

Perceived Influence of Socio-economic Factors of Fadama III Farmers on Forest Resources Values in Benue State, Nigeria

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Abstract: It is believed that several socio-economic factors influence rural people's utilization, depletion and conservation of forest resources. There is a growing wealth of information available on the utilization and contributions of forest resources to rural livelihoods in Benue State. However, these studies failure to consider socio-economic factors influencing farmers' perception of forest resources values in Benue State. A better understanding of farmers' knowledge of the value forest resources is fundamental to sustainable management perceived values. . Therefore, this paper assessed factors influencing FADAMA III user Groups (FUGs) perceived value of forest resources in Benue State. The population of the study comprised of crops User groups of FADAMA III in the study area. Sample sizes of 734 respondents were selected using stratified, purposive sampling technique. Primary data were collected through the use of semi-structured questionnaire. Descriptive and inferential statistical methods were used to analyze the quantitative data. Binary Logistic Regression Analysis was used to determine the factors influencing respondents' perceived values of forest resources. The results of the study revealed that majority of the respondents (83.5%), were male. The average age of the respondent was $44 \pm 8.154SD$ with most of the respondent (46.0%) having Non-formal education, the mean annual income of the respondents was $570,000 \pm 374,005.82SD$. The average land occupied by FADAMA III projects in the area was 1.86 ± 0.942 . Period of residence ($Exp \beta$) 1.20 was the most important variable influencing respondents perceived values of forest resources. Sex of the respondents in the study area had a negative regression coefficient (β) of -0.10 with odds ratio $Exp(\beta)$ of 0.90, Years spent in formal school had non-significant negative influence on respondent's perceived values of forest resources in the study area. The (β) coefficient was -0.03 with odds ratio $Exp(\beta)$ of 0.97. It was recommended that Farmers in the study area be educated more on the environmental values of trees which can enhance conservation among the farmers.

I. Introduction

Forest products play important roles in supporting rural livelihoods and food security in many developing countries. Forests provide critical sources of food, medicine, shelter, building materials, fuels and cash income. More than 15 million people in Sub-Sahara Africa earn their income from forest-related enterprises such as firewood and charcoal sales, small-scale saw-milling, commercial hunting and handicraft production (Kaimowitz, 2003).

In recent years, there has been increasing interest in the contributions that forests make as a source of local rural livelihood. This stems from arguments that the contribution is important in terms of both rural livelihoods and sustainable forest management. Studies on non-farm rural employment and income has shown that production and trading activities in forest products constitute one of the largest parts of rural non-farm enterprise in developing countries (Liedholm and Mead, 1993). According to Duong (2008) Forest-based activities in developing countries provide an equivalent of 17 and 30 million full-time jobs in the formal and informal sector respectively, as well as 13-35% of all rural non-farm employment. It is established that harvesting of forest products is undertaken by farmers (Arnold and Townson, 1998) and conservation of the forest resources is based on their values.

In Nigeria there is a growing wealth of information available on the contribution of forest resources to rural livelihood (Aiyelaja and Ajewole, 2006; Jimoh, 2006; Adekunle *et al.*, 2011; Onuche, 2011; Chukwuone and Okeke, 2012, Iheke and Eziuche, 2016). In Benue State, studies (Tee *et al.*, 2009; 2014; Ikoni, 2012; Adagba *et al.*, 2016; Shomkegh *et al.*, 2016) have shown that farmers often use a diverse variety of forest products; they also know a good number of forest species (Agbidye *et al.*, 2014). Agbidye *et al.*, (2014) further stated that farmers in the state even have good knowledge of when plants start flowering and fruiting including even their pollination agents. These studies indicate that, there is a knowledge gap on the socio-economic factors influencing farmers' perception of forest resources values in Benue State. It is believed that several socio-economic factors influence rural people's utilization, depletion and conservation of forest resources (Schwartz and Caro 2003, Giliba *et al.*, 2011). A better understanding of rural people's knowledge of the forest, their awareness of forest resources and their perceived values on their socio-economic and environmental welfare is fundamental to the development and implementation of management strategies that are both

sustainable in the long term and sensitive to existing local needs. Therefore, this paper assessed factors influencing FADAMA III user Groups (FUGs) perceived value of forest resources in Benue State. It is believed that the information generated in this study will help decision makers and other stakeholders in promoting sustainable forest resources management.

