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# Assessment of Forest Use and Value of Forest Resources to Local Communities in Maasai Mau Forest, Narok County

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## Abstract

This study explores the assessment of forest use and the value of forest resources to local communities, focusing on the Maasai Mau Forest area in Narok County, Kenya. The Maasai Mau Forest, inhabited predominantly by the Maasai community, serves as a vital ecosystem, providing resources essential for livelihoods, cultural practices, and ecological sustainability. However, the forest faces numerous challenges, including deforestation, land degradation, and competing land uses, threatening its ecological integrity and the well-being of local inhabitants. The findings indicate that the respondents acquired firewood, timber, charcoal, honey, medicine, poles, thatch grass, fruits, animal fodder, agricultural tools, murram, building stones, mushrooms, and water from the Mau Forest. The primary purpose of establishing the Masaai Mau reserve was to conserve the environment and biodiversity. The Maasai Mau Forest needs to be well-conserved since some species of trees/plants/ animals have disappeared over the years. Tree planting, fencing, i.e., electric fencing; tightening security measures, i.e., employing more security, scouting, planting trees of different species, educating locals on the importance of forest conservation and reforestation; prevent/stop people from encroachment, create policies that govern the restoration, training on importance of eco-tourism, avoid grazing inside the forest, avoid deforestation and formation of CBOs to engage in tree planting are the best way of conserving Maasai Mau forest.

## Keywords

Forest Use, Forest Resources, Value of Forest Resources, Local Communities' Livelihoods

## 1. Introduction

Forests are pivotal in supporting biodiversity, regulating climate, and providing essential ecosystem services for human well-being (Fedele et al., 2017). In many regions, forests also serve as a significant source of livelihood for local communities, contributing to their socio-economic development and cultural identity. Forests are rich in natural resources such as timber, non-timber forest products, water, and biodiversity (Wen et al., 2017). These resources contribute to local communities' livelihoods and have economic, social, and cultural values. Timber, for instance, is a valuable resource used for construction, furniture making and energy production. Non-timber forest products, including medicinal plants, fruits, and nuts, are often collected and used by local communities for subsistence income generation and traditional practices (Wen et al., 2017). However, the sustainable management of forests and the equitable distribution of their benefits remain critical challenges, particularly in the face of increasing pressures from deforestation, land degradation, and competing land uses.

The Maasai Mau Forest, a unique and vital ecosystem nestled in the heart of Narok County, Kenya, is a living testament to the intricate relationship between nature and human development (Kweyu, 2022). As one of Kenya's five "water towers", it plays a pivotal role in the country's hydrological cycle, ensuring the availability of clean water for both domestic use and agricultural purposes, thus directly contributing to the United Nations Sustainable Development Goal (SDG) 6: Clean Water and Sanitation. Beyond its ecological significance, the forest is a lifeline for the local communities. It provides essential livelihood resources, including subsistence agriculture, livestock rearing, and tourism, integral to achieving SDG 1: No poverty and SDG 2: Zero Hunger. The forest's rich biodiversity and carbon sequestration capabilities are crucial for combating climate action (SDG 13) and preserving life on land (SDG 15), highlighting its critical role in global environmental sustainability (Fedele et al., 2017).

However, the Maasai Mau Forest is not just facing threats, it is confronting escalating threats, including deforestation, encroachment, and unsustainable resource extraction, which are rapidly jeopardizing its ecological integrity and the well-being of local inhabitants (Mwiwawi, 2019). Many forest-dependent communities, especially in developing countries, rely on informal and undocumented practices, making it difficult to quantify the extent of forest use and its associated values. Additionally, the valuation of forest resources is often subjective and context-dependent, making it challenging to establish a standardized framework for the assessment.

## 2. Statement of the Problem

Despite the significant dependence of local communities on forest resources, there remains a limited understanding of the extent, nature, and value of forest use within the Maasai Mau Forest community. More comprehensive data is needed to formulate evidence-based conservation and sustainable management strategies

that effectively address people's and nature's needs and aspirations. Furthermore, the challenges of equitable resource governance, tenure rights, and external pressures from development initiatives further exacerbate the vulnerability of forest-dependent communities and undermine their resilience in the face of environmental change. Therefore, it is crucial to assess the utilization of forest resources and understand their value to local communities to ensure sustainable forest management and the well-being of these communities.

The overarching objective of this study was to assess the utilization and value of forest resources to local communities within the Maasai Mau Forest, Narok County.

## 3. Literature Review

Forests are integral to the livelihoods of millions of people worldwide, particularly in rural and indigenous communities (Vrabcová et al., 2019). Numerous studies have highlighted how forests contribute to household income, food security, health, and cultural identity. According to Talukdar, Choudhury, Barbhuiya, and Singh (2021), traditional practices such as agroforestry, non-timber forest product (NTFP) collection, and small-scale logging play a crucial role in sustaining rural livelihoods and alleviating poverty. However, the extent and nature of forest dependency vary across socio-economic contexts, geographical regions, and cultural settings.

Quantifying the economic value of forest resources is essential for understanding their contribution to local economies and informing policy decisions (Wen et al., 2017). Economic valuation methods, such as market price analysis, contingent valuation, and cost-benefit analysis, offer insights into forest goods and services' market and non-market values. While marketable timber and NTFPs constitute tangible economic benefits, forests also provide invaluable ecosystem services, including carbon sequestration, watershed protection, and biodiversity conservation, often undervalued or overlooked in traditional economic accounting (Vrabcová et al., 2019).

Effective forest governance and recognizing community rights are critical for sustainable forest management and equitable resource distribution. Decentralized governance systems, community-based forest management (CBFM) approaches, and participatory decision-making processes have shown promise in enhancing local participation, improving resource stewardship, and reducing conflicts over land and resource tenure (Nath et al., 2016). However, challenges persist in ensuring the meaningful inclusion of marginalized groups, addressing power asymmetries, and reconciling competing interests among stakeholders.

Despite forests' numerous benefits to local communities, they face numerous challenges, including deforestation, land degradation, climate change, and external pressures from development projects. These challenges are exacerbated by socio-economic factors such as poverty, population growth, and inadequate access to alternative livelihood options (Nath et al., 2016). However, there are also op-

portunities for innovation and collaboration, including sustainable land-use practices, community-based conservation initiatives, and payments for ecosystem services (PES) schemes, which can enhance both forest conservation and community well-being.

Mawa et al. (2023) emphasizes the importance of incorporating local ecological knowledge and cultural values into forest valuation processes, illustrating that community perceptions have a considerable impact on conservation outcomes and resource-use decisions. Their findings from Uganda emphasize that participatory forest valuation enhances community ownership and fosters more sustainable forest management practices. Similarly, Djenontin, Larson, and Miller (2024) provide empirical evidence from Kenya and Tanzania, demonstrating that forest valuation approaches that combine biophysical assessments with socio-economic dimensions offer more holistic and inclusive frameworks for understanding forest benefits. Their study highlights the role of gender and power dynamics in shaping access to forest resources and valuation priorities, advocating for equity-sensitive policies that reflect the diverse values communities assign to forest landscapes.

