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Miriam Obegi, Dr. Albert Kariuki & Dr. Paul Mwangi

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Green Practices and Sustainable Operations in Rural Hotels: Evidence from Samburu County, Kenya

[*1]Miriam Obegi, [2]Dr. Albert Kariuki & [3]Dr. Paul Mwangi

[1]Student, Department of Hospitality and Tourism Management; Kenyatta University

[2,3]Lecturer, Department of Hospitality and Tourism Management; Kenyatta University

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Abstract

Sustainability has become a central focus in the global hospitality industry, yet rural hotels in ecologically fragile areas remain underexplored in terms of how they implement and benefit from green practices. This study investigates the impact of environmentally responsible practices on the sustainable operations of eco-rated hotels in Samburu County, Kenya—an arid and semi-arid region with growing eco-tourism activity. Specifically, the study evaluates four key green practices: waste management, energy conservation, water conservation, and eco-friendly purchasing. It also examines whether stakeholder participation moderates the relationship between these practices and hotel sustainability. An explanatory survey design was adopted, targeting managers and senior staff from all 21 eco-rated lodges operating in the county. A total of 54 responses were collected using structured questionnaires. Data were analyzed using descriptive statistics, Pearson correlation, and hierarchical multiple regression to test both direct and moderating effects. Findings revealed that waste management, energy conservation, and eco-friendly purchasing all had statistically significant positive effects on sustainable operations. Among these, eco-friendly purchasing was the strongest predictor ($\beta = 0.824$, $p < 0.001$). Water conservation, although widely practiced, did not have a statistically significant relationship with sustainability. The inclusion of stakeholder participation as a moderating variable significantly increased the model's explanatory power ($\Delta R^2 = 0.055$), with the interaction effect also being significant ($\beta = 0.238$, $p < 0.001$). The study provides empirical validation for Sustainability Theory, Stakeholder Theory, and the Theory of Planned Behavior in a rural hospitality context. It emphasizes that stakeholder collaboration is not only beneficial but essential to maximizing the impact of green practices. Practical implications suggest that policy-makers, eco-certification bodies, and hotel managers should integrate stakeholder engagement into their sustainability frameworks, with particular focus on procurement, community partnerships, and regulatory support to enhance environmental, economic, and social performance in rural tourism enterprises.

Keywords: *Green Practices, Sustainable Operations, Rural Hotels, Samburu County, Kenya*

1.0 Introduction

The global hospitality sector is increasingly under scrutiny to adopt environmentally responsible and socially inclusive practices that align with the United Nations Sustainable Development Goals (UNWTO, 2022). Green practices such as waste reduction, energy and water conservation, and eco-conscious procurement are not only essential for minimizing ecological impact but also for ensuring long-term business viability (Mensah, 2020; Chan et al., 2019). These practices have become central to operational efficiency, cost savings, and reputational enhancement, especially as consumers and regulators prioritize sustainability. Despite the growing momentum, existing research is heavily skewed toward urban and luxury hotels in developed economies, leaving a critical gap in understanding how green practices are adopted and perform in rural hospitality settings, particularly within the Arid and Semi-Arid Lands (ASALs) of sub-Saharan Africa (Mbasera et al., 2016). Rural hotels in these regions often operate under constrained infrastructure, resource scarcity, and minimal institutional support yet they play a vital role in ecotourism and community-based development.

Samburu County, located in northern Kenya, exemplifies this tension. It is ecologically sensitive, economically marginalized, and socially diverse making it a significant yet under-researched setting for evaluating sustainable hospitality practices (Ministry of Tourism & Wildlife, 2022). Hotels here, especially those certified by Ecotourism Kenya, are expected to adopt green operations to mitigate negative environmental impacts while fostering community and economic development. However, empirical insights into their performance, especially from a sustainability lens, remain limited. Moreover, while green practices are recognized as important, their success often hinges on the extent of stakeholder involvement including local communities, guests, regulatory agencies, and non-governmental organizations (Freeman, 1984; Font et al., 2021). Stakeholder engagement can enhance compliance, resource access, and legitimacy, but its role as a moderator in the relationship between green practices and sustainable outcomes has rarely been empirically tested in rural contexts (Ajzen, 1991; Sharma & Henriques, 2005).

