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**Sustainable Livelihood Strategies for National Parks Wildlife
Conservation in South Sudan**



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Sustainable Livelihood Strategies for National Parks Wildlife Conservation in South Sudan

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ABSTRACT

Purpose: The main aim of the study was to investigate the sustainable livelihood strategies for national parks wildlife conservation in South Sudan. The study sought to specifically determine the effect of diversification of income sources, tourism-based initiatives, community participation and conflict mitigation on national parks wildlife conservation in South Sudan.

Methodology: A descriptive cross-sectional design and quantitative research approach were employed to collect data from communities residing near six national parks in South Sudan. The target population comprised approximately 580,000 individuals, from which a sample of 384 respondents was selected using stratified and proportionate sampling based on park representation. The data was analyzed using quantitative methods with regression analysis employed to assess the effect of sustainable livelihood strategies on wildlife conservation.

Findings: The study findings revealed that diversification of income sources, tourism-based initiatives, community participation, and conflict mitigation strategies collectively accounted for approximately 79.3% of the variance in wildlife conservation. Community participation emerged as the strongest predictor ($\beta = .309$, $t(379) = 8.65$, $p < .001$), underscoring the critical role of local involvement in conservation efforts. Conflict mitigation was similarly influential ($\beta = .302$, $t(379) = 8.09$, $p < .001$), highlighting the importance of addressing human–wildlife conflicts to sustain conservation gains. Diversification of income sources was a significant predictor ($\beta = .267$, $t(379) = 7.07$, $p < .001$), indicating that livelihood diversification contributes meaningfully to conservation outcomes. Tourism-based initiatives also had a positive effect ($\beta = .136$, $t(379) = 3.70$, $p < .001$), though weaker compared to other predictors.

Contribution to Policy, Theory and Practice: This study makes significant contributions to theory, policy, and practice by empirically extending the Sustainable Livelihoods Framework (SLF) and Community-Based Natural Resource Management (CBNRM) theory within fragile, post-conflict contexts, showing that wildlife conservation outcomes are optimized when socio-economic empowerment is integrated with participatory governance and conflict mitigation. For policy, the findings provide evidence-based guidance for governments and development agencies to design conservation policies that embed livelihood diversification, equitable benefit-sharing, and conflict-sensitive mechanisms into national park management, thereby enhancing legitimacy and sustainability. Practically, the study underscores the necessity of empowering local communities through inclusive participation, income-generating programs, and human–wildlife conflict reduction strategies, offering actionable models for conservation authorities and practitioners seeking to align biodiversity protection with poverty alleviation and community resilience in post-conflict regions.

Keywords: *Sustainable Livelihood Strategies, National Parks, Wildlife Conservation, local communities, South Sudan*

INTRODUCTION

The increasing threats like climate change, unsustainable resource exploitation, poaching and habitat loss has made wildlife conservation to emerge as a critical global concern. Wildlife conservation has been defined as preserving, protecting and managing animal species and their habitats sustainably to guarantee biodiversity continuity and ecological balance (Gupta et al., 2023). Conservation challenges in Africa are increasingly becoming acute and affecting the rich and diverse wildlife in the continent. Throughout Africa, national parks and protected areas play a critical role in the conservation efforts, yet they are facing threats of destruction from poaching, increasing human populations, agricultural encroachment and weak institutional capacity. Previous studies have indicated that success of conservation depends on the integration of livelihood considerations in conservation efforts to minimize overreliance of unsustainable resource extraction (Adams & Hulme, 2001; Berkes, 2004; Chang et al., 2025; Nyamogosa, Obonyo & Chepngetich, 2025; Roe, Nelson & Sandbrook, 2009). National parks that act as biodiversity sanctuaries are becoming endangered and degraded unless innovative and inclusive strategies are adopted to strike a balance between conservation imperatives and human livelihood needs. Sustainable livelihood strategies like agroforestry, community-based resource management and eco-tourism have been identified as the major mechanisms that can enable alignment of conservation objectives with socio-economic development across the continent.