Study Area

Benue State is located within Middle Belt of Nigeria on Longitude 6°31'E and 10°E and between Latitudes 6°30'N and 8°10'N and the land mass of 33,955km² (BNARDA, 2005). The State has a population of approximately 5 million by 2009 estimate/projection based on a 2.8% growth rate (NPC, 2006). Benue State has 23 Local Government Areas as contained in Fig 1.

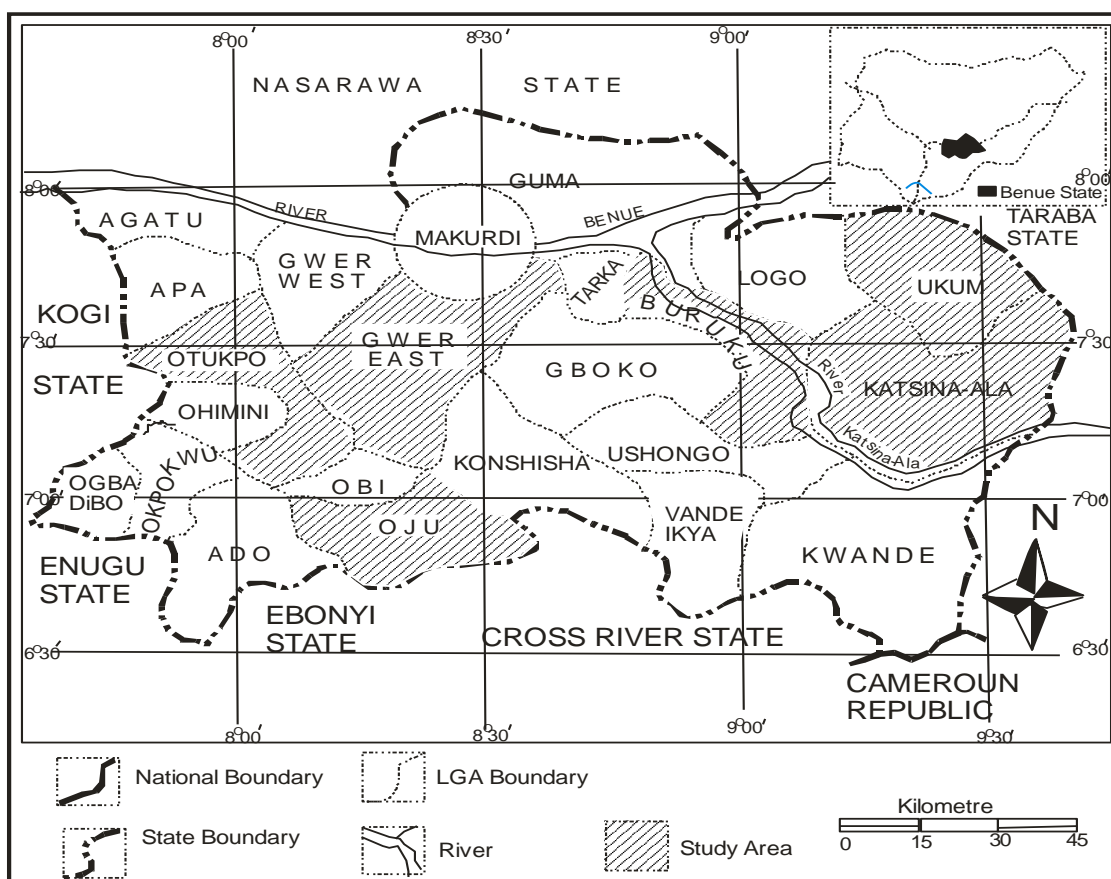


Fig 1. Map of Benue State showing study areas

Source: Ministry of Lands and Survey Makurdi (2015).

Climate

Benue State experiences two distinct seasons, the wet and the dry season. The rainy season lasts from April to October with annual rainfall in the range of 1000-2000mm. The dry season begins in November and ends in March. Temperatures fluctuate between 21 – 37 degrees Celsius in the year. The south-eastern part of the State adjoining the Obudu-Cameroun mountain range, however, has a cooler climate similar to that of the Jos Plateau State (Adamgbe and Ujoh, 2012).

