Univerzitet u Beogradu
Poljoprivredni fakultet
Institut za poljoprivrednu tehniku
Naučni časopis
POLJOPRIVREDNA TEHNIKA
Godina LI
Broj 3, 2026.
Strane: 46 – 55

University of Belgrade
Faculty of Agriculture
Institute of Agricultural Engineering
Scientific Journal
AGRICULTURAL ENGINEERING
Year LI
No. 3, 2026.
pp. 46 – 55

Original scientific paper
Originalni naučni rad
DOI: 10.5937/POLJTEH26030460

EFFECT OF HOUSEHOLD INVOLVEMENT IN NON TIMBER FOREST PRODUCTS HARVESTING AND ITS EFFECT ON FOOD SECURITY AMONG HOUSEHOLD OF OMO FOREST RESERVE, OGUN STATE

Samuel Olusola Oyewole[1*], Adekemi Lizzie Oyewole[2], Opeyemi Oladipo Abegunrrin[2]

[1]*Forestry Research Institute of Nigeria, P.M.B. 5054, Jericho, Ibadan, Nigeria,*
[2]*Federal College of Forestry Ibadan, Nigeria*

***Abstract*:** Non Timber Forest Products harvesting (NTFPs) is an important activities and play significant role in the livelihood of the communities around the forest area. This paper evaluated the effect of household participation in NTFPs among the household in Omo Forest Reserve Ogun State. Random sampling was used to select 100 household in five communities living around the strict nature reserve of Omo Forest Reserve. Primary data were collected using structured questionnaire. Data were analyzed using descriptive statistics, logit and multiple regression analysis. Household in the area were found harvesting NTFPs such as snails, nuts, fruits, vegetables, medicinal plants and bush meat. The factors influencing household involvement in NTFPs were household food security status ($\beta = 0.821$; $P<0.10$), household size (($\beta = 0.013$; $P<0.01$) and marital status ($\beta = 0.975$; $P<0.05$). Furthermore, the determinants of household food security were household size, forest income and involvement in NTFPs. The study recommends a policy and technical support for production and domestication of similar NTFP products as alternative to reduce biodiversity loss

Keyword: *Non timber, household, forest product, food security*

*Corresponding Author. Email address: oyewole.so@frin.gov.ng
ORCID NUMBER: 0000-0002-4685-1754

INTRODUCTION

Non timber forest products refer to the biological resources that were found and collected from forest without cutting down trees for wood. These products are important to households that are living around the forested areas providing alternative income and improving food security, [15]. NTFPs include fruits, nuts, vegetables, fish, medicinal plants, pitches, fibers, bamboo, rattans, honey, bugs, animals, feed, fertilizers, medicinal extracts, construction materials, dyes, gums, latex and different exudates, fundamental oils, flavors and spices, consumable oils, bones, pelts, hides and skins, non-wood lingo-cellulosic items, chemicals and fragrance synthetic compounds , [10]

NTFPs have significant contribution to household income in many communities globally. According to Sawadogo (2023) [14] NTFPs could provide income for the purchase of other commodities and consumption expenditure thereby contributing to food security. Similarly, [4] submitted that NTFPs may not provide total income and the most important household income generation but, they contribute significantly to household income, food security, and household healthcare as well as, provision of multiple social and cultural values.

The role of NTFPs varies from one place to another depending on the economic and cultural contexts. In developed countries, for instance, NTFPs are usually used for cultural and recreational purposes, biodiversity conservation, and rural economic development. In developing countries, especially in Africa and Asia, they are mostly utilized for subsistence and income generation [2]; [16].

The direct contribution of NTFPs to income generation is usually utilized within the household or marketed for their economic, social, cultural value in a bid to reduce poverty and alleviate poverty, among rural dwellers , [15]. In other words, NTFPs play important roles in the households' income-generating potential as a means to social awareness and a viable way of sustainable livelihood, [17] and also serve as a buffer, especially in times of economic vulnerability. NTFPs enterprises have greatly shown a diversity of potential products much sought after by several rural dwellers and groups, providing wide variety of livelihood advantages, [16].

