

Common Pool Resources Concerns: A Delicate Balance Between Utilization and Conservation in Awae, Central Region of Cameroon



Gilbert Zechia Mofor¹, Bidja Minkoulou Nelly¹, Adolf Bekumba Metta², Njofie Belinda Ntsiendie²

¹Department of Geography, Higher Teacher Training College, University of Bamenda.

²Department of Geography and Planning, FA, University of Bamenda.

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Abstract

Aim: Common pool resources (CPRs) are essential to the livelihoods of countless communities worldwide. Their management presents significant challenges in balancing individual needs with collective sustainability. The Awae area serves as an example of the consequences of a lack of awareness regarding sustainable practices, ecological value, post-harvest management, and innovative approaches to resource use. This study explores the relationship between community exploitation and the conservation of CPRs, focusing on forest resources and the livelihoods of Awae's residents. This study intends to analyze the interplay between community exploitation and conservation of CPRs, identifying important socio-economic drivers, gaps in resource management, and potential policy interventions.

Methods: Data were collected through semi-structured interviews with 151 respondents and focus group discussions to explore the Awae forest's rich natural resources, including non-timber products and a diverse range of flora and fauna species. The data were analyzed using descriptive and inferential statistics.

Results: Findings indicate that forest resources play a crucial role in the socio-economic well-being of the local population. 95% of the local population relies on forest resources, with a reported monthly harvest of 318 individual animals across multiple species. However, unsustainable harvesting practices have resulted in a decline in non-timber forest products, particularly affecting prey availability. The study highlights the ongoing dilemma between ecological preservation and livelihood dependence, underscoring the need for micro-level improvements.

Conclusion: Forest resources are vital for rural livelihoods and require focused conservation efforts to ensure long-term sustainability.

Recommendations: The study recommends creating alternative income-generating activities, diversifying the livelihoods of local communities, incorporating ecotourism, and strengthening management strategies for CPRs by policymakers. By so doing, it will foster the balance between resource utilization and conservation to ensure sustainable livelihoods in Awae.

Keywords: *Common pool resources, conservation, livelihoods, sustainability, Awae*

1.0 INTRODUCTION

According to the United Nations collaborative programme on reducing emissions from deforestation and forest degradation (UN-REDD, 2025), forests are home to about 80% of the world's terrestrial biodiversity and an estimated 1.6 billion people use forests for all or part of their livelihoods such as food, shelter, energy and income. Collective action in managing common-pool natural resources is a complex issue, with high exclusion costs allowing free riders to benefit from conservation efforts without reducing consumption (Ostrom, 1990). Forests are dynamic spaces where national conservation goals and local livelihood interests intersect often overlapping with where the severe rural poor in developing countries live (Sunderlin *et al.*, 2005; Agrawal, 2007).

Historically, forest resources and or CPRs have been central to the livelihoods of countless communities globally. They often form the backbone of local economies, providing essential resources for subsistence and economic activity. About 80% of the people in the developing world depend on Non-Wood Forest Products (NWFPs) for their primary health and nutritional needs and/or their subsistence consumption and income needs (FAO, 2024). In many countries, non-wood forest products form an important component of forest products exports. Early man's interaction with and dependence on the forest was for many years almost exclusively centered on non-wood forest products. For many communities, this has not changed. Non-timber forest products are particularly important to rural communities for food and nutritional requirements, medicines, fodder for livestock, fibre, fertilizers, construction materials, cosmetics, and cultural products Barnes *et al.* (2017). They support village-level craft activities. Non-timber forest products provide raw materials to support processing enterprises. They include internationally important commodities in food products and beverages, confectionary, flavourings, perfumes, medicines, paints, polishes and more (Agustino *et al.*, 2011).

The Congo Basin has the largest African forest cover, covering 200 million hectares, with 90% being tropical dense. These primary or naturally regenerated forests host more than 30 million people while supporting over 75 million people from more than 150 ethnic groupings. The remaining evergreen and semi-deciduous forests of Central Africa were estimated to cover approximately 200 million ha in January 2020, including 184.7 million ha with no visible sign of disturbances (Vancutsem *et al.*, 2021). Overall, about 9 percent of the TMF area of Central Africa has disappeared since 2000, representing 18 million ha. Forests also provide ecological services, such as maintaining the hydrological cycle (water quality and quantity) and controlling floods in high-rainfall regions (Doetinchem *et al.*, 2013).

Cameroon faces challenges sustaining forest values and addressing environmental concerns like deforestation, fragmentation, and degradation. Between 1990 and 2010, Cameroon lost 4,400,000 hectares of forest cover, an estimated average rate of about 220,00ha (0.9 percent) annually causing a 13.4% loss within 15 years (FAO, 2010). External factors like land use, agriculture, demographic growth, industrialization, and development also contributed to the rapid loss of forest areas. Should this trend continue, Cameroon is expected to lose 7 million hectares of its forest by 2025, a period of just 35 years gap (Wose, 2019). From 2001 to 2023, Cameroon lost 20.05 Mha of tree cover, equivalent to a 6.5% decrease since 2000, and 1.23 Gt of CO₂ emissions. The methods behind this data have changed over time, resulting in an underreporting of tree cover loss in Cameroon before 2015. However, the management of these resources poses substantial challenges owing to the 'tragedy of the commons', a situation where individual handlers, acting independently according

to their self-centeredness, eventually deplete or degrade the resource, leading to a long-term detriment for all (Bhim, 2021).

