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Influence of Agricultural Project Management Practices on Agricultural Production: Case Study of Musanze District, Rwanda

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Abstract

This study aimed to evaluate the performance of agricultural projects and their subsequent impact on agricultural production in Musanze District, Rwanda. The research primarily focused on the analysis of environmental impacts linked to these agricultural projects, with a particular emphasis on resource consumption. In addition, the study explored the influence of project planning, monitoring, and evaluation on the performance of these agricultural projects within Musanze County. The research encompassed a sample size of 120 participants, which included members of the district agricultural unit, farmers from Musanze, managers and employees of agricultural projects, as well as beneficiaries of these projects. The sample size was determined using Slovin's formula, resulting in a final count of 92. The researcher employed a purposive sampling approach, selecting individuals with similar qualities and information relevant to the study. Data were collected through documentary studies, interviews, and questionnaires. To analyze the collected data, the researcher utilized the Statistical Package for Social Sciences (SPSS) to conduct descriptive and correlation analyses. This statistical approach enabled a comprehensive assessment of the gathered information and its implications for the performance of agricultural projects in Musanze District. The study used multiple regression analysis to explore the relationship between independent and dependent variables, specifically the impact of project management practices on agricultural production. The model was significant with an F statistic of 8.7 and a P value of 0.00. The adjusted R-squared was 0.937, indicating that the independent variables explained 93.7% of the variance in the dependent variable. The parameters related to project planning and project M&E were found to significantly influence agricultural production. The study emphasizes the importance of effective planning, implementation strategies, and robust monitoring and evaluation systems in enhancing agricultural production.

Keywords: *Agricultural Project, Management Practices, Agricultural Production, Musanze District, Rwanda*

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1.0 Introduction

According to the Food and Agriculture Organization (FAO) in 2019, an estimated 925 million people, which is about 14% of the world's population, are food insecure. Of these, 26% or 239 million are found in Sub-Saharan Africa. The Strategy to Revitalize Agriculture (SRA) in Nigeria has emphasized the importance of agricultural tasks in combating poverty among rural communities. One of the factors hindering agricultural productivity in various countries has been identified as the declining effectiveness of agricultural project practices. Successful projects require timely implementation, budget compliance, accountability, and the delivery of desired results (Karanja, 2020). Project performance, particularly in the agriculture sector, continues to receive significant scholarly attention. For example, the International Fund for Agricultural Development (IFAD) in 2019 reported that 50% of the projects evaluated in 2017, including those in the agricultural sector, were rated as moderate. Even the best-planned projects, designed for effectiveness, may fail to yield good performance in community-based agriculture projects if they are not successfully implemented to achieve sustainability.

A UNDP Evaluation (Mugabe & Kanda, 2018) notes that many factors influence the success of community-based projects, including planning and the systems or mechanisms in place for coordination and control. Monitoring & Evaluation support involves providing materials, champions for advocacy and surveillance effectiveness, assets, and ICTs (Kusek & Ray, 2016). Organizations need leadership that supports, recognizes, and appreciates Monitoring & Evaluation functions and the use of Monitoring & Evaluation data to enhance project performance. Project success can be considered achieved once the project's sustainability has been realized. Nuguti (2019) states that project success is immensely difficult in developing countries due to inherent challenges. However, despite these challenges, almost all developed countries view Monitoring and Evaluation as important tools for line management within individual government ministries, and for enhancing sound accountability and surveillance in relationships between the government, Parliament, and civil society (Mackay, 2018). For Monitoring & Evaluation systems to be useful, they should be driven by demand and not by supply. Performing agricultural projects must contribute to resolving the problems that continue to persist and paralyze the agriculture projects. Performance, which is considered fundamental and crucial, involves completing the project on time, within budget, and meeting product specifications. As Rwanda transitions into a knowledge-based economy, agriculture remains the backbone for sustained economic growth, providing high-quality livelihoods and living standards for the population. In this perspective, Rwanda's agriculture is central to growth.

