
**Livestock Management Practices and Economic Development of Rural Areas in Terekeka
County in Central Equatoria State, South Sudan**

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Abstract

Terekeka County in South Sudan is richly endowed with natural resources, especially livestock, supported by diverse vegetation and favorable climatic conditions. The livestock sector, comprising cattle, sheep, and goats, plays a vital role in rural livelihoods and has great potential to drive socio-economic development. However, its economic contribution remains limited, as cultural practices prioritize prestige and traditional marriage, often fueling cattle raiding. The main objective of this research was to investigate the role of livestock management practices in the economic development of rural areas, with a specific focus on Terekeka County in Central Equatoria State. The study adopted a positivist research philosophy and a cross-sectional survey design. The target population was 11,836 household heads across four Payams in Terekeka County. Slovin's formula was used in the determination of the sample size, which resulted in a sample of 387 participants. A stratified random sampling technique was used to ensure representation from each Payam. Primary data was used, which was collected through semi-structured questionnaires. The research instrument generated both quantitative and qualitative data, which was analyzed using descriptive and inferential statistics through SPSS for quantitative data and thematic analysis for qualitative data. The study found that livestock management practices significantly contribute to the economic development of rural areas in Terekeka County, with improvements in breeding, feeding, and grazing systems enhancing productivity. However, health and disease management remain constrained by limited veterinary access, inadequate infrastructure, and inconsistent preventive care, highlighting the need for stronger extension services and reliable vaccine supply. The study recommends establishing a comprehensive livestock health policy, including mobile and stationary clinics, trained Community Animal Health Workers, and strengthened vaccine distribution to improve livestock health and rural livelihoods. Additionally, sustainable grazing practices, enhanced veterinary services, and strengthened veterinary supply chains are needed to conserve rangelands, ensure medicine availability, and promote effective livestock management in Terekeka County.

Keywords: *Livestock Management, Economic Development, Households, Veterinary Services*

INTRODUCTION

The livestock sector is a key driver of economic development in both developed and developing countries, contributing to food security, employment, and rural livelihoods (Duncan et al., 2023; Akash et al., 2022). It accounts for about 6 percent of global Gross Domestic Product (GDP) and roughly 25 percent of Agricultural GDP, demonstrating strong resilience and growth (Can,

2023). Over the past twenty years, the sector has expanded at an annual rate of 5.6 percent, outpacing the broader agricultural sector's 3.3 percent growth (Lovarelli et al., 2020). Beyond supporting export earnings and environmental conservation, livestock provides regular income, buffers households against crop failures, and mitigates seasonal livelihood fluctuations (Latino et al., 2020; Cheng et al., 2022).

In national economies, especially within developing nations, the livestock sector is instrumental in sustaining and enhancing agricultural GDP, contributing nearly 33 percent in some regions (Abu Hatab et al., 2021; Eeswaran et al., 2022). Its economic impact extends beyond direct production to influencing ancillary industries like processing, marketing, and distribution. At the household level, livestock ownership is a cornerstone of rural economies, enhancing asset accumulation, income diversification, and overall living standards (Igirisa et al., 2020). Moreover, income generated from livestock sales helps cover household expenses, including education and healthcare, thus contributing to human capital development (Rubino et al., 2023). In many cases, livestock also contributes to asset ownership, a critical determinant of household resilience to poverty and vulnerability. Additionally, livestock farming reduces seasonal variations in income and food availability, offering a consistent source of livelihood (Neethirajan & Kemp, 2021; Rubino et al., 2023). This multifaceted role solidifies livestock's importance in household economic welfare.

Significant disparities exist in livestock management practices between developed and developing nations (Bilotto et al., 2024). In developed nations, breeding programs use modern genetics and artificial insemination to enhance productivity and disease resistance (Awoke et al., 2024). Feeding practices are optimized through balanced rations and nutritional supplements. Health and disease management benefit from widespread access to veterinary services, vaccinations, and regular monitoring. Extension services also provide real-time support to livestock farmers (Neethirajan & Kemp, 2021). In contrast, developing countries often face constraints such as limited access to veterinary services, poor feed availability, and traditional breeding systems that lower productivity (Can, 2023; Awoke et al., 2024). Disease outbreaks are common due to inadequate veterinary coverage and lack of timely intervention. Strengthening veterinary extension services and investing in livestock management education can improve herd health, productivity, and income generation in rural communities (Baqwa et al., 2022).

