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Socio-Economic Determinants of Households' Dependence on Forest Resources. A Case of Forested Communities in Quan'Pan Local Government Area of Plateau State, Nigeria

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ABSTRACT: This study evaluated the socioeconomic factors determining rural households' reliance on forest resources, a case of forested communities in Quan'Pan Council Area of Plateau State, Nigeria. Using a multistage sampling process, 150 household heads were chosen for the study. Descriptive statistics, five point Likert scale and binary logit regression analysis were used to achieve the objectives of the study. The study's outcome showed that the heads of the households were averagely 40years. About 71% of the selected persons were men with a greater (89%) number married. Majority (58%) of them had only primary education. Findings from the study also revealed that 82% of the heads of the households were into farming as their major occupation. They practice farming on average farm sizes of 1.6hectares. All (100%) interviewed household heads collected and utilized a variety of forest products throughout the year for their daily subsistence and income generation. The respondents showed high level of dependability on resources from the forest to support themselves such as firewood (4.7), timber (4.0), charcoal (4.0), fruits and nuts (3.8), bush meat (3.7), honey (3.7) and medicinal herbs (3.0). Forest products contributed the second largest proportion of income in the home by 27.0% after income from agriculture (51.0%). Gender (0.944), education status (-0.385), household size (0.432), farm size (-0.581) and farm income (-0.024) were significant determinant of households reliance on the resources of the forest. Gender (0.944) and household size (0.432) had positive and significant relationships with households dependence on forest resources while education status (-0.385), farm size (-0.581) and farm income (-0.024) showed a significant inverse relationship with the reliance of households on forest resources.

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Globally, forest resources are essential to local communities' means of subsistence. About 1.6 billion locals, or little above 25% of the world's population are thought to depend on resources from bio diverse forests resources for their subsistence; these resources are valued at between US \$166 and \$490 billion annually (Liang *et al.* 2016). Forests are a necessary

component for people living in rural areas adjacent to forests with diverse materials and intangible benefits (Langat *et al.*, 2016). Forests remain a vital supply of resources for industrial uses, building materials, livestock fodder, hunting, and firewood just as they have been in the past. Forests offer services at local, regional, and global levels in addition to these

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characteristics. According to Chao (2012), about 300–350 million people are heavily dependent on forest products for both subsistence and revenue, and that one billion extreme poverty people rely on them. Forests throughout the world supply commodities and services to between 800 million and 1.6 billion people as approximately 70% of the world's population residing in sub-Saharan nations primarily relies on forest resources for their food and livelihood ((Fikir *et al.* 2016)). Globally, forest resources have a major economic role in rural livelihood, particularly for those who live near forests. Over two thirds of Africans depend on forest products in part to meet their demands for a living (Endamana, *et al.*, 2016). Different writers have given different definitions of "forest dependency," but generally speaking, it refers to the situation where a household depends heavily on forest products to meet most of its fundamental demands (Larson *et al.* 2017). The word has been employed to describe interactions amid humans and forests in most literatures, and its definition and description have been brought to bear on particular facets of examining this relationship. The use of trees and other forest products has long been a tradition among the people who have lived in forested environments. The advantages that forests offer have led to a multi-dimensional phenomenon of human dependence on them particularly for those who are impoverished (Garekae *et al.*, 2017). People utilize forests for three main purposes; direct use, revenue and employment, and household subsistence needs which include food, animals, medicinal herbs, and other supplies. The degree to which people make use of resources from the forest and how much the forests contribute to their income varies according to their socioeconomic standing. Individuals with weaker economies use forest resources more frequently. Forest products are harvested and used by rural farmers from a variety of socioeconomic, geographic, and cultural backgrounds. The patterns of use differ depending on the ecological and socioeconomic zones. Some people use it for cooking purpose and for heating their homes, self-employment, money creation, spiritual fulfillment, household subsistence, cultural preservation, and health (CIFOR, 2013). However, every household makes its own decisions on its own purpose for use, which is determined by its necessities. In rural settings in general, many activities that fetch income for the people are linked with forest especially the non-timber forest products (Jonah *et al.*, 2013). In a study carried out by Mbongo *et al.* (2014) in Namibia, it was discovered that very many of the socio-economic gains of the forests in the surrounding communities were primarily in form of forest products that enhanced the rural livelihoods of the people. Non woody forest resources for example serve as the

foundation for many rural income-generating enterprises (Jonah *et al.* 2013). According to Mbongo *et al.* (2014), the socioeconomic advantages of community forests are mostly derived from the supply of products that improve rural lifestyles.