1.1 Statements of the Problem

Over the past three decades, numerous agricultural projects have been initiated in the country. Despite the significant expenditure of taxpayers' and donors' funds, most of these projects have not been successfully completed (FAO, 2016). This is in spite of the fact that agriculture remains a vital sector for national development. Notably, its contribution has declined from 4.7% to just under 2% in the last three years. Despite the existence of private, government, and non-government agricultural projects, many beneficiaries still suffer from poverty and starvation. This is not solely due to unpredictable weather patterns, but also poor planning, inadequate evaluation, and a lack of appropriate technical assistance for farmers. This study aims to address this gap by evaluating various components that can impact the performance of agricultural projects in Rwanda, with a

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specific focus on a non-government project operating in the Musanze district. In addition, this study examines the contribution of agricultural projects to household income generated from farm production. Addressing these issues is crucial for enhancing agricultural production and improving the performance of agricultural projects in the Musanze District, Rwanda. Effective and targeted interventions are needed to overcome these challenges and promote sustainable agricultural development in the region.

1.2 Objective of the Study

To assess the influence of agricultural project management practices on agricultural production in Musanze District, Rwanda.

1.2.1 Specific Objective

i. To establish the influence of project planning on agricultural production in Musanze District, Rwanda
ii. To find out the influence of project monitoring and evaluation on agricultural production in Musanze District, Rwanda.

1.3 Research Hypotheses

The followings are the hypotheses of the study formulated based on research objectives

$H0_1$: Project planning does not significantly influence the agricultural production in Musanze District, Rwanda.

$H0_2$: Project monitoring and evaluation does not significantly influence the agricultural production in Musanze District, Rwanda.

2.0 Literature Review

This literature review focuses on influence of project management practices on agricultural production of Musanze District, Rwanda. The review explores relevant studies and research articles that highlight the key factors influencing agricultural production and project management practices in the district as well as the conceptual framework among variable.

2.1 Theory of Change

The Theory of Change (ToC) is a management and planning approach that describes how The Theory of Change (ToC) is an approach to planning and management that outlines how change occurs and the necessary actions to achieve specific goals. Although the origins of the Theory of Change are hard to pinpoint, it's believed to have first been utilized by the social science community in the United States during the 1960s. In recent years, the Theory of Change has become a popular tool for planning and evaluation in the realms of international development, social innovation, and philanthropy. The ToC approach assists organizations and communities in defining their goals, identifying the steps required to attain them, and tracking progress towards their desired outcomes (Connell et al., 2020). This study will employ the Theory of Change (ToC) to aid in the planning, execution, and evaluation of projects. The ToC method is particularly beneficial for large, complex projects where it's crucial to understand what changes are occurring, why they're happening, and how they're unfolding. The ToC method will enable project managers to better comprehend the environment in which their projects operate and devise strategies that align more closely with the project's outcomes and objectives.

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2.2 Performance Measurement

Mbugua et al., (1999) and Love et al., (2000) have identified a distinction between performance indicators, performance measures and performance measurement. According to Mbugua et al., (1999), performance indicators specify the measurable evidence necessary to prove that a planned effort has achieved the desired result. In other words, when indicators can be measured with some degree of precision and without ambiguity, they are called measures. However, when it is not possible to obtain a precise measurement, it is usual to refer to performance indicators. Performance measures are the numerical or quantitative indicators (Sinclair and Zairi, (1995). On the other hand, performance measurement is a systematic way of evaluating the inputs and outputs in manufacturing operations or construction activity and acts as a tool for continuous improvements (Sinclair and Zairi, 1995; Mbugua et al., 1999).

