



CATTLE MARKET DEVELOPMENT AS A STRATEGY FOR INTERNALLY GENERATED REVENUE (IGR) GROWTH IN ADAMAWA STATE

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ABSTRACT

This study examines strategies for enhancing revenue generation in the cattle market of Adamawa State, Nigeria. Using a mixed-method approach, data were collected from 150 respondents through structured questionnaires and interviews conducted across four major cattle markets: Yola, Mubi, Ganye, and Numan. Quantitative data were analyzed using descriptive statistics, Pearson correlation, and multiple regression, while qualitative responses were assessed through thematic analysis. The results indicate that key factors influencing revenue include market infrastructure, access to veterinary services, and availability of real-time market information, financial support, and transport security. Regression analysis revealed that improved infrastructure ($\beta = 0.48$, $p < 0.01$) and access to credit ($\beta = 0.65$, $p < 0.01$) significantly boost revenue. Correlation results also showed a strong relationship between infrastructure quality and earnings ($r = 0.71$). Interview insights highlighted recurring challenges such as poor facilities, cattle diseases, lack of pricing transparency, and insecurity during transportation. The study concludes that addressing these constraints through strategic investment in market infrastructure, veterinary services, digital information systems, and access to finance can significantly enhance revenue in the cattle trade. Recommendations are made for collaborative efforts between government agencies, private stakeholders, and local market authorities to improve the efficiency and profitability of the cattle market in Adamawa State.

Keywords: Cattle Market Development, Market Strategy, Internal Revenue, Adamawa State

INTRODUCTION

Revenue enhancement remains a key priority for governments across all levels, especially in developing nations where fiscal deficits and limited tax coverage hinder effective service delivery. As internal revenue sources become increasingly vital for states' economic sustainability, there is a growing need to explore non-oil and underutilized sectors with high income-generating potential. One such sector is the livestock industry—more specifically, cattle markets, which play a significant but often overlooked role in public revenue generation.

In agrarian economies such as Nigeria, the cattle market is not only central to rural livelihoods but also a potential driver of local government revenue through the collection of taxes, fees, levies, and permits. Cattle markets serve as commercial hubs where livestock are bought and sold, facilitating income flows among farmers, traders, transporters, and allied businesses. These activities generate direct revenue for government authorities through slaughter taxes, transaction levies, loading/unloading fees, and stall rentals. Indirectly, the presence of a functional market stimulates economic activity, thereby expanding the taxable base within surrounding communities (Yusuf et al., 2018; FAO, 2020).

Despite this potential, many cattle markets in Nigeria, including those in Adamawa State, fail to deliver optimum fiscal returns due to operational inefficiencies. Studies have shown that structural and systemic issues such as poor infrastructure, lack of formal regulation, weak institutional oversight, and the prevalence of informal trading practices limit revenue collection (Akinola & Olayemi, 2021; Okunlola et al., 2022). In some cases, revenues that should accrue to local governments are lost due to leakages, inadequate monitoring, and uncoordinated management frameworks.

In Adamawa State, where livestock farming constitutes a significant portion of agricultural activities, cattle markets

hold untapped potential for boosting internally generated revenue (IGR). Markets such as those in Mubi, Gombi, and Yola are notable for their strategic locations and high livestock traffic, yet they continue to operate below their economic and fiscal capacity. Weak physical infrastructure, informal fee collection practices, and poor market management remain widespread issues (Ahmed & Ibrahim, 2020; Olayiwola & Ajayi, 2019).

Cattle market development is essential, for it stimulates economic growth by providing platforms for trade, creating jobs, and promoting local businesses such as transport, feed supply, and veterinary services (Kubkomowa, 2018; Abdulazeez et al. 2024). Further view suggests well-regulated markets can generate significant revenue through transaction fees, livestock taxes, and ancillary service charges. Improved revenue collection mechanisms can bolster government budgets, particularly in rural economies. Developing infrastructure, such as loading ramps, weighing facilities, and digital payment systems, can reduce transaction costs and increase the volume of trade. Further, efficient cattle markets ensure fair prices for farmers and traders, enhancing their income and contribution to food systems.