## Theoretical Framework

The assessment of forest use and the value of forest resources to local communities draws upon diverse theoretical frameworks and perspectives from multiple disciplines. One such theoretical lens is the concept of political ecology, which explores the complex interplay between power dynamics, socio-economic structures, and environmental change (Rusca, 2023). Political ecology sheds light on how historical processes of colonization, land tenure systems, and neoliberal policies shape forest governance, access to resources, and the distribution of benefits among different social groups within the Maasai Mau Forest community. The study can uncover underlying power relations, conflicts of interest, and structural inequalities that influence forest use patterns and resource valuation by adopting a political ecology approach.

Another theoretical framework relevant to the study is the sustainable livelihoods approach, which emphasizes the importance of understanding the diverse livelihood strategies, assets, and vulnerabilities of local communities dependent on forest resources (Trædal & Vedeld, 2018). By examining the assets and capabilities of households within the Maasai Mau Forest community, including human, social, natural, physical, and financial capital, the study can identify pathways for enhancing livelihood resilience, reducing forest dependency, and promoting alternative income-generating activities. The sustainable livelihoods approach also highlights the need for participatory approaches, empowerment strategies, and institutional support mechanisms to strengthen community and adaptive capacity in the face of environmental change (Gyawali et al., 2020).

Furthermore, the study can draw upon economic theories of valuation, such as environmental economics and ecosystem services theory, to quantify the economic contribution of forest resources to local livelihoods and well-being (Okumu &

Muchapondwa, 2017). Environmental economics provides a framework for assessing both market and non-market values of forest goods and services, incorporating concepts such as willingness to pay, opportunity costs, and total economic value (Raihan, 2023). On the other hand, ecosystem services theory highlights the diverse benefits provided by forests, including provisioning, regulating, cultural, and supporting services, and their role in sustaining human well-being (Okumu & Muchapondwa, 2017). By applying economic valuation techniques, such as contingent valuation, hedonic pricing, or cost-benefit analysis, the study can estimate the economic importance of forest resources and inform policy decisions to enhance forest conservation and community development.

Additionally, the study can benefit from sociological theories of environmental justice and community-based natural resource management (CBNRM), which emphasize the importance of equity, participation, and local empowerment in natural resource governance (Villamayor-Tomas & García-López, 2018). Environmental justice theory focuses on the distributional equity of environmental risks and benefits, advocating for recognizing indigenous rights, cultural heritage, and traditional knowledge in decision-making processes. CBNRM approaches, on the other hand, emphasize the role of local communities as stewards of natural resources, promoting collective action, customary governance systems, and collaborative management arrangements (Villamayor-Tomas & García-López, 2018). By incorporating principles of environmental justice and CBNRM, the study can explore strategies for enhancing community involvement, strengthening social cohesion, and promoting inclusive forest management practices that address the needs and aspirations of diverse stakeholders within the Maasai Mau Forest community.

## 4. Methodology

The research design for this study was a descriptive survey. The study employed a field survey method to collect both quantitative and qualitative data, providing a comprehensive understanding of the Maasai Mau Forest community. The field survey supplies insight into the general picture of a situation without requiring the entire population (Cook et al., 2019).

The sampling technique utilized a multi-stage approach to ensure representation of diverse perspectives, geographical locations, and socio-economic characteristics within the Maasai Mau Forest community. Firstly, purposive sampling was employed to select key informants, including community leaders and local stakeholders with in-depth knowledge of forest use and management practices. These qualitative key informants were picked based on their roles, expertise, and active involvement in forest-related activities, ensuring the collection of rich and relevant insights. Secondly, random sampling was used to select households for participation in household surveys, ensuring that both forest-dependent and non-dependent households were included.

A total of 158 households were surveyed, yielding a high response rate of 94%,

which indicates strong participation and reliable data collection. Quantitative data were scrutinized for completeness, accuracy, and uniformity to ensure the quality of the data. Data from questionnaires were analyzed using descriptive statistics, resulting in frequencies and percentages generated with the Statistical Package for Social Sciences (SPSS), a reliable quantitative data analysis tool. Descriptive statistics were deemed appropriate for this study as the primary objective was to summarize and present the characteristics and patterns within the community rather than to test hypotheses or infer causality.

Qualitative data generated from open-ended questions were analyzed thematically, using content analysis to identify emerging similarities and differences. This included a detailed examination of respondents' statements to capture nuanced perspectives and contextual factors influencing forest use and management.

## 5. Findings and Discussions

To assess how most of the respondents use the forest, the researcher asked the respondents about their sources of various products used at home that could result from deforestation. Table 1 below shows that most of the respondents acquired firewood, timber, charcoal, honey, medicine, poles, thatch grass, fruits, animal fodder, agricultural tools, murram, building stones, mushrooms, and water from their farm, whereas 45.9% of the respondents get their meat from the market and 40% of the respondents get fibers from own farm and 40% from the market. Only some of the respondents acquire products from the stream. Products acquired from the forest drive deforestation which contributes to climate action (SDG 13) and life on land (SDG 15). Individuals indirectly support deforestation and its adverse impacts on ecosystems by consuming these products, emphasizing the importance of choosing sustainable alternatives and advocating for responsible forest management practices. Unsustainable practices will not ensure no poverty (SDG 1), zero hunger (SDG 2), and clean water and sanitation (SDG 6). Conversely, sustainable forest management promotes economic growth, biodiversity conservation, and climate resilience, aligning with multiple SDGs.

Table 1. Forest Products and their sources at home.

| Product | Source [n, (%)] | | | | | N |
|---|---|---|---|---|---|---|
| | Public forest | Own farm | Neighbours | Market | Stream | |
| Water | 3 (3.7%) | 62 (76.5%) | 1 (1.2%) | 0 (0%) | 15 (18.5%) | 81 |
| Firewood | 6 (7.6%) | 72 (91.1%) | 1 (1.3%) | 0 (0%) | 0 (0%) | 79 |
| Medicine | 10 (13.5%) | 63 (85.1%) | 0 (0%) | 1 (1.4%) | 0 (0%) | 74 |
| Agricultural tools (yoke, tool handles etc.) | 4 (6.3%) | 55 (85.9%) | 1 (1.6%) | 4 (6.3%) | 0 (0%) | 64 |
| Timber | 1 (1.6%) | 56 (88.9%) | 1 (1.6%) | 5 (7.9%) | 0 (0%) | 63 |
| Poles (fencing, building etc.) | 1 (1.9%) | 44 (81.5%) | 0 (0%) | 9 (16.7%) | 0 (0%) | 54 |

**Continued**

| | | | | | | |
|---|---|---|---|---|---|---|
| Charcoal | 2 (4.3%) | 31 (66%) | 1 (2.1%) | 13 (27.7%) | 0 (0%) | 47 |
| Fruits | 3 (6.4%) | 43 (91.5%) | 0 (0%) | 1 (2.1%) | 0 (0%) | 47 |
| Animal fodder/ browse | 4 (8.7%) | 42 (91.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 46 |
| Mushrooms | 1 (2.5%) | 39 (97.5%) | 0 (0%) | 0 (0%) | 0 (0%) | 40 |
| Honey | 5 (12.8%) | 24 (61.5%) | 0 (0%) | 10 (25.6%) | 0 (0%) | 39 |
| Meat | 0 (0%) | 12 (32.4%) | 1 (2.7%) | 17 (45.9%) | 7 (18.9%) | 37 |
| Building stones | 0 (0%) | 23 (85.2%) | 0 (0%) | 3 (11.1%) | 1 (3.7%) | 27 |
| Murram | 0 (0%) | 20 (87%) | 2 (8.7%) | 1 (4.3%) | 0 (0%) | 23 |
| Thatch grass | 0 (0%) | 11 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 11 |
| Fibres | 1 (20%) | 2 (40%) | 0 (0%) | 2 (40%) | 0 (0%) | 5 |

In understanding the various uses of the forest, Figure 1 below shows that most respondents (78%) did not use the forest for spiritual and cultural purposes. In comparison, 22% of the respondents used the forest for spiritual and cultural purposes.