In Africa, especially in post-conflict regions, sustainable livelihood strategies have been adopted as a pragmatic approach to integrate conservation objectives with community welfare. Sustainable livelihood strategies refer to practices that allow local communities to meet their socio-economic needs without degrading ecological systems (Chambers & Conway, 1992). These strategies include ecofriendly agriculture, community-based tourism, participatory resource management and alternative income-generating activities (Nath & Parameswar, 2025). In post-conflict regions like South Sudan where national parks like Boma and Bandingilo host important global wildlife migrations but encounter severe threats from food scarcity, insecurity and poaching, integrating livelihood strategies into conservation models is vital. Previous research reports that conservation efforts in fragile states ought to be conflict-sensitive, livelihood-oriented and participatory to gain legitimacy among local communities (Brockington & Wilkie, 2015; Lujala, & Rustad, 2012). Embedment of conservation within community welfare models makes it possible for sustainable livelihood strategies to minimize tensions between park authorities and local residents, thus improving protection of biodiversity.

National parks in South Sudan like Boma and Bandingilo provide habitat to globally important wildlife migrations and endangered species but still they are vulnerable to deforestation, poaching and weak institutional oversight. Sustainable livelihood strategies provide a pathway to minimize these threats by aligning survival of the community with conservation objectives (Chepkwony, Lyakurwa & Sabuhoro, 2024). Studies report that South Sudan's wildlife service has been in existence for over a century despite the country's chronic insecurity and weak state capacity (Ayling & Niazi, 2020; United Nations Environment Programme, 2007; Wildlife Conservation Society, 2011). However, the effectiveness of South Sudan's wildlife service

remains constrained by poverty-driven resource exploitation. In this context, sustainable livelihood strategies like beekeeping, alternative agriculture and community-managed ecotourism have become critical factors for national parks to minimize overdependence on hunting and encroachment (Eklund, 2024). However, whether sustainable livelihood strategies can effectively improve national parks wildlife conservation requires empirical research.

1. To examine sustainable livelihood strategies for national parks wildlife conservation; via empirical research, assess whether sustainable livelihood strategies can effectively enhance the national parks wildlife conservation
2. To give practical guidance on sustainable livelihood strategies for wildlife conservation in national parks, particularly in post-conflict and fragile regions: based on study findings propose targeted strategies to assist national parks effectively improve wildlife conservation in national parks.

Via these research goals, this study aimed at giving practical references and theoretical support for the sustainable livelihood strategies within national parks of post-conflict regions, provide basis for policymakers to optimize related support policies and improve wildlife conservation efforts.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

Theoretical Overview

The study used Sustainable Livelihoods Framework (SLF) to give a holistic lens for conducting an analysis on communities' mobilization of natural, financial, human, social and physical forms of capital to sustain their livelihoods within dynamic vulnerability contexts. SLF posits that access to assets, external shocks, and institutional processes influence livelihood strategies (Department for International Development, 1999). This makes SLF relevant for conservation in post-conflict and fragile regions such as South Sudan. SLF is able to capture the interaction between poverty reduction and environmental sustainability. Furthermore, SLF is able to adapt to diverse socio-ecological contexts. However, SLF has been criticized for its limited attention to government structures, political conflict and power relations which are key in post-conflict areas' conservation landscape (Hickey & Mohan, 2005; Scoones, 2009). It is against this reason that community-based natural resource management (CBNRM) theory was used to complement SLF. CBNRM focused on institutional legitimacy, equity and participation issues. CBNRM posits that granting rights, tangible benefits from conservation and responsibilities to local communities, makes them the most effective stewards of natural resources (Murphree, 1993). Individuals living near the forests, wildlife or other ecosystems have the major stake in using the resource sustainably and possess practical knowledge to manage them.

SLF was used in the wildlife conservation in the national parks of South Sudan to assess how local people strike a balance between livelihood needs and wildlife conservation under conditions of weak governance, displacement and poverty. Wildlife and ecosystems as natural capital were analyzed as both conservation priorities and livelihood assets. On the other hand, social capital was determined for its function in managing resources collectively. Locating conservation strategies within the wider livelihood framework showed that sustainable

outcomes are dependent on diversification of income sources, the strength of community involvement and anchoring conservation on local development agendas. SLF informed approaches have been reported to improve resilience by connecting conservation to tangible livelihood benefits (Scoones, 1998; Scoones, 2009). This has minimized dependence on unsustainable practices such as poaching and deforestation. As a result, SLF became the most preferred theory to enable understand and promote sustainable livelihood strategies in national parks of South Sudan.

