

# Navigating the Nexus: Climate Change, Protected Areas, and Local Tourism Communities in Sub-Saharan Africa

## Abstract

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This paper examines the intricate relationship between protected areas and local tourism communities in Sub-Saharan Africa amid the pressing challenges of climate change. Through a comprehensive review of 94 selected articles, it highlights the critical role of protected areas in preserving biodiversity and supporting local livelihoods. The study underscores the importance of integrating local communities into the management and benefits of protected areas, showing that participatory approaches can enhance conservation outcomes and socio-economic benefits, particularly in the face of climate change. The paper advocates for adaptive strategies, such as wildlife-compatible land use patterns, water conservation measures, and community-based tourism initiatives, to mitigate these impacts. The findings contribute to the evolving discourse on sustainable development, providing insights to inform policymakers, conservationists, and community leaders in balancing ecological preservation with socio-economic resilience.

**Keywords:** climate change, protected areas, local tourism community, rural livelihoods, community-based tourism

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## Introduction

In the crucible of a rapidly changing global climate (Fekadu & Belay, 2024), the intricate relationship between protected areas and the local communities engaged in tourism activities emerges as a critical focal point for sustainable development (Geldmann et al., 2019; Malhi et al., 2020). As the planet grapples with the consequences of climate change, biodiversity loss, and socio-economic challenges, preserving natural habitats and the well-being of local communities have become intertwined imperatives (Lapola et al., 2020; Maxwell et al., 2020). This calls for coordinated efforts among the indigenous communities (Ubisi et al., 2020), protected areas and various tourism stakeholders to fight climate change (Dube et al., 2023). The subcontinent of Africa, particularly the Sub-Saharan region, is a repository of immense ecological diversity, hosting a plethora of ecosystems, species, and landscapes (Dube & Nhamo, 2020). The expansive network of protected areas, ranging from iconic national parks to community-managed reserves, serves as custodians of this natural wealth. However, the spectre of climate change looms large, threatening these ecosystems and the myriad species that call them home (Ehiane & Moyo, 2022; Van Kerkhoff et al., 2019). Concurrently, the local communities inhabiting these regions, often intricately connected to the ecosystems for their sustenance and livelihoods, find themselves at the forefront of climate-induced challenges (Muringai et al., 2020; Seddon et al., 2021; Wu et al., 2023). The wealth of biodiversity in Sub-Saharan Africa plays a vital role in maintaining global biodiversity. However, the impacts of climate change, ranging from altered precipitation patterns to rising temperatures, directly threaten the delicate balance of these environments (Hoffmann & Beierkuhnlein, 2020). Climate change exacerbates existing pressures, such as habitat degradation and loss, overexploitation of resources, and human-wildlife conflicts (Hoveka et al., 2022). Protected areas, encompassing national parks, game reserves, and community-managed conservation areas, have emerged as critical tools for preserving biodiversity (Easter et al., 2019). These areas serve as sanctuaries for endangered species, corridors for migration, and essential carbon sinks. Nevertheless, the efficacy of protected areas in climate change hinges on a complex interplay of factors, including management strategies, community involvement, and adaptive governance (Maxwell et al., 2020). Simultaneously, local communities dwelling in and around these protected areas constitute an integral part of the conservation equation (Palmer & Chuamuangphan, 2018). Many of these communities depend on the natural resources provided by their surroundings for their livelihoods, engaging in activities such as agriculture, fishing, and traditional practices (Chambwe & Saayman, 2023). The rise of tourism, however, has introduced a transformative dynamic to these communities. If managed sustainably, tourism can provide economic incentives for conservation, contribute to community development, and foster a sense of stewardship of natural resources.

