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Community Involvement and Performance of Environmental Project: A Case of Green Amayaga Project in Ruhango District, Rwanda

Janvier Bigenimana, Sam Bazimya
https://orcid.org/0009-0003-1517-4839
Email: janvbigena@gmail.com

Abstract: *The general objective of this study was to assess the effect of community involvement on the performance of environmental projects, with specific reference to the Green Amayaga Project in Ruhango District. The reliability of the research instrument was assessed using Cronbach's Alpha, while validity was determined through the Content Validity Index (CVI). Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), employing descriptive statistics such as frequencies, percentages, means, and standard deviations, as well as inferential statistics including correlation and regression analysis at a significance level of 0.05. Multiple regression analysis revealed that all three phases of community involvement have a statistically significant positive effect on project performance ($p = 0.000 < 0.05$). The implementation phase emerged as the most influential predictor with an unstandardized coefficient ($\beta=0.415$, $t = 7.830$), followed by the monitoring and evaluation phase ($\beta=0.278$, $t = 5.451$) and the initial phase ($\beta=0.233$, $t = 5.178$). The overall model yielded an R-square of 0.747, indicating that these three dimensions of community involvement explain 74.7% of the variance in the performance of the Green Amayaga Project in Ruhango District. The study concludes that active community involvement throughout all project phases is a primary driver of performance of the Green Amayaga Project in Ruhango District. Project managers should institutionalize clear task-specific coordination and role communication during the implementation phase to maximize the environmental performance and beneficiary satisfaction of the Green Amayaga Project.*

Keywords*: Community Involvement, Performance of Environmental Projects, Initial Phase, Implementation Phase, Monitoring and Evaluation Phase*

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1. Introduction

Environmental and development projects increasingly recognize that community participation is a critical factor influencing project performance and sustainability. However, many environmental initiatives continue to experience implementation and sustainability challenges where local stakeholders are not actively involved. Reports indicate that nearly 30–40% of environmental restoration projects worldwide fail to achieve their intended long-term outcomes due to weak community engagement and limited local ownership (Cornwall, 2023).

Asare and Kankam (2023) show that over 35% of environmental and natural resource management projects experience performance difficulties due to low community participation in planning and monitoring activities in Sub-Saharan Africa. In many cases, beneficiaries are not fully involved in decision-making processes, which leads to underutilization of project facilities, weak maintenance practices, and reduced sustainability of environmental interventions.

Despite the proliferation of environmental initiatives across Rwanda, performance outcomes remain inconsistent, particularly where community participation

is weak or absent. In Gakenke District, the WASAC Rural Water Supply Project has faced repeated service interruptions. Although 78% of households rely on this system, only 29% of residents have participated in any form of project evaluation, and 34% report not knowing whom to contact during technical failures. These gaps have contributed to low ownership and delayed maintenance, undermining the sustainability of water infrastructure (Habimana, 2022).

In Bugesera District, the Climate Resilient Post-Harvest Agribusiness Support Project (PASP), funded through IFAD, has struggled with facility underutilization and poor maintenance. Only 36% of targeted beneficiaries were consulted during planning, and 41% lacked clarity on their roles in managing post-harvest infrastructure. This disconnects between project design and local realities has led to mismatches in facility placement and persistent exposure to environmental risks such as flooding and erosion (Mukamana, 2023). In Ruhuha Sector, the WaterAid Rwanda Community Water Project has faced operational setbacks due to poor financial participation. Only 22% of households contributed to maintenance funds, and 61% were unaware of their financial obligations. As a result, 47% of water points remained non-functional for over three months, indicating that technical sustainability was compromised when financial engagement was not structured (Ishimwe, 2024).

In Ruhango District, the Community-Led Clean Water Initiative, recorded a 46% higher failure rate when community members were excluded from the initiation phase. The study emphasized that early-stage engagement was critical for aligning infrastructure with local needs and ensuring long-term functionality (Nyarora, 2024). Borehole systems under the Ruhango Borehole Sustainability Program, have also suffered from weak capacity-building participation. Only 39% of residents attended training sessions, and 52% lacked clarity on their maintenance responsibilities, leading to frequent breakdowns and prolonged service gaps (Mutuzo & Wabala, 2025).

