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Project Appraisal Techniques on the Performance of Environmental Conservation Projects

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ABSTRACT

Environmental conservation projects are crucial for addressing global challenges, and effective project appraisal techniques ensure their successful implementation, sustainability, and optimal resource allocation. However, despite the recognition of these benefits, the actual influence of project appraisal techniques on performance of environmental conservation projects remained insufficiently explored in specific contexts, such as the Musanze district of Rwanda. This study, therefore, aimed to establish the influence of project appraisal techniques on performance of environmental conservation projects in Musanze, Rwanda, specifically, financial appraisal, technical appraisal, Environmental Impact Assessment (EIA) and economic appraisal. The study adopted Systems Theory. The research utilized both descriptive and correlational designs, targeting a census 84 respondents, including project managers, environmental officers, financial planners, technical experts, and community representatives. Data was collected through questionnaires, interviews, and document reviews. A pilot test was conducted with 8 respondents to determine the instrument's ability to produce consistent results over time. Validity and Reliability testing of the research instrument yielded 0.87 and a Cronbach's Alpha of 0.772 from pilot results, confirming the instrument's validity and reliability respectively. Data was analyzed using descriptive and inferential statistics, including correlation and regression analysis. The findings for four hypotheses were tested at α=.05 level of significance and the results were: financial appraisal (P = 0.000 < 0.05), technical appraisal (P = 0.000 < 0.05), Environmental Impact Assessment (EIA) (P = 0.000 < 0.05), and economic appraisal (p=0.000<0.05) have significant influence on project performance, thus rejecting the Null hypotheses. In conclusion, the study highlights the significant positive impact of financial, technical, environmental, and economic appraisals on the performance of environmental conservation projects, and it is recommended that these appraisals be strengthened through continuous monitoring, enhanced financial planning, and comprehensive technical assessments. Future research could explore the broader economic impacts and stakeholder engagement strategies to further improve project sustainability.

Introduction

Environmental conservation projects are vital in addressing the growing challenges of climate change, biodiversity loss, and environmental degradation (Garcia, 2019). These projects often aim to protect natural habitats, enhance ecosystem services, and promote sustainable development. To ensure their effectiveness, rigorous project appraisal techniques are essential. Project appraisal is a systematic evaluation process that assesses the feasibility, potential impacts, and sustainability of a project before its implementation (Glasson, 2019). It involves examining economic, financial, environmental, and social factors to determine whether the project aligns with its objectives and offers value for money (Pinto & Slevin, 2021).

In the United States, environmental conservation projects are essential components of national and local sustainability efforts, focusing on climate adaptation, biodiversity preservation, and pollution control (Fernandez, 2018). The U.S. Environmental Protection Agency (EPA) plays a significant role in setting regulations and standards for conservation initiatives. Project appraisal

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techniques like Cost-Benefit Analysis (CBA) and Environmental Impact Assessment (EIA) are widely used to evaluate the feasibility and potential impacts of these projects (Smith & Johnson, 2022). For instance, the Comprehensive Everglades Restoration Plan (CERP) in Florida is one of the largest environmental restoration projects in the U.S. It uses a combination of appraisal techniques, including risk analysis and CBA, to ensure that the benefits of restoring natural water flow and habitats outweigh the costs (Everglades Foundation, 2021). This rigorous appraisal process has been instrumental in securing funding, managing risks, and achieving project objectives effectively. However, challenges such as high costs, regulatory hurdles, and stakeholder conflicts can affect the implementation of conservation projects. To address these issues, U.S. projects often incorporate stakeholder engagement and adaptive management strategies during the appraisal phase, which help mitigate risks and improve project outcomes (Harrison, 2019). In Europe, environmental conservation is a high priority, driven by the European Green Deal, which aims to make Europe the first climate-neutral continent by 2050 (Garcia, 2019). European Union (EU) member states implement various conservation projects focused on reducing carbon emissions, enhancing biodiversity, and improving water and air quality. Project appraisal in the EU typically involves comprehensive Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA) as mandated by EU regulations (European Commission, 2021). These appraisal methods help identify potential environmental impacts, evaluate alternative solutions, and develop mitigation strategies. A notable example is the Natura 2000 network, the largest coordinated network of protected areas in the world (Fernandez, 2018). This initiative uses detailed appraisals to ensure conservation actions are economically viable and environmentally sound. The use of standardized appraisal techniques across EU countries helps maintain consistency and enhance project performance, but challenges remain in funding availability and stakeholder coordination, particularly when projects involve transboundary ecosystems (Garcia, 2019).