In Terekeka County, Central Equatoria State, livestock farming plays a critical economic, social, and cultural role in the livelihoods of rural households. The primary species reared include cattle, goats, and sheep, which serve as sources of milk, meat, and income (Ajak & Demiryürek, 2021). Livestock also represents wealth, social status, and a means for paying dowries, making it central to the socio-cultural fabric of the community. Despite its importance, the sector faces significant challenges such as inadequate veterinary services and vulnerability to disease outbreaks (Worthington, 2017). Weak livestock management practices, particularly in breeding, feeding, and disease control, further constrain productivity, while poor extension services hinder knowledge transfer to farmers. However, livestock farming continues to be a vital livelihood strategy, offering resilience to economic and climatic shocks. Strengthening livestock management systems alongside market development, improved breeds, veterinary extension, and access to value chains could transform the sector into a more productive and sustainable enterprise in Terekeka.

Statement of the Problem

Huge amounts of natural resources are found in South Sudan, especially livestock in Terekeka County of Central Equatoria, which enjoys a variety of vegetation ranging from semi-desert in

the far north, poor savanna in the middle, and rich savanna with an equatorial climate in the far southwest. One of the major natural features of South Sudan is the River Nile, whose many tributaries originate in the country. The region also contains other resources such as petroleum, iron ore, copper, chromium, zinc, tungsten, mica, silver, gold, and hydropower. In this study, focus is placed on the livestock sector, which has a huge number of cattle, sheep, and goats. This sector plays an important role in enhancing socio-economic development, particularly in Terekeka County. However, despite its potential, livestock is not adequately harnessed for economic purposes. Herds are mainly kept for prestige and traditional marriage, often fueling cattle raiding among pastoral communities. Beyond cultural practices, weak livestock management further constrains the sector. Breeding management is largely unplanned, resulting in low productivity; feeding and nutrition depend on seasonal pastures, leading to feed shortages; health and disease management is undermined by irregular deworming and limited access to veterinary drugs; and veterinary extension services are poorly developed, leaving herders with minimal technical support. Therefore, this study sought to examine the role of livestock management practices on the economic development of rural areas in Terekeka County, Central Equatoria State.

Literature Review and Conceptual Framework

Livestock Management Practices and Economic Development

In rural areas of developing countries like South Sudan, livestock is not only a source of food and income but also a critical asset for savings, labor, and social status. However, traditional management systems often face challenges such as inadequate veterinary services, poor feeding regimes, limited knowledge on breeding techniques, and exposure to climate-related risks (Bogale & Erena, 2022). These limitations hinder the full economic potential of livestock, especially among smallholder farmers and pastoral communities. By adopting improved practices, such as controlled grazing, rotational pasture use, supplemental feeding, and timely vaccinations, farmers can significantly increase output and resilience, making livestock a more reliable contributor to household and community livelihoods (Cullis, 2021).

In relation to economic development, livestock management practices are closely linked to productivity growth, food security, and poverty reduction. Improved management not only leads to healthier animals and higher yields of milk, meat, and hides but also facilitates better market integration, allowing producers to benefit from competitive pricing and expanded trade opportunities (Boselie et al., 2021). Moreover, modern livestock practices can support sustainable resource use, reduce environmental degradation, and enhance adaptation to climate change. In areas like Terekeka County, where livestock is a central part of rural life, strengthening management systems can unlock new avenues for economic empowerment, job creation, and community resilience (Bogale & Erena, 2022). Therefore, understanding and promoting best practices in livestock management is key to leveraging the sector's full potential for inclusive and sustainable development.

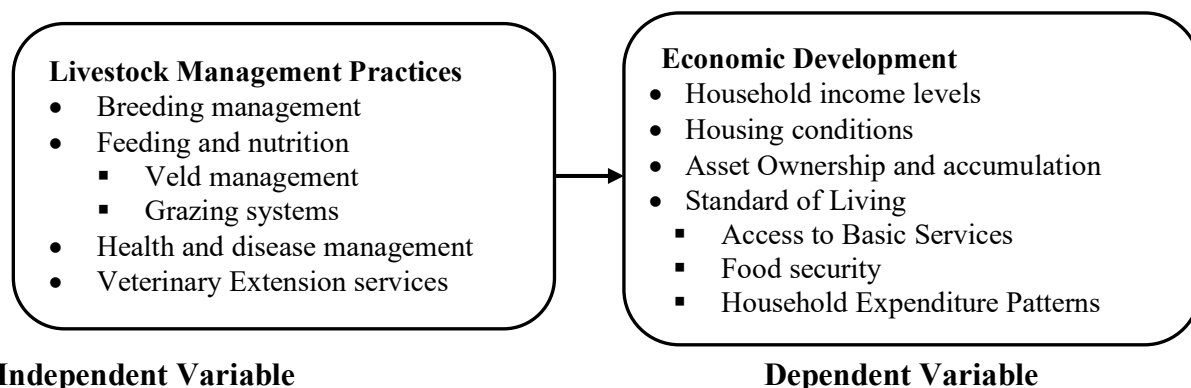
Veld management involves the sustainable use of natural vegetation to support livestock production at recommended stocking rates (Muller, 2023). Healthy veld contains diverse plant species that maintain cover even during droughts, ensuring consistent forage supply (Abubakar, 2020). In South Africa, however, about 60% of veld is degraded due to overutilization, poor advice, and misjudged grazing capacity, with only 10% in good condition (Horn & Isselstein, 2022). To address this, rotational grazing systems were developed to curb selective grazing. Four key veld management approaches are high-production grazing, controlled selective grazing,

