



Rural Livelihoods and Forest Incomes in the Etinde Community Forest of South West Cameroon

Mukete Beckline¹, Zhongqiu Sun^{2*}, Vivian Ntoko¹, Dominic Ngwesse³, Abdul Manan⁴, Yang Hu⁵, Ngoe Mukete⁶, Loveline Che³, Jacinta Foncha³

¹Community Service for Environmental Protection, Buea, Cameroon

²Academy of Forestry Inventory and Planning, National Forestry and Grassland Administration of China, Beijing, China

³Department of Development Studies, Pan African Institute for Development West Africa, Buea, Cameroon

⁴Department of Forestry, Range and Wild Life Management, Karakoram International University, Gilgit, Pakistan

⁵College of Ecology and Environment, Ningxia University, Yinchuan, China

⁶College of Economics and Management, Nanjing Agricultural University, Nanjing, China

Email: munasawa@gmail.com, *qiuqiu8708@163.com, ntoko_njole@yahoo.com, ngwesdom68@gmail.com, abdul.mannan@kiu.edu.pk, huyang@nxu.edu.cn, ngoer@yahoo.com, chelovelinchang@yahoo.com, Jacinta_foncha@yahoo.com

How to cite this paper: Beckline, M., Sun, Z.Q., Ntoko, V., Ngwesse, D., Manan, A., Hu, Y., Mukete, N., Che, L. and Foncha, J. (2022) Rural Livelihoods and Forest Incomes in the Etinde Community Forest of South West Cameroon. *Open Access Library Journal*, 9: e8793.

<https://doi.org/10.4236/oalib.1108793>

Received: April 26, 2022

Accepted: July 16, 2022

Published: July 19, 2022

Copyright © 2022 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

For several decades, many households in rural areas have relied on surrounding forests for their livelihoods, safety nets and sustenance. This reliance is most often determined by the household's characteristics, available forests and economic benefits. That notwithstanding, the demand for more farmlands and unsustainable harvesting of forest resources are pushing these forests into depletion. This rapid decline endangers the livelihoods of forest-reliant households, threatens biodiversity and impacts climate change adaptation efforts. The present study examines rural households and their reliance on surrounding forest resources around the Etinde Community Forest, Fako Division in the Southwest Region of Cameroon. Data were collected from 300 households, spread across 10 villages using 15 focus group discussions and household surveys. Results showed that 89% of the population was involved in farming activities, 100% in forest resources harvesting and 24% in other small businesses. In addition, fuelwood collection and wood harvesting contributed about 32.4% of the average total household income. In order to curtail reliance on forests and improve rural livelihoods, the government should invest in alternative domestic cooking energy sources, climate-smart agriculture, sustainable forestry, agroforestry and improve rural transport networks.

*Corresponding author.

Subject Areas

Agricultural Science, Biodiversity, Biogeography, Conservation Biology, Ecology, Ecosystem Science, Environmental Sciences, Environmental Sciences

Keywords

Rural Livelihoods, Household Income, Forest Dependence, Sustainable Forest Management, Tropical Forests, Cameroon

1. Introduction

Located along the West African coast, Cameroon has an estimated total surface area of about 475,440 km² mostly covered by agricultural lands, forests and other land-use types [1]. Mainly found in the southern zones of the country, these forests make up the western margins of the Congo Basin Forest [2] [3] [4].

Many surrounding village communities reside around these forests and depend on them for their livelihoods. These livelihoods include agricultural activities, harvesting of non-timber forest products and other forest tree resources for various services [5] [6]. This dependence challenges forest conservation efforts often resulting in biodiversity loss, deforestation, and forest degradation [7] [8]. The deforestation and forest degradation are often a result of a plethora of differential determinants such as settlement expansion, farming activities and unsustainable harvesting of forest resources [1] [9] [10].

Several studies have assessed the livelihoods of rural households and their reliance on forest resources. According to [11], rural households that had greater forest access were found to have higher forest income. In Zambia, [12] observed that the abundance of forest resources and products was directly responsible for a greater amount of rural household income. From another study, rural households with educated household members obtained more forest income than households with less-educated members [13].

Similarly, bigger rural households were observed to depend more on forest resources than households with smaller family sizes [14]. Also, Zenteno *et al.*, [15] found factors that include topography and geography influence a rural household's reliance on forest resources. Additionally, [16] found a rural household's reliance on forest resources to be driven by various factors which included wealth status, education, gender of the household head, time of the year and location of the household. Meanwhile, reliance on forest resources was found to be associated with low costs of using the forest, ability to farm, animal rearing skills and the number of years of residence within the local community [17] [18].

Using a new Forest Dependence Index (FDI) in southern Malawi, [19] observed the use of all forest products collected, amounts collected and walking time to the collection sites also determined a household level dependence on

forest products. In a related study, owners of forests on private land in Tanzania saw themselves as more forest-dependent than non-owners with similar levels of forest use [20]. In the Central Darfur State of Sudan, non-wood forest products were observed to have a considerable contribution to the livelihood systems and local economies of rural and urban societies. This contribution which accounted for over 54% of the total household's annual income was mainly determined by gender of the household head, female security, educational level and size of the household [21].

