



Quality Management Strategies and Economic Performance of Livestock Projects: A Case of Partnership for Resilient and Inclusive Small Stock Market Project in Rulindo District, Rwanda

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Abstract: Livestock plays a crucial role in rural communities' global social and economic development by ensuring access to food, generating revenue, and creating employment opportunities. Despite the significant contribution of the livestock projects in Rwanda, there is a lack of studies focusing on effect of quality management strategies on economic performance of livestock projects. The general objective of this study was to assess the influence of quality management strategies on economic performance of livestock projects in Rulindo District, Rwanda. The study used descriptive and correlational research designs. The target population of this study was 344 participants including 107 Partnership for Resilient and Inclusive Small Stock Market (PRISM) staff, 24 PRISM stakeholders in local government and 213 beneficiary representatives at cell level in Rulindo District, but only a sample size of 185 respondents were included in the study. This study used stratified sampling. Primary data was collected through structured questionnaire and an interview guide. The study concluded that there is significant influence of quality management strategies on economic performance of livestock projects in Rulindo District, Rwanda. The study recommends that the Government should invest in enhancing breeding programs by providing access to superior breeding stock and modern breeding techniques.

Keywords: Quality management strategies, Breeding services, Value-added processing services, Capacity building, Performance of livestock projects

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1. Introduction

Globally, livestock plays a crucial role in rural communities' social and economic development across the world by ensuring access to food, generating revenue, and creating employment opportunities (Santoro, Venturi, Bertani & Agnoletti, 2020). Livestock projects have long been an integral aspect of rural life in Asia, Europe, and the Americas, contributing to cultural preservation and environmental sustainability (Santoro *et al.*, 2020).

In Portugal, many people are looking to livestock enterprises to boost their economy and social standing in response to worries about rural population decline and stagnation (Carvalho, Rocha & Lopes, 2021). The potential for these initiatives to increase income creation and generate jobs in rural areas has been recently highlighted in research (Pimenta, Prestes, Fialho & Rocha, 2023).

For millions of people living in rural areas of Asia, livestock farming is an essential component of their life and means of subsistence (Fernandes, Pimentel & Ginja,

2022). Livestock projects have evolved as a technique to enhance socioeconomic progress in these areas. These projects seek to improve animal husbandry practices and access to markets while also enhancing the livestock industry (Sarkar, 2020).

Rural livelihoods in Senegal are dependent on livestock farming since it provides a source of income, ensures food security, and has cultural value (Fall, Diallo & Ndiaye, 2022). However, the potential for expansion is hindered by factors such as restricted access to veterinary services, better breeds, and market infrastructure (Fall, Diallo & Ndiaye, 2022). In an effort to find solutions to these problems, initiatives such as the *Projet d'Appui au Pastoralisme au Sahel (PRAPS)* have been developed. According to the findings of Fall, Diallo and Ndiaye (2022), such programs have the potential to empower women in pastoral communities by providing them with training in animal health and marketing. This training enables them to make a more substantial contribution to the income of their households.

Rural Rwandans rely heavily on livestock, especially cows, for both subsistence farming (milk and meat) and economic stability (food security) (Ndayishimiye, Mukunzi, Mussa & Nyangezi, 2021). Traditionally, livestock ownership has been a symbol of wealth and social status in Rwandan communities. However, recent years have seen a growing focus on utilizing livestock projects to drive broader socioeconomic growth in rural areas. This change is driven by several sources (Ndayishimiye *et al.*, 2021).

Rwanda has the lowest livestock output in the area, in spite of livestock being crucial to the Rwandan economy and people's livelihoods. According to Niyonshuti (2021) livestock industry faces a number of challenges, including limited quality feed resource base due to severe land and other abiotic and biotic constraints, low genetic potential of livestock breeds, infectious and vector-borne diseases, some of which attract public health and biosafety concerns, as well as high postharvest losses and quality assurance challenges that impede access to markets. Inadequate and low-quality feeds, with planted forages making only a little contribution as animal feed, are the most important of these limitations that lead to low livestock output. Pasture productivity has been on the decline owing to overgrazing, bad management, and drought, and natural pasture area has been decreasing over time as a result of more crops than cattle raising (Kirabo & Mupenzi, 2020).

