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MORALITY BEFORE KNOWLEDGE

Assessing livelihood dependency on forestry products during COVID-19 period

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ABSTRACT

Background: The importance of forest in improving human welfare is recognized worldwide. Both natural and artificial forests provide basic needs such as fuel wood, timber, industrial wood and non-timber products. They also provide employment, income and foreign exchange hence contributing to social and economic development. Equally important are the environmental benefits of forest. But as COVID-19 came people lost their job, their movement was restricted as a result an increase dependency on forest products for survival increases in developing countries. Therefore, the main aim of the study was to unearth impacts of COVID-19 has on the forest products of people living around zomba plateau forest reserve. The general objective of the study is to assess livelihood dependency on forest product during COVID-19 period. **Method**: Specifically, the study will identify and assess which forest products were frequently accessed during COVID-19 and analyze the contribution of forest products on household income during the pandemic period. Both qualitative and quantitative methodologies were used to collect data. The target population for the study consisted of residents of Mtendere village. The sample size was 59. Data were collected using self- administered questionnaire and interviews. Qualitative and quantitative data was analyzed using statistical package for social sciences (SPSS) and excel package respectively. **Findings**: The results of the study indicate that there was an increase dependency of forest products during COVID-19 period and such that the contribution the contribution of forest products to household income dwindles during this period. **Conclusion**: The study further recommends to build the resilience of forest- dependent communities to future shocks and crises. This can be achieved through the implementation of social safety nets, or savings and credit programs. **Novelty/Originality of this study:** This study presents the first comprehensive analysis of the impact of COVID-19 on community dependence on forest products and finds changes in forest resource use patterns during the pandemic. It provides new insights into the resilience of forest-dependent communities in the face of global crises. It offers practical recommendations for building community resilience through social safety nets and credit savings programs.

KEYWORDS: forest dependency; COVID-19 impact; forest products; household income; zomba plateau; forest reserve.

1. Introduction

The coronavirus disease (COVID-19) was first reported in Wuhan, China, on December 31, 2019 (WHO, 2020). Africa's first confirmed COVID-19 case occurred in Egypt on February 14, 2020, followed by Malawi's first case on April 2, 2020. Since then, every country in Africa has been affected, with over one million cases reported. On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic, marking it as one of the most devastating global crises since World War II (WHO, 2020). As of December 3, 2020, Africa had reported 2,196,257 cases, 52,490 deaths, and 1,862,685 recoveries.

Southern and Northern Africa reported the highest cases, with 894,700 and 753,900 cases respectively, accounting for 75% of Africa's total cases as of that date (Africa CDC, 2020).

African governments have rapidly implemented public health measures in alignment with WHO and Africa CDC guidelines to mitigate the spread of COVID-19. These measures, including movement restrictions, lockdowns, social distancing, and border closures, have had substantial social and economic impacts across the continent. What began as an unprecedented health crisis is now destabilizing the global economy. The crisis has also significantly affected the forest sector, causing disruptions to livelihoods and employment, interruptions in global supply chains, and reverse migration from urban to rural areas, which has led to increased dependence on forests and heightened pressure on forest health and biodiversity. Moreover, the economic crisis induced by COVID-19 is projected to push an additional 34.3 million people into extreme poverty in 2020 (UNDESA, 2020). The extreme poverty rate in sub-Saharan Africa is expected to rise by 2 percentage points due to the pandemic (Montes et al., 2020).

Forests are essential to Malawi, providing over 90% of the country's energy needs through fuel wood (Jumbe & Angelsen, 2006). They also supply the majority of the poles and timber necessary for construction, joinery, and board manufacturing. The rural population, which makes up more than 90% of the total population, heavily depends on forests for fuel wood, bush meat, other foods, construction materials, agricultural tools, and medicinal plants (Jumbe & Angelsen, 2007). However, during the COVID-19 pandemic, there was an increased utilization of forest products in Malawi, similar to other Sub-Saharan African countries. While much research on forests has concentrated on biological aspects, the social aspects have been less examined. Furthermore, Oksanen et al. (2003) noted that although the importance of forests for livelihoods is widely acknowledged, forests are generally not well integrated into poverty reduction strategy papers. This is partly due to a weak understanding of the relationship between forest reliance and poverty. Cavendish (2000) also observed that despite the significant economic role of environmental resources for rural households, environmental income is often overlooked or only briefly mentioned in national income surveys. This research project aims to fill this information gap by assessing the dependence on forest products for livelihoods during the COVID-19 period.

