

The Contribution of Non-Timber Forest Products to Farmers' Household Income around Awi Forest Reserve, Akamkpa LGA, Cross River State, Nigeria

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Abstract

This study evaluated the utilization of non-timber forest products (NTFPs) and their contribution to household income among farmers living around Awi Forest Reserve in Akamkpa LGA, Cross River State, Nigeria. A multistage sampling technique was employed to select 150 respondents. Data were analyzed using descriptive statistics and multiple regression analysis. The findings revealed an average farmer age of 40 years, with 71% being male and 89% married. A majority (58%) of the respondents had primary education as their highest level of schooling, and 82% identified farming as their primary occupation, with an average farm size of 1.6 hectares. All respondents (100%) reported collecting various NTFPs year-round for subsistence and income generation. Income from NTFPs accounted for 27% of household income, making it the second-largest source after agriculture (51%). Key NTFPs utilized included firewood (100%), fodder (67%), charcoal (39%), fruit nuts (37%), bushmeat (27%), bamboo (26%), medicinal herbs (22%), honey (11%), and mushrooms (7%). Multiple regression analysis identified gender (0.944), household size (0.432), educational level (-0.385), farm size (-0.581), and non-farm income (-0.024) as significant determinants of NTFP income. The study recommends that policymakers and stakeholders integrate NTFP utilization into forest conservation strategies to support the livelihoods of forest-dependent communities while ensuring sustainable resource management.

Key words: Assessment, Non-timber forest products, utilization, household income

Introduction: Globally, forest resources play a vital role in sustaining the livelihoods of communities living near them. Approximately 1.6 billion people, accounting for over 25% of the global population, rely on diverse forest resources for their livelihoods, with an estimated annual value ranging from US \$166–490 billion (Liang, Crowther, Picard, Wisser, Zhou, Alberti, Schulze, McGuire, Bozzato, Pretzsch, 2016). Beyond timber, forests provide an array of biological products collectively referred to as non-timber forest products (NTFPs). According to the Center for International Forestry Research (CIFOR, 2013), NTFPs encompass all forest-derived goods other than wood or timber, including nuts, vegetables, fruits, fish, medicinal plants, resins, bamboo, rattans, honey, insects, animals, construction materials, natural dyes, latex, and gums. These products also include spices, essential oils, mushrooms, horns, hides, pelts, and decorative items, which may be harvested from wild forests, plantations, agroforestry systems, or isolated trees. NTFPs are diverse and serve unique roles in various livelihood contexts, contributing significantly to household strategies. They are derived from thousands of plant and tree species, most of which are consumed locally rather than traded in markets (Sunday & Deekor, 2019). As noted by Loubelo (2012), NTFPs include biologically sourced goods other than timber, sourced from

forests and agroforestry systems. They are also used to create trophies, ethno-musical instruments, jewelry, decorations, and items for cultural or religious purposes (Bobo, Aghomo, and Ntumwel, 2015). Animal-based NTFPs, such as bushmeat, are highly valued (Ngoye, 2010), while plant-based NTFPs include raffia palm, mushrooms, wild vegetables, medicinal plants, and plant-derived oils and silk. NTFPs are essential for millions of people, particularly those in rural and forest-adjacent areas, by providing food, medicine, employment, income, and poverty alleviation (Suleiman, Wasonga, Mbau and Elhadi, 2017). In Africa, over two-thirds of the population depends on forest products to meet their livelihood needs (CIFOR, 2005; Endamana, Angu, Akwah, Shepherd, Ntumwe, 2016). In Central Africa, NTFPs provide 29–39% of food, medicine, and income for about 80% of the local population (Loubelo, 2012; Levang, Lescuyer, Noumbissi, Déhu, and Broussolle, 2015).

The extent to which communities depend on forest resources varies globally and is influenced by socio-economic factors. People with limited economic means are often more reliant on forest resources for sustenance and income. Many Africans live on less than US \$1.25 per day and depend on forests for subsistence activities and income generation (Anderson et al., 2006). Forests are vital for providing food, medicine, and income, particularly for low-income

