Global Scientific JOURNALS
GSJ: Volume 13, Issue 4, April 2025, Online: ISSN 2320-9186
www.globalscientificjournal.com

Impact of Project Life Cycle on Success of Agriculture Projects in Rwanda, A Case of Agro-Processing Trust Corporation, Rwanda

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ABSTRACT

Agriculture is Rwanda's economic backbone, contributing significantly to GDP and employing many. It ensures food security, improves livelihoods, and fosters growth. This research assesses the project life cycle's impact on agriculture projects in Rwanda, with a focus on the Agro Processing Trust Corporation (APTC). Guided by three specific objectives, it examined the Initiation Phase's effect, the Planning Phase's effect, and the Execution Phase's impact. Theoretical reviews included Project Life Cycle Theory, Systems Theory, and Stakeholder Theory. This study used a descriptive research design. The target population was individuals involved in three key projects under the APTC: the APTC Poultry Farming project, Gako Livestock Farm, and the Fertilizers and Seeds Distribution project. The group consisted of 153 research respondents, selected using a census approach. This study employed structured questionnaires and structured interviews to gather both quantitative and qualitative data from participants in three APTC agricultural projects. Data collection involved pre-testing instruments for clarity, using SPSS for statistical analysis, and thematic analysis for qualitative insights. The findings revealed that project life cycle phases significantly influenced agricultural project performance at APTC. In the first objectives, the initiation phase showed 62.09% agreement and 33.33% strong agreement on feasibility studies (M = 4.27, SD = 0.57), while stakeholder identification scored similarly (M = 4.24, SD = 0.58). In the second objective looks at planning where, for planning, 62.09% agreed and 33.33% strongly agreed on scope definition (M = 4.30, SD = 0.52), with budgeting and scheduling at 58.82% agreement and 35.29% strong agreement (M = 4.28, SD = 0.53). And finally, the third objectives which is execution, in execution, 69.93% agreed and 24.84% strongly agreed on resource management (M = 4.17, SD = 0.56), with timeline adherence at 71.90% agreement (M = 4.18, SD = 0.68) and lasting impacts at 68.63% agreement (M = 4.21, SD = 0.64). Overall performance was high (M = 4.57, SD = 0.33). Correlation analysis showed strong positive relationships: initiation (r = .850, p < .000), planning (r = .844, p < .000), and execution (r = .861, p < .000). Regression analysis revealed phases explained 92.5% (R^2 = 0.925) of performance variance, with planning having the strongest influence (B = 0.232, p = 0.048). These findings underscore the importance of structured project management for enhancing agricultural project success, sustainability, and efficiency. The study concluded by showing the critical role of

project life cycle phases—initiation, planning, and execution—in enhancing agricultural project performance, with planning showing the highest influence due to its emphasis on strategic resource alignment and risk mitigation. Recommendations call for organizations like APTC and policymakers to prioritize comprehensive feasibility studies, robust stakeholder engagement, advanced planning practices, and adaptive execution strategies supported by modern tools. For future research, longitudinal studies on the long-term effects of structured project cycles, the integration of advanced technologies, and the evolving role of stakeholder dynamics are suggested to inform sustainable practices and scalability in Rwanda's agricultural sector, fostering innovation and resilience.

Key words: Project Lifecycle, Project Success, Agro-processing and Agriculture project

GENERAL INTRODUCTION

Background of the study

Agriculture is a cornerstone of Rwanda's economy, contributing significantly to the country's GDP and employing a large portion of the population. The sector plays a crucial role in ensuring food security, improving livelihoods, and fostering economic growth. According to Pawlak & Kołodziejczak (2020), the performance of agriculture projects is essential for driving these outcomes. The Project Life Cycle (PLC), which encompasses stages such as initiation, planning, execution, monitoring, and closure, is pivotal in determining the success of these projects. Understanding how each phase of the PLC impacts the overall performance of agriculture projects can provide valuable insights into enhancing project outcomes. Mbuvi (2023) asserts that effective management of these life cycle stages can lead to significant improvements in project success. By focusing on the Agro Processing Trust Corporation (APTC), a key player in Rwanda's agro-processing sector, this study seeks to examine the influence of the PLC on the performance of agricultural projects.

On a global scale, countries like Brazil and India offer valuable lessons on how structured management of agricultural projects can significantly improve outcomes. In Brazil, one of the world's largest agricultural producers, project management tools are employed to streamline the planning and execution phases of agricultural projects. Jupally et al. (2024) noted strong emphasis on the planning phase, involving comprehensive feasibility studies, risk assessments, and project timelines, which help mitigate delays and ensure efficient resource use. Advanced monitoring systems are also employed to track real-time progress, allowing for quick adjustments. This structured approach has contributed to the success of Brazil's agricultural sector, particularly in agro-processing. By contrast, Rwanda's agricultural projects, especially in agro-processing, face challenges due to poor planning and limited use of technology for monitoring (Heinen, 2022).

India, another agriculture-dependent country, has made significant strides in agricultural project management by focusing on stakeholder involvement throughout the project life cycle. According to Jha and Gupta (2021) the Indian government has invested heavily in capacity building and training for farmers and project managers. This ensures that all stakeholders are aligned with project

objectives, contributing to the success of India's agro-processing sector.

At the African regional level, Rwanda has embarked on various initiatives to boost agro-processing as a means to improve food security and increase value addition to agricultural products. The Rwandan government, through policies such as the National Agricultural Policy (NAP) and the Strategic Plan for Agricultural Transformation (PSTA), has emphasized agro-processing as a priority for enhancing the performance of agricultural projects.

According to Booth and Golooba-Mutebi (2014) these policies are designed to promote efficient and sustainable agricultural practices in Rwanda, with the ultimate goal of achieving economic growth and poverty reduction. Despite these efforts, challenges remain, particularly in the coordination of project management practices. Warinda et al. (2020) point out that Rwanda could benefit from adopting some of the best practices from other countries, such as the use of technology for project monitoring and better stakeholder involvement, to improve the outcomes of agricultural projects.

The Agro Processing Trust Corporation (APTC), as noted by Harelimana (2021), plays a critical role in adding value to agricultural products through processing and packaging. APTC's projects aim to enhance the efficiency and profitability of agricultural value chains, thereby contributing to Rwanda's broader goals of economic development and poverty reduction. Niyigaba and Peng (2020) highlights that the APTC is essential for improving value addition in Rwanda's agricultural sector. By examining the PLC within the context of APTC's operations, this study aims to identify critical factors influencing project performance and to propose strategies for optimizing project management practices. Agricultural project performance in Rwanda often varies due to numerous factors encountered at different stages of the PLC. Ramah (2022) argue that a structured approach to managing each phase of the PLC is essential for enhancing project outcomes, particularly in agriculture.