Policymakers and development professionals often recognize that rural households in rural settings of developing nations are dependent on natural resources. In this sense, the role that natural forests play in creating jobs and revenue in rural areas has drawn more attention in recent years (Saifullah *et al.*, 2018). In order to develop more effective strategies for managing forest resources, especially in relation to communities, information about the connection between communities and forests, the dependence on particular forest resources, the socioeconomic factors that affect this dependence, and the primary causes of this dependence must be investigated. Because no research has previously looked at the socioeconomic elements affecting forest dependency in Plateau State, this study was conducted to fill this vacuum. As a result, it was anticipated that the study would contribute to ongoing strategies for managing and conserving limited forest resources. It also was anticipated to produce information regarding the important socioeconomic factors determining households' dependency on the forests and its resources. There is no denying that forest resources perform an important function in the family and overall economy. While each of the many forest products may not have a large impact individually, taken as a whole, they can boost export earnings and have a substantial impact on the rural economy. Among the people of Quan' Pan, harvesting of forest products is popular activity. Because they provide food, medicine, extra income, building materials, and employment possibilities, rural communities benefit tremendously from their reliance on forest. The objectives of this study is to investigate the socioeconomic feature influencing households' reliance on forests and its resources in the forest fringe communities of Quan' Pan, Local Government Area of Plateau State, Nigeria.

MATERIALS AND METHODS

This research study was carried out in Qua'an Pan administrative area, Plateau State. It is found in the southern region of the state and its administrative headquarters is located in Ba'ap. The coordinates of the Local Government are 8°48'N 9°09'E, with a land mass of 2,478 km² and a total of 196,929 persons (NPC, 2006). With a 2.8% annual population growth rate, the estimated population by 2022 stood at 291,430. It joins boundaries with Pankshin Local Government, Bokkos Local Government and

Shendam Local Government Areas all of Plateau State as well as Lafia Local Government Area, Nasarawa state. Eight (8) districts make up the local government namely; Deomak, Bwall, Kwalla, Kwa, Kwang, Kwande, Namu and Dokan-Tofa. The economic backbone in the area is predominantly agriculture which involves the cultivation of arable crops like yams, cassava, rice, millet and maize as well as rearing of livestock like cattle, sheep, goat, pig and poultry. Fruit crops such as guava, cashew, citrus and mangoes are also grown in large and commercial quantities. Travellers and scholars from within the country and abroad have been attracted to the local government's due to the presence of Pandam Game Reserve and animal Park, which is a natural habitat for diverse animals and tree species. It is home to several rare species and unique birds. Qua'an Pan Local Government area is the greatest animal-filled forest region on the Plateau, preserving 224 square kilometres of pristine marshes, forests, and savanna. The study's data was obtained through primary source. The data was generated through administration of structured questionnaire which was designed to elicit information in line with the objectives of the study.

Sampling Technique: To choose samples for this investigation, a multi-stage sampling procedure was used. Ten communities were purposefully chosen for the initial phase for the study. The communities selected were; Namu, Pandam, Janta, Kwari, Kayarda, Lankaku, Shindai, Gunkaroghom, Monday and Gallo. A sample frame of all the households in these communities was obtained through enumeration with the help of the extension personnel attached to the area in conjunction with the traditional leadership in the area. The second stage involved a random selection of 5% of the sample frame of each community to obtain the sample size of 150 household heads for the study.

Data analysis: Descriptive statistics, five-point Likert scale and binary logit regression analysis were used to achieve the objectives of the study. Descriptive statistics such as frequencies and mean were used to analyze socio-demographic data. Five-point Likert scale was employed to assess the degree of dependence of the sampled household heads on forest resources. Responses were rated on a scale of 1-5. It was asked of respondents to provide appropriate answer from 1 to 5, with 1 signifying no dependence and 5 signifying extreme dependence. That is; highly dependent (5), dependent (4), undecided (3), not dependent (2) and highly not dependent (1) for each forest resource considered. The responses were counted with respect to the weights. Each variable's score was multiplied by the corresponding weight to obtain a weighted score. Further, the weighted scores

were summed to obtain a weighted sum. The weighted sum was further divided by the total respondents to obtain a weighted mean for each resource. Finally, the weighted means were sorted in descending order against the decision rule. The mid-point values of the scale were added up and further divided by 5 to obtain a mean of 3.0. Any forest resource with weighted mean value equal to or above the cut-off mean of 3.0 was considered highly dependent upon, while those with weighted mean of less than 3.0 are considered lowly dependent upon. These weighted means were used to determine how the dependent variable (dependence on forest resources) and the independent variables are related.

