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Title: *The Role of Nature Reserves in Advancing UN Sustainable Development Goals: Public and Private Contributions*

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Abstract:

This developmental paper explores the critical role nature reserves—public and private—play in advancing the United Nations Sustainable Development Goals (SDGs) related to biodiversity conservation, climate action, and sustainable communities. Using case studies from Africa, the research examines nature reserves' ecological, socio-economic, and policy impacts, emphasizing their contributions to sustainable tourism, endangered species protection, and community development. The study employs a comparative analysis of public and private reserves, supported by biodiversity indices, economic upliftment metrics, and carbon sequestration data. Early findings reveal the potential of nature reserves to act as engines of sustainable development while highlighting challenges such as funding constraints and human-wildlife conflicts. The discussion provides insights into policy integration and the benefits of collaborative public-private partnerships. Recommendations are offered to enhance the alignment of nature conservation efforts with regional and national SDG targets.

Keywords: Nature reserves, safari tourism, Sustainable Development Goals (SDGs), biodiversity, socio-economic impacts, Botswana

Introduction

In 2015, the United Nations General Assembly approved the 2030 Agenda for Sustainable Development, in which they defined a framework of 17 Sustainable Development Goals (SDGs) to concretely measure contributions on a state, local, and private level (<https://tourism4sdgs.org>). The goals are interconnected, as it is difficult to separate one initiative or one goal from another. However, they have been established to create a common framework so companies and countries can compare their results.

While there are 17 SDGs, it may be too ambitious to tackle them all simultaneously. Therefore, many governments and businesses have chosen the specific SDGs that affect them most or are the most prevalent to deal with first and foremost. For example, the tourism industry has identified SDG 8 – Decent Work and Economic Growth, SDG 12 – Responsible Consumption and Production, and SDG 14 – Life Below Water as the three pertinent goals (<https://tourism4sdgs.org>). SDG 8 is relevant as tourism is one of the most significant contributors to a country's Gross Domestic Product (GDP) (Mbaiwa, 2017); thus, ensuring decent work opportunities is crucial. SDG 12 focuses on how the tourism sector, a resource-intensive industry, needs to make intelligent decisions regarding the production and sourcing of its resources (<https://tourism4sdgs.org>). SDG 14 protects fragile marine ecosystems, as coastline destinations are popular with tourists (<https://tourism4sdgs.org>).

From a geographical perspective, the United Nations conducts yearly studies on the current state of affairs of the SDGs worldwide. In the latest 'Global Sustainable Development Report' ('GSDR') (2023), the UN was critical of the progress that had been made thus far toward the 2030 objectives that had been set. However, there is one important caveat: The COVID-19 pandemic had not been considered when preparing the ambitious goals for sustainability projects and initiatives. Many countries were well-intentioned but could not fulfill their goals ('GSDR', 2023).

From the 'GSDR' (2023), the UN summarized the situation in Africa as pre- and post-pandemic. For instance, Africa had made progress in "poverty reduction, maternal and child health, access to electricity, and gender equality. Overall, however, achievements of the Sustainable Development Goals were too slow" (p. 196). Nonetheless, while African countries may have made lower achievements on the SDGs than other continents, they also had fewer negative spillovers than other regions ('GSDR', 2023). Like all countries, Botswana suffered from a reduction in tourism, which affected investments and poverty levels in a particularly devastating manner after years of bordering on over-tourism (Mogende and Moswete, 2018). Thus, making progress in many SDG goals was unrealistic when money became tight, and priorities such as hunger, unemployment, and poverty dominated daily lives ('GSDR', 2023). Also, post-pandemic, while the situation has returned to pre-COVID numbers, growing conflicts between key stakeholders have become more prevalent (Gaodirelwe, Motsholapheko, and Masunga, 2020; Seleka, 2015). These include "increasing energy costs, disrupting trade and supply chains, and causing serious damage to tourism" ('GSDR', 2023, p. 99).

For African tourism, SDGs 8, 12, and 14 can be complemented by one particularity of Botswana tourism, which consists of natural reserves; thus, SDG 15 – Life on Land is more relevant for this study. SDG 15 suggests protecting and conserving terrestrial ecosystems, including forests, land degradation, and biodiversity loss ('Progress toward Sustainable Development Goals', 2024). Further, SDG 13- Climate Action- has also been touted as a fundamental goal for African tourism. According to the United Nations' Global Sustainable Development Report (GSDR, 2023), the African continent and its wildlife and biodiversity are particularly susceptible to climate change.

