JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website:www.jriiejournal.com ISSN 2520-7504 (Online) Vol.9, Iss.1, 2025 (pp. 615 - 625)

Quality Management Practices and Performance of Agricultural Projects in Musanze District, Rwanda: A Case of Seed Potato Fund Ikigega Project

Racheal Phiona Wihogora & Amolo Elvis
University of Kigali
https://orcid.org/0009-0006-1017-4444
Email: wihogora30@gmail.com

Abstract: *Globally, the agricultural sector faces challenges such as climate change and resource depletion, necessitating robust quality management practices for sustainability. The purpose of this study was to evaluate the effect of quality management practices on the performance of agricultural projects in Rwanda. Data analysis involved descriptive and inferential statistics of correlation and regression analysis at a significance level of 0.05 through SPSS Version 25. The findings for first, ($H_0$1) that the quality planning does not influence the performance of Agricultural Projects was rejected since P=0.000<0.05, confirming that quality planning has a significant positive influence on performance of Agricultural Projects. Second, ($H_0$2) stating that quality planning does not significantly influence performance of Agricultural Projects was also rejected since P=0.000<0.05, indicating a significant impact of quality assurance on performance of Agricultural Projects. Third, ($H_0$3) that the quality control does not influence the performance of Agricultural Projects was rejected since P=0.000<0.05, suggesting that quality control has a significant positive influence on performance of Agricultural Projects. Finally, ($H_0$4) that the quality improvement does not significantly influence the performance of Agricultural Projects was similarly rejected since P=0.000<0.05, highlighting that quality improvement significantly contributes to improving performance of Agricultural Projects. The study concluded that the Seed Potato Fund Ikigega project exhibits strong quality management practices that significantly contribute to its success. The study recommended that there is a need of conducting comprehensive resource assessment and mobilization, implementing consistent training programs, and enhancing quality control measures.*

Keywords: *Quality Management Practices, Quality Planning, Quality Assurance, Quality Control, Quality Improvement and Performance of Agricultural Projects*

How to cite this work (APA):

Wihogora, R. P. & Amolo, E. (2025). Quality management practices and performance of agricultural projects in Musanze District, Rwanda: A case of seed potato fund Ikigega Project. *Journal of Research Innovation and Implications in Education, 9*(1), 615 – 625. **https://doi.org/10.59765/pvh2585rgu.**

1. Introduction

The current state of quality management practices in Rwandan agricultural projects still presents persistent challenges related to the implementation of robust quality management practices. These challenges manifest as variations in product quality, operational inefficiencies, and a potential hindrance to the overall performance of the projects (Mukamusoni, 2023). For instance, according to recent reports by the Ministry of Agriculture and Animal Resources in Rwanda, approximately 30% of agricultural produce is lost annually due to poor quality management practices (Rwanda Ministry of Agriculture, 2023). Additionally, a survey conducted by the Rwandan Farmers' Cooperative Association revealed that 65% of farmers reported experiencing quality-related challenges, such as inconsistent product quality and post-harvest losses, affecting their income and livelihoods (Rwanda Farmers'

Cooperative Association, 2022). These statistics highlight the pressing need for improved quality management practices in Rwandan agricultural projects to enhance productivity, reduce losses, and improve the livelihoods of farmers.

For agricultural projects to succeed, ensuring the highest standards of quality management practices is paramount. Effective quality management practices are crucial for optimizing agricultural processes and elevating project performance (Johnson *et al*., 2021; Ngabonziza &Uwimana, 2022). This entails implementing stringent quality control measures, standardized processes, and continuous improvement initiatives to guarantee the consistent production and distribution of agricultural products, increased productivity, and overall project success.

Despite the critical importance of quality management practices in agricultural projects, there is a noticeable lack of empirical studies specifically conducted in Rwanda. Existing literature predominantly focuses on global perspectives or other regions, and the application of these findings to the unique context of Rwanda may be limited. However, there is a notable dearth of empirical studies specifically focused on Rwanda's agricultural landscape. Existing literature predominantly offers global perspectives, and applying these findings directly to Rwanda may overlook the unique contextual nuances. This research seeks to fill this gap by conducting a localized study that delves into the effect of quality management practices on the performance of agricultural projects in Rwanda.

1.1 Research Objectives

The general objective of this study is to assess the effect of quality management practices on performance of agricultural projects in Musanze District, Rwanda.