Awae in the Central Region of Cameroon is found in the tropical rainforest area and constitutes several forest resources, which are contribute to the livelihood of the local communities. While forest resources play a crucial role in global livelihoods, their management poses challenges due to overexploitation and governance gaps. In Cameroon, rapid deforestation threatens the sustainability of these resources, with Awae being a key example of the tensions between resource utilization and conservation. This study seeks to examine how these challenges manifest at the community level and explore potential solutions.

2.0 STUDY AREA AND RESEARCH METHODS

2.1 Location of the Study Area

Awae is a geographical area in the Mefou and Afamba Division of the Center Region of Cameroon (figure 1). It is located between latitudes 3° 53' 11" and 4° 19' 0" North of the Equator and between longitudes 11° 53' 0" and 12° 20' 6" the East of the Greenwich Meridian. Awae has a population of 3024 according to projections from the census of 2005 (BUCREP, 2005). The following villages were chosen for the study: Nkolba, Ziti, Odououma, Nguindam, Mimbang, Bekoudou, Awae, Ebolowa, Nkolnguét and Ngat. This area is located on Southern Cameroon's low plateau with an average altitude of about 630m above sea level. The layout of the study area is illustrated in the Figure1.

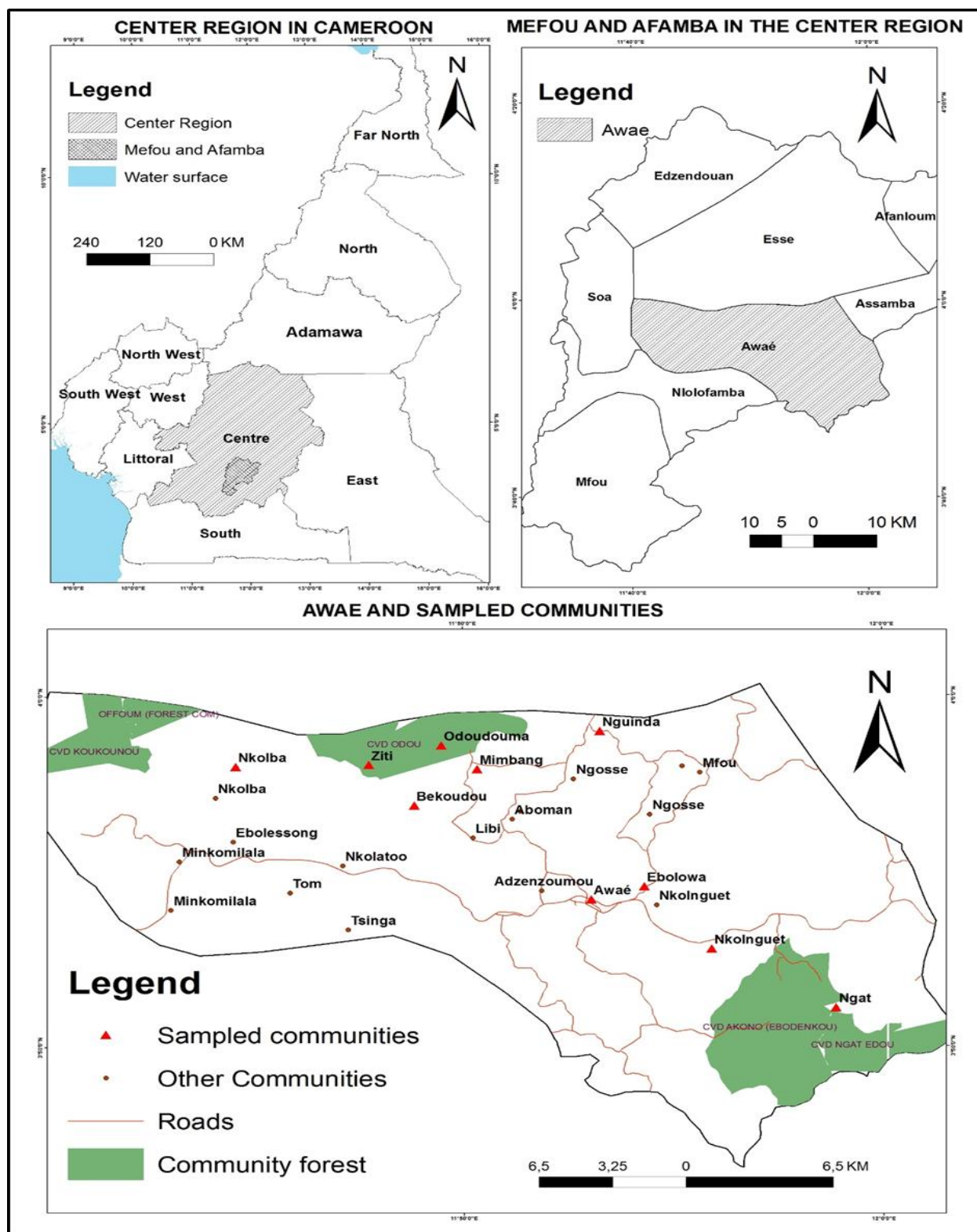


Figure 1: Location of the Study Area

Source: Divisional Delegation of Town Planning and Housing, Mefou and Afamba, (2021)