Striking a delicate balance between the economic benefits of tourism and the conservation imperatives of protected areas is an ongoing challenge that requires nuanced and context-specific solutions (Heslinga et al., 2021). Against the backdrop of these ecological and socio-economic complexities, the urgency of climate change mitigation adds a layer of imperative to the conservation discourse (Nila et al., 2019; Stralberg et al., 2020). The interconnected nature of climate change demands holistic approaches that address environmental concerns and account for local communities' socio-economic vulnerabilities (Lapola et al., 2020). With its unique blend of challenges and opportunities, the Sub-Saharan region presents a compelling context for exploring innovative strategies that integrate protected area management, sustainable tourism practices, and community resilience. This paper aims to bridge the gap between these disparate elements by investigating the nexus between Sub-Saharan protected areas and local tourism communities. By analysing case studies from diverse regions within Sub-Saharan Africa, this study seeks to distil critical lessons, identify successful collaboration models, and pinpoint challenges that demand innovative solutions. Furthermore, the research aspires to contribute to the evolving discourse on climate change adaptation and mitigation by proposing practical resolutions that can be adapted to different ecological and socio-cultural



contexts. In the subsequent sections, we will delve into specific case studies, methodologies, and findings to comprehensively understand the intricate interplay between Sub-Saharan protected areas and local tourism communities in the shared pursuit of combating climate change.

### **Methodology**

This study utilised a desktop literature review to explore the nexus between sub-Saharan protected areas and local tourism communities in combating climate change. Journal articles, books, book chapters, conference proceedings and institutional reports from Google Scholar, Web of Science and Scopus were used in this study. Literature review has become an important method of inquiry for researchers, practitioners and policymakers who seek to create new knowledge (Torraco, 2005; Webster & Watson, 2002). In addition, document analysis is regarded as an inexpensive and unobtrusive research method valued for following systematic procedures (Bowen, 2009). A set of keywords was first determined, and we searched for the appearance of those keywords in the title, abstract and full text of the published articles. The following keywords were used; “protected areas and local communities”; “climate change and protected areas”; “climate change adaptation and protected areas”. A total of 1128 articles were obtained through this search. This was followed by screening the articles to remain with only those relevant to this study. The search did not specify any start date, and only publications in the English language focusing on the protected areas, local communities, and climate change relationships were considered. Also, items with accessible full texts contextualised to sub-Saharan Africa were selected. In addition, publications with a global perspective were also considered. After this process, 143 articles were retained to verify the full texts further. Finally, each author independently checked the full texts of the remaining papers to remove duplications and determine their relevance to this study. A consensus was reached to retain 94 articles for synthesis and analysis.

### **Findings and discussion**

From the 1128 articles initially selected, 94 were retained for review. The analysis was categorised into three broad thematic areas: the link between protected areas and local communities, climate change impacts on protected areas, and climate change adaptation in protected areas.

#### ***The link between protected areas and local communities***

Protected areas are created and managed for several purposes, including biodiversity conservation, outdoor recreation, sustainable forestry, hunting and tourism (Job & Paesler, 2013). These activities provide socio-economic benefits for different stakeholders, who are directly and indirectly dependent on them (Hartter et al., 2016). Globally, local communities are critical stakeholders in developing and managing protected areas (Shereni & Chambwe, 2024). More importantly, indigenous communities have always co-existed with regions covered since time immemorial, and in some cases, they have been displaced to create wildlife sanctuaries (Mandudzo, 2019). In Sub-Saharan Africa, most protected areas border rural, peripheral, and marginalised communities so that they become integral in sustaining their livelihoods (Stone & Nyaupane, 2016). Regardless, previous studies have noted that local communities remain detached from the activities in protected areas, and little benefits trickle down to the household level (Chambwe & Saayman, 2023). Furthermore, Stone & Nyaupane (2016) argue that even though protected areas are recognised for contributing significantly to national budgets, their contribution to the livelihoods of local communities is a contested matter. Some studies have observed that, in most cases, benefits are enjoyed by a few politically connected elites, leaving the local communities as passive beneficiaries of resources within their localities (Chiutsi & Saarinen, 2017). To this end, policymakers have realised that conservation that excludes the locals is problematic for both protected areas and the communities (Shereni & Saarinen, 2021). Local participation is highly rated as necessary in achieving conservation, poverty alleviation and other related goals for protected areas (Segobye et al., 2022). This is because protected areas positively and negatively impact the local communities (Thapa et al., 2022). Protected areas provide surrounding communities access to construction materials, firewood, traditional medicine, game meat, and land for livestock and wild fruits (Shereni & Saarinen, 2021). They are also crucial in diversifying the livelihoods of the locals and providing employment opportunities (Job & Paesler, 2013). Conversely, livestock predation, destruction of crops, loss of human lives and property, and the spread of diseases from wild animals to livestock are some of the costs of conservation for communities adjacent to protected areas (Mackenzie et al., 2017). Consequently, various interventions have been implemented to integrate the local communities into activities within protected areas to ensure sustainable development (Harilal et al., 2022).

