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CHALLENGES AFFECTING CONSERVATION AREAS WITH UNSUSTAINABLE HARVESTING OF THE MOPANE WORMS

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Abstract

Challenges affecting conservation areas with unsustainable harvesting of the Mopane worms This study explored the challenges affecting conservation areas with unsustainable harvesting of the Mopane worms. It was observed that conservation areas in South Africa continued to use pesticides and deforestation, which could potentially lead to the extinction of Mopane worms. Pesticides were found to damage the leaves of Mopane trees, adversely affecting the mass production of Mopane worms. As Mopane worms are an indigenous staple crucial for local livelihoods, their decline poses significant concerns for the communities dependent on them. The overharvesting of Mopane worms without adequate ecosystem protection led to environmental unsustainability. This study highlighted the need for conservation areas to adopt alternative pest control methods and avoid deforestation to protect Mopane worm breeding habitats. The study was guided by the Afrocentricity Theory developed by Molefi Kete Asante in 2020, which emphasizes recognizing African values and perspectives. A qualitative research design was employed, utilizing purposive and snowball sampling methods for selecting participants. Semi-structured interviews were conducted, and thematic data analysis was used to interpret the findings. Data saturation was achieved with the 13th participant. The study revealed that sustainable management and harvesting practices are essential for preserving Mopane worms for future generations. Implementing integrated pest management strategies and promoting conservation practices that do not compromise Mopane worm habitats are crucial for ensuring the long-term viability of Mopane worm populations. The study concluded that balancing conservation efforts with local economic needs is vital for the sustainable harvesting of Mopane worms. Effective measures must be taken to mitigate environmental impacts while supporting the livelihoods of the local communities.

Keywords: ***Conservation, Harvesting, Indigenous food, Mopane worms, Sustainable management, Unsustainable.***

INTRODUCTION

Many conservation areas have attempted to shift away from the narrow-minded and trade protectionism approaches that have characterized many of their histories toward a mode of thinking that embraces just and fair benefit-sharing processes and approaches, with a particular emphasis on rural neighbours. According to Dube and Chitakira (2024), Most conservation areas, such as private game parks and farms, continue to use pesticides to eliminate pests. These pesticides may harm the tree leaves of Mopane trees, resulting in a negative effect on Mopane worm mass production due to a lack of leaves on which the Mopane worms can survive. Mopane worms are called caterpillars of the emperor moth 'Imbrasia Belina,' and they feed on the leaves of the Mopane tree (Makhado et al., 2014). Trees, including *Carissa grandiflora, Diospyros, Ficus, Rhus, Sclerocarya caffra, Terminali*a, and *Trema,* are breeding grounds for Mopane worms. There is a need to implement measures in conservation areas to develop alternate pest eradication methods and avoid deforestation that does not harm the breeding trees.

Unsustainable commercial harvesting techniques are being used. According to Ndlovu et al. (2019), no laws and procedures for harvesting Mopane worms in Zimbabwe's rural districts of Chikombedzi and Mwenezi threaten their supply. Similar observations have been made in South Africa, for example, a study was conducted on Mopane worm harvesting techniques in Limpopo Province and discovered that sustainable harvesting was not practiced. Contends that poverty is the motivation behind Mopane worm overharvesting at the expense of environmental sustainability. Literature calls for a sustainable collection of Mopane worms to safeguard and conserve this resource. Sustainable harvesting practices enable population levels to be maintained or even increased over time. Ndlovu et al. (2019) state that the challenge of establishing sustainability grows in direct proportion to the intensity and frequency with which resources are harvested. As a result, various parties must work together to address this dilemma. A balance between forest resource consumption and sustainability must be mandated through sustainable harvesting practices.

Literature Review

This section presents the literature review of the study.

According to Polit & Beck (2020), A literature review is defined as an academic assessment that involves the critique and analysis of recent and old literature.

Theoretical Framework

This section discusses the theoretical framework and its application to this study.

Theories are developed to explain forecast, and comprehend phenomena as well as, frequently, to question and broaden existing knowledge within the parameters of critical boundary claims. This study is grounded on the Afrocentricity theory, which was conceptualized by Molefi Kete Asante in 2009. According to Asante, Afrocentricity is an approach that prioritizes African interests, values, and perspectives, emphasizing the importance of African historical narratives in the continent's development (Asante, 2020). This cultural worldview encourages Africans to take pride in their heritage and Indigenous knowledge systems, recognizing their significance in contemporary society.