1.2 Specific Objectives

1. To assess the effect of quality planning on performance of Agricultural Projects in Musanze District
2. To evaluate the effect of quality assurance on performance of Agricultural Projects in Musanze District
3. To examine the effect of quality control on performance of Agricultural Projects in Musanze District
4. To find out the effect of quality improvement on the performance of Agricultural Projects in Musanze District

2. Literature Review

2.1 Theory of Quality Management

Juran's theory of quality management, proposed by Joseph M. Juran in 1950, revolves around the concept of the Quality Trilogy, comprising quality planning, quality control, and quality improvement, which form the foundation of quality management practices (Juran, 1950). Quality planning, the first stage of the trilogy, emphasizes the importance of designing products, services, or processes in a manner that aligns with customer needs and expectations (Juran, 1950). Often referred to as Design for Six Sigma in modern contexts, this phase focuses on integrating quality into the design and development processes to ensure that the final output meets or exceeds customer requirements (Juran, 1950). Following quality planning, the next stage is quality control, which involves monitoring progress and evaluating performance against predefined standards or benchmarks (Juran, 1950). Effective quality control necessitates clear identification of key metrics and measures to assess goal attainment (Juran, 1950). Moreover, it involves detecting any deviations or gaps between expected and actual performance and implementing corrective actions to address these discrepancies (Juran, 1950).

2.2. Theory of Total Quality Management

W. Edwards Deming's Theory of Total Quality Management (TQM) has significantly transformed the way organizations perceive and implement quality improvement processes. Deming's 14 Points for Management serve as a comprehensive framework that encourages a holistic and sustainable approach to quality management. These principles are designed to instigate a cultural shift within organizations, emphasizing continuous improvement and quality in all facets of operations (Deming, 1986). One of the cornerstone principles of Deming's theory is creating constancy of purpose. Deming highlighted the necessity for organizations to adopt a long-term vision and unwavering commitment to quality improvement (Deming, 1986). Another critical aspect of Deming's theory is adopting a new philosophy. Deming posited that organizations must embrace quality as an intrinsic value, discarding outdated practices that obstruct progress.

Ceasing dependence on inspection is another fundamental principle in Deming's TQM. He argued that quality should be embedded into the processes themselves, rather than relying solely on inspections to identify defects (Anderson *et al.*, 1994). The principle of improving constantly is central to Deming's TQM philosophy. Deming advocated continuous improvement in all areas of an organization's operations, encouraging

a relentless pursuit of process, product, and service enhancements (Deming, 1986; Ugwu, 2023). Instituting training and education is another vital element of Deming's theory. He emphasized the critical role of continuous learning and development for employees (Deming, 1986; Murenga & Njuguna, 2020). Deming also highlighted the importance of driving out fear and breaking down barriers within organizations. He believed that creating an open and collaborative environment where employees feel valued and empowered is essential for fostering innovation and quality improvement (Deming, 1986; Alauddin & Yamada, 2019).

2.3. Empirical Review

Hamed *et al*. (2022) assessed the impact of quality management on project success. Employing a survey research design, data was collected using structured questionnaires. Proportional stratification, random sampling, and purposive sampling techniques were employed to select a sample size of 57 and 246 for finite and infinite populations, respectively, consisting of project managers and clients of construction firms registered with the Lagos Chamber of Commerce and Industry. Content validity was utilized to validate the questionnaire, with Cronbach's Alpha demonstrating reliability at $\alpha = 0.88$. Regression analysis was conducted for data analysis. The results revealed significant relationships between project quality management and client satisfaction. The study recommended that organizations with effective project quality management strategies are more likely to meet the needs of clients, ultimately leading to higher levels of client satisfaction.

Okombe *et al.,* (2023) assessed the influence of quality planning on project success among electricity supply infrastructure projects in Kenya. The study was anchored on the Deming cycle and the Iron Triangle theories. A descriptive study design was employed in this research.The study population was drawn from the Kenya Electricity Transmission Company staff, which implements electricity transmission projects in Kenya. A stratified sampling method coupled with Yamane's formula was employed to identify the sample size of 80 among the staff. 63 responses from the surveyed staff were obtained and used for the analysis translating to a 78.75% response rate. The findings showed that the study accepted the alternative hypothesis and concluded that there is a significant and positive influence of quality planning on project success. This study concludes that quality planning is a critical factor that enhances project success in electricity infrastructure projects.