In Africa, environmental conservation projects are crucial for combating deforestation, desertification, and biodiversity loss, which are exacerbated by climate change and rapid population growth (Smith & Johnson, 2022). However, these projects often face significant challenges, including limited financial resources, inadequate technical expertise, and weak institutional frameworks. Project appraisal techniques such as Environmental Impact Assessments (EIA), Cost-Benefit Analysis (CBA), and risk analysis are increasingly adopted to evaluate the feasibility and potential impacts of conservation initiatives (Mutua & Kamau, 2021).

In Rwanda, environmental conservation is a strategic priority, driven by the need to protect the country's unique biodiversity and mitigate the impacts of climate change. The Musanze District, known for its rich biodiversity and proximity to Volcanoes National Park, is a focal point for conservation projects. The Wildlife Conservation Initiative (WCI) Project in this region aims to promote the conservation of indigenous tree species while enhancing community livelihoods through activities like tree planting, eco-tourism, and income-generating activities (WCI, 2023). Wildlife Conservation Initiative (WCI) Project in Musanze District illustrates the importance of effective appraisal techniques in achieving conservation goals. Environmental conservation projects play a crucial role in mitigating the adverse effects of climate change, biodiversity loss, and habitat degradation (Pinto & Slevin, 2021). However, the success of these projects heavily relies on their proper planning and appraisal to ensure they meet environmental and socio-economic objectives (Williams & Young, 2020). In the Musanze District of Rwanda, the Wildlife Conservation Initiative (WCI) Project aims to protect indigenous tree species and promote sustainable livelihoods through activities such as reforestation, community education, and eco-tourism development (Wildlife Conservation Initiative [WCI], 2023). Despite the project's potential benefits, its implementation faces several challenges, including limited financial resources, inadequate stakeholder involvement, and unforeseen environmental impacts (Rwanda Environment Management Authority, 2022).

This study aims to assess how these techniques influence the performance of conservation projects, providing valuable perspectives for improving planning processes and achieving better environmental and socio-economic outcomes. By understanding and addressing the gaps in project appraisals, Rwanda and other countries can enhance the effectiveness of their conservation efforts, contributing to global sustainability. This study contributes to the existing body of knowledge on project appraisal techniques and their impact on the performance of environmental conservation projects. By providing empirical evidence from the case of the WCI project in Musanze District, it helps bridge the knowledge gap in understanding how different appraisal methods affect project outcomes in a conservation context. Scholars and academicians can use the findings as a reference for future research on similar topics, potentially expanding the study to different regions or types of projects. The study was organized into introduction, literature review, findings and discussion, and conclusion.

Literature Review

Theoretical Review
This study was based on Systems theory:

Systems Theory
Systems Theory suggests that projects are complex systems comprising various interdependent components that must work together for successful outcomes. The theory was originally developed in the field of biology by Ludwig von Bertalanffy in the 1930s and was later adapted to organizational management and project appraisal contexts (Bertalanffy, 1968). According to Systems Theory, an environmental conservation project, like the Wildlife Conservation Initiative (WCI) in Musanze District, can be viewed as a system composed of various subsystems including financial, technical, environmental, and economic appraisal components. Each subsystem interacts and influences others, ultimately affecting the overall performance of the conservation project (Kast & Rosenzweig, 1972).

In the context of project appraisal, Systems Theory highlights the importance of understanding the interdependencies among different appraisal techniques to achieve project performance. For instance, a financial appraisal that focuses on budgeting and resource allocation interacts with technical appraisals assessing the feasibility of project activities. A failure in one component, such as inadequate financial resources, can negatively impact the technical implementation, leading to inefficiencies in achieving project goals (Kerzner, 2017). By applying Systems Theory, project managers can take a holistic view of the appraisal process, identifying potential bottlenecks and ensuring that all components are effectively integrated to enhance the project's overall performance (Sterman, 2000).