2.2 Methodology

With a total population of over 3024 inhabitants, ten stratified samples for villages were used in this study. About 5% (151) participants were identified through a stratified sampling strategy to ensure a perfect representation in the ten villages. This facilitated administering questionnaires as it was done in terms of known population size. The sampling technique used here was gotten through the formula:

$$\frac{05}{100} \times X \text{ Where } X = \text{the number of households. This implies that } \frac{05 \times 3024}{100} = 151.2$$

A reconnaissance survey was used in the field to understand the forest resources where villages were spotted for the research. The methodology used in conducting this research was developed considering the local population, government institutions, hunters, traders, NGO and the research's objectives. A combination of both primary and secondary data was used in the realization of this study. The primary data were obtained from 151 respondents through field observation, questionnaires, and interviews. Focus group discussions of 8 people composed of persons, youth, and women from each village were conducted. This permitted obtaining in-depth insight into the subject matter. Open-ended questions enabled participants to share their thoughts and opinions about forest resource exploitation and management. Audio recordings were also used to capture the discussions for later analysis. Secondary data were obtained principally from information collected from published and unpublished sources amongst which are textbooks, magazines, texts, internet sources, journals, articles, theses and dissertations. A greater proportion of these published and unpublished works was obtained from related websites, the geography department libraries of the University of Bamenda, the Central Library of the University of Yaounde I, and the Ministry of Forestry and Wildlife. In addition, Non-Governmental Organizations dealing with forest resources for national and international standards were consulted (IUCN and WWF). The population and household statistics for this research area were obtained partially from the population and household and complemented with data from the Council. This allowed the research to gather knowledge on the problem and to determine the lacuna, that the present research intends to fill.

Data collected from the field was analyzed using descriptive and inferential statistics, frequency tables, charts, figures and percentages. Statistical techniques such as chi-square and Statistical Package for Social Sciences (SPSS) were used to analyze the role of common pool resources in livelihood sustenance. ARC View GIS 3.2 was used for cartography work.

3.0 RESULTS

3.1 Types and Seasonal Variation of Forest Resources Availability in Awae

3.1.1 Typology of the forest resources

The analysis of the comprehensive review of the literature and field study indicates that Awae community depends almost entirely on forest resources. These resources however vary in their distribution and typology ranging from major flora species (non-timber forest products) which are in abundance. This situation places the inhabitants dependent on livelihood without a sustainable conservation drive. In addition to flora resources, fauna also constitutes another valued resource undergoing the same gap like floristic resources extracted by the local populations and non-

indigenes as indicated in Table 1. Owing to these conservation lapses, gave way to inequality in access, overexploitation, and lack of a strong indigenous institutional framework that often thwart the sustainable management of these resources. Consequently, placed the resources in a delicate balance between proper conservation and utilization for community livelihood.

Table 1: Major Flora and Fauna Species available in Awea area

Fauna species		
Common name	Scientific name	Vernacular name
Antelope	<i>Hypotragus equitus</i>	Ngo'o
Black mamba	<i>Naja nigricollis nigricollis</i>	Nyo
Bush pig	<i>Potamochoerus porcus</i>	Ngeafon
Giant pangolin	<i>Orycteropus afer</i>	Okeka
Grass cutter	<i>Thryonomys swinderianus</i>	Mvep
Greater white-nosed monkey	<i>Cercopithecus nictitans</i>	Kwe
Bush baby	<i>Peridicticus potto</i>	Mpop
Hare	<i>Cephalophus monticola</i>	Kop
Porcupine	<i>Atherurus africanus</i>	Ngum
Python	<i>Python sebae sebae</i>	Nyo
Giant rat	<i>Cricetomys gambianus</i>	Kweseh
Squirrel	<i>Tichechus senegalensis</i>	Ozen
Tiger	<i>Panthera tigris</i>	Esingi-afan
Tortoise	<i>Kinixys homeana</i>	Kulu
Chimpanzee	<i>Pan triglodytes</i>	Wa'ah
Grey Parrots	<i>Psittacus erithacus</i>	Ehwoun
Elephant	<i>Loxodonta Africana</i>	Zo'ok
Flora species		
Bitter kola	<i>Garcinia cola</i>	Abee
Bush mango	<i>Irvingia gabonensis</i>	Bdoh
Bush pepper	<i>Piper quinensis</i>	Ndolo-afan
Okok	<i>Gnetum africana</i>	Okok
Kola nuts	<i>Cola nitidia</i>	Abee
Monkey kola	<i>Cola lepidota</i>	Abee
Njansang	<i>Ricinodendron heudelotii</i>	Ezejang