This study seeks to address several critical gaps in the existing literature on sustainable hospitality. First, there is a noticeable absence of empirical research focusing on the impact of green practices within rural hotel settings, particularly in Kenya's ASAL regions. While sustainability discourse in tourism is expanding, rural contexts often marked by ecological fragility and limited infrastructure remain significantly underrepresented. Second, although stakeholder engagement is widely acknowledged as vital to sustainability, its role as a moderating factor that is, as a variable that strengthens or alters the effect of green practices on sustainable outcomes has not been adequately explored in empirical studies. Finally, there is a pressing need for a more integrated theoretical perspective that brings together Sustainability Theory, Stakeholder Theory, and the Theory of Planned Behavior (TPB) to offer a holistic explanation of sustainability performance, particularly in resource-constrained environments like rural Kenya. By analyzing data from 54 respondents across 21 eco-rated hotels in Samburu County, this study evaluates how four green practices waste management, energy conservation, water conservation, and eco-friendly purchasing affect sustainable operations, and how stakeholder participation moderates these effects.

2.0 Literature Review

Green practices in the hospitality sector refer to environmentally responsible operational strategies aimed at reducing resource consumption and minimizing ecological harm. These practices have

gained increasing attention in recent years as hotels seek to align their operations with sustainable development goals and enhance their environmental credibility. Among the most commonly adopted measures are solid waste separation and recycling (Kang et al., 2012), the use of energy-efficient appliances and renewable energy sources (Mensah, 2020), water-saving installations such as low-flow taps and greywater systems (Sangaran & Jeetesh, 2015), and sourcing of eco-friendly or locally manufactured products (Kasimu et al., 2012). These practices are widely acknowledged to contribute not only to environmental sustainability but also to operational efficiency, cost reduction, and improved public image (Chan et al., 2019). However, the adoption of such practices is far from uniform. While urban and high-end hotels often have the resources and motivation to embed green innovations as part of their competitive strategy, rural and low-resource hotels particularly those in developing countries face substantial challenges. These include high upfront costs of sustainable technologies, lack of awareness or technical capacity, and weak regulatory enforcement (Mbasera et al., 2016). Consequently, rural hotels often rely on localized or informal green efforts, many of which go undocumented and are excluded from mainstream hospitality sustainability research.

In the context of rural hospitality, the concept of sustainable operations encompasses the environmental, social, and economic dimensions of hotel performance. It involves minimizing environmental degradation, enhancing social welfare through community engagement, and maintaining financial viability. For rural hotels in arid and semi-arid regions (ASALs) such as Samburu County in Kenya, sustainable operations take on heightened significance due to their proximity to fragile ecosystems and reliance on natural and cultural assets for tourism. Despite this, few empirical studies have examined the extent to which green practices adopted in such settings translate into tangible sustainability outcomes (Mensah, 2020; Mbasera et al., 2016). The lack of data from rural areas limits the development of evidence-based models that could guide sustainability strategy in ecotourism-dependent regions. Central to the success of green practices is the role of stakeholder participation. Defined as the active involvement of individuals or groups who are affected by or can influence the outcomes of an initiative (Freeman, 1984), stakeholder participation in the hospitality sector includes actors such as local communities, government agencies, NGOs, hotel staff, and guests. Research shows that when these stakeholders are meaningfully engaged, hotels are more likely to enjoy legitimacy, access local knowledge, and achieve long-term buy-in for sustainability programs (Font et al., 2021; Sharma & Henriques, 2005). Despite this recognition, most sustainability studies treat stakeholder engagement descriptively acknowledging it as important but rarely testing its influence quantitatively or exploring its potential to condition other variables.

This study adopts a more integrated view, proposing that stakeholder participation operates not merely as an external condition but as a moderator that influences the strength and direction of the relationship between green practices and sustainability outcomes. In other words, the effectiveness of a hotel's environmental initiatives may depend not only on what the hotel does internally but also on how it engages with external actors. This perspective is particularly relevant in rural settings, where local communities often have strong informal influence over land use, resource access, and the cultural acceptability of business practices. The study is underpinned by three theoretical frameworks. Sustainability Theory provides a normative lens, emphasizing the importance of balancing environmental stewardship with socio-economic development and intergenerational equity (Redclift, 2005). Stakeholder Theory offers a strategic rationale for inclusive engagement, positing that organizations that address the interests of their stakeholders are more likely to succeed in the long term (Freeman, 1984). Lastly, the Theory of Planned

Behavior (TPB) adds a behavioral dimension by asserting that individuals are more likely to act sustainably when they hold favorable attitudes toward the behavior, feel social pressure to perform it, and perceive that they have the ability to do so (Ajzen, 1991). Together, these frameworks form a robust conceptual foundation for understanding the mechanisms through which green practices are adopted and succeed particularly in rural, multi-stakeholder contexts like Samburu County.

