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Contribution of Forest Income to Household Livelihood in Forest Areas of Southwestern, Nigeria

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ABSTRACT

Forest income could play an important role in improving household livelihoods. However, there are inadequate periodical information on the level of contribution of forest to livelihoods. A four-stage sampling technique was used to select respondents. Three states (Ogun, Osun and Ondo states) in southwestern Nigeria were purposively selected with ten percent representing two forest reserves in each state. Twenty-five villages were randomly selected from Ogun (15), Ondo (5) and Osun (5) proportionate to size in the forest areas and a total of 430 respondents were used. Data were collected on households' socioeconomic characteristics of household heads and income sources using a structured questionnaire. Data were analysed using descriptive statistics, Gini, Foster, Greer and Thorbecke (FGT) and ordered logit model. The median age of household heads was 47 years and household size was 7.0±4.0 persons. Majority of the household heads were married (89.5%) with median years of residency and education of 20 (range :(1-75) and 6 (range:0-16), respectively. Income distribution of respondents was 2.3% (low income class), 22.2% (moderate income class) and 75.5% (high income class). Household size (ß=0.08) and being a male (ß=1.25) increased the likelihood of being in moderate and high forest income classes, while increase in age (ß=-0.03) and farm size (ß=-0.29) reduced being in high forest income class. Therefore it could be deduced that socioeconomic characteristics such as sex, marital status, household size, education status and being a member of village group had major influence household livelihoods in the different income classes.

Keywords: Income, Income ClassGini Coefficient, Ordered Logit, Livelihoods

Introduction

Since time immemorial, forests and their associated products have remained essential in sustaining livelihoods (Mukul *et al.*,2016), particularly for the people of forest-dependent communities, who live in abject poverty (Shackleton *et al.,* 2007; Kabubo-Mariara, 2008). About 1.6 billion people globally are substantially reliant on forests for livelihood sustenance (World Bank 2002). Numerous studies on forest-livelihood nexus have demonstrated the critical role of forests in livelihood sustenance and diversification and as a pathway for poverty alleviation (Mukul *et al,.2016*). Forests are essential in provision of basic needs, cash savings and safety nets (Shackleton *et al., 2007*). They are a source of energy, employment, medicine and other subsistence needs for the majority of local communities, especially in developing countries (*Bahuguna, 2000*). Despite the contribution of forests on livelihoods, human dependence on forests is a multifaceted phenomenon *(*Beckley, 1998).

Forests are plant communities consisting predominantly of trees and other woody vegetation occupying an extensive area of land. A forest is a large area of land where the dominant plants are trees with undergrowth (Lodha, 2007), further defined forests as large

tracts of land covered with trees and other plants growing close together. Oriola, (2009) described forestry as the science of planting and managing large areas of trees and the natural resources. In other words, areas dominated by trees are areas regarded as forest vegetation. Nigeria forest are rich in biodiversity, with an array of fauna and flora. These include 1,417 known species of amphibians, birds, mammals and reptiles according to the World Conservation Monitoring Centre (*FAO, 2012*). Of these 12% are endemic, meaning that they exist in no other place than Nigeria while about 3.5% are threatened by deforestation and forest degradation. Nigeria is home to not less than 4,715 species of vascular plants of which 4.3% are endemic, 3.6% are protected (*FAO, 2012*).

The level of use and degree of reliance on forests and its importance as a source of subsistence varies geographically, over time and across communities (Babulo *et al.*, 2008; Bwalya, 2013). Since communities are not homogenous in nature, variation on household reliance on forests is inevitable (Coomes *et al.* 2004). Drawing upon the forest dependency literature, reliance on forest is a function of various factors and key among them includes a household's socio-economic factors (*Bhavannarayana et al., 2012*). For example, higher education attainment is associated with less reliance on forest resources (Fonta and Ayuk, 2013). This is so because education offers other alternative livelihood opportunities which may generate significant returns compared to forest extraction activities (*Córdova et al., 2013).* Household size is positively associated with forest dependency. Larger families have higher subsistence needs which necessitate them to depend more on forest resources (*Mamo et al., 2007*). On the other hand, age of household head is positively related with forest dependency, albeit with diminishing effect after reaching a peak of physical strength (*Mamo et al., 2007).* However, older people might possess strong ecological knowledge about their proximate environment, a phenomenon which might increase their likelihood of being more dependent on forest resources. This study thereby examined the contribution of few forest products income to household livelihoods in forest areas of rural southwestern, Nigeria.

