



Effect of Project Management Practices on the Performance of Smallholder Farmers in Fruit Farming Projects: A Case Study of Gashora Sector, Bugesera District, Rwanda

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Abstract: This study examined the effect of project management practices on the performance of smallholder farmers in fruit farming projects in Gashora Sector, Bugesera District, Rwanda. The four practices were project planning, implementation of planned activities, monitoring and evaluation. Control Theory, Contingency Theory, Resource-Based View and Goal-Setting Theory guided the study. A quantitative descriptive-correlational design was employed, using a census of 105 smallholder fruit farmers, all of whom returned usable questionnaires. Structured questionnaires and observation checklists were used; descriptive statistics, Pearson correlation and multiple linear regression informed the analysis. Composite mean scores were 4.02 for planning, 3.93 for implementation, 3.95 for monitoring, 3.96 for evaluation and 3.92 for performance. All four predictors had positive and statistically significant coefficients: planning ($B = 0.348$, $\beta = 0.343$, $p = 0.001$), implementation ($B = 0.180$, $\beta = 0.176$, $p = 0.041$), monitoring ($B = 0.177$, $\beta = 0.168$, $p = 0.042$) and evaluation ($B = 0.309$, $\beta = 0.290$, $p = 0.004$). The model explained 87.8% of the variation in performance ($R^2 = 0.878$). The findings support integrating practical planning, timely execution, routine monitoring and post-season evaluation into agricultural extension and cooperative support in Gashora Sector.

Keywords: Project Management Practices; Project Planning; Project Implementation; Project Monitoring; Project Evaluation; Smallholder Fruit Farming; Project Performance

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1. Introduction

Agriculture remains a critical component of Rwanda's economic reform goal and rural development plan. The sector employs a significant fraction of the labour population and continues to be a primary source of income for rural households (NISR, 2025). Over the last decade, the government has supported agricultural modernisation through irrigation expansion, improved seed systems, land consolidation, and cooperative development projects. Although these efforts have resulted in increases in some agricultural subsectors,

productivity gains among many smallholder farmer groups have been unequal (MINAGRI, 2024). This mismatch raises concerns about variables other than resource allocation that may explain variances in project success.

Historically, agricultural development interventions have focused on increasing access to production inputs such seeds, fertilizers, irrigation technologies, and agricultural loans. However, rising empirical evidence demonstrates that simply having access to resources does not guarantee better agricultural output. Rather, productivity outcomes are increasingly determined by

the efficiency with which resources are planned, coordinated, monitored, and assessed throughout project cycles (Anderson & Feder, 2021). According to research, organised managerial activities such as structured planning, implementation discipline, performance monitoring, and systematic evaluation considerably boost production, resource usage efficiency, and risk reduction in farming systems. This has focused scholarly attention on project management approaches as major predictors of agricultural performance.

Many agricultural programs in Sub-Saharan Africa continue to provide inconsistent results, including differences in productivity and income among farmers who receive similar interventions. These disparities are increasingly linked to flaws in project management practices, such as insufficient activity planning, poor coordination during implementation, limited monitoring systems, and ineffective evaluation mechanisms that impede timely decision-making and corrective actions (Mwangi et al., 2023).

Fruit cultivation has been pushed in Rwanda as a key strategy for increasing agricultural commercialisation and rural family incomes. Several fruit growing programs have been implemented in Bugesera District, namely in the Gashora Sector, to improve production and farmer lives. Despite these efforts, smallholder farmers in fruit farming initiatives continue to exhibit disparities in productivity and income outcomes.

The persistence of these variances raises questions about whether present agricultural solutions adequately address managerial issues that influence project success. Although farmers may have identical production resources and support services, changes in how farming activities are planned, implemented, monitored, and evaluated can have an impact on the overall performance of fruit farming projects. However, there is limited empirical information on how project management approaches explain variances in the performance of smallholder fruit farmers in the local setting. As a result, the purpose of this study is to address the issue of a lack of empirical information about the impact of project management techniques on the performance of smallholder farmers engaging in fruit farming projects in the Gashora Sector, Bugesera District, Rwanda.

1.1 General Objective

To examine the effect of project management practices on the performance of smallholder farmers in fruit farming projects in Gashora Sector, Bugesera District, Rwanda.

1.2 Specific Objectives

These were the specific objectives:

1. To determine the influence of project planning on the performance of smallholder farmers in fruit farming projects in Gashora Sector.
2. To assess the effect of project implementation on the performance of smallholder farmers in fruit farming projects.
3. To evaluate the impact of project monitoring on the performance of smallholder farmers in fruit farming projects.
4. To analyse the influence of project evaluation on the performance of smallholder farmers in fruit farming projects.