While numerous studies such as those by Habimana (2022), Mukamana (2023), Ishimwe (2024), Nyarora (2024), Mutuzo and Wabala (2025) have examined community participation and environmental project performance across Rwanda, there remains a critical gap in understanding how community involvement specifically affects the outcomes of the Green Amayaga Project in Ruhango District. This study addressed that gap by assessing the effect of community involvement on the performance of environmental interventions under the Green Amayaga framework, thereby contributing to improved planning, sustainability, and accountability in future conservation efforts.

The general objective of the study is to assess the effect of community involvement on performance of environmental projects, using the Green Amayaga Project in Ruhango District.

Specifically, the study has the following objectives:

1. To examine the effect of community involvement in initial phase on performance of Green Amayaga Project in Ruhango District.
2. To assess the effect of community involvement in implementation phase on performance of Green Amayaga Project in Ruhango District.
3. To determine the effect of community involvement in monitoring and evaluation phase on performance of Green Amayaga Project in Ruhango District.

2. Literature Review

2.1 Theoretical Review

The theoretical review establishes the conceptual basis for examining community participation and performance in project settings. It outlines structured explanations for how actor relationships are coordinated, how internal capacities support execution, and how community roles shape shared decision processes. The theories considered are Stakeholder Theory, the Resource-Based View, and Participatory Development Theory.

2.1.1 Stakeholder Theory

Stakeholder Theory was formally introduced in 1984 when Freeman argued that organizations operate through relationships with multiple actor groups who hold legitimate claims over project direction. This framework shifted attention from shareholder primacy to inclusive governance, recognizing employees, suppliers, communities, and regulators as essential contributors to performance through structured engagement and mutual accountability (Freeman & Phillips, 2022). Later research emphasized that cooperation depends on interpretive clarity, procedural transparency, and sustained dialogue, particularly in projects requiring distributed responsibilities across planning and implementation phases. These studies documented how shared meaning and reciprocal community participation strengthen coordination and reduce conflict in multi-actor environments (Parmar et al., 2023). In environmental and development contexts, the theory has been applied to structured forums, feedback loops, and representation mechanisms that enable continuous clarification of expectations and shared evaluation of progress. These applications demonstrate that performance improves when actor groups engage in coordinated interaction across all phases of project execution (Harrison & Wicks, 2024).

Criticism centers on the assumption that all actor groups possess equal capacity to influence decisions, yet institutional recognition and procedural fluency often determine which priorities shape outcomes. This creates uneven participation and limits the ability of marginalized groups to affect planning and monitoring processes (Miles, 2023). Additionally, stakeholder engagement may function symbolically when consultations occur without redistributing authority. Decisions often reflect pre-existing agendas, reducing trust and weakening commitment among participants whose contributions do not alter implementation or evaluation (Crane, 2024).

The study applied Stakeholder Theory to examine the effect of community involvement in initial phase of the Green Amayaga Project. The theory supported analysis of whether community actors expressed expectations, interpreted project direction, and contributed to shared decisions that influenced planning outcomes and alignment with performance goals.

2.1.2 Resource-Based View (RBV)

The Resource-Based View was first articulated in 1984 when Wernerfelt proposed that internal capabilities determine performance more than external market conditions. This conceptual shift introduced resource configuration as the foundation for sustained advantage, emphasizing that strategic direction depends on how internal strengths are identified and activated (Barney & Mackey, 2022). Later refinements defined valuable, rare, inimitable, and non-substitutable resources as essential for long-term outcomes, clarifying how internal assets such as knowledge, routines, and coordination shape execution across planning, implementation, and monitoring phases (Peteraf & Di Stefano, 2023). In development and environmental projects, RBV has been applied to assess how intangible capacities such as trust networks, experiential learning, and cooperative practice influence continuity and adaptation. These studies show that performance depends on how such capacities are shared, interpreted, and embedded into project cycles through community participation and feedback mechanisms (Kor & Mahoney, 2024).

RBV has been criticized for treating resources as static and context-independent, overlooking how value emerges through interpretation, experience, and cultural relevance in community-based projects (Kraaijenbrink, 2022). Another limitation lies in the difficulty of identifying intangible capacities such as trust, memory, and informal cooperation, which shape performance but remain invisible in standard inventories. Projects may neglect essential internal strengths when attention is placed only on measurable assets (Priem, 2023).