Methodology

Sources and Method of Data Collection

The study was carried out in selected forest reserve areas, in southwestern Nigeria with the highest concentration of forest. Three states in southwestern Nigeria were purposively selected. These are Omo and Olokemeji forest reserves in Ogun State; Akure (Aponmu) and Idanre forest reserves in Ondo State with Shasha and Ago-Owu forest reserves in Osun State. Omo is located in ogun state, about about 135km north east of Lagos and some 20km from the coast, it lies within a tropical low land rainforest and it has most complex and productive vegetation type in Nigeria with land area of 132,000hectares of land. Olokemeji also in Ogun state, it coordinate are 7°250''N and 331'60. and 58, 880km^{2} land mass. Akure forest reserve in Ondo state is 7.296^{o}N and 5.03^{o}E covering 66km$^{2.}$ Idanre also in Ondo state, is coordinate 6°51'28''N and 5°06;20E and land covering of 5,6092km^{2} Shasha is located at Osun state is a forest reserve in Nigeria with the region font code of Afirca/middle East. It is located at an elevation of 147meters above sea level. Its coordinate are 7o4;60''N and 4o30'0''E with land covering of 30,834km$^{2.}$ Ago-owuis located at an elevation of 228 meters above

sea level. Its coordinates are 7°7'60''N and 4°13'0''E with land covering of 24,847km$^{2.}$ Twenty-five villages were randomly selected from Ogun (15), Ondo (5) and Osun (5) proportionate to size in the forest areas (using equation 1and 2) and a total of 430 This is in line with *Fonta et al., (2012*) who used community forest areas in Eastern Nigeria. Data were collected with aid of a structured questionnaire, administered on heads of households living within and around the forests. The questionnaire were on income, consumption and expenditure (ICE) patterns of respondents, demographic characteristics and other household information relevant to the study.

$$S = {}^{n}\!/_{N}\, x25 \qquad (1)$$

Where,
S = number of villages to be selected
n = total number of village in a particular forest reserve (FR)
N = total number of villages around the six (6) FR selected
q = Number of villages to be sample (25)

$$S = {}^{n}\!/_{N}\, x450 \qquad (2)$$

Where:
S = number of respondents to be selected
n = total number of villages around one FR
N = total number of villages around the six (6) FR selected
q = sample size (total number of respondents needed for the work, that is, 450

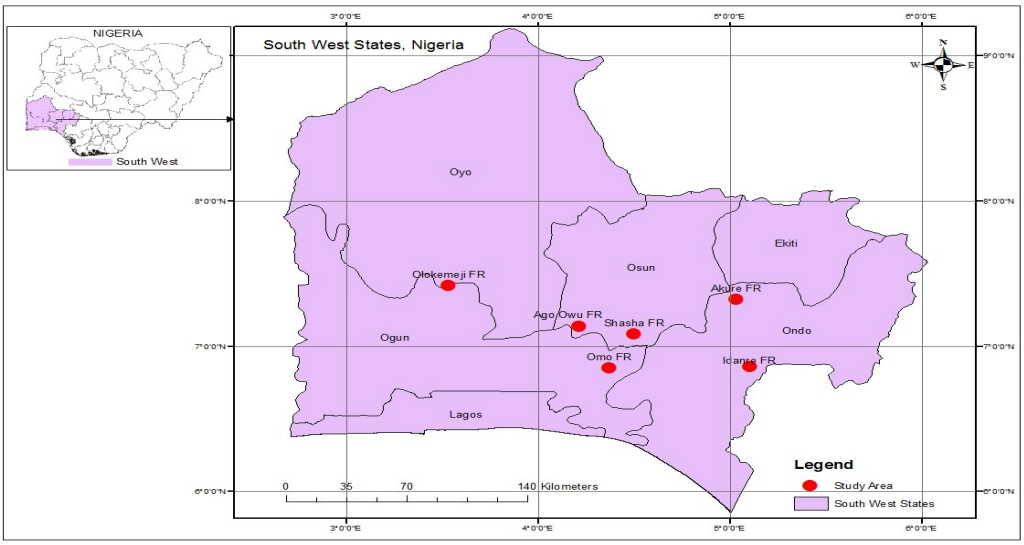

Figure 1. Showing the Selected Forest Reserves

Foster, Greer and Thorbecke (FGT)

