

INFLUENCE OF SOCIOECONOMIC AND FOREST RELATED-VARIABLES ON RURAL WOMEN INVOLVEMENT IN EXPLOITATION OF NTFPS IN SOUTHWESTERN NIGERIA: A MULTIVARIABLE ANALYSIS

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ABSTRACT

The study adopted a multivariable analysis based on Ordinal Logistic Regression (OLR) to examine the determinants of rural women's involvement in exploitation of Non-Timber Forest Products (NTFPs) in selected forest communities in Southwestern Nigeria. Specifically, the study examined socioeconomic characteristics influencing rural women's involvement in NTFPs and investigated forest-related variables associated with level of involvement of women in NTFPs. The study design was cross-sectional and multi-stage sampling procedure was used in selecting a sample of 320 respondents from 37 forest reserves in Ondo, Ogun and Osun States. The overall level of involvement showed that 38.4% of the women had low level of involvement in the exploitation of NTFPs. Socioeconomic variables associated with level of involvement in exploitation were age of the respondents (OR=0.87; $p<0.05$), level of education (OR=2.77; $p<0.01$), external orientation (OR=1.12; $p<0.05$) and marriage type (OR=7.14; $p<0.01$). Forest-related variables associated with level of involvement were source of NTFP collection (OR=2.75; $p<0.01$); government laws and policies regarding NTFPs (OR=0.25; $p<0.01$), proximity to market (OR=0.51; $p<0.05$) and postharvest handling of NTFPs (OR=1.62, $p<0.05$). In the full model of the OLR, three socioeconomic variables and four forest-related variables jointly influence level of involvement in NTFPs (Likelihood Ratio Chi Square=162, $p<0.01$). The study concluded that there is a need to address socioeconomic and forest-related variables associated with the level of involvement in NTFPs for greater involvement in NTFPs in order to alleviate rural poverty in the forest communities.

Keywords: Rural women; Level of involvement; Non-Timber Forest Products (NTFPs), Exploitation; Determinants

INTRODUCTION

The term Non-Timber Forest Products (NTFPs) has been defined in various ways and often referred to as minor forest products (Amusa *et al*, 2012) and used interchangeably as Non-Wood Forest Products (NWFPs). NTFPs are goods and services of biological origin, other than timber, derived from forests, and other wooded land and trees outside forests (De Beer and McDermott, 1989). There are several types of NTFPs for exploitation in Nigeria and these include a wide range of edibles and non-edibles such as fruits, seeds, leaves, nuts, bush meat, roots, tubers, fibres, resins, latex, sticks, ropes, and construction materials like bamboos and rattans and a host of others (Akanni, 2013).

In developing countries trade in NTFPs has a long history in contributing substantially to the livelihood of rural women especially as a means of subsistence for the rural households. NTFPs have been recognized as an alternative to timber products in improving economic status of women and rural households (Jimoh, Amusa and Azeez, 2012). In Nigeria NTFP trade has progressed from just a means of subsistence at the household level and sales at local market to international cross boundary (Jimoh, 2006). Collection and selling of NTFPs is therefore not only an important source of income by increasing their purchasing power but also provides medicine and contributes to food security in the household

(Okafor *et al*, 1994; Chikamai and Kagombe, 2002; Jimoh, Amusa and Azeez, 2012).

In economic terms, NTFPs contribute substantially to national economic growth and international trade (Adebayo, 2108). During the 1960s and 1979s, forest products earned large amounts of foreign exchange and the sector was ranked highest in employment generation in Nigeria (NBS, 2014). In the third quarter of 2017, the report from National Bureau of Statistics showed that forestry subsector increased in growth from 3.89 percent in Q3 in 2016 to 3.95 percent. Others studies on the contributions have also shown importance of NTFPs to livelihood (Oyetunji, 2019). Results from a recent study on NTFPs in Ondo State, Nigeria showed that at least 73 percent of the rural women sampled earned more than half of their income from NTFP exploitation (Adedayo and Falade, 2019).