The application of Systems Theory to environmental conservation projects is particularly relevant given the complexity and interrelated nature of the activities involved. Conservation projects, such as those undertaken by the WCI, often include a variety of activities like habitat restoration, community engagement, and biodiversity monitoring. Each of these activities is a subsystem contributing to the overall goal of environmental sustainability. The theory suggests that changes in one activity, such as an increase in habitat restoration efforts, can have ripple effects on other aspects of the project, including community livelihoods and biodiversity outcomes (Meadows, 2008). Therefore, project appraisal must consider these interconnections to ensure a balanced approach that enhances project performance. Systems Theory also emphasizes the importance of feedback loops, which are critical in adaptive project management. For example, during the implementation of the WCI project, feedback from environmental monitoring can inform project planners about the effectiveness of current conservation strategies. If the data indicates a decline in biodiversity, the project team can adjust their approach, such as by increasing reforestation efforts or modifying community engagement strategies. This adaptive management approach is key to improving the project's performance and achieving long-term conservation goals (Checkland, 1999). By applying Systems Theory, project managers can better anticipate and manage the intricate interactions between different appraisal components, leading to improved project performance and enhanced environmental conservation outcomes.

Empirical Review

The empirical review gives general view on the research objectives as developed.

Financial Appraisal and Performance of Environmental Conservation Projects

Financial appraisal focuses on assessing the economic viability of a project by evaluating costs and benefits in monetary terms. It helps to determine if the environmental conservation project will achieve a return on investment. Chien et al. (2020) conducted an empirical study on the use of Cost-Benefit Analysis (CBA) in conservation projects, showing how it effectively predicts the long-term financial returns and justifies initial investments. The study revealed that projects with strong financial appraisals are more likely to secure funding and perform well financially.

The researcher found that projects that integrate long-term revenue projections from eco-tourism and sustainable resource management, such as wildlife viewing and carbon credits, tend to perform better in terms of both conservation and financial sustainability. Bajwa et al. (2021) focused on the Net Present Value (NPV) and Internal Rate of Return (IRR) methods for assessing the financial sustainability of environmental projects. The study found that positive NPV and IRR results were associated with successful conservation outcomes, as they signal the potential for projects to generate sufficient returns over time. As findings, a high NPV can indicate that a conservation project, such as WCI, has the potential to be financially successful in the long run, supporting its viability as an investment. Nguyen and Tan (2022) examined the Payback Period as a financial appraisal tool for conservation projects. The study highlighted how longer payback periods might be common in environmental conservation projects, given their long-term benefits. The study recommended incorporating non-monetary benefits, such as biodiversity preservation, when considering payback periods in conservation projects. Li and Zhou (2020) explored the role of sensitivity analysis in financial appraisals for conservation projects. Their findings suggest that sensitivity analysis helps identify the most critical variables that impact project outcomes, such as changes in funding availability or variations in expected carbon credit prices. This tool enables project managers to make informed decisions and prepare for financial uncertainties, ultimately improving project resilience and performance.

Technical Appraisal and Performance of Environmental Conservation Projects

Technical appraisal evaluates the feasibility of the project’s technical aspects, including engineering, technology, and capacity to meet conservation objectives.

Zhao et al. (2022) examined the role of technical feasibility studies in the performance of conservation projects, particularly the use of advanced technologies like drones, GIS, and remote sensing for biodiversity monitoring and habitat protection. Their study demonstrated that the integration of modern technologies positively impacts project success by enhancing data collection and management, leading to improved decision-making. Technical appraisal that includes the integration of appropriate technology, such as for monitoring animal populations, directly improves the efficiency and effectiveness of conservation interventions.

Liu et al. (2023) analyzed how capacity building and human resources influence the technical success of environmental projects. Their study found that well-trained local teams and project staff significantly enhance the technical execution of conservation projects. The study emphasized that technical performance is enhanced when projects invest in the continuous training of staff to manage and execute complex conservation tasks. Stevens and Jenkins (2020) explored the impact of local infrastructure (e.g., roads, communication networks) on the technical performance of conservation projects. They argued that lack of infrastructure can hinder the timely execution of projects, affecting overall performance. Projects that invest in robust infrastructure, including access to conservation areas and communication systems, perform significantly better.