This was used to classify the households into income classes based on mean per capita income, following the work of *Ike* and Uzokwe (2015) and Adekoya, (2014) into three forest dependent groups: low, moderate and high income households. The classifications were between 0 to 1/3 of the mean per capita forest income for low class, 1/3 to 2/3 of the mean per capita forest

income for moderate class and 2/3 and above of the mean per capita forest income for high forest income class. The total forest income of each household was estimated for a year, and then corrected for each household size by dividing the household total by the number of people within the household, (eqn 3)

$$\text{Per Capita Forest Income} = \frac{\text{Total household forest income}}{\text{household size}} \quad -- \quad (3)$$

Then the total household's per capita income was calculated by finding the summation of all the household per capita income for the sampled households.

The mean per capita household income, (MPCHI), was calculated by dividing the 'Total per capita income by the total number of households surveyed'

$$\text{MPCHI} \quad \frac{\text{Total per capita forest income for all households}}{\text{Total number of households}} \quad (4)$$

From this mean of per capita household income, two lines were set or drawn relative to the standard of living in the study area.

Ordered Logit Model

To determine factors contributing to forest income among different income classes**.** Ordered Logit Regression was used to investigate the effect of socioeconomic variables such as education, age, gender, asset, household size, farm size, forest access and household type on forest dependent household heads categorised under one of the three income classes, that is, low, moderate and high (*MinetosandPolyzos, 2007*; *Mohammadi et al.,2015*). This is as used by *Chhetri*, (2010) while working on the analyses of the levels of participation of user household in major forest management activities and the contribution of community forest resources to the livelihood of the rural poor in Nepal. Ordered logit is preferable because three category dependent variables are neither continuous nor normally distributed.

The model is stated as follows:

$$\gamma * = \beta\chi\iota + \epsilon\iota \quad (5)$$

where,

y_i* = Income, latent variable or unobserved income

$ß_i$ = Vector of parameters that should be estimated

x_i = Observed vector of non-random explanatory variable which shows the characteristic of the ith household

e_i = Residual error which is logistically distributed.

Since y_i* is a latent variable, standard regression techniques are not applicable to the estimation of the sample size.

If y_i is considered as a discrete and observable variable which shows different levels of forest dependency, the relationship between latent variable, yi,* and observable variable Yi is obtained from the

Ordered logit model as follows:

$Y_i = 1$ if $\mu_1 < Y^* = \mu_1$ i = 1….n

$Y_i = 2$ if $\mu_2 < Y^* = \mu_2$ i = 1….n

$Y_i = 3$ if $\mu_3 < Y^* = \mu_3$ i = 1….n

Where n is the sample size, and μ is the threshold or the cut- point of the variables It is in increasing order ($\mu_1 < \mu_2 < \mu_3$), which is unknown. Then the ordered logit technique used the observations on y, which are a form of censored data on y*, to fit the parameter vector, β

Ordered Logit model is expressed as follows:

$$\log\left[\frac{Y\ i\ (\ Xi\ )}{1\ -\ Y\ i\ (\ Xi\ )}\right] = \mu\iota - [\beta\chi\iota + \beta 2\chi 2\iota \ldots\ldots\ldots.\beta\iota\chi\iota] \quad (6)$$

In order to evaluate the hypothesis of equality of the parameters for all the groups, parallel regression test is used. This test compares the estimated model with a series of coefficients for all the groups with a model with a separate series of coefficients for each group. In this case, if the current model, which is the null hypothesis, is accepted, it proves that the status parameters are the same for all the answer groups

j =1….3 ; I = 1……n

n which 'Y j' cumulative probability is as following:

$$\chi = \gamma(\mu\iota - \beta\chi\iota) = \rho(\gamma \leq j\chi j) \quad (7)$$

ßi is the column vector and of ($ß_1$, $ß_1$,…….,$ß_k$) parameters and Xi is the column vector of explanatory variables, µj is only dependent on probability of predicting category and is not dependent on explanatory variables