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households. Recently, there has been growing recognition of the economic potential of NTFPs in reducing poverty, improving livelihoods, and promoting sustainable development (Maharjan & Dangal, 2020). According to Chao (2012), approximately one billion people in extreme poverty partially rely on forest products, while 300–350 million are highly dependent on them for subsistence and income. The collection and sale of NTFPs significantly diversify the livelihoods of marginalized families, contributing substantially to household income (Melaku, Ewnetu and Teketay, 2014). During times of hardship, reliance on NTFPs increases as they act as a safety net for vulnerable populations. In many parts of the world, NTFPs are indispensable to rural communities, with low-income households heavily relying on them to sustain their livelihoods (Heubach, Wittig, Nuppenau and Hahn, 2011; Melaku *et al.*, 2014; Liu & Moe, 2016; Saifullah, Kari, Othman, 2018). Rural farmers from diverse socio-economic, geographical, and cultural backgrounds harvest and utilize NTFPs for various purposes, with utilization patterns differing by ecological zones and socio-economic contexts. These uses include household subsistence, cultural preservation, spiritual satisfaction, physical and emotional well-being, cooking and heating, self-employment, income generation, and medicinal applications (CIFOR, 2013). The specific purpose of NTFP utilization often depends on the needs of individual households. In Nigeria, approximately 80% of the population uses forest products for food and personal care (Anon, 2000). Commonly consumed NTFPs among rural households include wild fruits, vegetables, nuts, edible roots, bush meat, snails, edible insects, and honey (Agbogidi, 2010). Okpachu, Okpachu, and Obijesi (2013) noted that farmers vary in their utilization levels and patterns, influenced by their socio-economic and educational backgrounds. Many rural income-generating activities are directly tied to NTFPs (Jonah, Marcus and Llori, 2013). Despite the significant contributions of Non-Timber Forest Products (NTFPs) to national economic growth, they have historically been undervalued and neglected by policymakers. While timber products are widely recognized for their economic value, NTFPs vital for the livelihoods of forest-adjacent communities remain largely overlooked (Suleiman *et al.*, 2017). NTFPs play a crucial role in food security, material resources, construction, energy, income generation, and employment. These products serve as a safety net for vulnerable households, helping them cope with economic shocks such as rising food prices, natural disasters, or lack of human capital (Chou, 2018). However, the contribution of NTFPs to local livelihoods is often underestimated due to the lack of systematic data collection at national levels (FAO, 2001). Although some studies in Africa have assessed the cash income from NTFP sales, they often neglect the non-monetary benefits of subsistence use (Endamana *et al.*, 2016). Despite this, it is clear that NTFPs make substantial contributions to rural economies and hold potential for boosting export revenues. In Akamkpa LGA, Cross River State, timber extraction and NTFP harvesting are vital forest activities that significantly support rural livelihoods by providing food, medicine, building materials,

and employment. Yet, NTFPs do not receive the same level of attention as timber. Empirical data on the utilization and economic contributions of NTFPs, particularly regarding household incomes, remains limited. Therefore, there is a need to investigate the extent of NTFP utilization and their contribution to household income among farmers in Awi Forest Reserve, Akamkpa LGA, Cross River State. This study aims to assess the utilization of NTFPs and their contribution to household incomes among farmers around Awi Forest Reserve in Akamkpa LGA, Cross River State, Nigeria. The specific objectives are to: describe the socio-economic characteristics of rural farming households in the study area,; identify the respondents that collect and utilize non-timber forest products (NTFPs) in the study area,; identify the non-timber forest products (NTFPs) collected and utilized by the rural farming households,; ascertain the mode of utilization of the non-timber forest products (NTFPs) collected by households,; assess the contribution/share of income from non-timber forest products (NTFPs) in the annual household income of the farmers, and determine the factors influencing farming households income derived from non-timber forest products (NTFPs) in the study area.

Materials and Methods: Study Area: The study was conducted in Akamkpa Local Government Area (LGA) of Cross River State, Nigeria, with a focus on the Awi Forest Reserve. Akamkpa LGA, located within the rainforest belt of southeastern Nigeria, covers 5,003 square kilometers. It is bordered by Calabar Municipality to the west, Biase LGA to the north, and the Atlantic Ocean to the south, with geographical coordinates ranging from 5°00'N to 6°00'N latitude and 8°00'E to 9°00'E longitude. Awi Forest Reserve, a key part of the Cross River rainforest ecosystem, is known for its rich biodiversity and ecological significance, supporting rare and endangered species. The forest plays a crucial role in climate regulation, carbon sequestration, and maintaining the water cycle. Akamkpa's predominantly rural population depends on agriculture, timber, and non-timber forest products (NTFPs) for livelihood. Common crops include cassava, yam, and cocoa, while many households also engage in agroforestry. The proximity to Awi Forest Reserve makes the forest a vital resource for fuelwood, medicinal plants, and bushmeat. The LGA is administratively divided into wards and communities, with the Awi Forest Reserve influencing several surrounding settlements. The area is accessible by major roads connecting to Calabar and other parts of Cross River State, facilitating the transportation of agricultural and forest products. Data for the study was collected through primary sources, including structured questionnaires and oral interviews, to gather information on the socio-economic characteristics of farmers, the NTFPs available in the area, their collection and utilization, and the contribution of NTFPs to household income.