In East Cameroon, forest resources were found to make up over 38% of annual rural household income. The income was generally obtained through the sales of non-timber forest products, unauthorized logging activities and illegal wildlife trade [22]. Non-timber forest products (NTFPs) are natural resources aside from timber that is derived from surrounding forests. These forest resources are usually wild animals, fruits, seeds, nuts, mushrooms, spices and medicinal plants [18] [23]. Around the Etinde community forest, these NTFPs are mostly bitter cola (*Garcinia cola*), bush pepper (*Piper guineense*), bush mango (*Irvingia gabonensis*) and several edible mushroom types [24].

In Cameroon, a rural household's reliance on forest resources was observed to be influenced by forest management activities [25] [26] [27]. Meanwhile, [28] reported farming activities, illegal wildlife trade and logging hinder a rural household's reliance on forest resources in the east and south regions of Cameroon. In order to facilitate forest resources, conservation and reliance by rural households, [18] [25] asserted that it was necessary to develop and implement a participatory approach, which will involve rural forest-reliant households and the government of Cameroon.

Meanwhile, [2] observed drivers of a rural household's reliance on forest resources in the Ekondo-Titi district of Cameroon to be driven by the gender of the household head. Their study further concluded that forest resource dependence was facilitated by the needs of the different consumer groups.

However, the various setbacks related to the dependence of rural communities on forests and its implications for strategic livelihood management are lacking in Cameroon [29]. It is therefore necessary to carry out additional studies aimed at the reliance of rural households on forest resources. This will aid in curtailing the negative effects of over resource use as well as ensure forest resource conservation. The present study aims at bridging that knowledge gap and it explores the characteristics of rural households and their dependence on forest resources income around the Etinde community forest.

2. Methodology

2.1. Description of Study Area

The Etinde community forest is located within the Buea Municipality (4°10'0"N 9°14'0"E) and in the Mount Cameroon forest region. Buea Municipality is located in Fako Division (Latitude 4°10'0"N 9°10'0"E) which is an administrative

unit in the South West Region of Cameroon spreading across an estimated area of 2093 km². The municipality stretches from the lowlands of about 20 meters to the mountain slopes of Mount Cameroon towering at 4100 meters above sea level (**Figure 1**) [24] [30].

From a 2005 population census and considering future projections, the population is estimated at about 400,000 inhabitants, where 63% are semi-urban and 37% rural. This gives rise to an average population density of about 120.4 inhabitants per km² in the semi-urban areas. Around the rural areas, the population density decreases to about 70.7 inhabitants per km² [5] [31].

Covering about 48.6 km², the Etinde community forest is a combination of montane, coastal evergreen, mangroves and other lowland forests [24] [32]. These forests are extremely endowed with enormous varieties of ecological diversity ranging from simple to complex species. Meanwhile, over 370 bird species have been identified with three being endemic; Mount Cameroon Spurfowl (*Pternistis camerunensis*), Mount Cameroon rough-winged swallow (*Psaldiprocne fuliginosa*), and Mount Cameroon Speirops (*Zosterops melanocephalus*). Also, several large tropical montane mammals including the African forest elephant (*Loxodonta cyclotis*), chimpanzee (*Pan troglodytes*), putty-nosed monkey (*Cercopithecus nictitans*), and yellow-backed duiker (*Cephalophus sylvicultor*) have been identified [33].

Precambrian clays and sandstones dominate the soil type both of which may have originated from the numerous volcanic activities [34]. Two seasons, a dry season from November to March and a rainy season from May to October dominate the area. Annual rainfall ranges from 2000 mm at the peak of Mount Cameroon to about 10,000 mm at the southwestern lower altitudes. Throughout the year, temperature varies with mean monthly maximum temperatures in the dry season ranging between 25°C and 35°C and in the rainy season 18.2°C to 27°C. Meanwhile, at the summit of Mount Cameroon, temperatures may decline to 0°C throughout the year. During most of the year, the relative humidity and minimum monthly values range between 78% and 90% [18] [35].

The livelihoods of about 70% of the local population directly or indirectly depends on forests for food and cash crops such as; spices, vegetables, yams, banana, oil palm and cocoa, are generally grown. In the rural areas, the inhabitants mostly depend on the harvesting and extraction of NTFPs mainly as an off-season job when pressures on agricultural activity drop. The rural population is also employed as labourers by the agroindustrial companies Cameroon Development Corporation (CDC) and Cameroon Tea Estates (CTE), other smallholder plantations and private businesses. In addition, the maritime ports of Limbe, Tiko and Idenau provide access by water to neighbouring Equatorial Guinea, Gabon, Nigeria, and other regions of Cameroon thus facilitating the ferrying of forest resources [32] [35].