3.0 Methodology

This study employed an explanatory research design to examine the effect of green practices on sustainable hotel operations and to assess the moderating role of stakeholder participation. An explanatory design is appropriate for hypothesis testing and for establishing cause-effect relationships between variables using statistical procedures (Creswell & Creswell, 2018). This approach aligned with the study's objective of quantifying the influence of specific environmental practices and contextual factors in a rural hospitality setting. The research was conducted in Samburu County, an ecologically sensitive arid and semi-arid region in northern Kenya known for its rich biodiversity and cultural heritage. The county has a growing eco-tourism sector and a number of hotels certified by Ecotourism Kenya, making it an ideal context for exploring sustainability in rural hotel operations (Ministry of Tourism and Wildlife, 2022). The target population comprised 21 eco-rated lodges listed in the Ecotourism Kenya registry. A census approach was adopted, allowing for the inclusion of all units within the population. From each lodge, three key informants typically general managers, departmental heads, or sustainability coordinators were purposively selected. This yielded a sample of 54 respondents, deemed sufficient for the regression-based analysis planned for the study.

Primary data were collected using a structured, self-administered questionnaire composed of six sections. The questionnaire captured demographic data and responses on waste management, energy conservation, water conservation, eco-friendly purchasing, stakeholder participation, and sustainable operations. Measurement items were adapted from previously validated tools used in sustainability and hospitality studies (Chan et al., 2019; Mbasera et al., 2016; Kasimu et al., 2012) and modified to suit the Samburu context. All variables were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). To ensure content validity, the questionnaire was reviewed by two experts in hospitality sustainability and subjected to a pilot test with five respondents from eco-rated hotels in a neighboring region. Based on feedback, minor revisions were made to enhance clarity and contextual relevance. Construct reliability was confirmed using Cronbach's alpha, with all sub-scales achieving values above the recommended threshold of 0.70. Internal consistency ranged from 0.793 for stakeholder participation to 0.889 for eco-friendly purchasing, indicating strong reliability and meeting the accepted standard for internal consistency (Nunnally, 1978).

Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 25. Descriptive statistics were used to summarize respondent demographics and mean levels of green practice adoption. Pearson's correlation coefficients were computed to explore relationships between variables. To test the study's hypotheses, hierarchical multiple regression analysis was performed. The moderating role of stakeholder participation was assessed by creating interaction terms between the centered variables of each green practice and stakeholder engagement. Moderation was tested using hierarchical regression analysis, following the approach recommended by Aiken and West (1991), where interaction terms were computed using mean-centered variables. An increase in R^2 and the statistical significance of the interaction coefficients were used to confirm moderation. This methodological framework provided a rigorous and

context-sensitive approach for examining sustainability in rural hotel operations. It enabled the researcher to identify not only the direct effects of green practices on sustainable operations but also how these effects vary depending on stakeholder involvement.

4.0 Results and Discussion

This section presents and discusses the findings from the data analysis, focusing on the extent of green practice adoption, the strength of their relationship with sustainable operations, and the moderating role of stakeholder participation. Quantitative results are supported by descriptive statistics, correlation analysis, and hierarchical regression. Hotels in Samburu County reported a high level of adoption of green practices, as shown in Table 1. Water conservation scored the highest mean (M = 4.94), followed closely by waste management (M = 4.83), energy conservation (M = 4.81), and eco-friendly purchasing (M = 4.80). These findings indicate that environmental sustainability is a growing operational priority among eco-rated hotels, especially in resource-sensitive rural contexts. This aligns with earlier research highlighting the increasing prevalence of environmental practices in African hospitality (Mbasera et al., 2016; Mensah, 2020).

Table 1: Mean Scores of Green Practices Adopted by Hotels (N = 54)

Green Practice	Mean Score
Waste Management	4.83
Energy Conservation	4.81
Water Conservation	4.94
Eco-Friendly Purchasing	4.80

Note: Measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

To assess the relationship between green practices and sustainability outcomes, Pearson correlation coefficients were calculated. As indicated in Table 2, waste management ($r = .477$, $p < 0.01$), energy conservation ($r = .355$, $p < 0.01$), and eco-friendly purchasing ($r = .712$, $p < 0.01$) all showed significant positive correlations with sustainable operations. However, water conservation, despite its high mean score, showed a weak and statistically non-significant relationship ($r = .213$, $p = .123$). This suggests that while widely practiced, water conservation efforts may not be strategically aligned with other sustainability metrics or may lack consistency in execution.

