6	5.0
41 – 50	3	2.5
51 and above	1	0.8
Farm size in hectares		
< 1.00	84	70.0
1.00 – 1.99	15	12.5
2.00 – 2.99	10	8.3
3.00 – 3.99	4	3.3
4.00 – 4.99	4	3.3
5.00 and above	3	2.5
Household income in naira		
=100,000	59	49.2
100,001 – 500,000	47	39.2
500,001 – 1000000	6	5.0
1000001 and above	8	6.7
Household domestic energy		
Firewood	74	70.0
Charcoal	29	24.2
Kerosene	15	4.2
Others	2	1.6
Type of Cropping Enterprise		
Arable crop farming	38	31.7
Cash crop farming	16	13.3
Both	66	55.0
Sources of farm labour used		
Family	18	15.0
Hired	20	16.7
Both	82	68.3
Distance to market in kilometres		
=5	46	38.3
6 – 10	55	45.8
11 – 15	15	12.5
16 and above	4	3.3
Access to health centre		
No	72	60.0
Yes	48	40.0
Access to loan		
Yes	20	16.7
No	100	83.3
Total	120	100.0

Source: Data Analysis, 2011

Table 2: Observed livelihood strategies in the study area

Livelihood strategy	Frequency	Percentage
Arable farmer	42	35
Small business person	8	6.67
Hunter	6	5
Fisher man	4	3.33
Fish seller	5	4.16
Artisans	7	5.83
Non timer forest product gatherers	6	5
Timber logger/ Merchant	13	10.83
Bee keeper	11	9.17
Carpenter	2	1.67
Fuel wood/ Charcoal seller	12	10
Labourers	2	1.67
Others	2	1.67
Total	120	100

Source: Data Analysis, 2011.

Table 3: Showing Existing Natural Resources in the Study Area.
Existing Natural Resources for Sustainable livelihood and their percentages

Common names	Botanical names	Frequency	Percentage
Bush Mango	Irvingia gabonensis	5	1.20
Iru	Pakia biglobosa	6	1.45
Cassava	Manihot spp	10	2.41
Yam	Dioscorea spp	5	1.20
Mango	Magnifera indica	9	2.17
Pawpaw	Carica papaya	11	2.65
Cocoa	Theobroma cacao	36	8.69
Water leaf	Talinum triangulare	13	3.14
Indian hemp	Cannabis	50	12.07
Native pear	Dacryodes edulis	6	1.45
Bitter Kola	Garcina Kola	17	4.10
Alligator pepper	Afromonium meligata	9	2.17
Africa Nutmeg	Madora myristica	6	1.45
Cashew stick	Garcinia manni	6	1.45
Mushroom	Basidiomicotina	8	1.93
Raffia palm	Raphia spp	12	2.89
Akoko leaves	Newbodia lewis	9	2.17
Ewe iran	Thomatococcus spp	6	1.45
Maize	Zea mays	18	4.34
Plantain	Plantago majus	12	2.89
Banana	Musa spp	9	2.17
Pepper	Piper nigrum	12	2.89
Guinea corn	Cavia porcellus	8	1.93
Cocoyam	Zanthosoma spp	11	2.65
Potato	Ipomea batata	14	3.34
Groundnut	Arachis hypogea	9	2.17
Melon	Cucumis melo	18	4.34
Guava	Psidium guajava	6	1.45
Tomato	Solanum lycopersicum	13	3.14
Okro	Gardenia jasminoides	9	2.17
Walnut	Lovoa trichiliodes	7	1.67
Chewing stick	Euclea divinorum	6	1.45
Teak	Tectona grandis	5	1.20
Afara	Terminalia superba	4	0.96
Iroko	Melisia excels	3	0.72
Ebony	Diosyros spp	9	2.17
Opepe	Nauclea spp	6	1.45
Obeche	Triplochiton scleroxylon	2	0.48
Ceiba	Ceiba pentandra	8	1.93
Cordia	Cordia milleni	2	0.48
Apa	Afzelia Africana	3	0.72
Gmelina	Gmelina arborea	6	1.45

Source: Data Analysis, 2011.

Table 4: Marginal Effects from the Multinomial Logit (MNL) Regression Model R on Livelihood Strategies.

Explanatory variables	Estimates	Standard error
Sex	-0.2082847	38.60452
Age	**0.0076395***	**0.0042033**
Educational level	**0.0891266****	**0.0458239**
Marital status	**0.233643****	**0.1005438**
Family size	-0.0178015	0.0213602
Distance to the nearest rural/urban market	**0.0236108****	**0.0101635**
Access to loan	0.2963164	132.9137
Household Income	**-1.76E-06*****	**1.14E-08**

Note: ***,** means significant at 1% and 5% respectively

Source: Data Analysis, 2011.

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4 CONCLUSION

In terms of livelihood strategies, it is evident that agriculture and forest resources are important contributors to rural livelihoods and household income. Many livelihood strategies were identified which includes arable farmers, small business persons (Petty traders), hunters, fisher men, fish sellers, artisans, non-timer forest product gatherers, timber logger/ Merchant, and so on. Although the forest reserves have been depleted but logging activities are still taking place. Non-timber forest products are collected within the communities but in reducing amounts. This means the safety nets are less available which makes the communities more vulnerable in terms of economic stress. Hunting also takes place in but in smaller quantities. Only few of the community members in were artisans.

The importance of fuelwood wood production is a major source of forest income especially for those living around the forest reserves as many of the respondents depend on fuelwood as a source of domestic energy. Therefore Government should takes steps to reduce the factors which put pressure on the forests such as actively encouraging and supporting investment in industrial development, deliberately supporting employment and alternative income generating activities. There should also be massive reforestation and reforestation.

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