

Evaluating Green Initiatives in TVET Institutions for Sustainable Tourism and Hospitality Development in Murang'a County, Kenya

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ABSTRACT

The study aimed at assessing green initiatives in TVET institutions for sustainable tourism and hospitality development in Murang'a County, Kenya. The study was prompted by the increasing need for tourism and hospitality training institutions to offer their learners the green skills needed in sustainable tourism and hospitality industries. This study analyzed various aspects concerning green initiatives, including the type of green initiatives used, the level of awareness of TVET stakeholders towards sustainable development, the effect of green initiatives on sustainable development goals, and challenges hindering the use of green initiatives for sustainable development. The study utilized a mixed-methods research approach. The study population comprised 665 hospitality students in selected TVET institutions. The sample size was determined using Yamane's formula to be 250. For collecting quantitative data, the study used structured questionnaires, while for qualitative data collection, the study conducted interviews with five principals. Both quantitative and qualitative data analysis were done using SPSS software to find frequencies, percentages, means, standard deviations, Pearson correlation coefficient, and multiple regressions. The results indicated that green initiatives were highly adopted with a mean of 4.087 by way of reminders of energy saving, tree planting activities, proper waste management, and campus greening. The stakeholders had some degree of awareness regarding sustainable development with a mean of 3.284, showing that awareness exists but green knowledge and skill application is not fully developed. Green initiatives had some impact on sustainable development with a mean of 3.696 by enhancing institution reputation and environment-friendly behaviour. There existed various challenges to adoption of green initiatives in institutions with a mean of 4.210 because of poor regulation, high cost, lack of resources, and low knowledge. Multiple regression analysis revealed that the variables studied explained 66.0% of sustainable tourism and hospitality development.

Keywords: Green initiatives, TVET institutions, sustainable tourism, hospitality development, stakeholder awareness

INTRODUCTION

Sustainable tourism has now emerged as a significant area of development. The tourism industry plays an important role in the development of the economy, employment opportunities, and environmental sustainability. According to Wani et al. (2024), the tourism industry generates approximately US\$9.5 trillion, accounting for 9.2% of the world's GDP. In addition to this, tourism is a significant sector for employment, generating approximately 319 million jobs in 2018, which is equivalent to one job out of every ten jobs worldwide (WTTC, 2019). On the other hand, the tourism industry is also responsible for generating approximately 8% of the total greenhouse gases emitted by the world, primarily due to transportation, accommodation, food consumption, and other visitor-related activities (Lenzen et al., 2018; Leal Filho et al., 2022).

Sustainability has not been attained in Kenya in the tourism and hospitality sectors. There have been improvements in terms of tourism, but these improvements are yet to catch up with the needed systems for protecting the environment. Kenya has made gains as tourism numbers have recovered as indicated by an

increase of tourists from 2,089,259 in 2023 to 2,394,376 in 2024 and tourism revenues at KSh 452.2 billion in 2024, a 20% growth compared to last year's figures (Tourism Research Institute, 2025; Reuters, 2025). Another development that has been observed in Kenya is that of community-based conservation as seen by the establishment of 230 wildlife conservancies that cover a total area of 9.04 million hectares, which is around 16% of the land mass of the country (Bashir & Wanyonyi, 2024). Also, the country has made strides in terms of conservation because it boasts of more than 35,538 elephants, thus making it among the top wildlife destinations in Africa (Kenya Wildlife Service, 2024). Progress can be witnessed in these initiatives; however, the idea of sustainability has not been achieved since the continued growth of economies still depends heavily on ecosystems, wildlife habitats, and tourism industries.

The tourism and hospitality industry in Kenya is affected by issues related to habitat pressure, adoption of green practices, climatic shocks, and loss of wildlife resources, which are limiting the sustainability of the industry. As observed by Kenya Wildlife Service, in some instances 65% of Kenya's wildlife occurs outside the protected areas, thus the tourism industry in the country relies highly on community and private lands, whose land use conflicts, settlement encroachment, and lack of incentives for conservation could limit the movement and survival of wildlife species (Kenya Wildlife Service, 2024). The issue of wildlife decline is another challenge to sustainable tourism and hospitality practices, whereby Kenya has lost approximately 68% of its total number of wildlife since 1977, while rangeland records show that wildlife population reduced by 68% during the period from 1977 to 2016 due to increasing human populations, livestock pressures, reduction in precipitation, warming of climatic conditions, and poor policies (Kenya Wildlife Service, 2024; Ogutu et al., 2016). Sustainability is affected by climatic changes in Kenya through the recent floods in 2024, where more than 100,000 people were displaced and incurred losses of more than KSh 400 million in the country's coasts, which are popular among tourists (Kenya Meteorological Department, 2025). In addition, the country's hotel industry is weak since urban hotels in Kenya had moderate adoption of green practices, with a mean of 3.66, mostly due to lack of awareness, inadequate monitoring and clear adoption strategies (Kamunzyu et al., 2024).