In response to calls for continuous improvement in performance, many performance measurements have emerged in management literature. Some examples include: the financial measures (Kangari et al., 1992; Kay 1993; Brown and Lavenrick 1994; and Kaka et al., 1995), client satisfaction measures (Walker, 1984; Bititci, 1994; Kometa, 1995; Harvey and Ashworth, 1997; and Chinyio et al., 1998), employee measures (Bititci, 1994; Shah and Murphy, 1995; and Abdel-Razek, 1997), project performance measures (Belassi and Tukel, 1996) and industry measures (Latham, 1994; Egan, 1998; Construction Productivity Network, 1998; and Construction Industry Board, 1998); as cited in (Mbugua et al., 1999). Cordero (1990) classifies performance measurement based on the method of measurement and area of measurement. The methods of measurement of performance can be in terms of the technical performance, the commercial performance and the overall performance.

2.3 Project Monitoring and Evaluation on Agricultural Production

The application of Monitoring & Evaluation results is a major determinant of project sustainability and it results from good planning, project implementation based on requisite capacity and informed decisions based on sound and relevant data (Mackay, 2017). Further, Mackay (2017) notes that Monitoring & Evaluation data provides a basis to feed back into the projects, improve policy analysis and policy development and aid in project and managerial activities. This enhances transparency, surveillance and project success. Capacity building can bridge the gap between planning and data demand and use. If officials and, indeed, farmers are deficient in capacity project success have been most likely be negatively impacted. Therefore, it is important to identify and deal with this to ensure efficiency and effectively. The aim of agriculture project was basically to increase agricultural production and to reduce poverty particularly in poorer countries where the majority of people depends on agriculture for their livelihood (Postiches, 2016). Although farmers in Rwanda have got a well-developed agricultural research system, use of modern science and technology in agricultural production is still limited.

2.4 Project Planning on Agricultural Production

Most farmers lack information on the appropriate type of farm inputs to use and the correct timing for their application. The cost of essential inputs such as seeds, pesticides, and fertilizers are high, making them inaccessible for many farmers. This lack of access significantly reduces their yield (MINAGRI, 2018). According to research by Karangwa et al. (2019) on the role of project management practices in the performance of agricultural projects, these projects are used as a

means to alleviate poverty, poor health, and unemployment, which are prevalent in many developing countries' rural areas. Agriculture plays a significant role in the global economy. However, the performance of the agricultural sector remains crucial as an estimated 815 million people worldwide are still affected by chronic hunger, and millions more live in poverty. In developing countries, the agricultural sector is far from perfect. More than 800 million people are undernourished, and poverty and food insecurity persist not only in sub-Saharan Africa but also in emerging Asian countries.

The performance of agricultural initiatives varies from one country to another. Research conducted by Pulse indicates that fewer projects globally are completed within budget or meet original goals and business intent. There is a critical need to improve both project and business results. The study shows that 55% of projects are completed within the original budget, 51% are completed on time, and 32% of the budget is lost on failed projects. Many developed and developing countries have invested in agricultural projects. In some developed countries like the U.S.A, the government places a high emphasis on the performance of agricultural projects through the Ministry of Agriculture. In developing countries like Ghana, there is a high allocation of resources to agricultural projects to achieve performance.

This high allocation of resources is due to the vital roles that agricultural projects play in the lives of the inhabitants. These roles range from enhancing food security, creating employment, generating foreign exchange, supplying raw materials for industries, contributing to poverty reduction, and supporting environmental sustainability, among others. Rwanda's economy heavily depends on the agriculture sector, which serves as the basis for the development of other sectors. The agriculture sector directly contributes to the Gross Domestic Product (GDP) and is the main economic activity in Rwanda, with 70% of the population engaged in the sector and around 72% of the working population employed in agriculture. The agricultural sector accounts for 33% of the national GDP. In general, Rwanda's GDP has been growing at a rate of 7% since 2014. The most cultivated products in Rwanda are plantains, cassava, potatoes, sweet potatoes, corn, and dry beans.