The study used RBV to assess the effect of community involvement in the implementation phase of the Green Amayaga Project. The theory enabled evaluation of how internal community capacities such as coordination, trust, and experiential knowledge shaped execution quality, task sequencing, and responsiveness during implementation activities linked to performance.

2.1.3 Participatory Development Theory

Participatory Development Theory gained visibility in 1983 when Chambers advanced the principle that communities should define problems and shape interventions. This approach challenged expert-driven planning and positioned local interpretation as essential for effective project design, particularly in rural and marginalized settings where external models often failed (Chambers, 2022). Field-based research documented participatory mechanisms such as village assemblies, community mapping, and joint planning sessions as tools for aligning development tasks with cultural and environmental conditions, enabling communities to contribute directly to planning and implementation decisions (Cornwall, 2023). In recent environmental restoration projects, the theory has been applied through community monitoring committees and shared evaluation platforms. These applications demonstrate that performance continuity depends on collective observation, adaptive planning, and shared accountability across implementation and monitoring phases, especially where local actors manage feedback and revise project tasks in response to emerging conditions (Cleaver & Whaley, 2024). Critics argue that participatory processes may reproduce internal dominance structures, where actors with greater voice or status shape decisions while others remain excluded, undermining representation (Cooke & Kothari, 2022). Participation may also appear present when external agencies retain control over funding, timelines, or approvals, resulting in symbolic inclusion and reduced ownership of project outcomes among community members (Hickey, 2023).

The study applied Participatory Development Theory to determine the effect of community involvement in the monitoring and evaluation phase of the Green Amayaga Project. The theory supported assessment of whether community-led feedback, adaptive learning, and shared observation contributed to performance continuity and revision of project tasks during monitoring.

2.2 Empirical Literature Review

Empirical literature review presents evidence from previous studies that have examined variables related to the current research problem. It focuses on findings derived from systematic investigations conducted in different contexts using scientific research methods.

2.2.1 Community Involvement in initial phase and Project Performance

Ara *et al.* (2024) analysed how community engagement in planning strengthens performance of local

development projects in Sunamganj District in Bangladesh. The study used interviews, focus group discussions and institutional records to measure participation in identifying priorities, shaping annual plans and guiding resource decisions. Results indicated that community inputs during planning improved project relevance and service quality, with participation scores strongly associated with performance ratings ($r > 0.60$, $p < 0.01$). Projects that incorporated community views early recorded fewer planning disputes and clearer activity schedules, while facilities established through participatory planning achieved higher utilisation rates. The authors reported that shared planning structures reduced delays linked to unclear objectives and strengthened accountability mechanisms. The study concluded that community engagement during planning contributed meaningfully to implementation readiness and improved performance outcomes.

Korir et al. (2021) investigated the effect of community participation in planning on performance of community water supply projects in Kericho County. Using a descriptive and correlational design involving water user committee members and households, the study measured participation through scope planning, activity sequencing and resource planning. Correlation analysis indicated statistically significant relationships between planning participation and project performance, with r values above 0.40 and $p < 0.05$ across all planning dimensions. Communities that contributed to defining activities and allocating resources recorded higher reliability of water supply and reduced malfunction frequency. Projects with low participation showed lower levels of satisfaction and more interruptions. The study concluded that structured participation during planning increased ownership, strengthened coordination and enhanced performance of rural water schemes.

Mujawarurema (2023) analysed community engagement in planning and its effect on performance of the Child Centered Development Project in Rwamagana District using mixed methods and a large beneficiary sample of 2,056 respondents. Participation in planning was examined through involvement in needs identification, project design and agenda consultations. Regression results recorded $R^2 = 0.875$, meaning engagement in planning explained 87.5% of variation in project performance. Respondents who participated in planning reported stronger ownership, better alignment with household priorities and greater satisfaction with outcomes. The study noted that early engagement improved clarity of project goals and ensured that activities addressed community preferences. Findings demonstrated that community involvement in planning strengthens both relevance and performance of child-centred development initiatives.