The contribution of NTFPs in terms of food security to the rural household could be describe in three ways. These are provision of edible products, provision of income and nutrition diversity. NTFPs provide a wide range of edible products that supplement household diets. Wild fruits, leafy vegetables, nuts, and bushmeat are often readily available in forested areas and can be harvested without significant financial investment. This increases the availability of food, particularly during periods of food scarcity such as droughts or lean agricultural seasons. Many households collect and sell NTFPs in local markets. Products like honey, mushrooms, medicinal plants, and fuelwood generate income that can be used to purchase staple foods and other necessities. This enhances household purchasing power and improves access to diverse and nutritious food.

In many developing countries, NTFPs are considered as major safety net that fills the gaps due to a shortfall in agricultural production or other forms of emergencies, [16]; [1]. This implied that if these products are periodized, it can be used to enhance the economic and social wellbeing of communities living in and around forestlands. Despite the great impact of and the contribution to the livelihood of household around the forest areas, there is limited accurate evaluation of NTFPs as a revenue component for the livelihoods of indigenous people.

Furthermore, the importance of NTFPs in household income and the impact on household food security are not well known due to the absence of a systematic and rigorous data collection system at national level in many developing countries, [5]. Furthermore, there is a research gap on the contribution of NTFPs to household food security particularly in the study area. This study therefore, examine the effect of NTFPs to food security among household and the drivers of household participation in NTFPs harvesting in the Omo forest reserve area of Ogun State, Nigeria.

MATERIALS AND METHODS

The Study Area

Omo Biosphere Reserve (BR) is a vital biodiversity hub that provides numerous ecological, social, and economic benefits to local communities and the wider region. The BR is zoned into 3: core, buffer and transition areas, humans interact more with nature in the buffer and transition area. Omo Biosphere Reserve was the first designated Biosphere Reserve in Nigeria. It derives its name from River Omo that traverses it, is located between latitudes 6º 35' to 7º 05' N and 4º 19' to 4º 40' E in the Ijebu area of Ogun State in southwestern Nigeria. The Reserve was constituted in 1925 as part of a bigger Shasha Forest Reserve. Shasha was later split into Omo, Oluwa and Shasha Forest Reserves, the last two lying to the East and North-East of the present Omo. Farming is the major occupation of the dwellers. A small proportion are involved in other occupations like hunting, fishing, hired labour and timber contracting for income generation. Other secondary occupations include mechanics, tailoring, carpentry, blacksmith, food rending and herbalist work.

Sampling procedure and sample size

Two stage sampling technique was used. In the first stage purposive sampling was used to select five communities that are very close to the strict nature reserve area of the forest reserve. This area is often referred to the core area of the reserve. The communities selected are Eseke, Apora, Etemi, Owode and Sojukoro. In the second stage snow balling was adopted to select 20 households in each of the selected community given a total of 100 respondents for the study.

Data collection and analysis

Primary data were collected using structured questionnaires and interview schedule. The data selected were analyzed using descriptive statistics, food security scale,, logit and multiple regression analysis.

Food security scale

Food security scale was used to determine the food security status of the respondents. Following the scale that was developed by Freedom from Hunger (FFH) and adopted by [6], in their study on food security among urban household. The scale includes 12 items and was designed to capture the food security status (Appendix 1). The score was categorized into three categories. The score of 0-1 meant a food secure household, 205 meant a moderate scale household and a score greater than 5 meant a non food secure household.