According to Ntabakirabose, Mbabazi, Mpatwenumugabo, Izamuhaye and Mburu (2022), Challenges that face the animal feed industry include; improving quality of feedstuffs, reliable supply of raw materials; improving knowledge on feed formulation, regulating animal feed industry; increasing investment in animal feed production; and formulating and strengthening animal feeds manufacturer associations. Challenges facing milk production and productivity of

dairy animals include increased availability of quality dairy animals, consistent supply of quality feed resources, control of livestock diseases, and provision of technical support services, establishment, and strengthening of dairy farmer organizations.

The literature review revealed a gap in research concerning livestock projects specifically in the Partnership for Resilient and Inclusive Small Stock Market (PRISM) Rulindo District. Despite the significant contribution of the livestock sector to Rwanda's economy and livelihoods, there is a lack of studies focusing on initiatives within the Rulindo District. The study on quality management strategies of the livestock project in Rulindo District, Rwanda, aims to address key gaps in the livestock industry. By implementing initiatives to enhance feed quality, promote better livestock breeds, and provide technical support to farmers, the project seeks to boost milk production and overall livestock output. Additionally, it aimed to strengthen farmer organizations, regulate the animal feed industry, and increase investment in feed production.

1.1. Objectives of the Study

The general objective of this study was to assess the influence of quality management strategies on economic performance of livestock projects in Rulindo District, Rwanda.

Specifically, the study was guided by the following objectives:

- i. To assess the influence of breeding services on economic performance of livestock projects in Rulindo District, Rwanda
- ii. To determine the influence of value-added processing services on economic performance of livestock projects in Rulindo District, Rwanda
- iii. To examine the influence of capacity building on economic performance of livestock projects in Rulindo District, Rwanda

2. Literature Review

2.1. Empirical Review

A study conducted in Kyrgyzstan by Yang, Wang, Zhang, Su, Wu, Yan, and Yang (2022) looked at how various environmental and socioeconomic variables affected livestock output. Using a two-period livestock production model and a geographical panel model, the study examined the dynamics of livestock sales, self-consumption, and inventory in Kyrgyzstan from 2006 to 2020. The study then evaluated the influence of socioeconomic and environmental factors on these variables. More than half of the livestock in Kyrgyzstan was

stocked every year between 2006 and 2020, according to the statistics. This suggests that herders in the country used their cattle as a hedge against uncertainty. Kyrgyz herders might increase their profits by increasing or decreasing the size of their livestock company, adjusting their self-consumption, and managing their inventory according to the market price of livestock, the loan on livestock, non-herding revenue, and the present stock. Our research showed that spatial spillover effects occurred as a result of animal husbandry development in seven oblasts of Kyrgyzstan. This means that surrounding oblasts were significantly impacted by the dynamics of the animal husbandry market and environment, which in turn affected the scale of local animal husbandry. The herdsmen's income and the long-term viability of the animal husbandry business are both bolstered by our study, which in turn helps emerging nations whose economies rely on this sector to grow.

Researchers Adams, Ohene-Yankyera, Aidoo and Wongnaa (2021) looked at how livestock husbandry benefited Ghana's economy. Thus, in two agro-ecological zones (the Guinea and the Sudan savannah) in northern Ghana, this research aims to quantify the total economic advantages linked to traditional small ruminant systems by taking into consideration both market and non-market values. For this empirical study, the study surveyed 249 small ruminant producers using a multistage sample strategy to gather cross-sectional data. The findings reveal that a significant portion of the net benefits derived from the production of sheep and goats in northern Ghana are in non-marketable forms, namely non-cash. After accounting for the non-market value of the system, the research shows that the conventional free-range method of sheep and goat management is financially sound. Results might help northern Ghanaians and others in sub-Saharan Africa (SSA) increase meat production and revenue by enhancing the conventional small ruminant system.