Kimwaki (2023), investigated the influence of quality control and certifications on Performance of Manufacturing Firms in Kenya, the study used a descriptive approach, 160 respondents were surveyed through a structured questionnaire. The findings revealed that quality control and certification were essential in enhancing firm performance by enabling the companies to meet the quality standards and assure this to customers. The study concluded that failure by most of the companies to embrace quality control and certification affected their image and this significantly led to decline in their competitiveness and performance. The study recommended the need for management of manufacturing firms to embrace quality control and certification as a way of enhancing their performance through increased quality assurance to their customers.

Kaluyu *et al.,* (2022), assessed the influence of quality improvement practices on creative governance success inTier four public hospitals in Kenya. The study adopted a descriptive correlation research design. Thetarget population was 200 composed of Administrative officers and Mid-level employees from eachhospital. Collected information was analyzed using descriptive statistics such as frequencies and percentages.The hypothesis testing was done using linear regression analysis. Quality Improvement practices assessed entailed: Establishment of dedicated quality improvement teams, holding of regular quality improvement meetings, data collection and analysis and, monitoring to measure change. Overall, there is implementation of quality improvement practices to some extent in the Tier four hospitals in Kenya. Correlation analysis between quality improvement practices and creative governance indicated a strong positive significant relationship. Creative governance was measured by innovative ideas/products, creative designs of processes, learning new skills, attainment of organization goals, motivated staff and satisfied clients. On testing the study hypothesis, results showed that quality improvement practices influenced creative governance but to mere 55% in the case of these selected public hospitals. The study results therefore inform hospital managers on the need to pay more attention to quality improvement practices so that the hospitals may reap the benefits of creative governance which then leads to superior delivery of services.

3. Methodology

3.1 Research Design

The study adopted a descriptive and correlational research design to provide a thorough depiction of the current state of affairs.

3.2 Study Population

For this study, the target population includes 1,332 individuals composed of 32 project staff and 1300 beneficiaries of Seed Potato Fund Ikigega in Musanze District.

3.3 Sample size

The sample size was composed of 120 respondents who were selected from the project team and beneficiaries of

Seed Potato Fund Ikigega in Musanze District. Out of 32 project staff members, 27 were selected for the sample. This group represents the individuals directly involved in the implementation and management of the Seed Potato Fund Ikigega project. From a population of 1,300 beneficiaries, 93 were selected for the sample. For this study, the sample size is obtained by using the formula developed by Yamane, (1967).

$n=\frac{N}{1+N(e)^2}$
Whereby:
n=desired sample size
N=Target Population
e=error margin = 5%=0.05
By using the above formula, the following is obtained:
$n=\frac{1300}{1+1300(0.05)^2}$=93.86~93

3.4 Sampling Techniques

In this study, the researcher employed stratified sampling, purposive sampling and simple random sampling techniques. The stratified sampling was used to group the sample into two strata after which simple random sampling and purposive sampling was used. Purposive sampling was used to select 27 project staff members. Simple random sampling was employed to select 93 beneficiaries from the total population of 1,300. This technique gives each beneficiary an equal chance of being selected, ensuring that the sample is representative of the entire beneficiary population.

3.5 Sources of Data

Primary data was collected first-hand from the sampled respondents using structured questionnaires. During this study, primary data was used considering their main advantage that the exact information wanted is easily obtained. During this study, secondary data was sourced from journal articles, the internet, and newspapers which cover the area of study.

3.6 Data Analysis

The collected data and the information were verified to ensure that they are accurate, coded appropriately, tabulated, and analyzed through the Statistical Package for Social Sciences (SPSS) version 25 for easy management and longevity of the data. The collected data was analyzed using both descriptive and inferential statistics.. Descriptive statistics involved frequencies, percentages, means, and standard deviations derived from various data categories.

Inferential statistics included Pearson correlation and multiple regression analysis. The Pearson correlation coefficient was employed to establish statistical associations between variables. The interpretation was conducted at a 95 percent confidence level, with a significance level (α) set at 0.05. The simple regression analysis was done on individual independent variables represented by hypotheses $H_0$1, $H_0$2, $H_0$3 and $H_0$4 while multiple regression was done on the combined independent variable against dependent variable. In the multiple regression analysis, a comprehensive examination of the effect of independent variables on the dependent variable was conducted.
For example, the simple regression model for the first hypothesis took the form:
$Y= \alpha+\beta_1X_1+ ę$
Where:
Y= Project performance
α= Constant Term
X_1= Quality Planning
β= Beta Coefficient
ę=Error terms