2.2. Data Collection

Forest resources dependence and rural livelihoods data were obtained via various

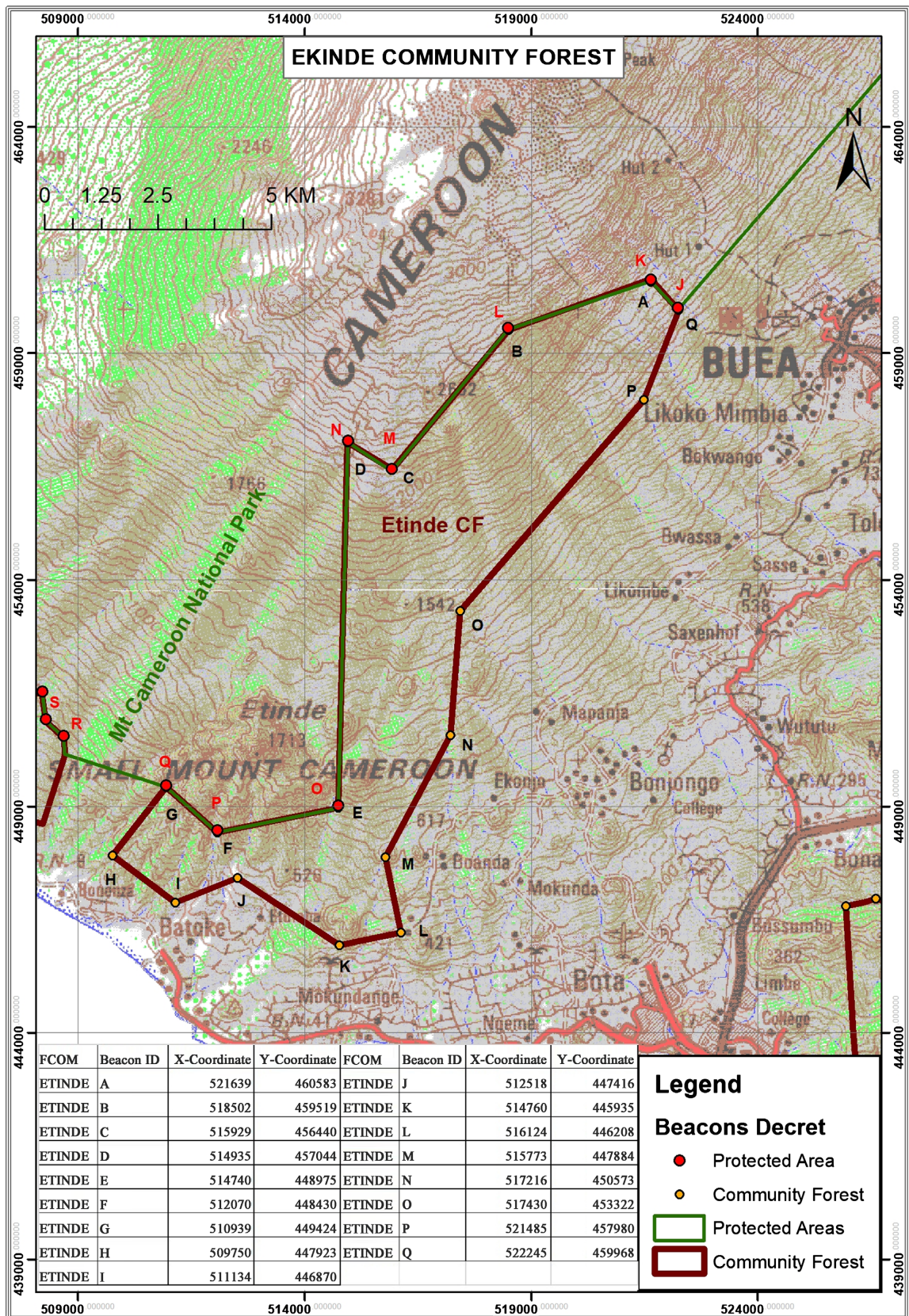


Figure 1. Location map of the study area showing Etinde community forest and other community forests in the Mount Cameroon region. Sourced from Ngang (2015).

formats. These included 15 focus group discussions (FGDs) with household heads, household surveys in the form of semi-structured, close and open-ended recall questions as described by Mukete *et al.* [36]. These assessed villages are adjacent to the Etinde community forest and among those that had existed and had been using the surrounding forests even before the creation of this community forest. The villages thus represented a primary source for forest, historical and socioeconomic information. The number of households in each village was obtained from the local village chiefs because reliable official government population census data are lacking. In villages with less than 25 households, this study used only semi-structured and open-ended questionnaires through a door-to-door survey. In villages with more than 25 households, these villages were divided into groups for FGDs. The number of respondents in each FGD was limited to 10, volunteers and household heads randomly selected who were at least 18 years old (a requirement of the Cameroon Law). Their National Identity Cards were verified and in cases where this was unavailable, reference was requested from the village chief and his representative. In instances where respondents were not able to communicate in the English language, Pidgin English and or the Bakweri language was used by the researchers to ensure proper understanding. The interview captured at least 70% of the households per village giving a total of 300 interviews of households across the 10 adjacent villages.