Durongkaverroj (2023) investigated the significance of domestic value added in exports during the global value chain era: Evidence from Thailand. Several nations' policymakers are aiming to boost exports' domestic value added. This research set out to analyze this focus on global value chains via the lens of industrial policy and trade. Using Thailand as an example, the formal empirical analysis models the link between domestic value added and two export performance measures (net-export profits and export-led income) using a combination of input-output analysis and panel econometrics. Industries with a lower domestic value added do not do better than those with a higher one, according to results from a system GMM estimator. Net export revenues and export-induced income do not correlate with domestic value added. But there's proof that export performance is much improved when more people are involved in global manufacturing networks. The conclusion is that there may be developmental costs

to focus on local value added rather than participating in global value chains.

Suresti, Tan, Adrimas and Dinata (2021) examined the contribution of the cattle sub-sector to the development of the West Sumatran economy. Examining the impact of cattle on economic growth in West Sumatra Province was the primary goal of this research. This research made use of shift share analysis, dynamic location quotient, and analysis of location quotient (LQ). This research made use of secondary data that was collected between 2016 and 2019. Desk study was the research strategy used. According to the findings, the livestock sub-sector did not provide a base. Livestock continued to play an important role in the future, as seen by the average LQ value of 0.96 from 2016–2019; this subsector will continue to be non-base. The economic framework dictated this shift in responsibility.

Kappes, Tozooneyi, Shakil, Railey, McIntyre, Mayberry, Rushton, Pendell and Marsh (2023) conducted a scoping analysis of chosen literature to analyze the economics of cattle health and diseases. Diseases affecting animals in both industrial and subsistence settings may have far-reaching consequences for economies, consumers, and producers. The need for efficient and secure methods of producing food from animals is rising worldwide. More effective investment paths, safer consumption, and efficient markets may all result from policymakers having a firm grasp of the full scope of animal disease burdens and how they are distributed throughout value chains. The current body of information about the impact of animal diseases on production, treatment and prevention, animal welfare, commerce, and regulation is reviewed in this article. scopping study included 192 documents from various organization reports and peer-reviewed journals. Our research shows that there is a lack of data on the worldwide impacts of animal illnesses and the distribution of these costs throughout value chains. In order to increase access to information on the effects on animal health, we also highlight the importance of developing an analytical framework based on existing methodologies to direct future assessments of the disease burden in animals.

Upadhyay, Goel and John (2023) recorded the steps taken to create and assess a program to enhance the skills of public health managers in different LMICs. Incorporating a number of cutting-edge learning and assessment strategies, as well as the Kirkpatrick training evaluation model, a training program was created according to Kern's six-step structure. The software was developed using the Delphi method. From 2016 to 2019, 178 participants from 42 countries registered in these five- to ten-day International Public Health Management Development Programs (IPHMDPs), which were partially or totally sponsored. Subjects such as monitoring and evaluation, project/program planning, supply chain management, and quality management showed the most notable improvement in participants'

knowledge scores ($P < 0.0001$) after completion of all programs. Ninety percent of participants turned in their plans for action within a week of the program, and 64 percent of those participants followed through with their goals within six months. With the ability to replicate the training, workshop, or webinar in their own environments, 54.7% of participants were able to put their newfound knowledge into practice. To address a wide range of public health management issues, low- and middle-income countries (LMICs) may benefit from a comprehensive program that trains public health managers to be more effective in their roles.

Zia, Ahmad, Alvi and Sheikh (2021) examined the impact of livestock extension education on empowering rural Punjabi women in Pakistan by enhancing their knowledge and abilities in fundamental animal husbandry activities. The Livestock and Dairy Development Department (L&DD) of the Government of the Punjab organized awareness seminars on fundamental animal husbandry methods in 2017. As part of their livestock extension education program, 197 females from the province participated in the survey. Information was collected in March 2018 from two female secondary schools in two rural union councils in Raiwind Tehsil, which was chosen at random from five Tehsils in the district of Lahore, Punjab, Pakistan. This paper's data came from the first author's own scholarly work. Half of the women in the research reported an improvement in their ability to handle cattle after participating in awareness training. At least two-thirds of the people who worked with animals were women, and they were mostly responsible for feeding and tending to their health. For better dairy output, a large percentage of people (69%) knew what to look for in animal feed. Many people who took the survey said that their training helped their family members, especially the women, learn more about livestock management. The availability of cattle at home was shown to be connected with respondents' desire and willingness to attend this awareness session, however. The significance of livestock awareness programs in enhancing the ability of respondents and their families was highlighted by the results of this research. In order to boost production in the livestock sector of the agriculture-economy, the research suggests policies that the education department and L&DD work together to help rural women improve their abilities in livestock management.

