



Effect of Project Management Approaches on Project Quality Compliance: A Case Study of European Union Horticulture Project in Rwamagana District, Rwanda

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Abstract: This study assessed the effect of project management approaches on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda. The study examined project planning, stakeholder coordination, risk management, and project monitoring and evaluation as predictors of project quality compliance. Project Management Theory, Stakeholder Theory, Risk Management Theory, and Total Quality Management Theory guided the analysis. Descriptive and correlational research designs were adopted using quantitative and qualitative approaches. The target population comprised 358 respondents involved in the horticulture project, from whom a sample of 190 was determined using Slovin's formula. Data were collected through questionnaires, interviews, and documentation review. Quantitative data were analysed using SPSS version 29 through frequencies, percentages, means, standard deviations, Pearson correlation, and multiple linear regression at the 0.05 significance level, while qualitative interview evidence was analysed thematically. Regression results showed that project planning ($B = 0.207$; $t = 3.339$; $p = 0.001$), stakeholder coordination ($B = 0.219$; $t = 3.712$; $p = 0.000$), risk management ($B = 0.409$; $t = 6.597$; $p = 0.000$), and project monitoring and evaluation ($B = 0.148$; $t = 2.552$; $p = 0.012$) had positive and significant effects on project quality compliance. The model explained 73.2% of the variation in project quality compliance. The study concluded that integrated planning, coordination, risk control, and monitoring strengthened product grading, safety, packaging, traceability, and certification readiness. It recommended integrated seasonal planning, structured stakeholder coordination, active risk registers, and evidence-based monitoring with corrective follow-up.

Keywords: Project Planning, Stakeholder Coordination, Risk Management, Project Monitoring and Evaluation, Project Quality Compliance.

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1. Introduction

Project management approaches influence project quality compliance because they organize how activities are planned, coordinated, monitored, evaluated and controlled against expected standards. In horticultural development projects, quality compliance is reflected in safe production, product grading, packaging, traceability, post-harvest handling and certification readiness. Weak management systems can create delays, inconsistent field practice, poor coordination and quality

gaps that reduce the sustainability of agricultural project outcomes (Mukashema & Turyasingura, 2023).

Globally, horticultural and agricultural value chains face increasing expectations for safe and high-quality products as local, regional and international trade expands. Quality standards, traceability systems, sanitary requirements and reliable post-harvest practices have become central to market access. These conditions make structured project management important because project teams must align production schedules, resources, actors and quality controls throughout

implementation (Food and Agriculture Organization, 2024).

European Union Horticulture Project was designed to strengthen horticulture value chains and support safe, high-quality products for local, regional and international markets. The project covers several districts, including Rwamagana, and works with smallholder farmers, farmer promoters, project staff, buyers, processors, exporters, government institutions and quality-assurance actors. The range of actors and activities makes Rwamagana District an appropriate setting for examining how project planning, stakeholder coordination, risk management, and monitoring and evaluation influence project quality compliance.

In Rwanda, horticulture contributes to agricultural commercialization, household livelihoods and market development, but project outputs must satisfy requirements related to safety, grading, packaging, traceability and certification. National agricultural evidence continues to emphasize horticultural market readiness and quality assurance as important conditions for competitiveness and sustainable value-chain development (National Agricultural Export Development Board, 2024; MINEAGRI, 2024).

Quality compliance challenges can arise when post-harvest handling is inconsistent, traceability records are weak, technical support is limited, stakeholder coordination is insufficient or field practices are not monitored regularly. Such conditions can weaken product acceptability, market readiness and confidence among buyers and project beneficiaries. Rwanda Development Board (2023) similarly emphasizes the importance of agricultural investment systems that support reliable quality, market access and implementation performance.

Previous research has addressed agricultural project performance, export competitiveness and quality assurance, but evidence remains fragmented across planning, stakeholder involvement, risk management and monitoring practices. Existing studies therefore do not fully explain how these project management approaches jointly influence project quality compliance within European Union Horticulture Project in Rwamagana District. This creates a practical and empirical gap because the project depends on coordinated management across production, post-harvest handling, market preparation and quality verification.

Accordingly, the study assessed the effect of project management approaches on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda. The investigation focused on project planning, stakeholder coordination, risk management, and project monitoring and evaluation as the four independent variables, while project quality compliance

was assessed through the standards and practices required for dependable horticultural outputs.

1.1 General Objective

The general objective was to assess the effect of project management approaches on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.

1.2 Specific Objectives

- i. The study examined the effect of project planning on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.
- ii. The study determined the effect of stakeholder coordination on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.
- iii. The study evaluated the effect of risk management on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.
- iv. The study assessed the effect of project monitoring and evaluation on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.

2. Literature Review

This section reviews relevant theories and empirical studies explaining project management approaches and project quality compliance within the study context.

2.1 Theoretical Review

The theoretical review presented the theories used to explain the relationship between project management approaches and project quality compliance. The study was based on Project Management Theory, Stakeholder Theory, Risk Management Theory and Total Quality Management Theory. These theories addressed the four specific objectives and explained how project management approaches influenced project quality compliance.

2.1.1 Project Management Theory

Project Management Theory developed from formal project management practices concerned with planning, scheduling, organizing, coordinating and controlling activities to achieve defined objectives. The theory considers a project as a coordinated set of activities that must be planned and managed through clear schedules, resources, responsibilities and performance requirements. In the present day, project management

literature still considers planning as a foundation for systematic implementation and achievement of project results (Kerzner, 2022).

Project Management Theory suggests that project activities perform better when they are guided by clear plans, schedules, budgets, responsibilities and quality requirements. The theory needs project activities to be defined, resources to be allocated, deadlines to be established and implementation priorities to be communicated before execution begins. It helps with coordination because planned activities give project actors a common direction for implementation. Similarly, in horticultural projects, the same reasoning supports production scheduling, harvest planning, resource allocation, quality budgeting and market readiness (Kerzner, 2022).