Binary Logit Regression: The logit regression model is a unit or multivariate technique which allows for estimating the probability that an event occurs or not by predicting a binary dependent outcome from a set of independent variables. In our study, measurements were made of the connection between the dependent variable of forest dependence and the explanatory variables of age, sex, marital status, educational level, household size, experience in forest resources collection, farm size, occupation, distance to source of forest resources, farm income and non-farm income. Based on this, the binary logistic regression model was employed to determine the socio-economic factors influencing forest dependence of the households. The dependent variable was given a score of 1, indicating high dependence, or 0, indicating low dependence. We used 3.0 as a cutoff point. The forest dependency value of ≤ 3.0 therefore denotes low dependence while a value of ≥ 3.0 indicates high dependence. The logit model is based on cumulative logistic probability function and it is computationally tractable. It is expressed as:

$$P_i = B_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n \quad (1)$$

For ease of estimation:

$$P_i = B_i + B_2X_i + \dots + B_nX_n \quad (2)$$

The empirical model of logistic regression assumes that the probability of households' dependence on forest resources is expressed as:

$$P_i = eb_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \dots + b_9X_9$$

$$/ (1 + eb_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \dots + b_9X_9) \quad (3)$$

Pi ranges between zero and one and is non-linearly related to Zi. Zi is the stimulus index, ranging from minus infinity to plus infinity, and expressed as:

$$Z_i = \log(P_i / (1 - P_i)) \quad (4)$$

To obtain the value of Zi, the likelihood of observing the sample was formed by introducing a dichotomous response variable. The explicit logit model is expressed as:

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + b_9X_9 + u \quad (5)$$

Where: Y= Dependence on forest resources (1= high dependence, 0 = low dependence); X₁ = Age of the head of household (Years); X₂ = Gender (1 if male, 0 female); X₃ = Marital status (1= married, 0= otherwise); X₄ = Educational level of household heads (Years of formal education); X₅ = Household sizes (Persons under the same roof); X₆ = Farm size (hectares); X₇ = Occupation (farmer=1, civil servant=2, business=3); X₈ = Distance to forests (Km); X₉ = Farm income (Naira)

RESULTS AND DISCUSSION

Socio-economic Features of Household Heads: Table 1 result shows that 52% of the respondents were within 31–40 years. This is followed by age group of 41–50 years with 27%. The responders' average age was forty years old. Since younger household heads tend to be stronger and more active than older ones, they may be more involved in the high labour demands of gathering forest resources and are more likely to break forest preservation laws. It is less likely that elderly family heads will gather resources from the forest reserves since they may be risk apprehensive when it comes to breaking forestry protection regulations. This finding agrees with that of Anoh *et al.* (2019) who in a related study reported that about 68 percent of the studied population was within the age of 20-50 years. Gender of the respondents as presented in Table 1 reveals that both genders were involved in forest resources extraction. The result of the study shows that most (71%) of those involved in extraction activities were males while the remaining 29% were females. This result shows that men are better positioned in terms of extracting products from the forest. Men and women engage in different forest activities based on socio-cultural context. This is a common scenario in many traditional societies where the men and the women have different and specific roles to play in the family welfare (Davenport *et al.* 2012). For instance, the fetching of firewood and herbs for medicinal purposes are carried out by both genders in some African countries whereas the collection of gum arabic and

honey are strictly activities meant for men (Agrawal *et al.* 2013), about 89 % of the heads of households were married. This implies that the married people actively participated in the collecting of forest resources in order to provide for their families' fundamental necessities. This finding also agreed with that of Jonah *et al.* (2013) who reported in a study that, 88 percent of the non woody products collectors were married while 10 percent were single in Oyo state Nigeria. The educational background shows that majority (58%) of the heads of households had primary education, 19% had secondary education, and 12% had tertiary education while the remaining (11%) had no form of school education. This indicates that many respondents were not very knowledgeable of the usefulness of forest resources to household economy considering their low level of formal education. Educational level of a person is expected to influence the nature of his/her economic activity and consequently the level of his/her income. This is because education would facilitate households' understanding of negative externalities and the values of passive use of forest resources. It is assumed that the formal education acquired by respondents would lead to extraction of fewer forest products since education opens up alternative employment opportunities and diverts people from subsistence livelihoods activities such as the extraction of resources from the forest reserve. On the size of the family, about 70% of the respondents' household sizes were 4-6 persons. This implied that majority of those who extract forest resources have relative big household sizes. The households had nine (9) persons on average. Families with many members have more likelihood to face lower per capita, non-availability of agricultural and high ratios of dependency for food. They may thus rely on food and other product from the forest because of the available family labor that can be utilized for collection.