In Sub-Saharan Africa, community-based tourism is one initiative that has been successfully implemented to ensure that communities participate and benefit from tourism resources within their localities (Job & Paesler, 2013). This initiative centres on local participation and control of tourism activities, retention of benefits within the local economy, social equity, uplifting livelihoods and redistributive justice for the local communities (Mtapuri & Giampiccoli, 2019). In addition, Community-Based Natural Resource Management (CBNRM) practice is another popular initiative in sub-Saharan Africa that has managed to integrate the local communities into working resources within protected areas (Jones, 2004). CBNRM centres on the assumption that to achieve sustainable conservation of natural resources, local communities should be given rights over control, benefits and management of resources in their vicinity (Mbaiwa, 2011; Shereni & Saarinen). Selected examples from sub-Saharan Africa give credence to the assertion that protected areas are critical in sustaining the livelihoods of the local communities that are predominantly rural and agro-based (Saarinen et al., 2020). In recognition of this, the Ugandan government is reported to have altered conservation policies to move away from a purely protectionist approach to policies that integrate the local communities into conservation efforts (Mackenzie et al., 2017). Elsewhere in Botswana, community-based



organisations/trusts were formulated for communities around protected areas to ensure that they participate and benefit from ecotourism activities in conservation areas (Bontle et al., 2022; Moswete et al., 2022). Botswana is among the leading nature-based tourism destinations in sub-Saharan Africa, with abundant wildlife confined in protected areas and used to further local economic development (Hambira et al., 2022). Moreover, research in Ethiopia points out a strong link between wildlife conservation and local communities that depend on protected areas for grazing land for their livestock, food, construction material and firewood (Kelboro & Stellmacher, 2015).

The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was formulated in Zimbabwe in the 1980s as a CBMRM initiative to involve local communities located adjacent to protected areas in the management and control of resources in their regions (Mandudzo 2019; Shereni & Saarinen 2021). Similar CBNRM practices have been replicated in other southern African countries like South Africa, Namibia, Botswana, and Zambia (Musavengane & Simatele, 2016). Similarly, in the Kenyan context, the participation of local communities in nature-based tourism in protected areas is recognised for improved livelihoods, employment creation and a reduction in poverty levels (Job & Paesler, 2013). In a study done in Cameroon, Harilal et al. (2022) argue that participatory management systems that prioritise the involvement of locals are vital for the success of ecotourism activities and in building community trust in government. These various cases from sub-Saharan Africa noted above evidence of the importance of involving the locals in the management of protected areas to facilitate benefits at a community level. However, in as much as participatory approaches have previously yielded positive outcomes in managing protected areas, climate change threatens the benefits accruing to local communities (Musavengane & Musakwa, 2023). This calls for a transition to a carbon-neutral economy as climate change negatively impacts biodiversity and other natural resources that support livelihoods (Pandy & Rogerson, 2020).

### ***Climate change impacts on protected areas***

With the unrelenting prevalence of climate change, land and marine protected areas are presented with direct and indirect challenges to the totality of their network areas as the impact is felt not just on the biological and geopolitical features but also on their management practices and functionality (Asamoah et al., 2021). While protected areas were established to conserve and protect natural resources in their varying physical conditions, climate change has negated their ability to support and maintain their original quality and features (Barr et al., 2021). The severe weather patterns and conditions have changed species distribution, habitats, and environmental parameters. As a result of climate change, the integrity of protected areas, the coherence of broader networks, and the provision of services to the bionetwork are compromised. Chief among the impacts of climate change on protected areas is the changes taking place in the rainfall (less and less rain is being experienced) and temperature (an average rise of +2 degrees Celsius) patterns, which invariably cause a significant disruption in the distribution of both flora and fauna species (Hoffmann & Beierkuhnlein, 2020). In a survey conducted by (Belle et al., 2016) in five counties, The Gambia, Mali, Sierra Leone, Chad and Ghana, which all have two distinct seasons in the form of alternating dry and wet seasons, it was confirmed that on the one hand, rainfall reduced in significant millimetres. The number of days that rained decreased also; on the other hand, violent winds increased before, during, and after rains while droughts were prolonged.