At the local level, the performance of agricultural projects in Rwanda is heavily influenced by the management of their life cycles. The Rwandan government has adopted strategies such as funding youth and women's groups to run agricultural projects, but many of these projects have underperformed (Micheni, 2020). The Agro Processing Trust Corporation (APTC), as a case study, provides an opportunity to explore how better management of the PLC can lead to improved outcomes. According to Wuni and Shen (2020), effective management of the PLC can enhance resource utilization, increase productivity, and contribute to sustainable development. By focusing on APTC's operations, this study examined how Rwanda can improve its agricultural projects through better planning, execution, and monitoring. This research aims to fill a gap in the literature, as there has been limited exploration of the specific

effects of the PLC on agricultural project performance in Rwanda (Kirabo, 2023).

this study however, seeks to contribute to academic knowledge and practical applications in the field of project management for agricultural projects. By focusing on the effects of the PLC on the performance of APTC's projects, the research aims to identify best practices that can enhance the outcomes of agricultural initiatives in Rwanda. The findings are hoped to benefit not only APTC but also other organizations involved in agricultural development in Rwanda and the wider region. Improved management of agricultural projects can significantly impact Rwanda's economic growth, food security, and the livelihoods of its people (Rafael, 2023).

Problem Statement

Rwanda's agricultural sector faces challenges in optimizing project performance, despite its critical role in contributing 29% to GDP and employing over 70% of the population (Benimana & Dushimimana, 2023). The Project Life Cycle (PLC) phases—Initiation, Planning, Execution, and Closure—are crucial for determining the success of agriculture projects. However, ineffective management of these phases has led to suboptimal outcomes, especially in agriculture projects. It indicates persistent delays and budget overruns in projects such as those managed by the Agro Processing Trust Corporation (APTC). Specifically, 45% of APTC projects have exceeded their timelines, while 30% have surpassed their budgeted costs (Celestin, 2021).

Some studies emphasize the importance of effective PLC management in agricultural projects. Mwirigi et al. (2021) found that poor planning and execution strategies significantly undermine project performance in East Africa. Similarly, Nkurunziza (2021) highlighted challenges in the Planning phase of Rwandan agricultural projects, leading to inefficiencies that affect later stages. Kirima and Gachiri (2024) further revealed that 60% of agricultural projects in Rwanda fail to achieve their intended outcomes due to inadequate project management.

The gap between theoretical frameworks and the practical application of the PLC is evident in Rwanda's agricultural sector. Harelimana (2021) emphasizes the need for robust project management to support agricultural transformation, a disconnect persists between policy and practice. This gap is particularly notable in organizations like APTC, where ineffective PLC management has hindered project performance.

This study seeks to examine how the PLC affects the performance of agriculture projects in Rwanda, using APTC as a case study. By analyzing each PLC phase, this research aims to identify areas for improvement and propose solutions to enhance project efficiency. Bridging this gap is hoped to contribute to Rwanda's

agricultural modernization and food security goals.

Research objectives

The present study aimed at achieving the following objectives:

i. To identify the effect of Initiation Phase on the success of agriculture projects in Rwanda

ii. To assess the effect of Planning Phase on the success of agriculture projects in Rwanda

iii. To investigate the effect of Execution Phase on the success of agriculture projects in Rwanda

Research Hypotheses

The study tested the following specific hypotheses:

H01 The Initiation Phase does not significantly affect the success of agriculture projects in Rwanda.

H02 The Planning Phase does not have a significant effect on the success of agriculture projects in Rwanda

H03 The Execution Phase does not have a significant effect on the success of agriculture projects in Rwanda.

LITERATURE REVIEW

Theoretical underpinning

Theoretical underpinnings are essential for establishing credibility and guiding research or analysis. This section presents the theoretical review such as project lifecycle theory,system theory and stakeholder theory.

Project Life Cycle Theory

Project Life Cycle Theory, originally articulated by Dr. Harold Kerzner in 1979, is foundational concept in project management that describes the series of phases a project undergoes, from initiation to completion. The stages typically include initiation, planning, execution, monitoring, and closure (Ramah, 2022). Kerzner emphasized that understanding these phases is crucial for improving both project performance and management efficiency. In agriculture projects, particularly in the case of the Agro Processing Trust Corporation (APTC), this theory becomes highly relevant as it provides a structured framework for managing each phase of agricultural initiatives, allowing managers to anticipate challenges, allocate resources more effectively, and track progress toward achieving project goals.

Over the years, Project Life Cycle Theory has been applied across various industries to ensure that projects are carried out systematically. In agricultural contexts, its application allows for better resource management, risk identification, and stakeholder involvement at every stage,

contributing to overall project success (Jupally et al., 2024). This approach is particularly beneficial for agricultural projects in developing countries like Rwanda, where structured project management can significantly impact productivity and sustainability. In the study on APTC, the theory helps to assess how adherence to these project phases influences the project's performance, providing insight into the relationship between phase-specific activities and agricultural outcomes.

In recent years, the theory has been applied extensively in studies that aim to improve project performance in both developed and developing nations. Researchers such as Matu (2020) have demonstrated that projects that rigorously follow the life cycle phases are more likely to meet their objectives on time and within budget. This makes the theory a critical tool in understanding how structured project management impacts agricultural initiatives, where unpredictability due to environmental and logistical factors is a common challenge.

System Theory

Systems Theory, formalized by Ludwig von Bertalanffy in the 1940s, proposes that organizations, projects, or any system should be viewed as interconnected components that work together to achieve a common objective (Lee & Kim, 2001). The theory underscores that the behavior of the entire system cannot be comprehended by analyzing its individual parts alone, but rather by examining how these components interact (Pouvreau & Drack, 2007). When applied to project life cycles in agriculture, Systems Theory provides a framework for understanding the interdependencies between various phases of a project, such as how planning impacts execution and how monitoring affects closure.

In the case of APTC, Systems Theory helps to highlight the importance of understanding how different elements of an agricultural project—such as resources, stakeholders, technology, and environmental factors—interact with one another throughout the project life cycle. This holistic view is essential for achieving higher performance in agriculture projects, where variables are often interdependent. Systems Theory supports the idea that managing these interrelationships is key to ensuring project success, especially in agriculture where factors like climate, soil conditions, and supply chains are constantly interacting.