Igirimbabazi and Amolo (2025) assessed the effect of participatory planning on agricultural project performance under the Tubura programme in Musanze District. The study used descriptive statistics and regression analysis on a sample of 215 respondents, measuring planning participation through joint target setting, involvement in selection of priority crops and contribution to scheduling extension support. Regression outputs showed significant effects, with $p = 0.000$ and beta values surpassing 0.30 across all planning indicators. Projects where farmers participated in planning achieved higher adoption of improved practices, better yields and stronger beneficiary satisfaction. The authors concluded that participatory planning clarified expectations, reduced conflict during implementation and strengthened project performance.

2.2.2 Community Involvement in the Implementation Phase and Project Performance

Syamsiyah et al. (2025) evaluated community participation during implementation of environmentally conscious hamlet development activities in Cirasea Village, Indonesia. The study applied mixed methods, using household surveys, participatory observation and key informant interviews. Participation indicators included labour contribution, joint supervision of construction tasks and involvement in daily operational decisions. Regression analysis showed that implementation participation positively influenced environmental cleanliness scores and functionality of shared facilities, with participation indices strongly associated with composite performance scores ($r > 0.55$, $p < 0.01$). Areas with strong participation demonstrated more consistent adherence to environmental actions and fewer disruptions during implementation. The study concluded that community involvement in implementation enhanced accountability and improved project performance.

Esau (2022) studied how community engagement during implementation affected performance of rural water supply projects in Kasese District. Using descriptive and regression methods on community committees and water users, the study measured participation through supervision of repair works, labour provision and involvement in daily operations. Regression results recorded $\beta = 0.473$ and $p < 0.01$ for participation in implementation, with $R^2 = 0.585$ for the overall model. Projects with higher participation reported improved functionality, fewer breakdowns and more timely repair activities. Community input improved cost-sharing behaviour and compliance with water usage schedules. Findings showed that active participation in implementation contributed strongly to operational performance of rural water supply systems.

Tugirimana and Dushimimana (2024) examined the effect of beneficiary participation during implementation of the HIV Peer Education Project in Gicumbi District. Using survey data and regression analysis, participation was assessed through attendance in implementation

meetings, contribution to peer sessions and involvement in operational choices. The study reported a correlation coefficient of r = 0.738, reflecting a strong positive relationship between implementation participation and project performance. Projects with greater community involvement achieved broader coverage, more consistent session delivery and stronger behaviour-change indicators. The authors concluded that beneficiary involvement during implementation increased responsiveness and strengthened performance outcomes.

Moraa (2022) analysed how community participation in implementation affected performance of the electricity supply project in Muhanga District. The study used descriptive and regression techniques to measure labour contribution, participation in right-of-way negotiations and community-level supervision of contractors. Regression results indicated that a one-unit increase in participation produced a 0.033 improvement in implementation success. Descriptive findings showed a mean participation score of 3.80 (SD = 1.32), demonstrating moderate to high engagement. Projects with higher participation experienced fewer delays, more efficient coordination with contractors and better adherence to schedules.

2.2.3 Community Involvement in the Monitoring & Evaluation Phase and Project Performance

Asmamaw and Mekonnen (2023) analysed the effect of participatory monitoring and evaluation on performance of watershed development projects in Ethiopia. The study used a mixed-methods design with 327 households and measured participation through field reviews, joint indicator assessment and involvement in reporting. Regression analysis produced $\beta = 0.436$ ($p < 0.001$) and $R^2 = 0.512$, showing that M&E participation explained more than half of variation in project performance. Projects with stronger participation reported quicker adjustments to implementation errors and higher adoption of soil conservation actions. The authors concluded that participatory monitoring and evaluation enhanced data accuracy and strengthened project performance.

Mwangangi et al. (2024) assessed participatory monitoring and evaluation in Kenya Police housing projects using surveys and regression analysis. Participation was measured through joint site inspections, development of terms of reference and feedback sessions. Results showed $R = 0.867$ and $R^2 = 0.751$, indicating that participation explained 75.1% of variation in project completion. Significant beta coefficients included participatory fieldwork ($\beta = 0.512$, $p = 0.008$) and participatory tool design ($\beta = 0.682$, $p = 0.001$). Projects with stronger participation achieved better adherence to cost, time and quality commitments. The study concluded that participatory monitoring strengthened contractor accountability and improved performance.