Sampling Technique: The study employs a multistage sampling technique to select respondents: In the first stage, Awi forest reserve was purposively selected as the focal

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point of this study due to its ecological significance and the high dependency of surrounding communities on its resources. In the second stage, five communities located in close proximity to the forest reserve were purposively selected for their high dependency on forest products. These communities were identified based on their direct interaction with the forest reserve and their involvement in agricultural and forest-related activities. Finally, from each of the five selected communities, 30 farmers were randomly selected to ensure representation and inclusivity giving a total of 150 farmers for the study. This sample size is deemed sufficient to provide reliable data for analyzing the contribution of non-timber forest products to household income.

Method of Data analysis: Descriptive statistics such as frequencies, percentages and mean were used to describe the socio-economic characteristic of the farmers (objective i), identify the respondents that utilize NTFPs in the study area. The model is specified below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_{10} X_{10} + e.$$

Where:

Y = NTFPs income (N)

X₁ = Age of farmers (Years)

X₂ = Sex (1 if male, 0 female)

X₃ = Marital status (1= married, 0= otherwise)

X₄ = Educational level of farmers (Years of formal education)

X₅ = Household size (number of persons)

X₆ = Experience in NTFPs collection (years)

X₇ = Farm size (hectares)

X₈ = Main occupation (farmer=1, civil servant=2, business=3)

X₉ = Farm income (Naira)

X₁₀ = Non-farm income (Naira)

b₁ – b₁₀ = Régression coefficients

a = constant

e = error term

Results and Discussion: Socio-economic Characteristics of Farmers: The age distribution of respondents, as shown in Table 1, reveals that 52% of those involved in non-timber forest product (NTFP) extraction were aged 31–40 years, followed by 27% in the 41–50 age group. The average age was 40 years. Younger household heads tend to participate more actively in NTFP collection than older individuals due to their physical strength and ability to handle the labor-intensive nature of the work. They may also be more likely to violate forest protection regulations. In contrast, older household heads, who are often more risk-averse, are less likely to engage in such activities. This finding aligns with Anoh, Ogar, Alobi and Ifebueme (2019), who reported that 68% of respondents in Oban Hills Group Forest Reserve were aged 20–50 years.

Table 1 also highlights the gender distribution of NTFP extraction, showing that 71% of participants were male,

(objective ii), identify the major NTFPs collected and utilized by the farmers (objective iii), examine the mode of utilization of non-timber forest products (objective iv) and estimate the contribution of NTFPs to household income (objective iv). Multiple linear regression was used to determine the factors that influence the farmer's income drive from NTFPs (objective vi).

Model Specification: Multiple Regression Model:

Multiple regression was run in order to identify the socioeconomic variables that had significant influence on NTFPs income. The NTFPs income was considered as the dependent variable and household characteristics such as age, sex, marital status, education status, household size, experience in NTFPs collection, farm size, main occupation, distance to source of NTFP, off-farm income and agricultural income were considered as independent explanatory variables.

while 29% were female. This suggests that men are more involved in forest product extraction. Gender-based roles and activities differ depending on socio-cultural contexts, with men and women utilizing different forest resources. For instance, in traditional societies, activities like firewood and medicinal plant collection are shared by both genders, while tasks such as honey and gum arabic harvesting are predominantly male roles (Davenport, Shackleton, Gambiza, 2012; Agrawal, Cashore, Hardin, Shepherd, Benson, Miller, 2013).