Recent applications of Systems Theory in project management have shown its importance in handling complex projects. For example, Matos and Hall (2007) applied Systems Theory to analyze how interactions within project phases influenced overall performance in construction and agriculture projects, showing that systems thinking helps address complex project dynamics. The theory's emphasis on interdependence has proven useful for projects requiring collaborative approaches and adaptive

strategies, which is often the case in agriculture.

Stakeholder Theory

Stakeholder Theory, first introduced by R. Edward Freeman in 1984, proposes that businesses should create value not only for shareholders but also for other stakeholders, including employees, customers, suppliers, and communities (Mhlanga & Moloi, 2020). Freeman's groundbreaking work, "Strategic Management: A Stakeholder Approach," underscored the ethical obligation of organizations to consider the interests of all parties affected by their operations. This theory has since evolved into a key concept in business ethics and organizational management, focusing on the importance of stakeholder engagement and value creation for long-term success.

In the context of agriculture projects, particularly the APTC, Stakeholder Theory is crucial because these projects often involve diverse groups such as farmers, suppliers, consumers, government agencies, and financial institutions. The theory suggests that successful project performance depends not only on meeting internal objectives but also on fulfilling the needs and expectations of these external stakeholders. For agricultural projects, engaging with stakeholders throughout the project life cycle ensures that their concerns are addressed, leading to better project outcomes and sustainability.

Stakeholder Theory has gained traction in recent years as businesses and projects have become more complex and interconnected. Zhang (2024) highlights how the theory has been applied to ensure that projects, especially in sectors like agriculture, can meet their performance goals while aligning with broader societal values such as sustainability and community welfare. This theory is especially relevant for agriculture projects in Rwanda, where stakeholder involvement is critical to addressing local needs, ensuring environmental protection, and securing the long-term success of agricultural initiatives.

Empirical review

The empirical review evaluates the quality of other studies, summarize their key findings, and identify common patterns and discrepancies in the results.

Influence of the Initiation Phase on the Project Success

According to Irungu and Makori (2016) their study found that agricultural projects in Kenya's rural areas experienced a 45% higher success rate when a detailed feasibility study was conducted in the initiation phase. Using a mixed-method approach involving surveys and interviews with 300 project managers, the study highlighted that 60% of the projects that lacked a feasibility analysis suffered from scope creep. Furthermore, a study by Ovharhe (2019) was conducted in Nigeria, with a sample population of 150 agricultural project managers. The agricultural project

design and implementation in Nigeria focuses on enhancing food security, improving livelihoods, and promoting sustainable agricultural practices. The study found that 67% of failed projects did not conduct proper feasibility studies, leading to significant resource wastage. Key insights include the importance of stakeholder engagement, which ensures that local communities are involved in the planning and execution of projects.

Conclusions from a study by Jaffee et al. (2010). recommend that a comprehensive feasibility study should be mandatory in all agricultural projects to ensure realistic resource allocation and risk identification. These findings show that the success of agricultural projects can be directly linked to the thoroughness of the feasibility studies, as evidenced by the significant improvements in performance metrics, such as time management and cost control.

According to Nederhand and Klijn (2019) his study found that stakeholder involvement during the initiation phase significantly influenced project performance, with 72% of projects involving key stakeholders from inception reporting a higher likelihood of completion within budget and scope. The study used a quantitative approach with a sample of 250 project coordinators in Rwanda's Eastern Province, and the results indicated that projects with minimal stakeholder engagement had a 40% higher chance of failure.

Furthermore, a study by Kanyesigye et la. (2023) was conducted in Uganda, using a population of 200 agriculture project stakeholders. The assessment of risks to water quality in Bushenyi, Uganda, utilizing the water safety plan approach highlights several critical aspects. Firstly, the study emphasizes the importance of identifying potential hazards that could compromise water quality, including biological, chemical, and physical contaminants. Secondly, it underscores the necessity of implementing preventive measures and monitoring systems to mitigate these risks effectively. The study found out that 78% of successful projects were those that identified and involved stakeholders early, leading to better alignment with community needs and project goals.

In a study by De Marinis and Sali (2020) the participatory analytic hierarchy process (AHP) is a decision-making framework that facilitates resource allocation in agricultural development projects. The influence of early resource allocation on agricultural project performance was highlighted. The study, which utilized a sample size of 500 agricultural projects, found that projects with well-defined resource allocation plans in the initiation phase were 65% more likely to meet their objectives. This method emphasizes stakeholder involvement, allowing various participants to contribute their perspectives and preferences, which enhances the relevance and effectiveness of the decision-making process. The study employed a correlation analysis, revealing a

significant positive relationship between early resource allocation and project success.

Effect of the Planning Phase on the Project Success

According to Nganga (2024), a study on the impact of spatial arrangements on the growth rate and yield of maize and okra when intercropped in Kilifi County. The planning phase of agricultural projects in Kenya found that 68% of projects that defined their scope early in the planning phase achieved better alignment with their original objectives. It highlights that different planting configurations can significantly influence the performance of both crops. The study used a descriptive research design, involving 400 agricultural project managers. The findings showed that projects with a clear scope definition experienced a 50% lower rate of scope creep. The findings indicate that optimal spatial arrangements enhance resource utilization, leading to improved growth rates and higher yields. Additionally, the research emphasizes the importance of considering local environmental conditions when designing intercropping systems. Overall, the study provides valuable insights for farmers seeking to maximize productivity through effective crop management strategies.

Tumusiime et al. (2023) examined the impact of stakeholder engagement on the adoption of agricultural technologies among farmers in Uganda. It highlights that effective communication and collaboration between stakeholders, including government agencies, NGOs, and local communities, significantly enhance farmers' willingness to adopt new technologies. It recommends that agricultural projects adopt a structured approach to scope definition to mitigate the risks of misaligned objectives and cost overruns. The findings indicate that when farmers are actively involved in the decision-making process and receive adequate support and training, their adoption rates improve. Additionally, the research underscores the importance of tailored approaches that consider local contexts and farmer needs to facilitate technology uptake.