The simple regression model for the second hypothesis took the form:
$Y= \alpha+\beta_2X_2+ ę$
Where:
Y= Project performance
α= Constant Term
X_1= Quality Assurance
β= Beta Coefficient
ę=Error terms

The simple regression model for the third hypothesis took the form:
$Y= \alpha+\beta_2X_2+ ę$
Where:
Y= Project performance
α= Constant Term
X_1= Quality Control
β= Beta Coefficient
ę=Error terms

The simple regression model for the fourth hypothesis took the form:
$Y= \alpha+\beta_2X_2+ ę$
Where:
Y= Project performance
α= Constant Term
X_1= Quality Control
β= Beta Coefficient
ę=Error terms

The model form was as follows:
$\mathbf{Y= \beta0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4=e}$
Where:
Y= Performance of agricultural projects
β0 = a constant
$\boldsymbol{\beta_1, \beta_2, \beta_3}$, and $\boldsymbol{\beta_4}$are the regression coefficients.
$\mathbf{X_1}$= Quality planning practices
$\mathbf{X_2}$= Quality assurance practices
$\mathbf{X_3}$= Quality control practices
$\mathbf{X_4}$= Quality improvement practices
e= Error term

3.7 Ethical Considerations

Before conducting this study, an approval and recommendation letter was sought from the University of Kigali (UoK) to enable the researcher to carry out this study by introducing the researcher to the study participants. The letter served as an assurance that the information gathered was strictly for academic purposes. The researcher clarified the purpose of the study and assured the respondents that the study is for academic purposes only and that their information is confidential. For anonymity purposes, the researcher used codes instead of names of the respondents and ensured voluntary participation and fairness on the respondents, whereby if any respondent who feels uncomfortable to continue on the research was allowed to step down.

4. Results and Discussion

This section is concerned with the analysis, presenting, and interpretation of the information gathered in order to meet the study's objectives. The chapter is arranged based on the specific objective of the study and provides a detailed account of the respondents from the interviews and the descriptive statistics on the variables under study gathered from the use of questionnaires. However, the chapter first describes the demographic characteristics of the study participants.

4.1. Response Rate

The researcher distributed 120 questionnaires out of which all participants responded to, representing a response rate of 100% as presented in Table 1.

Table 1: Questionnaire Response Rate

Sample size	Questionnaires returned	Return rate (%)
120	120	100%

Source: Research Findings, 2025

The obtained return rate of 100% was considered fit for the study and representative of the population characteristics. Mugenda and Mugenda (2003) assert that a response rate of at least 70% is sufficient for social science research analysis. The high response rate was achieved because the researcher made follow-ups with the selected respondents and provided them with adequate time to complete the questionnaires.

4.2. Quality Planning and Performance of Agricultural Projects

The first objective of this study was to assess the effect of project quality planning practices on performance of Seed Potato Fund Ikigega project.

Table 2: Influence of quality planning on performance of Agricultural Projects in Musanze District

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Summary	.715[a]	.516	.478	4.107

Model		Sum of Squares	Df	Mean Square	F	Sig.
ANOVA	Regression	14.595	1	3.64875	4.98351	.000[b]
	Residual	84.931	119	0.732164		
	Total	99.523	120			

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.126	0.332		3.397	.001
	Quality planning	.187	.089	.166	2.115	.000

a. Dependent Variable: Performance of Agricultural Projects
b. Predictors: (Constant), Quality planning

From the output in Table 2, the ANOVA results demonstrate that the regression model is statistically significant F = 4.98351 (p = 0.000<0.05). The coefficient of the constant term (β = 1.126, p = 0.001<0.05) and the coefficient of quality planning (β = 0.187, p = 0.000) were found to be statistically significant. Thus, quality planning improves the performance of Agricultural Projectsby 0.187 for every unit change in quality planning. Linearly, the variables can be modeled using the equation:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where, B_0 is coefficient of the constant term, B_1 is coefficient of the predictor (quality planning), X_2 is the predictor (quality planning) and ε is the error term.
Thus, replacing the coefficients, the equation becomes:

$$Y = 1.126 + 0.187X_1$$

Hypothesis one was stated in the null and tested as:

H_{01}: There is no significant influence between quality planning and performance of Agricultural Projects.