NTFPs is thus a sector that offers great promise for women, but to enhance the effectiveness of poverty reduction programmes, opportunities for greater involvement of women are essential (IFAD, 2008). In Madagascar, poor women in one community earned 37 percent of their income from NTFPs compared to 22 percent earned by men while 77 percent of women's income in some areas of Andhra Pradesh was derived from forests (FAO, 2012). In Malaysia, rattan collection contributes to 14.8 percent of the economic activity of the residents in the swamp

forest. However, the potentials of NTFPs in enhancing livelihood outcomes among rural women in most sub-Saharan Africa have not been fully harnessed unlike other parts of the world including Asia where tremendous success has been recorded (Ogunbanjo and Aina, 2013).

Despite the importance of NTFPs for rural livelihoods as well as its good potentials for socioeconomic development of Nigeria, the sector has generally been overlooked by policy makers.

Previous studies such as Jimoh, Amusa and Azeez (2012); Jimoh and Haruna (2007) and Ayeloja and Ajewole (2006) have worked on prevalence and collection of NTFPs while Belcher, Ruíz-Pérez and Achdiawan (2005) and Aiyeloja and Ajewole (2006) focused on their studies on conservation strategies of forest products and the contribution of NTFPs to the rural livelihoods. However, there is inadequate statistical evidence on the level of involvement of rural women's exploitation of NTFPs as a livelihood choice, in terms of increase in income; increased wellbeing and reduced vulnerability in the study area. Hence, this study was conceived to examine rural women's level of involvement in the exploitation of NTFPs and determine socioeconomic and forest-related variables influencing level of involvement using a multivariate analysis procedure based on ordinal logistic regression analysis.

METHODOLOGY

This study adopted a multistage sampling procedure. At first stage, three out of six States in Southwestern Nigeria were purposively selected based on the size of the forest reserves. These States are Ogun, Osun and Ondo States. At the second stage, ten percent of all the 37 forest reserves in all the selected States were selected and this translates to four forest reserves. At the third stage, 20 percent of the total number of communities in the forest reserves was randomly selected. Thus, a total of 32 communities were randomly selected across the three States. At the last stage of selection procedure, a total of 320 respondents, based on Cochran (1977) sampling selection formula were sampled.

Structured interview schedule was administered on women who collect or trade each of the selected NTFPs to obtain data on the following: socioeconomic characteristics of the women and level of involvement in gathering NTFPs. In order to measure level of involvement in the exploitation of NTFPs, all possible NTFPs in the selected locations were listed and involvement score was measured on a 3-point Likert Scale (rarely, sometimes and always). The mean plus or minus one standard deviation was used to classify the involvement composite score into three levels: low, moderate and high. Level of involvement was classified as low when the total involvement score

fell below the difference between the mean score and one unit of standard deviation. Involvement in exploitation was at the high level when score was above the sum of the mean score and one unit of standard deviation while at the medium level, level of involvement score fell in between the two extremes. Data were collected between the months of February and March, 2017 by the researcher and a team of 14 well trained interviewers using the Open Data Kit in Android devices.

The study analysed three models of ordinal logistic regression to examine the simultaneous effects of the independent variables on the dependent variables.

Ordinal logistic regression analysis

The main multivariable analysis technique in the study is the ordinal logistic regression analysis because of the ordered nature of the dependent variable (Menard, 2011). Ordinal logistic model or proportional odds model are used to estimate relationships between an ordinal dependent variable and a set of independent variables (O'Connell *et al.* 2008). The dependent variable in this study follows an ordinal response and has more than two outcomes – low involvement, moderate involvement or high involvement and has a meaningful sequential order where a value is indeed 'higher' than the previous one. In ordinal logistic, an underlying score is estimated as a linear function of the independent variables and a set of cut off points. The probability of observing outcome *i* corresponds to the probability that the estimated linear function, plus random error, is within the range of the cut points estimated for the outcome. The log odds of cumulative probabilities are modelled as linear functions of predictor variable(s):

$$\ln\left(\frac{P(y \leq k | x)}{1 - P(y \leq k | x)}\right) = \alpha_k + \beta_1 x; k = 1, \dots, K - 1$$

The predictor variables in this study include the socioeconomic and the forest variables. Three models of ordinal logistic regression analysis were used in this study, guided by the objectives of the study.

Model 1 Socioeconomic variables only

Model 2 Forest-related variables only

Model 3 Socioeconomic variables + forest-related variables

In Model 1, the simultaneous effects of the socioeconomic variables on the level of involvement in the exploitation of NTFPs were determined. In the second Model, the simultaneous effects of forest-related variables on the dependent variable were also determined. Model 3 examined simultaneously the joint effects of socioeconomic and forest-related variables on level of involvement in the exploitation of NTFPs. All categorical independent variables were dummied and the Odds Ratios as well as 95% confidence intervals with corresponding p-values were presented in each

model. Data was analysed using the Stata Version 13.0 software.