Inadequate green initiatives are continuing to affect sustainable tourism and hospitality development in Kenya due to poor waste management and environmental degradation by tourism destinations and hospitality businesses. Kenya's tourism industry accounted for almost 10% of the country's GDP prior to the pandemic, yet the issue of sustainability, including pollution, lack of enforcement of environmental laws, and strain on natural ecosystems, continues to hinder its growth (Ministry of Tourism and Wildlife, 2022). Poor infrastructure development, low implementation of sustainable tourism practices, and limited local communities' empowerment continue to negatively affect the development of environmentally-friendly activities and local communities (Otundo, 2024). Furthermore, property owners providing the ecosystems in which 70% of Kenya's wildlife resides receive less than 0.5% of the revenue made from tourism activities, thus limiting their commitment towards environmental conservation despite bearing the cost of such activities (IFAW, 2026). Odunga (2024) revealed that lack of involvement from locals and low level of awareness about sustainability issues continue to hinder sustainable tourism development in Kenya. In other words, insufficient green initiatives have continued to exacerbate environmental degradation and sustainable development in Kenya.

It is crucial to assess green practices in TVET institutions because TVET is where the future workers in the tourism and hospitality industries develop practical skills and attitudes necessary for sustainable operations. According to Pavlova and Chen (2019), TVET facilitates the transformation towards a green economy through the development of general green skills, which are essential for practicing sustainable workplace behaviors. The relevance of assessing green practices in TVET in Kenya is high since urban hotels have an average level of sustainability practice implementation ($M = 3.66$) while green energy is rarely applied ($M = 2.83$) (Kamunzyu et al., 2024). In addition, the implementation of green practices accounts for 61.2% of hotel selection decisions among customers visiting the star-rated hotels in Nairobi (Karanja, 2026). Consequently, evaluating green practices in TVET institutions allows determining whether the students are trained to develop their green practices effectively.

For this research, Murang'a County was chosen due to its ability to be developed into a tourism hotspot that would have immense potential when it comes to sustainable tourism. It has a wide range of tourism offerings including safari tourism in Aberdare National Park, ecotourism, cultural tourism in places like Mukurwe wa Nyagathanga and Karia Ka Mbari ya Ngware, and recreational fishing spots in places such as Kimakia Fishing

Grounds and Ndakaini Dam Rapids Camp (Murang'a County Government, 2023). The other reason behind choosing this region for our study was due to its tourism diversification strategy, which involves the promotion of ecotourism, water sports, homestays, cultural festivals, and agrotourism (Murang'a County Government, 2023).

Moreover, Murang'a County is gaining prominence within the realm of national tourism, having embraced the development of cultural tourism, agritourism, and adventure tourism, which culminated in the staging of the African Water Rafting Championship featuring participation from 10 nations (Kenya News Agency, 2025). The emphasis on TVET institutions was appropriate since TVET education is intrinsically related to the labour market and instrumental in ensuring the acquisition of relevant skills that facilitate the shift towards a sustainable economy and society (Kenya School of TVET, 2025). Consequently, Murang'a County and TVET institutions constituted an appropriate milieu for assessing whether hospitality students are acquiring green skills.

The study is anchored on the Stakeholder Theory and the Theory of Planned Behavior. According to Stakeholder Theory, organizations should not consider internal objectives only but also should react to different stakeholders who have any effect on the institution's operations or are affected by its activities (Freeman, 1984; McGahan, 2023). The theory corresponds with the study because sustainability in TVET depends on the involvement of these stakeholders who have a common understanding and resources for the development of sustainable activities in TVET institutions (Moonga, 2023; Auktor, 2020). According to the Theory of Planned Behavior, behavioral factors like attitude, subjective norms, and perceived behavioral control play a critical role in forming intention and behavior (Ajzen & Fishbein, 2020; Krath et al., 2021).

