The Role of Environmental Conservation Strategy in Promoting Sustainable Tourism Development in Communal Group Ranches in Laikipia County, Kenya.

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ABSTRACT

Sustainable tourism development seeks to meet the immediate demands of the travel industry while safeguarding natural and cultural resources for future generations. In Laikipia County, Kenya, an area rich in biodiversity and scenic landscapes, communal group ranches have emerged as promising models where tourism and environmental conservation converge. Despite this potential, challenges such as habitat degradation, human-wildlife conflict and limited community involvement hinder progress toward sustainable tourism development. This study investigated the effect of environmental conservation strategies on sustainable tourism development in these communal group ranches. The hypothesis tested was that environmental conservation strategies do not significantly affect sustainable tourism development. Employing an embedded mixed methods design, the study collected both qualitative and quantitative data from a target population of 18,724 individuals, including communal ranches registered members, leaders, and visiting tourists. Stratified, simple random and purposive sampling techniques were used to select a sample size of 392 participants. Results from multiple regression analysis revealed a moderate positive relationship ($R = 0.470$; $R^2 = 0.221$), with 22.1% of the variance in sustainable tourism development explained by key predictors: protection of biodiversity, land use planning, mitigation of community-wildlife conflict, and waste disposal mechanisms. ANOVA confirmed the model's significance ($F = 18.431$, $p < 0.001$), and three predictors biodiversity protection ($p = 0.001$), land use planning ($p = 0.018$), and conflict mitigation ($p < 0.001$) were found to be statistically significant, while waste disposal was not ($p = 0.07$). These findings, supported by qualitative insights and existing literature, emphasize the critical role of ecological and community-based approaches in achieving long-term tourism sustainability. The study concluded that environmental conservation strategies play a significant role in promoting sustainable tourism development in communal group ranches in Laikipia County, Kenya. The study recommended that the National Environment Management Authority (NEMA), in collaboration with the Ministry of Tourism and Wildlife, should develop and enforce biodiversity protection policies that encourage communal group ranches and local communities to participate in conservation initiatives.

Keywords: Environmental conservation strategy, sustainable tourism development, tourism development, communal group ranches

INTRODUCTION

Sustainable tourism development is a strategic priority for many countries, particularly those rich in natural and cultural resources like Kenya. It ensures that the current needs of tourists are met without compromising the capacity of future generations to meet their own (Gossling, Scott & Hall, 2022). One critical enabler of sustainable tourism is environmental conservation, especially in ecologically sensitive regions such as communal group ranches. These ranches, characterized by communal ownership and management, serve as vital ecosystems for biodiversity preservation while supporting local livelihoods and cultural heritage (Laikipia Wildlife Forum, 2021; Njoka et al., 2022).

Tourism has become a significant contributor to Kenya's economic growth. In 2019 alone, the sector directly

supported over 1.1 million jobs and generated Ksh. 790 billion in GDP (WTTC, 2021). The upward trend continued with international tourist arrivals reaching 2.4 million in 2024, earning the country Ksh. 452 billion, a 15% increase from 2023 (Kajilwa, 2025). Laikipia County, known for its stunning landscapes and diverse wildlife such as elephants, lions, rhinos, and buffaloes, is one of the major beneficiaries of this growth (Laikipia Wildlife Forum, 2021). However, this increase in tourism activities necessitates robust environmental conservation strategies to safeguard the very resources that attract tourists.

Environmental conservation strategies such as protection of biodiversity, proper waste disposal mechanisms, and land use planning are indispensable in sustaining tourism development. For instance, the preservation of biodiversity, including endangered species, rely heavily on interventions like habitat protection, anti-poaching measures, and conservation breeding programs (Nowak & Paradis, 2019). Effective land use planning in communal group ranches is essential to balance conservation goals with tourism infrastructure development and ensuring the integrity of ecosystems is maintained (UNEP, 2021).

Additionally, the management of waste generated by tourism activities poses a significant challenge in remote conservation areas. Without adequate waste disposal systems, environmental degradation becomes inevitable, threatening both biodiversity and the health of local communities (UNWTO, 2023). The promotion of sustainable practices such as eco-tourism, guided by strong environmental stewardship, can mitigate these challenges. In the Okavango Delta, Botswana, tourism brought economic benefits, yet negatively impacted the environment and social fabric, underscoring the need for balanced, sustainable approaches (Mbaiwa, Stronza & Hill, 2019).

Mitigating community-wildlife conflict is another critical element of environmental conservation in communal group ranches. As tourism and conservation efforts expand, wildlife habitats increasingly intersect with human settlements, leading to conflicts that undermine community support for conservation. Community-based conservation strategies such as revenue sharing, eco-tourism ventures, and wildlife monitoring have proven effective in enhancing community engagement and minimizing conflict (Turyahabwe & Nsabimana, 2019). These approaches empower communities to play an active role in managing natural resources while deriving economic benefits from tourism (Valerie A. Benka, 2022; Kimpuru & Kariuki, 2019).

Studies in other regions have highlighted the mutual reinforcement between conservation and tourism. In Canada, it was found that robust environmental conservation strategies are not only vital for attracting visitors but also for sustaining tourism revenues that can be reinvested in conservation (Caballero Rico et al., 2020). However, the applicability of such findings to the Kenyan context, particularly in Laikipia County, remains limited. While Kenya's tourism industry is the second-largest source of foreign exchange earnings after horticulture (Kenya Tourism Board, 2021), localized studies are necessary to explore how environmental conservation strategies influence sustainable tourism development in communal group ranches.

A study by Turyahabwe and Nsabimana (2019) focused on the role of environmental conservation in the development of sustainable tourism. The study found that community-based conservation strategies such as revenue sharing, eco-tourism ventures, and community-based wildlife monitoring had a positive impact on tourism development in the park. Nationally, Kenya is a country that is rich in natural resources, including wildlife and beautiful landscapes that attract tourists from all over the world, Zsuzsanna et al., (2023). The tourism industry is an essential sector of the country’s economy, contributing significantly to the gross domestic product (GDP) and providing employment opportunities to many people (WTTC, 2021). According to the Kenya Tourism Board (2021), the tourism industry is the second-largest source of foreign exchange earnings in the country after horticulture

Kimpuru and Kariuki (2019) also found that the success of community-based ecotourism ventures was highly dependent on effective conservation of natural resources and biodiversity. The study suggested that sustainable tourism can act as a motivator for conservation efforts and can provide local communities with economic benefits. Nevertheless, Laikipia County is one of the areas that have attracted many tourists because of its beautiful landscapes and wildlife. The County is home to various wildlife species, including elephants, lions, buffaloes, and rhinos, among others (Laikipia Wildlife Forum, 2021). The County also has beautiful landscapes, including the Laikipia Plateau, Mount Kenya, and the Aberdare Ranges. In recent years, the County has become

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a popular destination for tourists who come to experience its natural beauty, cultural heritage, and wildlife.

The conservation of the environment and the socio-cultural practices of the communities living in the area are critical for sustainable tourism development (UNWTO, 2023). The communal group ranches in Laikipia County are areas where wildlife conservation and socio-cultural practices are of utmost importance. They cover vast areas of land and are owned by communities living in the area, Njoka *et al*., (2022).

Environmental conservation strategies promote the conservation of natural resources, including wildlife, forests, and water sources (UNEP, 2021). While previous studies contributed to the understanding of the relationship between environmental conservation strategies and sustainable tourism development, there are still gaps in knowledge that need to be addressed. Strategies aimed at conserving wildlife populations and their habitats are crucial components of environmental conservation. This includes measures such as anti-poaching efforts, habitat protection for endangered species, and conservation breeding programs to prevent species extinction (Nowak & Paradis, 2019).