Multiple regression analysis was used to identify factors influencing household involvement in non timber forest products. The model contains dependent variable which is participation in non timber forest products and dependents variables which are socioeconomic and institutional variables. The model is explicitly specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$$

Where:
Y= Involvement in non timber forest product harvesting (number)
X_1 = food security status
X_2 = household size
X_3 = age
X_4 = gender
X_5 = marital status
X_6 = farming experience
X_7 = forest income
β_0 = Constant
β_1 - β_{10} = regression coefficients
e = error term

Logit regression

This was used to evaluate the determinant of food security among household and effect of household involvement in non timber forest products. The probability of a household being food secure is determined by an underlying response variable that captures the true economic status of a household. The underlying response variable y* in the case of binary choice is defined by the multivariate logit regression relation:

$$y^* = (-\sum Xi\beta j) + \mu$$

where: $\beta_j = \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$, and $X_i = X_{i1}, X_{i2}, X_{i3}, X_{i4}, X_{i5}, X_{i6}, X_{i7}, X_{i8}$
where;
Y* = Food security status (1= food secure, 0= not food secure)
μ_i = a logistic cumulative distribution in F
X_i = characteristics of households
X_1 = household size
X_2 = age
X_3 = gender
X_4 = marital status
X_5 = farming experience
X_6 = forest income
X_7 = non timber forest product harvesting
β_i = The coefficients for the respective variables in the logit function
μ = error term

RESULT AND DISCUSSION

Non timber forest product

The result presented in Table 1 showed the non-timber forest products (NTFPs) that are often harvested by the household. Forest nut was ranked first and this was followed by vegetables. Collection of snails was done by 33.9 percent and it was ranked third. About 18.1 percent were found harvesting medicinal plants. The result revealed that household dependent on non timber forest products for their livelihoods. These products provide a source of food, medicine, and income, particularly for women. Despite their importance, the collection of NTFPs is often unregulated, leading to overharvesting and depletion of certain species. Promoting sustainable harvesting techniques, value addition, and market linkages can enhance the economic benefits of NTFPs while ensuring their conservation. According to Kabir (2020a) [8], non-Timber. Forest Products species are used as food in the form of wild fruits, vegetables, and nuts, edible roots, bush meat, snails, edible insects and honey.

Table 1. Distribution of respondents by NTFP collection

Forest products	Frequency*	Percerntage	Rank
Wild fruit collection	18	17.54	5
Medicinal plants	18	18.13	4
Vegetables	37	37.43	2
Nuts	39	38.60	1
Snails	34	33.92	3
Wrapping leaves	12	12.28	6
Fuel wood	12	11.70	6
Mushroom	5	5.26	9
Bush meat	11	11.11	8

* Multiple responses allowed

Factors influencing Non Timber Forest Product Harvesting

The result in Table 2 showed that factors influencing household participation in NTFPs harvesting. The R-square value obtained was 0.63 percent. This showed that the independent variables explained 63 percent of the variation that exist in the variation that occur in the dependent variables. The F-value of 21.85 was significant at 1 percent indicating that the independent variables jointly explained that variation that exists in the dependent variable. The estimated coefficient obtained for food security status was positive and significant at 10 percent level of probability. This showed that food security is positively related to NTFP harvesting. The coefficient obtained for household size was significant at 1 percent and positively related to NTFPs. The implication of this is that household with higher members participate more in NTFPs collection. Household will have more responsibility in terms of food consumption and household expenses which could make them to extract more NTFPs compared to the household with small members.

The coefficient of marital status was positive and significant at 5 percent level of probability indicating that married individual would participant in NTFPs harvesting compared to the individual that are still single. This finding was similar to the report of Dash *et al.* (2016) [3] who reported that Level of education, age, landholding and household size, number of children, and gender influence the intensity of household collection of NTFPs.

