Original Research Article

Perceived Effects of Farmer Participation in Utilization and Conservation of Forest Resources in Otukpo Local Government Area of Benue State

Abstract

This study assessed the perceived effects of farmer participation in utilization and conservation of forest resources in Otukpo Local Government Area of Benue State. Data were collected from 150 farmers randomly selected, using structured questionnaire. The data were analyzed using both descriptive (percentages, frequencies and means) and inferential statistics (multiple linear regression). Result of the analysis indicated a low participation of farmers in forest conservation. The farmers however, had a positive perception on the fact that community participation in forest conservation increases job opportunities ($\bar{X} = 4.65$) and reduces poverty ($\bar{X} = 4.16$). Result of the linear regression analysis revealed that age had a negative (-0.009142: $p < 0.01$) and significant relationship with farmers' perceived effect of community participation in utilization and conservation of forest resources, while household size (0.0169081: $p < 0.05$), education (0.0503444: $p < 0.1$) and farm size (0.1228889: $p < 0.1$) all had positive and significant relationships with farmers' perceived effects of community participation in utilization and conservation of forest resources. It was concluded that farmers' participation in conservation of the forest was very low. The need for sensitization of the farmers on the importance of participation in forest conservation by all the stakeholders was recommended.

Key words: Perceived effects, farmer, participation, utilization, conservation, forest resources

1. INTRODUCTION

Forests provide products for different uses at households and industrial levels [1]. These products are highly valued worldwide as they play an important role in sustaining the livelihoods of communities living around forest areas [2]. They are important income generating products for local people living close to the forests, contributing significantly to household income, food security, and household healthcare as well as, provision of multiple social and cultural values [3.4]. In the developing nations, forest products are considered as safety net that fills the gaps due to a shortfall in agricultural production or other forms of emergencies [5,6,7].

Communities living close to protected areas in developing countries have historically depended on forest resources for their livelihoods' sustenance especially in times of hardship due to a shortfall in agricultural production and other forms of emergencies [8,9]. For most households in these communities, forests remain a bank of resources from which they derive additional income through consumption and sales of forest products [10,11,12]. Thus, sustainable extraction of forest products can be promoted as one of the rural development and biodiversity conservation strategies in forest rich areas [11]. In Nigeria, the problem of high population density coupled with limited off-farm income generating activities in rural areas, households adjacent to forests commonly rely on forest resources to supplement their household income [13].

Community participation in the conservation of forest resources can make a significant contribution to poverty reduction in the local community where the forests are located. The justification for community participation in natural resources conservation as viewed by International Union for conservation of Nature [14] provides that human culture must be based on a respect for nature and that the present generation have a social responsibility to conserved nature for the welfare of future generation. The view recognizes that mankind is part of nature and that all species have an inherent right to exist regardless of their materials value to humans [15].

Different studies in the Community Forestry show that it is possible to reduce poverty from forest by securing resources for poor, increasing the availability of a range of resources and providing potential for income generation activities (IGAs) [16,17,18]. The need for communities to invest in forest

resources conservation and to reduce the effect of environmental degradation is indisputable in Nigeria and particularly in Otupko Local Government Area of Benue State. The people in the study area are highly dependent on forest ecosystem for its diverse and abundant Natural wildlife, land, food and water resources. Therefore, this study was conducted to assess the perceived effects of farmer participation in utilization and conservation of forest resources in Otukpo Local Government Area of Benue State. It specifically described the farmers' socioeconomic characteristics, identify the benefits derived from or uses of the forest/forest products and determine the farmers' participation in forest conservation. This study also determined the relationship between farmers' socioeconomic characteristics and perceived effects of community participation in utilization and conservation of forest resources.

2. METHODOLOGY

This study was conducted in Otukpo Local Government Area (LGA) of Benue State, Nigeria. Otukpo LGA covers an area of 1,269 km². It is bounded to the north by Apa LGA, to the east by Gwer East and Gwer West LGAs, to the south by Obi LGA, to the south-west by Ado LGA, and to the west by Okpokwu and Ohimini LGAs and Kogi State. Otukpo LGA has a population of 261,666 [19]. It has an average temperature of 29^{o}C and is mostly characterized by grassy and flat topography. The LGA witnesses two distinct seasons which are the dry and the rainy seasons with the total precipitation of the area put at an estimated 1550 mm per annum. Otukpo LGA also has a few hills and the area is well forested [20].

Otukpo Local Government Area was targeted for this study. Four communities, namely Ibaji, Ilaba, Odaubi and Ogobia were purposively selected due to their pronounced use of forests resources. About 3% of the farmers from each of the 4 communities were randomly selected to obtain a total of 150 farmers out of about 5000 for the study sample.