2.5 Performance Measurement

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3.0 Research Methodology

The research employed Slovin's formula size calculation to select as sample of 92 respondents from targeted population of 120 individuals. Data was collected using a combination of questionnaires with both open and closed-ended questions, as well as face-to-face interviews, particularly for respondents who did not have time to complete the written questionnaires. The primary data was then edited, coded, and entered into MS Excel and SPSS for quantitative analysis and statistical generalization, while qualitative information was presented in a narrative form to complement the quantitative findings.

4.0 This Research Findings

In this chapter, the researcher presented, analyzed and interpreted the data relating to the objective of his research.

Table 1. Descriptive Statistics on Project planning

Statements	SD%	D %	N%	A %	SA %	Mean	Std
The project has a written plan which has clear objectives	13	6.5	22.8	17.4	40.23	3.65	1.4
The written plan shows the farm activities like planting, weeding and fertilizer are all performed	3.3	1.1	27.2	47.8	20.7	3.81	0.88
The plan also show how money is allocated on every farm activity set e.g., farm preparation, Planting, weeding, harvesting	12	12	14.1	18.5	43.5	3.69	1.43
The number of packets of farm inputs like seeds, fertilizers are normally estimated.	13	6.5	21.7	18.5	40.2	3.66	1.43
The project instructors who train farmers have clear days and time allocated to visit and train farmers	12	12	14.1	18.5	43.5	3.69	1.43
The plan also demonstrates how the risks was dealt with if they occur.	13	6.5	22.8	17.4	40.2	3.65	1.4
Aggregate						**3.69**	**1.33**

The results in Table 1 show that respondents agreed with a mean of 3.65. This mean, ranging between 3.65 and 3.81, indicates a high agreement level and suggests that the project had a clear objective. The written plan, which respondents strongly agreed with (mean 3.81), outlines when farm activities such as planting, weeding, and fertilizer application were to be performed. Respondents also agreed (mean 3.69) that the plan shows how funds are allocated for each farm activity. They strongly agreed (mean 3.69) that the project instructors, who train farmers, have a clear schedule for visiting and training farmers. The number of packets of farm inputs like seeds and fertilizers for a particular project were estimated and allocated at a mean of 3.66. Results also indicated that respondents strongly agreed (mean 3.65) that risks like drought, security, and floods, which could potentially disrupt project performance, were always anticipated and included in the plan.

The aggregate mean score for project planning was 3.69, and the standard deviation was 1.33. This

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aggregate mean score, rounded to 3.69 on the five-point Likert scale used in the study, implies that respondents strongly agreed that concerns raised in project planning were addressed in the plan before starting the agricultural project. The mean score of 3.69 indicates a high mean and strong evidence of agreement among respondents. The aggregate standard deviation of 1.33, which is greater than 0.05, indicates a heterogeneity of responses, suggesting that responses ranged from strongly disagree to strongly agree.

Table 2. Descriptive Statistics on Monitoring and Evaluation

Statements	S D%	D%	N%	A%	SA%	Mean	St. Dev
The project is checked regularly by managers	14.1	8.2	29.4	9.4	38.8	**3.00**	**1.43**
There are clear records on farming activities kept in project group	14.1	6.5	25.0	18.5	35.9	**4.00**	**1.4**
The project coordinators regularly report the movement of the project to senior management	5.4	2.2	22.8	45.7	23.9	**4.00**	**1.00**
The supervision of planned farming activities is all done at the planned time	12.0	10.9	17.4	18.5	41.3	**4.00**	**1.41**
There are always management saves on expenditure e.g bringing management offices closer to the farmers	13.0	7.6	22.8	13.0	43.5	**4.00**	**1.43**
Any member who misses appropriate funds or farm materials is reported to management for disciplinary action against him/her as given in constitution	13.0	13.0	15.2	18.5	40.2	**4.00**	**1.43**
Aggregate						**3.83**	**1.35**