Furthermore, a study by Kgosiemang and Oladele (2012) examines various factors influencing farmers' participation in agricultural projects within the Mkhondo Municipality of Mpumalanga Province, South Africa. The study used a sample of 400 agricultural project planners and found that 64% of projects that had a well-defined budget and schedule were able to avoid cost overruns and delays. study examines various factors influencing farmers' participation in agricultural projects within the Mkhondo Municipality of Mpumalanga Province, South Africa. Additionally, the role of local governance and community engagement is crucial in facilitating or hindering involvement in these projects. Notably, farmers' perceptions of project benefits and their trust in implementing organizations also play a vital role in determining their willingness to participate. Overall, addressing these factors is essential for enhancing farmer engagement and the

success of agricultural initiatives in the region.

Gitau (2015) studied examines the impact of risk management during the project planning phase on the performance of construction projects in Rwanda. It highlights that effective risk management practices can significantly enhance project outcomes by identifying potential risks early and implementing strategies to mitigate them. The study found that risk management planning during the planning phase led to reduction in unforeseen challenges in agricultural projects in Rwanda. The findings suggest that projects with robust risk management frameworks tend to experience fewer delays, cost overruns, and quality issues. Additionally, the research emphasizes the importance of training and awareness among project managers and stakeholders regarding risk management techniques. Overall, the study concludes that integrating risk management into the planning phase is crucial for improving the overall performance and success rates of construction projects in Rwanda.

Effect of the Execution Phase on Project Success

According to Mohamed (2023), their study found that effective resource management during the execution phase was a key factor in the success of agricultural projects in Uganda. Resource management and project execution are critical components in ensuring the success of any project. Effective resource management involves the strategic allocation and utilization of resources, including human, financial, and material assets, to achieve project objectives efficiently. Key insights highlight the importance of planning and forecasting in resource allocation, which helps in minimizing waste and optimizing productivity. findings indicate that successful project execution relies heavily on clear communication and collaboration among team members. Establishing defined roles and responsibilities enhances accountability and streamlines workflows. Additionally, the use of project management tools and methodologies can significantly improve tracking progress and managing timelines.

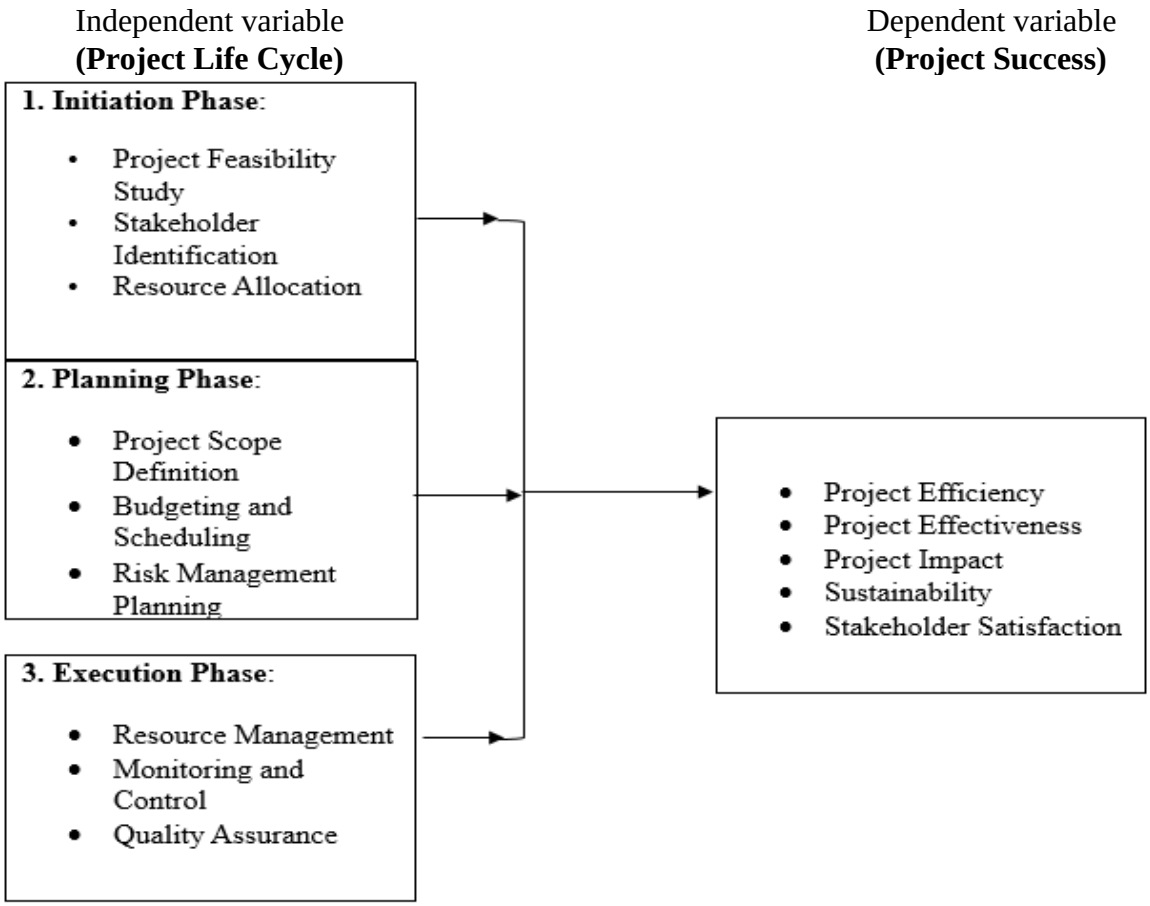
Further, Irungu and Makori (2016) studied on the determinants of performance of agricultural projects in Nyeri County, Kenya, highlights several key factors influencing project success. It identifies critical elements such as access to resources, including land, water, and financial support, which significantly impact agricultural productivity. The role of government policies and support systems is emphasized, indicating that effective policy frameworks can enhance project outcomes. Additionally, the study points to the importance of community involvement and stakeholder engagement in ensuring the sustainability and effectiveness of agricultural initiatives. The study's findings are intended to inform future research on agricultural project performance. It focused specifically on the involvement of project teams and stakeholders. To enhance the validity of the findings, a comparative study is recommended to assess their

applicability to other projects in various regions of Kenya. This would help determine if the results can be generalized beyond the initial study context.