high-utilization grazing, and short rotational grazing, each balancing livestock performance with veld sustainability (Ajak & Demiryürek, 2021).

Health and disease management is vital for livestock productivity, yet up to 30% of production in developing countries is lost to disease (Welay et al., 2018). Although technologies exist, veterinary service delivery faces institutional, financial, and accessibility challenges (Gizaw et al., 2021). Public veterinary departments provide essential services such as vaccination, surveillance, and quarantine, but budget constraints and privatization pressures limit coverage (Reed et al., 2022). Private provision is further constrained by high training and infrastructure costs, sparse livestock populations, and transaction risks (Godde et al., 2021). Para-veterinarians have emerged as cost-effective community-level providers, though formal regulation and support remain limited (Eeswaran et al., 2022). Thus, effective health management requires coordinated public-private systems, strengthened institutional frameworks, and community participation to ensure sustainable animal healthcare delivery.

Conceptual Framework

Figure 1 shows the relationship between the independent variable and the dependent variable. The independent variable was livestock management practices and the dependent variable was economic development, which was measured in terms of household income levels, housing conditions, asset ownership and accumulation and standard of living.



Independent Variable

Dependent Variable

Figure 1: Conceptual Framework

MATERIALS AND METHODS

This study adopted a positivist research philosophy and a cross-sectional survey design. This study focused on four of the 10 Payams in Terekeka County. These Payams included Terekeka, Muni, Nyori, and Tombek, which collectively have a population of 58,213. The unit of observation was the household heads in the four Payams in Terekeka County. Household heads were selected as the unit of observation because they are typically the primary decision-makers and possess comprehensive knowledge about the household's economic activities, including livestock ownership and management. Therefore, the target population was 11,836 household heads in Terekeka, Muni, Nyori, and Tombek Payams in Terekeka County.

Slovin's formula was used in the determination of the sample size. The formula was as follows:

$$n = \frac{N}{1 + N(e^2)}$$

Where: n = sample size; N = total population size; e = margin of error (0.05 for 5%)

$$n = \frac{11,836}{1 + (11,836 * (0.05^2))}$$

$$n = 387$$

Thus, the sample size was 387 household heads. Table 1 shows the proportionate distribution of the sample size per the Payams.

Table 1: Sample Size

Payam	Total Households	Sample Size
Terekeka	3,856	126
Muni	4,058	133
Nyori	2,233	73
Tombek	1,689	55
Total	11,836	387

Stratified random sampling was used in the selection of the sample size. The population was stratified according to the four Payams, Terekeka, Muni, Nyori, and Tombek, to ensure representation from each administrative unit. Stratified sampling is particularly appropriate for this study due to potential socio-economic and demographic differences across the Payams. Within each Payam, simple random sampling was used to select household heads using an online random number generator. The study made use of both primary and secondary data. Secondary data was obtained from the South Sudan National Bureau of Statistics, relevant government reports, reports by non-governmental organizations (NGOs), as well as through a systematic review of existing literature to provide background information, contextual understanding, and support for analysis and interpretation of findings. Primary data was collected by use of semi-structured questionnaires.

The research instrument generated both qualitative and quantitative data. Thematic analysis was used to analyze qualitative data from the open-ended questions in the questionnaire. The results were presented in a narrative. Quantitative data was analyzed by use descriptive and inferential statistics with the help of Statistical Package for Social Sciences (SPSS version 28), a statistical software. Descriptive statistics comprised of frequency distribution, percentages, standard deviation and mean. Inferential statistics, such as correlation analysis and regression analysis, were used to assess the relationship between the independent variable and the dependent variable. The regression model was as follows;

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

Whereby: Y = Economic Development; β_0 = Intercept; β_1 = Coefficient for Livestock Management Practices (X_1); and ε = Error term.