Table 2. Factors influencing Non Timber Forest Product Harvesting

Variables	Coefficients	Standard Error	t-value
Food security status	0.821	0.446	1.84*
Household size	0.013	0.004	3.17***
Age	0.008	0.013	0.61
Gender	0.449	0.370	1.21
Marital status	0.975	0.457	2.13**
Farming experience	0.007	0.070	0.05
Forest income	0.032	0.031	1.04
R-Square	0.63		
Adjusted R-square	0.60		
F-value	21.85***		

*** = P<0.001** = P<0.05 *** = P<0.01

Food Security status of household

The result of food security status of household is presented in Table 3. The result revealed that only 14.62% of the households were food secure. The household who falls within the category of moderately food secure constitute 11.11% while the non-food secure household constitutes the larger (74.27%) proportion. This is a great threat to forest conservation as household will extract more resources to meet up with food insecurity challenges thereby leads to degradation. This is not different for previous findings, for example, Kabir *et al.,* (2020b) [9] reported food security challenge among forest-based households in Oyo State of Nigeria. Their report revealed that majority of the respondents skip meals because of food insufficiency. The findings also followed the report of Olagunju *et al*. (2024) [11], in their study on the influence of NTFPs Collection and Usage on Household Food Security Status among Rural Women in Chikun Local Government Area (LGA) of Kaduna State, it was noted that most (66.7%) of their respondent were mildly food insecure, some (24.2%) of the respondents were severely food insecure, only few (9.2%) of the respondents were food secure.

Table 3. Distribution of the respondents by food security status

Food security score	Frequency	Percentage
Food secure	15	14.6
Moderately food secure	11	11.1
Food insecure	74	74.3
Total	100	

Effect of non timber forest product harvesting on food security status

The result presented in Table 4 showed the effect of household participation in NTFPs on food security status. The significant coefficient obtained for NTFPs harvesting was significant at 1 percent level of probability and positive. The implication of this is that NTFPs was found reducing food insecurity. NTFPs participation is significantly related to household food security status. Other determinants of food insecurity were household size and forest income. The income of household from forest sources were found reduce food insecurity. The large household tends to be food insecure compared to household with lower members. According to [12], forest resource accessibility can support household food security. Hence, there is an interaction between forest conservation and food security. Achieving the two concepts are part of the recent challenges, [7].

Table 4. Effect of non timber forest product harvesting on food security status

Variables	Coefficients	Standard Error	t-value
Constant	12.959	5.760	2.25**
Household size	0.989	0.511	1.93*
Age	0.014	0.079	0.18
Gender	-1.617	1.769	-0.091
Marital status	-0.156	1.875	-0.81
Farming experience	0.049	0.095	0.51
Forest income	-0.843	0.386	-2.18**
Participation in NTFPs	-0.460	0.032	-14.2***

*** = P<0.001** = P<0.05 *** = P<0.01

CONCLUSION AND RECOMMENDATIONS

The study examined the effect of NTFPs on food security among household of Omo mo Forest Reserve of Ogun State. The findings revealed that household depends on NTFPs and were found collecting a wide range of NTFPs such as wild nuts, vegetables, snails, medicinal plants and mushroom. The result established that NTFPs collection has positive impact on food security status. NTFP was found reducing the incidence of food insecurity. Participation on NTFPs largely depends on marital status and household size. Household who are married and have large members were less food insecure compared to those who are still single. The study recommends a policy and technical support for production and domestication of similar NTFP products as alternative to reduce biodiversity loss

REFERENCES

[1] Angelsen, A., Jagger, P., Babigumira, R., Belcher, B., Hogarth, N. J., Bauch, S., 2014. Environmental income and rural livelihoods: a global-comparative analysis. *World Dev.,* 64: pp.12–28

[2] Cocksedge, W. 2006. Incorporating non-timber forest products into sustainable resource management: an overview for resource managers. Royal Roads University, Victoria

[3] Dash, M., Behera, B., Rahut, D. B. 2016. Determinants of household collection of non-timber forest products (NTFPs) and alternative livelihood activities in Similipal Tiger Reserve, India, *Forest Policy and Economics,* 73: pp.215-228

[4] Endamana, D., Angu, K. A., Akwah, G. N., Shepherd, G., Ntumwel, B. C., 2016. Contribution of non-timber forest products to cash and non-cash income of remote forest communities in Central Africa. *Int For Rev*, 18(3): pp.280–295

[5] FAO 2012. State of the World's Forests 2012. FAO, Rome, http://www.fao.org/3/ a-i3010e.pdf. Accessed July 2015.