Afrocentricity is especially pertinent to this research as it highlights Africans' importance in prioritizing their indigenous cultural practices over external influences (Obenga, 2020). The theory underscores the need for African Indigenous groups to honour and utilize their traditional ecological knowledge, including sustainable practices surrounding harvesting Mopane worms. This resource provides nutritional benefits and plays a critical role in the cultural identity of various communities. However, the increasing demand for Mopane worms has led to unsustainable harvesting practices within these communities, threatening both the resource and the traditional ways of life. Using the Afrocentricity framework, this study underscores the importance of incorporating African indigenous knowledge systems into resource management strategies, fostering sustainability and cultural pride.

Overharvesting

According to Makhado et al (2014), Overharvesting of Mopane worms has contributed to the decline of this forest resource. The reasons for overharvesting include food shortages that cause a demand for food supply, and the trading of Mopane worms to generate income. This is the result of the absence of harvesting guidelines or regulations, or even failure to implement them, therefore, trading of the resource has increased and intensified harvesting competition among the local and outsiders. Ultimately, this also affects the worms' life cycle. In other cases, overharvesting results in the destruction of the Mopane trees, and this threatens the survival of the remaining worms (Bara, Sithole & Macheka, 2022). The problem has elevated areas that used to have the resource in abundance, while they have not experienced any outbreak for some time.

Deforestation

A survey of literature shows that uncontrolled harvesting of forest products has increased in South Africa, and this, in some instances, leads to deforestation. Activities that lead to deforestation include cutting down trees, including the Mopane trees, to clear land that is needed for crop production, the trees are a source of firewood, the trees are also used for fencing, and in the construction of houses (Makhado et al., 2014). Deforestation destroys the host trees and, in turn, the leaves that are consumed by Mopane worms. In the end, the worm will not survive as there will be no more food to consume; at the same time, population regeneration will be affected, thus threatening the extinction of the resources (Okyere, 2023).

Bush fires

Bush fires take place both within and outside urban areas and can widespread all over. The bush fire tends to be difficult to prevent from occurring, but proper mitigation can minimize the disaster on human and environment. Bush fires have influence on reducing the Mopane woodland and as a result browse quality is reduced and this reduces the population decline. However, there have been attempts to conserve woodlands to maintain a balance between harvesting and conservation (Baiyegunhi et al., 2016).

Research methodology

Methodology is also understood as a research approach that summarises how research is conducted. The study was qualitative and explorative, and the researcher collected data using semi-structured interviews (Bryman & Bell, 2020). The researcher chose to use semi-structured interviews because semi-structured interview is an interaction in which there is no strictly formalized list of questions that interviews follow, although there are outlined topics, which are organized by the research questions (Cresswell & Plano Clark 2022). The qualitative research design main aim was to focus on challenges affecting conservation areas with unsustainable harvesting of the Mopane worms, as explained above. The qualitative research design was relevant to this study because it is based on a philosophical state about the interpretations of the social world and how it is understood, experienced, and produced concerning challenges affecting conservation areas with unsustainable harvesting of the Mopane worms. This was done because the researcher wanted to learn different perspectives that participants shared. semi-structured interviews allowed the researcher to capture the emotions and attitudes of the participants on the challenges affecting conservation areas with unsustainable harvesting of the Mopane worms. A research team pertains to a group of people or individuals who collaboratively work together on the purpose of establishing new data on a selected study of choice (Stanley & Anderson, 2020. For purposes of this study, the research team consisted of rural householders (5), mopane worm traders (4), and indigenous knowledge holders (4) of Vhembe District Municipality, namely Ha-Gumbu, Matiyani , and Bokmakiries.

Challenges affecting conservation areas with unsustainable harvesting of the Mopane worms

Decline in Mopane worm populations

Makhado et al. (2021) report that unsustainable harvesting practices, coupled with habitat destruction, have led to a notable decrease in Mopane worm populations, impacting both ecological balance and local economies.

“Ho no vhesa na u fhungudzea ha tshivhalo tshinzhi kha ya mbalo ya mashonzha u swika kha tshifhinga tsha zwino, zwi konda u wana mashonzha zwino.”

Translated version:

"We have seen a significant decrease in the number of Mopane worms over the past few years. It’s becoming harder to find them."

“Ro vha rina mashonzha manzhi fhedzi ari tsha kona u tshila ro ḓitika nga nga mashonzha u nga kale.”

Translated version:

"The worms used to be plentiful, but now we can’t rely on them for our livelihood as much as we used to."

“U sa wanelesa ha mashonzha zwi kho fhiledza. Nyofho khulwane ndi uri a nga fhela asi tsha wanala arali ha sa dzhiwa maga.”

Translated version:

"The decline in Mopane worm populations is worrying. We fear that they might disappear if nothing is done.”