Rattan cane	<i>Lacosperma spp</i>	Nkok
Snail	<i>Helix aspersa</i>	Kwe-awon
Fuelwood	<i>Acacia seyal delile</i>	Nchah
Alligator Pepper	<i>Aframomum spp.</i>	Ndodo-afan
Bush Plum	<i>Dacroydes edulis</i>	Miseh
Ngongo	<i>Marantaceae</i>	Mekeh-bobolo
Bush Onion	<i>Afrostrirax kamerunensis</i>	Doko-awon

Source: MINFOF and field work (2021)

Table 1 shows the richness of the forest resources found in and around the community in Awae. The common pool resources of plant origin are not only valuable resources extracted by the local populations but also a variety of animal species that are hunted by the local populations as a main source of protein and income. This abundance confirms that the study area in the equatorial rainforest is home to a variety of wildlife species worth conservation efforts.

3.2 Seasonal Variations of Forest Resources in the Awae

The collection and harvesting of various forest resources in the study are determined by seasonal influence either in the rainy, dry, or both seasons. This finding corroborates the findings of Nghobuoche (2015) who also pointed out that the availability of non-timber forest products (NTFPs) varies from season to season. The study area is found in the tropical rainforest area with an Equatorial climate characterized by four seasons; a long rainy season, a long dry season and a short rainy and dry season. Field evidence disclosed that Awae experiences more than 8 months of rainy season (March 17 to November 15) and about months of dry season (November 15 to March 17) per annum though it fluctuates due to climatic variability. Table 2 vividly displays the variance in species availability and exploitation opportunities in the study area.

Table 2: Seasonal Determinants of Forest Resources Availability and Exploitation in Awae

Product	Part used	Months											
		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Flora Resources													
Eru	Leaves			×	×	×	×	×	×	×	×	×	×
Bitter Cola	Seeds					×	×	×	×	×	×	×	×
Bush Mango	Seeds, Fruits					×	×	×	×	×	×	×	×
Bush Pepper	Seeds	×	×	×	×	×	×	×	×	×	×	×	×
Njansang	Seeds			×	×	×	×	×	×				

Fuelwood	Tree	×	×	×	×	×	×	×	×	×
	Parts									
Medicinal	Leaves,					×	×	×	×	×
Plants	barks,									
	and									
	roots									
Fauna Resources										
Snail	Body					×	×	×	×	×

Source: Fieldwork, 2021.

X indicates availability.

As noticed in Table 2, most of the forest resources fluctuate by seasonal variability. Most of the products are harvested during the rainy season. The statistics depict that bush pepper and bush meat are unique resources harvested throughout the year, while the rest are determined by seasonal influence. It is further established that the availability of bush pepper throughout the year is because it is a vine flora species largely found in the evergreen forest. It is hardly affected by any season reason for which it is available all the time.

Field exploration also established that bush meat on their part has no specific season and this caused hunting throughout the year. This is elucidated by the fact that bush meat is the constant main source of income for the local inhabitants and this is substantiated by the high demand for bush meat in this Awea environs. However, they are aware of the restriction on category A animals in the Cameroon wildlife laws but they do not respect the restriction. This is the reason why the selling of these species is done in hiding.

From the above analysis of the types and seasonal availability of these forest resources, it is established that Awea forest area is abundantly endowed with a variety of plants and animal species which serve as common pool forest resources. Moreover, it also reveals that collected and harvested resources do vary per unit area or village. The exploitation trend in terms of quantity also differed per settlement area in the study area. However, it shows that the variation in terms of harvested quantities is determined by the population density, market, individuals' skills, hunting equipment as well proximity to the road. The seasonal availability of forest resources in Awea Cameroon, can optimise their livelihood strategies by ensuring a balance between economic and environmental conservation.

All in all, this part of the study exposed the seasonal availability of dependently forest resources for livelihood by the community of Awea constitutes a significant drive to poverty reduction and social development in the study area.

4.0 INCOME DERIVE FROM AWAE FOREST RESOURCES

A better understanding of revenue from the forest resources is streamlined into the exploitation of Flora and Fauna resources as indicated in Tables 3 and 4.