Project Management Theory was applied to project planning to provide a deeper understanding of how this project management approach influenced project quality compliance in European Union Horticulture Project in Rwamagana District. Specifically, the theory explained how production schedules, harvest planning, resource allocation, quality budgeting and implementation timelines helped improve product grading, safety standards, packaging quality, traceability records and certification readiness.

2.1.2 Stakeholder Theory

Stakeholder Theory was advanced by R. Edward Freeman and explains that organizations and projects depend on groups or individuals who influence, or are influenced by, project decisions and outcomes. The theory gives priority to stakeholder interests, communication, participation, relationships and shared value. It provides a basis for understanding why project actors need to cooperate and exchange information when their responsibilities are connected. In the present day, literature still considers stakeholder management important for collaboration, implementation and project performance (Dmytriiev & Freeman, 2023).

Stakeholder Theory suggests that project performance improves when relevant actors are identified, informed, consulted and involved in activities that affect them. The theory needs communication channels, participation mechanisms, role clarity, trust and shared decision-making among responsible stakeholders. It helps reduce misunderstanding and resistance by ensuring that different actors understand requirements and responsibilities. Similarly, in horticultural value chains, coordinated farmers, buyers, regulators, producer groups, transport actors and project teams can support consistent implementation of quality requirements (Dmytriiev & Freeman, 2023).

Stakeholder Theory was applied to stakeholder coordination to deepen the understanding of how this practice influenced project quality compliance in European Union Horticulture Project in Rwamagana District. The theory explained how farmer engagement, buyer communication, regulator collaboration, producer-group participation and transport coordination interacted with project procedures and responsibilities to support effective quality-compliance outcomes.

2.1.3 Risk Management Theory

Risk Management Theory is based on systematic management of uncertainty that may affect project objectives. The theory views risk management as a process of identifying, analysing, responding to, monitoring and communicating uncertain events before they weaken project performance. It assists in understanding why unmanaged threats can affect cost, time, quality, safety and compliance. Risk-management thinking is still applied in recent project literature to support preventive action, preparedness and stronger implementation decisions (Hillson, 2023).

Risk Management Theory describes project outcomes cannot be protected without understanding the uncertainties that may affect project activities. Pest threats, contamination, storage conditions, transport problems, market requirements and certification risks can interact with production and post-harvest processes. Failure to control one risk may affect product safety, packaging, traceability or market readiness. This theory can therefore be usefully applied when considering how preventive controls and response actions are related to quality compliance in horticultural projects (Hillson, 2023).

Risk Management Theory provided a framework for understanding risk management within European Union Horticulture Project in Rwamagana District. It explained how pest control, contamination prevention, storage-risk control, transport-risk management and certification-risk monitoring captured potential threats and informed actions aimed at improving product safety, quality consistency, market readiness and certification compliance.

2.1.4 Total Quality Management Theory

Total Quality Management Theory developed from quality-management activities associated with W. Edwards Deming, Joseph Juran and Philip Crosby. It is a theory that gives priority to customer requirements, process control, staff involvement, measurement and continuous improvement. It provides a definition of quality not as a final inspection activity but as a responsibility integrated throughout organizational processes. In the present day, literature still considers Total Quality Management as a basis for systematic

improvement of performance and prevention of quality defects (Goetsch & Davis, 2022).

Total Quality Management Theory suggests that quality embedded in all project processes leads to improved performance. The theory needs clear standards to be set, documented procedures, evidence-based monitoring and participation from responsible project actors. It helps with prevention because it is easier to identify and correct a quality gap before it becomes a repeated problem. Similarly, in horticultural projects, the same reasoning allows project teams to monitor field practices, verify standards, report deviations and apply corrective action. Thus, Total Quality Management connects continuous monitoring with measurable quality results (Goetsch & Davis, 2022).

Total Quality Management Theory provided a basis for examining project monitoring and evaluation in European Union Horticulture Project in Rwamagana District. It explained how field inspection, progress reporting, quality checklists, corrective-action follow-up and feedback application helped identify quality gaps, maintain compliance with required standards and strengthen continuous improvement.

2.2 Empirical Review

The empirical review synthesised evidence from previous studies concerning project management approaches and project quality compliance. Attention was given to research on project planning, stakeholder coordination, risk management and project monitoring and evaluation. Studies from international, regional and Rwandan contexts were assessed based on their methodologies, findings and conclusions. This assessment established what is already known, identified inconsistencies and unresolved issues in the existing evidence, and demonstrated the need to investigate these approaches within European Union Horticulture Project in Rwamagana District, Rwanda.

2.2.1 Project Planning and Project Quality Compliance

Agricultural export projects require organised systems that support quality, safety and traceability before products reach target markets. Against this background, Liu et al. (2024) examined the impact of digital transformation on the quality and safety level of agricultural exports among Chinese listed companies. Using customs data covering 2007–2016 and a staggered difference-in-differences approach, the research considered product tracing, information sharing, technological innovation and quality assurance. Digital transformation was found to improve agricultural product quality, safety and traceability during export. Stronger digital traceability and quality-assurance

systems were consequently proposed to improve agricultural export competitiveness.

Rather than treating quality as an activity that begins after production, Emlinger (2025) investigated whether quality management enabled agri-food firms to export successfully in the French market. Administrative employee data were combined with customs data on export value, quantity, destinations and products. Firms with specialised quality-management personnel were more likely to demonstrate stronger product reliability, safety commitment and export performance. This outcome underscored the importance of planning quality responsibilities, internal quality systems and specialised quality resources before export activities are implemented.