RESULTS AND DISCUSSIONS

The response rate refers to the percentage of respondents who participated in the study out of the total sample targeted. In this study, a total of 387 household heads were sampled across four Payams in Terekeka County. However, the total number of responses received was 400, resulting in an overall response rate of 103.36%. This shows that there was high engagement and cooperation from the community. High response rates, especially above 100%, enhance the reliability and generalizability of the study findings, as they reduce the likelihood of non-response bias. Creswell and Clark (2021) argue that an acceptable response rate depends on the nature of the study, but generally, a response rate of 50% is considered adequate, 60% is good, and 70% or more is very good.

Table 2: Response Rate

Payam	Sample Size	Responses	Response Rate
Terekeka	126	129	102.38
Muni	133	136	102.26
Nyori	73	77	105.48
Tombek	55	58	105.45

Total	387	400	103.36
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Livestock Management Practices

The objective of the study was to assess the role of livestock management practices on the economic development of rural areas in Terekeka County in Central Equatoria State.

Methods of Breeding Used

The respondents were asked to indicate the type of breeding method they use in their livestock production. The findings show a fairly even distribution between the two main breeding approaches. A slight majority, 47.75% (191), reported that they use natural mating, while 43.25% (173) indicated reliance on artificial insemination. A smaller group, 9.00% (36), reported using a combination of both methods. These results suggest that while traditional breeding methods like natural mating remain slightly more common, the adoption of artificial insemination is also widespread.

Primary Livestock Feeding Method

The respondents were asked to identify their primary livestock feeding method. Free-range grazing was most common at 38.3% (153), followed by the cut-and-carry system at 32.0% (128). About 18.8% (75) relied on crop residues, while 11.0% (44) used supplementary feeding with purchased feed. The findings show that although free-range grazing remains dominant, many livestock keepers are increasingly adopting more managed feeding systems.

Table 3: Primary Livestock Feeding Method

	Frequency	Percent
Free-range grazing	153	38.25%
Cut and carry system	128	32.00%
Supplementary feeding with purchased feed	44	11.00%
Crop residues	75	18.75%
Total	400	100.00%

Type of Grazing System Practiced

The study found that most respondents (33.3%) practice communal grazing, followed by rotational grazing (27.8%), private grazing (22.3%), and other methods such as tethering or zero-grazing (16.8%). While communal grazing remains common, it often leads to overgrazing and weak regulation. The rise of rotational grazing shows a shift toward sustainable practices, though it demands resources and knowledge. Private and alternative systems reflect efforts to improve pasture control and adapt to land scarcity, consistent with Erdaw (2023).

Table 4: Type of Grazing System Practiced

	Frequency	Percent
Communal grazing	133	33.25%
Private/Individual grazing land	89	22.25%
Rotational grazing	111	27.75%
Others	67	16.75%
Total	400	100.00%

Deworming and Parasite Control Practices

The study sought to examine deworming and parasite control practices among livestock keepers. Findings show that 61.25% regularly deworm their animals, reflecting awareness of livestock health and parasite management, influenced by veterinary access, drug availability, and awareness efforts. However, 38.75% do not treat their livestock consistently, likely due to cost, poor access, limited knowledge, or cultural factors. Untreated animals face reduced productivity, weight loss, disease spread, and mortality, undermining pastoral resilience. These results align

with Welay et al. (2018), who linked poor veterinary care to high vulnerability and reduced income stability.

Access to Veterinary and Animal Health Services

The study sought to assess access to veterinary and animal health services. The findings show that 74.25% of respondents lacked access, while only 25.75% reported availability. This gap threatens livestock health, productivity, and disease control, as limited services hinder timely diagnosis and treatment, causing economic losses and food insecurity. The results suggest the need for stronger veterinary infrastructure, mobile clinics, and community-based health programs. These findings align with Thapa (2020) and Maluleke et al. (2020), who emphasize decentralised, local services to enhance disease control and pastoral resilience.