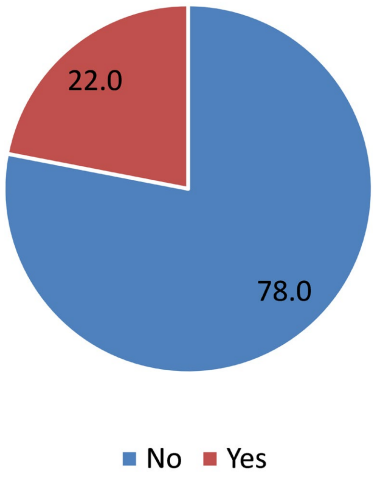


Figure 1. Forest use for spiritual and cultural purposes.

Table 2 shows that the percentage of respondents that use the forest for spiritual and cultural purposes once a year was recorded as 57.9%, whereas those that use the forest for spiritual and cultural purposes more than once a week and once a week, 2 or 3 times a week were separately recorded as 5.3%.

The researcher inquired whether domestic animals are grazed inside the forest. Figure 2 shows that the majority (78.1%) did not graze their domestic animals inside the forest, while 21.9% of the respondents did. Not grazing domestic animals in the Maasai Mau Forest could lead to unintended consequences, such as reduced biodiversity due to unchecked growth of shrubs and less palatable grasses,

potentially impacting the forest's ecological balance and its role in supporting local livelihoods and contributing to global sustainability goals like SDG 15 (Life on Land) and SDG 13 (Climate Action).

Table 2. Frequency of using the forest for spiritual and cultural purposes.

| Frequency of using the forest for spiritual and cultural purposes | Frequency | Percentage |
|---|---|---|
| More than once a week | 1 | 5.3 |
| Once a week, 2 or 3 times a week | 1 | 5.3 |
| Once a month | 3 | 15.8 |
| Few times a year | 3 | 15.8 |
| Once a year | 11 | 57.9 |
| **Total** | **19** | **100.0** |

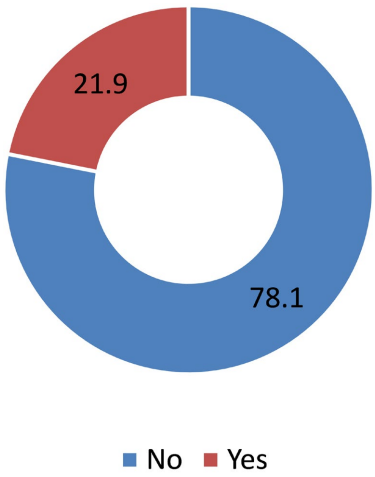


Figure 2. Grazing of domestic animals inside the forest.

All the various domestic animals grazed in the forest for an average number of 5 months in a year. Table 3 shows that the average number of sheep grazing in the forest was recorded as 29, the highest, while only a few donkeys (3) were recorded grazing in the forest. An average of 11 goats and 15 cattle were also recorded grazing in the forest.

There are multiple reasons for using the forest during specific months. According to the responses in Table 4, the findings were as follows: December recorded the highest number of times used (6), where 66.7% was because of drought, 16.7% was for use during ceremonies, and 16.7% was due to insufficient grazing land. January, May, and June had the least times used (1). Reasons for using the forest in January were 50% because of drought, an outbreak of flu (10%), inadequate products (10%), insufficient grazing land (10%), and 20% due to scarcity of land. May and June were used 100% because they were the planting seasons.

Table 3. Number of animals grazing in the forest.

| Animal | Average Number owned per person, | Average Number of months in a year |
|---|---|---|
| Cattle | 15 | 5 |
| Donkeys | 3 | 5 |
| Goats | 11 | 5 |
| Sheep | 29 | 5 |
| **Grand Total** | **15** | **5** |

Table 4. Month the forest is used most and reason why.

| Month the forest is used most | Reason [n, (%)] | | | | | | | | | N |
|---|---|---|---|---|---|---|---|---|---|---|
| | Winter months | Dry season/drought | Planting season | Outbreak of flu | For use during ceremonies | Inadequate products | Insufficient grazing land/ pasture | Scarcity of land | Seek alternative source of energy | |
| January | 0 (0%) | 5 (50%) | 0 (0%) | 1 (10%) | 0 (0%) | 1 (10%) | 1 (10%) | 2 (20%) | 0 (0%) | 10 |
| February | 0 (0%) | 2 (50%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (25%) | 1 (25%) | 0 (0%) | 4 |
| March | 0 (0%) | 0 (0%) | 1 (25%) | 0 (0%) | 0 (0%) | 1 (25%) | 1 (25%) | 1 (25%) | 0 (0%) | 4 |
| April | 1 (50%) | 0 (0%) | 1 (50%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 |
| May | 0 (0%) | 0 (0%) | 1 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 |
| June | 0 (0%) | 0 (0%) | 1 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 |
| July | 1 (33.3%) | 1 (33.3%) | 1 (33.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 3 |
| August | 0 (0%) | 2 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 |
| September | 0 (0%) | 2 (66.7%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (33.3%) | 0 (0%) | 3 |
| October | 0 (0%) | 3 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 3 |
| November | 0 (0%) | 2 (66.7%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (33.3%) | 0 (0%) | 3 |
| December | 0 (0%) | 4 (66.7%) | 0 (0%) | 0 (0%) | 1 (16.7%) | 0 (0%) | 1 (16.7%) | 0 (0%) | 0 (0%) | 6 |
| Throughout the year | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (50%) | 0 (0%) | 1 (50%) | 2 |

Figure 3 shows that the majority of the members of the respondents' households (98.8%) were not employed in the forest product industry or Kenya Forest Service, while only 1.2% were employed in these fields.

In Table 5, the researcher looked at the number of household members employed where N was 2, the mean was 0.5, and the standard deviation showing the spread was 0.707. The mean earnings and standard deviation for members in the household employed in the forest product industry (Kshs) were 15000.50 and 21212.496, respectively.

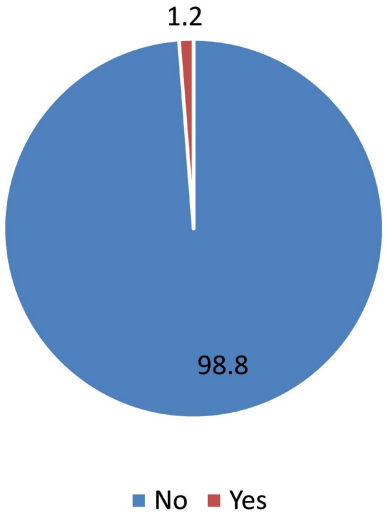


Figure 3. Employment of household members in the forest product industry or Kenya Forest Service.

Table 5. Number of household members employed and income.

| Statistics | Number of household members employed | Earnings for members of the household from employment in forest product industry (Kshs) |
|---|---|---|
| N | 2 | 2 |
| Mean | 0.50 | 15000.50 |
| Std. Deviation | 0.707 | 21212.496 |
| Minimum | 0 | 1 |
| Maximum | 1 | 30,000 |

According to the data collected in Table 6 below, the major source of water was the stream (97.6%) and the borehole and pond both recorded 1.2% thus being minor water sources as shown in the table below.