Vegetation

The vegetation in these areas in the State is open savannah woodland, characterized by predominantly fewer trees, more shrubs and predominantly tall grasses up to 2m tall. Forest formations are found in low land areas and river banks. Some of the species found in the area include; *Daniellia oliveri*, *Vitellaria paradoxa*, *Vitex doniana*, *Hymenocordia acida*, *Burkia africana*, *Khaya senegslensis*, *Parkia biglobosa* among others (Jimoh, *et al.*, 2009).

Topography

The elevation which is generally undulating rises from the Benue valley below 100m Eastwards and Southwards to the Western ranges of Cameroonians highlands and Nsukka escarpments respectively (Adamgbe

and Ujoh, 2012). Benue State is drained by River Benue and its tributaries such as Katsina-Ala, Okpokwu, Guma, Gwer, and Aya. The dominant soil in the State is the tropical ferruginous which is generally low in organic matter, bases and cation exchange capacity (Adamgbe and Ujoh, 2012)

Population, Sampling Procedure and Sample Size

The population of the study is made up of all the User groups in the study area. The target groups in the study were members of FUGs. There were between 10-15 FUGs in each Fadama Community Association (FCA), (Benue FADAMA III COMPENDIUM, 2014). Each FUG has between 10-25 members and 734 members (Table1) were drawn to form the study size. Stratified and purposive sampling techniques were adopted for the study.

The State was stratified into three parts based on the existing senatorial zones. In each zone, 20% of FUGs were sampled purposively based on the sub-projects which had bearing on forest resources. In each FUG 2 members were purposively selected based on their knowledge of the sub-project.

Table 1. Summary of Sampling Procedure of the Study

Senatorial Zone	No. Of FCA	No. Of FUGs	20% of FUGs	2 Respondents Selected in each FUG
A	49	682	136	272
B	41	470	94	188
C	44	685	137	274
Total	152	1857	367	734

Data collection

The study made use of both the primary and secondary data. Primary data was collected through the use of questionnaire while secondary data was obtained from the Fadama State Office records. Direct observations were made to assess the current status of forest resources around Fadama projects.

Data Analysis

Both descriptive and inferential statistical methods were used to analyze the quantitative data. Descriptive statistics such as frequency and percentages were used to analyze socio-economic characteristics of the respondents. They were also used to analyze the forest resources available in the area.

Binary Logistic Regression (BLR) analysis was used to determine the factors influencing respondents' perceived forest resources values in the study area

II. Result

Socio-economic Characteristic of the Respondents

The socio-economic characteristic of the respondents as shown in Table 2 revealed that 16.5% of the respondents were females while 83.5% were males. The mean age of the respondents was 44years. In terms of education 46% of the respondents' had non-formal education, 18.7% had primary education, and 20.7% had secondary education, while those with tertiary were the least 14.6%. All the respondents interviewed were married, also all the respondents were farmers. The result also showed that 43.1% of the respondents earned between N401, 000-N800, 000 annually with the mean annual income value of ₦570, 000. The result also showed that 42.3% of the respondents were in the area for a period of between 41-50 years with average period of stay of 44.10years. Majority of the respondents (89.0%) normally cultivate between 1-3ha, 10.8% cultivated between 4-6ha while 0.3% cultivated between 7-9ha annually, the mean annual farm size cultivated by respondents was 2.32ha per year.

Table 2: Socio economic Characteristics of the Fadama User Groups in Benue State

Sex	Frequency (n=734)	Percent (%)
Female	121	16.5
Male	613	83.5
Age years		
30-40	273	37.2
41-50	311	42.4
51-60	123	16.8
61-70	24	3.3
71-80	3	0.4
Mean age	44± 8.154 SD	
Educational Status		
Non-Formal Education	338	46.0
Primary Education	137	18.7
Secondary Education	152	20.7

Tertiary Education	107	14.6
Marital Status		
Married	734	100.0
Occupation		
Farming	734	100.0
Annual income (N) thousand		
50,000 – 400,000	274	37.3
401,000 – 800,000	316	43.1
801,000 – 1,200,000	103	14.0
1,201,000 – 1,600,000	34	4.6
1,601,000 – 2,000,000	2	0.3
2,001,000 – 2,400,000	1	0.1
2,401,000 – 2,800,000	4	0.5
Mean income	570,000±374,005.82 SD	
Period of Residence (Years)		
30-40	273	37.2
41-50	311	42.4
51-60	123	16.8
61-70	24	3.3
71-80	3	0.4
Mean Period of Residence	44±8.138 SD	
Farm size (ha)		
1-3	653	89.0
4-6	79	10.8
3-9	2	0.3
Mean Farm size (ha)	2.32±1.037 SD	

SD=Standard Deviation

Values of Forest Resources and Contribution to Livelihood in the Area

Majority of the respondents (99.0%) agreed that forests have value in their locality, as indicated in Table 3; they listed six common uses of forest resources in the area. The result also showed that fuel wood was the highest (47.0%) benefit derived from forest resources in the study area. Also majority of the respondents (94.8%) indicated that forest resources in the area have been contributing to their livelihood.

