

# Environmental Impact Assessment Process and Performance of Sustainable Development Project in Rwanda

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**Abstract:-** This study investigated how environmental impact assessments influence the performance of sustainable development projects in Rwanda. Aside from ascertaining the effect of the screening process on the performance of the Green Gicumbi Project sustainable development project, evaluating the effect of the scoping process on the performance of the Green Gicumbi Project sustainable development project, evaluating the effect of the baseline study on the performance of the Green Gicumbi Project sustainable development project, and assessing the effect of Green Gicumbi Project monitoring on the performance of the sustainable development project, The study's sample would be chosen using purposeful sampling. The study collected information using documentary research and a questionnaire. The information obtained was analyzed using SPSS Version 21 by the researcher. The researcher employed both descriptive and correlational analysis in this approach. The results indicate a model summary for monitoring, screening, scoping, a baseline study, and the performance of the Green Gicumbi Project. The value of R was 0.872, the R square was 0.760, and the adjusted R square was 0.749, indicating that the Green Gicumbi Project performed well in monitoring, screening, scoping, and baseline studies at 74.9%. The results show an analysis of variance between the independent variable and the dependent variable with  $F = 69.762$  and a p value of 0.000 less than 0.05, indicating that regression was significant as monitoring, screening, scoping, and baseline study are good predictors of the performance of the Green Gicumbi Project. As a result, the researcher chooses an alternative hypothesis while rejecting the null hypothesis. The Green Gicumbi project should develop and implement a robust monitoring program that includes appropriate sampling and analysis methods as well as regular site visits and inspections.

## I. INTRODUCTION

The National Environmental Policy Act of 1970 (NEPA) spawned the EIA process in the United States. EIA is the method of evaluating investment activities for their possible environmental impacts before making choices about whether or not to implement them and developing appropriate responses to any problems highlighted. To show people that a lot of the proposed undertaking's environmental issues were discovered and corrected before the program was completed, NEPA mandates that federal

agencies submit EISs for works within hisher authority (Morgan, 2012).

Scholars such as Bond and Pope (2012); Kolhoff (2016) believe that environmental protection and sustainable development are now the primary goals of EIA, and that the SDGs, with their seventeen integrated goals and 169 specific targets and 232 indicators, are the means by which this goal is to be achieved (Woolbridge, 2015).

To accomplish the SDGs, we must identify the social, environmental, and economic issues collaboratively, with a focus on encompassing, participatory development which leaves no one behind. Environmental impact assessment (EIA) systems in Azerbaijan (as well as in Armenia and Georgia) were assessed as part of a project called Assessment of the Effectiveness of Environmental Impact Assessment Systems in South Caucasus States. Different aspects of the system were examined throughout the course of the project in order to assess Azerbaijan's EIA system's effectiveness and make recommendations on how to improve it (UN, 2019).

Despite the fact that EIAs differ from country to country, significant progress has been made in Africa's EIA development over the last decade. More than a half dozen states got some form of EIA provision incorporated in their environmental legislation. Egypt, Ghana, South Africa, Zambia, Senegal, Côte d'Ivoire, and Togo are just few of the countries in Africa where EIA regulations have been included into overarching statutes. These are then put into effect by means of detailed rules and regulations. In light of the continent's many social, economic, and environmental problems and in expectation of the potential advantages, almost all African governments have adopted EIA systems. But they're from EIA skills and actions from developed nations. More comprehensive and long term approaches to environmental impact assessment (EIA) that directly benefit African communities and improve their standard of living are still needed (Benjamin & Godfred, 2013).

Taako, Keimo, and Amanda (2020) checked the institutional, lawful, and based predictive for EIA in Uganda, as well as related literature and EIA files such as EIA reports, to identify capacity and exercise issues. Inadequate state involvement and follow up, limited stakeholder capacity, political meddling, a lack of SEA practices, and failure to embrace EIA in a transboundary

context were all found to be reasons for the gap between law and practice.