1.3 Research Hypotheses

H₀₁: Project planning practices have no significant influence on the performance of smallholder farmers in fruit farming projects in Gashora Sector.

H₀₂: Project implementation practices have no significant effect on the performance of smallholder farmers in fruit farming projects in Gashora Sector.

H₀₃: Project monitoring practices have no significant influence on the performance of smallholder farmers in fruit farming projects in Gashora Sector.

H₀₄: Project evaluation practices have no significant effect on the performance of smallholder farmers in fruit farming projects in Gashora Sector.

2. Literature Review

This review examines the theoretical explanations and empirical findings underpinning the four management practices investigated among smallholder fruit farmers in Gashora Sector, Bugesera District.

2.1 Theoretical Review

The theoretical foundation covers feedback and control, adaptation to conditions, effective resource use and the influence of clearly defined production goals.

2.1.1 Control Theory

According to Control Theory, organisational and project performance increases when systems regularly compare actual results to planned objectives and take corrective steps to decrease deviations. The approach, which originated with cybernetic and management control systems, emphasises feedback loops as critical instruments for preserving stability and enhancing performance (Ouchi, 2022; Simons, 2021). In management, performance is achieved not only through initial planning, but also by ongoing observation, comparison, feedback, and correction.

Control Theory serves as the theoretical underpinning for this study, which examines monitoring and assessment methods as project management dimensions. Monitoring allows smallholder farmers to track farming activities, assess progress, identify obstacles, and implement corrective actions, whereas evaluation determines whether project objectives and expected outcomes were met. Effective monitoring and evaluation procedures are expected to boost farmer performance by eliminating inefficiencies, increasing responsibility, and promoting evidence-based decision-making.

2.1.2 Contingency Theory

Contingency Theory contends that there is no single management strategy that guarantees success in all scenarios. Instead, management strategies' efficacy is determined by how well they align with environmental conditions, organisational skills, and accessible resources (Donaldson, 2023; Otley, 2022). The paradigm emphasises flexibility and adaptation, implying that successful projects necessitate management practices that are responsive to changing conditions.

In this study, Contingency Theory is used to explain why the success of planning, implementation, monitoring, and assessment might differ depending on the agricultural environment. Smallholder fruit producers face climate uncertainties, limited resources, fluctuating input prices, and market dangers. Farmers that adjust their project management approaches to these situations are more likely to achieve positive results.

2.1.3 Resource-Based View (RBV) Theory

According to the Resource-Based View (RBV) Theory, performance disparities across organisations stem from their capacity to acquire, organise, and efficiently use important resources and skills (Barney, 2021). The notion emphasises that higher performance is not achieved solely through resources; rather, it is determined by how well resources are handled and translated into productive outcomes.

For this study, RBV provides theoretical support for implementation strategies and resource utilisation in fruit growing operations. Smallholder farmers may have equal resources such as land, manpower, seedlings, fertilisers, and technical assistance; nevertheless, discrepancies in how these resources are coordinated and utilised might result in disparate performance outcomes.

2.1.4 Goal-Setting Theory

According to Goal Setting Theory, explicit, clear, and demanding goals improve performance by directing attention, enhancing motivation, and motivating systematic action to achieve desired outcomes. The notion emphasises that individuals and organisations perform better when they understand the expected

outcomes and have quantifiable goals to guide their actions.

In this study, Goal Setting Theory is used to assist project planning practices as a critical predictor of smallholder farmer success. Planning tasks such as defining production objectives, creating agricultural schedules, allocating responsibilities, and recognising hazards assist farmers in setting clear goals and organising efforts to achieve them.

2.2 Empirical Review

Empirical research links agricultural project performance with the quality of managerial practices, although the strength of those relationships varies across farming contexts. The following review follows the study objectives.

2.2.1 Project Planning and Agricultural Project Performance

Empirical research at the worldwide level consistently shows that structured planning approaches improve agricultural project performance by improving coordination, eliminating inefficiencies, and aligning farm activities with environmental and seasonal circumstances. Farmers that use formal planning tools like crop calendars, input scheduling, and production targets have higher productivity and more reliable revenue outcomes than those who rely on informal or reactive decision-making systems (Doss & Kieran, 2022; Lobell et al., 2024). These data show that planning boosts performance by improving anticipatory decision-making and minimising resource uncertainty.