Evidence from the South African citrus industry offers an African perspective on the planning of quality and compliance requirements. Phologane et al. (2024) collected survey evidence from citrus producers and assessed sanitary and phytosanitary compliance requirements in the Western Cape. Planning for pest management, workforce training, record keeping and integrated quality systems emerged as important conditions for sustainable access to the European Union citrus market. Although risk and quality systems contributed to stronger compliance, weaknesses in training and institutional support remained important concerns. Stronger training, record keeping and integrated quality systems were therefore recommended.

Project planning in agricultural projects was further examined by Gitau and James (2025) at the International Livestock Research Institute in Kenya. Using a descriptive design, the study targeted 200 projects and obtained evidence from 152 key informants, including project managers, monitoring officers, project coordinators and financial managers. Sixty percent of the projects achieved their intended objectives, while 40% showed gaps in schedule, budget, customer satisfaction and quality-related outcomes. Weak planning was therefore associated with poorer project quality, schedule and performance. Stronger scope, risk, time and financial planning mechanisms were recommended.

Rwandan evidence was provided by Tuyisenge and Kabanda (2023), who assessed project planning and performance of agriculture projects at Holland Greentech Rwanda. A quantitative design was adopted, with data collected from 46 respondents selected purposively and analysed using SPSS version 22 and linear regression. Project planning explained a substantial proportion of project performance, while resource planning, scheduling, budget planning and risk planning all recorded statistically significant effects. Project planning was considered more beneficial when it was continued throughout implementation. Nonetheless, the study addressed general agricultural project performance

rather than project quality compliance in European Union Horticulture Project, leaving a contextual gap that the present study sought to address.

2.2.2 Stakeholder Coordination and Project Quality Compliance

Quality and safety in agricultural markets depend on coordination among the actors responsible for regulation, importation, production and consumption. Against this background, Tong et al. (2024) examined governance mechanisms affecting the quality and safety of imported agricultural products in China. Grounded theory was used to develop the governance model, while structural equation modelling tested the relationships among government regulation, importer regulation and consumer supervision. These stakeholder mechanisms were found to have direct and indirect effects on agricultural product quality and safety. Coordinated participation among government, importers and consumers was consequently proposed as a means of strengthening quality governance.

Rather than viewing agri-food governance as the responsibility of a single actor, Bachev (2024) developed a broader framework for assessing the quality of agri-food governance in Europe. The analysis considered governance agents, mechanisms, processes, order and sustainability. Effective governance was associated with clear roles and coordinated relationships among public authorities, private actors, farmers, markets and communities. This outcome underscored the importance of organised responsibilities and cooperation when several actors contribute to quality and compliance. Wider use of holistic governance-assessment tools was recommended.

Evidence from Kenya demonstrates the contribution of stakeholder involvement to agricultural project implementation. Akello and Moronge (2023) used a descriptive design with a census of 109 projects and respondents, while questionnaires and regression analysis provided empirical evidence. Stakeholder involvement had a positive and statistically significant effect on implementation and completion of government-funded agricultural projects in arid and semi-arid areas. Stakeholders were therefore considered capable of accelerating or slowing project delivery depending on the quality of their involvement. Greater participation throughout the project lifecycle was recommended.

Rwandan agricultural evidence was provided by Ufitimfura and Amolo (2025), who examined stakeholder engagement strategies and agricultural project performance using a KOICA project in Rutsiro District. Descriptive and correlational designs were applied to a sample of 338 respondents drawn from a population of 2,179. Collaboration, involvement, empowerment and consultation all produced statistically

significant effects on project performance. The study therefore demonstrated that cooperation and participation among project actors strengthened agricultural project outcomes. Better stakeholder cooperation and participation were recommended.

A further Rwandan perspective was provided by Pedro and Dushimimana (2025), who examined stakeholder management practices and the success of the Sustainable Agriculture Productivity and Market Linkage Project in Gisagara District. Quantitative and qualitative evidence showed that stakeholder communication supported project success by ensuring that responsible actors received information, coordinated activities and participated in implementation. Sustained communication, involvement and coordination were identified as important for agricultural productivity and market-linkage projects. However, the study focused on project success rather than quality compliance involving farmer engagement, buyer communication, regulator collaboration, producer-group participation and transport coordination in European Union Horticulture Project.

2.2.3 Risk Management and Project Quality Compliance

Agricultural export projects face quality and compliance risks that can arise from pests, handling, documentation and market requirements. Against this background, Phologane et al. (2024) examined integrated risk management and compliance for sustainable access to the European Union citrus market in South Africa. Survey evidence from registered citrus producers was considered together with sanitary and phytosanitary compliance requirements. Pest risk, documentation practices, personnel training and private standards emerged as important compliance concerns. Integrated risk-management and quality-management systems were consequently proposed to reduce risk and strengthen export compliance.

Rather than treating agricultural risks as isolated events, Ndateba and Amolo (2025) examined risk management practices and performance in a regenerative-agriculture project in Rwanda. The study considered risk identification, risk analysis, risk response, and risk review and control using hypothesis testing at the 0.05 significance level. All four risk-management practices had statistically significant effects on agricultural project performance, with reported p-values below the significance threshold. This outcome underscored the importance of frequent risk assessment, stakeholder participation and adaptive responses during implementation.

Rwandan evidence on agricultural value chains was also provided by Benimana and Dushimimana (2025). Using descriptive and correlational designs, the researchers collected data from 291 respondents and analysed the

results using SPSS. Project risk management produced a positive and statistically significant effect on agricultural project performance ($\beta = 0.233$; $t = 4.571$; $p = 0.000$). The evidence connected effective risk management with stronger agricultural project results, particularly where production, post-harvest handling, transportation and documentation risks were controlled. Stronger risk-management systems in agricultural value-chain projects were therefore recommended.