Table 3: Monthly Harvest of Bush Meat in Sampled Villages in the Awaie Area

Animal	Average Price per animal (FCFA)	Number of animals caught per village										Total
		Nkolngu	Ziti	Bekoudou	Ebolowa	Mimbang	Ngat	Nguindam	Awaie center	Oduoumou	Nkolba	
Antelope	7,500	3	1	2	2	1	-	2	5	1	2	19
Grass cutter	6,000	3	4	4	-	1	3	2	8	2	-	27
Civet	10,000	1	1	1	1	2	1	2	2	2	2	15
Hare	11,000	-	-	2	2	-	-	1	2	1	1	9
Porcupine	7,000	5	4	6	7	4	6	5	9	5	-	51
Hedgehog	6,500	-	-	-	2	-	1	-	2	-	-	5
Giant rat	3,000	9	7	5	5	4	6	5	10	1	8	60
Monkey	13,000	2	2	1	-	-	-	-	4	-	-	9
Squirrel	2,500	6	7	4	6	5	2	2	11	1	2	46
Tiger	12,000	-	-	-	-	1	-	-	1	-	-	2
Monitor lizard	7,500	2	3	3	4	3	2	1	5	1	1	25
Deer	8,000	2	-	-	-	-	1	-	4	1	-	8
Viper	8,500	5	3	3	2	6	2	4	12	1	4	42
Total		38	32	31	31	27	24	24	75	16	20	318

Source: Fieldwork, 2021

Table 3 exposed that within a month in the study area, a total of 318 animal species were hunted indicating a high prevalence of animal species harvested for the livelihood of the locals. Among these villages, it is established that the Awaie Center and Nkolngu villages produced the highest quantity of harvests. The locality of Awaie Center is found at a market point and a transit position where the heavy trucks transporting goods from the Douala seaports to the neighboring countries; Chad and Central African Republic always have a stop by, reason for which there is always increase in the quantity of bush meats. It is also relevant to underscore that; the Oduoumou village on the other side of the finding indicates the lowest number of harvests. This was because the indigenes concentrated more on farming than hunting and limited market potentials for animal-based products. The statistics also displayed a huge monthly harvest of some 318 animal populations which is an indicator of unsustainable management of these forest resources. If the rate of harvest runs as captured from Table 4 as a logical consequence, there is much to ponder about conservation measures in the study area. With this drift, the species shall become scarce, prices will fluctuate, leading to uncertainty for those dependent on bush meat for their livelihood in the study area. The Communities will likely need to seek alternative sources of income, which can be challenging if they lack skills or access to other economic opportunities. A vividly look of figure 2 shows the village localities and exploitation trends.

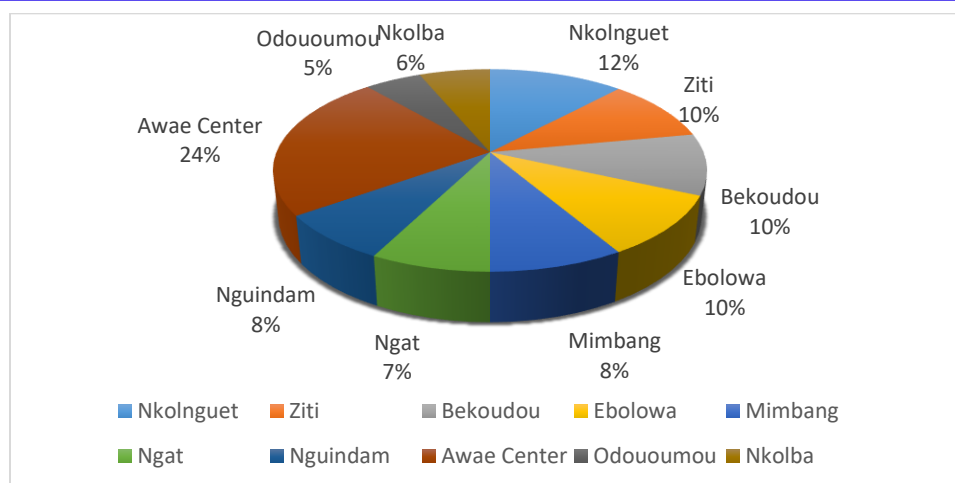


Figure 2: Localities and Proportion of Hunted Animals in Awea Area

From Figure 2, the proportion of various villages captured variation in terms of animal species harvest. The most significant aspect here is the ability to detect localities that are liable to experiment or conduct some sustainable measures for these wildlife resources. Even though hunting is obverse to have embedded in their cultural tradition, if measures are not properly taken, declining wildlife populations can disrupt these practices, affecting community identity and cohesion in the future. Table 4 shows the annual income for Bush meat exploitation in Awea Area.

Table 4: Annual Estimate of Household Income from Animals Products in Awea Area

Animal	Total	Unit price (FCFA)	Total Income (FCFA)	Percentage (%)
Antelope	19	7,500	142,500	7,2 %
Grass cutter	27	6,000	162,000	8,2%
Civet	15	10,000	150,000	7,5 %
Hare	9	11,000	99,000	4,9 %
Porcupine	51	7,000	357,000	18 %
Hedgehog	5	6,500	32,500	1,6 %
Giant rat	60	3,000	180,000	9,1 %
Monkey	9	13,000	117,000	5,9 %
Squirrel	46	2,500	115,000	5,8 %
Tiger	2	12,000	24,000	1,2 %
Monitor lizard	25	7,500	187,500	9,4 %
Deer	8	8,000	64,000	3,2 %
Viper	42	8,500	35,7000	18 %
Total	318		198,7500	100 %

Source: Fieldwork, 2021

From the field outcomes, it was observed that 1987,500 FCFA was generated per year as an income from the sale of bush meat. Table 4 depicts that, the highest revenue generated from the sale of bush meats comes from porcupine and viper with 18% each of the income generated in 2021. The Monitor Lizard with 9.4%, giant rat with 9.1% and follow with grass cutter with 8.2% are the order of the harvest. The reasons for the relatively high income generated from these animals are owing to the high market demands and ease with which these animals are easily caught with either gun, trap or hunting dogs. The surveys reveal that the lowest income generated from the sale of bush meat came from the sale of Hedgedog 1.6% and Tiger 1.2% and account for the scarcity of these animals and their intelligence to survive in the wild. Figure 3 displays sample photos of frequent bush meat for income-generating activities and sustenance of the local population.