However, research from sub-Saharan Africa paints a more complicated and uneven picture. While planning is universally acknowledged as necessary, many smallholder farmers lack the technical skills and institutional support needed to put it into action. According to studies conducted throughout East Africa, farmers recognise the value of planning, but limited access to extension services, insufficient training systems, and dependence on traditional farming practices prevent efficient implementation of structured plans (Mwangi et al., 2023). As a result, contextual restrictions frequently buffer planning's impact on performance.

2.2.2 Implementation of Planned Agricultural Activities and Project Performance

Empirical evidence strongly suggests that implementation quality plays a critical role in determining agricultural project results. While planning gives structure and direction, implementation ensures that scheduled tasks are carried out effectively, efficiently, and on time. Global studies reveal that even with planning mechanisms in place, planting delays, improper fertiliser use, and inadequate labour

coordination considerably diminish agricultural productivity (Lobell et al., 2024; Anderson & Feder, 2021). This emphasises implementation as the practical method for transforming plans into measurable results.

In developing nations, notably in Sub-Saharan Africa, implementation issues continue to be a key impediment to agricultural success. Empirical studies regularly show that, despite access to inputs and extension advice, farmers frequently fail to properly conduct planned activities because to labour shortages, budgetary restrictions, and insufficient institutional support structures (Mwangi et al., 2023). At the same time, interventions including farmer training, supervision, and timely input supply have been demonstrated to boost implementation efficiency and productivity.

2.2.3 Project Monitoring and Agricultural Project Performance

Empirical studies consistently identify monitoring as a central mechanism for improving agricultural project performance by enabling continuous tracking of activities and early identification of deviations from planned objectives. Globally, monitoring systems such as field supervision, performance tracking tools, and agricultural extension visits have been shown to improve productivity by ensuring timely corrective action and improved resource use efficiency (Anderson & Feder, 2021; Lobell et al., 2024).

However, monitoring practices in Sub-Saharan Africa are either ineffective or inconsistent. Limited supervision, inadequate performance indicators, and weak feedback mechanisms all contribute to poor agricultural results, even when planning and input allocation are adequate (Mwangi et al., 2023). In contrast, participatory monitoring measures such as farmer field schools and extension-led supervision have been linked to increased adherence to best practices and production.

2.2.4 Project Evaluation and Agricultural Project Performance

The empirical literature defines evaluation as a vital post-implementation procedure for determining the efficacy, efficiency, and impact of agricultural programs. Unlike continuous monitoring, evaluation is done on a regular basis and is centered around learning and accountability. Global studies suggest that evaluation improves agricultural performance by providing feedback that informs future planning and improves decision-making processes (OECD, 2021; Doss and Kieran, 2022).

Evaluation techniques in Sub-Saharan Africa remain underdeveloped, despite their acknowledged importance. Empirical studies show that many agricultural projects prioritise implementation and monitoring over systematic assessment, resulting in poor

learning mechanisms and recurring inefficiencies (Mwangi et al., 2023). Where evaluation is used, via effect assessments or farmer feedback systems, it has been found to improve program design and budget allocation in succeeding cycles.

3. Methodology

The methodology covered research design, study population and census procedure, measurement and instruments, validity and reliability, analytical techniques and ethical requirements.

3.1 Research Design

This study uses a quantitative, descriptive-correlational research approach to investigate the link between project management methods and agricultural project performance among smallholder farmers. A quantitative approach is ideal because it allows for objective measurement of variables and the use of statistical techniques to examine hypothesized correlations between independent and dependent variables (Creswell & Creswell, 2018).

3.2 Study Population and Census Sampling

This study's target group consists of 105 smallholder farmers working on fruit agricultural projects in the Gashora Sector, Bugesera District, Rwanda. These farmers serve as the unit of analysis since they are actively involved in the planning, implementation, monitoring, and evaluation of fruit farming operations, making them well-positioned to give information on project management techniques and project performance. The population was determined using official records kept by the Gashora Sector Office, agricultural extension officers, and farmer cooperatives engaged in fruit cultivation. To ensure the respondents' relevance, the target audience was limited to farmers who were actively involved in fruit growing initiatives at the time of the study and had appropriate project implementation expertise.

A census sampling approach was used to include all 105 eligible fruit farmers in Gashora Sector rather than selecting a sample. This enabled the study to draw responses from the entire identified population.

3.3 Data Collection and Variable Measurement

The study variables are operationalised into quantifiable constructs, allowing for an empirical analysis of the link between project management methods and agricultural project success among smallholder fruit growers in the Gashora Sector. The independent variables (IVs) include

project planning, implementation of planned activities, monitoring, and evaluation techniques, whereas the dependent variable (DV) is agricultural project performance as assessed by productivity and income.