The household according to Mukete *et al.* [18], which was the basic unit for this research, is a group of people living together in the same house who regularly cook and eat from the same pot. The respondents were interviewed their age, marital status, farming practices, gender, age, off-farm activities, annual income, income sources, educational level and ethnic origin.

2.3. Data Analysis

Microsoft Excel Software for Windows 10, was used to deduce the dependence of rural households on forest resources. The cumulative responses obtained through questionnaires, were used to explore the variations in household socioeconomic characteristics. All the procedures carried out in this research and which involved human participants were in accordance with the ethical standards of the Beijing Forestry University, Pan African Institute for Development West Africa, Buea, Cameroon and with the 1964 Helsinki declaration and its later amendments.

3. Results

3.1. Characteristics of the Rural Households

Of the 300 households, 55.22% were male-headed while 44.78% were female-headed, most of whom were either married or single. Majority of the respondents, (89%) were natives who have lived in the villages for more than 16 years. In household age make up, 26.44% fell within the 0 - 20 years age range, 46.02% in the 21 - 40 years (which is the very active age range), 21.45% in the 41

- 60 years (active age range) and 6.08% in the 61 years and above (inactive and retirement age range). Additionally, 9% of the respondents had acquired university education, 14% had secondary education while 55% had completed primary education. Meanwhile, about 22% of the respondents had no formal education and could neither read nor write. This lack of formal education does not qualify them for formal jobs either with the government or private sector and they are thus completely involved in agricultural and other activities (**Table 1**).

3.2. Rural Household Income Sources and Levels

The households are mostly involved in agricultural activities mainly through agroforestry and shifting cultivation. Under the agroforestry system, cash crops (cocoa, oil palm), fruit trees (oranges, avocado, mango, African plum) and food crops (banana, corn, groundnuts) are farmed together.

Apart from agricultural activities, the local populations have for centuries practiced animal husbandry as part of their tradition and culture. Several of these households (74.7%) reared various types of domestic animals including goats, pigs, dogs and chicken. This tradition, lifestyle and culture are also expressed in the way these rural households carry out their forest resources use, and the sales of forest goods such as rattan, bamboo products, fruits, nuts and wood. These expressions of lifestyle are also reflected in the sales of fishing and hunting products like shrimps, mudfish, eels, tilapia, snails, birds and small rodents.

Similarly, other off-farm income sources included small businesses as explained by 24% of the respondents. Also, households obtained 67.6% of their average total household income from rearing animals and agricultural activities. Furthermore, forest resources such as the collection of fuelwood and artisanal logging (wood harvesting) constituted a reasonable part of household livelihood and income sources as it contributed about 32.4% of average total household income.

Based on **Table 2**, nuts and fruits refer to mango, bitter kola, bush mango, plantain, banana, oil palm, African plum, avocado; vegetables include okra, various species of melon, pepper, huckleberry, spinach, garden eggs, and tomato. Meanwhile, spices are mainly njangsang, ginger, bush pepper, grains of paradise and African basil. Also, root crops include cassava, carrots, yams, cocoyams, potatoes and groundnuts. On the other hand, cereals simply constitute maize while others represent tea, rubber, cocoa, sugar cane, raphia palm, coffee and coconut.

4. Discussion

4.1. Characteristics of the Rural Households and Forest Dependence

A household's dependence on forest resources is often driven by its available man power, labour force and by the capacity of the purported household to pay for additional labour force. Majority of the local population falls within the active and very active age ranges which constitute an agile and youthful population.

Table 1. Rural household characteristics and main activities as mentioned by respondents across the 10 villages around the Etinde community forest.

Household characteristics	Respondents %
Male headed households	55.22
Female headed households	44.78
0 - 20 years	26.44
21 - 40 years	46.02
41 - 60 years	21.45
Above 61 years	6.09
Indigenous	89
Migrants	11
Educational level	
Primary Education	55
Secondary Education	14
University education	9
No education	22
Marital status	
Singles	23
Married	56
Divorced	7
Widows	14
Years of residence	
0 - 5	25
6 - 10	14
11 - 15	10
above 16 years	51
Main activities	
Food crop farming	93
Cash crop farming	85
Animal husbandry	74
Wood harvesting	100
NTFP harvesting	100
Fishing	33
Hunting	100
Small businesses	24
Others	13

Table 2. Rural household forest resources dependence as mentioned by respondents across the 10 villages around the Etinde community forest.

Farm income	Percentage (%) contribution	Animal income	Percentage (%) contribution	Forest income	Percentage (%) contribution
Fruits/nuts	17.4	Chicken	28.7	Medicines	15.4
Vegetables	18.8	Dogs	7.4	Rattan products	9.8
Cereals	26.2	Sheep	4.6	Fuelwood	29.7
Root crops	24.9	Cats	3.9	Wood harvesting	20.3
Spices	10.3	Ducks	5.8	Bamboo products	14.6
Others	8.7	Snails	15.3	Others	10.2
		Pigs	12.4		
		Goats	11.7		
		Others	10.2		
Total percentage (%) contribution	49.1		18.5		32.4
Income levels (FCFA)	Percentage (%) respondents				
0 - 50,000	39.3				
51,000 - 100,000	24.8				
101,000 - 150,000	14.7				
151,000 - 200,000	11.9				
Above 201,000	9.3				

Farming activities such as clearing, planting and harvesting require much energy which is readily available within the youthful population. This readily available youthful population also favours NTFPs harvesting, wood extraction and hunting in the Etinde community forest.