Cooked porcupine



Cooked bushmeat



Fresh Porcupine and Python Meats

Figure 3: Sample of major bush meat species for income generation

Source: Fieldwork, 2021.

Field finding reveals that Bush meat exploitation is a pertinent source of sustenance and income generating activity for the local community of Awae. Bush meat exploitation in general plays an indispensable role in because it serves as a crucial source of protein and income for local communities, often supplementing diets in the study area with limited access to alternative protein sources. It usually stabilizes their incomes during periods of low farm yields. The markets for these resources are reportedly constantly accessible because most traders do door-to-door purchases of these products in addition to local and roadside markets. Apart from Bush meat's critical role in coming and nutritional values, it constitutes a cultural practice in the study area: Hunting and consuming bush meat are deeply rooted in a community of Awae cultural traditions, providing not just food but also a connection to heritage and identity. It is further observed that these sales are common among the women and students. Similarly, figure 4 demonstrates principal monthly dependable plants for income-generating activities for the Awae inhabitants.

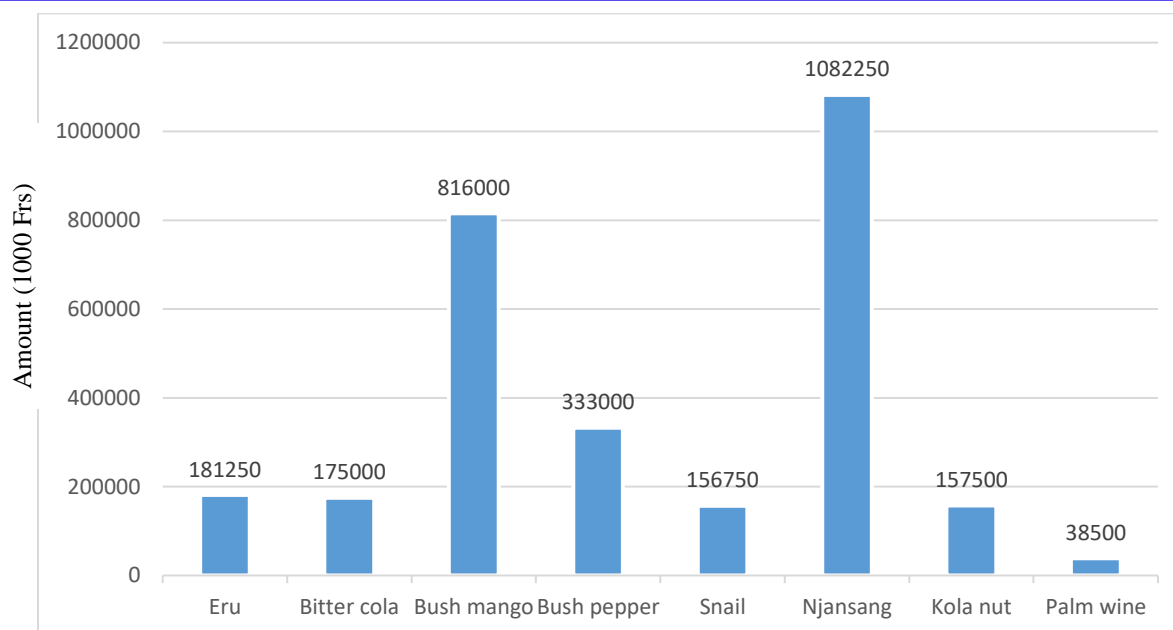


Figure 4: Sample of Monthly Dependable Plants and Income Generation

The figures above display income generated from the sale of some main flora resources. It indicates that Njansang (*Ricinodendron heudelottii*) and bush mango (*Irvingia gabonensis*) are the top plant species that fetch much income to the community of Awae, while the rest are followed in different ranges. The products with a low market value are mostly harvested for home consumption. The survey affirms the FAO, (1995) indicating that millions of people around the world living in the vicinity of forests survive thanks to these products for subsistence and income needs. Figure 4 showcases a photo of the top most reliable plant species for income generation in Awae area.



Njansang



Eru



Bush mango

Figure 4: Sample of Major Plant Species for Income Generation

Source: Fieldwork, 2021.