1.1. Literature review

Chilongo (2014) conducted a study titled "Forests and Livelihoods in Malawi: Looking Beyond Aggregate Income Shares," which emphasized the critical role of forests in Malawi. Over 90% of the country's energy needs are met with fuelwood. Additionally, forests provide the necessary poles and timber for construction, joinery, and board manufacturing. The rural population, making up over 90% of the total population, heavily relies on forests for fuel wood, bush meat, other foods, construction materials, agricultural tools, and medicinal plants. Chilongo also concluded that forest reliance varies across different livelihood strategies, influenced partly by local contexts (Attah, 2020).

In this research paper "Initial Assessment of the Impact of COVID-19 on Sustainable Forest Management in African States," Attah (2020) assessed the pandemic's impact and implications on forests and forest-dependent people in Africa. The study highlighted the potential of forests to mitigate the adverse impacts of the COVID-19 pandemic, their role and opportunities in post-pandemic recovery, and their potential contribution to inclusive and long-term sustainable development. The study also identified necessary mitigation measures for the forest sector's recovery and how these measures can enhance the contribution of forests to sustainable development.

Giri (2020), in his paper "Initial Assessment of the Impact of COVID-19 on Sustainable Forest Management in Asia-Pacific States: A Case Study on Thailand and Nepal," found that the COVID-19 pandemic has impacted the forestry sector. Disruptions from partial and total lockdowns have affected forestry operations and management targets. While there have been reports of illegal logging and poaching, these activities have not yet severely threatened forest conditions and wildlife species. However, forestry operations related to

plantations, afforestation, and reforestation have slowed down. Giri observed that forest communities used forest resources as a safety net during these challenging times, relying on forests for basic provisions such as food, fodder, and grass. Some communities also utilized forest resources to support alternative livelihoods, such as livestock rearing, milk selling, and forest-based tourism.

Coomes et al. (2016) conducted a large-scale census involving 919 communities across four major river sub-basins in eastern Peru under the PARLAP initiative to analyze the factors influencing the economic orientation of rainforest communities. The study found that the initial environmental endowments and market access of communities play significant roles in shaping their economic orientation. However, the ways these factors interact vary depending on the key natural resource upon which the communities rely. Additionally, a strong correlation was found between communities with rich terrestrial activity components and their participation in land-based extractive activities, such as hunting, non-timber forest product (NTFP) extraction, and timber extraction. Several case-specific analyses of livelihood strategies have been conducted in Southern and Eastern Africa. Some of these findings are similar to global studies, highlighting the importance of forest income for the poorest households (Khundi et al., 2011).Mamo et al., 2007; Kamanga et al., 2009) and the differential influence of livelihood assets on household strategy choices (Babulo et al., 2008) in Ethiopia and Malawi.

The main objective of the study is to assess the dependency on forest products for livelihood during the COVID-19 period. Specifically, the study aims to identify and evaluate the forest products that were most frequently accessed during the pandemic and analyze their contribution to household income. The research seeks to answer how the COVID-19 pandemic impacted the community's reliance on forest products and which products were involved, as well as the economic effects of the pandemic on the income derived from selling these forest products.