Meanwhile, as the population ages, youthful exuberance and energy diminishes as a result of poor health conditions. This health failure and drop in a household's labour force, facilitates the intensification of agriculture. Agricultural intensification usually involves monocropping, agroforestry systems, and mixed farming favouring cash crops and perennials. Moreover, these mainly farming households do not possess the education to propel their farming decisions. The households thus mostly rely on NTFPs harvesting, wood extraction, hunting, cash and food crop farming for livelihood. The farmers therefore lack the basic education on land-use, alternative livelihood sources as well as the contemporary techniques of water and soil conservation. These diversification restrictions enhance their dependence on farming, NTFPs harvesting, wood extraction, and hunting.

Therefore, with the constraints on livelihood diversification, forest dependence as a source of livelihood is the sole route aimed at sustaining constant

food supply to the entire household. According to [8] [37] [38], for forest dwelling households, expansion of agricultural lands into forested areas is the sole probable option to boost agricultural productivity when farm production drops. Therefore, as soil fertility drops and farm harvests fall, these degraded previously forested areas are abandoned and a new piece of forested land is cleared for agriculture and the cycle is repeated.

Similarly, most of the people are married and live together as couples thus face the pressures of nurturing and feeding their family. Often with little or no capital and labour inputs, reliance on forests for livelihood is their sole option. This reliance of rural households on forest resources is also conditioned by the combined effects from the ever-increasing demand for forest resources and products including wildlife trade [1]. Furthermore, singles are less dependent on forest resources use since their households exhibit less responsibility in the number of individuals mouths to be nurtured and fed.

In a related study, [39] observed that around the Chobe Forest Reserve of Botswana, age and education significantly determined the dependence of a household on forest resources. From their study, forest resources dependence decreased as the respondent's age and educational level increased. This translated into the fact that, as compared to adults in the 41 - 60 and above 60 age groups, youths were more forest dependent. Relatedly, [40] found the size of a household to be positively and significantly related to the decision of the household to depend on forest resources.

4.2. Rural Household Income and Forest Dependence

The dependence on incomes derived from farming and forest related activities is quite high. This is evidence of the differences in income levels, inaccessibility to credit schemes and government subsidies as well as low household annual income. The United Nations global poverty index relates to people living below the international poverty line or less than 1.90 USD (United State Dollars) or 950 FCFA (Central African Franc) a day and who are mainly found in less developed countries especially in urban slums and rural areas [41] [42].

Drawing from obtained results, about 39.3% of the local population is poor and fall within the lowest income group of less than 700 USD per annum. This is evident in the overdependence on agricultural activities and forest resources harvesting such as to obtain their daily livelihood needs. Moreso, the local population is not fully involved in off-farm income sources and the total absence of the industrial sector within the area, explains the high dependence on agricultural activities and forest resources harvesting.

Furthermore, this reliance on forest resources, hunting and agricultural activities is a reflection of an ever-increasing price advantage at the detriment of other sources of income around the village and distant market areas. This increasing price advantage provides a greater incentive for both forest resource and agricultural activities.

In a related study, [32] observed that most rural households have little or no access to government subventions and credit schemes, relying mainly on friends, family and farming groups for credit. This poverty trap, constrains the ability of the household towards developing large-scale agricultural investments, hence the persistence of subsistence agriculture particularly shifting cultivation and monocropping.

Meanwhile, [43] observed a direct relationship between forest resources dependence and household income. Here, low-income households exhibited a higher forest resources dependence ratio than higher income households, which often caused the degradation of surrounding natural environments. Also, [12] observed that the relatively richer and poorest households were more forest dependent than middle income rural households. Relatedly, [44] found household forest income to comprise the second most important household income source after crop income with income derived from hunting or the bushmeat trade providing the highest household forest income share.

Additionally, [45] revealed that in Cameroon, forest resource use and dependence is a direct consequence of adequate and proper finance, cooperation and support from law enforcement as well as the involvement of local communities in forest management plans.

Elsewhere in Kenya, [46] concluded that adopting sustainable development goals around the Arabuko Sokoke forest ushers in a plethora of stakeholders with varying forest interests. This thus creates a synergy and mechanism which enhances sustainability and ecological functions of forests.

5. Conclusions

A rural household's dependence on forest resources is determined by the income derived from forests and the household's social and economic characteristics. Household social characteristics, including the education of the household heads, marital status, and age, determine the household's reliance on forests. The educational level particularly tertiary education is primordial not solely for formal jobs but would provide the mostly agricultural and forest-reliant households the ability to effectively be involved in sustainable agricultural practices with little or no dependence on forest resources harvesting. This means that, as the literacy rate increases, these rural households become less forest-reliant.