The research shows that nature reserves can be a positive catalyst for driving progress toward these SDG goals. For instance, already in the 1990s in Botswana, the Community-Based Natural

Resource Management (CBNRM) was created as an attempt to reduce poaching by making the local communities feel that they are co-owners and co-managers of the natural resources (Gaodirelwe, Motsholapheko, and Masunga, 2020). After many decades, it is time to gauge how well CBNRM has done and what sustainable projects and initiatives should be the focus of the decade to come ('Wildlife Conservation Research', 2021). A mixed analysis of Botswana's progress was provided in a report published by the Department of Wildlife and National Parks (2021). On the negative side, Botswana lacks nature park data, has poor analysis of the data it has gathered, and has an unclear role for the pertinent stakeholders (Wildlife Conservation Research, 2021). However, to mitigate these issues, the Department suggested 12 Ecosystem Approach Principles, such as clearly defining the key stakeholders and their role in managing land, water, and living resources ('Wildlife Conservation Research', 2021).

This developmental paper aims to explore one public and one private reserve in Botswana—Chobe National Park and Mashatu Game Reserve—to compare their contributions to sustainable tourism, biodiversity conservation, and community upliftment. This focus reflects a broader objective of understanding how nature reserves can be more effectively integrated into national SDG frameworks through collaboration and measurable outcomes.

Research Question (RQ1): What challenges and opportunities exist for integrating nature reserves into national SDG frameworks, and how can public-private partnerships address these issues?

This research question aligns with the central premise that achieving the SDGs requires policy integration (frameworks) and demonstrable results (impacts). This paper examines reserves' ecological roles (e.g., biodiversity preservation, climate mitigation) and socio-economic functions (e.g., employment, sustainable tourism) as indicators of their SDG contributions. Challenges such as funding constraints, human-wildlife conflict, and overtourism are explored as barriers to achieving these goals, and as areas where public-private collaboration can serve as a strategic solution. In doing so, the paper links specific SDGs (8, 12, 13, 14, and 15) to Botswana's operational and policy realities of nature reserve management.

Methodology

As this is a developmental conference paper, the methodology section summarizes the research approach. The first stage of this project involved conducting a comprehensive literature review, using targeted keywords such as safari tourism, nature reserves, wildlife conservation, Africa, and Botswana to guide the search across academic databases and relevant policy reports. This review was designed to capture foundational themes and critical findings related to the region's ecological, socio-economic, and policy dimensions of conservation.

The most significant findings from this literature review have been synthesized in the present paper to establish the conceptual foundation for the broader study. In the full journal submission, we will provide a more detailed account of the review methodology, including specific databases searched, date ranges, inclusion and exclusion criteria, and quality assessment procedures for the selected literature.

To explore these dynamics in practice, we adopted a comparative case study approach focusing on two nature reserves in Botswana: Mashatu Game Reserve (private) and Chobe National Park (public). These cases were selected for their ecological significance, contrasting governance structures, and demonstrated roles in tourism and community engagement.

Future phases of the research will build upon this foundation through empirical analysis. Specifically, we will collect and examine data on biodiversity indices, carbon sequestration, and local economic impacts. These metrics will enable us to assess the reserves' contributions to key SDG targets quantitatively and explore opportunities for deeper integration into national development frameworks.

Mashatu Game Reserve

On the eastern corner of Botswana, Mashatu, or the Land of the Giants, has promoted co-existence between wildlife and humans for centuries ('Mashata Game Reserve', 2024). It was named the "Land of the Giants" after the local Mashatu trees (<https://mashatu.com>, 2024) and is the home to the largest elephant herds on private land and offers incredible big cat sightings (<https://mashatu.com>, 2024). According to their annual report, Mashata Game Research is the largest employer in the Boriwa District of Botswana and currently employs 288 permanent members while supporting the local community by promoting basket weaving groups, local seamstresses, and jewelry makers besides offering cultural village tours to the tourists ('Mashata Game Reserve', 2024). Mashata Game Reserve also sources 90% of supplies from within the country and contributes P72 million to Botswana's GDP in purchases ('Mashata Game Reserve', 2024).