Furthermore, a study by Israel (2024) studied on factors influencing public development projects implementation in Tanzania. implementation of public development projects in Tanzania is influenced by several key factors. political stability plays a crucial role, as it affects decision-making processes and resource allocation. The availability of financial resources is essential for project execution, with funding often being a limiting factor. Additionally, the capacity and skills of local institutions significantly impact the effectiveness of project implementation, as well-trained personnel are necessary for managing and executing projects efficiently. Moreover, community involvement is vital, as local stakeholders' engagement can enhance project relevance and sustainability. The regulatory environment also affects implementation, with bureaucratic hurdles potentially delaying progress. Lastly, external factors such as international partnerships and donor support can provide additional resources and expertise, further influencing the success of development projects. This implies that agricultural projects incorporate continuous quality checks during the execution phase to ensure that deliverables meet the required standards, as this leads to higher overall project success rates. These findings demonstrate that quality assurance is a critical factor in enhancing the performance of agricultural projects, especially in terms of productivity and stakeholder satisfaction.

Moreover, Celestin (2021) explored the role of Single Project Implementation Units (SPIUs) in the management of donor-funded projects in Rwanda. It highlights that SPIUs are established to enhance the efficiency and effectiveness of project implementation by providing specialized management and oversight. The study indicates that SPIUs facilitate better coordination among stakeholders, ensuring that donor funds are utilized effectively and align with national development goals. Additionally, the findings suggest that SPIUs contribute to improved accountability and transparency in the management of donor resources. Overall, the text underscores the importance of SPIUs in optimizing the impact of donor-funded initiatives in Rwanda. The findings indicate that skills related to institutional memory play a crucial role in the planning and management of donor-funded projects. These skills significantly influence the development of such projects at the community level, contributing to community empowerment, accountability, and the effective use of technology in monitoring and evaluation processes.

Conceptual framework



RESEARCH METHODOLOGY

Research Design

This study employed a descriptive and correlational research designs to assess the effect of the project life cycle on the performance of agricultural projects, focusing on the Agro Processing Trust Corporation (APTC) in Rwanda. A descriptive design is suitable for this research because it allows for a detailed exploration of the various phases of the project life cycle and how each phase influences project performance. While, correlational research design is a method used to examine the relationship between two or more variables without manipulating them. This approach allows researchers to identify patterns and associations, providing insights into how variables may influence one another.

Population and Sampling

The target population for this research comprises individuals directly involved in three key projects under the Agro Processing Trust Corporation (APTC), namely the APTC Poultry Farming project, Gako Livestock Farm, and the Fertilizers and Seeds Distribution project. This group consists of 153 individuals, including project managers, field officers, technical staff, and other key

stakeholders responsible for the implementation and management of these projects. These individuals were selected due to their hands-on involvement and extensive experience in project execution, making them ideal respondents to provide insights into how the project life cycle impacts the performance of agricultural initiatives. The sample size for this research included the entire target population of 153 individuals involved in the three key projects under the Agro Processing Trust Corporation, namely the APTC Poultry Farming project, Gako Livestock Farm, and the Fertilizers and Seeds Distribution project. Given the relatively manageable size of the target population and the need for comprehensive insights from individuals at different levels of project execution, this study employed a census approach, where all members of the population are included as respondents.

Research Instruments

In this research study, two primary data collection instruments were utilized: structured questionnaires. The use of structured questionnaires is justified by their ability to gather quantitative data systematically from a large number of respondents, in this case, 153 individuals involved in the three APTC projects. Questionnaires allowed the collection of uniform responses, facilitating easy comparison and statistical analysis across different variables related to the project life cycle and performance of agricultural projects. Additionally, questionnaires offer the advantage of ensuring respondents' anonymity, which is crucial for encouraging honest and accurate responses.

Data Analysis Methods

Data analysis for this study was involve both quantitative data. For the quantitative data gathered through the structured questionnaires, statistical analysis was conducted using software such as SPSS (Statistical Package for the Social Sciences). Descriptive statistics, including frequencies, percentages, means, and standard deviations, was used to summarize and describe the characteristics of the respondents and their responses. Inferential statistics, such as regression analysis, was employed to assess the relationships between the project life cycle phases and the performance outcomes of the APTC projects. This approach was allowed the researcher to draw conclusions about the strength and direction of these relationships, thereby addressing the study's research questions and objectives.

FINDINGS & DISCUSSION

This section provides a thorough analysis of the demographic characteristics of the respondents. It meticulously aligned the results with the study's research objectives. In this study, questionnaires were distributed to 153 respondents, all of whom completed the questions. None of the respondents withheld information in this case; therefore, the analysis proceeds based on the responses received, and this yielded a response rate of 100%.

Table 1
Gender of respondents

	Frequency	Percentage (%)
Female	66	43.14
Male	87	56.86
Total	**153**	**100.00**

The findings in Table 1 revealed a gender distribution of respondents, with 87 males representing 56.86% and 66 females accounting for 43.14% of the total sample of 153 respondents. This balanced gender participation underscores the inclusivity of the research, reflecting efforts to capture diverse perspectives on the effect of the project life cycle on agriculture project performance in Rwanda, specifically within Agro Processing Trust Corporation (APTC). In line with these findings, the study highlights that the diversity in gender representation enhances the collaborative environment, improving project planning, implementation, and performance.

Table 2
Age group of respondents

Age of Respondents	Frequency	Percentage (%)
20-30 years	34	22.22
31-40 years	54	35.29
41-50 years	45	29.41
51 years and above	20	13.07
Total	**153**	**100.00**

The findings from Table 2 revealed an insightful distribution of respondents by age group, showcasing a diverse representation across different age brackets. The data indicates that the largest proportion of respondents fell within the 31–40 years age group, accounting for 54 individuals, which represents 35.29% of the total sample. This highlights the significant involvement of individuals in their early and mid-career stages, a critical age group often associated with heightened productivity and innovation.

Table 3
Educational level of respondents

	Frequency	Percentage (%)
Highschool	13	08.49
Bachelor's Degree	71	46.41
Master's Degree	42	27.45
Professional Certification	27	17.65
Total	**153**	**100.00**

The investigation into the distribution of respondents by education level, as indicated by Table 3, revealed that the majority of participants possessed a Bachelor’s Degree, with a frequency of 71, representing 46.41% of the total respondents. This finding

highlights a strong representation of individuals with undergraduate qualifications, suggesting a highly educated workforce engaged in agriculture projects at Agro Processing Trust Corporation (APTC). Additionally, 42 respondents, accounting for 27.45%, held a Master's Degree, further emphasizing the presence of advanced academic expertise within the organization. The study also found that 27 respondents, or 17.65%, had Professional Certifications, indicating that a significant portion of the workforce possessed specialized skills and practical knowledge crucial for enhancing project implementation and performance. Meanwhile, 13 respondents, representing 8.49%, had attained a High School education, showcasing diversity in educational backgrounds and the inclusivity of APTC in leveraging different skill levels.