5.0 CHALLENGES IN FOREST RESOURCE EXPLOITATION IN AWAE COMMUNITY

The exploitation of common-pool resources, particularly forest resources, presents a myriad of challenges that affect ecological sustainability, economic stability, and social equity. These challenges have led to a drastic reduction in the quantity of forest resources. The Awae forest area in Cameroon, which provides vital ecosystem services, supports biodiversity and holds significant economic and social value, is increasingly subject to unsustainable practices. These practices, driven by overexploitation, illegal logging, and land conversion for agriculture, not only contribute to deforestation and species habitat loss but also disrupt the delicate balance of local ecosystems, threatening species and reducing biodiversity.

5.1 Social Challenges

The methods of exploitation in the Awae area present significant social challenges that demand policies promoting equitable resource management, empowering local communities, and ensuring the integration of all stakeholders. Unsustainable logging and land conversion have led to the displacement of local and indigenous communities. Many of the population members lack formal rights to resources, which marginalizes them and makes them vulnerable to resource mismanagement. This perpetuates their exclusion and lack of representation in decision-making processes.

In the Awae area, many people depend on forest resources for food, medicine, and materials. Consequently, unsustainable practices deplete these resources, directly threatening their livelihoods and food security. Additionally, socio-cultural challenges have emerged in the community. For example, traditional dishes such as “sanga” and “nkwem,” once consumed multiple times a week, are now rarely available due to the scarcity of ingredients. Kola nuts, once used as a traditional greeting, are now scarce, with much of the harvest being reserved for commerce. Furthermore, the social fabric of communities is strained as cultural practices tied to the forest are eroded, leading to a loss of identity and heritage. There is also a lack of awareness among local populations regarding sustainable forest management practices, hindering effective conservation and management efforts in the Awae region.

5.2 Economic Challenges

Economically, the Awae communities are highly dependent on forest resources for their livelihoods. However, due to poverty and economic pressures, many locals continue to rely heavily on these resources, resulting in overexploitation and unsustainable practices. This has led to the depletion of forest resources, which in turn undermines traditional livelihoods. The over-extraction of timber and non-timber products creates economic disparities, leading to struggles over dwindling resources. The scarcity of resources is exacerbating poverty, reducing food security, and diminishing economic opportunities. Illegal logging practices further undermine sustainable management efforts and contribute to forest degradation. It was established that the local and global market demands for the resources are not well structured, hence paving the way to intermediary trading which connects buyers and sellers has proven to influence pricing and supply chain decisions at the detriment of the exploiters. These forces; intermediaries, pricing mechanisms and supply chain challenges interact and influence each other, hence impacting the sustainable management of forest resources. Addressing this complexity requires a nuanced

understanding interconnected factors driving resource extraction and trade. This would be possible if weak enforcement of regulations that enabled unlawful practices is fully addressed.

5.3 Limited Funding Challenges

Awae community faces insufficient financial resources for conservation programs, which severely restricts the implementation of sustainable management practices. There is a lack of local schemes that could redirect attention toward alternative livelihoods, making the inhabitants reliant on an overexploited common source of income. Addressing these challenges requires a multi-faceted approach, including community engagement, alternative sources of livelihood, improved governance, and investment in sustainable practices. Examples could be alternative funding strategies such as community-based eco-tourism initiatives, payment for ecosystem services (PES) programs, public-private partnerships in conservation, government subsidies, and or international donor funding for sustainable projects.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study on common-pool resources and livelihoods in Awae, located in the Center Region of Cameroon, highlights a significant knowledge gap in the specific context of the area. Awae is rich in a variety of plants and animal species that have historically served as vital forest resources. However, increasing population pressures and weak governance have led to unsustainable resource extraction, which has become increasingly unmanageable owing to deforestation, illegal logging/hunting, weak governance, and socioeconomic dependence on forest resources with few livelihood alternatives.

The forest resources, which have historically contributed to poverty reduction, income generation, employment opportunities, socio-economic development, food security, and the preservation of cultural values, are now under threat. While the forest products trade provides essential resources and income for local communities, it also requires careful management to balance economic needs with conservation efforts. Consequently, promoting sustainable practices and alternative livelihoods can help protect both biodiversity and community welfare in areas like Awae, Cameroon. Therefore, exposing the ongoing dilemma between ecological preservation and livelihood dependence, which underscores the need for micro-level improvements.

6.2 Recommendations

Given the context-specific nature of the Awae area, several targeted recommendations could help mitigate the current challenges. First, creating alternative income-generating activities would reduce the pressure on forest resources. By diversifying the livelihoods of local communities, the overexploitation of forests can be alleviated.

Another important recommendation is the integration of ecotourism into forest management. Ecotourism, also known as eco-cultural tourism or rural tourism, could be a prominent income-generating activity in the Awae area. Incorporating ecotourism into forest activities would provide an economic incentive for forest conservation, while simultaneously sustaining local livelihoods. A model for this integration of ecotourism and forest management is outlined in Figure 5.