Nkunda (2021) studied the effect of participatory monitoring and evaluation on performance of the Savings for Transformation project in Mbazi Sector in Huye District. Participation was evaluated through involvement in reviewing financial records, contributing to monitoring meetings and providing feedback on gaps. Regression produced $R^2 = 0.821$, showing that participation explained 82.1% of variation in performance. Groups with active participation recorded stronger loan repayment, more reliable records and better continuation of savings activities. The study concluded that community involvement in M&E had a strong influence on performance and sustainability.

Rukundo and Gachiri (2024) evaluated community involvement in monitoring and evaluation of the WaterAid Rwanda project in Ruhuha Sector. The study surveyed 395 respondents and assessed participation through involvement in fault reporting, progress review meetings and indicator tracking. Regression analysis showed an Adjusted $R^2 = 0.619$, demonstrating that community M&E involvement explained 61.9% of variation in project performance. Projects with higher participation had more functional water points, fewer breakdowns and more responsive maintenance practices. The study concluded that M&E participation strengthened accuracy of field information and improved project outcomes.

3. Methodology

3.1 Research Design

The study used descriptive and correlation research design. Inferential designs tested the hypothesis and relationships between community involvement strategies and project performance, while descriptive research design allowed a mixed method approach for the collection of quantitative and qualitative data in their current form. Quantitative data (questionnaire) were analyzed using correlation and regression techniques to determine the strength and direction of the relationship between the variables. The qualitative method (interview) was used to collect detailed explanations and opinions from respondents regarding community involvement and project performance.

3.2 Target population and Sampling Technique

In this study, the target population consisted of 413 stakeholders involved in the Green Amayaga Project, selected from four relevant categories: project managers, local community leaders, project implementation team, and project beneficiaries in Ruhango District.

In this formula, n represents the size of the sample, N represents the number of participants, and e denotes the margin of error (0.05).

$$n = \frac{N}{1 + N(e)^2}$$

This calculation, compared to the previous equation, gave a representative sample of 203 for the study.

$$n = \frac{413}{1 + 413(0.05)^2} = \frac{413}{1 + 413(0.0025)}$$

$$= \frac{413}{1 + 1.0325} = \frac{413}{2.0325} = 203$$

Stratified sampling was used in this study, where the population was divided into distinct subgroups, known as strata, that share similar characteristics. Once these strata were defined, a random sample was taken from each group, ensuring that each subgroup is proportionally represented in the overall sample.

3.3 Data Collection Instruments

Data collection instruments were used to obtain the required information for the study. The instruments included the documentary technique and a questionnaire to gather both secondary and primary data relevant to community involvement and project performance.

3.4 Data Analysis

Data analysis was the process of incorporating participant perspectives into a cohesive written product. This process equipped researchers with tools for both theoretical and practical studies, functioning as a statistical toolbox to quantify research outcomes.

Bivariate correlation analysis tested hypotheses concerning relationships between a single dependent variable and a single independent variable, supplying a Pearson correlation coefficient r ranging between –1 and +1 to express both the direction and magnitude of the association. A positive coefficient showed that both variables increase or decrease together, while a negative coefficient indicated that one variable increases as the other decreases. The significance of the correlation was evaluated using a two-tailed probability threshold of 0.05, where $p < 0.05$ indicated a statistically significant relationship.

The coefficient $r = 1$ represents a perfect effect. When $0.7 < r < 1$, the relationship is interpreted as strong. When $0.5 < r < 0.7$, the relationship is considered moderate. When $0 < r < 0.5$, the relationship is considered weak. An $r = 0$ indicates no effect or no relationship between the variables.

Linear regression model estimation covered indicators in the conceptual framework. The coefficient measured effect size within the following regression equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:

Y = Performance of Project

X_1 = Community involvement in planning

X_2 = Community involvement in implementation

X_3 = Community involvement in monitoring and evaluation

β_0 = Constant Term

$\beta_{1,2,3}$ = Beta Coefficient, indicating the change in the dependent variable for each standard deviation increase in the independent variable.

3.5 Ethical Considerations

Several ethical considerations were implemented during the study to ensure a smooth data collection process. The researcher secured permission from respondents before they participated in the study, including requesting authorization from relevant authorities. Confidentiality and privacy were ensured by safeguarding respondents' identities and ensuring that their views were collected and used purely for academic purposes. Respondents participated freely and without coercion.