2. Methods

The study is a descriptive survey design. Kothari (2005), describes descriptive research as a study concerning specific predictions, with narrations of facts and characteristics concerning individual, group or situation, the major purpose of descriptive research is the description of the state of affairs and reporting the way things are on the ground.
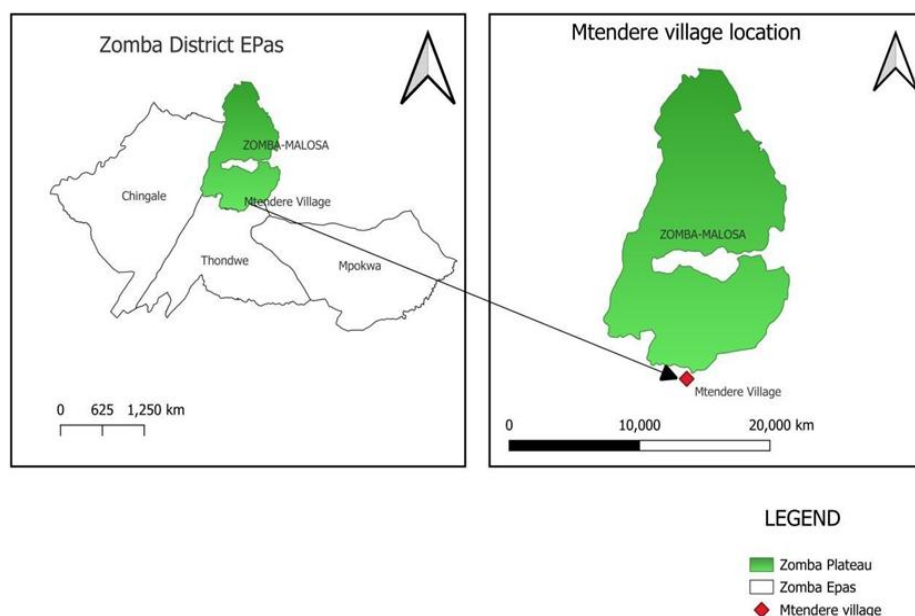

Fig. 1. Research location

The research was conducted in Mtendere village, Zomba city in southern region of Malawi. Mtendere village is one of the localities in southern region of Malawi, it has an open location code of 5GPQJ892+QH and is located on -15.38055° or 15° 22' 50" south latitude and 35.30143° or 35° 18' 5'' east longitude in southern part of Malawi (Figure 1). Mtendere village is situated at the base of the zomba plateau forest reserve making it an ideal place to conduct my research.

In this research, a convenience sampling strategy was used, which is a non-probability sampling technique where respondents are selected based on their availability and accessibility. In this case, the respondents were chosen for their ease of access, thus the convenience strategy was employed. A total of 59 households were interviewed, as these were the ones that were accessible and available for participation. This number was also influenced by the limited financial resources and time available for the research.

Since the research followed a survey approach, questionnaires were administered to the selected members of the Mtendere residents. The questionnaires contained both open-ended and closed-ended questions to gather a wide range of information. Open-ended questions were used to obtain personal responses on the issues raised, allowing for more detailed insights, while closed-ended questions provided definite answers to the posed questions. The questionnaire was designed using Kobotoolbox to reduce costs associated with printing hard copies for each participant. Furthermore, Kobotoolbox facilitated data entry, as completed questionnaires were sent directly to a server, where the data could be downloaded in Excel format. The collected data, which was both qualitative and quantitative in nature, was analyzed using SPSS, Excel, and descriptive statistics, including frequencies, mean, and percentages. Qualitative data was analyzed descriptively, while a paired two-sample t-test was used for analyzing and presenting the quantitative data.

3. Results and Discussion

3.1 Demographic characteristics

Table 1 below presents gender distribution of the respondents, with 32 individuals being females and 27 individuals being males. The frequency column represents the number of individuals in each gender category while the percent column represents the percentage of individuals in each category out of total. The valid percent refers to the percentage of individuals in each category out of the number of valid responses in this case 59. Overall this data indicates that the group consists of slightly higher proportion females 54.2% than males 45.8%.

Table 1. Gender of respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Female	32	54.2	54.2	54.2
Male	27	45.8	45.8	100.0
Total	59	100.0	100.0	

Based on the Table 2 below, the provided data represents the age distribution of a group, the age range "18-24" has the lowest frequency with only 1 individual, accounting for 1.7% of the group. This represents the smallest segment in terms of both frequency and percentage. The age range "25-30" is the most prominent category, with 23 individuals, representing 39% of the group. This range has the highest frequency and percent value. The age ranges "31-35," "36-40," and "41-50" follow with 8, 9, and 12 individuals, respectively. They represent 13.6%, 15.3%, and 20.3% of the group, respectively. Together, they account for the majority of the individuals in the dataset. The "over 50" age range has 6 individuals, making up 10.2% of the group. It has the second-lowest frequency and percent value. In summary, the data suggests that the group has a diverse age distribution, with a higher concentration of individuals in the 25-50 age range. The age ranges below 25 and over 50 have fewer individuals in comparison.