The reviewed studies have offered relevant findings related to sustainable development, green technology, stakeholders' awareness and implementation of policies within the scope of TVET, yet they lack geographical gap. Research Studies by Peter et al. (2016), Raji and Hassan (2021), Aluthge (2022), and Moonga (2023) were not conducted in Murang'a County, and there is some geographical bias. There are also several other studies that are not conducted in TVET institutions and/or do not focus on green projects implemented at TVET institutions (Yamane & Kanoke, 2021; Atif et al., 2022; Ndeche et al., 2021). Therefore, the proposed journal article will fill these gaps by focusing on green projects implemented in Murang'a County TVET institutions.

METHODOLOGY

Research Design

A mixed methods research design was employed in the analysis of the implementation of green practices in TVET institutions in the context of sustainable tourism and hospitality in Murang'a County. This type of design was suitable for the study because it provided the researcher with an opportunity to gather both numerical and textual data through the use of questionnaires and interviews respectively (Taherdoost, 2021; Hennink & Kaiser, 2022).

Sampling

The study target population was 665 hospitality students in chosen TVET colleges in Murang'a County. Sample size calculation was done using Yamane's formula at a 95% confidence level and 5% margin of error as shown below:

$$n = 665 / [1 + 665(0.05^2)] = 249.77, \text{ approximated to } 250 \text{ respondents.}$$

Stratified sampling was employed to ensure representation within the chosen TVET colleges, while simple random sampling technique was employed to choose the sample from the chosen strata. (Kumar & Praveenakumar, 2025; Taherdoost, 2021; Hennink & Kaiser, 2022).

Table 1: Sample Size Distribution

| TVET Institution | Students | Tutors | Principals | Total |
|------------------|------------|-----------|------------|------------|
| TVET 01 | 63 | 3 | 1 | 67 |
| TVET 02 | 44 | 2 | 1 | 47 |
| TVET 03 | 44 | 2 | 1 | 47 |
| TVET 04 | 43 | 2 | 1 | 46 |
| TVET 05 | 40 | 2 | 1 | 43 |
| Total | 234 | 11 | 5 | 250 |

Source: Researcher (2026)

Data Collection

Primary data was collected through the use of questionnaires and interview guide. Questionnaires were distributed among hospitality students and their respective tutors, and interviews were carried out with five TVET principal. Such an approach helped in collecting numeric answers about green initiatives and elaborated answers about stakeholders' awareness and their implications and problems. Questionnaires and interviews are appropriate techniques of primary data collection because researchers can gather information directly from the respondents (Taherdoost, 2021).

The questionnaires contained closed-ended items to generate quantifiable responses, while the interview schedules contained guiding questions that allowed principals to provide detailed explanations. Questionnaires are useful in research because they help collect information on respondents' opinions, attitudes, practices, and experiences in a structured and measurable form (Ranganathan & Caduff, 2023).

Data Analysis

Quantitative data were analyzed using IBM SPSS Statistics Version 32.0.0. The descriptive statistics technique was used to provide statistical measures like means and standard deviations for describing the degree of agreement and consistency in relation to study variables. The inferential statistic method was used to find out whether there is any strong relationship between green initiatives and sustainable tourism and hospitality development. IBM SPSS Statistics offers tools that facilitate statistics, regression, modeling, and advanced data analysis (IBM, 2026).

Thematic analysis was used for interpreting the qualitative data collected from the interviews. The data were then coded and analyzed based on the themes relating to the green initiatives, awareness among the stakeholders, the impact of such initiatives, and the challenges facing their implementation.

Econometric Model

To ascertain the effect of green initiatives on sustainable tourism and hospitality development, a multiple regression analysis was employed. The model for this analysis is presented below:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where:

Y = Sustainable tourism and hospitality development

β₀ = Constant/intercept

$\beta_1-\beta_4$ = Regression coefficients

X_1 = Types of green initiatives adopted

X_2 = TVET stakeholders' awareness

X_3 = Impact of green initiatives on sustainable development goals

X_4 = Challenges in integrating sustainable development

ϵ = Error term

This approach was chosen since it allowed the determination of how individual variables influenced sustainable tourism and hospitality.