3. Methodology

The study adopted descriptive and correlational research designs. Descriptive research design allows for the use of mixed method approach for collecting both quantitative and qualitative data of the phenomenon in their current state. The correlational research design is used to show the strength of the relationship between the variables under study.

The target population of this study was 344 including 107 PRISM staff, 24 PRISM stakeholders in local government and 213 beneficiary's representatives at cell level in Rulindo District. This population forms the basis for the study, focusing on the influence of livestock projects on economic performance.

Slovin's formula was used to determine the sample size for this investigation, Therefore, 185 people made up the complete sample size. Researchers used Stratified sampling. Respondents were selected from the clusters using a basic random sampling method for the study.

The researcher identified and utilized relevant documents that pertain to the study's focus. These documents included official records, historical archives, reports, memos, articles, photographs, and any other recorded materials that are connected to the research topic. The questionnaire used a commonly employed data collection method in which participants are presented with a series of questions to answer. In the current study, a total of 185 questionnaires were distributed to gather quantitative and relevant data.

Regression and correlation analyses were conducted to examine the relationships between independent variables (breeding services, value-added processing services, and capacity building and training services) and the dependent variable (Economic performance of PRISM). The regression equation formulated for this analysis allowed for the estimation of the impact of each independent variable on the dependent variable, taking into account the respective beta coefficients and error term.

The researcher kept confidentiality for the participants by not asking for their names or other personally identifiable data. Selecting respondents was conducted freely and fairly with no discrimination based on religion, sex, race, etc. The researcher ensured participant privacy by using anonymous data collection methods, obtaining informed consent, and implementing strict confidentiality protocols to prevent any impact on their personal or professional lives. All data collected was going to be exploited solely for research.

4. Results and Discussion

This section presents the findings of the study based on the data collected from the field. The analysis is centered on the overall objective of the study.

4.1 Response Return Rate

In this study, 167 questionnaires were completed and returned out of 185 that were distributed. To calculate the response rate, divide the number of completed questionnaires by the total number distributed and multiply by 100 to convert it into a percentage.

Table 1: Questionnaire Response Rate

Sample size	Questionnaire returned	Rate (%)
185	167	90.27

This results in a response rate of approximately 90.27%, indicating a high level of participation, as more than nine out of every ten recipients completed and returned their questionnaires. Thus, the researcher ensured that the questionnaire used had simple questions, and an understandable format, which made participation easy. A proper follow-up reminder by whichever method increases response greatly. It was quite useful because it reminded those respondents who had good intentions of replying but have since forgotten.

4.2 Breeding Services and Economic Performance of Livestock Projects

The first objective of the study was to assess the influence of breeding services on economic performance of livestock projects in Rulindo District, Rwanda.

Table 2: Relationship Between Breeding Services and Economic Performance of Livestock Projects

		Breeding services	Economic performance of Livestock Projects
Breeding services	Pearson Correlation	1	.725**
	Sig. (2-tailed)		.000
	N	167	167
Economic performance of Livestock Projects	Pearson Correlation	.725**	1
	Sig. (2-tailed)	.000	
	N	167	167

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

Table 2 shows that there is a strong positive correlation ($R = 0.725$) between breeding services and economic performance of livestock projects which is statistically significant ($p=0.000<0.05$). This shows that breeding services and economic performance of livestock projects are statistically strongly and positively correlated such that as breeding services increase, economic performance of livestock projects also improves to a high

extent. The findings are in line with the study conducted Cole, Dürr and Nicolazzi, (2021) breeding services include artificial insemination, genetic testing, and embryo transfer. To ensure the long-term viability and financial success of animal husbandry, breeding services use cutting-edge reproductive technology and selective breeding techniques to improve the genetic diversity, health, and productivity of cattle.