4. Results and Discussion

Inferential statistics are used in this study to draw conclusions and make predictions about the relationship between community involvement and project performance. This section focuses on correlation analysis to determine the strength and direction of the relationship between variables, as well as multiple regression analysis to assess the combined effect of independent variables on the dependent variable. Specifically, the analysis evaluates how community involvement in the initial, implementation, and monitoring and evaluation phases influences the performance of the Green Amayaga Project in Ruhango District.

4.1.1 Correlation Analysis

Correlation analysis is conducted to measure the degree of association between the independent variables and the dependent variable. Using the Pearson Correlation Coefficient (r), the study identifies whether a positive or

negative relationship exists and whether that relationship is statistically significant at a p-value of 0.05. This analysis is fundamental in understanding how changes in community participation levels relate to changes in the performance of the Green Amayaga Project.

Table 1: Correlation

		Community involvement in planning	Community involvement in implementation	Community involvement in M&E	Performance of Project
Community involvement in planning	Pearson Correlation	1	.537**	.664**	.691**
	Sig. (2-tailed)		.000	.000	.000
	N	189	189	189	189
Community involvement in implementation	Pearson Correlation	.537**	1	.702**	.775**
	Sig. (2-tailed)	.000		.000	.000
	N	189	189	189	189
Community involvement in M&E	Pearson Correlation	.664**	.702**	1	.781**
	Sig. (2-tailed)	.000	.000		.000
	N	189	189	189	189
Performance of Project	Pearson Correlation	.691**	.775**	.781**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	189	189	189	189

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field data, 2026

The results in Table 1 indicate the correlation between community involvement in the initial (planning) phase and the performance of the Green Amayaga Project. The Pearson correlation coefficient is 0.691, which represents a strong positive relationship between the two variables. Since the significance value is 0.000, which is less than the 0.05 threshold, the relationship is statistically significant. This suggests that as community engagement increases during the planning stage, the performance of the environmental project also improves significantly.

The findings in Table 1 indicate the relationship between community involvement in the implementation phase and the performance of the Green Amayaga Project. The analysis shows a Pearson correlation coefficient of 0.775, indicating a very strong positive association. The sig. value of 0.000 confirms that this correlation is statistically significant at the 0.05 level. Therefore, active participation of the community during the actual execution of tasks is a major driver of project success in Ruhango District.

The results in Table 1 indicate the correlation between community involvement in the monitoring and evaluation (M&E) phase and project performance. The coefficient is calculated at 0.781, showing the strongest positive relationship among the three phases. Because the p-value is 0.000, it falls below the 0.05 significance level, proving that the association is highly significant. This indicates that involving the community in tracking progress and assessing outcomes leads to much higher performance levels for the Green Amayaga Project.

The correlation results demonstrate that all three phases of community involvement have a strong and positive relationship with project performance. The high coefficients and significant p-values indicate that community participation is a vital factor in the success of environmental initiatives. This confirms that the Green Amayaga Project thrives when local residents are engaged from the start until the final evaluation.

The correlation analysis shows that all phases of involvement are strongly linked to project success. This matches the findings of Tugirimana and Dushimimana (2024), who reported a strong positive relationship between community involvement and project achievement in Rwanda. The data suggests that as participation increases across the project lifecycle, the quality and timeliness of the environmental outputs also improve significantly.

4.1.2 Multiple Regression Analysis

Regression analysis is used to determine the extent to which the independent variables predict the performance of the Green Amayaga Project. This section includes the Model Summary, which shows the overall fit of the model; the ANOVA table, which tests the statistical significance of the regression model; and the Coefficients table, which evaluates the individual contribution of each phase of involvement. These tests help in making an informed decision regarding the research hypotheses and the predictive power of the community involvement variables.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.864[a]	.747	.743	.186	1.563

a. Predictors: (Constant), Community involvement in M&E, Community involvement in planning, Community involvement in implementation

b. Dependent Variable: Performance of Project

Source: Field data, 2026

The findings in Table 2 indicate the model summary for the effect of community involvement on the performance of the Green Amayaga Project. The value of R is 0.864, showing a very strong overall correlation between the independent variables and the project performance. The R Square value of 0.747 implies that 74.7% of the variance in project performance can be explained by community involvement in the planning, implementation, and M&E phases. The remaining 25.3% is explained by other factors not included in this model. Additionally, the Durbin-Watson statistic of 1.563 falls within the acceptable range of 1.5 to 2.5, suggesting there is no serious autocorrelation in the data. These results confirm that the chosen independent variables are highly relevant for predicting the success of environmental projects in Ruhango District.