Digital systems can complement conventional risk management by improving traceability and information flow across agricultural export activities. Liu et al. (2024) analysed customs data and listed-company information through a staggered difference-in-differences approach. Digital transformation improved agricultural product quality and safety through technological innovation, product tracing, information sharing and quality assurance. Based on this evidence, digital traceability and information systems were considered useful for identifying, preventing and controlling quality and safety risks. Continued strengthening of traceability and quality-assurance mechanisms was recommended.

Supply uncertainty provides a broader perspective on risk management in agricultural systems. Ghasemi Naraghi and Jiang (2024) developed a stochastic mixed-integer quadratic constrained programming model for global agrochemical supply chains and transformed it into a mixed-integer linear programming model. Demand uncertainty and risk-related constraints were incorporated into the analysis, and the results indicated that structured risk tools could improve decision quality and supply-chain resilience. Stable inputs, predictable supply flows and risk-based planning were therefore identified as important conditions for maintaining quality requirements. Since the available studies did not specifically examine pest, contamination, storage, transport and certification risks in European Union Horticulture Project, the present study addressed an important contextual gap.

2.2.4 Project Monitoring and Evaluation and Project Quality Compliance

Agricultural projects require regular monitoring and evaluation to determine whether implementation remains aligned with expected outcomes. Against this background, Maitho and Kyalo (2025) examined monitoring and evaluation of agricultural project outcomes and household food security in Murang'a County, Kenya. A mixed-methods approach was used, with quantitative data obtained from 383 respondents through structured questionnaires and qualitative evidence obtained through interviews. Monitoring and evaluation systems recorded a positive relationship with improved outcomes ($r = 0.201$; $p < 0.05$). Community-inclusive, results-based monitoring systems, capacity

building, technology and stakeholder collaboration were consequently recommended.

Rather than limiting monitoring to final evaluation, Mbugua (2024) examined project monitoring and evaluation and performance of agribusiness projects in Kiambu County, Kenya. The study considered baseline surveys, monitoring and evaluation planning, technical data management and monitoring practices. Monitoring and evaluation were associated with project tracking, organisational learning and accountability during implementation. This outcome demonstrated that M&E systems can support better implementation when monitoring information is collected and used continuously. Stronger M&E plans, technical data management and regular monitoring were recommended.

Quantitative evidence from agricultural projects in Kenya further demonstrates the contribution of monitoring practices to project outcomes. Kosgei and Nyang'au (2024) collected data from 142 respondents and applied correlation and regression analysis. Project monitoring practices had a strong positive and statistically significant relationship with performance ($r = 0.745$; $p = 0.000$), while regression results also showed a significant effect ($\beta = 0.413$; $t = 4.848$; $p = 0.000$). Detailed monitoring plans, stronger monitoring capacity and stakeholder participation in monitoring were consequently proposed.

Rwandan evidence was provided by Kamagaju and Gachiri (2025), who assessed monitoring and evaluation practices and performance of the Kayonza Irrigation and Integrated Watershed Project. Descriptive and correlational analysis showed that monitoring and evaluation contributed to agricultural project performance through planning, progress tracking and performance assessment. Consistent use of M&E practices was therefore associated with stronger implementation. More detailed monitoring plans, regular monitoring data and application of findings through corrective action were recommended.

Participatory monitoring was examined in another Rwandan agricultural setting by Igirimbabazi and Amolo (2025), who analysed participatory project management and agricultural project performance in Musanze District. Descriptive and correlational methods showed that participation in planning, implementation, monitoring and evaluation positively affected project performance. Participatory M&E strengthened accountability and problem solving because beneficiaries and implementers were involved in identifying and addressing implementation issues. Greater stakeholder participation throughout the project process was recommended. Nonetheless, the study did not specifically examine field inspection, quality tracking, progress reporting, standard verification and

corrective action in relation to project quality compliance in European Union Horticulture Project.

3. Methodology

This chapter described the methodological procedures followed in examining project management approaches and project quality compliance in European Union Horticulture Project in Rwamagana District. It covered research design, target population, sample size, sampling techniques, data collection methods, research instruments, validity, reliability, data analysis procedures and ethical considerations. These procedures provided a systematic basis for collecting and analysing credible data on project planning, stakeholder coordination, risk management, project monitoring and evaluation and project quality compliance.

3.1 Research Design

Research design is a blueprint for conducting a study, which includes a plan on how the study collected, measure, and analyze data to solve research questions. It relates the research problem and the method, apparatus, sampling and analysis. Descriptive, correlational, quantitative and qualitative designs are used when it is necessary to describe variables and examine relationships within the study (Creswell & Creswell, 2023).

Descriptive and correlational research designs were conducted with quantitative and qualitative approaches. The descriptive design helped the researcher describe project planning, stakeholder coordination, risk management, project monitoring and evaluation and project quality compliance in European Union Horticulture Project. The correlational design determined whether each project management approach had a statistical relationship and effect on project quality compliance, while interview evidence provided qualitative explanations of the quantitative findings.

3.2 Study Population

A study population comprises the individuals or units from which relevant information is obtained (Saunders et al., 2023). This study targeted 358 respondents connected to European Union Horticulture Project in Rwamagana District, including smallholder horticulture farmers, farmer promoters and farmer-group representatives, project staff, buyers and processors or exporters, together with government and quality-assurance officers. Their involvement enabled them to provide information on project management approaches and project quality compliance.

3.3 Sampling Design

Sampling design is a process to select a manageable number of respondents from the target population. It describes the number of samples, sampling method and distribution of samples according to each category. A well-designed sampling method allows the researcher to gather information more reflective of the population and obtain conclusions that are valid (Saunders et al., 2023).

The sample size was determined using Slovin's formula at a 5% margin of error. From the target population of 358 respondents, the calculation produced a sample of 190 respondents. Proportionate allocation was used to distribute the sample according to the size of each respondent category.