Environmental Impact Assessment (EIA) and Performance of Environmental Conservation Projects
EIA is a critical tool for assessing the potential environmental impacts of a project and ensuring that negative impacts are mitigated. A well-conducted EIA often leads to more sustainable project outcomes. Smith et al. (2021) evaluated the role of EIA in conservation projects, specifically in terms of improving stakeholder engagement and regulatory compliance. Their study found that EIA processes that engage local communities in the decision-making process led to more successful conservation outcomes. Community involvement through the EIA process helps to address local concerns, leading to greater local support and sustainable project outcomes. Xu and Zhu (2022**)** conducted a study on how EIA contributes to the identification of ecological risks, such as habitat destruction or species displacement, in conservation projects. Their research found that projects with comprehensive EIAs were better equipped to prevent or mitigate negative environmental impacts. Projects that incorporate early-stage EIA are more likely to achieve their conservation goals without unintended environmental harm. Kumar et al. (2020) studied how the EIA process influences the long-term sustainability of conservation projects. They emphasized that EIAs that consider cumulative environmental impacts (such as climate change or deforestation) lead to more effective long-term conservation strategies. Proper implementation of EIA leads to better project planning and more sustainable environmental conservation outcomes.

Economic Appraisal and Performance of Environmental Conservation Projects
Economic appraisal involves assessing the broader economic implications of a project, including its social and environmental impacts. It is often broader than financial analysis and includes non-market values like ecosystem services. Green et al. (2021) discussed the application of contingent valuation methods (CVM) and stated preference techniques in environmental conservation projects, demonstrating their role in capturing the non-market values of ecosystem services, such as biodiversity and carbon sequestration. Projects that effectively incorporate ecosystem services in their economic appraisals tend to show higher local support and long-term sustainability, as these services often provide substantial value to local communities. Thompson et al. (2022) conducted a study using the Total Economic Valuation (TEV) approach for assessing the economic performance of wildlife conservation projects. The study found that TEV is particularly useful for estimating the broader economic benefits of conservation, including tourism, local employment, and environmental resilience.

Projects that measure and demonstrate the total economic value of ecosystems in economic appraisals tend to attract more investment and achieve better conservation outcomes. Rodriguez and Ortega (2023) examined cost-effectiveness analysis (CEA) in assessing the economic viability of environmental projects. They found that CEA helps identify the most cost-efficient ways to achieve conservation goals and maximizes the use of available resources. Projects that employ CEA to prioritize cost-effective strategies, such as targeted wildlife protection programs, achieve better long-term success.

Miller et al. (2019) assessed the integration of ecosystem service valuation into policy-oriented economic appraisals for conservation projects. Their research showed that projects incorporating such valuations often influence policy decisions, resulting in increased funding and support. They concluded that ecosystem service valuation strengthens the economic case for conservation by demonstrating the tangible and intangible benefits of preserving ecosystems.

Methodology

The study adopted a descriptive and correlational research designs with questionnaire and interview guide for data collection from a census 84 respondents. A pilot study involved 9 respondents for a reliability test that yielded a Cronbach's Alpha of 0.772 while the validity was tested through expert opinion that yielded a coefficient of 0.87. The data analysis techniques employed in this study included descriptive and inferential statistics of correlation and regression. The simple regression model was used for testing hypotheses $H_0$1, $H_0$2, H03, and $H_0$4; for example, to test hypothesis one, the simple regression model took the form.

$Y = \beta_0 + \beta_1 X_{1+} + \varepsilon$
Then a multiple regression analysis:
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Findings and Discussion

All the questionnaires were duly filled out and returned, resulting in a 100% return rate.

Financial Appraisal and Performance of Environmental Conservation Projects
The study was to assess the effect of financial appraisal on performance of environmental conservation projects through correlation and regression.

Relationship between Financial Appraisal and Performance of Environmental Conservation Projects
A correlation analysis aimed to determine whether there is a relationship between financial appraisal techniques and the performance of environmental conservation projects.