Primary data for this study was obtained through the use of a structured questionnaire administered to the respondents. Data were analyzed using both descriptive (frequencies, percentages and means) and inferential statistics (linear regression analysis). Frequencies, percentages and means were used to describe the socioeconomic characteristics of the farmers and identify the benefits derived from or uses of the forest resources to the farmers. A 5-point Likert-type scale was used to examine the perceived effects of community participation in utilization and conservation of forest resources. Linear regression analysis was used to determine the relationship between farmers' socioeconomic characteristics and perceived effects of community participation in utilization and conservation of forest resources.

The linear regression model is expressed as:

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_7 X_7 + e$$

Where;

Y= Farmers' perceived effects of community participation in utilization and conservation of forest resources; X_1 = age, X_2 = sex, X_3= marital status, X_4 = house hold size, X_5= years spent in attaining formal education, X_6 = farming experience, X_7 = annual income from non forest products, β_1 = coefficients to be estimated and e = error term.

3. RESULTS AND DISCUSSION

3.1 Socioeconomic characteristics of the farmers

The socioeconomic characteristics studied include age, sex, marital status, educational qualification, household size, farm occupation, non-farm occupation, annual income from non forest products and agricultural farm size. Table 1 showed that 44.67% of the respondents were within the age range of 30 – 49 years, 32.0% were within the range of 50 – 69 years, and 23.33% were within 70 years and above. The mean age of 54.91 years indicated that most of the farmers in the study area were relatively young and within their active and productive ages.

Tables 1 also showed that majority (90.00%) of the respondents were males and married (61.30%). This implies that farmers in the study area were predominantly males and married, with family responsibilities. About 48.00% of them had a household size within 1 – 9 members, 39.30% had within 10 – 20 members while 12.70% had within 21– 45 household members. This implies that most of the farmers had more than 9 members in their households. The result indicated that 48.66% of the respondents had 11- 20 years of farming experience, 31.33% had 21 - 30 years and 14.66% had less than 10 years with a mean of about 20 years (Table 1). This implies that most of the famers had at least 10 years of farming experience.

The result indicated that 31.30% of the respondents had secondary education, 24.70% had primary education, 24.00% had tertiary education and 20.00% had adult education. This implies that 80% of the farmers had formal education. Majority (80.67%) of the respondents had 0.1-1.99 ha of farmland, 16.67% had 2 - 3.89 ha and only 2.67% had more than 3.89 ha farmland. This implies that majority of the farmers had a small farmland. Having small holdings is one of the characteristics attributed to farming and farmers in Nigeria. Majority of the respondents mainly produced either crops (58.00%) or livestock (35.30%). This indicates that crops and livestock production are the major farming activities carried out by the farmers in the study area. Most of the respondents reported that they engaged in other occupations outside farming. Among them were traders (40.00%) and artisans (32.67%) (Table 1). Such occupations are important sources of additional income, thereby improving the farmers' standard of living.

On their estimated annual turnover from forest products, about 31.33% of them had an annual income within ₦300,000 - ₦49900,000, 25.33% had less than ₦100,000, 23.33% had within ₦100,000 - ₦299,000, and 20.00% had more than ₦499, 000, annually from the forest products. This implies that majority of the farmers had at least ₦100,000 annually from the forest products (Table 1).

In a study to determine the perceived influence of socio-economic factors of Fadama III farmers on forest resources values in Benue State, Nigeria, [21] reported that majority (83.5%) of the respondents were males and married (100%) with a mean age of 44 years. They added that 46% of the respondents had non-formal education and 43.1% of them earned between ₦401, 000 and ₦800, 000 annually with the mean annual income value of ₦570, 000. The respondents cultivated between 1-3ha (89.0%).

Table 1. Distribution of farmers according to socioeconomic characteristics (n= 150)

Variables	Frequency	Percentage	Mean
Age (years)			
30 – 49	67	44.67	54.92
50 – 69	48	32.00	
70 and Above	35	23.33	
Sex			
Male	135	90.00	
Female	15	10.00	
Marital Status			
Married	92	61.30	
Single	33	22.00	
Widow/Widower	15	10.00	
Divorced	8	6.70	
Household Size			

1-9	72	48.00	12.55
10-20	59	39.30	
21 – 45	19	12.70	
Farming Experience (years)			
Less than 10	22	14.66	
11 – 20	73	48.66	
21 – 30	47	31.33	
31 and Above	8	5.33	19.95
Highest Educational Attainment			
Adult Education	30	20.00	
Primary Education	37	24.70	
Secondary	47	31.30	
Tertiary Education	36	24.00	
Farm size (ha)			
0.10 – 1.99	121	80.67	
2.00 – 3.89	25	16.67	
More than 3.89	4	2.67	
Major Farm occupation			
Crop Production	87	58.00	
Livestock production	53	35.30	
Fish Farming	8	5.30	
No response	2	1.40	
Non Farm Occupation			
None	18	12.00	
Artisans	49	32.67	
Local manufacturers	5	3.33	
Traders	60	40.00	
Civil servants	9	6.00	
Others	9	6.00	
Annual Income from Forest Products (₦)			
Less than 100,000	38	25.33	
100,000 – 299,000	35	23.33	
300,000 – 499,000	47	31.33	
More than 499,000	30	20.00	