RESULTS AND DISCUSSION

Level of involvement in the exploitation of NTFPs

Result from the Figure 1 shows the overall level of involvement of the women sampled in the

four forest zones. The overall level of involvement classified into low, moderate and high shows that 38.44 percent of the women had low level of involvement in the exploitation of NTFPs, 31.87 percent were moderately involved in the NTFP business while 29.69 percent were ranked high on the level of involvement scale.

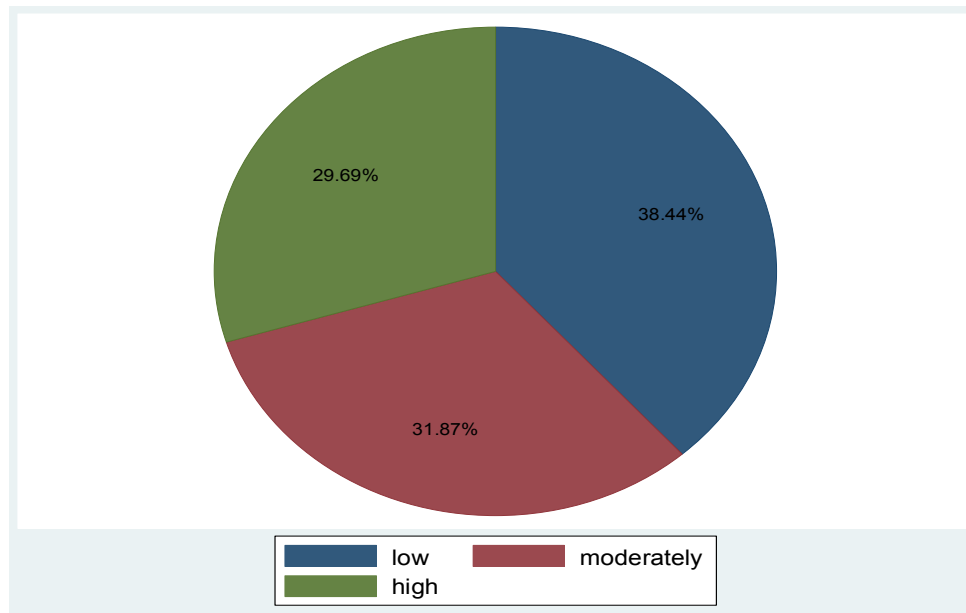


Fig 1: Level of Involvement in the exploitation of NTFPs
Source: Field survey, 2017

Multivariate Analysis

Each of the three regression models are presented in Tables 1, 2 and 3. In the first model some socioeconomic variables were examined in relation to level involvement in NTFPs. Table 1 shows the influence of socioeconomic variables such as age of respondents, education, type of marital union, external orientation, religious affiliation and number of children on level of involvement in NTFP exploitation. The probability value ($p < 0.01$) associated with the overall Likelihood Ratio of 67.01 shows that the model fits well. For a one unit increase in age of respondents, the odds of high level of involvement in NTFPs versus the combined middle and low level of involvement categories are 0.87 times lower, given the other variables are held constant in the model. Likewise, for a one unit increase in age of respondents, the odds of the combined high and middle level of involvement versus low level of involvement are 0.87 times lower, given that the other variables are held constant. In other words, a unit increase in age of respondents is associated with high involvement in NTFP when other variables are held constant. For women in polygynous relationship, the odds of high level of involvement versus the combined middle and low levels are 4.8 times greater than for women in

monogamous relationship, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle level of involvement in NTFP business versus low level is 4.8 times greater for women in polygynous relationship compared to those in monogamous union, given the other variables are held constant in the model.

For women who had ever travelled outside of their community (external orientation), the odds of high level of involvement in NTFPs versus the combined middle and low levels are 2.73 greater than those who have never travelled out of the community given that all other variables are held constant in the model. In the same way odds of the combined middle and low levels of involvement in NTFPs versus the low level is 2.73 greater for women in polygynous union compared to those in monogamous relationship, given that all other variables in the model are constant.