Table 3: Influence of Breeding Services on Economic Performance of Livestock Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
Summary	.725 ^a	.526	.523	.48645		
Model	Sum of Squares	df	Mean Square	F	Sig.	
ANOVA	Regression	43.300	1	43.300	182.982	.000 ^b
	Residual	39.045	165	.237		
	Total	82.345	166			
Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
Coefficients	(Constant)	.970	.200		4.841	.000
	Breeding services	.761	.056	.725	13.527	.000

a. Dependent Variable: Economic performance of Livestock Projects

b. Predictors: (Constant), Breeding services

From the output in Table 3, the model summary gives a R^2 value = 0.526 with $p=0.000<0.05$. This shows that Breeding Services account for 52.6% of Economic Performance of Livestock Projects. Moreover, the model was found to be a good fit for the data and variables with $F(1, 165) = 182.982$ ($p = 0.000<0.05$). The coefficient of the constant term ($\beta=0.970$, $p = 0.000<0.05$) and the coefficient of Breeding Services ($\beta= 0.761$, $p = 0.000<0.05$) were found to be statistically significant.

Thus, a unit change in Breeding Services improves Economic Performance of Livestock Projects by 0.761units.

$$\text{Linearly, } Y = 0.970 + 0.761X_1$$

Test for Hypothesis One

H_{01} : There is no significant influence of breeding services on economic performance of livestock projects in Rulindo District, Rwanda.

Since the results showed ($p < 0.05$), null hypothesis was rejected and alternative accepted. Thus, there is significant influence of breeding services on economic performance of livestock projects in Rulindo District, Rwanda.

4.3 Value-Added Processing Services and Economic Performance of Livestock Projects

The second objective of the study was to determine the influence of value-added processing services on economic performance of livestock projects in Rulindo District, Rwanda.

Table 4: Relationship Between Value-Added Processing Services and Economic Performance of Livestock Projects

		Value added processing services	Economic performance of Livestock Projects
Value added processing services	Pearson Correlation	1	.714**
	Sig. (2-tailed)		.000
	N	167	167
Economic performance of Livestock Projects	Pearson Correlation	.714**	1
	Sig. (2-tailed)	.000	
	N	167	167

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

Table 4 shows there is a strong positive correlation ($R = 0.714$) between value-added processing services and economic performance of livestock projects which is statistically significant ($p=0.000 < 0.05$). This shows that value-added processing services and economic performance of livestock projects are statistically strongly and positively correlated such that as value-

added processing services increases, economic performance of livestock projects also improves to a high extent. The findings are in line with the study conducted by Syofya and Chatra (2022), who stated that Value-added processing services involve the transformation of raw agricultural products into finished goods that have higher market value.

Table 5: Influence of Value-Added Processing Services on Economic Performance of Livestock Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
Summary	.714 ^a	.509	.507	.49476		
Model	Sum of Squares	df	Mean Square	F	Sig.	
ANOVA	Regression	41.955	1	41.955	171.389	.000 ^b
	Residual	40.391	165	.245		
	Total	82.345	166			
Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
Coefficients	(Constant)	1.006	.204		4.929	.000
	Value added processing services	.765	.058	.714	13.092	.000

a. Dependent Variable: Economic performance of Livestock Projects

b. Predictors: (Constant), Value added processing services

From the output in Table 5, the model summary gives a R^2 value = 0.509 with $p=0.000 < 0.05$. This shows that Value added processing services account for 50.9% of Economic Performance of Livestock Projects Moreover, the model was found to be a good fit for the data and variables with $F(1, 165) = 171.38$ ($p = 0.000 < 0.05$). The coefficient of the constant term ($\beta=1.006$, $p = 0.000 < 0.05$) and the coefficient of Value-added processing services ($\beta= 0.765$, $p = 0.000 < 0.05$) were found to be statistically significant. Thus, a unit change in Value added processing services improves Economic Performance of Livestock Projects by 0.765 units.

Linearly, $Y = 1.006 + 0.7652X_2$

Test for Hypothesis Two

H_{02} : There is no significant influence of Value-added processing services on economic performance of livestock projects in Rulindo District, Rwanda.

Since the results showed ($p < 0.05$), null hypothesis was rejected and alternative accepted. Thus, there is significant influence of Value-added processing services on economic performance of livestock projects in Rulindo District, Rwanda.

4.4 Capacity Building and Economic Performance of Livestock Projects

The third objective of the study was to examine the influence of capacity building on economic performance of livestock projects in Rulindo District, Rwanda.