The above discussion showed that the declining populations of Mopane worms have become a major concern for those who depend on them for their livelihood. Over recent years, harvesters have noticed a significant decrease in the number of worms available, making it increasingly difficult to find them. This reduction not only affects their immediate ability to gather the worms but also threatens their long-term economic stability.

Habitat degradation

Habitat degradation caused by agricultural expansion and logging activities poses a significant threat to Mopane worm habitats. Similarly, Dube & Chitakira, 2024 illustrate that unsustainable land use practices, such as overgrazing and deforestation, are contributing to the degradation of Mopane woodlands, which are crucial for the survival of Mopane worms.

"Fhethu hune miri ya mipaini ya wanala hone hu kho shumiwa zwa ndimo zwino i ta uri mashonzha a konḓe u wanala."

Translated version:

"The areas where Mopane trees grow are being cleared for agriculture, reducing the habitat for the worms."

"U remiwa ha maḓaka zwina khaedu khulwane, nga uri zwi ita uri ha remeswa mipaini ri vha na mashonzha maṱuku kha ṅwaha."

Translated version:

"Deforestation is a big problem. We see fewer Mopane trees each year, which means fewer worms."

The study discovered that the ongoing deforestation and land conversion for agricultural purposes are severely impacting the habitat of Mopane worms. As areas previously covered with Mopane trees are cleared, the natural environment that supports these worms is being rapidly diminished. The study also discovered that this loss of habitat is directly linked to a decline in the Mopane worm populations, further exacerbating the challenges faced by harvesters.

Biodiversity loss

The decline in Mopane worm populations leads to significant biodiversity loss, affecting other species that rely on them for food and ecological interactions.

As participant 3, 12 and 9 observe:

"U fhungudzea ha tshivhalo tsha mashonzha zwina masiandoitwa mavhi kha" zwine zwipuka zwino tshila nga u ḽa zwone."

Translated version:

"The decrease in Mopane worms affects other species that rely on them as a food source".

"U xelelwa nga mashonzha zwi amba uri r ikhou ḓo xelelwa nga zwimelwa na zwipuka zwino tshila nga mashonzha."

Translated version:

"Losing the Mopane worms means we're also losing other plants and animals that depend on the same habitat."

"U khakhisea ha vhupo vhukati ha zwipuka na zwimela zwikho i twa nga zwithu zwine vhathu vha i ta."

Translated version:

"Biodiversity in our area is declining because the ecosystems are being disturbed by unsustainable practices."

The above response indicated that the decline in Mopane worm populations is having a cascading effect on local ecosystems, impacting not only the worms themselves but also the broader web of species that depend on them. As Mopane worms are a key food source for various animals, their reduction is causing disruptions throughout the food chain. Additionally, the loss of Mopane worms is indicative of broader environmental changes affecting other plant and animal species within the same habitat.

Conflicts between conservation and livelihoods

According to Simelane and Kerley (2020), conflicts between conservation policies and local livelihoods arise when regulatory frameworks fail to incorporate the socio-economic needs of local communities. Moreover, these indicate that balancing conservation efforts with the livelihoods of local communities requires an inclusive approach that considers both ecological sustainability and economic necessities.

As Participants 7, 8, and 2 express:

"Ri tshila nga u rengisa mashonzha fhedzi milayo ya u a bata ndi yone i no konda."

Translated version:

"We depend on Mopane worms for our income, but conservation rules make it difficult to harvest them."

"Hu dzulela u vha na khuḓano vhukati ha milayo ya u langa vhupo na vhabati vha mashonzha."

Translated version:

"There's always a conflict between protecting the environment and making a living from Mopane worms."

"Milayo ya tsireledza vhupo a i sedzi ṱhoḓea ya miṱa i no tshila nga mashonzha."
Translated version:
"Conservation efforts don't consider our need to sustain our families, leading to tensions with authorities."
The majority of participants said that balancing environmental conservation with the economic needs of local communities presents a significant challenge. Harvesters who rely on Mopane worms for their income often find themselves in conflict with conservation rules that restrict their activities. These regulations, while important for environmental protection, can undermine the livelihoods of those who depend on harvesting Mopane worms to sustain their families, leading to tensions with authorities and difficulties in reconciling conservation goals with economic realities.