The result in Table 1 further showed that 89% of rural households engaged in NTFP extraction were married, indicating that marital status plays a role in forest resource utilization. Married individuals are more likely to engage in such activities to meet their families' needs. This observation is consistent with Jonah *et al.* (2013), who found that 88% of respondents in a study on NTFPs in Oyo State, Nigeria, were married. Table 1 also reveals the educational

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attainment of respondents, with 58% having primary education, 19% secondary education, 12% tertiary education, and 11% no formal education. This indicates that most respondents had low levels of formal education, which may limit their understanding of the economic value of NTFPs. Education level significantly influences economic activities and income generation. More educated individuals are likely to pursue alternative livelihoods and may extract fewer forest resources due to greater employment opportunities (Newton, Miller, Byenkya, Agrawal, 2016). Household size, shown in Table 1, reveals that 70% of households had between 4 and 6 members, with an average size of six people. Larger households often face challenges such as lower per capita land availability and higher dependency ratios, which may drive them to rely on forest resources to meet food requirements. Additionally, larger families can leverage family labor for NTFP collection (Mujawamariya & Karimov, 2014).

Table 1 also indicates that 37% of respondents had farm sizes between 1.6 and 2 hectares, while 24% owned 1.1–1.5 hectares, with an average farm size of 1.6 hectares. Farm size affects household food production and determines reliance on forest resources. Households with smaller farms often turn to forests as a safety net to supplement food shortages. Conversely, those with larger farms are less likely to depend on NTFPs, as they can produce enough food for consumption and sale (Suleiman *et al.*, 2017).

Table 1 finally reveals that 82% of respondents identified farming as their primary occupation, followed by 12% engaged in business, and 6% in civil service. The primary occupation reflects the household's main economic activity for income and subsistence. Due to limited livelihood options in rural areas, many households rely on forest resources like NTFPs to supplement income and address food deficits. In contrast, those engaged in business or formal employment are less reliant on NTFPs than their farming counterparts (Suleiman *et al.*, 2017; Daneji & Suleiman, 2011).

Involvement in NTFP Extraction: Non-timber forest products (NTFPs) play a significant role in improving the livelihoods of rural communities. According to the findings in Table 2, all (100%) of the surveyed households in the study area reported collecting various NTFPs year-round to support their daily subsistence needs and generate income.

Purpose of collecting NTFPs: Farmers were asked to identify their primary reasons for collecting non-timber forest products (NTFPs). The findings in Table 3 indicate that NTFPs are harvested for a variety of purposes, with their significance and value differing among households and individuals, though these uses often complement one another. The results reveal that the majority (67%) of respondents collect NTFPs for both household consumption and income generation. Approximately 26% harvest NTFPs primarily for domestic uses, including medicinal purposes, food, and construction materials like bamboo, while the remaining 7% focus exclusively on income generation.

Available NTFPs Extracted in the Study Area: The primary non-timber forest products (NTFPs) collected in the study area are summarized in Table 4. Respondents reported

that the main NTFPs extracted include fuelwood (100%), charcoal (39%), fruit nuts (37%), bush meat (27%), bamboo (26%), medicinal herbs (22%), honey (11%), fodder (14%), mushrooms (7%), and other minor products (6%). The results indicate that all respondents (100%) collect firewood, highlighting its importance as the primary source of energy and income for communities living near the forest. This reliance is likely due to firewood being the most accessible and affordable energy option in the area. Many households lack access to electricity and continue to use traditional biomass for cooking, making firewood the preferred energy source. Similarly, studies such as Ariyo *et al.* (2018) and Asfaw and Etefa (2017) have documented firewood as the dominant source of energy in rural areas.

About 39% of respondents extract charcoal, which is considered affordable, portable, and easy to store. Charcoal production is driven by market demand, particularly from urban consumers, and peaks during the dry season.

Medicinal plants are gathered by 22% of respondents, reflecting the common rural practice of treating ailments at the family level rather than seeking modern healthcare. Limited access to hospitals and health facilities further reinforces reliance on traditional medicinal knowledge. Additionally, 14% of respondents utilize forest grazing areas as a major source of fodder for their livestock. Honey collection, reported by 14% of respondents, is primarily undertaken by older community members using traditional log hives, which yield lower-quality and smaller quantities compared to modern hives. Most raw honey is sold directly in local markets without further processing or value addition.