Table 1: Relationship between Financial Appraisal and Performance of Environmental Conservation Projects

		Financial Appraisal	Performance of Environmental Conservation Projects
Financial Appraisal	Pearson Correlation	1	.812**
	Sig. (2-tailed)		.000
	N	84	84
Performance of Environmental Conservation Projects	Pearson Correlation	.812**	1
	Sig. (2-tailed)	.000	
	N	84	84

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

The correlation results show that there is a strong positive correlation (R = 0.812) between Financial Appraisal and the Performance of Environmental Conservation Projects, which is statistically significant (p = 0.000 < 0.05). This indicates that Financial Appraisal and the Performance of Environmental Conservation Projects are strongly and positively correlated. As Financial Appraisal increases, the performance of environmental conservation projects also significantly improves.

This finding aligns with the argument made by several scholars that effective financial appraisal positively influences project performance. Financial appraisals ensure that resources are allocated efficiently, risks are managed appropriately, and the financial viability of the project is sound, ultimately contributing to improved project outcomes and sustainability

Effect of Financial Appraisal on Performance of Environmental Conservation Projects

A regression analysis sought to determine the linear effect of risk identification on the successful implementation of pest control projects.

Table 2: Effect of Financial Appraisal on Performance of Environmental Conservation Projects

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	
Summary	.812[a]	.660	.656	.47995	
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	36.670	1	36.670	159.190	.000[b]
	Residual	18.889	82	.230		
	Total	55.560	83			
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.165	.225		5.178	.000
	Financial Appraisal	.735	.053	.830	13.881	.000

a. Dependent Variable: Performance of Environmental Conservation Projects

b. Predictors: (Constant), Financial Appraisal

Source: Author, 2024

An R^2 value of 0.660, with P=000<0.05 indicating that Financial Appraisal accounts for 66.0% of the variation in the Performance of Environmental Conservation Projects. The F (1,82)= 159.190, and the associated p-value is 0.000 (p < 0.05), suggesting that the model is a good fit for the data and the relationship between the variables is statistically significant. The analysis of the coefficients shows that the intercept has a coefficient of $\beta = 1.165$ (p = 0.000<0.05), which is statistically significant. This represents the expected level of performance of environmental conservation projects when Financial Appraisal is excluded. Financial Appraisal has a coefficient of $\beta = 0.735$ (p = 0.000<0.05), meaning that for each unit increase in Financial Appraisal, the performance of the environmental conservation projects improves by 0.735 units. Thus, the regression model: $Y = 1.165 + 0.735X_1$

This equation shows that the performance of environmental conservation projects increases by 0.735 for every unit increase in Financial Appraisal.

Test for Hypothesis One

H_{01}: Financial appraisal has no significant influence on the performance of environmental conservation projects in Musanze district; was rejected (p = 0.000<0.05). Thus, there is a significant influence of financial appraisal on the performance of environmental conservation projects in Musanze district.

Technical Appraisal and Performance of Environmental Conservation Projects

The study was to examine the effect of technical appraisal on the performance of environmental conservation projects in Musanze District through correlation and regression.

Relationship between Technical Appraisal and performance of environmental conservation projects

A correlation analysis aimed to determine whether there is a relationship between technical appraisal techniques and the performance of environmental conservation projects.

Table 3: Relationship between and Performance of Environmental Conservation Projects

		Technical Appraisal	**Performance of Environmental Conservation Projects**
Technical Appraisal	Pearson Correlation	1	.657**
	Sig. (2-tailed)		.000
	N	84	84
Performance of Environmental Conservation Projects	Pearson Correlation	.657**	1
	Sig. (2-tailed)	.000	
	N	84	84

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

The correlation results show that there is a moderate positive correlation (R = 0.657) between Technical Appraisal and the Performance of Environmental Conservation Projects, which is statistically significant (p = 0.000 < 0.05). This indicates that Technical Appraisal and the Performance of Environmental Conservation Projects are moderately and positively correlated. As Technical Appraisal increases, the performance of environmental conservation projects also improves.

This finding aligns with the argument that a thorough technical appraisal ensures the viability and effectiveness of a project, contributing significantly to its success. The technical assessment helps in identifying key project requirements, evaluating risks, and determining optimal implementation strategies, all of which enhance the overall performance of environmental conservation projects.

Effect of Technical Appraisal on Performance of Environmental Conservation Projects

A regression analysis sought to determine the linear effect of technical appraisal on the Performance of Environmental Conservation Projects.