Rwanda Environmental Management Authority was the vehicle through which the EIA concept was first introduced to the country (REMA). REMA was established in accordance with Article 64 of Organic Law No.04/2005 of 08/04/2005 to rule and supervise all subjects of environmental control for long term growth in the country.

Rwanda's Environmental Impact Assessment (EIA) system was evaluated and analyzed by Nkundabose (2020), focusing on the EIA process and methodology, highlighting some of the challenges of EIA practice, and making recommendations. It was necessary to conduct a thorough investigation of the legislative and administrative framework in order to properly evaluate the work. In Rwanda, environmental impact assessments (EIAs) help to ensure that development projects are both financially viable and environmentally sound. It is suggested that environmental government agencies strengthen environmental monitoring and audits in order to meet the implementation challenge. The study's findings could be used to improve EIA performance in other developing countries around the world.

## II. REVIEW OF RELATED LITERATURE

### ➤ *Environmental Impact Assessment Process*

Every new proposal or operation must undergo an environmental impact assessment in order to determine whether it will have significant effects on the physical biological, cultural, and socio economic characteristics of a given area (Ripple, 2017).

The EIA procedure is used to disclose to the public and decision makers the environmental impacts of a proposed program. The Environmental Impact Assessment report is a professional instrument for identifying, forecasting, and analyzing environmental, social, cultural, and health consequences. If an EIA is done well, it will find ways to lessen a project's negative effects on the environment. By encouraging openness and public participation, the EIA procedure also plays a crucial operational part in decision making generally (Smilka, 2018).

### ➤ *Screening*

Mackinnon (2018) It is essential to the overall EIA process that projects be relevant to screening and determine whether or not EIA is essential. According to most EIA systems, the competent authority conducts the first formal examination of a project's environmental impacts. EIA screening is the procedure of identifying whether or not an EIA is required. The procedure is used to assess if a proposed project will have a significant environmental impact. It must be done at the beginning of the project's design.

### ➤ *Scoping*

Scoping is the process through which the kind and extent of the environmental data required for submission to the relevant authority in the event of a required EIA are established. By scoping, we mean to determine which project issues should be addressed in an impact assessment (IA) and how much steps need to be taken to fix these problems (Elliott, 2014).

### ➤ *Baseline study*

An environmental baseline study is a study of the area's current state prior to the project's begin. As a baseline from which the project's results can be compared, this research serves its intended purpose. Like a principle, a baseline study is needed for project proposals in which cultural historic sites are identified or where powerful facts show that their existence is highly probable. Environmental Baseline Surveys characterize a space of prior to the enhancement of a program and make its initial environmental status (Hanna, 2011).

### ➤ *Monitoring*

Systematic sampling of air, water, soil, and biota is used in environmental monitoring to keep tabs on the environment and learn more about it. To compare predicted and actual effects, monitoring is necessary, especially if the impacts are large or difficult to estimate accurately. When environmental issues are discovered early enough, they can be addressed before they become a major problem. Evaluation of a program in linkage to a predetermined plan is called monitoring. It's a project control tool that gives real time response on the program's progress, determining potential performance and setbacks that could be needed to provide informed decisions at the right time (Mohammed, 2018).

### ➤ *Sustainable development*

Sustainable development is concerned with meeting the requirements of the present without compromising the ability of next generations to meet their own fundamental wants. To achieve long term economic and environmental stability, Decisions pertaining to sustainable development (SD) must take economic, environmental, and social factors into account (Emas, 2015).

### ➤ *Project Performance*

Literature reviews reveal that project performance is a complex notion with several facets. Academics and experts in the field of project management have examined it from a variety of perspectives. Some research, as reviewed by Kariuki (2015) equates successful project performance with meeting or exceeding all project objectives, including those related to time, money, and client satisfaction.

The financial plan for the program serves as a fixed cost baseline. When creating a budget, it is common practice to make educated guesses about how much time and money will be needed to complete certain phases of the work. If you want to save costs on assignment, you'll either have to narrow its focus or extend its timeline (Smith, 2016).

### III. RESEARCH METHODOLOGY

➤ *Research design*

From Soeters (2014), a survey plan is a detailed blueprint that directs a survey to its goals. Study plan is the glue that makes the research project around each other. Descriptive and explanatory survey plans would be needed.