Although those in lower education: primary education or below were found to be more involved in NTFPs than those with secondary education or more, the relationship between education and level of involvement in NTFPs is not significant. Similarly, women with 5 or more children had a higher odd of being in the NTFP business than women who had 4 children or less.

The relationship between numbers of children is not significantly related to level of involvement in NTFP trade. Muslim women though had higher odds of involvement in NTFPs than Christian

women, but the relationship between religion and level of involvement in NTFP trade is not statistically significant.

Table 1: Model 1: Socioeconomic variables and level of involvement in the exploitation of NTFPs

| Variables | OR | Standard Error | Z | P> Z | 95% confidence interval | |
|--|---------|----------------|-------|-------|-------------------------|--------|
| Age | 0.8712 | 0.0574 | -2.09 | 0.036 | 0.7657 | 0.991 |
| Age Square | 1.0013 | 0.0007 | 1.82 | 0.068 | 0.9999 | 1.0028 |
| Education | | | | | | |
| None (RC) | 1.0000 | | | | | |
| Primary | 1.6457 | 0.5138 | 1.60 | 0.111 | 0.8924 | 3.0347 |
| Secondary | 0.9477 | 0.3032 | -0.17 | 0.867 | 0.5062 | 1.7742 |
| Post-Secondary | 0.2204 | 0.2029 | -1.64 | 0.100 | 0.0363 | 1.3389 |
| Religion | | | | | | |
| Christianity | 1.0000 | | | | | |
| Islam | 1.4314 | 0.3721 | 1.38 | 0.168 | 0.8599 | 2.3827 |
| Marital Union | | | | | | |
| Monogamous | 1.0000 | | | | | |
| Polygynous | 4.7788 | 1.1863 | 6.32 | 0.000 | 2.9462 | 7.7817 |
| Ever Travelled out of community | | | | | | |
| No | 1.0000 | | | | | |
| Yes | 2.7426 | 1.1209 | 2.47 | 0.014 | 1.2310 | 6.1103 |
| Number of children | | | | | | |
| <=4 | 1.0000 | 0.3308 | 1.10 | 0.272 | 0.8057 | 2.1556 |
| 5+ | 1.3179 | | | | | |
| /cut1 | -1.9827 | 1.4832 | | | -4.8896 | 0.9243 |
| /cut2 | -0.3978 | 1.4783 | | | -3.2953 | 2.4996 |
| Iteration 0: log likelihood = -349.5985 | | | | | | |
| Iteration 1: log likelihood = -316.3861 | | | | | | |
| Iteration 2: log likelihood = -316.0955 | | | | | | |
| Iteration 3: log likelihood = -316.0946 | | | | | | |
| Iteration 4: log likelihood = -316.0946 | | | | | | |
| Ordinal logistic regression Number of obs = 320 | | | | | | |
| LR chi2(9) = 67.01 | | | | | | |
| Log likelihood = -316.0946 Prob> chi2 = 0.0000 | | | | | | |
| Pseudo R2 = 0.0958 | | | | | | |

Source: Field Survey, 2017

Model 2: Forest-related variables and level of involvement in the exploitation of NTFPs

The results of Model 2 are presented in Table 2. The Model shows the influence of forest-related variables on level of involvement in NTFPs. The forest related variables included in this Model are number of years respondents have been in the NTFP trade, access to NTFPs, source of NTFPs, government rules on NTFPs, availability and demand for NTFP over time. Others are distance from home to collection points of NTFPs measured in hours and the number of hours dedicated to NTFP trade in a week. The probability (p<0.001)-value) associated with the overall Likelihood Ratio Chi Square of 76.38 shows that the model fits well. Results from Model 2 of the multivariable ordinal logistic regression analysis show that four variables were significant. Women who dedicated 20 to 29 hours per week have the odds of 3.0 times greater

level of involvement versus the combined middle and low levels than for women who spent 10 hours or less per week when other variables are held constant. Similarly, women who devoted 30 hours or more per week to NTFP business have the odds of 4.8 higher in terms of involvement in NTFPs than their counterparts versus the combined middle and low levels of involvement than those who spent 10 hours or less per week given that other variables in the model are held constant. This shows that the higher number of hours spent on NTFPs per week, the higher the involvement in the business. Similarly, for women who spent longer hours from home to reach the collection point, the odds of high involvement combined with middle and low involvement was higher than those who spent few hours to reach the collection point. For example, for women who spent up to 7 hours or more in search of NTFPs, the odds of high level of

involvement versus the combined middle and low levels were 3.4 times greater than for women who spent 3 hours or less, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle level of involvement in NTFP business versus low level was 3.4 times greater for women who spent at least 7 hours from home to reach the collection point compared to those who spent 3 or fewer hours given the other variables are held constant in the model. This suggests that people can invest the bulk of their time to any venture if they find it profitable or as long as such venture is meeting their needs.