Furthermore, the crisp part

$$\beta\iota\chi\iota + \beta 2\chi 2 + \cdots \ldots . \beta\kappa\chi\kappa \quad (8)$$

is the independent part of the category. These two characteristics ensure that the answers groups are ordered and show that the results are a series of parallel lines. The explanatory Variables are stated below:

X_1 = Sex (Dummy Male =1, Female =0)

X_2 = Marital status

X_3 = Age (years)

X_4 = Education (year)

X_5 = Household Size (Number)

X_6 = Farm size (hectare)

X_7 = Forest Distance (Kilometer)

X_8 = Market Distance (Kilometer)

X_9 = Year of Residency (year)

X_{10} = Member of village group (Dummy: Yes =1, 0 if otherwise)

X_{11} = Access to credit (Dummy: Yes =1, 0 if otherwise)

X_{12} = Asset Ownership (Dummy: Yes =1, 0 if otherwise)

Results and Discussion

Distribution of Sex, Marital Status, Age, Household size, Education Level and Primary Occupation of the Household Heads

This study explored socioeconomic characteristics of households in the selected forest area as presented in tables 1 and 2. The sex distribution of the respondents revealed that the proportion of male headed households was higher than that of female headed households. The male headed household constituted 92% while female headed household were 7.90% (Table 1). This signifies a typical rural area setting especially in southwestern region of Nigeria where men and women are predominantly farmers (*Fonta and Ayuk, 2013*). The majority of the household heads were married, constituting 89.5%, about 5.6% were single, 3.5% were widowed and 1.4% were divorced The distribution of household heads according to age shows that 33.0% of the respondent were in age group between 46 and 55years of age and 22.8% were equal and above 56 years old, only 3.0% were less/equal to 25years. The median household head age in the study area was 47 years indicating that household heads were in the economically active age and can perform forest activities quite easily *(Yemiru et al., 2010).*About 37.2% had household members between 1 and 5 in number, 50.1% had between 6 and 10 household members while 12.8% had more than 10 members with average of 6.92 which is higher than 6.2 by *Nwera*, (2014) in *Ngong* forest in Nairobi . About 19.5% had no formal education, 35.3% and 34.9% had primary and secondary education respectively while 10.2 % had tertiary education. Education in

agricultural production will enhance ability to make accurate decisions on the management of the farm. Average number of years in school of household head was 2.38 ± 5.02 years.

The average year of residence in the area was 19.89 ± 14.86 years which was in line with *Garekaeet al*., (2017) while working on the socioeconomic factors influencing household forest dependency in Bostwana, where the average years of residence was 40.26 ± 20.73. *Kartoolinejad et al., 2007*) also supported the finding that long-term resident of forest were more knowledgeable about the ecological structure, composition and seasonal patterns of the forests and hence collect more forest products while studying ecological parameter of some trees.

The distribution of primary occupation in the study area show that farming was the major occupation of the household heads (65.30%). About 17.90% took forest resources extraction as their primary occupation, 5.6% were artisanal workers, 2.80% were only wage/salary and trading was just 8.40%. It could be seen that few people took to artisanal, wage/salary and trading as primary occupation in the rural areas. More people took forest activities as their secondary occupation (40.70%). This confirms the fact that forest resources serve as economic safety nets during periods of economic hardship, drought, seasonal food shortfalls, off farming season (Kabubo-Mariara and Gachoki, 2008) and a source of regular subsistence (*Nwera, 2014*). About 28.10% practice agriculture as their secondary occupation, 21.60% were into trading of agricultural and non-agricultural products, while artisanal activity (8.60%) and wage/salary (0.90%) were very low (Table 1).

Table 1. Distribution of Sex, Marital Status, Age, Household size, Education Level and Primary Occupation of the Household Heads

Variable	Frequency	Percentage	Mean	Standard Deviation
Sex				
Male	396	92.10		
Female	34	7.90		
Total	430	100		
Marital status				
Married	385	89.50		
Singled	24	5.60		
Windowed	15	3.50		
Divorced	06	1.40		
Total	430	100		
Age			47.63	11.65
= 25	13	3.00		
26-35	64	14.90		
36-45	113	26.30		
46-55	142	33.00		
= 56	98	22.80		
Total	430	100		