Table 2: Pearson Correlation Matrix Between Green Practices and Sustainable Operations

Variable	r	p-value	Significance
Waste Management	.477	< 0.01	Significant
Energy Conservation	.355	< 0.01	Significant
Water Conservation	.213	0.123	Not Significant
Eco-Friendly Purchasing	.712	< 0.01	Significant

Note: Correlation is significant at the 0.01 level (2-tailed).

To test the hypotheses and the moderating role of stakeholder participation, hierarchical multiple regression analysis was conducted. As shown in Table 3, the initial model including green practices explained 80.4% of the variance in sustainable operations ($R^2 = 0.804$, $p < 0.001$). When

stakeholder participation was introduced as a moderator, the model's explanatory power increased to 85.9% ($R^2 = 0.859$), and the interaction term was statistically significant ($\beta = 0.238$, $p < 0.001$). This confirms that stakeholder participation significantly moderates the relationship between green practices and sustainability outcomes.

Table 3: Hierarchical Regression Results

Model	R^2	β (Interaction)	R^2	p-value	Interpretation
Without Moderator	0.804	—	—	< 0.001	Green practices alone explain 80.4% variance
With Moderator	0.859	0.238	0.055	< 0.001	Stakeholder participation moderates relationship

Note: Dependent variable = Sustainable Operations. Moderation tested per Aiken & West (1991).

These results align with Stakeholder Theory, which posits that inclusive engagement enhances implementation effectiveness and legitimacy (Freeman, 1984; Font et al., 2021). They also support the Theory of Planned Behavior, where organizational behavior is influenced by perceived control and social reinforcement (Ajzen, 1991). Practically, this suggests that rural hotels cannot rely solely on internal policies; rather, their sustainability success is amplified when they partner with local communities, regulators, and guests in meaningful ways.

5.0 Conclusion

This study set out to examine the impact of green practices on the sustainable operations of eco-rated hotels in Samburu County, Kenya, and to explore whether stakeholder participation moderates these relationships. The findings offer both theoretical and practical insights into sustainable hospitality management in resource-constrained rural contexts. The results demonstrate that green practices particularly waste management, energy conservation, and eco-friendly purchasing are significantly associated with improved sustainability outcomes. Among these, eco-friendly purchasing emerged as the most impactful predictor, affirming earlier work that positions procurement as a critical sustainability lever in hospitality operations (Kasimu et al., 2012; Mensah, 2020). Water conservation, while widely practiced, did not show a statistically significant correlation with sustainable outcomes, likely due to inconsistent investment in water-saving technologies or limited access to infrastructure in rural ASAL regions (Sangaran & Jeetesh, 2015). Most notably, the inclusion of stakeholder participation as a moderating variable significantly enhanced the explanatory power of the model. This confirms the relevance of Stakeholder Theory and supports the assertion that effective sustainability initiatives require collaborative, inclusive approaches (Freeman, 1984; Font et al., 2021). The interactive effect of stakeholder engagement suggests that green practices are more successful when supported by communities, regulatory bodies, guests, and staff. The study also lends empirical support to the Theory of Planned Behavior (TPB) by showing that managers' intentions to implement sustainable practices are strengthened when they feel empowered through stakeholder buy-in (Ajzen, 1991). This integrated theoretical model offers a useful framework for future sustainability research and practice, especially in contexts where institutional capacity is limited.

6.0 Recommendations

Based on the findings, the following practical and policy-oriented recommendations are made:

i. Strengthen eco-friendly procurement: Hotels should prioritize purchasing from local, ethical, and environmentally responsible suppliers. Policies encouraging bulk procurement and the elimination of single-use plastics should be formalized through internal guidelines.
ii. Foster inclusive stakeholder collaboration: Hotel managers should actively engage local communities, guests, environmental NGOs, and regulatory agencies in sustainability planning and reporting. Platforms for dialogue and shared decision-making can enhance transparency and legitimacy.
iii. Invest in water conservation technologies: Although widely practiced in principle, water-saving strategies in rural hotels require more focused investment in technology (e.g., low-flow fixtures, greywater systems) and staff training to yield measurable benefits.
iv. Incentivize sustainability through policy: National and county-level tourism authorities should offer fiscal or certification incentives to hotels that demonstrate high-impact sustainability practices combined with stakeholder engagement. This can include grants, tax rebates, or preferential marketing.
v. Enhance eco-certification frameworks: Certification bodies such as Ecotourism Kenya should revise their assessment criteria to give weight not only to operational green practices but also to the degree of stakeholder participation in sustainability efforts.

By embracing these recommendations, rural hotels in Kenya—and similar contexts globally—can achieve deeper, more resilient forms of sustainable development that benefit both the environment and local communities.

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