Despite growing literature on the subject, gaps persist regarding how strategies such as biodiversity protection, waste management, land use planning, and community-wildlife conflict mitigation interact to shape sustainable tourism development in communal group ranch setting. Understanding how these strategies function in this specific context is crucial for informing policy, promoting ecological sustainability, and maximizing tourism's socio-economic benefits. The communal group ranches in Laikipia County represent a unique model of conservation, where communities own and manage land through management committees and community-based organizations (Laikipia Wildlife Forum, 2021; Njoka et al., 2022).

This study, therefore, seeks to examine the relationship between environmental conservation strategies and sustainable tourism development in communal group ranches in Kenya. It will explore how these strategies contribute to the protection of biodiversity, enhance waste management systems, inform effective land use planning, and mitigate community-wildlife conflicts, all of which are essential for the long-term sustainability of tourism in Kenya's ecologically rich regions.

Statement of the Problem

Sustainable tourism development holds the promise of economic prosperity and the preservation of cultural and natural resources worldwide (UNWTO, 2023). Laikipia County, Kenya, renowned for its remarkable natural beauty and biodiversity, was an ideal location for such development (Abrahms *et al.*, 2023). However, the idyllic vision of sustainable tourism here faced multifaceted challenges. Human-wildlife conflict, climate change, and the delicate balance between conservation and traditional pastoralism by host communities cast a shadow over the county's great sustainable tourism potential. While Laikipia held the allure of a wild and magical destination, communal group ranches in the region, representing a significant tourism resource, remain underexplored (Juma and Khademi-Vidra, 2019).

Efforts to address these challenges and harness the opportunities presented by sustainable tourism development in the County involved the implementation of several environmental conservation strategies. However, empirical evidence regarding the impact of these strategies remain limited. Therefore, the core problem that the study sought to address was the lack of a comprehensive understanding of environmental conservation strategies and sustainable tourism development in communal group ranches in Laikipia County, Kenya.

According to UNWTO (2023), in the ideal scenario, sustainable tourism development in Laikipia County would serve as an economic engine, benefiting local communities. However, the actual state of it was plagued by challenges and uncertainties, which included land use and human-wildlife conflict, climate change, drought and the complex interplay of environmental conservation efforts and pastoralism.

Objective of the Study

The objective of the study was to investigate the effect of environmental conservation strategy on sustainable tourism development in communal group ranches in Laikipia County, Kenya.

Hypothesis

The null hypothesis of the study was that environmental conservation strategy does not have significant effect on sustainable tourism development in communal group ranches in Laikipia County, Kenya.

Delimitations of the Study

The study was delimited to communal group ranches in Laikipia County, Kenya. Consequently, the findings may not be generalizable to other destinations with different characteristics, environmental conditions, and tourism markets. In addition, there was a delimitation on methodology as the study only used questionnaires and interview schedules for data collection.

Limitations of the Study

The respondents might have had biases in their responses that would have affected the findings of the study. To overcome this limitation, the researcher used multiple sources of data collection tools including questionnaires and interviews to reduce bias and provide a more comprehensive understanding of the research problem. Also, the researcher anticipated that the investigation of environmental conservation strategy on sustainable tourism development would be hindered by factors such as community participation, leadership, and resources. The researcher mitigated this challenge by engaging stakeholders in the research process and built trust and rapport with the local communities as well as employing research assistants and guides from the study sites.

Assumptions of the Study

The study was guided by the following assumptions: To begin with, the researcher assumed that community members and other stakeholders were willing to support and participate in environmental conservation efforts that could lead to sustainable tourism development in communal group ranches in Laikipia County. In addition, he/she assumed that the data collected was accurate and reliable. Moreover, it was assumed that the respondents provided honest and truthful answers as well as their views being representative of the broader population.

LITRATURE REVIEW

Environmental conservation strategy and sustainable tourism development in communal group ranches

Environmental conservation strategies often involve the initiation and management of protected areas such as wildlife reserves, nature reserves and national parks. These areas are designated to safeguard unique ecosystems, biodiversity, and critical habitats from human encroachment and unsustainable exploitation (Jones, 2018). In the context of tourism development, environmental conservation strategies encompassed efforts to integrate sustainable practices into tourism activities (Baloch, Shah, Iqbal, 2023). This involved minimizing the negative environmental impacts of tourism, promoting eco-friendly infrastructure, and raising awareness among tourists about conservation issues. As people and wildlife came into expanding contact under the force of climate change, zoonosis and species recovery, it was important that we explored how to facilitate coexistence in a shared multi-use landscapes as well as how the same contributed to sustainable tourism development.

In the USA, a study by Li, Zhou, and Wang (2020) examined the role of environmental conservation strategies in promoting tourism development in the Yosemite National Park. The study found that environmental conservation efforts, such as implementing sustainable tourism practices, positively impacted visitor satisfaction and experience. Smith et al., (2023) conducted a valuable study investigating the interplay between environmental conservation strategies and tourism development in communal group ranches in America. The researchers utilized a combination of interviews and surveys to gather data from local communities, tourism operators, and conservation organizations, allowing for a comprehensive understanding of the topic. The study established potential economic benefits of tourism in communal group ranches. The findings emphasized the role of tourism in fostering economic development, creating employment opportunities, and improving the livelihoods of local communities. However, despite the above, the findings also point out that increased tourism activities can lead to environmental degradation, including habitat destruction, pollution, and strain on natural resources (Baloch *et al*., 2023) The discussion of these challenges provides valuable insights into the potential

trade-offs between tourism growth and environmental conservation.

While the study acknowledges the challenges posed by tourism, there is limited exploration of the specific strategies that could address these issues effectively (Reindrawati, D. Y. (2023). Moreover, the study primarily focused on communal group ranches in America, which limits its generalizability to other regions and contexts especially in Laikipia County, Kenya.

Moreover, Jones, Williams and Brown (2015) examined the effect of environmental conservation strategy on sustainable tourism development in communal group ranches in England. The study found that environmental conservation strategies positively influenced tourism development by preserving natural resources and promoting eco-tourism. However, the effect of specific environmental conservation strategies used was not shown and thus there was a gap in knowledge regarding the effectiveness of environmental conservation strategies in communal group ranches.

Thompson *et al.,* (2023) conducted a study on the interplay between environmental conservation strategies and tourism development in communal group ranches in Britain. The researchers employed a mixed-methods approach, combining interviews and surveys to gather data from various stakeholders including local communities, tourism operators, and conservation organizations. The findings indicated that tourism could serve as a catalyst for economic growth, job creation, and the overall enhancement of local livelihoods. Moreover, the study highlighted the challenges and potential negative implications associated with tourism development in communal group ranches. However, it could be strengthened by providing more specific strategies or interventions to address the identified challenges and by expanding the scope to include comparative analysis with communal group ranches in different region

Literature on environmental conservation strategies and tourism development in communal group ranches in South Africa provided valuable insights into the complexities of sustainable development in these contexts. Previous studies shed light on the economic benefits of tourism in communal group ranches (Johnson & Williams, 2017). However, there was a notable gap in the literature regarding the limited examination of local community perspectives, which is essential for ensuring that conservation strategies and tourism initiatives align with the socio-cultural values and aspirations of the communities (Johnson & Williams, 2017). Additionally, the existing literature lacked comprehensive analysis of the governance and policy frameworks for communal group ranches in South Africa (Thompson & Brown, 2018; Adams, 2019). Addressing these gaps through further research would contribute to a more holistic understanding of the topic.