Table 6. Sources of water.

| Source of water | Frequency | Percentage |
|---|---|---|
| Stream/river | 80 | 97.6 |
| Borehole/well | 1 | 1.2 |
| Pond/dam | 1 | 1.2 |
| **Total** | **82** | **100.0** |

Figure 4 shows that majority of the water used by the respondents comes from the forest (96.3%) and only 3.7% of the water does not come from the forest. Reliance on forest water sources underscores their critical role in fulfilling clean wa-

ter and sanitation (SDG 6). Sustaining these sources is vital for community well-being, emphasizing the forest's importance in achieving sustainable development goals.

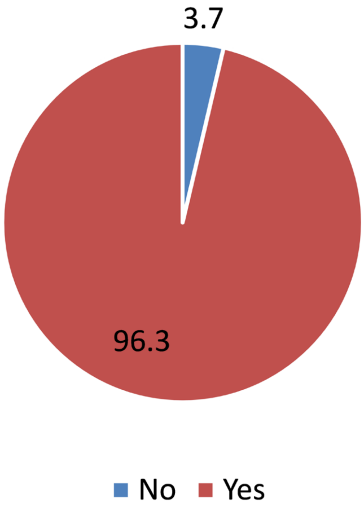


Figure 4. Whether the water comes from the forest.

According to Table 7 below, the mean and standard deviation of the distance of the source of water in minutes were 45.73 and 27.846, respectively. The number of people who collected water N was 56, having a mean of 5.64 and a standard deviation of 4.4441, 81, 20 L jerry cans were used with an average of 5.71 and a standard deviation of 24.1662.

Table 7. Distance to the source of water and number who collected water and quantity collected.

| Statistics | Distance of the source of water (minutes) | Number who collect | Number of 20l jerry cans used per day |
|---|---|---|---|
| N | 81 | 56 | 81 |
| Mean | 45.73 | 5.64 | 5.710 |
| Std. Deviation | 27.846 | 4.441 | 24.1662 |
| Minimum | 2 | 1 | 1.0 |
| Maximum | 120 | 20 | 220.0 |

Looking at the person who collects water in the household, Table 8 below shows that majority of them were women (66.7%) while man and children both recorded the least percentages both having 2.1%.

From the results in Figure 5, the respondents used different types of purification for drinking water where majority (78%) used nothing, many respondents used chemicals (14.6%) and 6.1% boiled the water, with few boiling and filtering (1.3%).

Table 8. Person who collects water in the household.

| Who collects water in the household | Frequency | Percentage |
|---|---|---|
| Woman | 32 | 66.7 |
| Woman and child | 14 | 29.1 |
| Man | 1 | 2.1 |
| Children | 1 | 2.1 |
| **Total** | **48** | **100.0** |

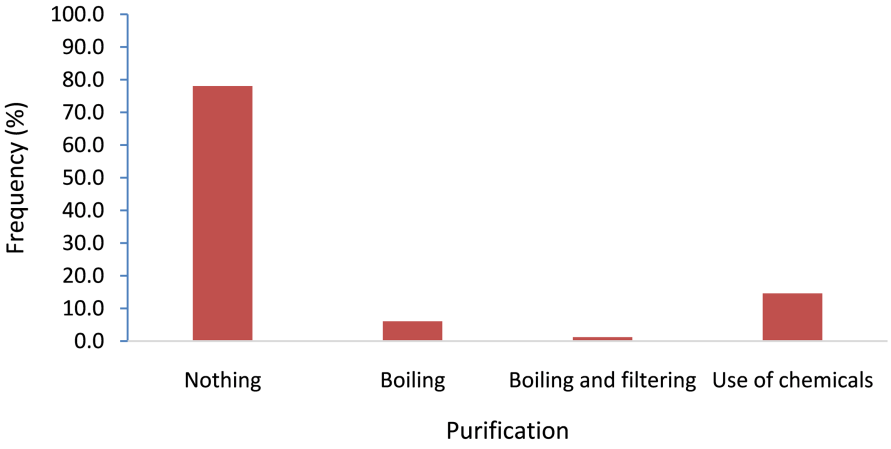


Figure 5. Type of purification undertaken for drinking water.

According to the responses in Figure 6 below, 59.3% said that the quality of water collected from the forest was excellent, 37% said that the quality was good and 3.7% that the quality was fair. The excellent quality of water collected from the forest supports clean water and sanitation (SDG 6), promoting community health and well-being. Maintaining this quality is crucial for sustaining ecosystem services and achieving sustainable development goals.


Figure 6. Quality of water collected from the forest.

Figure 7 below shows that majority of the respondents (73.4%) had a problem with crop raiding animals from the forest while only 26.6% of them did not have a problem with this. Crop raiding animals from the forest pose challenges of ensuring zero hunger (SDG 2) and livelihoods. Addressing this issue requires balancing life on land (SDG 15) with the needs of local communities for sustainable development.

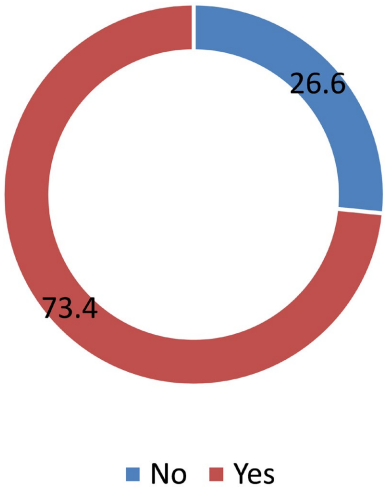


Figure 7. Problem with crop raiding animals from the forest.

According to the results in Table 9 below, the cases of crop-raiding animals from the forest were high among the respondents. The average cost of damage by hyenas, which was the highest, was Kshs. 265,000, whereas deer, mice, and rabbits had the lowest average cost of damage at Kshs. 5000 separately.

Table 9. Estimated damage caused by raiding wild animals.

| Animal | Average Cost of damage |
|---|---|
| Hyena | 265000.0 |
| Elephant | 100000.0 |
| Monkey | 26342.1 |
| Porcupine | 15000.0 |
| Antelope | 14250.0 |
| Birds | 11100.0 |
| Deer | 5000.0 |
| Mouse | 5000.0 |
| Rabbits | 5000.0 |
| Baboons | Unquantifiable |
| Dik dik | Unquantifiable |

**Continued**

| | |
|---|---|
| Gazelle | Unquantifiable |
| Leopard | Unquantifiable |
| Zebra | Unquantifiable |
| **Grand Total** | **33394.7** |

According to the outcome in Table 10 below, most of the respondents (61.4%) stated that the primary purpose for the establishment of the Masaai Mau reserve was due to environmental and biodiversity conservation. Many (26.5%) said it was because of providing raw materials for industry. Very few had reasons such as to reduce the impacts of global warming (0.8%), for animals to graze (0.8%), because of other places that benefit from the Mau proceeds (0.8%), to prevent soil erosion (0.8%), to protect water catching areas (0.8%). Maasai Mau Forest reserve promotes life on land (SDG 15), protect critical ecosystems, and safeguard water catchment areas, ensuring sustainable development and supporting the well-being of local communities.