This study used two data gathering tools: structured questionnaires, and observation checklists. The study objectives, conceptual framework, and variable operationalisation all played a role in the instrument selection.

A structured questionnaire was the primary tool used to obtain quantitative data from small-scale fruit farmers. The questionnaire was divided into four sections: respondents' demographic characteristics, project management procedures (planning, implementation, monitoring, and evaluation), and performance indicators for fruit growing initiatives. A five-point Likert scale was used to assess measurement items, with 1 indicating strongly disagree and 5 indicating strongly agree. The items were created using evaluated empirical literature and tailored to the local agricultural setting.

3.4 Pilot Study, Validity and Reliability

Before beginning data collecting, specialists in project management and agricultural research assessed the study instruments to verify content validity. To assess the

instruments' clarity and reliability, a pilot test was conducted among farmers from outside the study area who had similar features. Cronbach's Alpha coefficient was used to test questionnaire item reliability, and values of 0.70 or higher were judged satisfactory.

Validity ensured by a variety of methods. First, content validity was established by creating research instruments (questionnaires, and observation checklists) based on the study objectives, theoretical framework, and operationalised variables. Each indication of project planning, implementation, monitoring, and evaluation is clearly linked to measurable results of Performance smallholder farmers in fruit project. Second, the instruments were pre-tested (pilot tested) on a small group of smallholder farmers other than the research sample to identify ambiguities, irrelevant items, and measurement errors. Revisions was made prior to data collection (Kothari, 2019). This improves construct validity by ensuring that reported practices match observed farming behaviours (Patton, 2015).

The pilot study was conducted in Mayange, with N = 53 reported in the original reliability-table source note. Cronbach's alpha assessed internal consistency across the five constructs, and all reported coefficients exceeded 0.70.

Table 1: Reliability Test Results

Variable	Number of Items	Cronbach's Alpha	Interpretation
Agricultural project planning,	5	0.842	Good reliability
Implementation of agricultural planned activities	5	0.851	Good reliability
Monitoring agricultural practices	5	0.879	Good reliability
Evaluation practices	5	0.899	Good reliability
Performance of smallholder farmers in fruit project	6	0.888	Good reliability

Source: Pilot Study Data Collected from Mayange (N = 53), 2026.

Table 1 presents the reliability test results for the study variables using Cronbach's Alpha coefficients. All variables recorded alpha values above the recommended threshold of 0.70, indicating good internal consistency among the questionnaire items. Agricultural project planning ($\alpha = 0.842$), implementation of planned activities ($\alpha = 0.851$), monitoring practices ($\alpha = 0.879$), evaluation practices ($\alpha = 0.899$), and agricultural project performance ($\alpha = 0.888$) demonstrate that the measurement instruments were reliable and suitable for data collection. Therefore, the questionnaire items consistently measured the intended constructs.

3.5 Data Management and Statistical Analysis

Inferential statistics were then employed to examine the relationships between the study variables. Pearson correlation analysis was conducted to determine the strength and direction of the relationships between project planning, project implementation, project monitoring, project evaluation, and the performance of smallholder farmers in fruit farming projects. Multiple linear regression analysis was subsequently performed to determine the effect of each project management practice on the performance of smallholder farmers and to test the study hypotheses. The results were presented using tables and interpreted in line with the study objectives and the existing theoretical and empirical literature.

To improve dependability, completed questionnaires and observation sheets were checked daily to confirm their completeness and accuracy. The data were coded and properly put into statistical software (SPSS), with validation tests to reduce entry errors. Overall, the use of instrument design, pilot testing, triangulation, standardised administration, and statistical reliability testing assures that the study's findings are valid, consistent, and replicable.

A multiple linear regression model estimated the contribution of planning, implementation, monitoring and evaluation to smallholder fruit farmers' performance. The level of significance for decisions on the four null hypotheses was 0.05.

3.6 Ethical Considerations

Ethical considerations are critical in research involving human participants, especially smallholder farmers with variable levels of literacy and resource availability. This study follows the known ethical principles of personhood, beneficence, and justice (Creswell & Creswell, 2018). Before data collection began,

participants were thoroughly informed about the study's goal, procedures, and their rights as responders. Participation was fully optional, and responders had the option to withdraw at any time without penalty. Depending on the literacy skills of the participants, informed consent were sought in writing or verbally (Mugenda & Mugenda, 2012).

4. Results and Discussions

The empirical results are presented in accordance with the study objectives, beginning with questionnaire completion and the overall descriptive pattern, followed by correlation, regression and hypothesis testing.