The use of stratified and simple random sampling allowed the researcher to collect information from the relevant categories connected to European Union Horticulture Project in Rwamagana District. Respondents were grouped according to their study categories and selected through simple random procedures within each group. This helped the study capture perspectives from farmers, farmer representatives, project staff, buyers, processors or exporters, government actors and quality-assurance officers on project planning, stakeholder coordination, risk management, project monitoring and evaluation and project quality compliance.

3.4 Data Collection Instrument

Documentation is a data collection approach dependent upon written, electronic and institutional records as sources of information. Documents become useful records for the understanding of procedures, trends, policies, reports, and historical records related to the area of interest. Documentary evidence can be used to support research where relevant, authentic and goals of the study correspond (Saunders et al., 2023).

The study was done through documentation that looks at available European Union Horticulture Project records relating to project quality compliance and project management approaches. The researcher requested access to relevant records, including project plans, monitoring records, quality-inspection records, market-access guidelines, compliance documents and performance reports.

A questionnaire is a structured tool consisting of questions or statements to be answered with predetermined types of responses. It is helpful to get quantitative information systematically from multiple respondents. When the items in a questionnaire are unambiguous, variable relevant, and measured in a

uniform scale, it can help to analyze data statistically (Creswell & Creswell, 2023).

The study was carried out in the form of a close-ended questionnaire using a five-point Likert scale. The questionnaire had sections for demographic characteristics, project planning, stakeholder coordination, risk management, project monitoring and evaluation and project quality compliance. These sections match the specific objectives and conceptual framework so that quantitative data can be analyzed descriptively and inferentially using SPSS version 29.

3.5 Pilot Study, Validity and Reliability

A pilot study was conducted with 19 respondents in Kayonza District. The site had a comparable horticultural project environment but was independent of the main study area in Rwamagana District. The pilot assessed questionnaire clarity, completion time and respondent understanding.

Expert review established the instrument's validity. Of the 29 questionnaire items, 25 were rated as relevant, resulting in a Content Validity Index of 0.862. This exceeded the minimum benchmark of 0.70 and confirmed acceptable content validity.

Reliability was tested using pilot data in SPSS version 29. Cronbach's alpha coefficients were 0.841 for project planning, 0.830 for stakeholder coordination, 0.817 for risk management, 0.828 for project monitoring and evaluation and 0.844 for project quality compliance. Each variable contained five questionnaire statements. Since all coefficients exceeded the acceptable threshold of 0.70, the questionnaire demonstrated good internal consistency and was considered reliable for the main study.

3.6 Data Analysis

Data from the questionnaires were analyzed using SPSS version 29. Means, standard deviations, frequencies and percentages were used for descriptive analysis. The testing of the effect of project management approaches on project quality compliance was undertaken via correlation and multiple regression in an inferential

analysis. Interview evidence was analysed thematically to support interpretation of the quantitative findings.

Inferential Analysis assisted the researcher to test relationship and effect between variables. Each independent variable was correlated with Project Quality Compliance using bivariate correlation. Since the majority of the variables were measured by Likert scale composite scores, Pearson correlation was used in the research. A p value of 0.05 was used as statistical significance.

The effect of mixed factors, namely project planning, stakeholder coordination, risk management and project monitoring and evaluation was analyzed using multiple linear regression based on Project Quality Compliance.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where: Y = Project Quality Compliance; β_0 = Constant term; β_1 – β_4 = Regression coefficients; X_1 = Project Planning; X_2 = Stakeholder Coordination; X_3 = Risk Management; X_4 = Project Monitoring and Evaluation; ε = Error term.

3.7 Ethical Considerations

In the study, the responsible conduct was guided by ethical considerations. The researcher safeguarded the participants, adhered to institutional protocols and use information for academic purposes only. During all aspects of data collection and reporting, the study adhered to access, informed consent, confidentiality, privacy, anonymity, and voluntary participation.

4. Results and Discussions

This section presents the findings obtained from respondents involved in European Union Horticulture Project in Rwamagana District, Rwanda.

4.1 Response Rate

Response rate was used to determine the level of participation of respondents selected for the study.

Table 1: Response rate

Questionnaires	Frequency	Percentage (%)
Returned Complete	181	95.3
Returned Incomplete	5	2.6
Unreturned	4	2.1
Total	190	100.0

Source: Field data, 2026

Table 1 presents the questionnaire response rate for European Union Horticulture Project in Rwamagana District. Complete questionnaires were returned by 181 respondents (95.3%), providing the cases used in the quantitative analysis. Five questionnaires (2.6%) were returned incomplete and were excluded, while four questionnaires (2.1%) were not returned. The high completion rate provided adequate coverage of the selected sample and reduced the likelihood that non-response would materially weaken the field-data analysis.

4.2 Inferential Statistics

This section examines the relationships and predictive effects linking Project Planning, Stakeholder Coordination, Risk Management, and Project Monitoring and Evaluation with Project Quality

Compliance in European Union Horticulture Project in Rwamagana District. Pearson correlation was used to determine the strength, direction and significance of each relationship, while multiple regression assessed the combined and individual contribution of the four predictors. The model summary, ANOVA, regression coefficients and hypothesis decisions are presented in line with the specific objectives of the study.

4.2.1 Correlation Analysis

Pearson correlation analysis was used to determine whether each independent variable was significantly related to Project Quality Compliance. The interpretation focused only on the four relationships corresponding to the specific objectives, applying a 0.05 significance level to establish whether each association was statistically meaningful.