Wildlife Conservation in National Parks

Wildlife conservation refers to managing and protecting wildlife and their habitats to guarantee sustainable livelihoods (Chambers & Conway, 1992). Wildlife conservation plays an essential role in global biodiversity and ecosystem health and it has gradually developed from focusing on specific species preservation to wider integration of economic, environmental and social dimensions (Mace, 2014). This evolution is captured in the sustainable livelihood strategies' notion that emphasize the relationship between environmental sustainability and human well-being. Previous studies have reported this interdependence, for instance, Bertram and Vivier (2016) highlighted that engagement of communities in wildlife tourism result in them experiencing enhanced economic outcomes.

Nevertheless, there exists inconsistencies in findings about the wildlife conservation effectiveness in different regions. Kideghesho et al. (2007) noted in their research in East Africa that although community-based conservation programs can generate positive outcomes, their success is dependent on community involvement and local governance structures. On other hand, in South America, studies have reported that community-based conservation programs may greatly marginalize local people, resulting in socio-economic inequities (Berkes, 2017). Competing pressures of community survival and protection of biodiversity have long challenged wildlife conservation in national parks. Although protected areas are key to global conservation agendas, they often create unintended outcomes like poaching, human-wildlife conflict and land-use disputes that affect both local livelihoods and ecological integrity (Muliru, 2024; Davies et al., 2024). Exclusionary conservation models have been reported to historically marginalize communities and create tensions that weaken conservation outcomes (Hickey & Mohan, 2005). Recent studies emphasize that conservation success depends on involving local communities in conservation programs and benefit sharing. Liu et al. (2024) reported that wildlife population sustenance is dependent on local communities' perception of direct livelihood benefits. Similarly, Andam et al. (2010) highlighted that protected areas are connected to reduction of poverty in Costa Rica and Thailand. These findings warranted further research, especially in post-conflict regions such as South Sudan, where wildlife conservation remain underexplored. It is essential to address these gaps and develop tailored conservation models that align with local needs and contexts. As a result, environmental integrity and community resilience is improved.

Sustainable Livelihood Strategies

Sustainable livelihood strategies have become important interventions in striking a balance between conservation and development goals. Sustainable livelihood strategies refer to

different ways local communities mobilize social, human, natural, financial and physical assets to protect their well-being while ensuring ecological integrity protection (Department for International Development, 1999). Embedded in Chambers and Conway's (1992) conceptualization of sustainable livelihoods and later operationalized via DFID's sustainable livelihoods framework (1999), the concept gradually developed into emphasizing on reduction of poverty, encouraging of resilience and environmental sustainability. Leisher et al. (2013) indicated that sustainable livelihood strategies improve community involvement in conservation and that generic solutions may become ineffective across different contexts.

Previous studies across Sub-Saharan Africa show that connecting conservation to tangible livelihood benefits like community forestry, wildlife-based enterprises and ecotourism minimize overreliance on unsustainable practices such as deforestation and poaching (Scoones, 1998; Scoones, 2009). Kiconco et al. (2025) further reported that tourism –related livelihood strategies near national parks of Uganda substantially enhanced household well-being when anchored in SLF. Additionally, Liu et al. (2024) indicated that wildlife population recovery is sustained only when local communities perceive direct benefits. Sustainable livelihood strategies are essential in fragile post-conflict landscape like South Sudan, as they integrate conservation goals with alleviation of poverty and community empowerment. This aligns with global frameworks like the Convention on Biological Diversity and national biodiversity strategies.