The demand for NTFPs is significantly related to level of involvement in the NTFP trade.

For example, the odds of high level of involvement among women who reported that there seems to be no change in the demand of NTFP versus the combined middle and low levels of involvement was 3.7 times higher than among those who reported a decrease in demand for NTFP, given that all other variables are held constant. The odds of high level of involvement among women who reported increase in demand of NTFPs versus the combined middle and low levels of involvement was 7.0 times greater than with those who reported decrease in demand over time. This suggests that women will continue to exploit NTFPs and be committed to the trade as long as there is demand for the products.

Table 2: Forest-related variables and level of involvement in the exploitation of NTFPs

| Variables | OR | Standard Error | Z | P> Z | 95% interval | confidence |
|--|--------|----------------|-------|-------|--------------|------------|
| Access to NTFP | | | | | | |
| Social Relations | 1.0000 | | | | | |
| Permission | 1.3389 | 0.3963 | 0.99 | 0.324 | 0.7496 | 2.3916 |
| Free | 1.8103 | 0.7890 | 1.36 | 0.173 | 0.7705 | 4.2532 |
| Others | 1.6963 | 0.7163 | 1.25 | 0.211 | 0.7414 | 3.8813 |
| Source of NTFPs | | | | | | |
| Natural Forest | 1.0000 | | | | | |
| Cultivated Forest | 0.8534 | 0.2243 | -0.60 | 0.546 | 0.5098 | 1.4285 |
| Distance from Forest gate to end market | | | | | | |
| Decreased | 1.0000 | | | | | |
| No change | 3.7082 | 2.4568 | 1.98 | 0.048 | 1.0121 | 13.5863 |
| Increased | 6.9922 | 4.6178 | 2.94 | 0.003 | 1.9163 | 25.5130 |
| Number of collection hours from home | | | | | | |
| <=10 hours | 1.0000 | | | | | |
| 11-19 hours | 0.8273 | 0.2551 | -0.61 | 0.539 | 0.4521 | 1.5138 |
| 20-29 hours | 2.9998 | 1.0731 | 3.07 | 0.002 | 1.4880 | 6.0477 |
| 30 hours or more | 4.8161 | 2.2359 | 3.39 | 0.001 | 1.9387 | 11.9640 |
| Hours spent on NTFPs per week | | | | | | |
| less than 3 hours | 1.0000 | | | | | |
| 4-6 hours | 1.3142 | 0.4283 | 0.84 | 0.402 | 0.6938 | 2.4893 |
| 7hours or more | 3.3661 | 1.6550 | 2.47 | 0.014 | 1.2842 | 8.8232 |
| /cut1 | 0.5038 | 0.8404 | | | -1.1433 | 2.1510 |
| /cut2 | 2.1252 | 0.8481 | | | 0.4629 | 3.7875 |
| Iteration 0: log likelihood = -349.5985 | | | | | | |
| Iteration 1: log likelihood = -311.9171 | | | | | | |
| Iteration 2: log likelihood = -311.4069 | | | | | | |
| Iteration 3: log likelihood = -311.4061 | | | | | | |
| Iteration 4: log likelihood = -311.4061 | | | | | | |
| Ordinal logistic regression Number of obs= 320 | | | | | | |
| LR chi2(11) = 76.38 | | | | | | |
| Prob> chi2 = 0.0000 | | | | | | |
| Log likelihood = -311.2061 Pseudo R2 = 0.1092 | | | | | | |