Household size			6.92	3.639
1-5	160	37.20		
6-10	218	50.10		
Above 11	52	12.70		
Total	430	100		
Education level(year)			2.38	5.016
0	84	19.50		
1-6	150	35.30		
7-12	152	34.90		
Tertiary	44	10.20		
Total	430	100		
Years of residency			19.89	14.86
1-10	141	32.80		
11-20	137	31.90		
Above 21	152	35.30		
Total	430	100		
Primary Occupation				
Farming	281	65.30		
Forest activity	77	17.90		
Artisanal activity	24	5.60		
Wage/salary	12	2.80		
Trading	22	5.11		
Transfer	14	3.25		
Total	430	100		

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Distribution of Family Type, Land Acquisition, Farm Size, Village Group and Credit Access of Household Heads

The study revealed that 38.1% acquired the land by inheritance, 19.30% rented the farmland with cash crops such as cocoa, palm trees, kolanut, bitter cola, and crop plants such as oranges, plantains and bananas (Table 2). About 12.3% leased the farmland and 21.4% acquired the land by purchase, agroforestry system, planting on degraded land and open lands around the forest. The average farm size was 2.4 ± 3.57 hectares which is close to average of 1.39 ± 1.05 hectares derived in the study conducted in southern Ethiopia by *Yemiru et al*., (2010). The distribution of household head based on being a member of an association/village group shows that 38.30% belonged to a group/association while 61.70% did not join any group. Membership of a group in the rural areas helps people to work together, financially supporting each other, sharing labour, harvesting forest resources, hunting at night, fighting their course at the local, state and federal level. According to *Olwande* and *Mathenge*, (2012) membership of associations/groups possesses the potential of increased access to information which is important for marketing and production. The distribution of access to credit facility as further shown in Table 2, 22.70 % of the household heads had access to formal credit while 42.30% accessed informal credit. This implies that having high access to credit will make them diversify, finding alternative sources of income and not depending on forest resources alone.

Table 2. Distribution of Family Type, Land Acquisition, Farm Size, Village Group and Credit Access of Household Heads

Variable	Frequency	Percentage	Mean	Standard Deviation
Secondary Occupation				
Farming	121	28.10		
Forest Activities	175	40.70		
Artisanal	37	8.60		
Wage/ Salary	04	0.90		
Trading	85	19.76		
Transfer	08	1.86		
Total	430	100		
Family Type				
Monogamy	101	76.50		
Polygamy	329	23.50		
Total	430	100.00		
Land acquisition				
No land	39	9.10		
Inheritance	164	38.10		
Rented	82	19.10		
Leased	53	12.30		
Other	92	21.40		
Total	430	100.00		
Farm size			2.40	3.57
0-10	418	97.21		
11-20	10	2.33		
21- above	02	0.46		
Total	430	100		
Member of village group				
Yes	164	38.30		
No	266	61.70		
Total	430	100.00		
Formal credit				
Yes	98	22.70		
No	332	77.30		
Total	430	100.00		
Informal Credit				
Yes	182	42.30		
No	248	57.70		
Total	430	100.00		

.Classification of Respondents into the Forest Dependent Income Classes

The figure 2. below shows the classification of households into low, moderate and high forest income class based on the mean per capita forest income (MPCFI) approach (Igbalajobi and Fatuase, 2013; Oluwatayo, 2008). Those with 2/3 and above mean per capita forest income of ₦83,635.95, were classified under the high forest income class; those between 1/3 and 2/3 of MPCFI were under the medium forest income, and those with 1/3 and below were under the low forest income class household. In this study, therefore, less or equal to 1/3 was = ₦27,878.65 for the low dependent class; between 1/3 and 2/3 was between ₦27,878.65 and ₦55,757.95 for medium forest dependent and above 2/3 was ₦55,757.95 and above. The result showed that 30.93% of the households were in the low forest dependent class, that is, they were involved in subsistence forest activities like non-timber forest products extraction. About 16.74% were in the medium income class while 52.33% were in the high forest dependent class. This implies that they were involved in cash earning forest activities especially in timber activities, charcoal production and exportations. The mean income of the low forest dependent class was ₦66, 399.96 ± ₦24,671.30, the mean income of the moderate forest class was ₦244,309.90 ± ₦38,436.36 while that of the high dependent class was ₦788,530.40 ± ₦53,444.30. This shows that the respondents were highly dependent on forest resources for their livelihoods, translating to their welfare. This is in agreement with *Sunderlin et al.*, (2008) that showed there were approximately 20 million Indonesians residing in and around forest areas, of whom around six million depended on forest resources for their livelihoods and welfare. The study on forest-livelihood nexus have demonstrated the critical role of forests in livelihood sustenance and diversification and as a pathway for poverty alleviation, forest income varied from 10 to 20% of the total household income.