Table 2: Correlation between study variables and Project Quality Compliance

		Project Planning	Stakeholder Coordination	Risk Management	Project Monitoring and Evaluation	Project Quality Compliance
Project Planning	Pearson Correlation	1	.602**	.690**	.635**	.709**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	181	181	181	181	181
Stakeholder Coordination	Pearson Correlation	.602**	1	.623**	.704**	.701**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	181	181	181	181	181
Risk Management	Pearson Correlation	.690**	.623**	1	.707**	.794**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	181	181	181	181	181
Project Monitoring and Evaluation	Pearson Correlation	.635**	.704**	.707**	1	.727**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	181	181	181	181	181
Project Quality Compliance	Pearson Correlation	.709**	.701**	.794**	.727**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	181	181	181	181	181

** . Correlation is significant at the .01 level (2-tailed).

Source: Field data, 2026

Table 2 shows that Project Planning was positively related to Project Quality Compliance ($r = 0.709$; $p = 0.000$). Since $p < 0.05$, the relationship was statistically significant. This means that improvements in production scheduling, harvest planning, resource allocation, quality budgeting and implementation timelines were associated with stronger quality compliance in European Union Horticulture Project in Rwamagana District.

This relationship aligns with Gitau and James (2025), who found that stronger planning improved agricultural project performance by organizing objectives, schedules, resources and implementation priorities. Their findings support the current evidence because quality-compliant horticultural outputs depend on advance decisions that align field activities and resources with expected standards.

Stakeholder Coordination was positively related to Project Quality Compliance ($r = 0.701$; $p = 0.000$). Since $p < 0.05$, the relationship was statistically significant. This indicates that farmer engagement, buyer communication, regulator collaboration, producer-group coordination and transport coordination were associated with stronger application of quality requirements across the horticulture value chain.

This association resonates with Pedro and Dushimimana (2025), who found that stakeholder communication and involvement supported the success of an agricultural productivity and market-linkage project in Rwanda. Their evidence is relevant because quality compliance depends on timely information, shared responsibilities and coordinated action among project beneficiaries, institutions and market actors.

Risk Management had a strong positive relationship with Project Quality Compliance ($r = 0.794$; $p = 0.000$). Since $p < 0.05$, the association was statistically significant. This means that stronger controls for pests, contamination, storage, transport and certification-related risks were associated with stronger product safety, condition, traceability and market readiness.

This finding is supported by Phologane et al. (2024), who showed that integrated risk and quality management strengthened compliance and competitiveness in the citrus export sector. Their results support the current study because horticultural quality can be protected when project actors identify operational and compliance

threats early and apply preventive controls before they affect products or documentation.

Project Monitoring and Evaluation was positively related to Project Quality Compliance ($r = 0.727$; $p = 0.000$). Since $p < 0.05$, the relationship was statistically significant. This indicates that field inspection, progress reporting, checklist use, corrective follow-up and feedback were associated with stronger compliance with the quality standards expected in European Union Horticulture Project.

This result agrees with Kamagaju and Gachiri (2025), who found that monitoring and evaluation practices supported agricultural project performance through progress tracking, assessment and use of monitoring evidence. Their findings support the current study because continuous field information helps project teams identify deviations, strengthen accountability and correct quality gaps during implementation.

4.2.2 Regression Analysis

Multiple linear regression was applied to determine the combined and individual effects of the four independent variables on Project Quality Compliance. The model summary assessed the strength and explanatory capacity of the model and the independence of errors, the ANOVA tested overall statistical significance, and the coefficients table estimated the direction, magnitude, significance and collinearity condition of each predictor.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.855a	.732	.726	.16900	2.265
a. Predictors: (Constant), Project Monitoring and Evaluation, Project Planning, Stakeholder Coordination, Risk Management					
b. Dependent Variable: Project Quality Compliance					

Source: Primary Data, 2026

The explanatory pattern is consistent with Project Management Theory, which views project outcomes as the result of coordinated planning, resource allocation, communication and performance control rather than one isolated activity (Kerzner, 2022). The combined model therefore reflects the practical reality that quality compliance in a horticulture project depends on several connected management processes operating throughout implementation.

The model also resonates with Total Quality Management Theory, which emphasizes that dependable quality is achieved through integrated leadership, process control, participation, measurement and continuous improvement (Goetsch & Davis, 2022). The strong explanatory power therefore supports examining the four management approaches together as complementary mechanisms for sustaining horticultural quality requirements.

Table 4: ANOVA results

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	13.703	4	3.426	118.138	.000b
Residual	5.026	176	.029		
Total	18.729	180			

a. Dependent Variable: Project Quality Compliance

b. Predictors: (Constant), Project Monitoring and Evaluation, Project Planning, Stakeholder Coordination, Risk Management

Source: Primary Data, 2026

The joint significance of the model aligns with Kerzner (2022), who explains that project performance depends on coordinated planning, management, monitoring and control throughout the project lifecycle. In the current study, the significant F value shows that these management approaches collectively provided meaningful explanatory evidence for project quality compliance.

The collective result also agrees with Goetsch and Davis (2022), whose quality-management perspective emphasizes that quality is sustained through connected organisational processes rather than isolated inspection. The model therefore supports the view that planning, stakeholder coordination, risk management, and monitoring and evaluation work together to protect consistent quality standards in horticultural project implementation.

Table 5: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	.083	.188		.441	.660		
Project Planning	.207	.062	.193	3.339	.001	.461	2.167
Stakeholder Coordination	.219	.059	.213	3.712	.000	.454	2.201
Risk Management	.409	.062	.414	6.597	.000	.394	2.536
Project Monitoring and Evaluation	.148	.058	.162	2.552	.012	.375	2.666

a. Dependent Variable: Project Quality Compliance

Source: Field data, 2026

Table 5 indicates that the regression constant was positive ($B = 0.083$; $t = 0.441$; $p = 0.660$) but was not statistically significant at the 0.05 level. The intercept represents the expected baseline value of Project Quality Compliance when all predictors are held at zero, a condition outside the practical Likert-scale range. Its non-significance does not weaken interpretation of the predictor effects because the substantive hypotheses concern the four independent variables.