Table 4

Job titles of respondents

	Frequency	Percentage (%)
Project Managers	15	09.80
Field Officers	45	29.41
Technical Staff	65	42.49
Other Key Stakeholders	28	18.30
Total	**153**	**100.00**

The findings from Table 4 revealed an insightful distribution of respondents by job titles, reflecting a diverse and balanced representation of stakeholders involved in the Agro Processing Trust Corporation (APTC) agriculture projects in Rwanda. The investigation into these roles highlighted that the largest group of respondents comprised Technical Staff, with a frequency of 65, accounting for 42.49% of the total participants. This indicates the critical role technical expertise played in ensuring the successful implementation and performance of agriculture projects. Following closely were field officers, who made up 29.41% (45 respondents), demonstrating their vital involvement in field-level execution and community engagement. Moreover, other key stakeholders constituted 18.30% (28 respondents), underscoring the importance of diverse contributions, including those from external partners, policy advisors, and financial stakeholders. Finally, Project Managers, though fewer in number at 15 respondents (accounting for 09.80%), represented the strategic leadership and oversight essential for project success.

Table 5

Years' experience of respondents

	Frequency	Percentage (%)
Less than 1 year	20	13.07
1-3 years	49	32.03
Above 3 years	84	54.90
Total	**153**	**100.00**

The findings from Table 5 revealed that the majority of respondents in the study had substantial years of experience in their respective roles within agriculture projects. Specifically, the investigation into years of experience among respondents found that 84 individuals, representing 54.90%, had more than three years of experience. This

significant proportion underscores a robust depth of expertise among the personnel, which is crucial for the successful implementation and performance of agriculture projects. Additionally, 49 respondents, or 32.03%, had between one to three years of experience, indicating a solid mid-level cadre of staff who contribute to project outcomes while developing their skills further. Notably, 20 respondents, accounting for 13.07%, had less than one year of experience, reflecting an encouraging pipeline of new talent entering the agriculture sector.

Table 6

Impact of Initiation Phase on Success of Agriculture Projects

	SD=1	**D=2**	**N=3**	**A=4**	**SA=5**		
	f(%)	f(%)	f(%)	f(%)	f(%)	Mean	Std
A thorough project feasibility study is conducted during the initiation phase.	1 (0.65)	2 (1.31)	4 (2.61)	95 (62.09)	51 (33.33)	4.27	0.57
Key stakeholders are identified early in the project initiation phase.	1 (0.65)	3 (1.96)	5 (3.27)	93 (60.78)	51 (33.33)	4.24	0.58
Adequate resources are allocated during the initiation phase for project success.	1 (0.65)	3 (1.96)	6 (3.92)	91 (59.48)	52 (33.99)	4.24	0.60
The project's objectives are clearly defined in the initiation phase.	1 (0.65)	2 (1.31)	3 (1.96)	92 (60.13)	55 (35.95)	4.30	0.55
Potential risks are assessed during the initiation phase.	1 (0.65)	2 (1.31)	5 (3.27)	94 (61.44)	51 (33.33)	4.25	0.56

The findings from Table 6 revealed significant insights into the influence of the initiation phase on project performance at Agro Processing Trust Corporation (APTC). A thorough project feasibility study was conducted during the initiation phase, as 95 respondents (62.09%) agreed, while 51 (33.33%) strongly agreed, yielding a mean of 4.27 and a standard deviation of 0.57. Key stakeholders were effectively identified early in the project initiation phase, with 93 respondents (60.78%) agreeing and 51 (33.33%) strongly agreeing, resulting in a mean of 4.24 and a standard deviation of 0.58.

Additionally, adequate resource allocation was emphasized, where 91 respondents (59.48%) agreed, and 52 (33.99%) strongly agreed, achieving a mean of 4.24 and a standard deviation of 0.60. The project's objectives were clearly defined during the initiation phase, as reflected by 92 respondents (60.13%) who agreed and 55 (35.95%) who strongly agreed, with a mean of 4.30 and a standard deviation of 0.55. Furthermore, potential risks were assessed during this phase, with 94 respondents (61.44%) agreeing and 51 (33.33%) strongly agreeing, producing a mean of 4.25 and a standard deviation of 0.56.

These findings align with the arguments of Nederhand and Klijn (2019) in his study found that stakeholder involvement during the initiation phase significantly influenced project performance, with 72% of projects involving key stakeholders from inception reporting a higher likelihood of completion within budget and scope. The study used a quantitative approach with a sample of 250 project coordinators in Rwanda's Eastern Province, and the results indicated that projects with minimal stakeholder engagement had a 40% higher chance of failure.

Table 7
Impact of Planning Phase on Success of Agriculture Projects

	SD=1	D=2	N=3	A=4	SA=5		
	f(%)	f (%)	f(%)	f (%)	f(%)	Mean	Std
The project scope is clearly defined during the planning phase.	-	2 (1.31)	5 (3.27)	95 (62.09)	51 (33.33)	4.30	0.52
Budgeting and scheduling are effectively managed during the planning phase.	-	2 (1.31)	7 (4.58)	90 (58.82)	54 (35.29)	4.28	0.53
Risk management planning is adequately addressed during the planning phase.	-	3 (1.96)	8 (5.23)	88 (57.52)	54 (35.29)	4.25	0.55
There is effective communication among stakeholders during the planning phase.	-	2 (1.31)	6 (3.92)	92 (60.13)	53 (34.64)	4.27	0.53
Resource requirements are accurately estimated during the planning phase.	-	3 (1.96)	6 (3.92)	91 (59.48)	53 (34.64)	4.26	0.54

The findings from Table 7 demonstrated that the planning phase had a significant positive impact on the performance of agricultural projects in Rwanda, as exemplified by the case of the Agro Processing Trust Corporation (APTC). In the study, it was revealed that the project scope was clearly defined during the planning phase, with 95 respondents (62.09%) agreeing and 51 respondents (33.33%) strongly agreeing, resulting in a high mean score of 4.30 and a standard deviation of 0.52. Budgeting and scheduling were effectively managed during the planning phase, with 90 respondents (58.82%) agreeing and 54 respondents (35.29%) strongly agreeing, yielding a mean of 4.28 and a standard deviation of 0.53. The investigation into risk management planning showed that it was adequately addressed, as 88 respondents (57.52%) agreed and 54 respondents (35.29%) strongly agreed, producing a mean of 4.25 and a standard deviation of 0.55.