4.1 Response Rate

Table 2 presents the response rate of the study by showing the distribution, return, and usability status of the questionnaires administered to respondents. It provides an overview of the extent of questionnaire participation and the completeness of the collected data used for analysis.

Table 2: Response Rate of Respondents

Category	Frequency	Percentage (%)
Questionnaires distributed	105	100.0
Questionnaires returned and usable	105	100.0
Questionnaires not returned/unusable	0	0.0
Total	105	100.0

Source: Author's computation (2026).

Table 2 presents the response rate of the study respondents. The findings indicate that all 105 questionnaires distributed were successfully completed and returned, representing a 100% response rate. This implies full participation of the targeted respondents and eliminates concerns related to non-response bias. The high response rate was likely facilitated by effective questionnaire administration and follow-up with participants. Therefore, the collected data were considered adequate for subsequent statistical analysis and interpretation.

4.2 Descriptive Overview

The composite mean for project planning was 4.02; implementation of planned activities recorded 3.93, monitoring practices 3.95 and evaluation practices 3.96. The overall performance of smallholder farmers in fruit farming projects recorded a composite mean of 3.92. These values, all exceeding the neutral midpoint of 3.00, indicate general agreement that the management practices were applied and that project outcomes were favourable. The individual items in the original

descriptive tables provide the basis for these composite scores.

Planning practices were widely reported among fruit farmers in Gashora Sector, with individual mean scores ranging from 3.86 to 4.08 and a composite mean of 4.02. The comparatively weaker item concerned anticipating drought, pests and diseases during planning.

Implementation practices produced a composite mean of 3.93. The results reflect farmers' general agreement that planned activities were executed, while variation in individual scores points to scope for stronger adherence to schedules and input plans.

Monitoring practices recorded a composite mean of 3.95, indicating generally favourable reports on record keeping, identification of farming problems, supervision and corrective action during implementation.

Evaluation practices recorded a composite mean of 3.96, reflecting farmers' reported use of production targets, profitability assessment and lessons from previous farming seasons.

4.3 Inferential Statistics

Inferential analysis assesses bivariate relationships, overall model fit and the independent contributions of the four practices.

4.3.1 Pearson Correlation Analysis

Pearson correlation analysis was conducted to examine the strength and direction of the relationships between project management practices and the performance of smallholder farmers in fruit farming projects. The results are presented in Table 3.

Table 3: Pearson Correlation Results

		PSF	PP	IPA	MP	EP
PSF	Pearson Correlation	1	.712**	.780**	.675**	.707**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	105	105	105	105	105
PP	Pearson Correlation	.712**	1	.578**	.488**	.514**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	105	105	105	105	105
IPA	Pearson Correlation	.780**	.578**	1	.654**	.693**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	105	105	105	105	105
MP	Pearson Correlation	.675**	.488**	.654**	1	.668**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	105	105	105	105	105
EP	Pearson Correlation	.707**	.514**	.693**	.668**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	105	105	105	105	105

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

Source: Research survey data (2026). PSF = performance of smallholder farmers; PP = planning; IPA = implementation; MP = monitoring; EP = evaluation.

Table 3 indicates positive and statistically significant bivariate relationships between performance (PSF) and planning ($r = 0.712$), implementation of planned activities ($r = 0.780$), monitoring ($r = 0.675$) and evaluation ($r = 0.707$), with significance reported as .000 in the dissertation table. Implementation showed the strongest simple correlation with performance. These bivariate associations do not establish the relative conditional contributions of the predictors; the multiple regression estimates address that question.

The findings suggest that farmers with stronger planning, implementation, monitoring and evaluation practices

also tended to report stronger fruit farming project performance in Gashora Sector. This interpretation concerns association and does not establish experimental causality.

4.3.2 Regression Analysis

Multiple regression examined the combined and separate associations of planning, implementation, monitoring and evaluation with fruit farming project performance.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.937 ^a	.878	.873	.29367

a. Predictors: (Constant), PP, IPA, MP, EP

Source: Research survey data (2026).

The regression model produced a multiple correlation coefficient (R) of 0.937, indicating a very strong positive relationship between the combined project management practices, project planning practices, implementation of planned activities, monitoring practices, and evaluation practices, and the performance of smallholder farmers in

fruit farming projects. This implies that improvements in these project management practices are strongly associated with improvements in farmers' project performance.

The coefficient of determination ($R^2 = 0.878$) indicates that 87.8% of the variation in the performance of

smallholder farmers in fruit farming projects is explained jointly by the four project management practices included in the model. Only 12.2% of the variation is attributable to other factors not included in the study,

such as climatic variability, market price fluctuations, farmers' entrepreneurial ability, access to finance, soil fertility differences, government support programmes, and other socioeconomic conditions.