Table 4: Effect of Technical Appraisal on Performance of Environmental Conservation Projects

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	
Summary	.657[a]	.431	.425	.62065	
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	23.973	1	23.973	62.234	.000[b]
	Residual	31.587	82	.385		
	Total	55.560	83			
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.769	.316		5.600	.000
	Technical Appraisal	.600	.076	.657	7.889	.000

a. Dependent Variable: Performance of Environmental Conservation Projects
b. Predictors: (Constant), Technical Appraisal

An R^2 value of 0.431, indicating that Technical Appraisal accounts for 43.1% of the variation in the Performance of Environmental Conservation Projects. The F(1,82)= 62.234, and the associated p-value is 0.000 (p < 0.05), suggesting that the model is a good fit for the data and the relationship between the variables is statistically significant.

The analysis of the coefficients shows that the constant term has a coefficient of β = 1.769 (p = 0.000<0.05), which is statistically significant. This represents the expected level of performance of environmental conservation projects when Technical Appraisal is excluded. Technical Appraisal has a coefficient of β = 0.600 (p = 0.000<0.05), meaning that for each unit increase in Technical Appraisal, the performance of the environmental conservation projects improves by 0.600 units. Thus, the regression model: $Y = 1.769 + 0.600X_2$

This equation shows that the performance of environmental conservation projects increases by 0.600 for every unit increase in Technical Appraisal.

Test for Hypothesis Two

H_02: Technical appraisal has no significant influence on the performance of environmental conservation projects in Musanze district; was rejected (p = 0.000<0.05). Thus, there is a significant influence of technical appraisal on the performance of environmental conservation projects in Musanze district.

Environment Impact Assessment and Performance of Environmental Conservation Projects

The study was to determine the effect of Environmental Impact Assessment (EIA) on the performance of environmental conservation projects in Musanze District through correlation and regression.

Relationship between Environment Impact Assessment and performance of environmental conservation projects
A correlation analysis aimed to determine whether there is a relationship between Environmental Impact Assessment (EIA) techniques and the performance of environmental conservation projects.

Table 5: Relationship between Environment Impact Assessment and performance of environmental conservation projects

		Environment Impact Assessment	**Performance of Environmental Conservation Projects**
Environment Impact Assessment	Pearson Correlation	1	.677**
	Sig. (2-tailed)		.000
	N	84	84
Performance of Environmental Conservation Projects	Pearson Correlation	.677**	1
	Sig. (2-tailed)	.000	
	N	84	84

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

The correlation results show that there is a moderate positive correlation (R = 0.677) between Environmental Impact Assessment (EIA) and the Performance of Environmental Conservation Projects, which is statistically significant (p = 0.000 < 0.05). This indicates that EIA and the performance of environmental conservation projects are moderately and positively correlated. As the quality and comprehensiveness of the Environmental Impact Assessment improve, the performance of environmental conservation projects also improves significantly.

This finding supports the idea that a thorough and effective Environmental Impact Assessment is crucial for ensuring the successful implementation of environmental conservation projects. EIA helps identify potential risks and impacts, optimize strategies, and ensure that projects align with environmental sustainability goals, thereby improving their overall performance

Effect of Environment Impact Assessment on Performance of Environmental Conservation Projects
A regression analysis sought to determine the linear effect of Environment Impact Assessment on the Performance of Environmental Conservation Projects.

Table 6: Effect of Environment Impact Assessment on Performance of Environmental Conservation Projects

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
Summary	.677[a]	.458	.452	.60584

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	25.462	1	25.462	69.372	.000[b]
	Residual	30.097	82	.367		
	Total	55.560	83			

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.347	.349		3.858	.000
	Environment Impact Assessment	.661	.079	.677	8.329	.000

a. Dependent Variable: Performance of Environmental Conservation Projects
b. Predictors: (Constant), Environment Impact Assessment

An R^2 value of 0.458, indicating that Environment Impact Assessment accounts for 45.8% of the variation in the Performance of Environmental Conservation Projects. The F (1,82)= 69.372 and the associated p-value is 0.000 < 0.05), suggesting that the model fits the data well and the relationship between the variables is statistically significant.