As in many rural areas across Cameroon particularly around the Etinde community forest, the majority of the farming households are uneducated. In addition, the necessary capacity building programs are not provided by the understaffed agricultural extension office. There is therefore little or no information flow and contacts with farmers are usually unavailable. The reliance on forests decreases with age but with the majority of the population being in the active age range, reliance on forest resources is probably going to increase in the next decades, thus a transition from fuelwood to renewable energy resources is not implemented.

Apart from these social household characteristics, other factors are particularly related to household economic conditions such as a higher price advantage of forest resources as compared to other income sources at the local village and distant market levels. These give rise to a strong drive for agricultural activities and forest resource harvesting. This is mainly due to the fact that most households are unable to access government subventions and other credit schemes, and they solely rely on friends, farming groups and family for financial support and subsidies. The inability to access finance limits the households' ability to diversify their livelihood options, hence the increased reliance on agricultural activities and forest resource harvesting in the Etinde community forest.

This study has also found several pieces of scientific literature, which show a household's dependence on forest resources to be determined by household economic conditions and characteristics. The determinants include among others household characteristics (educational level, gender and marital status) and economic conditions (income sources and, price advantage of forest resources). Governments can use these determinants to effectively develop and implement policies that recognize the importance of social and economic requirements of forest-reliant communities. Some of these policies could also probably involve a wider assessment of the social and economic characteristics of surrounding forest dependent communities. This would facilitate and enhance the development, implementation and monitoring of forest conservation projects, particularly around protected areas.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Mukete, B., Yujun, S., Etongo, D., Saeed, S. and Mannan, A. (2018) Assessing the Drivers of Land-Use Change in the Rumpi Hills Forest Protected Area, Cameroon. *Journal of Sustainable Forestry*, **37**, 592-618. <https://doi.org/10.1080/10549811.2018.1449121>
- [2] Etongo, D. and Glover, K. (2012) Participatory Resource Mapping for Livelihood Values Derived from the Forest in Ekondo-Titi Subregion, Cameroon: A Gender Analysis. *International Journal of Forestry Research*, **2012**, Article ID: 871068. <https://doi.org/10.1155/2012/871068>
- [3] Mukete, B., Sun, Y., Baninla, Y., Achem, B., Mor-Achankap, B., Sajjad, S., Tamungang, R., Wose, J. and Chalwe, P. (2017) Perspectives of Remote Sensing and GIS Applications in Tropical Forest Management. *American Journal of Agriculture and Forestry*, **5**, 33-39. <https://doi.org/10.11648/j.ajaf.20170503.11>
- [4] Ekoungoulou, R., Fousseni, F., Mukete, B., Ifo, S., Loumeto, J., Liu, X. and Niu, K. (2018) Assessing the Effectiveness of Protected Areas on Floristic Diversity in Tropical Forests. *Applied Ecology and Environmental Research*, **16**, 837-853. https://doi.org/10.15666/aeer/1601_837853
- [5] Mukete, B., Sun, Y., Zama, E. and Monono, S. (2016) Paper Consumption and Environmental Impact in an Emerging Economy. *Journal of Energy, Environmental & Chemical Engineering*, **1**, 13-18.