Source: Field Survey, 2018

3.2 Benefits derived from or uses of the forest/forest products

Result in Table 2 showed that majority (65.33%) of the respondents reported that the forest maintained and restored the soil fertility and stability in their lands. About 60.00% of them obtained both raw materials for harvest and transport equipments and for packing and processing food from the forest. Other benefits derived from the forest/forest products include provision of raw materials for crop support (59.33%), provision of raw materials for boats, nets, traps, poles poisons and fuel woods for fish preservation and for protecting crops such as fencing materials and plant-based insecticides (58.00%), both raw materials for agricultural implements and crop storage containers (57.33%), both raw materials for crop marketing equipment and for food stores (56.67%).This implies that most of the farmers benefitted in several ways from the forest/forest products. It also indicates the numerous benefits derivable from the forest. Hence, forests should be judiciously utilized and adequately conserved.

The World Bank report of 2007, affirmed that approximately 1.7 billion people directly and indirectly depend on forest products and resources such as honey, firewood, timber, fodder, and fruits for their livelihood. The report further articulated that various user groups including herdsmen, hunters, and firewood and pole collectors benefit from exploiting forest resources in different ecosystems [22]. [23] reported that main benefits from forests through the services forests provided were social, economic and environmental in nature. Such benefits included among others, provision of woods for cooking, heating and construction; environmental services such as air and water purification, watershed protection to control of run-off, soil stabilization, nutrient cycling, carbon sequestration (storage) etc; recreational facilities such as game reserves, zoos etc; medicinal plants for the treatment of various types of ailment; and food in the form of non-timber forest products. However, awareness of these

forests benefits which contribute to a great extent to the development of socio-economic wellbeing as well as maintain good health conditions of human beings resulted into intense and unsustainable exploitation of forest resources for improved standard of living of human beings. This intense exploitation of forest resources led to forest degradation, which was mainly in the form of deforestation [24].

[21] reported that forests had value in the locality and the highest benefit derived from forest resources was sources of fuel wood. [25] was of the opinion that it was more probable for local communities to consent to preservation and management of resources if they can derive some benefits from it.

Table 2. Distribution of farmers according to the benefits derived from or uses of the forest/forest products (n = 150)

Variables	Frequency	Percentages
Benefits derived from or uses of the forest*		
Maintains and restores soil fertility and stability	98	65.33
Helps protect water supplies	80	53.33
Provides the raw materials for crop support (e.g. yam stakes)	89	59.33
Provides the raw materials for agricultural implements (e.g. hoe)	86	57.33
Provides the raw materials for harvest and transport equipment (e.g. basket)	90	60.00
Provide raw materials for crop processing equipment (cocoa drying racks)	80	53.33
Provides raw materials for crop storage containers (e.g yam storage stakes)	86	57.33
Provides the raw materials for crop marketing equipment (e.g. basket and sacks)	85	56.67
Provides the raw materials for protecting crops (e.g. fencing and plant-based insecticides)	87	58.00
Provides the raw materials for food stores (e.g. wood ash placed in storage bins)	85	56.67
Provides the raw materials for packing and processing food	90	60.00
Provides the raw materials for boats, nets, traps, poles, poisons and fuel woods for fish preservation	87	58.00

Source: Field Survey, 2018 *Multiple responses

3.3 Famers' participation in forest conservation

Considering its numerous benefits, forest must be conserved for future generations. Result in Table 3 showed that only 26.67% of the respondents practiced selective exploitation of the forest resources, 26.00% took part both in afforestation and forest fire prevention and control, 13.33% each, participated in agro forestry and considered other alternative uses of forest, 10.60% participated in reforestation and 7.33% used alternative sources of energy besides fuel wood. This implies that participation in forest conservation among the farmers was very low. [26] is of the view that the level of community participation in the conservation of forest resources has been acknowledged as an indispensable component of sustainable development in general. Furthermore, community participation can help increase a common visualization of the way natural resources are supposed to be managed, build self-assurance and competence for cooperative action, recognize, develop and integrate local ideas, ways of life and principles.