Ethical Considerations

The ethical issues have been adhered to through securing research authorization letters from the university and research permits from NACOSTI as per research licensing requirements in Kenya (NACOSTI, 2024). Ethical considerations have also been followed by ensuring protection of participants, by ensuring that participants are informed about the purpose of the study and voluntarily participate without any harm, while at the same time ensuring confidentiality. In order to protect the institutions, names of TVETs were not mentioned but were rather referred to using codes like TVET 01, TVET 02, TVET 03, TVET 04, and TVET 05 (Bhandari, 2021; Chime, 2025).

RESULTS AND DISCUSSION

Response Rate

The response rate was calculated based on the number of questionnaires returned by respondents out of the total sample size of 250 respondents, as shown in Table 2.

Table 2: Response Rate

| Response | Frequency | Percentage (%) |
|---------------------------|-----------|----------------|
| Returned questionnaires | 206 | 82.4 |
| Unreturned questionnaires | 44 | 17.6 |
| Total | 250 | 100.0 |

Source: Research Data (2025)

The response rate for this research is shown in Table 2. The results indicate that out of 250 questionnaires sent out, 206 were received, yielding a response rate of 82.4%. This was sufficient to conduct an analysis because it included almost all respondents from the sample population. Considering that the attained response rate exceeded 80%, it met the minimum acceptable rate and was deemed to be excellent (Booker et al., 2021).

Analysis for the Study Variables

Types of Green Initiatives Adopted within the Institution

This section presents descriptive statistics for Types of Green Initiatives Adopted within the Institution

Table 3: Descriptive Statistics for Types of Green Initiatives Adopted within the Institution

| Statement | N | Mean | Std. Deviation |
|--|-----|--------------|----------------|
| Students practice proper waste disposal as part of active eco-sustainability. | 206 | 4.236 | 0.733 |
| Green spaces within the institution are conserved and protected. | 206 | 4.018 | 0.814 |
| The institution supports waste recycling and re-use. | 206 | 3.789 | 0.958 |
| There is regular tree planting and seasonal clean-up. | 206 | 4.412 | 0.686 |
| The institution engages adjacent communities on sustainability. | 206 | 3.627 | 1.104 |
| There are energy-saving reminders like turning off lights in classrooms and offices. | 206 | 4.439 | 0.721 |
| Overall Mean | | 4.087 | |

Source: Research Data (2026)

The highest average score was energy-saving reminders ($M = 4.439$, $SD = 0.721$), indicating high agreement and consistency in promoting energy saving in institutions. The lowest average was community participation ($M = 3.627$, $SD = 1.104$), indicating low agreement and inconsistency in the experience of the participants. Overall, the internal green practices appeared to be better developed than community green practices. From the qualitative results of principals, it was evident that waste management, tree planting on campuses, and environmental campaigns were the major green practices embraced by institutions. Nevertheless, principals reported that these initiatives were not very effective since there was a need for changes in behavior, provision of resources, and enforcement. Both results were alike because internal green practices appeared to be better developed. At the same time, they contradicted each other because community practices remained weak.

TVET Stakeholders' Awareness on Sustainable Development

This section presents descriptive statistics for TVET Stakeholders' Awareness on Sustainable Development

Table 4: Descriptive Statistics for TVET Stakeholders' Awareness on Sustainable Development

| Statement | N | Mean | Std. Deviation |
|--|-----|--------------|----------------|
| Tutors and students understand the environmental impact of green practices. | 206 | 3.462 | 0.947 |
| Staff and students recognize the value of green practices for sustainable development in this institution. | 206 | 3.108 | 1.083 |
| The institution supports the aesthetic value of green spaces. | 206 | 3.735 | 0.821 |
| Existing green spaces are conserved and protected from other uses. | 206 | 2.986 | 1.166 |
| Greening practices are taught in hospitality and tourism programmes in this institution. | 206 | 3.214 | 1.018 |
| Both students and tutors are aware of greening practices. | 206 | 3.197 | 0.976 |
| Overall Mean | | 3.284 | |

Source: Research Data (2026)

The most highly rated indicator is the fact that the institution acknowledges the aesthetic importance of green areas ($M = 3.735$, $SD = 0.821$). This is an indication that the respondent perceived that this value has been acknowledged. The least rated indicator is conservation and protection of existing green areas ($M = 2.986$, $SD = 1.166$). This could be a reflection of a lack of agreement by the respondents regarding this matter. The results from the qualitative study indicate that there was an awareness among the students and tutors about the tree planting process, clean-up days, and environmental campaigns. Nevertheless, according to the principals, this awareness was not fully manifested in terms of knowledge of green areas, practical skills, regular tutor training, and conservation of the green areas.