The analysis of the coefficients shows that the constant term has a coefficient of $\beta = 1.347$ ($p = 0.000<0.05$), which is statistically significant. This represents the expected level of performance of environmental conservation projects when Environment Impact Assessment is excluded. Environment Impact Assessment has a coefficient of $\beta = 0.661$ ($p = 0.000<0.05$), meaning that for each unit increase in Environment Impact Assessment, the performance of the environmental conservation projects improves by 0.661 units. Thus, the regression model: $Y = 1.347 + 0.661X_3$

This equation shows that the performance of environmental conservation projects increases by 0.661 for every unit increase in Environmental Impact Assessment

Test for Hypothesis Three
$H_0 3$: Environmental Impact Assessment has no significant influence on the performance of environmental conservation projects in Musanze district; was rejected ($p = 0.000<0.05$). Thus, there is a significant influence of Environmental Impact Assessment on the performance of environmental conservation projects in Musanze district.

Economic Appraisal and Performance of Environmental Conservation Projects
The study was to determine the effect of economic appraisal on the performance of environmental conservation projects in Musanze District through correlation and regression.

Relationship between Economic Appraisal and Performance of Environmental Conservation Projects
A correlation analysis aimed to determine whether there is a relationship between economic appraisal techniques and the performance of environmental conservation projects.

Table 7: Relationship between Economic Appraisal and Performance of Environmental Conservation Projects

		Economic Appraisal	**Performance of Environmental Conservation Projects**
Economic Appraisal	Pearson Correlation	1	.806**
	Sig. (2-tailed)		.000
	N	84	84
Performance of Environmental Conservation Projects	Pearson Correlation	.806**	1
	Sig. (2-tailed)	.000	
	N	84	84

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

The correlation results show that there is a strong positive correlation (R = 0.806) between Economic Appraisal and the Performance of Environmental Conservation Projects, which is statistically significant ($p = 0.000 < 0.05$). This indicates that Economic Appraisal and the performance of environmental conservation projects are strongly and positively correlated. As the thoroughness and quality of the economic appraisal process increase, the performance of environmental conservation projects also significantly improves.

This finding supports the view that a robust economic appraisal is essential for enhancing the success of environmental conservation projects. Economic appraisal helps in assessing the financial feasibility, resource allocation, and overall viability of projects, leading to better project planning, management, and outcomes. Consequently, projects that undergo comprehensive economic appraisals are more likely to perform well, ensuring sustainability and efficiency in the long term.

Effect of Economic Appraisal on Performance of Environmental Conservation Projects
A regression analysis sought to determine the linear effect of Economic Appraisal on the Performance of Environmental Conservation Projects.

Table 8: Effect of Economic Appraisal on Performance of Environmental Conservation Projects

Model	**R**	**R Square**		**Adjusted R Square**	**Std. Error of the Estimate**	
Summary	.806[a]	.650		.646	.48685	
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	36.123	1	36.123	152.403	.000[b]
	Residual	19.436	82	.237		
	Total	55.560	83			
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.377	.235		5.859	.000
	Economic Appraisal	.658	.053	.806	12.345	.000

a. Dependent Variable: Performance of Environmental Conservation Projects

An R^2 value of 0.650, indicating that Economic Appraisal accounts for 65.0% of the variation in the Performance of Environmental Conservation Projects. The $F(1,82) = 152.403$, and the associated p-value is 0.000 ($p < 0.05$), suggesting that the model is a good fit for the data and the relationship between the variables is statistically significant.

The analysis of the coefficients shows that the constant term has a coefficient of $\beta = 1.377$ ($p = 0.000<0.05$), which is statistically significant. This represents the expected level of performance of environmental conservation projects when Economic Appraisal is excluded. Economic Appraisal has a coefficient of $\beta = 0.658$ ($p = 0.000<0.05$), meaning that for each unit increase in Economic Appraisal, the performance of the environmental conservation projects improves by 0.658 units. Thus, the regression model: $Y = 1.377 + 0.658X_4$

This analysis shows that Economic Appraisal significantly and positively affects the performance of environmental conservation projects. This equation shows that the performance of environmental conservation projects increases by 0.658 for every unit increase in Economic Appraisal.

Test for Hypothesis Four

$H_0$4: Economic appraisal has no significant influence on the performance of environmental conservation projects in Musanze district; was rejected ($p = 0.000<0.05$). Thus, there is a significant influence of Economic Appraisal on the performance of environmental conservation projects in Musanze district.