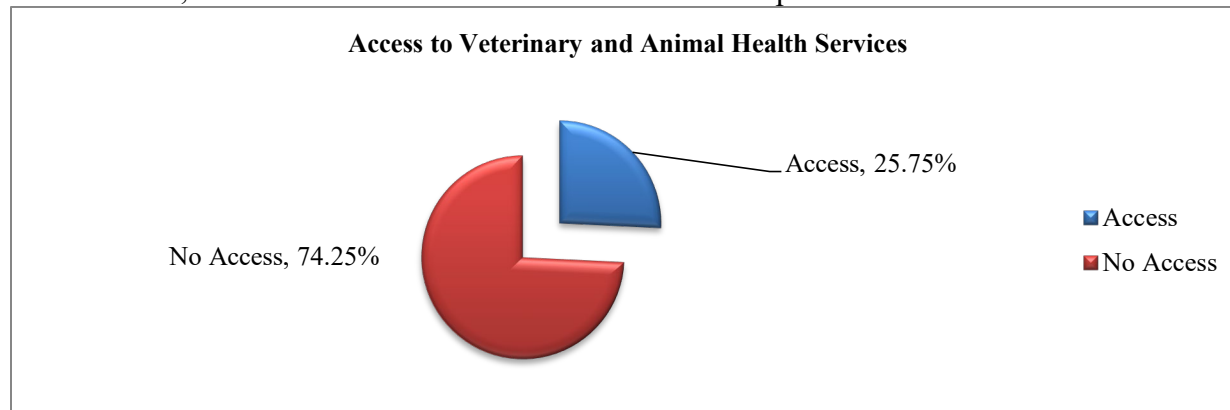


Figure 2: Access to Veterinary and Animal Health Services

The study assessed how often the 25.75% of respondents with access to veterinary and animal health services received them. As shown in Table 5, 14.6% reported weekly access, 34.0% monthly, 38.8% occasionally, and 12.6% rarely. These findings reveal that over half (51.4%) receive services only occasionally or rarely, highlighting major gaps in consistent veterinary care. This suggests the need not only for wider access but also for more reliable service delivery. Jena et al. (2020) noted that inconsistent care undermines disease control and livestock productivity.

Table 5: Frequency of Receiving Veterinary and Animal Health Services

Frequency	Frequency	Percent
Weekly	15	14.56%
Monthly	35	33.98%
Occasionally	40	38.83%
Rarely	13	12.62%
Total	103	100.00%

Type of Veterinary Services Accessed

The study sought to establish the type of veterinary services most commonly accessed. Results in Table 6 show that deworming was most reported (31%), followed by treatment for diseases (27.8%) and vaccinations (27.3%). Only 14% accessed advice and training. These findings suggest veterinary service provision is mainly focused on curative and preventive care, while advisory services remain limited. This aligns with Eeswaran et al. (2022), who observed that restricted investment in farmer education reduces knowledge transfer, constraining improved livestock management and long-term productivity.

Table 6: Type of Veterinary Services Accessed

	Frequency	Percent
Vaccinations	109	27.25%
Deworming	124	31.00%
Treatment for diseases	111	27.75%
Advice and training	56	14.00%
Total	400	100.00%

Consultation with Veterinary Drug Suppliers

The study also explored whether respondents seek advice from veterinary drug suppliers on disease conditions, prevention, and husbandry. As shown in Figure 4.23, most respondents (86.75%) reported consulting suppliers, while 13.25% (53) did not. Those who sought advice cited accessibility, timely responses, and practical solutions for livestock health. Conversely, non-consulting respondents mentioned lack of trust, preference for trained veterinarians, or limited interaction beyond purchases.

Availability of Required Medicines at Veterinary Drug Stores

The study looked at the consistency of veterinary medicine availability in local drug stores. The responses revealed frequent shortages, especially during disease outbreaks and rainy seasons when demand spikes. While common drugs like dewormers, antibiotics, and vaccines were generally accessible, specialized or costly medicines were often unavailable in smaller outlets. Stockouts were linked to weak supply chains, poor transport, and limited restocking in off-peak periods. Some respondents reported traveling long distances or waiting days for delivery, delaying treatment and reducing livestock productivity. Overall, inconsistent medicine availability undermines livestock health management, underscoring the need for better supply chains, inventory systems, and rural drug store support.

In addition, the study assessed access to veterinary vaccines and vaccination practices. From the findings, nearly all respondents (99.8%) reported having access, with only one (0.3%) indicating otherwise. This suggests near-universal availability among the surveyed population. However, access alone is insufficient; the quality of vaccine delivery is equally critical. Outcomes depend on whether vaccines are administered by trained professionals or untrained farmers. Inadequate storage, improper dosing, or poor scheduling can reduce efficacy, highlighting the need for both access and proper administration.