Table 3. Distribution of farmers according to participation in forest conservation (n = 150)

Variables	Frequency*	Percentages
Afforestation	39	26.00
Agroforestry	20	13.33
Reforestation	16	10.67
Selective Exploitation	40	26.67

Use of alternative sources of energy besides fuel wood	11	7.33
Forest fire prevention and control	39	26.00
Consideration of other alternative uses of forest	20	13.33

Source: Field Survey, 2018 *Multiple responses

3.4 Farmers perceived effects of community participation in utilization and conservation of forest resources

Table 4 shows that the respondents had a positive perception on the fact that community participation in forest conservation increases job opportunities among the participants with a mean score of 4.65. It was followed by the perception that community participation in forest conservation reduces poverty among participants (4.16). The farmers also perceived that community participation in forest conservation increases food security (4.03). They also perceived that community participation in forest conservation ensured sustainable growth and development of the forest (3.85). The perception that community participation in forest conservation improves the level of living of the farmers had a mean score of 3.72. This implies that community participation in the utilization and conservation of forest resources was strongly and positively perceived by the farmers to increase job opportunities, reduce poverty and increase food security. It was also perceived by the farmers that utilization and conservation of forest resources ensure sustainable growth and development of the forest and improve the level of living of the farmers.

Table 4. Farmers' perceived effects of community participation in utilization and conservation of forest resources

Perceptional Statement	Mean	Rank
Community participation in forest utilization and conservation increases job opportunities among participants.	4.65	1st
Community participation in forest utilization and conservation reduces poverty among participants.	4.19	2nd
Community participation in forest utilization and conservation increases food security among participants.	4.03	3rd
Community participation in forest utilization and conservation ensure suitable growth and development of the forest	3.85	4th
Community participation in forest utilization and conversation improve the level of living among participants.	3.72	5th

Source: Field Survey, 2018

3.5 Relationship between farmers' socioeconomic characteristics and perceived effects of community participation in utilization and conservation of forest resources

This study estimated the relationship between the farmers' socioeconomic characteristics perceived effects of community participation in utilization and conservation of forest resources. Table 5 presents the linear regression estimates for the relationship. With reference to the overall fit of the regression model, the obtained R^2 (0.7745) and R^2 adjusted (0.7601) suggests that the weighted combination of the predictor variables was jointly significant in explaining each of the dependent variables.

The result reveals that age had a negative (-0.009142: $p < 0.01$) and significant relationship with farmers' perceived effect of community participation in utilization and conservation of forest resources. Household size was found to have a positive and significant (0.0169081: $p < 0.05$) relationship with farmers' perceived effect of community participation in utilization and conservation of forest resources. Similarly, education (0.0503444: $p < 0.1$) and farm size (0.1228889: $p < 0.1$) also had a positive and significant relationship with farmers' perceived effects of community participation in utilization and conservation of forest resources. With the existence of these relationships between the variable, the null hypothesis is rejected. It implies that the farmers' perceived effects of community participation in utilization and conservation of forest resources were controlled by their age, household size, education and farm size. As the farmers grow older, their perception on the effects of community participation in utilization and conservation of forest resources becomes weaker or more negative.

However, the farmers' perceived effects of community participation in utilization and conservation of forest resources becomes stronger or more positive with increase in the farmers level of education and farm size.

Table 5. Relationship between farmers' socioeconomic characteristics and perceived Effects of community participation in utilization and conservation of forest resources

Variable	Coefficient	Standard error	t-ratio	P[|T|>t]
Constant	3.496047	.293014	11.93	0.000
Age	- .009142	.1309088	-3.12	0.002***
Sex	-.098024	.0836575	-0.75	0.455
Marital Status	.1170587	.0721998	1.62	0.107
Household size	.0169081	.0069965	2.42	0.017**
Education	.0503444	.0099066	5.08	0.000***
Faming experience	-.0011752	.0027344	-0.43	0.668
Farm size	.1228889	.0633856	1.94	0.055*
Annual forest income	-3.81e-07	3.21e-07	-1.19	0.238
R-squared = 0.7745				
Adjusted R-squared = 0.7601				
F-ratio = 0.0000				

***, ** and * denote significant at 1%, 5% and 10% levels

4. Conclusion

Farmers in the study area were within their active and productive ages with good farming experiences. They produced crops and livestock under small holdings which led to involvement in other non-farm occupations for additional income and improvement in their standard of living. The forest was an important part of the farmers' lives since they benefitted in several ways from its products. However, the farmers' participation in conservation of the forest was very low despite having a positive perception on the fact that community participation in forest conservation could increase job opportunities; reduce poverty, increase food security among others. Such perceptions were determined by the farmers' age, household size, education and farm size.

5. Recommendations

Based on the findings of this study the following recommendations were made;

i. There is need for sensitization of the farmers on the importance of participation in forest conservation by all stakeholders in forest conservation (Both government and non-governmental organizations).
ii. The farmers should be encouraged by forest conservation agencies to form associations for improved participation in forest conservation.
iii. Governments at all levels should enact policies that will encourage and increase the farmer participation in conservation of the forest.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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