- [6] Abdul, M., Yongxiang, F., Tauheed, U., Mukete, B., Moazzam, S., Ahmad, A., Amara, U., Jincheng, L. and Mamoon, M. (2021) Urban Growth Patterns and Forest Carbon Dynamics in the Metropolitan Twin Cities of Islamabad and Rawalpindi, Pakistan. *Sustainability*, **13**, Article No. 12842. <https://doi.org/10.3390/su132212842>
- [7] Chanthalath, X., Yong, L., Beckline, M. and Inthilath, S. (2017) Assessing the Socioecological Perspectives of Eucalyptus Cultivation and Plantation Expansion in Laos. *Open Access Library Journal*, **4**, Article No. e4243. <https://doi.org/10.4236/oalib.1104243>
- [8] Fandjinou, K., Zhang, K., Folega, F., Mukete, B., Yang, X., Wala, K., Akpagana, K. and Bohnett, E. (2020) Assessment of the Protected Areas Strategy in Togo under Sustainable Management: The Case Study of Oti-Keran, Togodo, and Abdoulaye Faunal Reserve. *Open Journal of Ecology*, **10**, 141-159. <https://doi.org/10.4236/oje.2020.104010>
- [9] Kimengsi, J. and Lambi, C. (2015) Pamol Plantations Plc: Prelude to a Looming Population Problem in Ekondo-Titi Sub-Division, South West Region of Cameroon. *Journal of Sustainable Development in Africa*, **17**, 79-95.
- [10] Umesh, M. and Nautiyal, S. (2015) Conservation and Management of Forest Resources in India: Ancient and Current Perspectives. *Natural Resources*, **6**, 256-272. <https://doi.org/10.4236/nr.2015.64023>
- [11] Kamanga, P., Vedeld, P. and Sjaastad, E. (2009) Forest Incomes and Rural Livelihoods in Chiradzulu District, Malawi. *Ecological Economics*, **68**, 613-624. <https://doi.org/10.1016/j.ecolecon.2008.08.018>
- [12] Bwalya, S. (2013) Household Dependence on Forest Income in Rural Zambia. *Zambia Social Science Journal*, **2**, 67-86.
- [13] Belcher, B., Achdiawan, R. and Dewi, S. (2015) Forest-Based Livelihoods Strategies Conditioned by Market Remoteness and Forest Proximity in Jharkhand, India. *World Development*, **66**, 269-279. <https://doi.org/10.1016/j.worlddev.2014.08.023>
- [14] Mamo, G., Sjaastad, E. and Vedeld, P. (2007) Economic Dependence on Forest Resources: A Case from Dendi District, Ethiopia. *Forest Policy and Economics*, **9**, 916-927. <https://doi.org/10.1016/j.forpol.2006.08.001>
- [15] Zenteno, M., Zuidema, P., de Jong, W. and Boot, R. (2013) Livelihood Strategies and Forest Dependence: New Insights from Bolivian Forest Communities. *Forest Policy and Economics*, **26**, 12-21. <https://doi.org/10.1016/j.forpol.2012.09.011>
- [16] Timko, J., Waeber, P. and Kozak, R. (2010) The Socio-Economic Contribution of Non-Timber Forest Products to Rural Livelihoods in Sub-Saharan Africa: Knowledge Gaps and New Directions. *International Forestry Review*, **12**, 284-294. <https://doi.org/10.1505/ifor.12.3.284>
- [17] Ofoegbu, C., Chirwa, P., Francis, J. and Babalola, D. (2017) Socio-Economic Factors Influencing Household Dependence on Forests and Its Implication for Forest-Based Climate Change Interventions. *Southern Forests: A Journal of Forest Science*, **79**, 109-116. <https://doi.org/10.2989/20702620.2016.1255420>
- [18] Mukete, B., Sun, Y., Etongo, D., Ekoungoulou, R., Folega, F., Sajjad, S., Ngoe, M. and Ndiaye, G. (2018) Household Characteristics and Forest Resource Dependence in the Rumpi Hills of Cameroon. *Applied Ecology and Environmental Research*, **16**, 2755-2779. https://doi.org/10.15666/aeer/1603_27552779
- [19] Nerfa, L., Rhemtulla, M. and Hisham, Z. (2020) Forest Dependence Is More than Forest Income: Development of a New Index of Forest Product Collection and Livelihood Resources. *World Development*, **125**, Article ID: 104689. <https://doi.org/10.1016/j.worlddev.2019.104689>

- [20] Ntiyakunze, S. (2021) Forest Dependence in Developing Countries: Analysis of Household Perceptions, Energy, and Food Security in Tanzania. Doctoral Thesis, Department of Social Sciences, Luleå University of Technology, Luleå.
- [21] Ahmed, A., Elamin, Y., Mustafa, H. and Magboul, A. (2020) Contribution of Non-Wood Forest Products in Income and Livelihood of Rural Community in Dry Lands of Central Darfur State, Sudan. *Journal of Environmental Science*, **14**, 38-42.
- [22] Makoudjou, A., Levang, P. and Tieguhong, J. (2017) The Role of Forest Resources in Income Inequality in Cameroon. *Forests, Trees and Livelihoods*, **26**, 271-285. <https://doi.org/10.1080/14728028.2017.1297258>
- [23] Ofundem, T., Nkongho, R., Awono, A. and Levang, P. (2017) Bush Mango (*Irvingia* spp.): Forest and On-Farm Resource Availability and Market Chains in the Southwest Region of Cameroon. *Forests, Trees and Livelihoods*, **26**, 170-182. <https://doi.org/10.1080/14728028.2017.1283250>
- [24] Ngang, D. (2015) The Contribution of Community-Based Natural Resources Management to Livelihoods, Conservation and Governance in Cameroon. A Comparative Assessment of Three Community Forests in Fako Division. Postgraduate Diploma Thesis, Pan African Institute for Development West Africa, Buea, Cameroon.
- [25] Ewane, B., Ewane, O. and Heon-Ho, L. (2015) Challenges to Sustainable Forest Management and Community Livelihoods Sustenance in Cameroon: Evidence from the Southern Bakundu Forest Reserve in Southwest Cameroon. *Journal of Sustainable Development*, **8**, 226-239. <https://doi.org/10.5539/jsd.v8n9p226>
- [26] Mukete, B., Sun, Y., Etongo, D., Sajjad, S., Ngoe, M. and Tamungang, R. (2018a) Cameroon Must Focus on SDGs in Its Economic Development Plans. *Environment: Science and Policy for Sustainable Development*, **60**, 25-32. <https://doi.org/10.1080/00139157.2018.1419008>
- [27] Moutoni, L. (2019) Community Forestry in Cameroon—An Overview of the Community Perspective. Forest Peoples Programme, Anderen. <https://www.forestpeoples.org/en/node/50409>.
- [28] Levang, P., Lescuyer, G. and Dehu, C. (2015) Does Gathering Really Pay? Case Studies from Forest Areas of the East and South Regions of Cameroon. *Forest, Trees and Livelihoods*, **24**, 128-143. <https://doi.org/10.1080/14728028.2014.1000980>
- [29] Lang, C. (2015) Parallel Worlds: Illegal Logging and REDD in Cameroon. <http://www.redd-monitor.org/2015/01/27/parallel-worlds-illegal-logging-and-redd-in-cameroon/>
- [30] Ufoka, B., Molua, E. and Fabinin, N. (2018) Poultry Price and Market Analysis in the South West Region of Cameroon. *Journal of Food Security*, **6**, 42-50. <https://doi.org/10.12691/jfs-6-1-5>
- [31] Fonge, B., Bechem, E. and Juru, V. (2015) Agriculture Practice and Its Impact on Forest Cover and Individual Trees in the Mount Cameroon Region. *Current Journal of Applied Science and Technology*, **6**, 123-137. <https://doi.org/10.9734/BJAST/2015/12906>
- [32] Mukete, B. (2018) A Study on Land-Use and Land Cover Changes in the Rumpi Hills Forests of Cameroon. PhD Dissertation, Department of Forest Management, Beijing Forestry University, China.
- [33] BirdLife International (2022) Important Bird Areas Factsheet: Mount Cameroon and Mokoko-Onge. <http://www.birdlife.org>
- [34] Yerima, K., van Ranst, E. (2005) Major Soil Classification Systems Used in the Tropics: Soils of Cameroon. Trafford Publishing, Canada.