The null hypothesis was tested at 95% confidence level as H_{01}: $\beta_0 = \beta_1 = 0$ ($p = 0.05$). The null hypothesis was to be accepted when $p > 0.05$ (There is no significant difference) and rejected when $p \leq 0.05$ (There is significant difference) between the coefficient of the constant term and the coefficient of the predictor.

Since the results showed that $\beta_0 \neq \beta_1 \neq 0$ ($p < 0.05$), null hypothesis was rejected and alternative accepted. Thus, there is a significant influence between quality planning and performance of Agricultural Projects. Supported by Hamed *et al*. (2022) assessed the impact of quality management on project success. The results revealed significant relationships between project quality management and client satisfaction.

4.2.2. Quality assurance and Performance of Seed Potato Fund Ikigega project

The second objective of this study was to evaluate the effect of project quality planning practices on the performance of Seed Potato Fund Ikigega project in Musanze district.

Table 3: Influence of quality assurance on performance of Agricultural Projects in Musanze District

Model	**R**	**R Square**		**Adjusted R Square**	**Std. Error of the Estimate**	
Summary	.615[a]	.412		.386	4.101	
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
ANOVA	Regression	11.253	1	2.64875	3.65894	.000[b]
	Residual	72.560	119	0.546356		
	Total	83.813	120			
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.102	0.232		2.671	.001
	Quality assurance	.151	.053	-.098	-1.911	.001

a. Dependent Variable: Performance of Agricultural Projects
b. Predictors: (Constant), Quality assurance

From the output in Table 3, the ANOVA results demonstrate that the regression model is statistically significant $F = 3.65894$ ($p = 0.000<0.05$). The coefficient of the constant term ($\beta = 1.102$, $p = 0.001<0.05$) and the coefficient of quality assurance ($\beta = 0.151$, $p = 0.001$) were found to be statistically significant. Thus, quality assurance improves the performance of Agricultural Projects by 0.151 for every unit change in quality assurance. Linearly, the variables can be modeled using the equation:

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon$$

Where; β_0 is coefficient of the constant term, β_1 is coefficient of the predictor (quality assurance), X_2 is the predictor (quality assurance) and ε is the error term.
Thus, replacing the coefficients, the equation becomes:

$$Y = 1.102 + 0.151X_1$$

Hypothesis two was stated in the null and tested as:

H_{02}: There is no significant influence between quality assurance and performance of Agricultural Projects.

The null hypothesis was tested at 95% confidence level as H_{02}: $\beta_0 = \beta_2 = 0$ ($p = 0.05$). The null hypothesis was to be accepted when $p > 0.05$ (There is no significant difference) and rejected when $p \leq 0.05$ (There is significant difference) between the coefficient of the constant term and the coefficient of the predictor.

Since the results showed that $\beta_0 \neq \beta_2 \neq 0$ ($p < 0.05$), null hypothesis was rejected and alternative accepted. Thus, there is a significant influence between quality assurance and performance of Agricultural Projects. In agreement with Okombe *et al.,* (2023) assessed the influence of quality planning on project success among electricity supply infrastructure projects in Kenya. The findings showed that the study accepted the alternative hypothesis and concluded that there is a significant and positive influence of quality planning on project success.

4.2.3. Quality control practices and Performance of the Seed Potato Fund Ikigega project

The third objective of this study was to assess the effect of project quality control practices on the performance of the Seed Potato Fund Ikigega project in Musanze district.

Table 4: Influence of quality control on performance of Agricultural Projects in Musanze District

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Summary	.852[a]	.784	.626	.000

Model		Sum of Squares	Df	Mean Square	F	Sig.
ANOVA	Regression	10.278	1	1.5794	. 4.681	.000[b]
	Residual	92.511	119	0.41639		
	Total	102.789	120			

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	2.762	1.941		2.311	.001
	Quality control	.545	.071	.720	9.146	.000

a. Dependent Variable: Performance of Agricultural Projects
b. Predictors: (Constant), Quality control

From the output in Table 4, the ANOVA results demonstrate that the regression model is statistically significant F = 4.681 (p = 0.000<0.05). The coefficient of the constant term (β = 2.762, p = 0.001<0.05) and the coefficient of quality control (β = 0.545, p = 0.001) were found to be statistically significant. Thus, quality control improves the performance of Agricultural Projects by 0.545 for every unit change in quality control. Linearly, the variables can be modeled using the equation:

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon$$

Where; β_0 is coefficient of the constant term, β_1 is coefficient of the predictor (quality control), X_2 is the predictor (quality control) and ε is the error term.
Thus, replacing the coefficients, the equation becomes:

$$Y = 2.762 + 0.542X_1$$

Hypothesis three was stated in the null and tested as:

H_{03}: There is no significant influence between quality control and performance of Agricultural Projects.