In addition, several studies emphasized the importance of community-based natural resource management (CBNRM) as an effective conservation strategy (Adams, 2018; Kagoro *et al*., 2018). CBNRM empowered local communities to manage their natural resources, leading to improved environmental stewardship and preservation of biodiversity (Smith & Johnson, 2020). In Uganda, CBNRM initiatives showed promising results in communal group ranches by involving communities in decision-making processes and enhancing their sense of ownership and responsibility. The development of tourism in communal group ranches provided economic opportunities while promoting environmental conservation. Studies highlighted the potential of ecotourism in attracting visitors who are interested in experiencing Uganda's unique wildlife and landscapes (Kasozi *et al*., 2017). As a result, Ecotourism initiatives generated revenue that could be reinvested in conservation efforts, benefiting both local communities and the environment. However, it was important to ensure that tourism development was sustainable and did not lead to negative impacts such as over-tourism or cultural commodification (Luganda & Sserunkuuma, 2021).

In Kenya, the Community-Based Natural Resource Management (CBNRM) initiatives showed promising results in communal group ranches by involving locals in making decisions and enhancing their awareness of ownership and responsibility (Measham &Lumbasi, 2013). The development of tourism also provided economic opportunities while promoting environmental conservation (Juma and Khademi-Vidra, 2019). Moreover, Smith *et al.,* (2020) highlighted the significance of community-based conservation initiatives in Laikipia County. The study emphasized the vital role of involving local communities in sustainable environmental management efforts. As a result, it established that ecotourism supports conservation while providing economic opportunities for residents in communal group ranches (KCB, 2020). Land tenure and governance were also explored, with a

focus on secure land rights as an incentive for long-term investments in conservation and tourism development.

While previous studies contributed valuable insights, there were some gaps that warranted further investigation. Limited research specifically focused on communal group ranches with a significant portion of the literature examining national parks or protected areas instead. Therefore, more studies were needed to understand the unique dynamics, challenges, and opportunities within communal group ranches.

Theoretical Framework

Tourism Area Life Cycle (TALC)

The researcher anchored the study on the Tourism Area Life Cycle (TALC) theory developed by Butler (1980). TALC theory explained how tourism destinations evolve over time, and how different stages of development required different types of strategies for sustained growth and development. According to the theory, tourism destinations go through four stages of development: exploration, involvement, development, and consolidation. Each stage has its own unique characteristics and challenges that require different strategies for conservation and development.

TALC theory was best suited for the study because it provided a framework for understanding the different stages of tourism development and how environmental conservation strategies could be tailored to each stage (Kubickova and Martin, 2020). The theory emphasized the importance of balancing tourism development with environmental conservation. The specific objectives of the study aligned with the key components of TALC theory, such as investigating the effect of environmental conservation strategy (Butler, 1980; Lepp, 2007) on sustainable tourism development in communal group ranches in Laikipia County.

METHODOLOGY

Research Design

The study employed embedded mixed method research design which combines both qualitative and quantitative data collection and analysis (Campbell *et al.,* 2020). The design allowed for triangulation, where both qualitative and quantitative data sources converged, ensuring the credibility and reliability of the findings (Teddlie & Tashakkori, 2009). Secondly, the qualitative component, such as interviews, provided an in-depth understanding of the local context, culture, and community perspectives related to environmental conservation strategies and tourism development (Creswell, 2014).

Target Population

The study targeted a population of 18724 respondents comprising 13 chairpersons, 13 secretaries and 14006 registered members from all the communal group ranches in Laikipia County. In addition, there were 4692 tourists from 6 of the communal group ranches which house tourists' lodges. The distribution of these is shown in Table 1.1.

Table 1: Target Population

S/No.	Group Ranches	Chairpersons	Secretaries	Registered Members	Tourists (p.a)	Total
1	Koija	1	1	1198	720	1920
2	Il Motiok	1	1	858	204	1064
3	Tiemamut	1	1	718	-	720
4	Musul	1	1	355	-	357
5	Nkiloriti	1	1	411	-	413
6	Kijabe	1	1	971	1200	2173

7	Morupusi	1	1	308	-	310
8	Il Polei	1	1	473	-	475
9	Munishoi	1	1	2198	1440	3640
10	Shulmai	1	1	1209	-	1211
11	Il Ngwesi	1	1	2046	840	2888
12	Lekuruki	1	1	457	288	459
13	Maiyanat	1	1	2804	-	2806
TOTAL		**13**	**13**	**14006**	**4692**	**18724**

Source: NRT, LCA and Group Ranches Chairpersons, 2023.

Sampling Techniques

The study employed stratified, simple random and purposive sampling techniques to select respondents. Stratified sampling is a robust and effective sampling technique used when the target population can be divided into distinct subgroups, known as strata, each sharing similar characteristics (Meinck, 2020). Accordingly, the researcher used stratified sampling technique to select group ranches to be included in the study. Through stratified sampling, the researcher ensured that all the group ranches were included in the sample. This proportional representation guaranteed that the insights gained from the sample are more applicable and generalizable to the entire population of group ranches (Johnson & Brown, 2017).

Secondly, the study used simple random sampling techniques to select registered members of group ranches to participate in the study. As explained by Berndt (2020), simple random sampling ensures that all individuals in the population have an equal and independent chance of being included in the sample. It is a process that provides every subject from the population with an equal probability of selection. This choice of random sampling is based on the aim of obtaining research data that can be generalized to a larger population within statistically determined margins of error.

Finally, the researcher used a purposive sampling technique to select chairmen and secretaries of group ranches to participate in the study. Campbell *et al.*, (2020) emphasized that purposive sampling is a commonly employed qualitative data collection technique. The approach entailed deliberately selecting individuals who possessed relevant knowledge or firsthand experience related to the subject of investigation. The researchers believed that due to the positions held by the chairmen and secretaries, they would be able to offer the desired information.

Sample Size

This was determined using Slovin's formula:$n = \frac{N}{1+N(e)^2}$ $n = \frac{N}{1+N(e)^2}$, where, n = sample size, N = population size and e = level of precision. The sample size for the study was therefore calculated as follows:

$$n = \frac{18724}{1 + 18724(0.05)^2}$$

$$n = \frac{18724}{1+18724(0.0025)}$$

$$n = \frac{18724}{1+46.81}$$

$$n = \frac{18724}{47.81}$$

$$n = 392$$

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Thus, the sample of 392 was selected from the targeted population of 18724Thus, in the study undertaken, a sample size of 392 respondents was selected from a target population of 18,724 respondents. This decision was guided by established principles in statistical research and sample size determination. For instance, Simon and Goes (2012) emphasized that for populations exceeding 5,000, a sample size of around 400 was often deemed sufficient for reliable results. Therefore, a sample size of 392 for a population of 18,724 supports the rationale behind the chosen sample size.

Table 2: Distribution of Sample Size

Group Ranches	Target Population	Chairpersons and Secretaries	Registered Members	Tourists	Total Sample Size
Koija	1920	2	23	14	39
Il Motiok	1064	2	17	4	23
Tiemamut	720	2	14	-	16
Musul	357	2	7	-	9
Nkiloriti	413	2	8	-	10
Kijabe	2173	2	19	25	46
Morupusi	310	2	6	-	8
Il Polei	475	2	9	-	11
Munishoi	3640	2	43	28	73
Shulmai	1211	2	24	-	26
Il Ngwesi	2888	2	40	15	57
Lekuruki	459	2	9	6	17
Maiyanat	2806	2	55	-	57
	18724	**26**	**274**	**92**	**392**

Source: NRT, LCA and Group Ranch Chairpersons, 2023.

Research Instruments

The study used questionnaires to collect quantitative data whereas interview schedules were employed for qualitative data.

Questionnaires

The researcher used five-point Likert scale questionnaires to collect quantitative data from registered members of the communal group ranches due to various reasons. First, questionnaires offered efficient and scalable means of data collection (Smith & Johnson, 2020). Additionally, they provided a standardized approach thus ensuring consistent data collection across participants (Jones, Johnson & Smith, 2020)

Interview Schedule

The researcher used interview schedules to collect qualitative data from chairpersons and secretaries of the communal group ranches. The study used interview schedules because it allowed the researcher to design a predefined set of questions to be asked consistently across all participants, ensuring standardization and reducing potential bias (Bergelson *et al.*, 2022).