The result further shows that 37% of interviewed household heads had farm size of 1.6 - 2 hectares, 24% had farm size of 1.1- 1.5 hectares. The respondents averagely had 1.6 hectares of farmland. Farm size is defined as the total area of farmland owned by the household and is measured in hectares. The size of the farm is crucial to agricultural yield as it influences the quantity and availability of food in the household at any point in time. Families with little farmland may not be able to cultivate food crops in large quantities enough to feed their families, therefore they mostly depend on the forest resources nearby as a safety net in case of a food emergency to complement food shortage.

Data presented in Table: 1 also revealed that the main means of survival of majority (82.0%) of sampled household heads was farming. About 12% had business as their primary job aside from farming while the remaining 6% major occupation was civil service. The main occupation represents the primary economic activity engaged by the household head for cash income and subsistence. Because of the fewer number of livelihood options in rural areas that can supplement household income and food deficit, they are therefore expected to rely more on products from the forests for sustenance. Household heads who venture into other means of getting money such as buying and selling or civil service paid jobs will probably shift attention away from forest resources in comparison to those who take farming as a major income source (Suleiman *et al.*, 2017).

Table 1: Socio-economic Demographics of the Heads of Households

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	
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	1.6
Occupation			
Farming	123	82.0	
Civil servant	9	6.0	
Business	18	12.0	

Source: Field survey, 2023

Involvement in Forest Resources Collection: Forest resources contribute largely to the welfare of the people living around them. From result in Table 2, all (100%) interviewed respondents affirmed that they collect varieties of forest resources throughout the year either for their daily home consumption or for income generation. This shows that forest resource utilization is a vital component of livelihood of households surrounding the forests. Investigations in the study location reveals that several items from the forest such

as timber, fuelwood, bush meat, fruits, honey, snails and lots more are directly harvested from forest for various purposes.

Table 2: Respondents' Involvement in Forest Resources Collection

Collect Forestry resources	Frequency	Percentage
Yes	150	100
No	-	-
Total	150	100

Source: Field survey, 2023

Purpose of collecting Forest Resources: The finding in Table 3 reveals that the farmers harvested a variety of forest based resources for various purposes. The relative importance and values of the harvested products varies among households and individuals but often they are interrelated and complementary. About 67% of the persons interviewed extract forest resources for both household consumption and income generation. About 26% of the respondents collect the forest resources mainly for home consumption purposes ranging from medicinal, food as well as house construction purposes (timber and bamboo) while the remaining 7 percent collect strictly for income generation.

Table 3: Purpose for collecting Forest Resources

Purpose for 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, 2023

Source of Forest Resources: From Table 4, we can see that majority (68%) of the people involved in extraction of forest resources gather them from natural forests, 19%, gather them from farmlands while 13% gather theirs from open fields. Forest resources are mostly collected from state-owned forests as there is medium to low enforcement of the rules. Therefore, people generally collect forest products from wherever they can, even if illegally, especially when they are in need of food for the households. The implication is that forests are very significant to the means of subsistence of the rural dwellers and urban dwellers.

Table 4: Sources of Forest Resources

Source	Frequency	Percentage
Forests		
Open fields		
Farm lands		

Source: Field survey, 2023

Distance to Source of Forest Resources: From Table 5, it can be observed that 38.0% of the individual engaged in collection of forest resources cover a distance of between 0.1-1 km. About 33.0% cover a distance of between 1.1-2 km. About 20.0% of the individual cover a distance of 2.1-3 km while the remaining 9.0% cover a distance above 3 km to extract forest resources. The actual distance expressed in km, between the homes of the heads of household and the forests is anticipated to have an impact on the collection of forest resources. Households who are farther away from the forests may tend to collect lesser products from the forests due to distance and difficulties in transporting the harvested products. Suleiman *et al.* (2017) noted that those who live nearer to the forest are more reliant on its resources than those who live farther away, who face greater challenges because of expensive transportation and other unimaginable hardships.