Table 2. Age of respondents

Age range	Frequency	Percent	Valid Percent	Cumulative Percent
18-24	1	1.7	1.7	1.7
25-30	23	39.0	39.0	40.7
31-35	8	13.6	13.6	54.2
36-40	9	15.3	15.3	69.5
41-50	12	20.3	20.3	89.8
Over 50	6	10.2	10.2	100.0
Total	59	100.0	100.0	

3.2 Ethnicity

Table 3 below is the data presents the distribution of ethnicities within a certain population. The table includes the following information for each ethnicity Lhomwe, There are 16 individuals representing this ethnicity, which accounts for 27.1% of the total population. Yao, This ethnicity is the most frequent, with 33 individuals, representing 55.9% of the population. Chewa there are 5 individuals belonging to this ethnicity, representing 8.5% of the population. Tumbuka, this ethnicity is represented by 2 individuals, accounting for 3.4% of the population. Ngoni, there is 1 individual from this ethnicity, representing 1.7% of the population. Sena, this ethnicity is represented by 2 individuals, accounting for 3.4% of the population. Overall, there are 59 individuals in the population, with each ethnicity contributing to the total count. The data provides insights into the ethnic composition and distribution within the specified population ethnicity distribution.

Table 3. Ethnicity of respondents

Ethnicity	Frequency	Percent	Valid Percent	Cumulative Percent
Lhomwe	16	27.1	27.1	27.1
Yao	33	55.9	55.9	83.1
Chewa	5	8.5	8.5	91.5
Tumbuka	2	3.4	3.4	94.9
Ngoni	1	1.7	1.7	96.6
Sena	2	3.4	3.4	100.0
Total	59	100.0	100.0	

3.3 Marital status

Table 4 below shows the provided data presents the distribution of marital status among a sample of 59 individuals and the categories include single married and widowed and here is a breakdown of the data. Single includes 10 individuals in the sample who are single accounting for 16.9% of the total sample and married is the largest category with 36 individuals representing 61.0% of the sample and widowed includes 13 individuals who are widowed making up 22.0% of the sample. In terms of cumulative percentages the single category accounts for 16.9% of the total and the married category represents 78.0% which includes the percentage of single individuals as well and the widowed category accounts for 100.0%. Overall the data shows that the majority of individuals in the sample are married followed by the widowed category while the single category has the smallest representation.

Table 4. Marital Status of Respondents

Marital Satus	Frequency	Percent	Valid Percent	Cumulative Percent
Single	10	16.9	16.9	16.9
Married	36	61.0	61.0	78.0
Widowed	13	22.0	22.0	100.0
Total	59	100.0	100.0	

3.4 Education level

The provided data presents the education levels of a given population as shown in Table 5 below and the table includes the following information for each education level. Tertiary education is attained by 7 individuals who represent 11.9% of the total population, and secondary education is the most frequent with 14 individuals representing 23.7% of the population. Primary education is held by 26 individuals accounting for 44.1% of the population, and none category indicates that 12 individuals in the population have not received any formal education representing 20.3% of the total.

Overall, there are 59 individuals in the population, each categorized according to their education level. The data provides insights into the educational attainment within the specified population, with primary education being the most prevalent, followed by secondary education and tertiary education. Additionally, a portion of the population, 20.3%, has not received any formal education.

Table 5. Education level

Education level	Frequency	Percent	Cumulative Percent
Teritiary	7	11.9	11.9
Secondary	14	23.7	35.6
Primary	26	44.1	79.7
None	12	20.3	100.0
Total	59	100.0	