Source: Field survey, 2017

Table 3: Model 3: Socioeconomic characteristics, forest-related variables and level of involvement in the exploitation of NTFPs

| Categories | Variables | OR | Standard Error | Z | P> Z | 95% confidence interval | | |
|--|---|---------|----------------|-------|-------|-------------------------|---------|--|
| Age | Age | 0.8397 | 0.0644 | -2.28 | 0.023 | 0.7224 | 0.9759 | |
| | Age square | 1.0017 | 0.0009 | 1.99 | 0.046 | 1.0000 | 1.0034 | |
| Education | None (RC) | 1.0000 | | | | | | |
| | Primary | 3.3699 | 1.2525 | 3.27 | 0.001 | 1.6264 | 6.9823 | |
| | Secondary | 2.7756 | 1.1069 | 2.56 | 0.010 | 1.2702 | 6.0652 | |
| | Higher | 0.1972 | 0.2002 | -1.60 | 0.110 | 0.0270 | 1.4424 | |
| Religion | Christianity | 1.0000 | | | | | | |
| | Islam | 1.3134 | 0.4140 | 0.86 | 0.387 | 0.7081 | 2.4360 | |
| | Monogamous | 1.0000 | | | | | | |
| Marital Union | Polygynous | 7.1497 | 2.2012 | 6.39 | 0.000 | 3.9106 | 13.0718 | |
| Years in NTFP business | Years in NTFP business | 1.0776 | 0.0184 | 4.37 | 0.000 | 1.0421 | 1.1142 | |
| External orientation | No | 1.0000 | | | | | | |
| | Yes | 2.5204 | 1.2736 | 1.83 | 0.067 | 0.9361 | 6.7857 | |
| Number of children | <=4 | 1.0000 | | | | | | |
| | 5+ | 1.0154 | 0.2880 | 0.05 | 0.957 | 0.5823 | 1.7705 | |
| Access to resources | Social Relations | 1.0000 | | | | | | |
| | Permission | 3.8168 | 1.3768 | 3.71 | 0.000 | 1.8821 | 7.7401 | |
| | Free | 3.0497 | 1.6084 | 2.11 | 0.034 | 1.0848 | 8.5740 | |
| | Others | 2.0417 | 0.9909 | 1.47 | 0.141 | 0.7886 | 5.2859 | |
| Type of forest | Natural | 1.000 | | | | | | |
| | Cultivated forest | 0.6262 | 0.1929 | -1.52 | 0.129 | 0.3423 | 1.1456 | |
| Any Government rule on NTFP | Yes | 1.0000 | | | | | | |
| | No | 1.3773 | 0.5751 | 0.77 | 0.443 | 0.6075 | 3.1225 | |
| Availability of NTFPs | Decreased | 1.0000 | | | | | | |
| | No change | 0.1732 | 0.0920 | -3.30 | 0.001 | 0.0611 | 0.4908 | |
| | Increased | 0.3061 | 0.1629 | -2.22 | 0.026 | 0.1079 | 0.8687 | |
| Demand for NTFPs | Decreased | 1.0000 | | | | | | |
| | No change | 2.5699 | 1.6714 | 1.45 | 0.147 | 0.7182 | 9.1945 | |
| | Increased | 5.9159 | 3.7532 | 2.80 | 0.005 | 1.7060 | 20.5139 | |
| Number of collection hours | <=10 hrs | 1.0000 | | | | | | |
| | 11-19 hrs | 0.6156 | 0.2218 | -1.35 | 0.178 | 0.3037 | 1.2474 | |
| | 20-29 hrs | 3.4798 | 1.5132 | 2.87 | 0.004 | 1.4839 | 8.1604 | |
| | 30hrs or more | 3.7909 | 1.9636 | 2.57 | 0.010 | 1.3735 | 10.4632 | |
| Time spent on collection per week | <-3 hrs | 1.0000 | | | | | | |
| | 4-6 hrs | 0.8710 | 0.3183 | -0.38 | 0.706 | 0.4255 | 1.7828 | |
| | 7hrs or more | 1.9237 | 1.0573 | 1.19 | 0.234 | 0.6551 | 5.6489 | |
| | /cut1 | -0.2835 | 1.8969 | | | -4.0014 | 3.434 | |
| | /cut2 | 1.7079 | 1.8986 | | | -2.0132 | 5.4290 | |
| | Iteration 0: log likelihood = -349.5985 | | | | | | | |
| | Iteration 1: log likelihood = -270.5539 | | | | | | | |
| Iteration 2: log likelihood = -268.5329 | | | | | | | | |
| Iteration 3: log likelihood = -268.5294 | | | | | | | | |
| Iteration 4: log likelihood = -268.5294 | | | | | | | | |
| Ordinal logistic regression Number of obs= 320 | | | | | | | | |
| LR chi2(11) = 162.14 | | | | | | | | |
| Prob> chi2 = 0.0000 | | | | | | | | |
| Log likelihood = -268.5294 Pseudo R2 = 0.2319 | | | | | | | | |