Table 3. Respondents Response to Questions on Values of Forest Resources and Contribution to Livelihood in Benue State

Question	Response Category	Frequency (n=734)	%
Do the forest resources have any value to you	Yes	7	1.0
	No	727	99.0
Various uses of forest resources in the area	Source of Food	77	11.1
	Source of Meat	9	1.2
	Fuel-wood	347	47.0
	Medicare	66	9.0
	Timber material	215	29.0
	Animal feeds	20	2.7
Do forest resources contribute to your livelihood	No	38	5.2
	Yes	696	94.8

Factors Influencing Respondents Perceived Forest Resources Values in the Study Area

The result presented in Table 4 showed that all Wald statistics were non-zero values, which implied that there was interaction between the dependent (Perception of forest resources values) and independent variables; indicating the presence of relationships between the dependent and independent variables (Giliba *et al.*, 2011).

Sex of the respondents in the study area had a negative regression coefficient (β) of -0.10 with odds ratio $\text{Exp}(\beta)$ of 0.90, indicating that a unit increase in the number of female respondents will decrease the likelihood of perceiving values of forest resources by factor 0.90 and vice versa. The variable was not statistically significant ($p > 0.05$). The male respondents were the variable of interest in the analysis.

Income of the respondents in the study area had a non-significant positive regression coefficient (β) of 0.00 with odds ratio $\text{Exp}(\beta)$ of 1.000 which indicates that a unit increase in income will increase the likelihood of perception of values of forest resources by a factor 1.000 and vice versa.

Duration of residence in the area had a non-positive regression coefficient (β) of 0.18 with odds ratio $\text{Exp}(\beta)$ of 1.20. This indicates that the chance of perception of values of forest resources will increase by a factor of 1.20 for a unit increase in the period of stay in the area. In other words, increase in the number of years of residence of the respondents in the study area increases the likelihood of perceiving the values of forest resources in the area.

Years spent in formal school had non-significant negative influence on respondent’s perceived values of forest resources in the study area. The (β) coefficient was -0.03 with odds ratio Exp (β) of 0.97 indicating that increase in the years of schooling will lead to a decrease in likelihood of perceiving the values on forest resources in the study area by a factor 0.97.

Age of the respondents had a non-significant positive ($p > 0.05$) influence on the respondents perception. The regression coefficient (β) of 0.11 with odds ratio Exp(β) of 1.11 indicated that a unit increase in age will lead to an increase in the likelihood of perceiving the values of forest resources by a factor of 1.11.

Table 4. Logistic Regression Analysis of Socio economic Factors Influencing Respondents perception of Forest Resources Values in the Benue State

Variables	B	SE	Wald	Df	Sig	EXP(B)
X ₁ = sex	-0.10	1.09	0.009	1	0.92	0.90
X ₂ = age	0.11	0.18	0.978	1	0.950	1.11
X ₃ = Schooling years	-0.03	0.06	0.186	1	0.67	0.97
X ₄ = income	0.000	0.000	0.001	1	0.98	1.000
X ₅ = period	0.18	2.14	0.07	1	0.93	1.20
Constant	2.53	2.61	0.94	1	0.33	12.61

P = 0.68

Number of cases = 734, Model Chi-square= 9.24 ($p > 0.05$), -2LL = 77.53; Overall percentage = 99%, Exp (β) = odds ratio (probability of success/probability of failure), SE= standard error of the estimate, Sig = significance, b = regression coefficients which stand for the odds ratio of probability of success to the probability of failure and Wald statistics = $(b/ SE)^2$, d.f = degree of freedom

III. Discussion

Socio-economic Characteristics of the Respondents Participating in FADAMA Activities in Benue State

The study recorded more male than their female counterpart in FADAMA activities in the study area, even though FADAMA project as a World Bank Project has a special consideration for women particularly widows and divorced (Umar, 2007; Mohammed *et al.*, 2011). Similar situation were reported in Kwara State (Babatunde *et al.*, 2008) and in Niger State (Mohammed *et al.*, 2011) where women participation was low. This low participation could be due to the nature of the crops involved. For instance in Edo State Omorogbee and Onemolease (2008) reported that women were the dominant participant in FADAMA activities, which they linked to the type of crop, cultivated mostly vegetables.