Due to climate change, these extreme weather conditions continue to endanger the plant and animal species in protected areas as they become more susceptible (Wu et al., 2023). This is evidenced by ecosystem degradation, resulting in habitat and wildlife losses (Hoveka et al., 2022; Malhi et al., 2020). The reduced rain and lack of it in some seasons and the prolonged droughts have led to the drying up of water holes and reduced vegetation, all of which are crucial for the sustenance of wildlife (Nila et al., 2019). This, in turn, causes a modification in the migration patterns of animals as they would be consistently on the move in search of water and food (Sattar et al., 2021). The sharp increases in temperatures, the heatwaves, the strong and violent winds, and the dwindling of surface water resources have also resulted in regular occurrences of bushfires in the protected areas of places such as Sierra Leone and Mali, where herbivore species like the hartebeest, buffalo, and waterbuck have become vulnerable because of the fire inspired changes to the vegetation (Masumbuko & Somda, 2014). With the incessant fires comes the gradual recession of vegetation cover, leading to possible desertification in the long term. Similarly, the rise of sea levels has led to the recession of coastlines, which is affecting the coastal biodiversity. To illustrate this, (Belle et al., 2016) observe that the protected areas of Tanbi, which are near Gambia's major urban settlement of Banjul, are prone to frequent flooding owing to rising Atlantic Sea levels. According to Guelly & Segniabeto (2013), the rise in sea levels and flooding also causes the seeping of seawater into freshwater sources, affecting the reproduction of aquatic resources like fish that migrate to freshwater. This has been witnessed in Togo, in the Aneho lagoon and the mouth of the Mono River, with their water being highly salinised by seawater (Guelly & Segniabeto, 2013).

The effect of climate change on protected areas is also evident in recreation and recreation patterns (Monz et al., 2021). As the water, weather, plant, and animal species rapidly change, so do the visitor experiences within the parks (Askew & Bowker, 2018). As attractive wildlife populations reduce, so will the visitors and the park's income-generating activities, such as bird watching, wildlife photography, game viewing and game drives, and trophy hunting (Brice et al., 2017; O'Toole et al., 2019). The rise in temperatures has adversely affected visitors' comfort in protected areas. Research has shown a considerable likelihood that suitable climatic conditions for tourism will shift to higher latitudes and elevations (Hewer & Gough, 2018; Miller et al., 2022). Tourist numbers to southern parks and wilderness areas may decline as temperatures rise (Askew & Bowker, 2018). The change in seasons, the prolonged dry seasons and shortened wet seasons have also increased the seasonality of visitations within regions and communities dependent upon wildlife tourism (Lehikoinen et al., 2019; Maxwell et al., 2020). Resultantly, the effects of climate change on protected areas create various problems for future work in this field. The following section examines the importance of saved places in adaptation and mitigation to climate change.



### ***Climate change adaptation in protected areas***

The Intergovernmental Panel on Climate Change's Sixth Assessment Report emphasises mitigation and adaptation strategies in climate change hotspots like sub-Saharan Africa (Dube et al., 2023). Considering the devastating impacts of climate change, focus has been placed on adaptation mechanisms to ensure that protected areas contribute to the sustainable development of various constituencies (Dube & Nhamo, 2020). In this regard, 'adaptation is a process by which strategies to moderate and cope with the adverse effects of climate change can be enhanced, developed, and implemented' (Fekagu & Belay, 2024:2). Therefore, rural and peripheral communities in sub-Saharan Africa, especially those near protected areas, must adapt to climate change and variability to reduce their vulnerability (Musakwa et al., 2020). In addition, Rogerson (2016) underscores the need to build adaptive capacities in local communities at risk of hazards associated with climate change. Saarinen et al. (2020) maintain that in the face of drought and extreme weather conditions facing sub-Saharan Africa, agriculture, which is the mainstay of most rural economies, is no longer viable, calling for the need to diversify the livelihoods of the local communities. In doing this, the active participation of the local people in nature-based tourism activities in protected areas is seen as a viable option for diversifying livelihoods and adaptation to climate change (ibid). Rural tourism can be promoted in such areas to improve community resilience to environmental changes (Lendelvo et al., 2018). However, if not managed well, this can be ineffective, considering that climate change also threatens tourism (Hoogendoorn & Fitchett, 2018).