The tolerance values ranged from 0.375 to 0.461 and all were above the minimum acceptable threshold of 0.10, while the VIF values ranged from 2.167 to 2.666 and remained below the conservative threshold of 10. These results indicate that serious multicollinearity was not present. Together with the Durbin-Watson value of 2.265, the diagnostics supported stable interpretation of the regression coefficients.

Project Planning had a positive and significant effect on Project Quality Compliance ($B = 0.207$; $t = 3.339$; $p = 0.001$). The coefficients show that a one-unit increase in Project Planning increased Project Quality Compliance by 0.207 units when the other predictors were held constant. The positive t-value confirmed a meaningful contribution, while $p < 0.05$ supported rejection of the corresponding null hypothesis.

This relationship aligns with Gitau and James (2025), who describe planning as a foundation for agricultural project performance because it organises objectives, schedules, resources and implementation priorities. The present coefficient similarly shows that structured scheduling, resource decisions and quality planning made an independent contribution to quality compliance in European Union Horticulture Project.

Stakeholder Coordination had a positive and significant effect on Project Quality Compliance ($B = 0.219$; $t =$

3.712; $p = 0.000$). A one-unit increase in Stakeholder Coordination increased Project Quality Compliance by 0.219 units, holding the remaining predictors constant. The positive t -value confirmed that stakeholder coordination contributed meaningfully to the regression model, and the significance value supported rejection of the corresponding null hypothesis.

This association resonates with Pedro and Dushimimana (2025), who show that stakeholder-management practices support agricultural project success through communication, involvement, role clarity and shared responsibility. The present result confirms that coordinated farmer, buyer, regulator, producer-group and transport actions independently strengthened quality compliance within the horticulture project.

Risk Management had the largest positive and significant effect on Project Quality Compliance ($B = 0.409$; $t = 6.597$; $p = 0.000$). A one-unit increase in Risk Management increased Project Quality Compliance by 0.409 units after controlling for the other predictors. The high positive t -value demonstrated a strong individual contribution, while the significance value confirmed that the effect was statistically significant.

This finding is supported by Phologane et al. (2024), whose integrated risk-management approach links agricultural market access with systematic identification and control of operational, compliance and quality threats. The present coefficient shows that proactive control of pests, contamination, storage, transport and certification risks was especially important for safeguarding project quality compliance.

Project Monitoring and Evaluation had a positive and significant effect on Project Quality Compliance ($B = 0.148$; $t = 2.552$; $p = 0.012$). A one-unit increase in Project Monitoring and Evaluation increased Project Quality Compliance by 0.148 units, with the other predictors held constant. The positive t -value showed a measurable contribution to the model, and $p < 0.05$ supported rejection of the corresponding null hypothesis.

This result is consistent with Kamagaju and Gachiri (2025), who explain that monitoring and evaluation improve agricultural project performance through field observation, progress information, reporting and corrective follow-up. The current coefficient similarly indicates that field inspection, evidence, feedback and corrective action made an independent contribution to maintaining quality standards in European Union Horticulture Project.

Therefore, all four predictors retained positive coefficients and statistically significant effects after simultaneous estimation. The collinearity statistics remained within acceptable limits, supporting stability of the estimates. Risk Management recorded the largest unstandardized contribution, followed by Stakeholder Coordination, Project Planning, and Project Monitoring and Evaluation. The regression evidence consequently supported rejection of all four null hypotheses.

The adopted model for analysis was structured as follows:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Where Y = Project Quality Compliance; X_1 = Project Planning; X_2 = Stakeholder Coordination; X_3 = Risk Management; X_4 = Project Monitoring and Evaluation; B_0 = constant; B_1 to B_4 = regression coefficients; and e = error term.

$$\text{Project Quality Compliance} = 0.083 + 0.207 \text{ Project Planning} + 0.219 \text{ Stakeholder Coordination} + 0.409 \text{ Risk Management} + 0.148 \text{ Project Monitoring and Evaluation} + e$$

4.3 Decision on Null Hypotheses

This section consolidates the statistical decisions reached for the four null hypotheses. Each decision was based on the predictor significance value in the multiple regression model, using 0.05 as the criterion for determining whether the corresponding project management approach had a statistically significant effect on Project Quality Compliance.

Table 6: Decision on null hypotheses

Hypothesis	Null Hypothesis	Sig.	Decision
H01	Project planning had no significant effect on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.	.001	Rejected
H02	Project monitoring and evaluation had no significant effect on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.	.012	Rejected
H03	Stakeholder coordination had no significant effect on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.	.000	Rejected
H04	Risk management had no significant effect on project quality compliance in European Union Horticulture Project in Rwamagana District, Rwanda.	.000	Rejected

Source: Field data, 2026

Table 6 shows that all predictor significance values were below 0.05. Each null hypothesis was therefore rejected in favour of the conclusion that its corresponding independent variable had a statistically significant effect on Project Quality Compliance. The decisions were consistent with the positive regression coefficients and objective-specific correlation results. Taken together, the hypothesis tests confirmed that all four management approaches were relevant explanatory factors in European Union Horticulture Project in Rwamagana District.

4.4 Discussion of Research Findings

This section discusses the research findings in relation to the study objectives and relevant empirical evidence.

4.4.1 Influence of Project Planning on Project Quality Compliance

Project Planning had a positive and significant effect on Project Quality Compliance ($B = 0.207$; $t = 3.339$; $p = 0.001$). A one-unit increase in Project Planning increased Project Quality Compliance by 0.207 units when the other predictors were held constant. The result shows that clear production schedules, resource allocation, quality budgeting and implementation timelines strengthened product grading, safety, packaging, traceability and certification readiness in European Union Horticulture Project.

These findings align with Gitau and James (2025), who found that planning improves agricultural project performance by organising objectives, schedules, resources, responsibilities and implementation priorities. The positive result in the current study similarly indicates that quality-compliant horticultural outputs depend on advance decisions that align activities and resources with

the standards expected during production and market preparation.