Nevertheless, there exists inconsistencies in the literature about the sustainable livelihood strategies' effectiveness. While some studies have reported that SLF- informed approaches improve resilience and foster community involvement (Scoones, 2009; DFID, 1999), others critique it for limited attention to power relations, governance and political conflict (Hickey & Mohan, 2005; Scoones, 2009). Andam et al. (2010) reported that sustainable livelihood strategies can substantially enhance conservation efforts. On other hand, De Jong et al. (2021) and Davies et al. (2024) highlighted the rise of unintended consequences like land-use conflicts or poaching in application of sustainable livelihood interventions. This dichotomy shows a need to assess context-specific variables that influence these outcomes. Furthermore, previous studies focus on developed and stable nations, leaving significant gaps in post-conflict and fragile areas that account for sociocultural dynamics and their influence on sustainable livelihood strategies effectiveness. Kiconco et al. (2025) called for community-centric research to explore how different stakeholder inputs can improve the application of sustainable livelihood strategies in national parks.

Also, empirical findings regarding sustainable livelihood strategies vary in various regions and countries. In Namibia and Zimbabwe, community-based natural resource management has generated measurable conservation and livelihood benefits (Murphree, 1993; Fabricius et al., 2004). Whereas, in other areas studies have reported elite to have captured, weakened institutions and created an inequitable benefit sharing, which has undermined sustainable performance. Human-wildlife conflict, poaching and inadequate funding have been linked to weakening livelihood conservation strategies (Muliru, 2024). Therefore, there was need for a study to investigate adoption of SLF in fragile nations, integrate political ecology perspectives

and develop governance mechanisms that are participatory to guarantee equitable benefit distribution and sustainable biodiversity.

In conclusion, limited studies have hypothesized the relationship between sustainable livelihood strategies and wildlife conservation in national parks, especially in post-conflict regions like South Sudan. Furthermore, there exists limited empirical evidence from previous studies regarding the effect of sustainable livelihood strategies on wildlife conservation in national parks, especially in fragile areas like South Sudan. The current study suggests and explores the effect of these strategies on wildlife conservation in national parks of South Sudan. The conceptual model displayed in Figure 1 indicates a direct relationship between diversification of income sources, tourism-based initiatives, community participation, conflict mitigation and wildlife conservation in national parks.