Model 3: Socioeconomic variables, forest-related variables and level of involvement in the exploitation of NTFPs

Model 3 presents the adjusted odd ratios from ordinal logistic regression analysis of the effects of forest related variables on level of involvement of NTFPs controlling for

socioeconomic variables in the model. The probability value ($p < 0.01$) associated with the overall Likelihood Ratio Chi Square of 108.77 and this shows that the model fits well in explaining the joint effect of the socioeconomic variables and the community-related variables on respondents' level of involvement in the exploitation of NTFPs.

With the introduction of socioeconomic variables, the forest related variables that are significantly associated with level of involvement include availability of NTFPs, demand for NTFPs, access to resources and average number of hours of collection of NTFPs per week. Among the socioeconomic variables that remain significantly associated with level of involvement in NTFP were age of respondents and marital union. The probability value ($p < 0.01$) associated with the overall Likelihood Ratio Chi Square of 162.14 is small, showing that the Model 3 fits well in explaining the adjusted odds of involvement in NTFPs according to forest-related variables when socioeconomic variables have been controlled for.

Specifically, in terms of access to resources, the odds of high level of involvement versus the combined middle and low levels are 3.8 times greater for women who got permission to trade/collect NTFPs than for women who got access through social relations, given the other variables are held constant. Likewise, the odds of the combined categories of high and middle level of involvement in NTFP business versus low level is 3.8 times greater for women who had permission to exploit NTFPs compared to those who gained access by social relations.

Similarly, as reported in the unadjusted model (Model 2) higher average number of collection hours per week was significantly associated with high involvement in the exploitation of NTFPs with the inclusion of socioeconomic variables in the model. Increase in demand for NTFPs also increases the level of involvement by nearly 6 times (Odd ratio=5.9) compared with when there is decrease in the presence of socioeconomic variables, given that all other variables in the model remain constant.

CONCLUSION

Rural women are involved at the different levels of exploiting NTFPs particularly, those that offer great economic benefit. The overall level of involvement in exploitation of NTFP showed that 38.4 percent of the women had low level of involvement in the exploitation of NTFPs, 31.9 percent were moderately involved in the NTFP business while 29.7 percent were ranked high on the level of involvement scale. This implies that involvement in NTFP is expected to contribute significantly to livelihood of rural women in the forest zones. Carr and Hartl (2008) had earlier recommended a greater involvement of rural

women in NTFP trade because of its effectiveness in alleviating poverty in the rural area. NTFP involvement thus offers a great promise for rural women living in the forest areas.

Socioeconomic variables associated with level of involvement in exploitation were age of respondents, level of education, external orientation, religion and marriage type. Amusa *et al.*, (2017) also reported that certain socioeconomic characteristics were found to be associated with NTFP extraction and use in local communities in the tropical lowlands of Southwestern Nigeria. Results from a similar study in Tanzania by Kilonzo *et al.*, (2019) also affirmed at the bivariate level of analysis that socioeconomic variables such as income level, education level, age distribution, household size, occupation and residence influenced the extraction and use of NTFPs.

Forest-related variables associated with levels of involvement were forest location, source of NTFP, enforcement of rules on NTFPs collection, extinction, and availability, consciousness about the future availability of NTFPs, distance of transporting NTFPs from forest gate to end market and the demand for NTFPs.

There is need for concerted efforts to encourage rural women for greater involvement in exploiting NTFPs as a means of livelihood because of varieties of benefits attached to it which could reduce rural poverty. More enlightenment programmes should be organised by the government for the rural women for awareness creation on the income generation opportunities that abound in NTFP sector. Government should encourage promotion of Non-Timber Forest Products (NTFP) species, through productivity improvement and value addition and reverse the trend of massive destruction of forest resources in order to sustain the livelihood of the rural women, whose main means of livelihood is NTFPs. Government should give more appreciation and recognition to the potentials in exploiting NTFPs because of the great benefits in the sector and put in place measures that will enhance greater involvement of rural women in the sector.

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