The outcomes resonate with Project Management Theory, which holds that project activities perform better when they are organised around clear objectives, schedules, resources and responsibilities (Kerzner, 2022). Structured planning therefore supported production schedules, harvest arrangements, resource readiness, quality budgeting and implementation timelines needed to protect product grading, safety, packaging, traceability and certification readiness in European Union Horticulture Project.

4.4.2 Influence of Stakeholder Coordination on Project Quality Compliance

Stakeholder Coordination had a positive and significant effect on Project Quality Compliance ($B = 0.219$; $t = 3.712$; $p = 0.000$). A one-unit increase in Stakeholder Coordination increased Project Quality Compliance by 0.219 units after controlling for the other predictors. This indicates that farmer engagement, buyer communication, regulator collaboration, producer-group coordination and transport coordination strengthened consistent application of project quality requirements.

The findings align with Pedro and Dushimimana (2025), who established stakeholder management practices supported agricultural project success through communication, participation and coordinated responsibilities. The current study similarly shows that quality compliance in European Union Horticulture Project depended on collective action among beneficiaries, project teams, institutions and market actors rather than on a single actor.

The pattern resonates with Stakeholder Theory, which views projects as systems of connected actors whose interests, responsibilities, communication and participation affect implementation outcomes (Dmytriiev & Freeman, 2023). Coordination among farmers, buyers, regulators, producer groups, transport actors and project teams supported shared understanding of quality requirements and strengthened consistent quality-compliance practices across European Union Horticulture Project.

4.4.3 Influence of Risk Management on Project Quality Compliance

Risk Management had the strongest positive and significant effect on Project Quality Compliance ($B = 0.409$; $t = 6.597$; $p = 0.000$). A one-unit increase in Risk Management increased Project Quality Compliance by 0.409 units when the other predictors were held constant. The result shows that pest control, contamination prevention, storage-risk control, transport-risk management and certification-risk monitoring were especially important for maintaining acceptable horticultural quality.

The findings align with Phologane et al. (2024), who found that integrated risk and quality-management systems strengthened compliance and competitiveness for citrus producers accessing the European Union market. The current study similarly indicates that proactive identification and control of operational and compliance threats protected safety, condition, documentation and market readiness in European Union Horticulture Project.

The outcomes resonate with Risk Management Theory, which holds that systematic identification, analysis, response and monitoring of uncertainty protects project objectives from disruption (Hillson, 2023). Pest control, contamination prevention, storage-risk control, transport-risk management and certification-risk monitoring therefore supported product safety, quality consistency, market readiness and dependable project quality compliance.

4.4.4 Influence of Project Monitoring and Evaluation on Project Quality Compliance

Project Monitoring and Evaluation had a positive and significant effect on Project Quality Compliance ($B = 0.148$; $t = 2.552$; $p = 0.012$). A one-unit increase in Project Monitoring and Evaluation increased Project Quality Compliance by 0.148 units after controlling for the other predictors. This shows that field inspection, progress reporting, quality checklists, corrective follow-up and feedback application improved the project's ability to identify and correct quality gaps.

The findings align with Kamagaju and Gachiri (2025), who found that monitoring and evaluation practices improved agricultural project performance through progress tracking, assessment and application of monitoring information. The present study similarly demonstrates that continuous field evidence helped European Union Horticulture Project detect deviations, strengthen accountability and maintain expected quality standards during implementation.

The findings resonate with Total Quality Management Theory, which emphasises process measurement, continuous verification and corrective improvement to maintain dependable quality (Goetsch & Davis, 2022). Field inspection, progress reporting, quality checklists, corrective-action follow-up and feedback application therefore supported early detection of quality gaps and continuous improvement of project quality compliance.

5. Conclusions and Recommendations

This section presents the study conclusions and recommendations derived from the findings.

5.1 Conclusion

The study concluded that Project Planning and Stakeholder Coordination strengthened Project Quality Compliance in European Union Horticulture Project in Rwamagana District. Clear production schedules, harvest arrangements, resource decisions, quality budgets and implementation timelines helped align project activities with expected standards from the beginning of the production cycle. At the same time, coordinated communication and participation among farmers, buyers, regulators, producer groups, transport actors and project teams supported shared understanding of quality requirements, timely problem solving and consistent implementation across the horticulture value chain.

Risk Management and Project Monitoring and Evaluation also strengthened Project Quality Compliance in European Union Horticulture Project. Proactive attention to pests, contamination, storage, transport and certification-related threats protected product safety, condition and market readiness, while field inspections, progress reporting, quality checklists, feedback and corrective follow-up enabled the project to identify and address quality gaps during implementation. Overall, the study concluded that project quality compliance depended on the coordinated application of planning, stakeholder coordination, risk control and continuous monitoring rather than on any single management practice in isolation.

5.2 Recommendations

This section presents recommendations derived from the study findings and conclusions. Suggestions for future research are also provided.

1. Project managers should prepare integrated seasonal work plans that connect production schedules, harvest arrangements, resource allocation, quality budgets and market deadlines, and review them with farmer groups and field teams before implementation.
2. Project leadership should maintain structured communication forums linking farmers, farmer promoters, buyers, processors, exporters, regulators and transport actors, with decisions and responsibilities documented and followed through.
3. European Union Horticulture Project management should maintain an active risk register covering pests, contamination, storage, transport, market and certification threats, with preventive measures, responsible actors, warning indicators and response actions.
4. Field and quality-assurance teams should use consistent inspection checklists linked to grading, safety, packaging, traceability and certification requirements and convert identified gaps into documented corrective actions with follow-up dates.
5. Project management should review monitoring reports regularly and use evidence on recurring quality gaps to adjust training, resource allocation, stakeholder support and implementation procedures so that continuous quality improvement is sustained.

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