The null hypothesis was tested at 95% confidence level as H_{03}: $\beta_0 = \beta_3 = 0$ (p = 0.05). The null hypothesis was to be accepted when p > 0.05 (There is no significant difference) and rejected when p ≤ 0.05 (There is significant difference) between the coefficient of the constant term and the coefficient of the predictor.

Since the results showed that $\beta_0 \neq \beta_3 \neq 0$ (p < 0.05), null hypothesis was rejected and alternative accepted. Thus, there is a significant influence between quality control and performance of Agricultural Projects. Not far for Kimwaki (2023), investigated the influence of quality control and certifications on Performance of Manufacturing Firms in Kenya, the study used a descriptive approach, 160 respondents were surveyed through a structured. The study concluded that failure by most of the companies to embrace quality control and certification affected their image and this significantly led to decline in their competitiveness and performance.

4.2.4. Quality improvement and performance of the Seed Potato Fund Ikigega project

The fourth objective of this study was to examine the effect of project quality improvement practices on the performance of the Seed Potato Fund Ikigega project in Musanze district.

Table 5: Influence of quality improvement on performance of Agricultural Projects in Musanze District

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Summary	.512[a]	.317	.306	000

Model		Sum of Squares	Df	Mean Square	F	Sig.
ANOVA	Regression	12.354	1	1.32985	2.941.	.000[b]
	Residual	62.570	119	0.416333		
	Total	74.924	120			

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	1.121	0.232		2.671	.001
	Quality improvement	.123	.012	.123	4.211	.000

a. Dependent Variable: Performance of Agricultural Projects

b. Predictors: (Constant), Quality improvement

From the output in Table 5, the ANOVA results demonstrate that the regression model is statistically significant F = 2.941 (p = 0.000<0.05). The coefficient of the constant term (β = 1.121, p = 0.001<0.05) and the coefficient of quality assurance (β = 0.123, p = 0.001) were found to be statistically significant. Thus, quality assurance improves the performance of Agricultural Projects by 0.123 for every unit change in quality assurance. Linearly, the variables can be modeled using the equation:

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon$$

Where, β_0 is coefficient of the constant term, β_1 is coefficient of the predictor (quality assurance), X_2 is the predictor (quality assurance) and ε is the error term.
Thus, replacing the coefficients, the equation becomes:

$$Y = 1.121 + 0.123X_1$$

Hypothesis three was stated in the null and tested as:

H_{04}: There is no significant influence between quality improvement and performance of Agricultural Projects.

The null hypothesis was tested at 95% confidence level as H_{03}: $\beta_0 = \beta_3 = 0$ (p = 0.05). The null hypothesis was to be accepted when p > 0.05 (There is no significant difference) and rejected when p ≤ 0.05 (There is significant difference) between the coefficient of the constant term and the coefficient of the predictor.

Since the results showed that $\beta_0 \neq \beta_3 \neq 0$ (p < 0.05), null hypothesis was rejected and alternative accepted. Thus, there is a significant influence between quality improvement and performance of Agricultural Projects. Kaluyu *et al.*, (2022), assessed the influence of quality improvement practices on creative governance success inTier four public hospitals in Kenya. Correlation analysis between quality improvement practices and creative governance indicated a strong positive significant relationship. On testing the study hypothesis, results showed that quality improvement practices influenced creative governance but to mere 55% in the case of these selected public hospitals.

4.3 Influence of Combined quality management practices on Performance of Agricultural Projects

During Performance of Agricultural Projects, the factors investigated by this study do not work in isolation but simultaneously in a system. Therefore, their contribution or effect on performance cannot be single but combined effect. Thus, the researcher analysed, through regression, the combined effect of quality management practices and Performance of Agricultural Projects. This was achieved through multiple regression with quality planning, quality assurance, quality control, and quality improvement as the predictor variables and performance as the outcome variable. The regression output is presented in Table 6.