In Zimbabwe and Namibia, accommodation establishments operating within protected areas have also implemented various adaptation strategies that include the installation of air conditioning, provision of swimming pools and drilling of boreholes as a source of water for watering holes (Tervo-Kankare et al., 2018). Most of these measures have been adopted as business survival strategies rather than intentional measures to fight climate change (Mushawemhuka et al., 2022). Relocation of wildlife from drought-stricken areas has also been reported in South Africa as an adaptive measure (Musavengane & Musakwa, 2023). Water conservation strategies that include rainwater harvesting are necessary adaptation measures in protected areas affected by drought and erratic rainfall (Mushawemhuka et al., 2022). Dube et al. (2023) identified the adoption of adequate early warning systems to reduce the impacts of floods induced by changing climate in South African national parks. Adopting wildlife-compatible land use patterns around protected areas is also critical in ensuring the free movement of animals in search of a suitable climate (Coldrey et al., 2022). Mpolokang et al. (2022) further assert that changing weather patterns associated with climate change will inevitably result in wildlife changing habitats following the seasonal availability of forages. This raises the need to keep wildlife corridors open to accommodate the increased migratory behaviours of animals in protected areas in response to climate change.

### **Conclusion**

This study has delved into the multifaceted interplay between protected areas, local tourism communities, and the pressing challenges of climate change in Sub-Saharan Africa. Through a comprehensive review of 94 selected articles, the research has underscored the critical role of protected areas in preserving biodiversity and supporting local livelihoods, particularly in rural and agro-based communities. However, the findings also reveal that climate change significantly threatens these protected areas, disrupting ecosystems, altering species distributions, and affecting natural and socio-economic landscapes. The contributions of this paper are threefold. Firstly, it highlights the importance of integrating local communities into the management and benefits of protected areas, demonstrating that participatory approaches can enhance conservation outcomes and socio-economic benefits (Stone & Nyaupane, 2016; Shereni & Saarinen, 2021). Secondly, the research provides evidence of the detrimental impacts of climate change on protected areas, such as altered precipitation patterns, rising temperatures, and increased incidences of extreme weather events (Hoffmann & Beierkuhnlein, 2020; Wu et al., 2023). Thirdly, the study emphasises the need for adaptive strategies to mitigate these impacts, including the adoption of wildlife-compatible land use patterns, water conservation measures, and community-based tourism initiatives (Musavengane & Musakwa, 2023; Tervo-Kankare et al., 2018). Despite these insights, the study acknowledges several limitations. The reliance on secondary data limits the ability to capture real-time changes and localised nuances. Additionally, the focus on English-language publications may have excluded relevant studies in other languages, potentially narrowing the scope of the findings. Directions for future research should include longitudinal studies to monitor the long-term impacts of climate change on protected areas and local communities. Investigating the effectiveness of specific adaptation strategies in diverse ecological and socio-cultural contexts is also crucial. Moreover, there is a need for more localised and participatory research methodologies that engage directly with indigenous and local communities to co-create sustainable solutions. Expanding the geographic scope to include comparative studies with other regions facing similar challenges can provide broader insights into best practices and innovative approaches. This paper contributes to the evolving discourse on sustainable development by elucidating the complex relationships between climate change, protected areas, and local tourism communities in Sub-Saharan Africa. By advocating for integrated and adaptive management approaches, it aims to inform policymakers, conservationists, and community leaders in their efforts to balance ecological preservation with socio-economic resilience.

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