[6] Ibrahim, H., Uba-Eze, N. R. and **Oyewole, S. O**., 2009. Food Security among urban households: A case study of Gwagwalada Area Council of the Federal Capital Territory Abuja, Nigeria. *Pakistan Journal of Nutrition* 8(6): pp.810-813.

[7] Jouzi, Z., Leung, Y-F and Nelson, S. 2022. Addressing the food security and conservation challenges: Can be aligned instead of apposed? Front. Conserv. Sci. 3:921895. doi: 10.3389/fcosc.2022.921895.

[8] Kabir, G. B., Ogunniyi, L.T., Fanifosi, G.E., And Azeez, F.A. 2020a. Evaluation of rural households demand for Non-Timber Forest Products (nNTFPs) in Oyo State: A quadratic almost ideal system (quaids) approach. *Ethiopian Journal of Environmental Studies & Management* 13(2): pp.221 – 231

[9] Kabir, G. B., Azeez, F. A., Arowolo, O. V.; Nosiru, M. O. 2020. Determinants of Food Security among Forest-Based Households in Oyo State, Nigeria. *J. Appl. Sci. Environ. Manage*. 24 (7): pp.1293-1298.

[10] Kolade, T.A. 2021. Non-Timber Forest Products (NTFPs) Needs Assessment of Forest Community Dwellers in Ondo State Nigeria. School of Agriculture and Agricultural Technology, Federal University of Technology, Akure, Ondo State.

[11] Olagunju, O. E., Olagunju, O. S. and Ariyo, M.O. 2024. Influence of NTFPs Collection and Usage on Household Food Security Status among Rural Women in Chikun Local Government Area (LGA) of Kaduna State. *Journal of Forestry Research and Management*. 21(2): pp.41-49.

[12] Olesen, R. S., Hall, C. M. and Rasmussen, L. V. 2022. Forests support people's food and nutrition security through multiple pathways in low- and middle-income countries. *One Earth* 5(12): pp.1342-1353.

[13] Paumgarten, F. 2005. The role of non-timber forest products as safety-nets: a review of evidence with a focus on South Africa. *Geo Journal,* 64(3):pp.189–197

[14] Sawadogo, S. 2023. "Contribution of non-timber forest products to food security of households bordering the Pô-Nazinga-Sissili ecological complex in Burkina Faso," *Int. Journal of Economic Policy in Emerging Economies,* 17(3):pp. 420-443.

[15] Suleiman, M. S., Wasonga, V. O., Mbau, J. S., Suleiman, A. and Elhad, Y. A. 2017. Non-timber forest products and their contribution to households income around Falgore Game Reserve in Kano, Nigeria. *Ecological Processes*, 6(23): pp.1-14

[16] Shackleton, C.M Pandey, A.K. 2014. Positioning Non-Timber Forest Products on the development agenda. *Forest Pol Econ*. (38): pp.1–7.

[17] van Vliet, N., Nebesse, C. and Nasi, R. 2015. Bush meat consumption among rural and urban children from Province Orientale, Democratic Republic of Congo. *Oryx 49*(01): pp.165–174.