Most Common Vaccines for Livestock

The respondents reported that the most common livestock vaccines were Peste des Petits Ruminants (PPR) 99.5% (398), Rabies 99.0% (396), Contagious Bovine/Caprine Pleuropneumonia (CBPP/CCPP) 98.8% (395), Newcastle Disease (ND) 98.5% (394), and Hemorrhagic Septicemia (HS) 97.3% (389). These high rates align with national and international disease control priorities (FAO, 2020; OIE, 2018). In contrast, only 3.0% (12) reported vaccinating against Anthrax and 1.8% (7) against East Coast Fever (ECF). The strong uptake of core vaccines reflects awareness of their economic impact, while low coverage for Anthrax and ECF highlights gaps in risk perception, access, and farmer awareness.

Table 7: Most Common Vaccines for Livestock

Categories	Frequency (N)	Percentage (%)
CBPP/CCPP.	395	98.75%
ECF	7	1.75%
PPR	398	99.50%
Rabies	396	99.00%
HS	389	97.25%

ANTHRAX	12	3.00%
ND	394	98.50%

Aspects of Livestock Management

According to the findings, the respondents were requested to specify the extent to which they agree with various statements on livestock management practices. According to the study findings, as illustrated in Table 8, the respondents agreed with a mean of 4.152 (SD = 0.800) that they use grazing systems that prevent overgrazing and land degradation. In addition, the respondents agreed with a mean of 4.083 (SD = 0.829) that they apply good breeding practices to improve livestock productivity. The respondents also agreed with a mean of 4.050 (SD = 0.851) that veterinary extension services have improved livestock management in their areas. With a mean of 4.013 (SD = 0.833), respondents agreed that they follow proper feeding practices to ensure their livestock remain healthy. Additionally, respondents agreed with a mean of 3.997 (SD = 0.880) that they regularly access veterinary services for their livestock.

Table 8: Livestock Management Practices

	N	Mean	Std. Deviation
I follow proper feeding practices to ensure my livestock remain healthy.	400	4.013	.833
I regularly access veterinary services for my livestock.	400	3.997	.880
I apply good breeding practices to improve livestock productivity.	400	4.083	.829
I use grazing systems that prevent overgrazing and land degradation.	400	4.152	.800
Veterinary extension services have improved livestock management here.	400	4.050	.851

Economic Development

Contribution of Livestock to Household Income

The respondents were asked whether livestock production contributes to household income. As shown in Figure 3, 93.8% (375) affirmed its role, while only 6.3% (25) reported no contribution. Livestock provides cash through sales of animals and products like milk, eggs, hides, and meat, while also reducing costs by supplying manure and draft power. The few households reporting no contribution may face limited herds, poor market access, or alternative livelihoods. Overall, livestock remains central to rural income and poverty reduction.

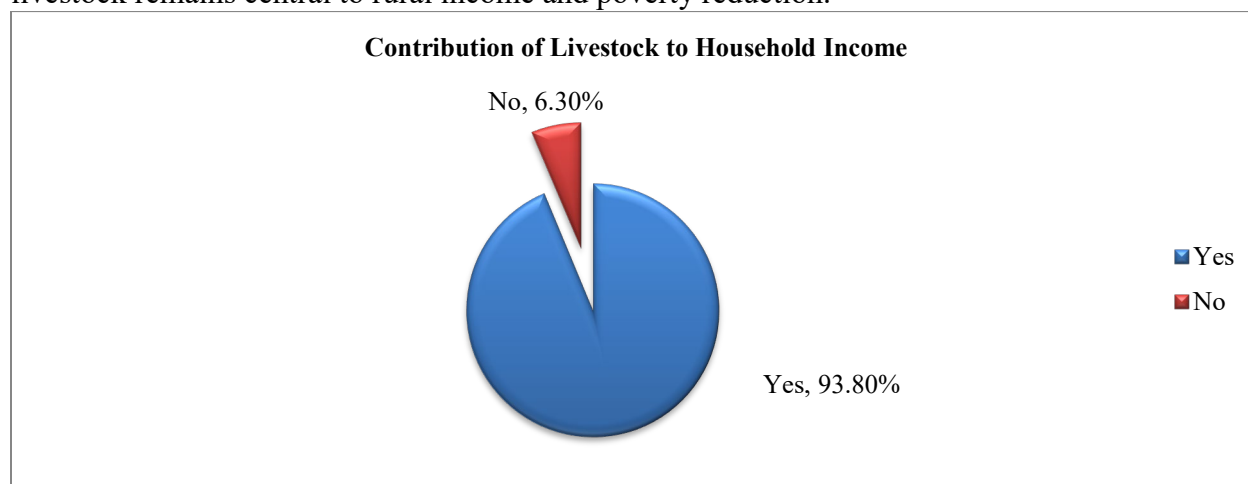


Figure 3: Contribution of Livestock to Household Income

Contribution of Livestock to Household Livelihood and Well-being

The findings highlight livestock's vital role in enhancing household well-being across multiple dimensions. As shown in Table 9, 30% (120) of respondents reported improved food supply from livestock, underscoring its value in providing milk, meat, and eggs while buffering against

food insecurity. Income from livestock also enhanced healthcare access for 23.3% (93) and supported children's education for 22.8% (91), covering fees, materials, and transport. Additionally, 19.8% (79) linked livestock income to better housing, while 4.3% (17) cited benefits such as income stability, reinvestment, and social status. Overall, livestock strengthens resilience and promotes rural development.