Impact of Green Initiatives on Sustainable Development Goals

This section presents descriptive statistics on the impact of green initiatives on sustainable development goals.

Table 5: Descriptive Statistics for Impact of Green Initiatives on Sustainable Development Goals

| Statement | N | Mean | Std. Deviation |
|---|-----|--------------|----------------|
| Green initiatives have reduced energy consumption in the institution. | 206 | 3.258 | 1.095 |
| Green practices have minimized environmental pollution. | 206 | 3.624 | 0.924 |
| Adoption of green initiatives has promoted responsible consumption of resources such as paper, water and electricity. | 206 | 4.016 | 0.783 |
| The institution has experienced cost savings due to implementation of green practices. | 206 | 3.183 | 1.138 |
| The institution's reputation and attractiveness to students have improved. | 206 | 4.102 | 0.756 |
| The institution actively contributes to national and global sustainable development goals through green practices. | 206 | 3.994 | 0.802 |
| Overall Mean | | 3.696 | |

Source: Research Data (2026)

The highest mean was institutional reputation and attractiveness ($m = 4.102$, $SD = 0.756$), reflecting high agreement and consistency that the green initiatives made the institution look better. On the other hand, the lowest mean was cost-saving ($m = 3.183$, $SD = 1.138$), suggesting moderate agreement and inconsistency. Thus, it implies that the green initiatives made the institution more visible rather than saving costs. Qualitative results revealed that the principals noted better student behavior, less littering, proper waste management, reuse of materials, greater institutional recognition, and contributions to SDG learning. In addition, the principals identified that collaboration and cost-saving are still minimal. Hence, both results are consistent since green initiatives enhanced the reputation and behavior but not costs and collaboration.

Challenges in Integration of Sustainable Development in TVETs

This section presents descriptive statistics on Challenges in Integration of Sustainable Development in TVETs.

Table 6: Descriptive Statistics for Challenges in Integration of Sustainable Development in TVETs

| Statement | N | Mean | Std. Deviation |
|---|-----|-------|----------------|
| Implementation and maintenance of green initiatives incur high costs. | 206 | 4.456 | 0.702 |
| There is insufficient knowledge and information on green initiatives. | 206 | 4.217 | 0.839 |

| | | | |
|--|-----|--------------|-------|
| The institution has inadequate resources such as time, personnel and finances. | 206 | 4.392 | 0.744 |
| Lack of urgency and ambiguity of environmental guidelines affect implementation. | 206 | 3.986 | 0.946 |
| It is difficult to balance quality of service with environmental performance. | 206 | 3.724 | 1.073 |
| The government has poor regulation and enforcement on green initiatives. | 206 | 4.487 | 0.681 |
| Overall Mean | | 4.210 | |

Source: Research Data (2026)

The most outstanding mean is poor regulatory control by the government (m=4.487, SD=0.681), implying a strong level of agreement with the idea that poor enforcement was the leading hindrance. The least mean is challenging to find the balance between service quality and environment performance (m=3.724, SD=1.073), which suggests a moderate level of agreement. It means that the weaknesses in the regulatory side were more severe than those from within.

Correlation Analysis

Pearson correlation analysis was conducted to establish the strength and direction of the study variables.

Table 7: Correlation Analysis

| Variable | | Green Initiatives Adopted | Stakeholders' Awareness | Green Initiatives on SDGs | Integration Challenges | Sustainable Tourism and Hospitality Development |
|---------------------------|---------------------|---------------------------|-------------------------|---------------------------|------------------------|---|
| Green Initiatives Adopted | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | — | | | | |
| | N | 206 | | | | |
| Stakeholders' Awareness | Pearson Correlation | .621** | 1 | | | |
| | Sig. (2-tailed) | .000 | — | | | |
| | N | 206 | 206 | | | |
| Green Initiatives on SDGs | Pearson Correlation | .652** | .593** | 1 | | |
| | Sig. (2-tailed) | .000 | .000 | — | | |
| | N | 206 | 206 | 206 | | |
| Integration Challenges | Pearson Correlation | -.542** | -.504** | -.558** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | — | |

| | | | | | | |
|---|---------------------|--------|--------|--------|---------|-----|
| | N | 206 | 206 | 206 | 206 | |
| Sustainable Tourism and Hospitality Development | Pearson Correlation | .688** | .650** | .721** | -.620** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | — |
| | N | 206 | 206 | 206 | 206 | 206 |