The low participation of youth in the project was an indication that young people are gradually leaving agriculture, even with the presence of incentives. Similar situation was reported by Mohammed *et al.* (2011) in Niger State and Omorogbee and Onemolease (2008) in Edo State. However Adeolu *et al.* (2004) considered this age group of above 40 years which dominated the program as not healthy. Their submission was that, it was an indication that the youth were not replacing the older ones or the youth were not getting involved in Agricultural activities. On the conservation side the reduced involvement of youth may be of benefit as it would reduce pressure on forest resources (Ajake and Enang, 2012).

It was clear from the study that agriculture in Benue State and indeed Nigeria is still left in the hands of uneducated people (Adeolu *et al.*, 2004). This might explain why adaptation of sustainable agriculture which is environmentally friendly might be difficult to achieve in Nigeria. This could be due to the fact that most educated young people are not ready to take to farm activities as observed by Adeolu *et al.* (2004) but rather prefer to migrate to urban areas for greener pastures. Muhammad *et al.* (2011) reported the same experience in Niger State, where most of FADAMA participants had below primary education. In Kwara State, Babatunde *et al.* (2008) found that over 60% of farmers of Fadama II Maize FUGs had no formal education. The result of the study also demonstrated that farmers in the area usually have low income from their farm produce which is the major attributes of farming in sub Saharan Africa (Oni, 2014), which in most cases is due to poor farm yield. The small size of project might be due to the nature of land tenure in the area which makes it difficult to acquire land on large scale; this agreed with the finding of Adeolu *et al.* (2004) and Babatude *et al.* (2008).

Values of Forest Resources

Throughout the history of man, forest resources have been important to human being (Young and Giese, 2003). This was clearly demonstrated in this study. The result of the study revealed that a good numbers of people in the area were knowledgeable about uses of plant around them and they perceived trees as being valuable and useful resources. This agreed with the finding of Agbidye *et al.* (2014). This knowledge was reflected by the number of uses they were able to mention and it was a manifestation that trees formed an integral part of their daily life. Similar experience was reported by Kobbail (2012) in Kosti province of White Nile area of Central Sudan. The values of the forest resources mentioned in this study were similar to the ones mentioned by other studies (Jimoh *et al.*, 2009; Onuche, 2010; Ramcilovic-Suominen *et al.*, 2012; Yang *et al.*,

2015). The study revealed further that FADAMA III user group members appeared to be mostly concerned about the economic values that are directly connected to their livelihoods. Similar experiences were recorded by Yang *et al.* (2015) in southern China and Arowosoge (2015) in Ekiti State Nigeria. This according to Ramcilovic-Suominen *et al.*, (2012), a farmer is primarily interested in using forests for commercial use, to improve their economic well-being rather than other benefits like for the provision of environmental services (e.g. climate regulation, erosion control and biodiversity conservation).

The study established that fuel wood still remained the major source of energy in Benue State like other parts of Nigeria. This confirmed the submission by Ogunjinmi *et al.*(2008) and Onuche (2010) that fuel wood constitutes the major forest products from savanna vegetation as it accounts for a larger part of household energy need and meeting 80% of domestic energy requirement of rural and urban people in Nigeria. This high dependence could be linked to the high cost of other forms of energy which are usually beyond the reach of the poor, thereby forcing them to rely more on fuel wood for their energy need. The implication of this high rate of fuel wood consumption is that, there will be increase in forest resources depletion.