Table 10. Main purpose for the establishment of the Maasai Mau Forest reserve.

| Main purpose for the establishment of the Maasai Mau Forest reserve | Frequency | Percentage |
|---|---|---|
| Environmental and biodiversity conservation | 81 | 61.4 |
| Creating more employment opportunities | 5 | 3.8 |
| Tourism | 5 | 3.8 |
| Provide raw materials for industry/ locals | 35 | 26.5 |
| I don't know | 1 | 0.8 |
| To reduce the impacts of global warming | 1 | 0.8 |
| For animals to graze | 1 | 0.8 |
| Because of other places that benefit from Mau proceeds | 1 | 0.8 |
| To prevent soil erosion | 1 | 0.8 |
| To protect water catching areas | 1 | 0.8 |
| **Total** | **132** | **100.0** |

According to Table 11, majority of the respondents (52.2%) found the economic service least important, while many found it somewhat necessary (22.4%) and most important (16.4). Very few found the economic service essential, and more important, 4.5%.

85.9% of the respondents said that subsistence farming was the most important, whereas 2.8% said that it was the least important. Subsistence farming can con-

tribute to zero hunger (SDG 2) and no poverty (SDG 1) by providing livelihoods and sustenance.

A more significant percentage of the responses (61.4%) was that cultural/ spiritual/worship was the least important. More critical being the most minor responses, both contributing 4.3%

Future use-values had 84.8% responses of most essential and 1.3% responses of important.

**Table 11.** Level of importance of the different services/values.

| Services/values | Level of importance [n, (%)] | | | | | N |
|---|---|---|---|---|---|---|
| | Least important | Somewhat important | Important | More important | Most important | |
| Economic (income) | 35 (52.2%) | 15 (22.4%) | 3 (4.5%) | 3 (4.5%) | 11 (16.4%) | 67 |
| Subsistence (Domestic uses) | 2 (2.8%) | 0 (0%) | 0 (0%) | 8 (11.3%) | 61 (85.9%) | 71 |
| Cultural/Spiritual/Worship | 43 (61.4%) | 8 (11.4%) | 13 (18.6%) | 3 (4.3%) | 3 (4.3%) | 70 |
| Future use values | 0 (0%) | 0 (0%) | 1 (1.3%) | 11 (13.9%) | 67 (84.8%) | 79 |

According to Figure 8 below, majority of the respondents (71.6%) stated that the Maasai Mau forest is well conserved. 25.9% stated that the forest is not well conserved while 2.5% had no idea. A well-conserved Mau Forest would significantly contribute to achieving life on land (SDG 15) by protecting and restoring terrestrial ecosystems, enhancing carbon sequestration, and preserving biodiversity, thereby mitigating climate change and supporting local livelihoods through sustainable use of forest resources.

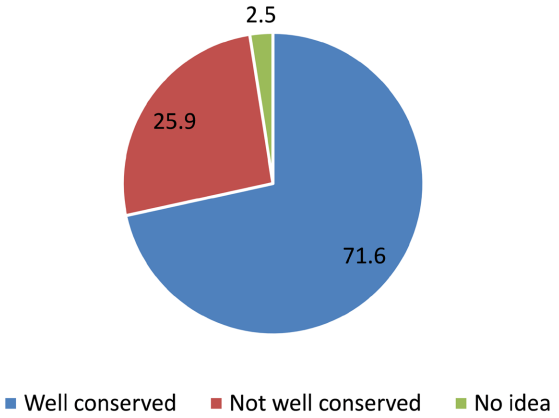


**Figure 8.** Status and management of Maasai Mau Forest.

Figure 9 below shows that majority of the respondents (66.3%) agreed that there are species of trees/ plants/ animals that may have disappeared over the years while 33.8% did not agree. The disappearance of tree, plant, and animal species from the Mau Forest over the years implies a loss of biodiversity, which is crucial for ecosystem health, carbon sequestration, and the provision of ecosystem ser-

vices. This loss could exacerbate climate change impacts and undermine the forest's role in supporting local livelihoods and achieving SDG 15 (Life on Land) and SDG 13 (Climate Action).

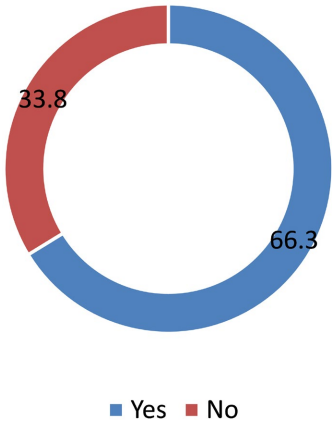


Figure 9. Species of trees, plants and animals that may have disappeared over the years.

Table 12 lists species of trees/ plants/ animals that may have disappeared over the years. 25.3% of the respondents stated that white cedar has disappeared over the years, 18.7% stated red cedar, 12.1% stated rhinos, 7.7% stated Colombus monkeys, and 6.6% stated antelopes. The least respondents stated hippos, Olosesie, Oltiyani, Olosesiai, Oreteti, bushback, bamboo, and gazelle, all having 1.1%.

Table 12. Species of trees, plants and animals that may have disappeared over the years.

| List species of trees, plants and animals that may have disappeared over the years | Frequency | Percentage |
|---|---|---|
| White cedar | 23 | 25.3 |
| Red cedar | 17 | 18.7 |
| Rhinos | 11 | 12.1 |
| Colombus monkeys | 7 | 7.7 |
| Antelopes | 6 | 6.6 |
| Buffalos | 3 | 3.3 |
| Chimpanzee | 3 | 3.3 |
| Cedars | 3 | 3.3 |
| Cheetahs | 2 | 2.2 |
| Olive | 2 | 2.2 |
| White podos | 2 | 2.2 |
| Wild pigs | 2 | 2.2 |
| Gorillas | 2 | 2.2 |

**Continued**

| | | |
|---|---|---|
| Hippos | 1 | 1.1 |
| Olosesie | 1 | 1.1 |
| Oltiyani | 1 | 1.1 |
| Olosesiai | 1 | 1.1 |
| Oreteti | 1 | 1.1 |
| Bushback | 1 | 1.1 |
| Bamboo | 1 | 1.1 |
| Gazelle | 1 | 1.1 |
| **Total** | **91** | **100.0** |

Table 13 below shows that 35.5% of the respondents suggested tree planting as the best way of conserving the Maasai Mau forest. 25.2% suggested fencing, and 18.7% suggested tightening security measures, whereas creating policies that govern the restoration, training on the importance of eco-tourism, avoiding grazing inside the forest, avoiding deforestation, and formation of CBOs to engage in tree planting individually all had 0.9%. The best way of conserving the Mau Forest involves integrated, multisectoral solutions that balance economic growth, food security, and climate change objectives, ensuring the forest's role in achieving SDG 15 (Life on Land) and contributing to a healthier planet.

Table 13. Suggestion on the best way of conserving Maasai Mau Forest.

| Suggestion on the best way of conserving Maasai Mau Forest | Frequency | Percentage |
|---|---|---|
| Tree planting/afforestation | 38 | 35.5 |
| Fencing i.e. electric fencing | 27 | 25.2 |
| Tighten security measures i.e. employ more security | 20 | 18.7 |
| Scouting | 5 | 4.7 |
| Planting trees of different species | 5 | 4.7 |
| Educating locals on importance of forest conservation and reforestation | 3 | 2.8 |
| Prevent/stop people from encroachment | 3 | 2.8 |
| Create policies that govern the restoration | 2 | 1.9 |
| Training on importance of eco-tourism | 1 | 0.9 |
| Avoid grazing inside the forest | 1 | 0.9 |
| Avoid deforestation | 1 | 0.9 |
| Formation of CBO' s to engage in tree planting | 1 | 0.9 |
| **Total** | **107** | **100.0** |

In regards to conserving Maasai Mau conservancy project, Figure 10 below shows that majority of the respondents (98.8%) supported the project while 1.2% did not support the project.