Table 5: Distance to Source of Forest Resources

Distance	Frequency	Percentage
0.1-1.0	57	38.0
1.1-2.0	50	33.0
2.1-3.0	30	20.0
> 3.0	13	9.0
Total	150	100
Mean	1.55	

Source: Field survey, 2023

Households Dependability on Forest Resources: From the result, the respondents showed higher level of reliance on forest resources such as firewood (4.7), timber (4.0), charcoal (4.0), fruits and nuts (3.8), bush meat (3.7), honey (3.7) and medicinal herbs (3.0). It is an indisputable fact that firewood is the primary energy source in most rural communities and also a revenue source for forest fringe dwellers.

Investigations revealed that the people are not connected to electric power supply and they still use traditional biomass energy for cooking. This makes the use of firewood the most preferred choice by the locals of this study area. Charcoal is also another form of energy that is considered as cheap, easy to transport and store. Charcoal production for commercial purpose is encouraged by market condition as urban residents are the main users of charcoal. Charcoal can be made all the year around, but production increases dramatically during dry season. Products from forest trees like leaves, nuts, fruits, barks etc. are also very important forest products that are collected and utilized by the rural people. The rural people depend on several fruits and nuts such as mangoes, coconuts, pawpaw, cashews, date palm etc. for food and for commercial purpose. The respondents also depend on forest for medicinal herbs. It is a common practice in rural areas that many ailments are treated at family level (self-medicate) than always searching for modern medicine. Moreover, lack of accessibility of hospital and other health facilities in most rural communities results in different interaction between lay people and healers. Also, the necessity for everyday management of frequent mild illnesses within the village family encourages the acquisition and upkeep of some knowledge regarding medicinal herbs and their applications. The result also revealed that the respondents depend on forest for their honey. The older people engage more in honey production in the forests. Much of the honey is produced by use of the traditional log hives which have low quality and quantities compared to the modern bee hives. The respondents however indicated a low level of dependence on products from the forest such as snails (1.7), bamboo (2.5), fodder (2.0), mushrooms (1.8), and spices (1.8).

Table 6: Dependability on Forest Resources

Forest resources	Level of Dependency on NTFPs						Sum	Mean	Remark
	HD(5)	D(4)	N(3)	ND(2)	HND(1)				
Timber	255	324	6	18	7	610	4.0	High	
Fuelwood	545	164	-	-	-	709	4.7	High	
Charcoal	230	292	-	46	8	576	3.8	High	
Fruits and nuts	195	336	12	28	9	580	3.8	High	
Bush meat	255	244	27	26	16	568	3.7	High	
Bamboo	55	176	-	116	37	384	2.5	Low	
Medicinal herbs	105	260	-	66	31	462	3.0	High	
Honey	260	244	-	36	19	559	3.7	High	
Fodder	30	44	21	162	45	302	2.0	Low	
Mushroom	10	36	-	182	48	276	1.8	Low	
Spices	-	36	-	198	42	276	1.8	Low	
Snails	15	52	-	126	71	264	1.7	Low	

HD=highly dependent, D= dependent, N=neutral, ND=Not dependent, HND= highly not dependent

The Contribution of Forest Resources to Household Income: The major livelihood activities engaged in by the sampled respondents were farming, non-farm activities and forest resources collection. Table 7

indicates that agriculture was the major and highest income source with 51.0% portion of the whole household income. Forest resources came second with 27.0% contribution of the total revenues of the

households while non-farm income has a share of 22.0%. This result suggests that forest resources contribute immensely to household income and thus can act as a safeguard during the period of hardship and other emergencies. This finding also implies that forest resources constitute an important component of the rural households' economy. Similar conclusion have been reached by Dash *et al.* (2016) that agriculture is considered as the primary income source for local people residing in and around Similipal Tiger Reserve of India where non woody forest products accounted for the second biggest part in total

household income with an average income share of 29.34% next to crop production (39.1%). Melaku *et al.* (2014) reported in their study in Southwestern Ethiopia that the agricultural income's share to annual household income was 50%, the amount that forest products provided to yearly household income was 47% while the remaining 3% was from off-farm sources. Suleiman *et al.* (2017) also reported that forest products other than timber make almost 30% of overall household income in Kano state as compared to crop production.