Pre-testing

Before the main data collection, the research instruments underwent pre-testing in selected group ranches in Laikipia County. The respondents who participated in the pre-testing were not included in the actual study. This approach aligned with Tichapondwa (2013) assertion that pre-testing involved respondents from the population but not the sample, possessing identical attributes to the target population

Validity

The researcher employed a range of methods to ascertain the validity of the research instruments, including questionnaires and interview schedules. These strategies encompass content validity, criteria validity, construct validity, and face validity. The content validity of the research instruments was evaluated by subject matter experts, comprising supervisors and lecturers from Kenyatta University, ensuring comprehensive coverage of the research questions and objectives (Polit & Beck, 2017).

Reliability

The researcher utilized diverse strategies to evaluate the reliability of research instruments, which encompassed questionnaires and interview schedules. To begin with, the researcher applied Cronbach's alpha coefficient to establish the reliability of the questionnaire. Cronbach's alpha, a metric for internal consistency, revealed the extent to which questionnaire items effectively measure the same underlying concept (Cronbach, 1951). Specifically, an alpha coefficient of more than 0.70 indicated favorable internal consistency, signifying that the items consistently gauge the identical construct (Kline, 2015).

For interview schedules' reliability assurance, interviewers underwent training to adhere to a standardized protocol. This entailed utilizing a comprehensive script to steer the conversation, ensuring uniform phrasing of all questions, and maintaining consistent recording of responses. Moreover, the involvement of multiple interviewers mitigated bias and facilitated inter-rater reliability evaluation (Jessica *et al.*, 2023).

Data Analysis

Quantitative data was entered, cleaned, and subjected to analysis using Statistical Package for Social Sciences (SPSS) version 22.0 software. Descriptive statistics, encompassing frequencies, percentages, means, and standard deviations, were employed to analyze quantitative data. To ensure robustness of quantitative data analysis, the researcher conducted diagnostic tests, including assessments of Normality, Heteroscedasticity, and Multicollinearity. These tests were essential prerequisites for accurate inferential statistical analysis (Tabachnick and Fidell, 2019). To address the issue of the moderating variable, the researcher employed hierarchical multiple regression analysis. This approach allowed the researcher to examine how the moderating variable influenced the relationship between independent and dependent variables, which is particularly relevant to this research (Baron & Kenny, 1986). Qualitative data collected in accordance with research objectives was analyzed using thematic content analysis. This method involves identifying, analyzing, and reporting patterns or themes within qualitative data, providing valuable insights into the nuanced aspects of the study (Braun & Clarke, 2006).

RESULTS AND DISCUSSIONS

The participants were requested to respond to the items on environmental strategy. The findings on environmental conservation strategies reveal important insights into various initiatives and their effectiveness. Table 3 summarises the findings.

Table 3: Respondents on Environmental Conservation Strategy

		SA	A	N	D	SD	T	M	SD
There is awareness creation to community members on need to conserve	F	138	83	26	11	7	265	1.7	1.0
	%	52.1	31.3	9.8	4.2	2.6	100		

the environment through trainings, workshops, school clubs etc									
There is use and recycling of materials to mitigate environmental degradation	F	24	73	47	77	44	265	3.2	1.3
	%	9.1	27.5	17.7	29.1	16.6	100		
Formation of the group ranches has led to an increase in wildlife numbers in the group ranch	F	82	132	21	21	9	265	2.0	1.0
	%	30.9	49.8	7.9	7.9	3.4	100		
Diversity of species for both flora and fauna has grown since the introduction of group ranch	F	97	109	35	10	14	265	2.0	1.1
	%	36.6	41.2	13.2	3.8	5.3	100		
Measures have been put in place to prevent environmental degradation	F	140	85	28	8	4	265	1.7	0.9
	%	52.9	32.1	10.6	3	1.5	100		
Boreholes have been sunk in the community to address water scarcity	F	97	64	32	37	35	265	2.4	1.4
	%	36.6	24.2	12.1	14	13.2	100		
Communities adjacent to the proposed crocodile jaw dam welcome the project as they perceive it to be a solution to water problems	F	73	34	46	37	75	265	3.0	1.6
	%	27.5	12.8	17.4	14	28.3	100		
Community members are familiar with proper waste disposal methods	F	51	83	34	61	36	265	2.8	1.4
	%	19.2	31.3	12.8	23	13.6	100		
The community members have been trained in hygiene and sanitation	F	59	127	33	23	23	265	2.3	1.2
	%	22.3	47.9	12.5	8.7	8.7	100		
Permanent toilets have been built in every homestead	F	15	11	27	64	148	265	4.2	1.1
	%	5.7	4.2	10.2	24.2	55.9	100		
There is adequate vegetation and pasture for grazing due to land use planning	F	98	112	28	11	16	265	2.0	1.1
	%	37	42.3	10.6	4.2	6	100		
Land used planning is used to control grazing patterns for wildlife and livestock with great success	F	100	96	28	23	18	265	2.1	1.2
	%	37.7	36.2	10.6	8.7	6.8	100		
There are more returns for the land using the group ranches model compared to other economic activities	F	93	90	53	20	9	265	2.1	1.1
	%	35.1	34	20	7.5	3.4	100		
Losses of life and property due to community-wildlife conflict have decreased	F	58	97	19	28	63	265	2.8	1.5
	%	21.9	36.6	7.2	10.6	23.8	100		
Community members perceive elephants as the main cause of community-wildlife conflict	F	147	68	11	22	17	265	1.9	1.4
	%	55.5	25.7	4.2	8.3	6.4	100		
Community members have embraced elephant conservation due to continuous awareness efforts	F	62	145	27	25	6	265	2.1	1.0
	%	23.4	54.7	10.2	9.4	2.3	100		

Community members are happy to coexistence with elephants than being in conflict with them	F	75	123	33	21	13	265	2.1	1.1
	%	28.3	46.5	12.5	7.9	4.9	100		
Measures taken to reduce elephant attacks and crop raiding have worked	F	52	44	43	39	87	265	3.2	1.5
	%	19.6	16.6	16.2	14.7	32.9	100		
There is less fighting for pasture and water among local communities	F	55	104	22	25	59	265	2.7	1.5
	%	20.8	39.3	8.3	9.4	22.3	100		
There has been an increase in wildlife in the area hence attracting tourists	F	82	136	20	13	14	265	2.0	1.0
	%	30.9	51.3	7.5	4.9	5.3	100		

On the creation of awareness regarding the need to conserve the environment, a significant proportion of respondents strongly agreed (52.1%) or agreed (31.3%) that initiatives such as workshops, training, and school clubs have been implemented. Only a minority were neutral (9.8%), disagreed (4.2%), or strongly disagreed (2.6%). With a mean score of 1.7 and a standard deviation of 1.0, the results indicate a strong consensus that these programs have positively impacted community awareness. This suggests that educational initiatives are vital in fostering environmental stewardship. The implication is that continued and expanded efforts in community education can significantly enhance sustainable practices, creating long-term benefits for the environment.

The findings of this study align with existing literature on environmental conservation strategies and their impact on tourism development. The high level of agreement among respondents regarding awareness initiatives such as workshops, training, and school clubs (52.1% strongly agreed, 31.3% agreed) supports the assertion by Jones (2028) that environmental conservation efforts often involve the establishment of protected areas and public awareness campaigns. Jones (2018) emphasized that such awareness programs are instrumental in fostering environmental stewardship, which is consistent with the study's implication that continued and expanded education initiatives would further enhance sustainable practices and long-term benefits for the environment.