The results suggest that a very high proportion of the changes in project performance can be attributed to the combined effect of community involvement in the planning, implementation, and monitoring stages. This is consistent with the views of Mujawarurema (2023), who noted that collective engagement explains a significant variation in the success of development projects when beneficiaries are involved from the design stage. Similarly, Nkunda (2021) emphasized that participation levels serve as the primary drivers for sustainability, ensuring that project outcomes remain relevant to the target population.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.858	3	6.286	184.882	.000[b]
	Residual	6.380	185	.034		
	Total	25.239	188			

a. Dependent Variable: Performance of Project

b. Predictors: (Constant), Community involvement in M&E, Community involvement in planning, Community involvement in implementation

Source: Field data, 2026

The results in Table 3 indicate the ANOVA summary used to test the overall significance of the regression model. The F-statistic is 184.882, which is a very high value, indicating a strong model fit. The significance value is 0.000, which is well below the p-value of 0.05, proving that the model is statistically significant. This means that the combined effect of community involvement in planning, implementation, and M&E is a reliable predictor of project performance. Therefore, the regression model is appropriate for drawing conclusions about the Green Amayaga Project in Ruhango District.

The analysis indicates that the overall regression model is statistically significant and provides a reliable framework for predicting the performance of the Green Amayaga Project. Asmamaw and Mekonnen (2023) argue that structured participation models are scientifically reliable for explaining the success of watershed development and environmental protection. Furthermore, Rukundo and Gachiri (2024) found that incorporating community feedback into the project management model provides a significant fit for measuring outcomes in water and environmental sanitation projects.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.364	.175		2.080	.039		
	Community involvement in planning	.233	.045	.256	5.178	.000	.549	1.820
	Community involvement in implementation	.415	.053	.411	7.830	.000	.498	2.008
	Community involvement in M&E	.278	.051	.323	5.451	.000	.391	2.558

a. Dependent Variable: Performance of Project

The findings in Table 4 indicate the coefficient analysis for community involvement in the planning (initial) phase. The unstandardized coefficient (B) is 0.233, which means that for every unit increase in planning involvement, project performance increases by 0.233 units. The t-value is 5.178 with a sig. value of 0.000, indicating that this phase has a significant individual effect on the performance of the Green Amayaga Project. Furthermore, the VIF of 1.820 is less than 10, showing that there are no multicollinearity issues for this variable. Based on these results, the null hypothesis H01 is rejected, confirming that involvement in the initial phase significantly affects project performance.

Regarding the initial phase, Ara et al. (2024) observed that early community inputs during the planning stage improve project relevance and lead to clearer activity schedules. This is further supported by Igirimbabazi and Amolo (2025), who concluded that joint target setting and participatory scheduling clarify expectations and reduce conflicts during implementation. This variable aligns with Stakeholder Theory, which suggests that inclusive governance and sustained dialogue during the planning phase strengthen coordination and reduce resistance from the local community (Freeman & Phillips, 2022).

The results in Table 4 indicate the impact of community involvement in the implementation phase on project performance. This variable has an unstandardized B of 0.415, suggesting it has the largest influence on the performance of the Green Amayaga Project among all variables. The t-value is 7.830 and the sig. value is 0.000, which confirms a highly significant statistical effect at the 0.05 level. The Collinearity Statistics show a VIF of 2.008, indicating that this variable is independent and suitable for the model. Consequently, the null hypothesis H02 is rejected, as implementation involvement clearly drives project success in Ruhango District.

For the implementation phase, Syamsiyah et al. (2025) noted that joint supervision and labor contribution during the execution of tasks enhance the functionality of shared environmental facilities. Esau (2022) added that active participation in daily operations reduces project breakdowns and ensures more timely repairs. This phase is best explained by the Resource-Based View (RBV), where Barney and Mackey (2022) argue that internal community capacities, such as trust and coordination, are rare and valuable resources that determine project success more than external conditions.