Table 6: Relationship Between Capacity Building and Economic Performance of Livestock Projects

	Capacity building	Economic performance of Livestock Projects
Capacity building	Pearson Correlation	1
	Sig. (2-tailed)	.664**
	N	167
Economic performance of Livestock Projects	Pearson Correlation	.664**
	Sig. (2-tailed)	.000
	N	167

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

Table 6 shows there is a strong positive correlation ($R = 0.664$) between capacity building and economic performance of livestock projects which is statistically significant ($p=0.000 < 0.05$). This shows that capacity building and economic performance of livestock projects are statistically strongly and positively correlated such that capacity building increases, economic performance

of livestock projects also improves to a high extent. The findings are in line with the study conducted by Alayoubi, Al Shobaki & Abu-Naser (2020), Capacity building focuses on strengthening the competencies and capabilities of people and organizations. These services offer various forms of training, including technical skills development, leadership training, and organizational management courses.

Table 7: Influence of Capacity Building and Economic Performance of Livestock Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
Summary	.664 ^a	.440	.437	.52842		
Model	Sum of Squares		df	Mean Square	F	Sig.
ANOVA	Regression	36.272	1	36.272	129.900	.000 ^b
	Residual	46.073	165	.279		
	Total	82.345	166			
Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients	T	Sig.
Coefficients	(Constant)	1.336	.206		6.496	.000
	Capacity building and training services	.665	.058	.664	11.397	.000

a. Dependent Variable: Economic performance of Livestock Projects

b. Predictors: (Constant), Capacity building

From the output in Table 7, the model summary gives a R^2 value = 0.440 with $p=0.000 < 0.05$. This shows that Capacity Building accounts for 44.0% of Economic Performance of Livestock Projects Moreover, the model was found to be a good fit for the data and variables with $F(1, 165) = 129.900$ ($p = 0.000 < 0.05$). The coefficient of the constant term ($\beta=1.336$, $p = 0.000 < 0.05$) and the coefficient of Value-added processing services ($\beta=0.665$, $p = 0.000 < 0.05$) were found to be statistically significant. Thus, a unit change in Capacity Building accounts improves Economic Performance of Livestock Projects by 0.665 units.

Linearly, $Y = 1.336 + 0.665X_3$

Test for Hypothesis Three

H_{03} : There is no significant influence of Capacity Building on economic performance of livestock projects in Rulindo District, Rwanda.

Since the results showed ($p < 0.05$), null hypothesis was rejected and alternative accepted. Thus, there is significant influence of Capacity Building on economic performance of livestock projects in Rulindo District, Rwanda.

4.5 The combined effect of Quality Management Strategies on Economic Performance of Livestock Projects

A multiple regression analysis was done to show the combined effect of independent variable on the dependent variable, that is, Quality Management Strategies of Capacity building, breeding services, Value added processing services on Economic Performance of Livestock Projects.

Table 8: The combined effect of Quality Management Strategies on Economic Performance of Livestock Projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
Summary	.780 ^a	.608	.600	.44517		
Model	Sum of Squares		df	Mean Square	F	Sig.
ANOVA	Regression	50.042	3	16.681	84.169	.000 ^b
	Residual	32.303	163	.198		
	Total	82.345	166			
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Coefficients	(Constant)	.513	.199		2.573	.011
	Breeding services	.372	.090	.355	4.118	.000
	Value added processing services	.260	.096	.242	2.694	.008
	Capacity building	.268	.069	.267	3.872	.000

a. Dependent Variable: Economic performance of Livestock Projects

b. Predictors: (Constant), Capacity building, Breeding services, Value added processing services