The Contribution of NTFPs to Household Income of the Respondents: The primary livelihood strategies in the study area include farming, non-farm activities, and the collection of non-timber forest products (NTFPs). As indicated in Table 5, agricultural income constitutes the largest portion of household earnings, accounting for 51% of the total income. NTFPs represent the second-largest income source, contributing 27%, followed by non-farm income at 22%. This finding underscores the significant role of NTFPs in household economies, serving as an essential safety net during times of hardship or emergencies. It also highlights the importance of NTFPs as a vital component of rural livelihoods. Similar observations were made by Dash *et al.* (2016) in a study of Similipal Tiger Reserve, India, where agriculture was the primary income source, contributing 39.1%, while NTFPs accounted for 29.34% of household income. Melaku *et al.* (2014) also reported that in Southwestern Ethiopia, agricultural income contributed 50% to annual household earnings, with NTFPs contributing 47% and off-farm sources just 3%. Likewise, Suleiman *et al.* (2017) found in Kano, Nigeria, that NTFPs contributed approximately 30% to annual household income, second only to crop production. These findings emphasize the critical role NTFPs play in achieving livelihood outcomes, making them an integral part of household strategies for income diversification and resilience.

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Income Share of Individual NTFPs: Table 6 presents the major non-timber forest products (NTFPs) contributing to overall NTFP income. Firewood accounts for the largest portion of NTFP income, with a share of 39.5%. Charcoal follows with 21%, while bush meat, fruits and nuts, honey, mushrooms, and bamboo contribute 15%, 11%, 9%, 3%, and 1.5%, respectively. Some NTFPs generated no income, indicating they were primarily collected for household consumption rather than for sale. This study highlights that firewood and charcoal are the most significant contributors to NTFP income in the study area.

Factors Influencing Income derived from NTFPs: Multiple linear regression was used to examine the relationship between income from non-timber forest products (NTFPs) and various socioeconomic factors, with the results shown in Table 7. The F-ratio was significant at the 1% level, indicating that the model fits the data well and that the independent variables are important determinants of the dependent variable's variation. The R² value of 51.96% suggests that approximately 51.96% of the variation in NTFP income is explained by the independent variables. Several socioeconomic factors significantly influence household income from NTFPs.

Among the variables analyzed, gender (0.944) and household size (0.432) were positively and significantly correlated with NTFP income, while educational level (-0.385), farm size (-0.581), and non-farm income (-0.024) showed negative and significant correlations with NTFP income.

Gender (X₂): The gender coefficient was positively correlated with income from NTFPs, indicating that men were the primary collectors of NTFPs. This is likely because NTFP collection often takes place in dense forests, which can be unsafe for women, especially in remote or hilly areas. Men are generally more willing to take risks, including violating forest extraction regulations. This finding aligns with Opaluwa *et al.* (2011), who found that gender plays a significant role in NTFP collection in North Central Nigeria.

Educational status (X₄): The education level of the household head had a negative correlation with NTFP income. This suggests that higher education levels provide better livelihood alternatives, reducing reliance on forest resources. Education offers individuals more employment opportunities, diverting them from subsistence activities like NTFP collection, as noted by Newton *et al.* (2016).

Household size (X₅): A positive correlation between household size and NTFP income suggests that larger households, with more available labor, are better able to collect and generate income from various NTFPs. This

supports the findings of Kar and Jacobson (2012), Moe and Liu (2016), and Suleiman *et al.* (2017), who all reported a positive correlation between household size and NTFP income.

Farm size (X₇): Farm size showed a significant negative correlation with NTFP income, suggesting that households with larger agricultural plots are less dependent on NTFP extraction. This result aligns with studies by Moe and Liu (2016) and Heubach *et al.* (2011), who found an inverse relationship between farm size and NTFP income. As agricultural income increases, households tend to reduce their reliance on NTFPs, as noted by Sumukwo (2017).

Non-farm income (X₁₀): Non-farm income was negatively correlated with NTFP income, indicating that households with higher non-farm income sources tend to rely less on forest resources. Rayamajhi (2012) also found that increased income from other sources leads to reduced reliance on forest products. In the context of sustainable livelihoods, households with more physical capital, such as agricultural land, tend to decrease their dependence on natural capital like forests.

Conclusion: The study findings revealed that most farmers were young, married, and had low levels of formal education. It was found that income from non-timber forest products (NTFPs) made a significant contribution to household income. The study area is predominantly agrarian, with agriculture being the largest contributor to household income, followed by NTFP income. The empirical results indicated that gender, household size, and agricultural land size had significant positive correlations with income from NTFPs. Furthermore, gender, household size, educational level, farm size, and non-farm income were all key determinants of NTFP income.