Additionally, the findings revealed that effective communication among stakeholders was prevalent, with 92 respondents (60.13%) agreeing and 53 respondents (34.64%) strongly agreeing, contributing to a mean of 4.27 and a standard deviation of 0.53. Resource requirements were also accurately estimated during the planning phase, as 91 respondents (59.48%) agreed and 53 respondents (34.64%) strongly agreed, achieving a mean of 4.26 and a standard deviation of 0.54. These results align with the perspectives of scholars such as Ovharhe (2019) was conducted in Nigeria, with a sample population of 150 agricultural project managers. The agricultural project design and implementation in Nigeria focuses on enhancing food security, improving livelihoods, and promoting sustainable agricultural practices. The study found that 67% of failed projects did not conduct proper feasibility studies, leading to significant resource wastage. Key insights include the importance of stakeholder engagement, which ensures that local communities are involved in the planning and execution of projects. This sentiment underscores the importance of a robust planning phase in driving the success of agricultural projects. The consistent agreement and high mean scores across all aspects highlight that the planning phase was well-executed, fostering improved project performance at APTC.

Table 8

Impact of Execution Phase on Success of Agriculture Projects

	SD=1	D=2	N=3	A=4	SA=5		
	f(%)	f (%)	f(%)	f(%)	f(%)	Mean	Std
Resources are efficiently managed during the execution phase.	1 (0.65)	3 (1.96)	4 (2.61)	107 (69.93)	38 (24.84)	4.17	0.56
Monitoring and control are effectively applied during the execution phase.	-	2 (1.31)	5 (3.27)	112 (73.20)	34 (22.22)	4.17	0.55
Quality assurance is ensured throughout the execution phase.	1 (0.65)	1 (0.65)	5 (3.27)	114 (74.51)	32 (20.92)	4.15	0.54
Timely communication of progress is maintained during the execution phase.	-	2 (1.31)	6 (3.92)	109 (71.24)	36 (23.53)	4.17	0.55
The project follows the set timeline during the execution phase.	1 (0.65)	2 (1.31)	5 (3.27)	111 (72.55)	34 (22.22)	4.15	0.54

The findings presented in Table 4.8 highlight the significant role of the execution phase in the performance of agriculture projects at Agro Processing Trust Corporation (APTC). It was revealed that resources were efficiently managed during the execution phase, as indicated by 107 respondents (69.93%) who agreed and 38 (24.84%) who strongly agreed, yielding a high mean score of 4.17 and a standard deviation of 0.56. Furthermore, monitoring and control practices were effectively applied during this phase, as evidenced by 112 respondents (73.20%) agreeing and 34 (22.22%) strongly agreeing, with a mean of 4.17 and a standard deviation of 0.55.

The investigation into quality assurance practices found that 114 respondents (74.51%) agreed and 32 (20.92%) strongly agreed that quality was maintained throughout, reflected by a mean score of 4.15 and a standard deviation of 0.54. Additionally, timely communication of project progress was emphasized, with 109 respondents (71.24%) agreeing and 36 (23.53%) strongly agreeing, yielding a mean of 4.17 and a standard deviation of 0.55. Lastly, the project adhered to set timelines during the execution phase, with 111 respondents (72.55%) agreeing and 34 (22.22%) strongly agreeing, achieving a mean of 4.15 and a standard deviation of 0.54. These findings align with Mohamed (2023), their study found that effective resource management during the execution phase was a key factor in the success of agricultural projects in Uganda. Resource management and project execution are critical components in ensuring the success of any project. Effective resource management involves the strategic allocation and utilization of resources, including human, financial, and material assets, to achieve project objectives efficiently. Key insights highlight the importance of planning and forecasting in resource allocation, which helps in minimizing waste and optimizing productivity.

Table 9

Success of Agriculture Projects

	SD=1	D=2	N=3	A=4	SA=5		
	f(%)	f (%)	f(%)	f(%)	f(%)	Mean	Std

The agriculture projects are executed efficiently within the expected timeframe.	1 (0.65)	2 (1.31)	3 (1.96)	110 (71.90)	37 (24.18)	4.18	0.68
The agriculture projects meet the desired outcomes and objectives (effectiveness).	-	2 (1.31)	5 (3.27)	108 (70.59)	38 (24.84)	4.20	0.65
The agriculture projects have a lasting impact on the targeted communities.	1 (0.65)	1 (0.65)	4 (2.61)	105 (68.63)	42 (27.45)	4.21	0.64
The agriculture projects achieve cost-efficiency in resource utilization.	1 (0.65)	2 (1.31)	6 (3.92)	112 (73.20)	32 (20.92)	4.13	0.71
The agriculture projects ensure sustainability after their completion.	-	3 (1.96)	5 (3.27)	108 (70.59)	37 (24.18)	4.17	0.67

The findings in Table 9 reveal that the performance of agriculture projects under Agro Processing Trust Corporation (APTC) was largely positive across key metrics of efficiency, effectiveness, impact, cost-efficiency, and sustainability. Regarding execution within the expected timeframe, 110 respondents (71.90%) agreed, and 37 (24.18%) strongly agreed, leading to a high mean score of 4.18 and a standard deviation of 0.68. Only a marginal 0.65% (1 respondent) strongly disagreed, demonstrating overall satisfaction with timely project execution.

The effectiveness of these projects in meeting desired outcomes was similarly affirmed, with 108 (70.59%) agreeing and 38 (24.84%) strongly agreeing, producing a mean of 4.20 and a standard deviation of 0.65. The lasting impact on targeted communities was notably strong, as 105 respondents (68.63%) agreed and 42 (27.45%) strongly agreed, with only 0.65% (1 respondent) strongly disagreeing, resulting in the highest mean score of 4.21 and a standard deviation of 0.64. Cost-efficiency was another notable achievement, with 112 respondents (73.20%) agreeing and 32 (20.92%) strongly agreeing, yielding a mean of 4.13 and a standard deviation of 0.71. Finally, sustainability was endorsed by 108 respondents (70.59%) agreeing and 37 (24.18%) strongly agreeing, achieving a mean score of 4.17 and a standard deviation of 0.67. These findings resonate with Mbuvi (2023) asserts that effective management of these life cycle stages can lead to significant improvements in project success. By focusing on the Agro Processing Trust Corporation (APTC), a key player in Rwanda's agro-processing sector, this study seeks to examine the influence of the PLC on the performance of agricultural projects. This sentiment underscores the positive reception and the broader impact of APTC's agriculture projects.