From the output in Table 8, the model summary reveals an R² value = 0.608 with p = 0.000 < 0.05. This indicates that the combined Quality Management Strategies (Capacity building, breeding services and Value-added processing services) account for 60.8% of the variation in Economic Performance of Livestock Projects. This suggests a strong explanatory power of the independent variables in predicting the dependent variable. The model is found to be a good fit for the data and variables, as indicated by the F (3, 163) = 84.169 (p = 0.000 < 0.05). The coefficients analysis reveals that the constant term has a coefficient of $\beta = 0.513$ (p = 0.000), which is statistically significant, representing the expected level of Economic Performance of Livestock Projects when all Quality Management Strategies are excluded. Breeding services has a coefficient of $\beta = 0.372$ (p = 0.000 < 0.05), indicating that a unit increase in Breeding services contributes to a 0.372 -unit improvement in Performance of Livestock Projects. Similarly, the Value-added processing services shows a coefficient of $\beta = 0.260$ (p = 0.000 < 0.05), suggesting that every unit increase in Value added processing services leads to a 0.260-unit increase in Performance of Livestock Projects. Lastly, the Capacity building demonstrates the highest impact with a coefficient of $\beta = 0.268$ (p = 0.000 < 0.05), showing that a unit increase in Value added processing services results in a 0.268 -unit improvement in Performance of Livestock Projects. All variables are statistically significant, indicating their critical roles in enhancing Performance of Livestock Projects.

Linearly, the variables can be modeled using the equation:

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

Where, B₀ is coefficient of the constant term, β_1 , β_2 and β_3 were the coefficients of the predictors while X₁, X₂ and X₃ were the predictors (Capacity building, breeding services and Value added processing services) and ε is the error term. Thus, replacing the coefficients, the equation becomes:

$$Y = 0.513 + 0.372X_1 + 0.260X_2 + 0.268X_3$$

The analysis reveals that all three Quality Management Strategies significantly and positively impact the Performance of Livestock Projects. The high R² value (0.608) demonstrates the collective importance of these strategies in explaining variations in performance. Simultaneous application of all strategies yields better outcomes than implementing them individually. This finding highlights the critical role of Quality Management Strategies on Performance of Livestock Projects.

This supported by Wurzinger *et al.* (2021) revealed that quality management strategies encompass a structured set of activities designed to ensure that an organization's outputs consistently meet predetermined quality standards. They involve defining quality objectives, implementing processes to achieve these objectives, and continuously monitoring performance through data and feedback.

5. Conclusion and Recommendations

5.1 Conclusions

The following conclusions were made based on the findings of the study:

On the economic performance of livestock projects; the study concludes that there is a strong positive perception of the economic performance of livestock projects. The projects are viewed as effective in improving savings and significantly enhancing health outcomes. There is also a recognition of positive impacts on nutrition levels, food security, and overall livelihoods.

On the first objective of breeding services, the research concludes that breeding services offered through livestock projects are perceived positively by beneficiaries. These services are recognized for promoting genetic diversity, which enhances profitability, as well as for improving livestock health and productivity. Insemination services are particularly

viewed as effective, contributing to the long-term viability of livestock.

On the second objective of value-added processing services; The findings conclude that value-added processing services provided through livestock projects are highly regarded by beneficiaries. These services are credited with enhancing the quality of livestock products and accessing niche markets, which significantly benefit participants. Compliance with health regulations is recognized as an important factor in building consumer trust, while value-added processing is also noted for creating employment opportunities and attracting investments.

On the third objective of capacity building, the study concludes that capacity building associated with livestock projects are viewed favorably by beneficiaries. These initiatives are seen as essential for empowering participants with the necessary knowledge and skills. The adoption of best practices through training is recognized for enhancing efficiency, while continuous training updates help beneficiaries stay informed about industry trends.

The findings show that all the three Quality Management Strategies have positive and significant effects on the Performance of Livestock Projects. The results prove that all these strategies are useful in explaining differences in performance at an aggregate level. When all strategies were applied simultaneously, there were better result than when strategies were applied one at a time. This discovery is an indication of the importance of Quality Management Strategies on Performance of Livestock Projects.

5.2 Recommendations

1. Government should prioritize capacity building for livestock farmers through structured training programs that focus on best practices in livestock management, production efficiency, and marketing strategies. The PRISM Project should focus on developing comprehensive training modules that address the specific needs of local livestock producers in the Rulindo District.
2. PRISM Project should establish partnerships with local governments, academic institutions, and agricultural organizations to create a support network for livestock producers.

5.3 Suggestion for future researchers

Further research into specific aspects of each quality management strategy will provide more detailed recommendations for program design and implementation. Other researchers can assess the effect

of stakeholders' participation on performance of livestock projects in Rulindo District.

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