Table 5: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.014	4	15.504	179.772	.000 ^a
	Residual	8.624	100	.086		
	Total	70.638	104			

a. Predictors: (Constant), PP, IPA, MP, EP
b. Dependent Variable: PSF

Source: Research survey data (2026).

The findings show that the regression model is statistically significant ($F = 179.772$, $p < 0.001$). The regression means square (15.504) is substantially larger than the residual mean square (0.086), indicating that the explanatory variables jointly account for a considerable proportion of the variation in the dependent variable. Since the significance value is less than the conventional

5% level ($p = 0.000 < 0.05$), the null hypothesis that all regression coefficients are simultaneously equal to zero is rejected. This confirms that project planning practices, implementation of planned activities, monitoring practices, and evaluation practices collectively have a statistically significant influence on the performance of smallholder farmers in fruit farming projects.

Table 6: Multiple Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.129	.155		-.830	.408
	PP	.348	.101	.343	3.440	.001
	IPA	.180	.087	.176	2.070	.041
	MP	.177	.086	.168	2.055	.042
	EP	.309	.105	.290	2.932	.004

a. Dependent Variable: APP

Source: Research survey data (2026).

Table 6 presents the multiple regression coefficients used to examine the individual contributions of project planning, implementation of planned activities, monitoring, and evaluation to the performance of smallholder farmers in fruit farming projects in Gashora Sector, Bugesera District. The unstandardized coefficients (B) indicate the estimated change in the dependent variable associated with a one-unit increase in each explanatory variable, holding the remaining variables constant. The standardized coefficients (Beta) facilitate comparison of the relative strength of the four predictors.

The findings indicate that all four project management practices have positive and statistically significant coefficients at the 5% significance level. Specifically, project planning ($B = 0.348$, $\beta = 0.343$, $p = 0.001$), implementation ($B = 0.180$, $\beta = 0.176$, $p = 0.041$), monitoring ($B = 0.177$, $\beta = 0.168$, $p = 0.042$), and evaluation ($B = 0.309$, $\beta = 0.290$, $p = 0.004$) were positively associated with the performance of smallholder farmers after controlling for the other explanatory variables. Accordingly, all four null hypotheses were rejected.

Project planning emerged as the strongest predictor of performance, recording the highest standardized coefficient ($\beta = 0.343$, $t = 3.440$, $p = 0.001$). Its unstandardized coefficient ($B = 0.348$) indicates that a one-unit increase in the planning score was associated with an estimated 0.348-unit increase in the performance score, holding implementation, monitoring, and evaluation constant. This finding highlights the importance of establishing clear production objectives, preparing seasonal farming schedules, planning input and labour requirements, and anticipating potential production risks. Systematic planning provides an operational foundation for coordinating farming activities and allocating scarce resources across the production cycle.

Project evaluation was the second strongest predictor ($B = 0.309$, $\beta = 0.290$, $t = 2.932$, $p = 0.004$). The positive and statistically significant coefficient indicates that farmers reporting stronger evaluation practices also tended to report better project performance, after accounting for the other management practices. Evaluation enables farmers to compare achieved results with planned targets, assess profitability, identify

operational weaknesses, and incorporate lessons learned into subsequent production decisions. The finding therefore highlights the relevance of systematic performance assessment and continuous learning in smallholder fruit farming projects.

Implementation of planned activities ranked third ($B = 0.180$, $\beta = 0.176$, $t = 2.070$, $p = 0.041$). Its positive coefficient indicates that effective implementation was significantly associated with better performance when the remaining predictors were held constant. This finding emphasizes the importance of translating production plans into practical farming operations through timely input application, adherence to production schedules, appropriate agronomic practices, efficient labour allocation, and adjustments to emerging production challenges. Implementation therefore represents an important operational component of project management.

Project monitoring recorded the smallest standardized coefficient, although its contribution remained positive and statistically significant ($B = 0.177$, $\beta = 0.168$, $t = 2.055$, $p = 0.042$). This finding indicates that regular monitoring was associated with better project performance, even after accounting for planning, implementation, and evaluation. Continuous monitoring enables farmers to track progress, maintain production records, identify emerging challenges, and undertake timely corrective measures. Its relatively smaller standardized coefficient should not be interpreted as evidence that monitoring is unimportant; rather, it indicates that monitoring had the smallest estimated independent association with performance among the four predictors in the fitted regression model.