Appendix 1

Sn		Criteria
1	I (we) couldn't afford to eat balanced meal In the last 12 months	No=0 Ye =1
2	In the last 12 months did you or other household member cut the size of your meals or skip meals because there was not enough or money to buy food?	No=0 Ye =1
3	In the last 12 months, were you and your household member worried that your food will run out before you have food or money to buy more	No=0 Ye =1
4	In the last 12 months, were you hungry but did not eat because you could not afford enough food	No=0 Ye =1
5	In the last 12 month did you have to eat same food daily because you did not have varieties of food	No=0 Ye =1
6	In the last 12 month did you ever eat less than you felt you should because there was no food	No=0 Ye =1
7	Did you or any adult household stop eat for a whole day because there was no food	No=0 Ye =1
8	Did you rely on few kinds of low cost food because you do not have money	No=0 Ye =1
9	Did you ever comment that the food you bought did not have money to get more	No=0 Ye =1
10	Did you or any adult household member lose weight during the past 12 months because you did not eat enough food	No=0 Ye =1
11	I could not feed my children with balanced and enough meal because there was no enough food	No=0 Ye =1
12	Which of the following describes your household food consumption during the past 12 months? (a) always have enough of what is required ( ) (b) Enough but not always what is required ( ) (c) sometimes enough food (d) often not enough food ( ) 2-4=1	

UTICAJ UČEŠĆA DOMAĆINSTAVA U SAKUPLJANJU NEDRVNIH ŠUMSKIH PROIZVODA NA BEZBEDNOST HRANE DOMAĆINSTAVA U ŠUMSKOM REZERVATU OMO, DRŽAVA OGUN, NIGERIJA

Samuel Olusola Oyewole[1*], Adekemi Lizzie Oyewole[2], Opeyemi Oladipo Abegunrrin[2]

[1]*Forestry Research Institute of Nigeria, P.M.B. 5054, Jericho, Ibadan, Nigeria*
[2]*Federal College of Forestry Ibadan, Nigeria*

*Corresponding Author. Email address: oyewole.so@frin.gov.ng
ORCID NUMBER: 0000-0002-4685-1754

Apstrakt: Sakupljanje nedrvnih šumskih proizvoda (NTFP – *Non-Timber Forest Products*) predstavlja važnu aktivnost i ima značajnu ulogu u obezbeđivanju sredstava za život zajednica koje žive u blizini šumskih područja.

U ovom radu analiziran je uticaj učešća domaćinstava u sakupljanju nedrvnih šumskih proizvoda među domaćinstvima u Šumskom rezervatu Omo, u državi Ogun.

Metodom slučajnog uzorkovanja odabrano je 100 domaćinstava iz pet zajednica koje žive u okolini strogo zaštićenog prirodnog rezervata šumskog rezervata Omo. Primarni podaci prikupljeni su primenom strukturisanog upitnika.

Podaci su analizirani korišćenjem deskriptivne statistike, logit modela i višestruke regresione analize.

Utvrđeno je da domaćinstva u posmatranom području sakupljaju različite nedrvne šumske proizvode, kao što su puževi, orašasti plodovi, voće, povrće, lekovite biljke i meso divljači.

Faktori koji značajno utiču na učešće domaćinstava u sakupljanju nedrvnih šumskih proizvoda bili su: status prehrambene bezbednosti domaćinstva($\beta = 0{,}821$; $P < 0{,}10$), veličina domaćinstva ($\beta = 0{,}013$; $P < 0{,}01$) i bračni status ($\beta = 0{,}975$; $P < 0{,}05$).

Dalje, utvrđeno je da su veličina domaćinstva, prihod ostvaren iz šuma i učešće u sakupljanju nedrvnih šumskih proizvoda značajne odrednice prehrambene bezbednosti domaćinstava.

Studija preporučuje kreiranje odgovarajućih politika i pružanje tehničke podrške za proizvodnju i domestikaciju sličnih nedrvnih šumskih proizvoda kao alternativnog načina smanjenja gubitka biodiverziteta.

Ključne reči: *Nedrvni šumski proizvodi, domaćinstvo, šumski proizvodi, prehrambena bezbednost.*

Prijavljen:
Submitted: **13.04.2026**.
Ispravljen:
Revised: **27.05.2026.**
Prihvaćen:
Accepted: **30.06.2026.**