Table 9: Contribution of Livestock to Household Livelihood and Well-being

Category	Frequency	Percent
Better housing	79	19.8%
Education of children	91	22.8%
Health care access	93	23.3%
Food supply	120	30.0%
Others	17	4.3%
Total	400	100.0%

Types of Housing among Respondents' Families

The study assessed respondents' housing conditions as shown in Table 10. Most households lived in grass-thatched huts (33.8%) or mud-walled houses (32.3%), reflecting reliance on modest structures. Another 22.8% resided in semi-permanent dwellings, indicating some progress toward stability, while only 11.3% occupied permanent houses, suggesting better economic standing. Overall, the findings reveal that the majority still live in basic housing, highlighting persistent socio-economic challenges.

Table 10: Types of Housing among Respondents' Families

Category	Frequency	Percent
Grass-thatched hut	135	33.8%
Mud-walled house	129	32.3%
Semi-permanent house	91	22.8%
Permanent house	45	11.3%
Total	400	100.0%

Assets Owned by Household

As shown in Table 11, asset ownership provides insight into households' economic status and access to services. Radios were most common (30.25%), followed by bicycles (27.25%) and mobile phones (24.5%), reflecting reliance on basic communication and transport. Solar panels (7%) and televisions (4.75%) indicated limited access to electricity and renewable energy. Financial inclusion was notably low, with only 3.5% reporting bank accounts. Motorbike (2.25%) and vehicle (0.5%) ownership was rare due to high costs. Overall, 61.25% owned at least one of the top three assets, while ownership of higher-value assets remained minimal, highlighting persistent economic constraints.

Table 11: Assets Owned by Household

Category	Frequency	Percent
Motor vehicle	2	0.5%
Bicycle	109	27.3%
Radio	121	30.3%
Mobile phone	98	24.5%
Television	19	4.8%
Solar panel	28	7.0%
Motorbike	9	2.3%
Bank account	14	3.5%
Total	400	100.0%

Frequency of Daily Meals Consumed by Households

As shown in Table 12, 45.5% of households consumed two meals daily, reflecting moderate food security, while 26.5% survived on just one meal, indicating vulnerability. About 23.8% reported three meals, suggesting better access, and only 4.3% had more than three. These findings highlight disparities in food intake and the need for targeted food security interventions.

Table 12: Frequency of Daily Meals Consumed by Households

Category	Frequency	Percent
One	106	26.5%
Two	182	45.5%
Three	95	23.8%
More than three	17	4.3%
Total	400	100.0%

Income Spent Across Basic Services

The respondents were asked to rate their level of expenditure in each category using a five-point scale: Very High, High, Medium, Low, and None. As shown in Table 13, households allocated most of their income to food, with 80% reporting high or very high expenditure, underscoring the centrality of food security amid economic instability and shortages. Healthcare was also a major burden, as 55% spent heavily, reflecting high medical costs and limited access to affordable services. Education followed closely, with 50% reporting high or very high spending, showing strong commitment despite financial barriers. Clothing ranked lower, with 45% spending little or nothing, suggesting prioritization of urgent needs. Livestock inputs were the least prioritized, with 62.5% reporting low or no expenditure, highlighting reduced reliance on livestock-based livelihoods.

Table 13: Income Spent Across Basic Services

Expense Type	Very High	High	Medium	Low	None
Food	180 (45%)	140 (35%)	60 (15%)	15 (3.75%)	5 (1.25%)
Health care	100 (25%)	120 (30%)	90 (22.5%)	60 (15%)	30 (7.5%)
Education	90 (22.5%)	110 (27.5%)	100 (25%)	70 (17.5%)	30 (7.5%)
Clothing	30 (7.5%)	80 (20%)	110 (27.5%)	120 (30%)	60 (15%)
Livestock inputs	20 (5%)	50 (12.5%)	80 (20%)	100 (25%)	150 (37.5%)

Inferential Statistics

Inferential statistics refers to the techniques used to analyze sample data and make generalizations, predictions, or inferences about a larger population. Inferential statistics, such as Correlation Analysis and Regression Analysis,

Correlation Analysis

As shown in Table 14, livestock management practices had a positive and significant relationship with economic development ($r = 0.516$, $p\text{-value} = 0.000$). The obtained $p\text{-value}$ of 0.000 is less than the predetermined level of significance of 0.05, making the correlation coefficient substantial. This implies that improved livestock management practices would lead to enhanced economic development. These findings are consistent with Bogale and Erena (2022) observations that sound management practices are fundamental to advancing economic outcomes.