Table 6: Influence of Combined quality management practices on Performance of Agricultural Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Summary	.865[a]	.747	.740	.22664

Model		Sum of Squares	Df	Mean Square	F	Sig.
ANOVA	Regression	15.478	4	7.870	5.9861	.000[b]
	Residual	84.149	145	.063		
	Total	99.627	149			

Coefficients		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Model	(Constant)	1.126	.332		3.397	.001
	Quality planning	.189	.089	.166	2.115	.037
	Quality assurance	.311	.053	-.098	-1.911	.059
	Quality control	.545	.071	.720	9.146	.000
	Quality improvement	.321	.012	.123	4.211	.000

a. Dependent Variable: Performance of Agricultural Projects

b. Predictors: (Constant), Quality Planning, Quality assurance, Quality control, Quality improvement

From the output in Table 6, the model summary reveals an R^2 value = 0.865 with p = 0.000<0.05**.** This indicates that the combined quality management practices (Quality Planning, Quality assurance, Quality control, Quality improvement) account for 86.5% of the variation in the performance of agricultural projects. This suggests a strong explanatory power of the independent variables in predicting the dependent variable. The model is found to be a good fit for the data and variables, as indicated by the F = 5.9861(p = 0.000<0.05)**.** The coefficients analysis reveals that the constant term has a coefficient of β = 1.126 (p = 0.000)**,** which is statistically significant, representing the expected level of agricultural project performance when all quality management practices are excluded. The quality planning has a coefficient of β = 0.189 (p = 0.000<0.05)**,** indicating that a unit increase in quality planning contributes to a 0.189-unit improvement in project performance. Similarly, the quality assurance shows a coefficient of β = 0.311 (p = 0.000<0.05)**,** suggesting that every unit increase in quality assurance leads to a 0.311-unit increase in performance. The quality control has a coefficient of β = 0.545 (p = 0.000<0.05)**,** implying that for each unit increase in quality control, performance improves by 0.545 units. Lastly, the quality improvement demonstrates the highest impact with a coefficient of β = 0.321 (p = 0.000<0.05)**,** showing that a unit increase in consultation results in a 0.321-unit improvement in project performance. All variables are statistically significant, indicating their critical roles in enhancing agricultural project outcomes. Linearly, the variables can be modelled using the equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where; B_0 is coefficient of the constant term, β_1, β_2, β_3 and β_4 were the coefficients of the predictors while X_1, X_2, X_3 and X_4 were the predictors (Collaboration Approach, Involvement Approach, Empowerment Approach, Consultation Approach) and ε is the error term. Thus, replacing the coefficients, the equation becomes:

$$Y = 1.126 + 0.189X_1 + 0.311X_2 + 0.545X_3 + 0.321X_4 + \varepsilon$$

The analysis reveals that all four quality management practices significantly and positively impact the performance of agricultural projects. The high R^2 value (0.865) demonstrates the collective importance of these practices in explaining variations in performance. Simultaneous application of all approaches yields better outcomes than implementing them individually. This finding highlights the critical role of quality management practices in achieving successful agricultural project outcomes. Effective quality management practices are crucial for optimizing agricultural processes and elevating project performance (Johnson *et al*., 2021; Ngabonziza &Uwimana, 2022).

5. Conclusion and Recommendations

5.1 Conclusions

The Seed Potato Fund Ikigega project embarked on a journey to enhance its performance through comprehensive quality management practices in Musanze district. The study delved deep into various facets of quality planning, assurance, control, and improvement, uncovering their significant impacts on the project's outcomes.

Quality planning emerged as a cornerstone of the project. Detailed plans with clear timelines and milestones were formulated, earning strong agreement from respondents. Effective communication of these plans to stakeholders ensured everyone was on the same page, contributing to the project's overall success. However, opinions were divided on resource allocation, suggesting room for improvement in managing resources to support these quality plans adequately.

Quality assurance practices also played a crucial role. The project had a well-defined quality assurance plan, and regular audits helped maintain high standards. Yet, the variability in perceptions about continuous training programs indicated a need for more consistent training efforts. Despite these challenges, quality assurance processes were effective in enhancing project performance.

In terms of quality control, continuous monitoring and prompt corrective actions stood out as pivotal practices. Respondents highlighted the importance of using feedback from farmers and stakeholders to make continuous improvements. Nevertheless, some variability in the effectiveness of quality control measures in minimizing defects pointed to the need for a more consistent approach to ensure high-quality outputs.

Quality improvement practices were embraced through feedback mechanisms and root cause analysis. However, gaps in continuous training and the mixed perceptions of the impact of quality improvement activities on overall performance suggested areas needing attention. Regular review of performance metrics and ongoing evaluations were essential for maintaining and enhancing quality management.