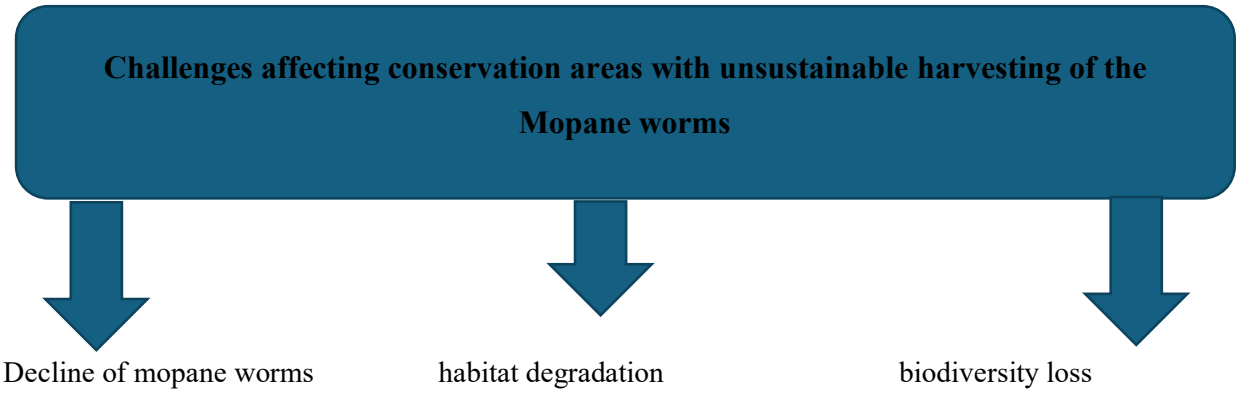

Figure 1. Challenges affecting the area with unsustainable harvesting of the Mopane

The results of the study indicated that the decline in Mopane worm populations is a pressing concern, as highlighted by respondents who observe fewer Mopane worms during the harvesting season. This decline is attributed to several factors, including overharvesting, habitat loss, climate change, and increased predation. The study discovered that habitat degradation poses a significant threat to Mopane worm populations, and immediate action is required to address this issue. The respondents frequently mentioned the negative impact of agricultural expansion, deforestation, and overgrazing on the habitats of Mopane worms. The study also discovered that biodiversity loss extends beyond ecological functions to the cultural and economic aspects of local communities. Many respondents expressed concerns about the loss of traditional knowledge and cultural practices associated with Mopane worm harvesting.

CONCLUSION

The study highlights the multifaceted challenges faced by Mopane worm harvesters in conservation areas, with a focus on Bokmakieries Farm in the Vhembe District. Key issues identified include legal and regulatory barriers, habitat degradation, biodiversity loss, and the decline in Mopane worm populations. These challenges are interconnected, with each exacerbating the others, leading to significant ecological, economic, and cultural impacts. The legal and regulatory framework presents a significant barrier to sustainable harvesting, with cumbersome permit processes and inconsistent enforcement undermining compliance. Habitat degradation due to agricultural expansion, deforestation, and overgrazing reduces the available habitat for Mopane worms, further contributing to their decline. Biodiversity loss is a critical concern, as the reduction in Mopane worm populations impacts other species and disrupts ecological functions. Addressing these challenges requires a holistic approach that integrates sustainable harvesting practices, community engagement, and supportive legal frameworks.

RECOMMENDATIONS

Recommendations for the community

- Encourage the adoption of sustainable harvesting techniques to ensure the long-term viability of the Mopane worm populations. This includes adhering to seasonal harvesting guidelines and leaving a portion of the population to mature and reproduce.
- Establish community-based management committees to oversee the sustainable use of the Mopane worms. These committees can facilitate cooperation among harvesters, ensure compliance with regulations, and promote best practices.

- Implement educational programs to raise awareness about the ecological importance of the Mopane worms and the impacts of overharvesting. These programs should target both adults and children to foster a culture of conservation.
- Strengthen communication and collaboration with local authorities to ensure that the legal and regulatory framework supports sustainable harvesting practices. This includes simplifying the permit process and providing clear information on legal requirements.

Recommendations for future studies

- There is a need for Longitudinal Studies to be conducted in future research. Conduct long-term studies to monitor the population dynamics of Mopane worms and the impacts of harvesting practices over time. This will provide valuable data for sustainable management.
- Perform detailed ecological impact assessments to understand the broader effects of the Mopane worm harvesting on the ecosystem, including plant biodiversity and soil health.
- Investigate the socio-economic factors influencing Mopane worm harvesting, including market dynamics, economic pressures, and cultural practices. This research can inform policies that balance economic needs with conservation goals.
- There is a need for research on the climate change effects study which aims to understand the impacts of climate change on Mopane worm populations and their habitats. Understanding these effects is crucial for developing adaptive management strategies.
- Conduct comparative studies between different regions and communities to identify best practices and successful conservation models that can be replicated in other areas.

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