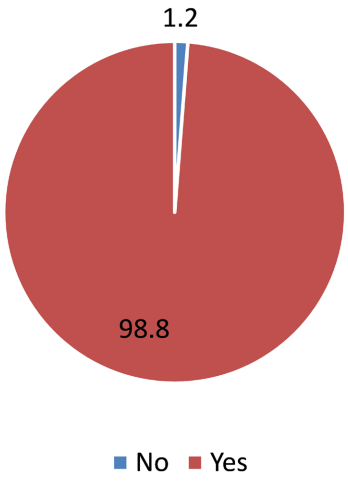


Figure 10. Support for the project.

According to Table 14, most respondents (68.1%) stated they would contribute to the project to ensure that the forest remains in a good state for cultural and spiritual values by tree planting and 8.8% by fencing the forest. Others by enlightening farmers on the importance of agroforestry (1.1%), guarding the forest (1.1%), stopping deforestation (1.1%), enforcing policies (1.1%), and lessening charcoal and timber production (1.1%). The reason for not contributing to the project was that the respondents had forests that provided them with many products.

Table 14. Contribution to the project to ensure that the forest remains in a good state for cultural and spiritual values.

| Contribution to the project to ensure that the forest remains in a good state for cultural and spiritual values | Frequency | Percentage |
|---|---|---|
| Enlighten farmers on importance of agroforestry | 1 | 1.1 |
| Scouting | 2 | 2.2 |
| Tree planting | 62 | 68.1 |
| Create awareness on dangers of deforestation | 2 | 2.2 |
| Regularly monitor forest encroachers and raise alarm | 4 | 4.4 |
| Guard the forest/ protect the natural trees | 1 | 1.1 |
| Advocate for forest conservation/ restoration | 4 | 4.4 |
| Stop deforestation | 1 | 1.1 |
| Enforce policies | 1 | 1.1 |
| Lessen charcoal and timber production | 1 | 1.1 |

**Continued**

| | | |
|---|---|---|
| Planting of more tree species | 4 | 4.4 |
| Fencing of the forest/ trees | 8 | 8.8 |
| **Total** | **91** | **100.0** |

Different sizes of land have various uses. According to the Table 15 below, the majority of the land (7.87 Acres) was a natural forest, 6.09 acres of land was used for pasture, 4.41 acres of land was used to grow cash crops, 3.41 acres was used to grow food crops, 3.19 acres of land was primarily wetlands/ marshy/ rocky areas and 3.01 acres of land was planted forest.

Table 15. Size of land for the different uses.

| Land use | Average Size (acres) |
|---|---|
| Natural forest/woodland | 7.87 |
| Pasture land | 6.09 |
| Cash crop | 4.41 |
| Food crops (pyrethrum, wheat, tea) | 3.41 |
| Wetlands/marshy/rocky areas | 3.19 |
| Planted forest (woodlot) | 3.01 |
| **Grand Total** | **5.12** |

Table 16 below shows that amongst owned livestock, cattle had the highest average number owned being 46 followed by sheep being 30 the goats and chicken/ ducks/ geese both being 20. Rabbits, donkeys and pets had an average number of 5, 3, and 2 respectively.

Table 16. Livestock ownership.

| Livestock type | Average Number |
|---|---|
| Cattle | 46 |
| Sheep | 30 |
| Goats | 20 |
| Chicken/ Ducks/ Geese | 20 |
| Rabbits | 5 |
| Donkeys | 3 |
| Pets | 2 |
| **Grand Total** | **25** |

According to Table 17 below, the income-generating activity earning the highest average gross income is livestock sales, earning Kshs.148,107, followed by income from business earning Kshs.90,370, then payment for renting out land and salary, each earning Kshs.90,000.

Remittances and boda boda recorded the lowest earnings of Kshs.18615.4 and Kshs.12,000, respectively.

Table 17. Income generating activities and average amount earned.

| Income source | Average Gross income in 2021/2022 (Kshs) |
|---|---|
| Livestock sales | 148107.1 |
| Income from business | 90370.0 |
| Payment for renting out land | 90000.0 |
| Salary | 90000.0 |
| Farming (annual crops) | 64202.7 |
| Livestock products (milk, wool, hides, skin) | 45594.6 |
| Income from residential/ commercial buildings | 36666.7 |
| Remittances | 18615.4 |
| Boda boda | 12000.0 |
| **Grand Total** | **82661.8** |

Table 18 below shows that agriculture recorded the highest value of quantity input for agricultural production at 22,805 while livestock recorded a value of 18145.6 for livestock production.

Table 18. Quantities of inputs used in agricultural and livestock production.

| Quantities of inputs used in agricultural and livestock production | Value |
|---|---|
| Agricultural | 22805 |
| Livestock | 18145.6 |
| **Grand Total** | **20808.1** |

According to Figure 11, 74.4% of the respondents have not had an account with financial/ credit institutions in the last 5 years while 25.6% have had an account with financial/ credit institutions in the last 5 years.

Regarding Table 19, there is a total N of 27 respondents with savings accounts. The mean amount available in accounts for those with a savings account is 44788.89, and the standard deviation showing the spread is 68455.22, which is a high extent of variation.

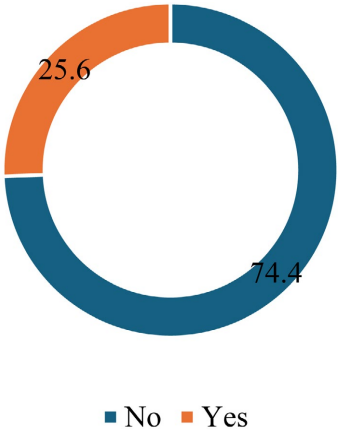


Figure 11. Whether they have had an account with financial/credit institutions in the last 5 years.

Table 19. Average amount available in accounts for those who have a savings account.

| Statistics | Savings in account |
|---|---|
| N | 27 |
| Mean | 44788.89 |
| Std. Deviation | 68455.220 |
| Minimum | 100 |
| Maximum | 300,000 |

According to Figure 12 below, majority of the respondents (87.5%) have not received any formal credit in the last 5 years whereas 12.5% have received formal credit in the last 5 years.

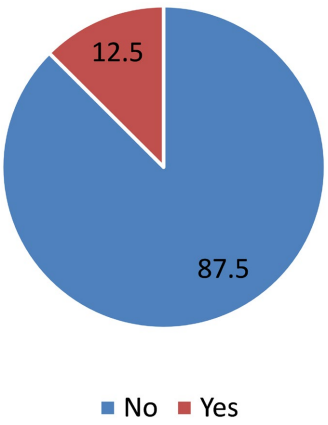


Figure 12. Receipt of any formal credit in the last 5 years.

As shown in Figure 13, majority of the respondents (88.8%) are not a member of an environmental conservation group while 11.3% are a member of any environmental conservation group.