- [35] Emma, M. and Burgess, N. (2022) Mount Cameroon and Bioko Montane Forests. <https://www.oneearth.org/ecoregions/mount-cameroon-and-bioko-montane-forest/s/>.
- [36] Mukete, B., Sun, Y., Ayonghe, S., Ojong, L., Itoe, C. and Tamungang, R. (2017) Adaptation of Women to Climate Variability in the Southern Slopes of the Rumpi Hills of Cameroon. *Agriculture, Forestry and Fisheries*, **5**, 272-279. <https://doi.org/10.11648/j.aff.20160506.19>
- [37] Etongo, D., Djenontin, I., Kanninen, M., Fobissie, K., Korhonen-Kurki, K. and Djoudi, H. (2015) Land Tenure, Asset Heterogeneity and Deforestation in Southern Burkina Faso. *Forest Policy and Economics*, **61**, 51-58. <https://doi.org/10.1016/j.forpol.2015.08.006>
- [38] Folega, F., Atakpama, W., Wala, K., Mukete, B., Shibata, S., Akira, O., Zhao, X. and Akpagana, K. (2019) Land-Use Patterns and Tree Species Diversity in the Volta Geological Unit, Togo. *Journal of Mountain Science*, **16**, 1869-1882. <https://doi.org/10.1007/s11629-018-5154-4>
- [39] Garekae, H., Tsompie, O. and Lepetu, J. (2017) Socio-Economic Factors Influencing Household Forest Dependency in Chobe Enclave, Botswana. *Ecological Processes*, **6**, Article No. 40. <https://doi.org/10.1186/s13717-017-0107-3>
- [40] Biland, M., Zeb, A., Ullah, A. and Kaechele, H. (2021) Why Do Households Depend on the Forest for Income? Analysis of Factors Influencing Households' Decision-Making Behaviors. *Sustainability*, **13**, Article No. 9419. <https://doi.org/10.3390/su13169419>
- [41] Phimmachanh, S., Zhang, Y. and Mukete, B. (2015) Bamboo Resources Utilization: A Potential Source of Income to Support Rural livelihoods. *Applied Ecology and Environmental Sciences*, **3**, 176-183.
- [42] World Bank (2021) Measuring Poverty. <https://www.worldbank.org/en/topic/measuringpoverty#1>
- [43] Angelsen, A., Jagger, P., Babigumir, R., Belcher, B., Hogarth, N., Bauch, S., Börner, J., Smith-Hall, C. and Wunder, S. (2014) Environmental Income and Rural Livelihoods: A Global Comparative Analysis. *World Development*, **64**, S12-S28. <https://doi.org/10.1016/j.worlddev.2014.03.006>
- [44] Mendako, R., Gang, T., Ullah, S., Sagali, L. and Kipute, D. (2022) Assessing the Economic Contribution of Forest Use to Rural Livelihoods in the Rubi-Tele Hunting Domain, DR Congo. *Forests*, **13**, Article No. 130. <https://doi.org/10.3390/f13010130>
- [45] Beckline, M., Manan, A., Dominic, N., Ngoe, M. and Hu, Y. (2022) Patterns and Challenges of Forest Resources Conservation in Cameroon. *Open Access Library Journal*, **9**, Article No. e8683. <https://doi.org/10.4236/oalib.1108683>
- [46] Mbuvi, M., Ndalilo, L. and Hussein, A. (2018) Applying Sustainability and Ethics in Forest Management and Community Livelihoods: A Case Study from Arabuko Sokoke Forest, Kenya. *Open Journal of Forestry*, **8**, 532-552. <https://doi.org/10.4236/ojf.2018.84033>