Sustainable Livelihood Strategies

Wildlife Conservation in National Parks

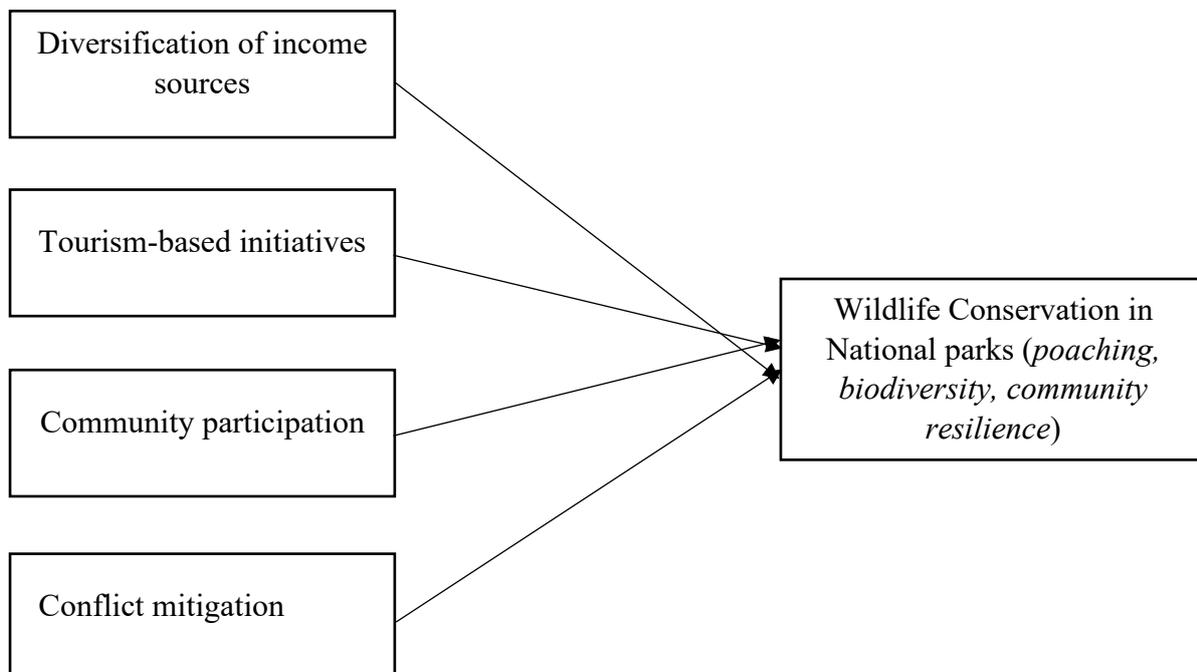


Figure 1 Conceptual Model

METHODOLOGY

A descriptive cross-sectional design and quantitative research approach were employed to collect data from communities residing near six national parks in South Sudan. This design facilitated data collection at a single point in time, preserving the integrity of variables and enabling analysis of their interrelationships. The target population comprised approximately 580,000 individuals, from which a sample of 384 respondents was selected using stratified and proportionate sampling based on park representation. Data were gathered through a researcher-administered structured questionnaire designed to capture quantitative insights. The instrument incorporated a 5-point Likert scale to assess the effect of income diversification, tourism-based initiatives, community participation, and conflict mitigation on wildlife conservation. The scale

enabled standardized response quantification and supported large-scale data interpretation. A pretest involving 38 participants (10% of the sample) was conducted to evaluate the questionnaire's validity and reliability. Feedback from the pilot informed refinements that strengthened the instrument's effectiveness for the main study.

Data analysis

The data were analyzed using quantitative methods. Following editing and coding, the dataset was entered into IBM SPSS version 22 for regression analysis to assess the effect of sustainable livelihood strategies on wildlife conservation in South Sudan's national parks. The regression specification adopted in this study was articulated as:

$$Y = \alpha + \beta_1 X_1 + \dots + \beta_n X_n + \epsilon.$$

In this formulation, Y denotes the dependent variable, representing wildlife conservation outcomes within national parks. The independent variables (X_n) comprise diversification of income sources, tourism-based initiatives, community participation, and conflict mitigation, each hypothesized to exert a measurable influence on conservation performance.

RESULTS

Sustainable livelihood strategies for national parks wildlife conservation

The study determined the effect of sustainable livelihood strategies on wildlife conservation in national parks of South Sudan. The objective of this study was attained by regressing sustainable livelihood strategies against the national parks wildlife conservation. Sustainable livelihood strategies factor scores were regressed against national parks wildlife conservation factor to answer the following question:

To what extent does sustainable livelihood strategies influence national parks wildlife conservation in South Sudan?

Table 1 shows the analysis of variance (ANOVA) for national parks wildlife conservation regressed against sustainable livelihood strategies.

Table 1 Analysis of variance (ANOVA) for wildlife conservation factor

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	293.193	4	73.298	362.894	.000 ^b
	Residual	76.552	379	.202		
	Total	369.745	383			

a. Dependent Variable: wildlife conservation

b. Predictors: (Constant), conflict mitigation, community participation, tourism-based initiatives, diversification of income sources

Regression findings in Table 1 show that the regression model was highly significant, $F(4, 379) = 362.89, p < .001$. This finding confirms that diversification of income sources, tourism-based initiatives, community participation, and conflict mitigation jointly contribute to

explaining variations in wildlife conservation within national parks. The large F-statistic and the associated p-value below .001 provide strong evidence that the predictors, taken together, offer a meaningful and reliable explanation of conservation outcomes. These results underscore the importance of integrating socio-economic and community-based strategies into conservation planning.

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 ^a	.793	.791	.44943

a. Predictors: (Constant), conflict mitigation, community participation, tourism-based initiatives, diversification of income sources

The model results presented in Table 2 show a high explanatory power, $R = .890$, $R^2 = .793$, Adjusted $R^2 = .791$, with a standard error of the estimate of .449. These results suggest that the predictors; diversification of income sources, tourism-based initiatives, community participation, and conflict mitigation collectively accounted for approximately 79.3% of the variance in wildlife conservation. This high level of variance explained suggests that socio-economic and community-driven factors are central to conservation success in national parks.