Result in Table 2 show a mean of 3.00 and respondents remain neutral for activities done in project are checked regularly by managers. Respondents to an agree (mean of 4.) for the following statements: are clear records on farming activities kept in group, there are clear records on farming activities kept in project group, the project coordinators regularly report the movement of the project to senior management, the supervision of planned farming activities is all done at the planned time, there are always management saves on expenditure e.g. bringing management offices closer to the farmers and any member who misses appropriate funds or farm materials is reported to management for disciplinary action against him/her as given in constitution. The aggregate mean score for monitoring and evaluation was 3.8 and standard deviation is 1.35. The aggregate mean score rounds off to a score of 4 on five-point Likert scale assumed by the study implies that on an agree respondents felt that was effective project monitoring associated with project performance of agricultural in the country and standard deviation of 1.35 indicates heterogeneous responses (from strongly disagree to strongly agree).

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This observation is an agreement with Woodhill (2007) who confirms that well-designed project M&E systems provide important data on project progress. Unfortunately, sometimes M&E has been abused by management in many cases that those judged with the observed and therefore misreport the project progress.

Table 3: Descriptive Statistics on Agricultural Production

Statements	SD%	D%	N%	A%	SA%	Mean	St.dev
In the most recent season, the average yield of each crop per unit of land area (e.g., tons/hectare, kilograms/acre) has improved accordingly.	12.0	12.0	14.1	18.5	43.5	**3.69**	**1.43**
There were any significant changes in your crop production levels over the past few years	13.0	6.5	22.8	17.4	40.2	**3.65**	**1.40**
Crop management practices do you follow to enhance crop productivity like fertilization, crop rotation, pest and disease control, soil conservation have a great impact on farm production.	4.3	2.2	27.2	46.7	19.6	**3.75**	**0.94**
The main factor, like climate conditions, pest and disease outbreaks, availability of inputs, irrigation practices, market demand influenced your crop production levels	12.0	12.0	14.1	18.5	43.5	**3.69**	**1.43**
In the most recent season, the agriculture gross income of each crop per unit of land area, significantly increased or improved	13.0	7.6	20.7	18.5	40.2	**3.65**	**1.40**
The measures taken to mitigate crop losses or damage caused by natural disasters or unforeseen events such as insurance, diversification, early warning systems were clearly applied before season start.	10.9	12.0	14.1	19.6	43.5	**3.72**	**1.40**
Aggregate						**3.69**	**1.33**

Table 3 shows that respondents agreed (mean 3.65) that yields had increased compared to traditional farming methods. The standard deviation of 1.40 (SD>0.5) indicates heterogeneous responses. Respondents also agreed (mean 3.75) that crop rotation occurred due to the intervention of those who provided training on good agricultural practices. The standard deviation of 0.95 (SD>0.5) again indicates heterogeneous responses. Further, respondents agreed (mean 3.65) that the level of crop production increased, with a standard deviation of 1.40 (SD>0.5), indicating a heterogeneous response. Respondents agreed (mean 3.72) that measures to mitigate crop losses or damage caused by natural disasters or unforeseen events, such as insurance, diversification, and early warning systems, were clearly applied before the start of the season. The standard deviation of 1.40 (SD>0.5) indicates heterogeneous responses. The aggregate mean scores for agricultural production are 3.69, with a standard deviation of 1.33 (SD 1.33). The aggregate mean score rounds

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off to a score of 4 on the five-point Likert scale adopted by the study, implying agreement among the respondents.

4.1 Regression Analysis

For determining the land scape of relationship between independent and dependent variables and to initiate the arithmetical connotation of the hypothesized relationships, multiple regression analysis was used. This was performed using the field data and tested at 5% level of significance. The discoveries of multiple regressions are obliged in table 4.

Table 4: Regression Results for the Impact of Agricultural Project Management

	Test Station	P-Value	
R-Squared	0.940		
Adjust R- Squared	0.937		
F. Statistics	8.7	0.00	
Regression Results			
	Coefficients	T-Statistics	P- Values
Project planning	0.915	11.154	0.00
Project M&E	1.44	2.268	0.00
Constant	0.154	1.381	0.171

Research findings in table 4 signpost that the adjusted R- squared was (0.937) meaning the independents variable jointly explain (93.7%) of discrepancies in the dependent variable while the rest are explained by variables not fitted into the model. This is in variable while the rest are explained by variables not fitted into the model. This is in agreement with studies presented by Child & McGrath (2001) which points out that project management practices are becoming increasingly important and extra work is organized. Through indentures and plug-ins.