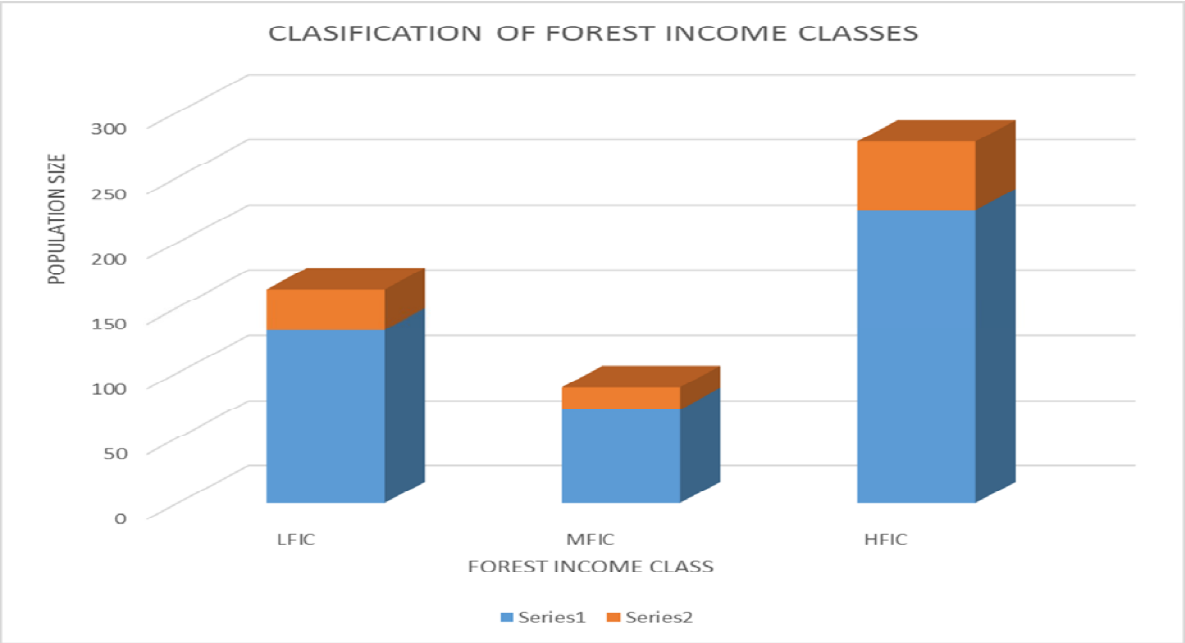

Figure 2. Classification of Respondents into the Forest Dependent Income Classes

Figure 3. presents the relative contributions of different income sources to the total household incomes. The chart shows the share or percentage of each income source i.e farm income, forest income, wage income, transfer income, artisanal income and trading income in the total household income. As indicated in the result, the principal source of household total income was farm income (53.11%) followed by forest income (29.37%). This showed that these two sources contributed more to rural household welfare. The contribution of forest income to household income is fairly comparable to the result by Bwalya (2013) in Zambia in which forest income contributed 30% of the total household income. Likewise, in Chi-radzulu District, Malawi, forest income constituted around 15% of the total income (*Kamanga et al., 2009*) and 17% in a rural forest community in Ethiopia (*Teshome et al., 2015*). In a community forest area in Cross River State southern Nigeria, forest income contributed close to 25% of the total household income (*Fonta et al., 2010*). The contributions of other income sources: wages/salary (8.51%), transfer (1.39%), trading (7.26%) and artisanal income (0.03%) were very small. This was because, these sources of income activities proportion in the rural area were very small.