Table 3 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.465	.088		5.255	.000
	diversification of income sources	.239	.034	.267	7.065	.000
	tourism-based initiatives	.123	.033	.136	3.704	.000
	community participation	.275	.032	.309	8.646	.000
	conflict mitigation	.269	.033	.302	8.088	.000

a. Dependent Variable: wildlife conservation

The regression analysis examined the influence of diversification of income sources, tourism-based initiatives, community participation, and conflict mitigation on wildlife conservation. As shown in Table 3, all predictors were statistically significant and positively associated with the dependent variable. Diversification of income sources was a significant predictor ($\beta = .267$, $t(379) = 7.07$, $p < .001$), indicating that livelihood diversification contributes meaningfully to conservation outcomes. Tourism-based initiatives also had a positive effect ($\beta = .136$, $t(379) = 3.70$, $p < .001$), though weaker compared to other predictors. Community participation emerged as the strongest predictor ($\beta = .309$, $t(379) = 8.65$, $p < .001$), underscoring the critical role of local involvement in conservation efforts. Conflict mitigation was similarly influential ($\beta = .302$, $t(379) = 8.09$, $p < .001$), highlighting the importance of addressing human-wildlife conflicts to sustain conservation gains.

Discussion

The findings show that socio-economic and community-driven factors are key to wildlife conservation in national parks. The strong predictive role of community participation aligns with Kipkeu, Mwangi, and Njogu (2014), who found that community-managed lands around Amboseli National Park were critical for wildlife dispersal and long-term conservation. Similarly, Mwangi et al. (2023) emphasized that participatory governance enhances biodiversity outcomes by fostering local stewardship. Conflict mitigation also emerged as a significant determinant. Human-wildlife conflict has been identified as one of the greatest threats to conservation in Kenya's Tsavo ecosystem, where crop raiding and livestock predation often lead to retaliatory killings (Makindi et al., 2014). Effective mitigation strategies, such as compensation schemes and community-led monitoring, have been shown to reduce hostility and foster coexistence (Burudi et al., 2025). These findings corroborate the present study's results, highlighting conflict mitigation as a cornerstone of sustainable conservation.

The role of tourism-based initiatives was positive but comparatively weaker. Gumbo et al. (2025) reported that nature-based tourism in Southern Africa enhances conservation by generating revenue and incentivizing habitat protection. However, Akama, Maingi, and Camargo (2011) critiqued Kenya's safari tourism model for marginalizing communities and exacerbating conflicts, suggesting that tourism's effectiveness depends on equitable benefit-sharing. This explains the relatively lower predictive strength of tourism initiatives in the current model. Diversification of income sources was also significant, supporting WWF (2025) findings that alternative livelihoods such as beekeeping and sustainable agriculture reduce reliance on extractive practices. Ngongolo and Kyando (2025) similarly argued that socio-economic diversification strengthens conservation incentives by integrating biodiversity protection into community development strategies.

Implications, limitations and future research

The study extends the Sustainable Livelihoods Framework (SLF) and community-based natural resource management (CBNRM) theory in wildlife conservation by showing that income diversification and tourism initiatives strengthen household resilience and incentivize conservation, while community participation and conflict mitigation enhance sustainable resource management through tangible benefits and inclusive governance. Practically, the findings highlight the need for national parks, policymakers, and conservation agencies to embed conservation within socio-economic empowerment by promoting participatory governance, benefit-sharing, conflict mitigation strategies such as compensation and deterrent technologies, and livelihood programs like beekeeping, eco-crafts, and sustainable agriculture, while ensuring equitable tourism benefits and infrastructure for community-driven ecotourism. However, the study is limited by its focus on selected predictors, reliance on cross-sectional data, and context-specific scope, which restrict causal inference and generalizability; future research should adopt longitudinal and comparative designs, integrate ecological and institutional variables, and employ mixed-method approaches to capture the dynamic interplay of livelihoods, governance, and conservation sustainability.

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