Table 7: Annual Income share of Respondents

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
Forest income	78615.32	21,000	105,000	27.0
Total	288014.75			

Source: Field survey, 2023

Determinants of Households' Forest Resources Dependence: Binary logit regression was employed to examine the factors influencing the degree of dependence of households on forest resources. The result is presented in Table 8. The Chi-Square statistic of 14.30 indicates that the explanatory variables possess a correlation that is statistically significant with forest dependency at the 5% level. The Hosmer-Lemeshow' test and Pearson also show an insignificant outcome indicating that the model fits the observed data well. Some socio-economic factors influenced the level of household's dependence on forest resources. Among the variables considered, gender (0.944) and household size (0.432) had positive and significant relationships with households dependence on forest resources while education (-0.385), farm size (-0.581) and non-farm income (-0.024) were strongly and negatively connected with dependence on forest resources.

Gender (X₂): Gender had a positive and statistically significant relationship with households' dependence on forest resources at 1% level of probability. This means men were the dominant extractors of forest resources than women. The probable reason could be that the large percent of the forest goods were sourced from dense forest where women might not be secure enough to go and collect couple with the long distances and hilly nature of the area. Forest products collection activities in natural forest need active individuals and are illegal, time-consuming and tedious. Women are discouraged from the risky practices compared with men who are more inclined to take risks of violating the rules governing extraction of products from protected forests. This result is in line with a study done by Opaluwa *et al.* (2011) who

also reported a positive and statistically significant correlation between gender and dependency on forest products other than timber.

Educational status (X₄): Education coefficient is found to be negatively correlated with households' dependence on forest resources at 10% level of probability. This implies that as the people acquire more formal education, their tendency of depending on forest resources declines. This result is in line with the general expectations. It is expected that higher level of education will avail better livelihood opportunities away from forest resources. It is assumed that as the people acquire more education, it would lead to extraction of fewer forest products since education opens up alternative employment opportunities and diverts people from subsistence livelihoods activities such as the gathering of products from the forest. A study by Garekae *et al.* (2017) also reported a negative and statistically significant correlation between the level of education of heads of the households and their reliance on forests.

Household size (X₅): The coefficient of household size is positively correlated with the degree of households' dependence on forest resources at 5% level. This implies that a larger house might employ more people to harvest a greater range of non-wood and wood forest products to generate more revenue. Suleiman *et al.* (2017), Moe & Liu (2016) in their separate studies also found a strong and positive relationship between family size and dependence on non-timber forest products. Household with larger number of working people may tend to involve more in the forest resources collections.

Farm size (X₆): The coefficient of farm size is statistically significant and negatively correlated with households' dependence on forest resources at 5% probability level. One of the crucial factors that lessen the reliance on forests and forest products is agricultural land because households with large plots of land are less likely to engage in forest extraction as their dominant strategy.

Farm income (X₉): Farm income was statistically significant and negatively correlated at 5% level of probability with households' dependence on forest resources. This result simply implies that farm income has an indirect or inverse relationship with dependence on forest products. It shows that a unit increase in the farm income of the house would lead to a decrease in households' dependence on forest products by 23%. When households' earn more income from the farm, the tendency of relying on forests resources reduces.

Table 8: Determinants of Households Dependence on Forest Resources

Variable	Coefficient	Std. Error	T-value	P-value
Constant	-1.304	0.793	0.793	0.100
Age (X ₁)	0.016	0.208	0.08	0.938
Gender (X ₂)	2.0490	.6040	3.39	0.001***
Marital status (X ₃)	-0.302	0.432	-0.70	0.485
Education (X ₄)	.0958	.0562	1.70	0.088*
Household size (X ₅)	-0.542	0.227	-2.39	0.017**
Farm size (X ₆)	-0.385	0.188	-2.04	0.041**
Occupation (X ₇)	0.237	0.828	0.29	0.775
Distance (X ₈)	-0.149	0.181	-0.82	0.411
Farm income (X ₉)	0.531	0.237	2.24	0.025**
Chi-Square	14.30**			
Hosmer-Lemeshow	4.88			
Pearson	142.50			

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

Conclusion: Based on findings from this study, it can be concluded that the household heads in the study location showed high level of dependence on forest resources for their sustenance. Firewood, timber, charcoal, fruits and nuts, bush meat, honey and medicinal herbs were the most important forest products relied upon by the households. Gender, household size, educational status, farm size and farm income were significant determinants of households' dependence on forest resources. The study recommended that owing to the sizable contribution of forest resources to household income, policymakers and stakeholders should developing conservation strategies for forests that could sustain the requirements of people that depend on them.

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