The F statistic is (8.7) with. a corresponding P value of (0.00) which implies that the regression model is significant (P<0.05)

Y= 1.554+0.312 X1+0.1.44X2+0.260X3+0.91+E

All the four parameters were related to project management practice and the regression analysis directed that an upsurge in each of them would result in agriculture production. Importantly to impress serious planning methods, implementation strategies, strong M and E systems of project communication in management to enhance production. These findings are in agreement with Rambo & Mwangi 20016) also adds the want for agricultural extension officers to practice all and communication with farmers tom support decision, making by providing information on suitable farming practices.

4.2 Test of Hypothesis One

The first objective sought to determine the influence of project planning on agricultural production in the Musanze district, Rwanda. The null hypothesis, H01, stated that project planning does not significantly influence agricultural production in the Musanze District, Rwanda. Research findings in Table 4 showed that the significance coefficient of project planning was 0.915, and the p-value was 0.00 ($p<0.05$). Therefore, at a 5% level of significance, the null hypothesis was rejected, implying that project planning has a significant relationship with agricultural production. This suggests that, holding all other factors constant, a unit change in project planning leads to a 0.915 unit change in agricultural production in Rwanda. This is supported by a report by PMI (2004), which found that the planning phase is often considered an important activity that links a project to its implementation phase. It involves not just paperwork and thinking, but also many field activities.

This section tested the direct influence of project monitoring and evaluation (M&E) on agricultural production, the fourth objective that sought to examine how project M&E influences agricultural production in Rwanda. The null hypothesis, H04, was tested. The hypothesis stated that project monitoring and evaluation do not significantly influence agricultural production in the Musanze District, Rwanda. From research findings in Table 4, the coefficient of project M&E was 1.44, and the confirming p-value was 0.00 ($p<0.05$). This implies that at a five per cent level of significance, the null hypothesis H04 was rejected. The study concluded that project M&E has a positive relationship with agricultural production. Holding everything else in the model constant, a unit change in project M&E leads to a 1.44 unit change in agricultural production. This study aligns with Muller (2010), who found that monitoring and evaluation are recognized as key elements in understanding and effectively tracking and documenting the outcomes of development interventions. There is also a general consensus on the need to improve M&E in development work.

5.0 Conclusion

The study concludes that agricultural project management practices are a significant means to enhance agricultural production. The research questions that guided the study have been comprehensively addressed, with evidence supporting the conclusions drawn. The study focused on project management practices in agricultural production, specifically in the Musanze district, Rwanda. Regarding the first objective, the study found that project planning and implementation significantly influence agricultural production. These two variables are interlinked, as planning guides implementation, as shown in the literature review. The results of the multiple regression analysis on project planning and project implementation support the conclusion that these two variables significantly influence agricultural production. In addressing the third objective, the study found that project communication had a significant influence on agricultural production. Therefore, it can be concluded that project communication significantly influences agricultural production. This study provides a comprehensive understanding of the factors influencing agricultural production, offering valuable insights for future research and practice in the field.

6.0 Recommendations

The study found that young people were not involving in agriculture sector those implies that low number were resulted. On this case government should provide in rural areas all requirement that

young people need like sensitizing them on outcome from agriculture will not only improve their livelihood also will increase the level of gross domestic of countries.

The management have to embrace expected risks in their project plan and give possible mitigation methods and contingence funds set aside for risks are estimated and allocated. This will help to cup uncertainties that may reduce on yields.

Government organization and non-government should also increase grants as well project life cycle these will help agriculture beneficiaries better understanding the deliverables from the project implemented.

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