The quantitative method would be based on the quantification of variables with frequency, percentages, mean and standard deviation for analysis of respondents views, correlation and regression for relationship between variables.

➤ *Data collection instruments*

For the study's success, specific questions used to investigate each of the goals. Research would be using the following data gathering methods:

➤ *Documentation technique*

The researcher used some files during the documentary analysis process and, after determining their relevance to this survey, categorized the information on paper before typing it into a digital file for synthesis. It's important for viewers, thus it delves into the works and tries global perspectives to provide a comparative framework for research and evaluation.

➤ *Questionnaire technique*

The questionnaire, from Chareen (2016), is a set of queries which is often sent or hand delivered to the responder. The inquiry could include structured questionnaires. Closed ended questions enable responders to choose from a limited number of possibilities. As a response, collectors would be restricted to answering a single question or choosing from a selection of options. Closed ended questions offer the benefit of being able to compare replies from person to person and being consistent. Because they're easier to code and evaluate, they might frequently be programmed immediately from the study, maintaining both time and money. Those who react often understand the significance of the question and the response it requires.

➤ *Data analysis*

The researcher used SPSS Version 21 to evaluate the gathered info.

Multiple linear regression analysis was used to draw conclusions from the information collected in the research. The following regression analysis model was used;  
 $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$   
 Y is Performance of sustainable development project,  
 X<sub>1</sub> is the of Screening process, X<sub>2</sub> is the Scoping process,  
 X<sub>3</sub> is Baseline study and X<sub>4</sub> is Monitoring.

### IV. RESEARCH FINDINGS AND DISCUSSIONS

**Table 1: Correlation matrix**

		Project performance	Screening	Scoping	Baseline study	Monitoring
Project performance	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	93				
Screening	Pearson Correlation	.751**	1			
	Sig. (2-tailed)	.000				
	N	93	93			
Scoping	Pearson Correlation	.772**	.650**	1		
	Sig. (2-tailed)	.000	.000			
	N	93	93	93		
Baseline study	Pearson Correlation	.773**	.695**	.753**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	93	93	93	93	
Monitoring	Pearson Correlation	.680**	.690	.594**	.507*	1
	Sig. (2-tailed)	.000	.068	.004	.047	
	N	93	93	93	93	93

\*\* . Correlation's significant at the 0.01 level (2-tailed).

\* . Correlation's significant at the 0.05 level (2-tailed).

Table 1 reveals the link among the investigation's factors. The Pearson correlation coefficient was 0.751, and the findings revealed a significance level of  $p=0.000 < 0.05$ . This data shows that the screening procedure has a major impact on how well the Green Gicumbi Project performs. Results from a Pearson correlation analysis show a strong relationship between scoping and Green Gicumbi Program success, with a probability value of 0.000 (smaller than the significance threshold of 0.05) and a Pearson coefficient of 0.772. The Pearson correlation value was 0.773, indicating statistical significance at the  $p=0.000 < 0.05$  level. This points to a strong connection between the baseline study and Green Gicumbi Project outcomes. With a Pearson coefficient of 0.680 and a probability value of 0.000, both below the significance threshold of 0.05, the findings of the correlation show that monitoring has a strong relationship with the success of the Green Gicumbi Program.

**Table 2: Model Summary**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate
1	.872 <sup>a</sup>	.760	.749	7.33612

a. Predictors: (Constant), Monitoring, Screening, Scoping, Baseline study

Table 2 shows model summary on monitoring, screening, scoping, baseline study and Performance of Green Gicumbi Project. R was 0.872, the R<sup>2</sup> was 0.760, and the adjusted R<sup>2</sup> of 0.749 i.e the success of Green Gicumbi Project by Monitoring, Screening, Scoping and Baseline study at 74.9%.