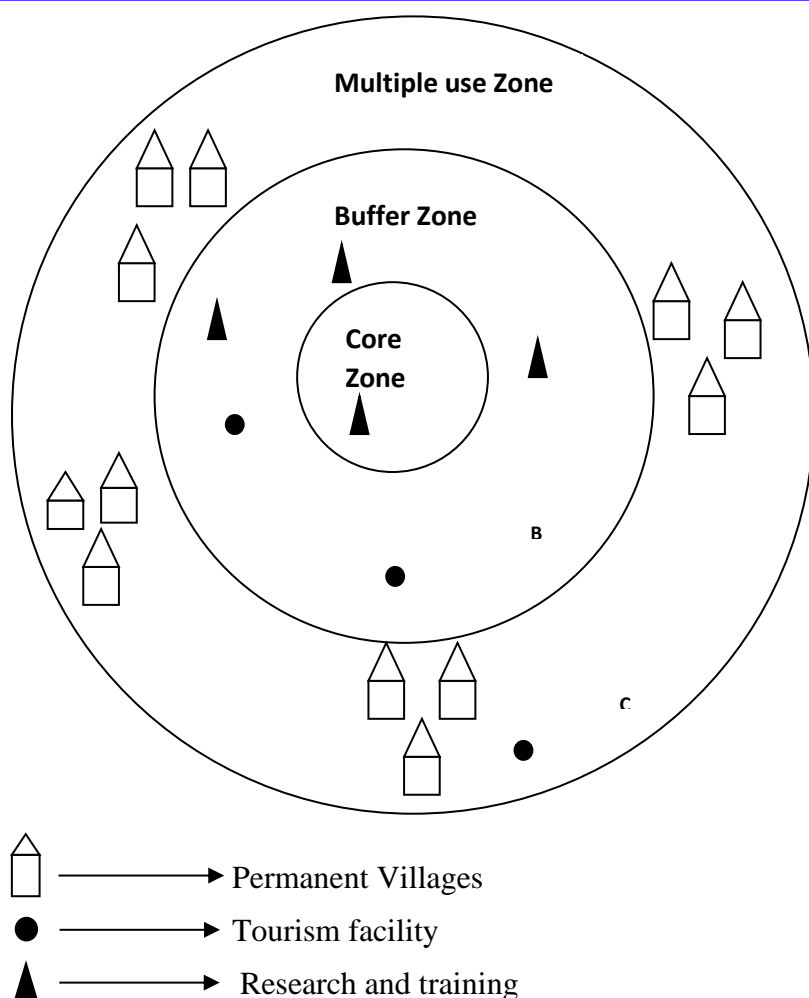


Figure 5: A Model to Integrate Ecotourism and Biodiversity Protection in the Forest of Awae

Source: Adapted from Butcher (2007) and modified in 2021.

Core zone serves as the conservation hotspot and is strictly restricted from exploitation by the adjacent community. Specific actions should be taken within the core zone to assess the extent of land degradation, identify species that have been greatly depleted, and determine which tree species should be planted to restore the area. Farmers currently operating within the core zone should be encouraged to relocate to more suitable areas. The local council should facilitate and support this relocation process.

Buffer zone constitutes a transitional area where villagers are allowed to harvest resources under controlled and sustainable practices. The introduction of improved agricultural practices in these zones is crucial to reduce the pressure on forest resources. By stabilizing farming and increasing crop yields, these areas can become more sustainable.

Multiple use zone consists of permanent villages and areas where intensive farming activities are carried out. Permanent villages in Awae should be situated around the reserve in the multiple-use zones. These areas would support intensive farming, allowing villagers to engage in sustainable agricultural practices while preserving the core forest zone.

This development concept is proposed as a way forward for the implementation of a land-use plan for the Awae forest. The plan includes a proposed boundary demarcation, which encompasses the core, buffer, and multiple-use zones. The successful implementation of this plan will depend on three principal elements: forest resource bases, management structures, and benefit-sharing mechanisms.

To further support sustainable livelihoods and protect the forest, the following activities should be promoted within the multiple-use zones: 1) Cultural Promotion for Tourism: Organize and develop local cultural activities (cultural festivals, traditional dances, and ceremonies) to attract tourists and generate interest in the local culture, 2) Marketing for Tourism: Promote the area as a destination for both scientific and cultural tourism, raising awareness about its significance on national and international platforms, 3) Develop Natural Attractions: Highlight and develop natural features within the villages and protected areas to create a unique tourist experience, 4) Organize Local Festivals: Organize festivals that showcase local gastronomy, traditional foods, and cultural practices, offering visitors a taste of Awae's heritage, 5) Create Tourist Infrastructure: Develop tourist pathways, footpaths, and residences that reflect the local culture, providing tourists with an immersive experience, 6) Community Engagement: Organize local communities into associations focused on tourism activities, and institutionalize a tourism board to oversee and promote tourism efforts and 7) Sustainability: Sustainable hunting practices can go a long way to help maintain biodiversity and support ecosystem health. Overhunting, however, poses significant risks to wildlife populations. Therefore, community-based forest management, sustainable agriculture techniques such as agroforestry, climate-smart agriculture should be encouraged.

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