Regarding the use and recycling of materials to mitigate environmental degradation, perceptions were divided. Only 9.1% of respondents strongly agreed, and 27.5% agreed that recycling is effective, while 17.7% were neutral. A notable 29.1% disagreed, and 16.6% strongly disagreed, resulting in a mean score of 3.2 and a standard deviation of 1.3. These mixed opinions suggest that recycling practices are either not widespread or not effectively implemented in the community. This could be attributed to factors such as inadequate infrastructure or a lack of public engagement. The implication is that more targeted interventions, including improved recycling facilities and education on waste management, are necessary to address this challenge and promote more sustainable practices. These findings support Baloch et al. (2023), who identified challenges in integrating sustainable tourism practices, including recycling and waste management. The lack of robust recycling infrastructure and public engagement, as suggested by this study, is echoed in the literature, which calls for targeted interventions such as improved facilities and community participation in sustainable waste management (Reindrawati, 2023).

The formation of group ranches has been positively received, with 30.9% of respondents strongly agreeing and 49.8% agreeing that these ranches have led to an increase in wildlife numbers. Only a small fraction was neutral (7.9%) or disagreed (11.3%). The mean score of 2.0 and standard deviation of 1.0 suggest a general consensus on the effectiveness of group ranches in wildlife conservation. This reflects the success of these ranches in providing secure areas and sustainable management practices that support wildlife populations. The implication is that replicating and scaling up the group ranch model can further enhance wildlife conservation efforts, contributing to biodiversity and ecosystem stability. These findings align with Nowak & Paradis (2019) argue that conservation breeding programs and sustainable land management practices play a crucial role in biodiversity preservation. The strong agreement in this study (mean score of 2.0) reinforces the effectiveness of group ranches in supporting ecosystem stability, suggesting that their replication and expansion could further enhance wildlife conservation efforts.

Similarly, the diversity of species for both flora and fauna has grown since the introduction of group ranches. A majority of respondents strongly agreed (36.6%) or agreed (41.2%) with this assertion, while a smaller percentage were neutral (13.2%) or disagreed (9.1%). The mean score of 2.0 and standard deviation of 1.1 indicate strong agreement on this issue. These findings highlight the ecological benefits of group ranches in preserving habitats and fostering species diversity. The implication is that sustained investment in such conservation strategies is critical for maintaining and enhancing biodiversity in the region. Also, the findings agree with Smith et al. (2020), who highlighted the significance of community-based conservation initiatives in Laikipia County. Their study underscored how ecotourism and conservation programs contribute to species preservation and provide economic benefits. The findings also resonate with the works of Johnson & Williams (2017) and Kagoro et al. (2018), who argued that community-based natural resource management (CBNRM) strategies foster biodiversity conservation and sustainable livelihoods. The implication of these findings is that sustained investment in community-led conservation strategies can enhance biodiversity while promoting ecotourism.

When it comes to measures to prevent environmental degradation, a large proportion of respondents strongly agreed (52.9%) or agreed (32.1%) that effective measures are in place. Only a small number were neutral (10.6%) or disagreed (4.5%). The mean score of 1.7 and standard deviation of 0.9 reflect strong confidence in existing measures such as afforestation and controlled land use.

Furthermore, and according to the local community members in Lower Naibunga, several NGOs in conservation have come up with initiatives that already has had positive impacts on their livelihoods and sustainable tourism. For example, the Wyss Academy For Nature initiated the semi-circular bunds project in 2023 which a few months later resulted in more vegetation cover as well as improved pasture for both cattle and wildlife. In addition, this restored land became a pull factor for elephants and other wildlife, especially after having been hugely degraded for a long time. A satellite photo for monitoring taken recently showed herds of elephants happily patronizing the green fields which was as a result of the land restoration initiative affirming the need for healthier landscapes for sustainable tourism development.

Nevertheless, it suggested that the community recognized the importance of these initiatives in addressing environmental challenges. The implication was that further strengthening and scaling of these measures could ensure continued success in preventing environmental degradation. The results supported the assertion Baloch et al. (2023) identified tourism-related environmental degradation as a significant concern, emphasizing the need for balanced conservation approaches. The high confidence in the existing conservation measures suggested that local communities recognized their effectiveness, reinforcing the need to strengthen and scale up these efforts to ensure long-term sustainability.

Efforts to address water scarcity through the sinking of boreholes received mixed feedback. While 36.6% strongly agreed and 24.2% agreed that boreholes had been provided, 12.1% were neutral, and a combined 27.2% disagreed or strongly disagreed. The mean score was 2.4, with a standard deviation of 1.4, reflecting varying levels of satisfaction. These findings suggested that while progress had been made, there were gaps in coverage or access to boreholes, which could limit their effectiveness. The implication was that expanding borehole projects and ensuring equitable access to water resources would be crucial in addressing water scarcity comprehensively. The study's findings suggested that additional investment in water infrastructure and better management strategies were necessary to address this persistent challenge.

The proposed Crocodile Jaw Dam on the border of Laikipia and Isiolo counties received polarized responses. While 27.5% strongly agreed and 12.8% agreed that the project would address water problems, 17.4% were neutral, and 42.3% disagreed or strongly disagreed. The mean score of 3.0 and a standard deviation of 1.6 indicated significant variation in perceptions. This divergence may be attributed to concerns about potential environmental and social impacts or skepticism about the project's implementation. The implication is that effective stakeholder engagement and transparent communication would be essential to address community concerns and build support for the project.

The findings indicated a moderate level of awareness regarding proper waste disposal methods within the community, with 19.2% strongly agreeing and 31.3% agreeing that they were familiar with appropriate waste

management practices. However, a significant proportion remained neutral (12.8%) or disagreed (36.6%), suggesting that gaps persisted in community knowledge. The mean score of 2.8 and standard deviation of 1.4 reflected this moderate awareness, aligning with studies such as Smith et al. (2020), which found that public awareness of waste management correlates strongly with available infrastructure and educational interventions.

These findings supported the argument by Jones and Brown (2019) that targeted educational campaigns to significantly enhance community engagement in waste disposal practices. However, they diverged from the conclusions of Kimani et al. (2021), who argued that regulatory enforcement is a more effective driver of proper waste management. The implication was that while awareness was present, its practical application required strengthened educational initiatives and accessible waste management infrastructure.

Training in hygiene and sanitation was widely acknowledged, with 22.3% of respondents strongly agreeing and 47.9% agreeing that such training had been conducted. A smaller proportion were neutral (12.5%) or disagreed (17.4%). The mean score of 2.3 and standard deviation of 1.2 reflect a positive trend in hygiene awareness. This suggested that community initiatives had successfully imparted knowledge on sanitation, leading to improved health outcomes. The implication was that sustained efforts in hygiene education were essential to ensure lasting behavioral change. However, the divergence emerged when comparing these results with those of Williams et al. (2020), who argued that training alone was insufficient unless accompanied by sustained community engagement and behavioral reinforcement strategies. This suggested that while knowledge dissemination had been successful, the real challenge lied in ensuring long-term adherence to hygiene practices.

The availability of permanent toilets in homesteads remained a significant concern, with only 5.7% strongly agreeing and 4.2% agreeing that such facilities existed, while 80.1% either disagreed or strongly disagreed. The mean score of 4.2 and standard deviation of 1.1 highlighted substantial gaps in sanitation infrastructure. These findings were consistent with the work of Onyango and Wanjiru (2022), who identified inadequate sanitation as a persistent challenge in many rural and peri-urban communities due to financial constraints and poor policy implementation. However, they contrasted with the findings of Mburu (2021), who argued that community-led initiatives had been instrumental in improving sanitation coverage in similar contexts. The implication is that large-scale government and non-governmental interventions were urgently needed to bridge this gap and mitigate health risks.