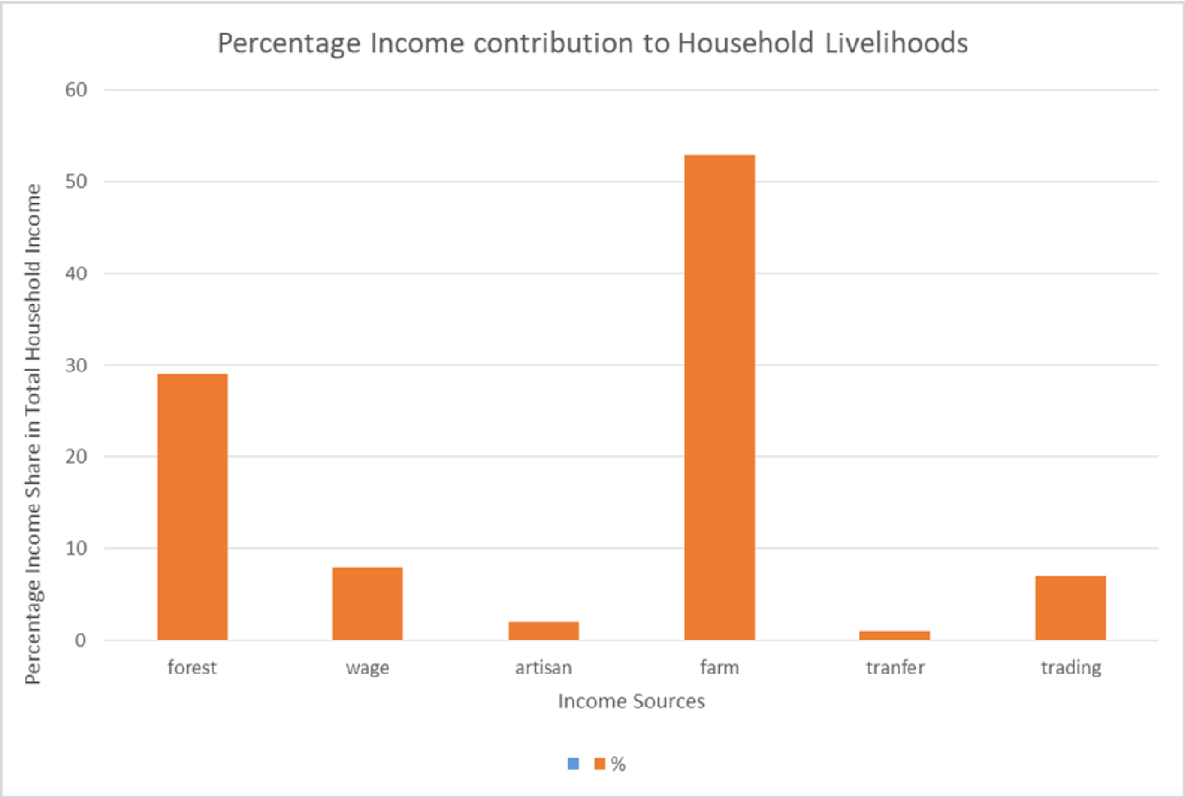

Fig. 3: Percentage of income contribution to Livelihoods

Determinants of Forest Income among Different Income Classes

This is to identify the factors influencing forest income among the different forest income classes as discussed in table 5 above. The Ordered Logit regression was significant at 1% level as shown in Table 3. The likelihood ratio chi-square of 63.08 test for the goodness of fit showed a good fit for the model. Variation inflation factor analysis was carried out to sort for multicollinearity which were less than 5. The pseudo R squared was 0.1447 and accordingly, the estimated ordered logit model correctly predicted about 60% of the changes in different levels of the income. The first cut point 0.3072 was the partition between the low and the moderate forest income range while 1.1059 the second cut was the partitions of range of forest income classes between moderate and high forest income classes. This implies that most of the household in the forest areas fell under medium and high forest income classes. Out of 12 variables, 5 were identified as statistically significant at various probability levels. These are sex (P<0.001), age (P<0.001), household size (P<0.05), farm size (0.001) and forest distance (P<0.001).While marital status, village group membership, education status, access to credit, market distance asset ownership and number of years of residency had expected sign but not significant.

As presented in Table 3, the coefficients of variables: sex, farm size, member of village group marital status, education, household size and access to credit had positive effect on the level of income, and increase in these independent variables, increase the likelihood of the people being placed at higher forest income classes. While age, forest distance, market distance and asset ownership affect income in opposite direction (negative effect). In other words, the increase in independent variables reduced the likelihood of the people to be placed at higher classes of income *Mamoet al.*, (2007). The marginal effects of the explanatory variables for the three income classes are expected to reflect the effect of a unit change in an explanatory variable on the likelihood of being in the low, moderate and high forest income class.