The Combined Effect of Project Appraisal techniques on Performance of Environmental Conservation Projects

A multiple linear regression analysis was done to examine the combined effect independent variables namely Project appraisal techniques on Performance of Environmental Conservation Projects.

Table 9: Effect of Project Appraisal Techniques on Performance of Environmental Conservation Projects

Model	**R**	**R Square**		**Adjusted R Square**	**Std. Error of the Estimate**	
Summary	.891[a]	.795		.784	.38009	
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	44.147	4	11.037	76.396	.000[b]
	Residual	11.413	79	.144		
	Total	55.560	83			
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	.328	.247		1.325	.189
	Economic Appraisal	.385	.067	.425	5.714	.000
	EIA	.126	.064	.138	1.975	.052
	Technical Appraisal,	.162	.068	.166	2.394	.019
	Financial Appraisal	.249	.073	.305	3.430	.001

a. Dependent Variable: implementation of integrated housing development projects

b. Predictors: (Constant), Economic Appraisal, EIA, Technical Appraisal, Financial Appraisal

An R^2 value of 0.795, indicating that the project appraisal techniques (Economic Appraisal, Environmental Impact Assessment (EIA), Technical Appraisal, and Financial Appraisal) explain 79.5% of the variation in the performance of environmental conservation projects. The F-value is 76.396, and the associated p-value is 0.000 ($p < 0.05$), suggesting that the model is a good fit for the data and the relationship between the variables is statistically significant.

The analysis of the coefficients reveals that the constant term has a coefficient of $\beta = 0.328$ ($p = 0.189>0.05$), which is not statistically significant. This suggests that the baseline level of environmental conservation project performance (when all project appraisal techniques are excluded) is not statistically different from zero.

Economic Appraisal has a coefficient of $\beta = 0.385$ ($p = 0.000<0.05$), indicating that for each unit increase in Economic Appraisal, the performance of environmental conservation projects improves by 0.385 units. This is statistically significant and suggests that Economic Appraisal has a strong positive effect on project performance.

EIA shows a coefficient of $\beta = 0.126$ ($p = 0.052$), which is marginally above the 0.05 significance level, suggesting that the effect of EIA on project performance is not as strong as the other appraisal techniques, though it may still have some influence. Technical Appraisal has a coefficient of $\beta = 0.162$ ($p = 0.019<0.05$), which is statistically significant, meaning that an increase in Technical Appraisal leads to a 0.162-unit improvement in project performance.

Financial Appraisal has a coefficient of $\beta = 0.249$ ($p = 0.001<0.05$), indicating that an increase in Financial Appraisal leads to a 0.249-unit improvement in project performance. This is statistically significant and shows that Financial Appraisal positively affects project performance. Thus, the regression model: $Y = 0.328 + 0.385X_1 + 0.126X_2 + 0.162X_3 + 0.249X_4$

This equation shows that the Performance of Environmental Conservation Projects improves with increases in Economic Appraisal, EIA, Technical Appraisal, and Financial Appraisal, with Financial Appraisal having the strongest effect.

Conclusions

The study concludes that these projects are generally successful, with respondents indicating high levels of satisfaction regarding their effectiveness in meeting conservation goals, budget adherence, timeliness, stakeholder satisfaction, and contribution to the community and environment. Financial appraisal significantly influences the success of environmental conservation projects, with key practices like resource allocation, risk assessment, and budget reviews positively impacting performance. Technical appraisal plays a vital role in ensuring the feasibility and alignment of projects with achievable outcomes, with respondents rating it highly. The EIA process is effective in managing environmental risks and ensuring sustainability. Economic appraisals are crucial to project success, with strong positive correlations between economic evaluations and project performance. These appraisals improve resource

efficiency, community livelihoods, and alignment with broader regional goals, contributing significantly to the overall success of conservation projects.

Given the overall performance of the projects, it is recommended that continuous monitoring and evaluation systems be put in place. Regular assessment of project progress, particularly with regards to environmental goals, will help ensure that projects remain on track and adapt to evolving challenges. Future research could focus on the direct and indirect economic impacts of environmental conservation projects on local communities, such as job creation, sustainable livelihoods, and improved infrastructure, to better understand the broader socio-economic benefits of these initiatives.

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