Land use planning led to adequate vegetation and pasture for grazing, with 37% of respondents strongly agreeing and 42.3% agreeing. Only a minority were neutral (10.6%) or disagreed (10.2%). The mean score of 2.0 and standard deviation of 1.1 demonstrated strong support for land-use planning. These results implied that organized land management had effectively addressed challenges such as overgrazing, promoting environmental conservation and community livelihoods. The implication was that expanding such practices could further optimize land use and enhance ecological sustainability.

These findings were in concurrence with research by Taylor et al. (2020), which highlighted the role of structured land-use policies in promoting environmental sustainability. The mean score of 2.0 and standard deviation of 1.1 indicated strong support for land management initiatives. However, a divergence was evident in comparison to the work of Kamau and Otieno (2019), who contended that while land use planning enhances environmental sustainability, it could sometimes lead to conflicts over land rights and access. The implication was that while current strategies were effective, incorporating participatory approaches in land-use decision-making could further enhance community support and sustainability.

Respondents also acknowledged the success of land use planning in controlling grazing patterns for wildlife and livestock, with 37.7% strongly agreeing and 36.2% agreeing. A smaller percentage were neutral (10.6%) or disagreed (15.5%). The mean score of 2.1 and standard deviation of 1.2 indicate a positive reception to grazing controls. These findings suggest that effective land-use policies minimize conflicts and ensure sustainable use of resources.

The implication was that integrating community participation in land-use decisions could further improve outcomes. This aligned with research by Becker and Smith (2021), who found that controlled grazing significantly reduces resource depletion and mitigated human-wildlife conflict. However, the findings diverged

from the conclusions of Njeri et al., (2022), who argued that land-use policies often faced resistance due to competing interests among different stakeholders. The implication was that ensuring equitable land-use policies that integrated local community needs could enhance effectiveness.

The group ranches model was perceived as economically beneficial, with 35.1% strongly agreeing and 34% agreeing that it provides better returns than other economic activities. This aligned with the findings of Kinyanjui et al. (2021), who highlighted the economic viability of group ranches in promoting sustainable livelihoods. The mean score of 2.1 and standard deviation of 1.1 reflected broad agreement on the model's economic value. However, a divergence was observed when compared to the work of Obiero (2020), who noted that while group ranches could be beneficial, mismanagement and conflicts over resource allocation could undermine their effectiveness. The implication was that strengthening governance structures within group ranches could enhance their economic potential.

The reduction in losses of life and property due to community-wildlife conflict received mixed responses, with 21.9% strongly agreeing and 36.6% agreeing, but 23.8% strongly disagreed. The mean score of 2.8 and standard deviation of 1.5 indicated moderate success in conflict mitigation efforts. This highlighted the need for more effective measures to reduce human-wildlife conflict. The implication was that innovative strategies, such as early warning systems and buffer zones, were essential for fostering peaceful coexistence. This aligned with research by Kariuki (2021), which demonstrated that while conflict mitigation strategies have had some success, persistent challenges remained. However, the findings diverged from those of Mutua (2020), who argued that community-wildlife conflict could only be effectively mitigated through comprehensive compensation schemes and enhanced law enforcement. The implication is that more proactive and community-centered strategies, such as early warning systems and buffer zones, were needed to ensure lasting solutions.

Elephants were overwhelmingly identified as the primary cause of community-wildlife conflict, with 55.5% strongly agreeing and 25.7% agreeing. The mean score of 1.9 and standard deviation of 1.4 suggest a broad consensus. This was consistent with studies such as Mwangi and Ouma (2022), which found that elephant-related conflicts were a major challenge in conservation areas. However, a noteworthy divergence arose when considering the findings of Wambui (2020), who emphasized that other wildlife species also contributed significantly to conflicts. The implication was that while elephant conservation remained crucial, a broader focus on human-wildlife conflict dynamics was necessary.

Despite these conflicts, 23.4% strongly agreed and 54.7% agreed that community members embraced elephant conservation. The mean score of 2.1 and standard deviation of 1.1 reflected growing acceptance of coexistence. This concurred with the findings of Njoroge (2021), who demonstrated that sustained awareness campaigns can foster positive attitudes towards conservation. However, it contrasted with the work of Omondi (2020), who found that economic losses due to wildlife conflicts often lead to negative perceptions of conservation efforts. The implication is that further investment in community-based conservation programs was essential to balance conservation goals with community livelihoods.

Moreover, The Ministry of Tourism and Wildlife, Kenya Wildlife Service and the County Government of Laikipia have also come up with initiatives of dealing with the HWC through continuous engagement with the local communities and timely response to cases. There has been an improvement in the time between when an HWC case is reported and when the intervention is conducted.

Nevertheless, a good number of NGOs in conservation have also had a huge impact in this perception shift. Some of these institutions include a member organization- Laikipia Conservancies Association (LCA), Wyss Academy for Nature, Northern Rangelands Trust (NRT), Mpala Research Centre, Save the Elephants, Loisaba and Space for Giants to mention just but a few.

Also, Mpala Research Centre, Save the Elephants and Wyss Academy for Nature have also been involved in cutting edge research and promoting creation of wildlife-friendly corridors and conservation areas. These areas range from community conservancies, forests to national parks, allow elephants to move safely between habitats without disrupting farming areas and human settlements. This has been coupled with community led conservation projects which have resulted in a reduction in HWC and improved pastures for both wildlife and cattle.

However, measures to reduce elephant attacks and crop raiding were less successful, with only 19.6% strongly agreeing and 16.6% agreeing, while 32.9% strongly disagreed. The mean score of 3.2 and standard deviation of 1.5 suggest dissatisfaction with current interventions. This was consistent with the findings of Otieno and Mwangi (2021), who identified gaps in the effectiveness of mitigation measures. These findings diverged from the conclusions of Nyambura (2020), who argued that improved fencing and deterrent technologies have had significant success in reducing such conflicts. The implication is that a multi-faceted approach incorporating technology, community engagement, and policy reinforcement is needed.

Finally, respondents recognized an increase in wildlife numbers in the area, with 30.9% strongly agreeing and 51.3% agreeing. The mean score of 2.0 and standard deviation of 1.0 suggested broad agreement on the success of conservation efforts. This aligned with the findings of Kiptoo and Muthoni (2021), who observed positive trends in biodiversity conservation due to enhanced protective measures. However, a divergence was noted when compared to the work of Kamara (2020), who argued that rising wildlife populations could sometimes exacerbate human-wildlife conflict. The implication was that maintaining a balance between conservation success and community well-being is crucial for long-term sustainability.

The hypothesis under consideration was H_{01}: Environmental conservation strategy does not have a significant effect on sustainable tourism development in communal group ranches in Laikipia County, Kenya. The study findings, based on the statistical analysis from the model summary, ANOVA, and coefficients table, are interpreted as follows:

Table 4: Model Summary Table

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.470a	0.221	0.209	0.33291
a Predictors: (Constant), Mitigation_of_Community_Wildlife_Conflict, Waste_Disposal_Mechanisms, Protection_of_Biodiversity, Land_Use_Planning				

The model summary presents the relationship between environmental conservation strategies (independent variables) and sustainable tourism development (dependent variable). The findings from the model summary indicate a moderate positive relationship between the independent variables namely, protection of biodiversity, waste disposal mechanisms, land use planning, and mitigation of community-wildlife conflict and the dependent variable, sustainable tourism development.

The R-value of 0.470 indicates a moderate positive correlation between the predictors (mitigation of community-wildlife conflict, waste disposal mechanisms, protection of biodiversity, and land use planning) and sustainable tourism development. The R^2 value of 0.221 signifies that approximately 22.1% of the variance in sustainable tourism development can be explained by the environmental conservation strategies included in the model.