Recommendations: Based on the findings of this study, the following recommendations are made: The significant contribution of NTFP income to household livelihoods should alert policymakers and stakeholders to the importance of integrating the NTFP sector into forest conservation strategies that address the needs of forest-dependent communities; The role of households, particularly low-income ones, in managing forest resources should be clearly defined, given their reliance on NTFPs for both subsistence and income; . Capacity-building and skills training should be provided for NTFP collectors, especially women, who are primarily responsible for the collection and marketing of NTFPs. This training should focus on value addition techniques to enable them to process and enhance the value of NTFPs before selling, thereby increasing their income.

Table 1: Socio-economic Characteristics of the Farmers

Age	Frequency	Percentage	Mean
21-30	15	10.0	
31-40	78	52.0	
41-50	41	27.0	
>50	16	11.0	40
Sex			
Male	107	71.0	
Female	43	29.0	

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Marital status				
Single	16			11.0
Married	134			89.0
Educational status				
Primary	87			58.0
Secondary	29	19.0		
Tertiary	18			12.0
Non formal	16			11.0
Household size				
1-3	11			7.0
4-6	105			70.0
7-9	22			15.0
>9	12			8.0
Farm size				
0.5-1.0	27			18.0
1.1- 1.5	36			24.0
1.6 – 2.0	56			37.0
2.1- 2.50	23			15.0
>2.50	8			5.0
Occupation				
Farming	123			82.0
Civil servant	9			6.0
Business	18	12		

Source: Field survey, 2024

Table 2: Distribution of Farmers based on Involvement in NTFPs Extraction

Collect NTFPs	Frequency	Percentage
Yes	150	100.0
No	-	-
Total	150	100

Source: Field survey, 2024

Table 3: Distribution of Farmers based on Purpose for collecting NTFPs

Purpose for NTFP Collection	Frequency	Percentage
Home consumption only	39	26.0
Income generation only	11	7.0
Home consumption and income generation	100	67.0
Total	150	100

Source: Field survey, 2024

Table 4: Distribution of Farmers based on NTFPs extracted in the Study Area

NTFP	Frequency	Percentage	Rank
Fuelwood	150	100	1 st
Charcoal	59	39.0	2 nd
Fruits and nuts	55	37.0	3 rd
Bush meat	43	27.0	4 th
Bamboo	39	26.0	5 th
Medicinal herbs	33	22.0	6 th
Honey	21	14.0	7 th
Fodder	21	14.0	7 th
Mushroom	11	7.0	8 th
Others	9	6.0	9 th

Source: Field survey, 2024

Table 5: Distribution of Farmers based on their Annual Income

Income type (₦)	Mean annual income	Minimum	Maximum	Share (%)
Farm income	146059	78,000	300,000	51.0
Off farm income	63340.43	7500	167,000	22.0
NTFPs income	78615.32	21,000	105,000	27.0
Total	288014.75			

Source: Field survey, 2024

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Table 6: Distribution of Farmers based on Income generating NTFPs and their Proportion

Purpose for NTFP Collection	Mean income	Share of NTFP income (%)
Firewood	31,055	39.5
Charcoal	16,500	21.0
Bush meat	11,900	15.0
Honey	6,735	9.0
Fruits and nuts	8,800	11.0
Mushroom gathering	2,369	3.0
Bamboo	1,256.32	1.5
Total	78615.32	

Source: Field survey, 2024

Table 7: Determinants of NTFPs Income of the Farmers

Variable	Coefficient	Std. Error	T-ratio	P-value
Constant	1.071	0.689	1.55	0.120
Age (X ₁)	0.100	0.290	0.34	0.730
Gender (X ₂)	0.944	0.213	4.43	0.000***
Marital status (X ₃)	-0.850	0.711	-1.19	0.232
Education (X ₄)	-0.385	0.188	-2.04	0.041**
Household size (X ₅)	0.432	0.211	2.05	0.041**
NTFPs /Exp (X ₆)	0.054	0.263	0.20	0.838
Farm size (X ₇)	-0.581	0.168	-3.46	0.001***
Main occupation (X ₈)	-0.777	0.674	-1.15	0.249
Distance (X ₉)	-0.149	0.181	-0.82	0.411
Farm income(X ₁₀)	0.313	0.383	0.82	0.415
Non-farm income (X ₁₁)	-0.024	0.014	-1.75	0.083*
R Square	= 51.96			
F statistics	= 767.886***			
Observations	= 120			

***, ** and * = Significant at 1%, 5% and 10%

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