**Table 3: ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	15017.964	4	3754.491	69.762	.000 <sup>b</sup>
	Residual	4736.036	88	53.819		
	Total	19754.000	92			

a. Dependent Variable: Project performance  
b. Predictors: (Constant), Monitoring, Screening, Scoping, Baseline study

Source: Field data (2023)

Table 3 displays the results of an analysis of variance with a dependent variable of Green Gicumbi Project efficiency. The results show that monitoring, screening, scoping, and a baseline study are all important indicators of that efficiency, with F=69.762 and a p value of 0.000<0.05, respectively. The researcher then adopts a competing theory while rejecting the null hypothesis.

**Table 4: Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.050	5.494		4.013	.000
	Screening	1.376	.316	.328	4.358	.000
	Scoping	.916	.267	.289	3.433	.001
	Baseline study	.942	.282	.291	3.345	.001
	Monitoring	1.097	.348	.172	3.149	.002

a. Dependent Variable: Project performance

The following regression analysis model was used;  
 $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$   
 Y is Performance of sustainable development project,  
 X<sub>1</sub> is the of Screening process,  
 X<sub>2</sub> is the Scoping process,  
 X<sub>3</sub> is Baseline study,  
 X<sub>4</sub> is Monitoring,  
 β= Beta Coefficient,

Performance of sustainable development project = 22.050 + 1.376b(Screening process) + 0.916 (Scoping process) + 0.942 (Baseline study) + 1.097 (Monitoring) + 5.494

Table 4 on regression equation demonstrates that, despite the presence of other factors, the success of the long term growth program will always rely on a constant factor of 22.050. With all other factors held constant, the efficacy of the Green Gicumbi program would rise by a factor of 1.376 for every unit increase in the screening process. The efficiency of the Green Gicumbi initiative improves by a factor of 0.916 for every unit increase in scoping. Green Gicumbi project efficiency will improve by a factor of 0.942 for every unit increase in the baseline study. The efficiency of the Green Gicumbi initiative increases by a factor of 1.097 for every additional unit of monitoring.

Green Gicumbi project performance was shown to be significantly improved by implementing a screening process (p=0.000<0.05), scoping (p=0.001<0.05), baseline study (p=0.001<0.05), and monitoring (p=0.002<0.05). Thus, the study concluded that Ho<sub>1</sub>, which claimed that the screening procedure had no appreciable impact on the success of the Green Gicumbi sustainable development initiative, was false. Ho<sub>2</sub>: There is no statistically significant relationship between the scoping procedure and the success of the Green Gicumbi sustainable development project. Ho<sub>3</sub>: The Green Gicumbi sustainable development project's baseline research had no statistically meaningful impact on success. Also the researcher rejected the fourth hypotheses (Ho<sub>4</sub>) stated that there is no statistical significant effect of monitoring on performance of Green Gicumbi sustainable development project.

**V. CONCLUSION**

The general objective was to examine the effect of environment impact assessment process on performance of sustainable development project in Rwanda. Analysis of variance among independent variable and dependent variable was significant as monitoring, screening, scoping

and baseline study are good predictors of performance of Green Gicumbi Project.

Hereby, investigator rejected the hypothesis (Ho1) stated that screening process has no statistically significant effect on success of Green Gicumbi sustainable development project. The second hypothesis (Ho2): Scoping process does not have statistical significant effect on performance of Green Gicumbi sustainable development project. The third hypothesis (Ho3): there is no statistical significant effect of baseline study on performance of Green Gicumbi sustainable development project. In addition, the researcher rejected the fourth hypotheses (Ho4) stated that there's no statistical significant effect of monitoring on performance of Green Gicumbi sustainable

### RECOMMENDATIONS

Management should evaluate alternatives to the proposed project, including alternative locations, technologies, and designs. This can help to identify options that may have lower environmental impacts or be more socially acceptable.

### SUGGESTION FOR FURTHER STUDIES

Sure, here are three suggestions for further studies on the role of Environmental Impact Assessment (EIA) and project performance: conduct long term monitoring of project performance to study the effectiveness of mitigation measures and the accuracy of EIA predictions. Conduct comparative studies of projects that have undergone EIA and those that have not. Conduct studies to evaluate stakeholder perceptions of EIA and its impact on project performance in Rwanda.

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