4.3.3 Hypothesis Decisions

Hypothesis decisions follow the reported coefficient significance levels at $\alpha = 0.05$.

Table 7: Hypotheses Decision Table

Hypothesis	Standardized β	t-value	p-value	Decision
H ₀₁ : Project planning practices have no statistically significant effect on the performance of smallholder farmers in fruit farming projects.	0.343	3.440	0.001	Rejected
H ₀₂ : Implementation of planned activities has no statistically significant effect on the performance of smallholder farmers in fruit farming projects.	0.176	2.070	0.041	Rejected
H ₀₃ : Project monitoring practices have no statistically significant effect on the performance of smallholder farmers in fruit farming projects.	0.168	2.055	0.042	Rejected
H ₀₄ : Project evaluation practices have no statistically significant effect on the performance of smallholder farmers in fruit farming projects.	0.290	2.932	0.004	Rejected

Source: Researcher's analysis of survey data (2026).

The hypothesis-testing results indicate that all four null hypotheses were rejected at the 5% significance level. Project planning ($\beta = 0.343$, $p = 0.001$), implementation of planned activities ($\beta = 0.176$, $p = 0.041$), project monitoring ($\beta = 0.168$, $p = 0.042$), and project evaluation ($\beta = 0.290$, $p = 0.004$) each demonstrated a positive and statistically significant relationship with the performance of smallholder farmers in fruit farming projects, controlling for the other explanatory variables.

Based on the standardized regression coefficients, project planning emerged as the strongest predictor of performance, followed by project evaluation, implementation of planned activities, and project monitoring. These findings provide empirical support for the relevance of all four dimensions of project management practices within the estimated regression model.

4.4 Discussion of Research Findings

This section discusses the key findings in relation to the four specific objectives of the study. It interprets the

statistical results within the context of smallholder fruit farming projects, examines their theoretical and economic implications, and identifies relevant practical considerations for improving project management in Gashora Sector, Bugesera District.

4.4.1 Project Planning and Smallholder Fruit Farming Performance

The findings established that project planning had a positive and statistically significant relationship with the performance of smallholder farmers in fruit farming projects ($B = 0.348$, $\beta = 0.343$, $t = 3.440$, $p = 0.001$). Planning recorded the highest standardized coefficient among the four explanatory variables, indicating that it was the strongest predictor of performance within the estimated regression model. This finding highlights the importance of systematic planning as a foundational managerial practice in smallholder fruit farming.

In Gashora Sector, the results suggest that agricultural extension support should place greater emphasis on strengthening farmers' planning capabilities. Relevant interventions include seasonal production planning,

enterprise budgeting, resource allocation, climate-risk anticipation, and market-oriented production scheduling. Although planning emerged as the strongest predictor, this does not establish that planning alone is sufficient to improve project performance; its effectiveness should be considered alongside the other project management practices.

The finding agrees with Doss and Kieran (2022), who associate structured agricultural management with improved farm performance, and with the planning contribution discussed by Mwangi et al. (2023). Goal-Setting Theory explains why seasonal targets, input budgets and activity schedules guide effort and coordination.

In Gashora Sector, the results suggest that agricultural extension support should place greater emphasis on strengthening farmers' planning capabilities. Relevant interventions include seasonal production planning, enterprise budgeting, resource allocation, climate-risk anticipation, and market-oriented production scheduling. Although planning emerged as the strongest predictor, this does not establish that planning alone is sufficient to improve project performance; its effectiveness should be considered alongside the other project management practices.

4.4.2 Project Implementation and Smallholder Fruit Farming Performance

The findings demonstrated that project implementation had a positive and statistically significant relationship with the performance of smallholder farmers ($B = 0.180$, $\beta = 0.176$, $t = 2.070$, $p = 0.041$). Based on the standardized regression coefficients, implementation ranked third among the four project management practices. Its statistical significance nevertheless indicates that implementation retained a positive independent association with performance after accounting for planning, monitoring, and evaluation.

The practical implication for Gashora Sector is that agricultural extension interventions should combine technical advice with implementation support. Farmers should receive practical guidance on operational scheduling, input management, labour coordination, and adaptive farm management. Such support would strengthen their capacity to translate production plans into well-organized farming activities.

The result is compatible with the emphasis on management discipline in agricultural project implementation noted by Anderson and Feder (2021). The Resource-Based View likewise emphasises that the productive value of inputs depends on their organisation and effective use, rather than possession alone (Barney, 2021).