Factors Influencing Respondents Perception of Forest Resources Values in the study Area

It was evident from the study that socio-economic variables of the respondents like age, period of residence and income had positive association with respondents perceived values of forest resources, though the regression coefficients of these variables were not significant at ($P < 0.05$). The positive regression implies that elderly people perceived more forest resource values than the younger which could be due to the fact that the older generation has had more experience, longer association and interaction with forest resources (Yang *et al.*, 2015). This agreed with submission by Hunter (2007) that experience changes peoples' values of forest resources. Similar experience was observed by Yang *et al.* (2015) in Southern China that age lead to a reduction of the difference in perception of the number of forest values between older and younger people. Another possible explanation was attributed to the fact that the young people have more opportunities to leave the community and gain more in-depth environmental education or have more frequent contact with the outside world through various media sources (Yang *et al.*, 2015). The implication of this finding could be an indication of loss of traditional knowledge about tree values among the young generation (Jimoh *et al.*, 2009)

The study has demonstrated that most of the educated people were youth with low knowledge about the uses of plants around them. This could be the possible reason for negative regression coefficient for education, as their education did not translate into knowledge about trees uses. However, elderly people who had good knowledge about the uses of forest resources were uneducated. This was evidenced in the positive association with age. Similar findings were reported by Luoga *et al.* (2000) in Kitulanhalo, Tanzania. This study also agreed with submissions by Hunter (2007) that acquiring more education is not the simple solution to change people's values of forest resources. In this light, Caro *et al.* (2003) considered the type of education one has to be the solution in changing his view and value system. Caro *et al.* (2003) study revealed that people with environmental education were more concerned about conservation. Another reason might be that highly-educated people will have greater off farm employment opportunities than less educated people which will take them away from forest environment (Adhikari *et al.*, 2004). In general, education creates more and better employment opportunities and reduces dependent on forest resources for survival. However, the no significant value ($r = -0.022$, $p > 0.057$) suggested that no matter the level of one's education he /she still had value for forest resources.

It is believed that use of forest resources depended on the sex of the individual. Studies have shown that the roles, knowledge, and skills of rural men and women differ with respect to forest use and management (Hunter, 2007; Agarwal, 2009; Mai *et al.* 2011 Sunderland *et al.*, 2014). The negative relationship ($r = -0.006$, $p > 0.057$) was an indication that males and females in the study area valued forest resources in different ways. This agreed with findings of Hunter (2007) that men and women differ in how they value particular species because they interact with different suites of species. According to Sunderland *et al.* (2014) Activities along the forestry value chain tend to be differentiated along gender lines. These differences may be connected to the types of forest products collected by both men and women (Sunderland *et al.*, 2014) .

Increase in the number of years of residence of the people in the study area increases the likelihood of perception of forest resources values. The more people stay in a given place, the more their familiarity with forest resources in the area and their benefits (Shibia, 2010). Hunter (2007) stated that experience is the major factor that influences and changes people's values and attitudes towards forest resources, their uses and conservation. This is because older people and those who stay in the area a long time might have good knowledge of how the vegetation was and will be able to detect changes in the vegetation cover.

The positive association between income and forest resources values in the study area was confirmation of submission by other studies that higher incomes, of rural poor in developing countries, are likely to increase the dependency on forests (Angelsen and Kaimowitz, 1999; Escobal and Aldana, 2003; Adhikari *et al.*, 2004;

Mamo *et al.*, 2007). It was clear that most of the incomes were coming from the selling of NTFPs such as fuel wood as it was evidence with high percentage for fuel wood as major forest resources.

This study agreed with submission by Coulibaly- Lingani *et al.* (2009) that ownership of more assets allows households to exploit more forest resources. This implies that forest products play an important role in equalizing incomes of rural households, as well as in sustaining the livelihood of the rural poor and in managing risks associated with weather, crop losses and other unpredictable events (Coulibaly- Lingani *et al.*, 2009).

IV. Conclusions And Recommendation

This study provides an understanding of FADAMA III User groups' perceptions of value of forest resources. The result of the study revealed that good numbers of people in the area were knowledgeable about uses of plant around them and they perceived trees as being valuable and useful resources. The study also confirmed high dependence on forest resources in the area especially fuel wood; the implication of this high rate of fuel wood consumption is that, there will be increase in forest resources depletion.

Members of FADAMA III User groups' understood values of forests, but the understanding was influenced by socio-economic factors of sex, age, education, income and period of resident. While socio-economic variables of the respondents like age, period of residence and income had positive association with respondents' perceived values of forest resources, sex and education had negative influence on their perceived values of forest resources. This meant that forest resources value chain differentiated along gender lines and also not the level of education but the types of education one had that influenced his value and perception of forest resources. It was recommended that Farmers in the study area be educated more on the environmental values of trees which can enhance its conservation among the farmers.

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