Sex: Table 3 further shows that being a male, increased the likelihood to be in moderate and high forest income class by 27.52% and 30.17%, respectively but reduce the likelihood to be in low forest income class by 29.95%. This implies that forest activities demand for more men than women, this is because logging, charcoal processing, pole processing and hunting of animal at night cannot really be done by women.

Age: An increase in age of the household heads by one year reduced the likelihood of being in moderate (0.52%) and high (0.68%) forest income classes but increased the likelihood of being in the low forest income class by 0.68%. Age is expected to be associated with skill enhancement, accumulation of resources and extensive social capital and to contribute positively to household welfare but at very old age one may not be active and productive (*Bashaasha et al.*, 2006).

Household Size: The forest dwellers used family labour mostly for their occupations. It was discovered from the socioeconomic analysis that the average household size was about 6.92 ±3.60. Table 3. shows that a unit increase in the number of household members reduced the likelihood of being in the low forest income class by 2.05% while increased the likelihood of being in the moderate and high income classes by 1.55% and 2.06% respectively. This implies that having more

family members to work with will increase household income and forest dependency, especially in the case of non -timber forest products that one has to look for, hunt and set traps for.

Farm size: Increasing the hectare of farm size cultivated by a unit hectare reduced the likelihood of being in the moderate (4.94%) and high forest income (6.59%) classes but increase the likelihood of being in low forest income class by 6.54%. This is because the more one is involved in farming activities the less time he has for forest activities.

Forest Distance: A unit increase in distance from the community to the forest reduced the likelihood of being in moderate and high forest income classes but increase the likelihood of being in low forest income class by 1.11%. This implies that the farther away the household is from the forest the lower the likelihood to participate in forest activities and less dependent on forest income. This implies that, as distance from the forest increases, the income generated by households from the forest decreases. This is in line with the report of *Mamoet al.,* (2007) while working on forest resources dependence in Ethiopia.

Table 3. Determinants of Forest Income among Different Income Classes

Independent variables	Coefficient B	Standard Error	P>|Z|	Marginal effect for low forest income class	Marginal effect for medium forest income class	Marginal effect for High forest income class
Sex	0.2499***	0.3531	0.0000	-0.2995	0.2752	0.3017
Marital Status	0.1025	0.3378	0.7640	-0.0237	0.0181	0.0794
Age(years)	-0..0299***	0.0109	0.0070	0.0068	-0.0052	-0.0068
Education. (yrs)	-0.0586	0.0442	0.1860	0.0133	-0.0102	-0.0134
Household size	0.0898**	0.0355	0.0120	- 0.0205	0.0155	0.0206
Farmsize (Ha)	-0.2862***	0.0715	0.0000	0.0654	-0.0494	-0.0659
For. Distance(Km)	-0.0474***	0.0829	0.0070	0.0111	-0.0083	-0.0111
Market Distance(Km)	0.0025	0.0038	0.509	0.0056	-0.0004	-0.0005
Residency (No.of year)	0.0048	0.0087	0.578	-0.0011	0.0008	0.0011
Member village group	0.1881	0.2154	0.503	- 0.0329	0.0250	0.0334
Access credit	-0.0606	0.2486	0.807	0.0138	-0.01034	-0.0139
Asset Ownership	0.1310	0.1775	0.460	0.0299	-0.0227	-0.0302
Cut1	0.3072	0.6736				
Cut 2	1.1059	0.6764				
LR Chi ^{2}(14)	63.78	-----				
Pr. >chi^2	0.0000	------				
Log likelihoods	-377.3979	-------				
Psuedo R^2	0.1447					
McfaddenPsuedo R^2	0. 1040					
Cox and Snell	0.1910					
No. observation	430					

. *significant at 10% ** significant at 5%; ***significant at 1%;

Conclusion and Recommendation

The study found that rural people depend on forest resources for their livelihoods but did not depend on forest income or resource at the same level that was why they were categorised into low, moderate and high forest income classes. Also the socioeconomic characteristics such as sex, marital status, household size, education status and being a member of village group had major influence on forest resources extraction and income distribution in the different income classes. It was as found that forest income had high income share in total household income after forest income, therefore improve on household livelihoods. The study recommend that forest resources should be used sustainably

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