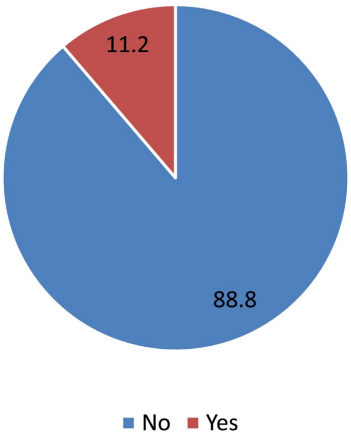


Figure 13. Member of an environmental conservation group.

Figure 14 below shows that majority of the respondents (64.2%) are self-sufficient in food throughout the year whereas 35.8% of the respondents are not self-sufficient in food throughout the year.

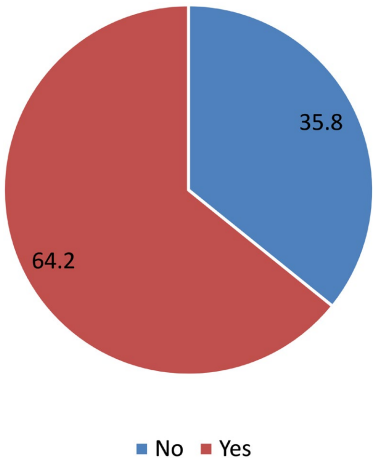


Figure 14. Self-sufficiency in food throughout the year.

According to Table 20, during all the months stated, food was either scarce or expensive due to various reasons.

In April, the main reason food was scarce was drought (37.5%). Other reasons included reduced harvest, inadequate rains, crops being in early stages, and planting season, all contributing to 12.5% of food scarcity.

In May, food was scarce for reasons such as low supply (25%), old stock being finished, and crops at the flowering stage (25%) being the main reasons. Reduced harvest (12.5%), locust invasion (12.5%), heavy investment period (12.5%), and it being the planting season (12.5%) were also some of the reasons.

Old stock being finished and crops being at the flowering stage were 42.9% of why food was scarce in June. Crops being in early stages was 28.6% of the reason food was scarce in June, and reduced harvest and inadequate rains contributed 14.3% each to food being scarce in June.

Table 20. Months that food are scarce or expensive and reason.

| Reason [n, (%)] | Months that food are scarce or expensive | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | April | May | June | September | August | February | March | January | July |
| Reduced harvest/poor harvest | 1 (12.5%) | 1 (12.5%) | 1 (14.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Selling to purchase household goods | 0 (0%) | 0 (0%) | 0 (0%) | 1 (100%) | 1 (50%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Lack of rains/inadequate rans | 1 (12.5%) | 0 (0%) | 1 (14.3%) | 0 (0%) | 0 (0%) | 1 (16.7%) | 2 (28.6%) | 2 (14.3%) | 0 (0%) |
| Low supply | 1 (12.5%) | 2 (25%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (7.1%) | 0 (0%) |
| Locust invasion | 0 (0%) | 1 (12.5%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Lack of money to purchase | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (14.3%) | 0 (0%) | 0 (0%) |
| Drought | 3 (37.5%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 (33.3%) | 2 (28.6%) | 5 (35.7%) | 0 (0%) |
| Heavy investment period and crops haven't ripened | 0 (0%) | 1 (12.5%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (16.7%) | 1 (14.3%) | 3 (21.4%) | 0 (0%) |
| Old stock is finished and crops are at flowering stage | 0 (0%) | 2 (25%) | 3 (42.9%) | 0 (0%) | 1 (50%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 (40%) |
| School fees payment from field proceeds | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (20%) |
| Crop in the fruition period/early stages | 1 (12.5%) | 0 (0%) | 2 (28.6%) | 0 (0%) | 0 (0%) | 1 (16.7%) | 1 (14.3%) | 2 (14.3%) | 2 (40%) |
| Being the planting season | 1 (12.5%) | 1 (12.5%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (16.7%) | 0 (0%) | 1 (7.1%) | 0 (0%) |
| **N** | **8** | **8** | **7** | **1** | **2** | **6** | **7** | **14** | **5** |

The only reason food was scarce in September was due to selling it to purchase household goods.

In August, food was scarce and expensive due to two reasons: selling it to purchase household goods (50%) old, stock being finished, and crops being at the flowering stage (50%)

One of the reasons food was scarce in February, first and foremost, is drought (33.3%). Due to inadequate rains and heavy investment periods, crops have not ripened, the crops are in the early stages, and it is the planting season. All these contributed 16.7% to the reason food was scarce in February.

Food was mainly scarce in March because of inadequate rains (28.6%) and drought (28.6%). Other reasons included lack of money to purchase (14.3%), heavy investment period crops that have not ripened (14.3%), and crops being in early stages (14.3%).

Drought was the main reason food was scarce in January, contributing 35.7%. Other reasons included heavy investment periods, crops that have not ripened (21.4%), inadequate rains, and the crops being in early stages individually contributing 14.3% also, low supply, and it is the planting season, each contributing 7.1%.

In July, the main reasons were that old stock was finished, crops were at the flowering stage, and the crops were in early stages, individually contributing 40%

to the food being scarce. School fees payment from field proceeds also contributed 20% to this.

According to Table 21, the total number of respondents that stated they were self-sufficient was N is 57. The mean and standard deviation of the duration of self-sufficient months is 10.25 and 1.985 respectively.

Table 21. Duration of self-sufficiency (months).

| Statistics | Duration of self-sufficiency (months) |
|---|---|
| N | 57 |
| Mean | 10.25 |
| Std. Deviation | 1.985 |
| Minimum | 5 |
| Maximum | 12 |

Regarding Figure 15 below, majority (78%) of the respondents' households have not faced any major crisis in the last 5 years while 28% of the households have faced major crisis in the last 5 years.

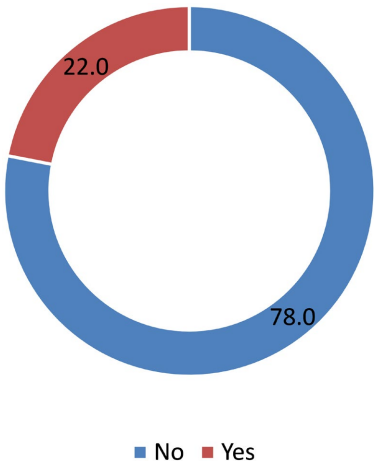


Figure 15. Whether household have faced any major crisis in the last 5 years.

According to the results in Table 22, many of the respondents (41.2%) coped with the crisis by selling assets such as land and livestock. 26.5% spent cash saving as a coping strategy, and 23.5% did extra casual labour work. A few asked for assistance from friends and relatives and got loans from money lenders, covering 5.9% and 2.9% of the respondents, respectively.

Comparing the average units of assets owned as shown in Table 23 below, the plough recorded three units, the highest record; the car recorded two units, and all the other assets recorded 1 unit.

The tractor asset recorded the highest resale value and highest average computed value of 1,251,250 and 1,275,000, respectively, followed by the asset car, re-

cording 550,000 and 1,050,000, respectively. The asset chainsaw recorded the lowest resale value and the lowest average computed value, both being 550.