Table 14: Pearson Correlation Coefficients

			Economic development	Livestock Practices	Management
Economic Development	Pearson Correlation Sig. (2-tailed) N		1		
			400		
			.516**	1	
			.000		
Livestock Management Practices	Pearson Correlation Sig. (2-tailed) N		400	400	

Regression Analysis

A linear regression was employed to evaluate the strength of the relationship between livestock management practices and economic development in rural areas, with a specific focus on Terekeka County in Central Equatoria State. The R-squared value for the association between the independent and the dependent variables was 0.266, as shown in Table 15. This means that 26.6% of the variability in the dependent variable (economic development) can be explained by the independent variable (livestock management practices) included in the model.

Table 15: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.516 ^a	0.266	0.238	0.67958

a. Predictors: (Constant), Livestock Management Practices

As indicated in Table 16, the F-calculated value of 118.378 was above the F-critical value (3.841). In addition, the p-value associated with the F-statistic was 0.000, indicating that the overall regression model is statistically significant. Therefore, the regression model can be used to explain the impact of livestock management practices on economic development.

Table 16: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17.616	1	17.616	118.378	.000 ^b
	Residual	59.227	398	0.149		
	Total	76.843	399			

a. Dependent Variable: Economic Development

b. Predictors: (Constant), Livestock Management Practices

The regression was as follows:

$$Y = 1.08 + 0.323X_1 + \varepsilon$$

The study established that livestock management practices have a positive and significant influence on economic development in Terekeka County ($\beta_1 = 0.323$, p-value = 0.009). The relationship was deemed significant because the p-value (0.009) was below the significance level of 0.05. This means that improvements in livestock management practices enhance economic development. These findings concur with Boselie et al. (2021), who noted that effective management systems are key to sustainable rural livelihoods.

Table 17: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.08	.363		2.975	.001

Livestock Practices	Management	.323	.121	.268	2.669	.009
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a. Dependent Variable: Economic Development

Conclusion

The study also concludes that livestock management practices have a positive and significant influence on the economic development of rural areas in Terekeka County, Central Equatoria State. Among these practices, breeding shows a shift from traditional to productivity-focused approaches, emphasizing traits such as high milk yield and disease resistance. Closely linked to this, feeding remains largely dependent on free-range grazing; however, the gradual adoption of sustainable systems, like cut-and-carry and nutritional supplementation, is a promising development. Similarly, grazing systems are evolving, with overgrazing and land degradation prompting growing interest in rotational and private grazing. On the other hand, health and disease management, though widely practiced, faces constraints due to limited access to veterinary services, inadequate infrastructure, and unreliable supply chains. While deworming and disease control are common, preventive healthcare and extension services remain inconsistent. Vaccination efforts have shown progress, yet access to essential vaccines is still limited.

Recommendations

Based on the findings of the current study, it is worth recommending the following:

1. The government should establish a comprehensive livestock health policy to improve veterinary services in Terekeka County. This should include mobile and stationary veterinary clinics, subsidized drugs, structured training and deployment of Community Animal Health Workers (CAHWs), and strengthened vaccine distribution and surveillance systems. Such measures will improve disease detection, enhance livestock health, and safeguard rural livelihoods.
2. Government extension services, NGOs, and local administrations should promote sustainable grazing practices, such as rotational grazing and controlled stocking, to reduce overgrazing, conserve soil, and prevent deforestation. Simultaneously, veterinary services should be strengthened through increased recruitment, training of professionals and Community Animal Health Workers (CAHWs), and the introduction of mobile clinics to provide deworming, treatment, vaccination, and regular animal health campaigns.
3. The study was confined to Terekeka County and hence its findings cannot be generalized to other counties or regions. Therefore, the research recommends that further studies be conducted to examine the role of livestock management practices in economic development across other counties in Central Equatoria State and beyond. In addition, further research should be carried out to explore other potential factors affecting the contribution of livestock to rural economic development in Terekeka County, including the impact of climate change, policy frameworks, and market infrastructure.

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