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4.4.3 Project Monitoring and Smallholder Fruit Farming Performance

Project monitoring was found to have a positive and statistically significant relationship with farmers' performance ($B = 0.177$, $\beta = 0.168$, $t = 2.055$, $p = 0.042$). Although monitoring recorded the smallest standardized coefficient among the four predictors, its statistical significance indicates that it remained relevant to performance after controlling for the other project management practices.

For smallholder fruit farming projects in Gashora Sector, the findings support strengthening routine farm monitoring, production record keeping, field supervision, and timely technical assistance. Agricultural extension services and farmer cooperatives should encourage practical monitoring arrangements that enable farmers to identify production challenges and respond appropriately throughout the farming cycle.

Doss and Kieran (2022) and Mwangi et al. (2023) similarly emphasise the importance of coordinated agricultural management and routine tracking for addressing performance gaps. Control Theory provides the rationale for using record keeping, feedback and corrective action throughout the growing season (Simons, 2021).

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4.4.4 Project Evaluation and Smallholder Fruit Farming Performance

Project evaluation demonstrated a positive and statistically significant relationship with the performance of smallholder farmers ($B = 0.309$, $\beta = 0.290$, $t = 2.932$, $p = 0.004$). Evaluation recorded the second highest standardized coefficient, indicating that it was the second strongest predictor of performance within the estimated regression model.

The findings suggest that agricultural extension services in Gashora Sector should institutionalize structured post-

season performance reviews as part of their support to smallholder fruit farmers. These reviews should include comparisons between planned and achieved production targets, assessment of farm profitability, identification of operational challenges, and documentation of lessons for subsequent production cycles.

The value of periodic assessment corresponds to the criteria of relevance, effectiveness and learning set out by the Organisation for Economic Co-operation and Development (2021). From a Contingency Theory perspective, evaluation helps farmers adjust subsequent production decisions to changing climatic, resource and market conditions (Otley, 2022).

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Taken together, the regression findings favour stronger integration of all four practices in Gashora Sector. Planning had the highest standardised regression coefficient, while evaluation ranked second; implementation and monitoring also remained statistically significant. The ranking follows the original coefficients table, which differs from some narrative summaries elsewhere in the dissertation.

5. Conclusions and Recommendations

The following conclusions and recommendations relate directly to the four project management practices examined in the study.

5.1 Conclusions

This study concludes that project management practices play a fundamental role in determining the performance of smallholder farmers participating in fruit farming projects in Gashora Sector. The empirical evidence demonstrates that improvements in project planning, implementation, monitoring, and evaluation significantly enhance agricultural productivity, household income, achievement of production targets, and overall project sustainability.

The study also concludes that project management practices operate as an integrated management system. Planning establishes strategic direction, implementation transforms plans into productive activities, monitoring provides continuous feedback for corrective action, while evaluation facilitates learning and continuous improvement. Weaknesses in any one of these stages reduce the effectiveness of the entire management

process. Therefore, sustainable improvements in fruit farming performance require simultaneous strengthening of all project management functions rather than isolated interventions. The empirical findings equally validate the theoretical foundations underpinning this study. Goal-Setting Theory explains the significant contribution of planning practices; the Resource-Based View demonstrates the importance of effective implementation and resource utilization; Control Theory explains the role of monitoring through continuous feedback mechanisms; while Contingency Theory confirms the importance of evaluation and adaptive decision-making under changing agricultural conditions. Collectively, these theories provide a comprehensive explanation of how structured project management contributes to improved agricultural performance.

5.2 Recommendations

Based on the empirical findings and in line with the four specific objectives of the study, the following recommendations are proposed.

1. MINAGRI, RAB, district agricultural authorities, and agricultural extension officers should strengthen smallholder farmers' capacity in seasonal project planning. Extension services should assist farmers in developing production calendars, setting measurable production targets, identifying input requirements, assessing production risks, and establishing implementation schedules before each production season.
2. Agricultural extension officers and farmer cooperatives should strengthen farmers' capacity to effectively translate project plans into farming activities. Particular attention should be given to timely acquisition and utilization of agricultural inputs, labour coordination, adherence to production schedules, and efficient allocation of available resources.
3. Farmer cooperatives and agricultural extension officers should establish simple and practical monitoring and record-keeping mechanisms for smallholder fruit farmers. Farmers should be encouraged to regularly track production progress, input utilization, labour allocation, pest and disease occurrence, irrigation activities, and financial performance.
4. Local agricultural authorities, development partners, and farmer cooperatives should promote periodic evaluation of fruit farming projects. Farmers should be encouraged to conduct post-harvest performance reviews, assess profitability, compare planned and actual production outcomes, and participate in farmer reflection and knowledge-sharing sessions.

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