The adjusted R^2 value of 0.209 corrects for the number of predictors in the model and is slightly lower, showing that the model remains reasonably valid when adjusted for potential overfitting. The standard error of the estimate is 0.33291, which reflects the average deviation of the observed values from the predicted values of sustainable tourism development. While this suggests some variability that is not explained by the model, the R^2 value confirms that the predictors contribute significantly to explaining the outcome variable.

The positive association between environmental conservation strategies and sustainable tourism development aligns with existing literature. Similarly, the findings are in line with the qualitative findings from the chairpersons, secretaries and visitors. For example, one of the chairpersons (C1/12/2024) had this to say:

Tourists visiting Laikipia County are primarily influenced by its dedication to sustainable tourism and conservation efforts. The region's commitment to preserving its diverse wildlife, coupled with opportunities to engage with local Maasai and Turkana communities, creates a uniquely enriching experience. The presence of eco-tourism initiatives, including conservancy-led safaris and community-run lodges, further enhances its appeal

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by ensuring that tourism activities contribute directly to environmental conservation and community empowerment.

These findings agree with Bramwell and Lane (2021) who posit that sustainable tourism was largely dependent on effective conservation strategies, including biodiversity protection, waste management, and land-use planning. They argued that preserving natural resources enhanced tourism appeal and ensured long-term sustainability. Similarly, Buckley (2020) underscored the role of biodiversity conservation in maintaining ecosystem health, which directly benefited nature-based tourism. This finding concurred with the study results, where protection of biodiversity emerged as a significant predictor of sustainable tourism development.

ANOVA Table

The ANOVA table assesses the overall significance of the model in predicting sustainable tourism development. The findings are shown in Table 4.10.

Table 5: ANOVA Table

ANOVAa						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.171	4	2.043	18.431	.000b
	Residual	28.815	260	0.111		
	Total	36.986	264			
a Dependent Variable: Sustainable_tourism_development						
b Predictors: (Constant), Mitigation_of_Community_Wildlife_Conflict, Waste_Disposal_Mechanisms, Protection_of_Biodiversity, Land_Use_Planning						

The findings indicate that the F-statistic is 18.431 with a significance level (p-value) of 0.000. Since the p-value is less than the standard significance level of 0.05, it indicates that the regression model as a whole is statistically significant. This means that the combination of the predictors including mitigation of community-wildlife conflict, waste disposal mechanisms, protection of biodiversity, and land use planning significantly impacts sustainable tourism development. The significance of these findings underscores the importance of considering a range of environmental, social, and community-based factors when developing strategies for sustainable tourism. This aligns with recent studies that highlight the complex, interdependent relationships between environmental preservation, community engagement, and sustainable tourism development (Barton et al., 2022; Lee et al., 2021).

For instance, Barton et al. (2022) emphasized the critical role of biodiversity conservation and waste management in achieving sustainability in tourism, while Lee et al. (2021) argue that integrating community-driven wildlife conflict mitigation was key to ensuring long-term tourism sustainability. Moreover, the results highlighted the need for comprehensive land use planning as part of an integrated strategy for tourism development, a view that had been similarly supported by scholars such as Kumar et al. (2020), who suggested that effective land use planning helps balance environmental and socio-economic goals in tourism destinations.

The total sum of squares is 36.986, which represents the total variance in the dependent variable. Of this, 8.171 is explained by the model (regression sum of squares), while 28.815 remains unexplained (residual sum of squares). This division further emphasizes that although there is unexplained variability, the model accounts for a meaningful proportion of the variance in sustainable tourism development. This result is in line with recent work by Schmitz et al. (2020), who noted that although environmental and social factors were critical to sustainable tourism, they represent only part of the larger picture, suggesting the presence of other variables such as economic and political considerations that also influenced tourism outcomes.

Furthermore, the unexplained variance echoes the findings of Han et al. (2021), who argued that while

environmental and community-based predictors are essential, other unmeasured variables, such as tourist behavior and global economic conditions, also play significant roles in shaping the sustainability of tourism.

Coefficients Table

The coefficients table provides detailed insights into the contribution of each predictor to sustainable tourism development. Each predictor's unstandardized coefficient (B), standardized coefficient (Beta), t-statistic, and p-value are analyzed below:

Table 6: Coefficients Table

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.058	0.106		19.444	0
	Protection_of_Biodiversity	0.149	0.043	0.233	3.481	0.001
	Waste_Disposal_Mechanisms	-0.046	0.026	-0.11	-1.82	0.07
	Land_Use_Planning	0.068	0.028	0.162	2.376	0.018
	Mitigation_of_Community_Wildlife_Conflict	0.13	0.034	0.239	3.863	0
a Dependent Variable: Sustainable_tourism_development						

The findings from the coefficients table provide an in-depth understanding of the relative contributions of each predictor to sustainable tourism development in the context of communal group ranches in Laikipia County, Kenya. The protection of biodiversity emerges as a particularly strong and statistically significant predictor, with an unstandardized coefficient (B) of 0.149. This indicates that a one-unit increase in the protection of biodiversity leads to a 0.149-unit increase in sustainable tourism development, while holding other variables constant.

The standardized coefficient (Beta) of 0.233 further confirms its moderate yet meaningful influence, as the higher standardized coefficient reflects the relative importance of biodiversity protection in the context of all predictors. The t-value of 3.481, with a p-value of 0.001, strongly supports the statistical significance of this relationship, as the p-value is well below the conventional threshold of 0.05. These results suggest that biodiversity conservation is a critical determinant of sustainable tourism development in Laikipia County, aligning with a growing body of literature that emphasizes the fundamental role of biodiversity in tourism destinations.

This finding is in tandem with the qualitative findings. For instance, one of the secretaries, (S1/12/2024) reported:

Visitors frequently express admiration for the region’s ecological diversity and conservation initiatives. Guided game drives offer an opportunity to witness not only the breathtaking wildlife but also the structured conservation measures in place to protect endangered species. Interactions with local communities further enrich the experience, providing valuable insights into indigenous knowledge systems and the symbiotic relationship between humans and their environment.

Research in the field of sustainable tourism underscored that biodiversity served as an essential resource for tourism, not only enhancing the attractiveness of destinations but also ensuring the long-term viability of tourism-related activities (Liu et al., 2022; Zhou et al., 2022). Tourism, particularly in ecologically sensitive regions, was deeply reliant on the preservation of natural habitats and species diversity. Scholars like Linton et al. (2020) have documented how biodiversity conservation efforts can directly boost tourism revenues by safeguarding the landscapes and species that tourists come to visit.

The positive relationship between biodiversity protection and sustainable tourism development was further supported by studies such as those by Song et al. (2021), who found that biodiversity preservation strategies,

when integrated into tourism planning, result in more sustainable outcomes, including increased tourist satisfaction and longer-term economic benefits for local communities. Thus, the results of this study were consistent with broader trends in the field, which argue that biodiversity conservation should be a central consideration in any sustainable tourism framework.

In contrast, waste disposal mechanisms, while important for maintaining environmental integrity, appeared to have had a relatively weak and negative relationship with sustainable tourism development in this study. The unstandardized coefficient (B) of -0.046 suggested that a one-unit increase in waste disposal mechanisms was associated with a 0.046-unit decrease in sustainable tourism development. The negative direction of this relationship, coupled with a standardized coefficient (Beta) of -0.11, reflected a minor and weak effect. Moreover, the t-value of -1.82 and the p-value of 0.07, which exceeded the standard significance level of 0.05, indicated that waste disposal mechanisms are not statistically significant predictors of sustainable tourism development in this context. This finding aligned with a nuanced understanding of waste management's role in tourism, where the direct impact of waste disposal infrastructure may be overshadowed by other, more immediate environmental factors such as biodiversity and community involvement.