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

Source: Research Data (2026)

The correlation analysis shows that the use of green practices showed a significant positive correlation with the sustainable development in tourism and hospitality industries ($r = .688, p < .001$), as well as stakeholders' awareness about green issues was significantly positively correlated ($r = .650, p < .001$). The correlation between the use of green initiatives for the SDGs and the dependent variable is the highest ($r = .721, p < .001$). Challenges to integration negatively correlated with sustainable development ($r = -.620, p < .001$).

Regression Model Summary

Multiple regression analysis was conducted to determine the combined contribution of the independent variables to sustainable tourism and hospitality development.

Table 8: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1 | .813 | .660 | .654 | .518 |

a. Predictors: (Constant), Types of Green Initiatives Adopted, TVET Stakeholders' Awareness, Impact of Green Initiatives on Sustainable Development Goals, Challenges in Integration of Sustainable Development.

b. Dependent Variable: Sustainable Tourism and Hospitality Development.

Source: Research Data (2026)

In the model summary, it is evident that the independent variables were strongly correlated to sustainable tourism and hospitality development, where $R = .813$. The R Square value of .660 means that 66.0% of the variation in sustainable tourism and hospitality development is accounted for by the four independent variables. The adjusted R Square of .654 is a proof that the model still stands despite adjusting for the number of predictors.

Analysis of Variance

ANOVA was conducted to evaluate the statistical significance of the overall regression model by comparing the variance explained by the predictors with the unexplained variance.

Table 9: ANOVA

| Model | Sum of Squares | df | Mean Square | F | Sig. (p-value) |
|------------|----------------|----|-------------|--------|----------------|
| Regression | 104.861 | 4 | 26.215 | 97.755 | .000 |

| | | | | | |
|----------|---------|-----|------|--|--|
| Residual | 53.903 | 201 | .268 | | |
| Total | 158.764 | 205 | | | |

a. Dependent Variable: Sustainable Tourism and Hospitality Development.

b. Predictors: (Constant), Types of Green Initiatives Adopted, TVET Stakeholders’ Awareness, Impact of Green Initiatives on Sustainable Development Goals, Challenges in Integration of Sustainable Development.

Source: Research Data (2026)

From the results provided by the ANOVA test, it is evident that the regression model used was significant as it had $F(4, 201) = 97.755$ and P-value of .000. Therefore, it shows that the independent variables had significant effects on the sustainable tourism and hospitality development in TVET institutions. The model is therefore appropriate since the P-value obtained was less than 0.05.

Regression Coefficients

Regression coefficients were used to determine the individual contribution of types of green initiatives adopted, TVET stakeholders’ awareness, impact of green initiatives on SDGs, and challenges in integration to sustainable tourism and hospitality development.

Table 10: Coefficients Table

| Variable | Unstandardized Coefficients B | Std. Error | Standardized Coefficients Beta | T | Sig. |
|--|-------------------------------|------------|--------------------------------|--------|------|
| (Constant) | 1.471 | .285 | — | 5.161 | .000 |
| Types of Green Initiatives Adopted | .269 | .069 | .232 | 3.899 | .000 |
| TVET Stakeholders’ Awareness | .217 | .060 | .205 | 3.617 | .000 |
| Impact of Green Initiatives on SDGs | .372 | .066 | .334 | 5.636 | .000 |
| Challenges in Integration of Sustainable Development | -.232 | .059 | -.205 | -3.932 | .000 |

a. Dependent Variable: Sustainable Tourism and Hospitality Development.