Table 22. Coping strategy with the crisis.

| Coping strategy with the crisis | Frequency | Percentage |
|---|---|---|
| Sell assets (land, livestock, etc.) | 14 | 41.2 |
| Spend cash savings | 9 | 26.5 |
| Do extra casual labour work | 8 | 23.5 |
| Assistance from friends and relatives | 2 | 5.9 |
| Get loan from money lender, welfare association, bank etc. | 1 | 2.9 |
| **Total** | **34** | **100.0** |

Table 23. Asset ownership.

| Asset | Average Units owned | Average Respondent valuation (resale value of all units) | Average Computed value |
|---|---|---|---|
| Bicycle | 1 | 120000.0 | 120000.0 |
| Car/truck | 2 | 550000.0 | 1050000.0 |
| Cassette/CD/VHS/VCD/DVD/Player | 1 | 1850.0 | 1850.0 |
| Cell phone/Phone | 1 | 4040.9 | 5577.3 |
| Chainsaw | 1 | 550.0 | 550.0 |
| Furniture | 1 | 7920.5 | 9472.7 |
| Motorcycle | 1 | 73333.3 | 68888.9 |
| Plough | 3 | 21887.3 | 22318.2 |
| Radio | 1 | 1986.6 | 2006.1 |
| Solar panel | 1 | 20283.3 | 21311.9 |
| Stove for cooking (gas or electric only) | 1 | 4769.2 | 4769.2 |
| Tractor | 1 | 1251250.0 | 1275000.0 |
| TV | 1 | 19375.0 | 21875.0 |
| Water pump/Money maker | 1 | 9550.0 | 9550.0 |
| Wooden cart or wheelbarrow | 1 | 4166.7 | 4166.7 |
| Grand Total | 1 | 33556.4 | 39525.0 |

As shown in Table 24, many of the respondents (23.1%) commented that there should be continued tree planting, 16.7% said that there should be increased security in forests, 13% commented that fencing should be done, 9.3% said that there should be provision of tree seedlings, 8.3% said that the forest should be

preserved. A minority of the responses included creating awareness of the dangers of deforestation, promoting eco-tourism, government subsidies for inputs, stopping charcoal burning, provision of exotic tree seedlings, restriction of personal entry in the forest, commenting on the good that has been done in restoring the Mau and for the government to implement conservation strategies each of these covering 0.9% of the responses.

Table 24. Any other comments on conservation of Maasai Mau.

| Any other comments | Frequency | Percentage |
|---|---|---|
| Tree planting | 25 | 23.1 |
| Increase security in forests | 18 | 16.7 |
| Fencing | 14 | 13.0 |
| Provision of tree seedlings | 10 | 9.3 |
| Forest should be preserved/ conserved | 9 | 8.3 |
| Awareness creation on importance of forest restoration | 7 | 6.5 |
| Government should put strict policies to govern forest restoration | 6 | 5.6 |
| Scouting | 3 | 2.8 |
| Eviction of encroachers | 2 | 1.9 |
| Training on tree planting and scouting methods | 2 | 1.9 |
| Involve public participation | 2 | 1.9 |
| Planting indigenous trees | 2 | 1.9 |
| Creating awareness on dangers of deforestation | 1 | 0.9 |
| Promote eco-tourism | 1 | 0.9 |
| Government subsidies for inputs | 1 | 0.9 |
| Stop charcoal burning | 1 | 0.9 |
| Provision of exotic tree seedlings | 1 | 0.9 |
| Restrict persons entry | 1 | 0.9 |
| Commenting on the good that has been in restoring the Mau | 1 | 0.9 |
| Government to implement conservation strategies | 1 | 0.9 |
| **Total** | **108** | **100.0** |

## 6. Conclusion

Based on the study findings, the multifaceted nature of forest dependency among the Maasai community encompasses traditional practices, economic activities, and cultural significance, underscoring the integral role in achieving several United Na-

tions Sustainable Development Goals (SDGs). The forest's role in water catchment, biodiversity conservation, and carbon sequestration underscores its importance for clean water and sanitation (SDG 6), life on land (SDG 15), and climate action (SDG 13). Economically, the forest supports local livelihoods through subsistence agriculture, livestock rearing, and tourism, contributing to no poverty (SDG 1) and zero hunger (SDG 2). The economic valuation of forest resources highlights their substantial contribution to household income and the broader local economy, emphasizing the importance of recognizing both market and non-market values in forest management strategies contributing to SDGs 1 (No Poverty), 2 (Zero Hunger), and 8 (Decent Work and Economic Growth). Additionally, the research identifies challenges related to governance, land tenure, and external pressures, emphasizing the need for participatory approaches, community empowerment, and policy interventions that reconcile conservation objectives with socio-economic realities. Overall, the study underscores the importance of holistic and context-specific approaches to forest management that prioritize the well-being of both people and nature, advocating for collaborative efforts to promote sustainable forest use, enhance community resilience, and safeguard ecosystem integrity. The use of mushrooms or thatch grass for Sustainable Development Goals (SDGs) like Zero Hunger or Clean Water is justified by their broader functional roles in local livelihoods. Mushrooms contribute to food diversity and dietary supplementation, supporting SDG 2 (Zero Hunger). Likewise, thatch grass helps in watershed protection and sustainable land use, indirectly supporting SDG 6 (Clean Water and Sanitation). These linkages highlight the multifaceted value of forest resources in advancing community resilience and sustainability.

## 7. Recommendations

Strengthen Community Participation and Empowerment: Foster inclusive decision-making processes that involve local communities in forest management and governance, ensuring their voices, knowledge, and rights are recognized and respected. Facilitate capacity-building initiatives, training programs, and awareness campaigns to empower communities to engage in sustainable forest management practices.

Enhance Forest Governance and Land Tenure Security: Implement policies and legal frameworks that support community-based natural resource management (CBNRM) and recognize customary land rights, ensuring equitable access to forest resources and benefits. Strengthen institutional mechanisms for conflict resolution, law enforcement, and resource tenure regularization to address governance challenges and mitigate land and resource use conflicts.

Promote Sustainable Livelihood Diversification: Encourage the development of alternative income-generating activities and livelihood strategies that reduce dependency on forest resources while improving household resilience to environmental shocks and socio-economic vulnerabilities. Support the establishment of sustainable agroforestry systems, eco-tourism initiatives, and value-added enter-

prises that harness the economic potential of forests while conserving ecosystem integrity.

Invest in Forest Conservation and Restoration: Allocate resources and implement measures to halt deforestation, mitigate land degradation, and restore degraded forest ecosystems, emphasizing the importance of biodiversity conservation, watershed protection, and carbon sequestration. Promote sustainable land-use practices, reforestation programs, and community-led conservation initiatives that enhance ecosystem resilience and support long-term ecological sustainability.

Foster Collaboration and Partnerships: Facilitate multi-stakeholder collaboration, partnerships, and knowledge-sharing platforms that bring together government agencies, non-governmental organizations (NGOs), academia, local communities, and other stakeholders to coordinate efforts, share best practices, and leverage resources for sustainable forest management. Foster synergies between conservation objectives, development priorities, and community aspirations to promote integrated forest conservation and community development approaches.

## Ethical Approval

The authors have completely observed ethical issues (including plagiarism, informed consent, misconduct, data fabrication or falsification, double publication, and redundancy).

## Acknowledgements

The authors express their gratitude to the Maasai Mau Community for their willingness to share their information on forest use and the value of forest resources to local communities. Thanks to research assistants and local administrative officials in the study areas for their support during data collection. Special thanks are due to Kenya Forest Research Institute for financing this study.

## Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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