Chobe National Park

Chobe National Park (CNP) was founded in 1973 as Botswana's first luxury safari lodge (<https://www.chobegamelodge.com>). CNP created a new opportunity for Botswana, i.e., the introduction of sustainable wildlife tourism (<https://www.chobegamelodge.com>) with its large elephant population and rich river ecosystem ('Conservation Policies', 2024). Prior to the COVID-19 pandemic, parks such as CNP were rapidly becoming victims of over-tourism, which was destroying roads with frequent Game drives and causing congestion on the river ('Chobe River Front', 2024; Mogende and Moswete, 2018). Since 2005, Chobe Game Lodge has been a pioneer in training women for the guiding profession, and today boasts a full team of professionally trained female guides. This initiative, launched in 2004, aims to enhance the representation of women in Botswana's guiding industry. Currently, women make up more than 65% of the staff at Chobe Game Lodge, including an all-female team of 10 professionally qualified guides out of 16. (Chobe Game Lodge, 2024). The lodge employs approximately 200 staff members, with 99% of the workforce being citizens of Botswana, underscoring its commitment to local employment. (Chobe Safari Lodge, 2023).

Discussion and Conclusions

In the work we have done thus far, we can divide our findings into three categories: Ecological Contributions, Socio-Economic Benefits, and a Challenging Future. For *Ecological*

Contributions, we have seen the positive role of nature reserves in creating biodiversity hotspots and protecting endangered species. Botswana continues to commit firmly to its natural resources and heritage ('Conservation Policies', 2024), but it needs to balance local needs and biological diversity ('Wildlife Conservation Research', 2021). This delicate balance will ensure that conservation efforts remain sustainable while fostering community support and long-term ecological resilience.

This developmental paper establishes a strong foundation by drawing on existing tourism, sustainability, and conservation research in Africa and Botswana. Key studies by Mbaiwa (2017, 2024), Mogende and Moswete (2018), Gaodirelwe et al. (2020), Seleka (2015), and Stone et al. (2017) are cited throughout the introduction and discussion to support the analysis of socio-economic and ecological dynamics. Additionally, the paper situates its inquiry within the broader post-pandemic landscape by referencing authoritative sources such as the United Nations' Global Sustainable Development Report (GSDR, 2023) and national-level insights from the Department of Wildlife and National Parks (2021), thereby ensuring both global and local relevance in its contextual framing.

For *Ecological Contributions*, nature reserves play a positive role in creating biodiversity hotspots and protecting endangered species. Botswana demonstrates a commitment to its natural resources. However, a crucial balance between local community needs and biological diversity is needed to ensure conservation sustainability and community support. The paper links reserves to SDGs 13, 14, and 15 through these ecological roles.

For *Socio-Economic Benefits*, the locals have seen more employment opportunities (although the enclave hierarchy remains problematic) (Mbaiwa, 2017; Stone, Stone and Mbaiwa, 2017), more empowerment in choices made for their community, and more effective use of resources to ensure sustainable tourism models ('Wildlife Conservation Research', 2021). Nonetheless, as seen in the literature, the COVID-19 pandemic affected the positive steps that certain geographical areas were making; thus, not only are African countries behind, but they are not necessarily making the progress that they would have wished at this point.

Finally, regarding the *Challenging Future* that Botswana's sustainable tourism faces, the issues mentioned in the literature, such as revenue losses from accommodation, air transport, and taxes, must be mitigated to ensure future financial sustainability (Mbaiwa, 2024). According to literature, too much money is lost to external companies that own and run nature reserves, i.e., enclave tourism (Stone, Stone, and Mbaiwa, 2017). Another challenge is the human-wildlife conflict, where key stakeholders must find a way to balance conservation with development needs. Conflict management strategies must be co-created with the key stakeholders ('Conservation Policies', 2024; Seleka, 2015), particularly between the local communities and conservation authorities in a holistic approach toward a positive future for nature reserves ('Conservation Policies', 2024). A new and growing concern is overtourism. Most areas in Botswana with high tourist potential have been fully explored or are currently in danger of saturation (Mogende and Moswete, 2018). As areas of beauty and tranquility, Botswana safari sites have become victim of their success. New regulations on the number of visitors or the time of their stays may need to be drafted soon.

Our research underscores the importance of leveraging nature reserves as dynamic tools for sustainable development, providing a roadmap for aligning conservation efforts with global and regional development frameworks. Further, even in this early phase, we have tentatively identified a few immediate recommendations for maximizing the potential of nature reserves in achieving SDG targets. Firstly, the key stakeholders must work together to identify what sustainable practices are working and what must be changed or stopped. Secondly, the financial aspect of sustainable tourism should be recalibrated so that more of the profits from accommodations and air transport stay in the hands of Botswana's locals. Finally, there is a call to advocate for collaborative models that enhance public-private partnerships to amplify conservation and development outcomes.

In conclusion, this developmental paper summarizes the first stage of our research project. The next step will involve gathering empirical data analysis from the two case studies (Mashatu and Chobe), including biodiversity indices, economic impacts, and carbon sequestration metrics.

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