Source: Research Data (2026)

The regression equation was expressed as follows:

$$Y = 1.471 + 0.269X_1 + 0.217X_2 + 0.372X_3 - 0.232X_4$$

Where:

Y = Sustainable Tourism and Hospitality Development

X₁ = Types of Green Initiatives Adopted

X₂ = TVET Stakeholders’ Awareness

X₃ = Impact of Green Initiatives on SDGs

X₄ = Challenges in Integration of Sustainable Development

Regression analysis indicates that with the control of all the independent variables, the level of sustainable tourism and hospitality development is at 1.471. If there is an increase of one unit in the types of green initiatives, then the level of sustainable tourism and hospitality development increases by 0.269, whereas with one-unit increase in TVET stakeholders' awareness, there will be an increase of 0.217 in sustainable tourism and hospitality development. On the other hand, with a one-unit increase in impact of green initiatives on SDGs, there will be an increase of 0.372 in sustainable tourism and hospitality development. The one-unit increase in challenges in the integration of sustainable development causes a decrease of 0.232 in the level of sustainable tourism and hospitality development.

CONCLUSION

According to the study, a number of sustainable practices within the institution had been undertaken, with energy-saving measures having the highest mean value whereas community engagement the least mean value. In qualitative results, it was evident that principals focused on issues like waste management, planting trees, greening of campuses and environmental sensitivity campaigns. The conclusion arrived at is that indeed green practices had taken place and were being observed within the institutions, particularly internal activities. However, community involvement and sustainability sensitization remained low, implying that institutions need to expand green practices outside their immediate environment.

The stakeholders of TVET were moderately aware of the concept of sustainable development. However, the respondents were more knowledgeable of the beauty of the environment than the protection of the already existing environment. Moreover, from the qualitative analysis, it is evident that the students and tutors were aware of the concepts such as tree planting, clean-up, and environmental campaigns, but their knowledge was not deeply ingrained. From the above discussion, it is clear that there is some level of awareness among the stakeholders concerning sustainability. However, awareness alone does not suffice.

Institutional green initiatives played an important role in achieving sustainability through good reputation, attracting learners, environmental sustainability, and proper resource usage, but they failed to have a significant effect on cost savings at the institution level. Findings from qualitative data revealed that principals had noticed improved learner behavior, reduced littering, effective waste management, proper resource usage, and increased recognition. In light of this finding, the researcher was able to conclude that green initiatives had made positive contributions to sustainable tourism and hospitality development by making institutions more environmentally sustainable and having improved reputations. However, the financial effect had not been realized yet.

The main constraints to implementing sustainable development in TVET institutions were poor government policy and regulations, cost, resource shortages, and lack of information. This was further confirmed by qualitative results, which indicated that there was lack of sufficient financial resources, technical expertise, constant training, and proper sustainability mechanisms for green activities. The study revealed that while the TVET institutions had the intention to implement green activities, they were unable to do so because of lack of proper policy and financing mechanisms. In order to implement sustainable development, the TVET institutions need to have government involvement, clear guidelines, funding, training of staff, and industry collaboration.

RECOMMENDATIONS OF THE STUDY

The study revealed that there were greater internal green activities within the TVET institutions than community-based sustainability campaigns. Consequently, the institutions need to reinforce waste management, recycling, planting of trees, cleaning exercises, and energy conservation as part of their day-to-day activities while simultaneously developing sustainable programs within their immediate communities. Secondly, the study revealed that although stakeholders' knowledge of sustainability was present, it was yet to be fully realized and implemented. Hence, TVET institutions need to offer continuous training, workshops, green clubs, demonstrations, and classroom-based sustainability activities to ensure effective implementation of green practices within tourism and hospitality training.

Green practices contributed significantly to the image of the institution, behavior of the students, and environmental stewardship rather than financial gains. This implies that TVET institutions need to adopt systems

for measuring their cost efficiencies, reduction in pollution, conservation of resources, and their role in achieving sustainable development goals. The findings indicated that lack of resources, inadequate budgetary allocation, lack of knowledge, and ineffective government legislation hindered sustainability in the adoption of green practices. This implies that the government needs to develop clear policies and provide sufficient funds and strict enforcement of regulations in collaboration with the county government, industries, NGOS, and environment authorities.

The adjusted R Square of .654 indicates that the variables under investigation accounted for 65.4% of the variance in sustainable tourism and hospitality development, while 34.6% were left unexplained. Consequently, further research should consider other factors that might affect sustainable tourism and hospitality development within TVET institutions, including leadership within the institution, green finance, effective implementation of government policies, partnership with the tourism industry, training skills of instructors, and the presence of green facilities.

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