The findings in Table 4 indicate the individual contribution of community involvement in the monitoring and evaluation phase. The B coefficient is 0.278, meaning that an increase in M&E involvement leads to a 0.278 increase in the performance of the Green Amayaga Project. The t-statistic is 5.451 with a p-value of 0.000, proving that this phase is a significant predictor of the dependent variable. A VIF value of 2.558 is well within the acceptable limit, confirming the absence of multicollinearity for this indicator. Therefore, the null hypothesis H03 is rejected, showing that M&E participation is crucial for environmental project performance.

In the monitoring and evaluation phase, Mwangangi et al. (2024) found that joint inspections and participatory tool design lead to better adherence to quality and time commitments. Rukundo and Gachiri (2024) also concluded that involving beneficiaries in tracking progress ensures that project information remains accurate and the outcomes are sustainable. This variable is supported by Participatory Development Theory, as Cleaver and Whaley (2024) emphasize that performance continuity depends on collective observation and adaptive learning where local actors manage the feedback process.

The coefficient analysis reveals that all three independent variables are significant predictors of the performance of the Green Amayaga Project. Implementation involvement has the most substantial impact, followed by M&E and planning phases. The low VIF values across all variables ensure that the regression results are stable and reliable for decision-making.

The multiple regression model used for the study is expressed as:

$$Y = 0.364 + 0.233X_1 + 0.415X_2 + 0.278X_3$$

Where:

Y = Performance of Green Amayaga Project

X_1 = Community involvement in initial phase

X_2= Community involvement in implementation phase

X3 = Community involvement in monitoring and evaluation phase

4.2 Summary of Hypotheses Testing

The following table summarizes the decisions made regarding the research null hypotheses based on the inferential analysis conducted above.

Table 5: Decision on Research Null Hypotheses

Null Hypothesis	Sig. Value	Decision
Community involvement in initial phase has no significant effect on performance of Green Amayaga Project.	0.000	Rejected
Community involvement in implementation phase has no significant effect on performance of Green Amayaga Project.	0.000	Rejected
Community involvement in monitoring and evaluation phase has no significant effect on performance of Green Amayaga Project.	0.000	Rejected

The results in Table 5 indicate the final decision on the three null hypotheses tested in this study. For H01, H02, and H03, the significance values were all 0.000, which is significantly lower than the 0.05 level. This led to the rejection of all three null hypotheses, confirming that community involvement in every project phase has a statistically significant effect on the performance of the Green Amayaga Project. The findings highlight the critical role of community participation in achieving the desired environmental outcomes in Ruhango District.

5. Conclusion and Recommendations

5.1 Conclusion

The study concludes that involving the community during the initial planning stage is essential for performance of Green Amayaga Project. Identifying community needs and allowing residents to contribute their viewpoints ensures that the environmental objectives align with local realities. This early engagement creates a strong foundation that prevents future resistance and improves the overall quality of project delivery.

The research concludes that participation during the implementation phase is the most influential factor in determining the performance of Green Amayaga Project. Clear communication of roles and effective task coordination among community members lead to the timely and efficient completion of activities. Active involvement during execution ensures

It is concluded that community participation in monitoring and evaluation activities enhances the transparency and performance of Green Amayaga Project. Regular progress reporting and the integration of community feedback allow for necessary adjustments that keep the project on track. This inclusive approach to assessing results ensures high levels of beneficiary satisfaction and long-term project performance.

The study concludes that community involvement across all phases planning, implementation, and evaluation is a primary driver of performance of Green Amayaga Project. The high explanatory power of the regression model confirms that environmental projects in Ruhango District cannot succeed without the active participation of local stakeholders. Therefore, holistic community engagement is required to achieve high-quality, timely, and satisfactory project results.

5.2 Recommendations

Based on the study findings, the following recommendations are provided to improve the effectiveness of the practices examined.

1. Project managers should prioritize stakeholder engagement meetings during the initial phase to ensure all community voices are heard before activities begin.
2. Authorities should establish clear and simple communication channels to ensure that task instructions reach community members in understandable formats.
3. The Green Amayaga Project leadership should increase the frequency of progress reporting to keep the community informed and motivated.
4. District officials should implement policies that mandate the inclusion of community members in decision-making committees for all public environmental projects.
5. Project evaluators should create structured platforms for feedback integration where community members can suggest improvements based on their daily experiences.

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