3.5 Objective 1

The data shows the frequencies and percentages of different forest products in a graphical context as presented in Figure 2 below. Firewood accounts for 31 cases which represents 34.1% of the total and in terms of responses it is the most common forest product making up 57.4% of the total responses. This is so because firewood is easy to access since there is a short distance of roughly 2 km to the forest from the community and also cheap to buy and firewood is needed daily for domestic purpose like cooking but during pandemic there was an increase usage of firewood for preparation COVID-19 remedies and medicine.
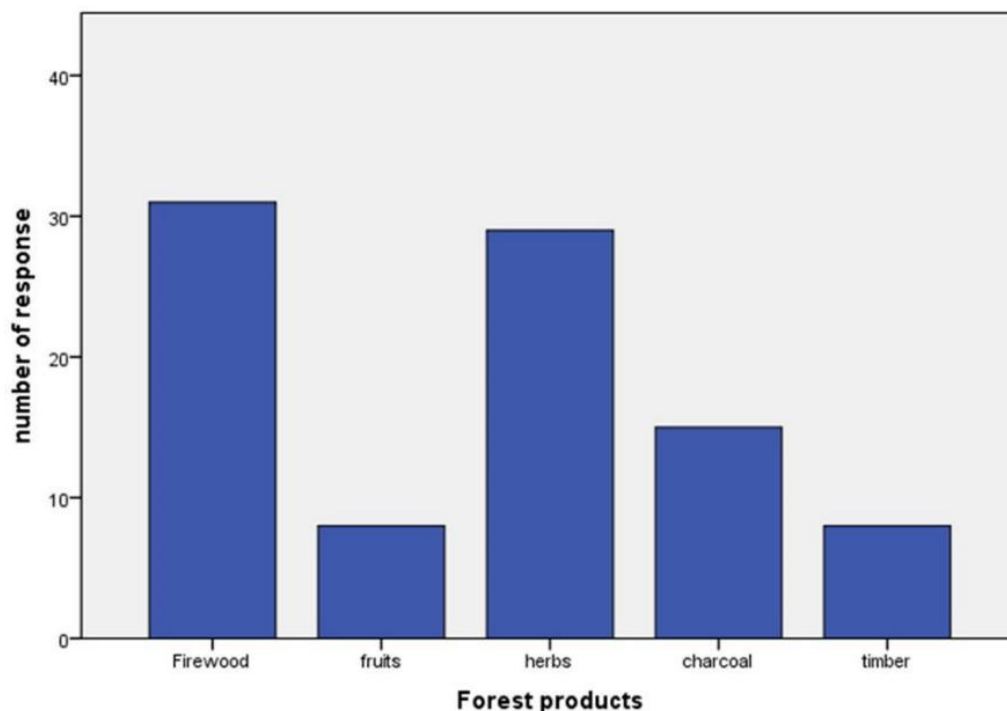

Fig. 2. Forest production frequency

Fruits have 8 cases accounting for 8.8% of the total and as for responses fruits constitute 14.8% of the total and Mulunguzi, guava and mulbelese were commonly accessed in the forest for consumption and business to survive since piece works were scarce. Herbs with 29 cases make up 31.9% of the total cases and in terms of responses herbs account for 53.7% and during the pandemic period there was an increase in dependency of herbs used as medicine and remedies to cure or minimize chance of the virus and Blue gam leaves, lemons and various tree roots were used almost daily in this period leading to the sharp increase usage of herbs.

Charcoal has 15 cases representing 16.5% of the total and in terms of responses charcoal makes up 27.8% and production of charcoal is commonly done for business purpose but during pandemic period it was not bought regularly as people did not have money to purchase since piece works were scarce and others suspended from their workplaces this result in an increase relying on firewood which was cheap and easily accessed. Timber has 8 cases accounting for 8.8% of the total and as for responses timber constitutes 14.8% and timber is a product used for house khola construction and carpentry and during pandemic it was not accessed since its business was not performing positively on market. Overall firewood and herbs are the most frequently mentioned forest products both in terms of the number of cases and responses and these results are quite similar to the study which was conducted by Kalpana Giri 2021 in Thailand and in his research titled initial assessment of impact of COVID-19 on sustainable forest management finds that herbs firewood and fruits were frequently accessed forest products during the pandemic.

3.6 Objective 2

Table 6 below shows responses to a question about the impact of COVID-19. Out of 59 respondents, 2 individuals (3.4%) answered "no," indicating they were not affected by COVID-19, while 57 individuals (96.6%) answered "yes," indicating they were affected by the pandemic. The ways in which these people were affected include workplace suspensions, scarcity of temporary work, contracting the virus and falling ill, and in some cases, losing their lives. Additionally, business owners reported that their businesses were not performing well.