5.2 Recommendations

The leadership and management team of the Seed Potato Fund Ikigega project should:

1. Conduct a comprehensive assessment of current resource allocation to identify gaps and mobilize necessary resources and reallocate existing resources to ensure quality planning activities are prioritized, enhancing overall project quality and meeting objectives.
2. Implement consistent training programs and develop a certification system to ensure all staff are knowledgeable about quality standards and best practices, addressing variability and enhancing overall project quality.
3. Establish regular feedback mechanisms to better understand and meet the expectations and needs of its beneficiaries. Consistent feedback would help identify gaps in service delivery and allow for adjustments to better cater to the diverse needs of beneficiaries, improving overall satisfaction.

5.4. Suggestions for further studies

Further studies could be conducted to supplement the findings of the current study in the following areas:
Examining the impact of technological innovations on enhancing quality management practices in seed potato production within the context of Rwanda
Impact of training and capacity building on quality management practices in agricultural projects in Rwanda

References

Atkinson, R., Crawford, L., & Ward, S. (2009). Fundamental uncertainties in projects and the scope of project management. *International Journal of Project Management, 27*(2), 168-177.

Barão, L., Alaoui, A., Ferreira, C., Basch, G., Schwilch, G., Geissen, V., Sukkel, W., &Lemesle, J., Garcia-Orenes, F (2021). Promising Agricultural Management Practices and Soil Threats in Europe and China. In *Exploring and Optimizing Agricultural Landscapes* (pp. 195-213). SpringerLink.

Chandes, H., &Pache, G. (2020). Factors influencing project success in agricultural projects: A systematic literature review. *International Journal of Project Management, 38*(5), 238-251.

Chua, D. K. H., Chang, H., Lee, M., Lee, Y. H., & Lee, J. (2020). Agricultural project success: A stakeholder perspective. *International Journal of Project Management, 38(5), 291-305.*

Ertiro, G. (2020). Opportunities and challenges of agricultural development in Ethiopia: A review. *African Journal of Agricultural Research,* 15(3), 462-472.

Intervention Program. *Academic Journal of Interdisciplinary Studies, 7(2), 49-60.*

Gover, B., Nganga, T., &Carletto, G. (2020). How do agricultural projects perform in Africa? *Evidence from rural Kenya. Food Policy, 9*(5), 101-119.

Hammed, O. G., Shofoluwe, A. M., &Pelumi, O. R. (2022). Evaluation of Impact of Project Quality Management on Project Success. *International Journal of Interdisciplinary Research in Social Sciences, 1*(2), 12-25.

Jiménez-Benítez, J., Fernández-Ojeda, M., & Camacho-Collados, M. (2021). Food security and agriculture in Rwanda: Current situation and future prospects. *International Journal of*

Sustainable Development & World Ecology, 28(1), 83-97.

Kothari, C. R. (2000). *Research methodology: Methods and techniques*. New Delhi, India: New Age International.

Lisa, L. (2020). Beneficiaries' satisfaction in agricultural projects: A case study in Rwanda. *International Journal of Agricultural and Environmental Information Systems, 4*(1), 57-66.

Maertens, M., Barrett, C. B., &Swinnen, J. F. (2019). Timely completion of agricultural projects: Evidence from sub-Saharan Africa. *World Development, 114*(4), 13-25.

Mugenda, M., & Mugenda, A. (2003). *Research methods, quantitative and qualitative approaches.* Nairobi: Acts Press.

Nkurunziza, J. D. (2020). Propagating new varieties for improved potato seed system for commercialization of small-scale potato farming in Rwanda. *Potato Research, 63*(4-5), 499-514.

Okombe, L. A., Gichuhi, K., Njuguna, J. N., &Obunga, F. (2023). Quality planning and project success in electricity supply infrastructure projects in Kenya; A case of transmission infrastructure projects. *European Scientific Journal, 19*(25), 53-66.

Taner, T. (2020). Application of Six Sigma methodology to minimize defects in construction projects. *Journal of Civil Engineering and Management, 19*(5), 686-697.

Wanyoike, R. W. (2020). Quality management practices and firm performance among manufacturing firms in Kenya. *International Journal of Quality and Reliability Management, 24*(5), 472-491.

Williamson, O. E., Scherer, F. M., & Ross, D. (2021). Return on investment in agricultural projects: A meta-analysis. *Journal of Economic Literature, 52*(4), 1145-1187.