While waste management remains an essential component of sustainable tourism particularly in terms of maintaining environmental health and mitigating pollution, its direct effect on tourism development may be less pronounced in regions where other factors, such as biodiversity conservation and land use planning, are more influential. This was consistent with research by Liu et al. (2020) and Zhang et al., (2023), who suggested that waste disposal, although crucial for sustainability, did not always have the same immediate impact on tourism development compared to other factors like community engagement or ecological preservation.

As Liu et al. (2020) pointed out, waste disposal practices can sometimes be regarded as a secondary concern in the tourism sector, with tourists' primary interests often centered on experiencing natural environments and local culture rather than the technicalities of waste management.

On the other hand, land use planning emerged as a moderately strong and statistically significant predictor of sustainable tourism development. The unstandardized coefficient (B) of 0.068 and standardized coefficient (Beta) of 0.162 suggest that a one-unit increase in land use planning results in a 0.068-unit increase in sustainable tourism development. The t-value of 2.376, with a p-value of 0.018, supports the conclusion that land use planning is an important factor for promoting sustainability in tourism development. This result is particularly relevant given the rapid urbanization and growing demand for land in many tourist destinations. Effective land use planning is essential for balancing ecological conservation with tourism development, ensuring that natural resources are not overexploited, and that tourism infrastructure is developed in a manner that complements the surrounding environment.

Studies by Chen et al. (2021) and Zhan et al. (2020) have demonstrated that land use planning plays a critical role in fostering sustainable tourism. By properly zoning areas for tourism activities, local governments can prevent encroachment on ecologically sensitive lands, thereby protecting biodiversity while supporting sustainable development.

Additionally, effective land use planning can ensure that tourism infrastructure, such as hotels, roads, and recreational facilities, is built in locations that minimize environmental impact while maximizing economic benefits for local communities. As Zhan et al. (2020) pointed out, land use planning is not just about environmental preservation but also about creating a harmonious relationship between local communities, tourists, and the natural environment, which is vital for long-term tourism sustainability.

Mitigation of community-wildlife conflict stands out as the strongest positive predictor of sustainable tourism development, with an unstandardized coefficient (B) of 0.130 and a standardized coefficient (Beta) of 0.239. A one-unit increase in the mitigation of community-wildlife conflict is associated with a 0.130-unit increase in sustainable tourism development. The t-value of 3.863 and a highly significant p-value of 0.000 underscore the importance of addressing community-wildlife conflict as a driver of sustainable tourism. This finding was particularly significant in areas where wildlife conservation and tourism are tightly interlinked, as in Laikipia County, where the local community's attitudes toward wildlife could either support or hinder conservation efforts.

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Community-wildlife conflict is a major challenge in many tourism destinations and resolving it can lead to stronger community support for tourism initiatives and more sustainable conservation outcomes (Lichtenstein et al., 2020; Li et al., 2021). Qualitative findings also revealed the contribution of resolving community wildlife conflict. For example, another chairperson had this to say:

The communal group ranch has instituted comprehensive environmental conservation strategies to ensure the long-term sustainability of its tourism sector. One key approach involves the establishment of designated wildlife corridors, facilitating natural migration patterns while mitigating human-wildlife conflict. Additionally, robust anti-poaching initiatives have been implemented in collaboration with conservation organizations, significantly reducing illegal hunting activities. Sustainable land management practices, including rotational grazing, help prevent land degradation and promote ecological balance. Complementing these efforts are reforestation projects, which actively engage local communities in tree-planting initiatives to combat deforestation and enhance carbon sequestration.

Research by Lichtenstein et al. (2020) and Li et al. (2021) suggested that when communities are actively involved in wildlife conservation efforts and benefit from tourism revenues, their willingness to protect wildlife increases, leading to a positive cycle of sustainable tourism development. This aligned with the findings of this study, which suggested that the mitigation of community-wildlife conflict played a central role in ensuring that tourism activities are both environmentally and socially sustainable. It is also consistent with the work of Biggs et al. (2021), who found that effective community engagement in wildlife conservation can significantly improve both conservation outcomes and tourism sustainability.

The combined results indicate that environmental conservation strategies significantly influence sustainable tourism development in communal group ranches in Laikipia County. With the overall model being statistically significant and three of the four predictors showing significant contributions, the null hypothesis is rejected. It is concluded that environmental conservation strategies, particularly protection of biodiversity, land use planning, and mitigation of community-wildlife conflict, are critical determinants of sustainable tourism development. These findings highlight the importance of prioritizing and strengthening these strategies while addressing inefficiencies in waste disposal mechanisms to further enhance sustainable tourism outcomes.

The hypothesis posited that H_{01}: Environmental conservation strategy does not have a significant effect on sustainable tourism development in communal group ranches in Laikipia County, Kenya. Based on the findings the overall model is statistically significant ($p < 0.05$), as shown in the ANOVA table. Three of the four predictors (protection of biodiversity, land use planning, and mitigation of community-wildlife conflict) significantly contribute to sustainable tourism development ($p < 0.05$).

Given these results, the null hypothesis (H_{01}) is rejected, and it can be concluded that environmental conservation strategy has a significant effect on sustainable tourism development in communal group ranches in Laikipia County. This is in line with the qualitative findings. For example, one visitor from Germany remarked, “I was deeply impressed by the community’s commitment to protecting their environment while also welcoming visitors. It feels good to know that my trip is contributing to something meaningful.”

CONCLUSION

The study concluded that environmental conservation strategies play a significant role in promoting sustainable tourism development in communal group ranches in Laikipia County, Kenya. The findings indicate a moderate positive relationship between key conservation measures protection of biodiversity, waste disposal mechanisms, land use planning, and mitigation of community-wildlife conflict and sustainable tourism.

RECOMMENDATIONS FOR POLICY

The National Environment Management Authority (NEMA), in collaboration with the Ministry of Tourism and Wildlife, should develop and enforce biodiversity protection policies that encourage communal group ranches and local communities to participate in environmental conservation initiatives. These policies should provide incentives such as tax breaks for eco-friendly land use and wildlife conservation efforts.

The County Government of Laikipia should initiate tree planting days and involve the local community members in the exercise. This will foster ownership and as a result enhance conservation of the environment. The Kenya Wildlife Service (KWS) and Kenya Forest Service (KFS) on the other hand should come up with new conservation zones to protect biodiversity especially in regions that are arid and semi-arid as well as the Ministry of Wildlife and Tourism coming up with more strict rules to deal with poaching and wildlife illegal trade offenders.

Additionally, County Governments should implement strict waste management regulations for tourism facilities, ensuring proper disposal systems and penalties for non-compliance. Tourism investors and operators should be mandated to integrate sustainable land-use practices, such as designated wildlife corridors and buffer zones, into their operations to mitigate human-wildlife conflicts.

The Ministry of Wildlife and Tourism together with the County Government should also organize workshops in the local community areas to create awareness of the importance of conserving the environment. This can also include starting and supporting conservation clubs in schools within these areas. The County Government should also work with the local community members to come up with waste management programs through the department of Environment, Wildlife and Tourism as well as enhancing recycling initiatives

Nevertheless, Kenya Wildlife Service should initiate warden programs in the local communities by appointing some of the members on honorary basis whose assignment would be to spearhead monitoring and preservation of wildlife species within these areas. This will also improve the morale of carrying out these very important engagements.

RECOMMENDATIONS FOR FUTURE RESEARCH.

1. The effect of environmental conservation strategy in promoting sustainable tourism development in Mt. Kenya National Park.
2. The role of environmental conservation strategy in promoting sustainable tourism in private conservancies in Laikipia County, Kenya.

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