Table 6. How farmers were affected by COVID-19

Response	Frequency	Percent	Valid Percent	Cumulative Percent
No	2	3.4	3.4	3.4
Yes	57	96.6	96.6	100.0
Total	59	100.0	100.0	

3.7 Major sources of income

The data represents the major sources of income for a given population categorized into four categories which are piece work farming business and employed and let's discuss the information presented in the table 7 below. Piece work accounts for 33.9% of the total population surveyed making it the largest source of income and piece work typically refers to work where individuals are paid based on the number of items produced or tasks completed. Farming involves activities such as cultivating crops raising livestock or engaging in other agricultural practices and about 15.3% of the population relies on farming as their major source of income. Business contributes to the income of 23.7% of the surveyed population and this category likely includes individuals who own or manage their own businesses such as small enterprises or self-employed professionals.

Employed represents approximately 27.1% of the population who derive their income from working for someone else's business or organization receiving a salary or wage in return for their services and this makes employment a significant income source as well. Overall the data provides insights into the diverse sources of income among the surveyed

population and it indicates that a significant portion of individuals earn their living through piece work farming business ownership or traditional employment.

Table 7. Major sources of Income

Source	Frequency	Percent	Valid Percent	Cumulative Percent
Piece Work	20	33.9	33.9	33.9
Farming	9	15.3	15.3	49.2
Business	14	23.7	23.7	72.9
Employed	16	27.1	27.1	100.0
Total	59	100.0	100.0	

3.8 Contribution of forest products to household income

During COVID-19 out of the 59 individuals the minimum money made from selling forest products annually was K15 000, while the maximum was K350 000. On the other hand, the minimum money made from selling forest products before COVID-19 was K35 000 whilst the maximum was K850000. By conducting a T test of paired two sample for means between estimated money contribution to household income before and during COVID-19. The results came out as it is in the table 8 below.

Table 8. t-Test: paired two sample for means

	Variable 1	Variable 2
Mean	161084.7	85432.20339
Variance	3.08E+10	7989555669
Observations	59	59
Pearson Correlation	0.953531	
Hypothesized Mean Difference	0	
Df	58	
t Stat	6.168681	
P(T<=t) one-tail	3.59E-08	
t Critical one-tail	1.671553	
P(T<=t) two-tail	7.17E-08	
t Critical two-tail	2.001717	

By checking the mean from the Table 8 above, the mean before COVID-19 (variable 1) was estimated at K161 081.70 and during COVID-19 (variable 2) was estimated at K85,432 (Table 8). The T test hypothesis to indicate if there is a significant change in contribution of forest products to household income during COVID-19. On a t test of paired two sample mean, t critical value on a one-tail is 1.671553. Therefore, in this case the t stat is 6.168681 which is greater than 1.671553 this entails that there was a change in forest products contributing to household income and the P(T<=t)=0.0039 indicates the significance of the test.

This change is there as a result of scarcity of piecework, failure of the commodity business and suspension of workplace during pandemic period, this lead to an increase dependency on nature particularly forest products for money to survive. Overall it was noted that the contribution of forest product to household income decreases during the pandemic period due to an increase in number of people doing a forest product business.

4. Conclusions

This research project sheds light on the challenges faced by communities relying on forest products for their livelihoods during the COVID-19 period. The identified forest products, including charcoal, firewood, and fruit, experienced a significant decrease in income due to disruptions caused by the pandemic. Overall from the results of the study it can be concluded that the COVID-19 pandemic led to the increase on dependency of forest products such that the contribution of forest products to household income dwindles.

To conclude, promoting education and awareness about the importance of sustainable forest management and the value of forest products is crucial. This can be achieved through community outreach programs, workshops, and campaigns that highlight the benefits of sustainable practices, conservation efforts, and the potential for income generation. Additionally, it is essential to strengthen the resilience of forest-dependent communities to future shocks and crises. This can be accomplished by implementing social safety nets, or savings and credit programs, ensuring that these communities are better prepared for future challenges.

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F.C contributed fully to the conception, design, research, analysis, interpretation of data, drafting, and revising of this article. F.C approved the final version to be published and are accountable for all aspects of the work.

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