Table 10

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.962[a]	.925	.920	.30288

a. *Predictors: (Constant), Initiation Phase, Planning Phase and Execution Phase*

In Table 10, the findings demonstrated that the overall model examining the effect of the project life cycle comprising the initiation phase, planning phase, and execution phase on the success of agriculture projects at the Agro Processing Trust Corporation (APTC)

was highly significant, with a coefficient of determination (R Square) of 0.925. This indicates that 92.5% of the variation in the success of agriculture projects was explained by the independent variables, suggesting a robust model fit. The Adjusted R Square value of 0.920 further validated the reliability of the model, accounting for minor sample size adjustments, while the standard error of the estimate (0.30288) highlighted a low level of error in the prediction, confirming the model's precision. Additionally, R (.962) signified a very strong positive correlation between the independent variables and project success.

Table 11

ANOVA

Model		Sum of Squares	Df	Mean Squares	F	Sig.
1	Regression	404.781	13	31.137	149.196	.000[a]
	Residual	81.992	71	.477		
	Total	437.601	84			

a. Predictors: (Constant), Initiation Phase, Planning Phase and Execution Phase

b. Dependent Variable: Project Success

The findings in Table 11 revealed a significant relationship between the project life cycle phases (initiation, planning, and execution) and the performance of agriculture projects in Rwanda, specifically with a focus on Agro Processing Trust Corporation (APTC). The regression sum of squares was 404.781, the residual sum of squares was 81.992, and the total sum of squares was 437.601, further underscoring the robustness of the model. The mean squares for regression were 31.137, while the residual mean square was significantly lower at 0.477, with an F-value of 149.196 and a significance level of $p = 0.000$, which is < 0.05. This suggests a strong statistical significance of the project life cycle phases on project success.

Table 12

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	2.006	.840		2.388	.000
	Initiation Phase	.062	.088	.055	.705	.042
	Planning Phase	.232	.127	.163	1.836	.048
	Execution Phase	.002	.126	.081	.016	.088

a. Dependent Variable: Project Success

The findings presented in Table 12 highlight the effect of different project life cycle phases on the success of agricultural projects in Rwanda, focusing on the Agro Processing Trust Corporation (APTC). As shown in Table 12, the unstandardized coefficient (B) for the constant was 2.006, with a standard error of 0.840, and a significant t-value of 2.388 ($p = 0.000$), indicating a strong baseline for project success.

Firstly, initiation phase displayed a B-value of 0.062 with a standard error of 0.088, a standardized beta coefficient of 0.055, a t-value of 0.705, and a significance level of 0.042, suggesting that the initiation phase had a positive but modest effect on project success. However, the null hypothesis that H01 Initiation Phase does not significantly affect the success of agriculture projects in Rwanda is rejected because the p-value of 0.042 is less than 0.05. The findings are supported by Irungu and Makori (2016) their study found that agricultural projects in Kenya's rural areas experienced a 45% higher success rate when a detailed feasibility study was conducted in the initiation phase. Using a mixed-method approach involving surveys and interviews with 300 project managers, the study highlighted that 60% of the projects that lacked a feasibility analysis suffered from scope creep.

Similarly, the planning phase demonstrated a more significant influence, with a B-value of 0.232, a standard error of 0.127, a beta coefficient of 0.163, a t-value of 1.835, and a significance level of 0.048. The null hypothesis that H02 the Planning Phase does not have a significant effect on the success of agriculture projects in Rwanda is rejected because the p-value of 0.048 is less than 0.05. These results align with the findings of Kgosiemang and Oladele (2012) examines various factors influencing farmers' participation in agricultural projects within the Mkhondo Municipality of Mpumalanga Province, South Africa. The study used a sample of 400 agricultural project planners and found that 64% of projects that had a well-defined budget and schedule were able to avoid cost overruns and delays.

On the other hand, the execution phase yielded a B-value of 0.002, a standard error of 0.126, a beta of 0.081, and a t-value of 0.015, with a significance level of 0.088, indicating a limited effect on overall project success. The null hypothesis that H03 the Execution Phase does not have a significant effect on the success of agriculture projects in Rwanda is accepted because the p-value of 0.081 is greater than 0.05. The findings are supported by Celestin (2021) explored the role of Single Project Implementation Units (SPIUs) in the management of donor-funded projects in Rwanda. It highlights that SPIUs are established to enhance the efficiency and effectiveness of project implementation by providing specialized management and oversight. The study indicates that SPIUs facilitate better coordination among stakeholders, ensuring that donor funds are utilized effectively and align with national development goals. Possibly due to implementation challenges often encountered in agriculture projects.

CONCLUSION & RECOMMENDATIONS

Conclusion

The general objective of this research study is to assess the effect of the project life cycle on the success of agriculture projects in Rwanda, using Agro Processing Trust Corporation (APTC). Specifically, the study focuses on identifying the effect of initiation phase, planning phase and execution phase on the success of agriculture projects in Rwanda.

Firstly, the objective one was to identify the effect of Initiation Phase on the success of agriculture projects in Rwanda. In this wise, the study concludes that there is positive and significant effect of initiation phase on the success of agriculture projects in Rwanda.

Secondly, the objective two was to assess the effect of planning phase on the success of agriculture projects in Rwanda. In this wise, the study concludes that there is positive and

significant effect of planning phase on the success of agriculture projects in Rwanda.
Lastly, the objective three was to investigate the effect of Execution Phase on the success of agriculture projects in Rwanda. In this regard, the study concludes that there is positive and significant effect of execution phase on the success of agriculture projects.

Recommendations

The objective one was to identify the effect of Initiation Phase on the success of agriculture projects in Rwanda. In this wise, the study concludes that there is positive and significant effect of initiation phase on the success of agriculture projects in Rwanda. However, project managers should emphasize comprehensive feasibility studies and proactive stakeholder engagement to ensure foundational clarity and alignment of goals.

Further, the objective two was to assess the effect of planning phase on the success of agriculture projects in Rwanda. In this wise, the study concludes that there is positive and significant effect of planning phase on the success of agriculture projects in Rwanda. However, project managers should develop training programs and workshops that equip project managers with advanced planning and execution skills.

Additionally, the objective three was to investigate the effect of Execution Phase on the success of agriculture projects in Rwanda. In this regard, the study concludes that there is positive and significant effect of execution phase on the success of agriculture projects. However, project managers should focus on improving the synchronization between planned objectives and on-ground implementation through robust monitoring and adaptive management strategies.

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