Despite the significant revenue potential of cattle markets, their ability to contribute meaningfully to government revenue remains largely underutilized. This shortfall is closely linked to the operational conditions of these markets. Specifically, deficiencies in infrastructure such as the absence of adequate holding pens, clean water supply, sanitation facilities, and reliable transportation systems directly hinder efficient market operations. These operational inefficiencies not only reduce trader participation and transaction volumes but also limit the government's capacity to enforce fees, collect levies, and expand its tax base. In effect, poor market conditions result in reduced economic activity within the market environment, thereby constraining revenue

enhancement efforts. This raises critical questions about the extent to which operational challenges in cattle markets impede the optimization of internally generated revenue (IGR), particularly in regions like Adamawa State where livestock trade is prominent. Hence, addressing these infrastructural and management gaps is not merely an operational concern, but a fiscal necessity for enhancing public revenue through structured and formalized cattle market systems.

Informal practices and corruption often result in revenue losses for governments. Poor communication of market prices and demand leads to inefficiencies and exploitation of traders (Girei et al. 2013; Mustapha & Danbatta, 2016). Weak regulatory frameworks fail to ensure standardization, quality control, and fair-trading practices. Seasonal demand and supply fluctuations affect market stability and predictability. This study seeks to critically examine how the strategic development of cattle markets can serve as a viable mechanism for enhancing government revenue. By investigating the operational structures and management practices within these markets, the research aims to uncover the extent to which infrastructure, governance, and transactional processes influence revenue outcomes. The study also addresses existing inefficiencies that undermine market performance, thereby providing evidence-based insights to support policy interventions that can foster more sustainable and fiscally productive market systems.

Literature Review

To understand and enhance the revenue potential of cattle markets, it is essential to investigate the internal operations of these markets. Cattle market operations refer to the mechanisms, structures, and systems that govern the buying and selling of livestock, including infrastructural provisions, institutional arrangements, market accessibility, and the volume of trade conducted. Each of these components plays a critical role in determining the market's capacity to generate consistent and sustainable revenue. Operational variables that influence revenue enhancement include: Market infrastructure such as cattle pens, water supply, weighing scales, veterinary services, roads, and fencing. Markets that lack adequate infrastructure often experience low patronage, inefficient operations, and difficulty enforcing tax collection. Another, is the Transaction Volume and Frequency within a specific period directly impacts the volume of taxable activities. High-traffic markets typically yield greater revenue from tolls, taxes, and related charges. Further, Governance and Management Structure of the market provided by market committees, local government authorities, or traditional institutions affects transparency, enforcement of fees, and accountability in revenue remittance. Others components includes Regulatory Compliance which refers to the extent to which traders and market users comply with levies and market regulations determines actual revenue versus projected income. Market Accessibility ensures producers and buyers can reach a market, influenced by road quality and transportation services, affects the market's operational scale and attractiveness. Market Integration on the other hand provides connection between cattle markets and broader value chains (e.g., meat processors, exporters, and logistics providers) enhances or constrain the flow of capital and taxes within the market ecosystem.

The Market Efficiency Theory, as propounded by Fama (1970), emphasizes that markets are efficient when resources are allocated optimally and all participants have access to relevant information. In the context of cattle markets, this means minimizing transaction costs, ensuring transparent

pricing, and facilitating open competition. Efficient markets are more likely to encourage participation, increase trade volume, and improve price discovery—all of which create opportunities for governments to increase tax revenues through better compliance and higher market activity (Berhanu et al., 2012; Ma et al., 2024).

Additionally, the Value Chain Approach provides another conceptual lens for this study. The value chain framework suggests that revenue can be enhanced when value is added at various stages of the production and distribution process (Kaplinsky & Morris, 2000). For cattle markets, this includes investments in animal health services, market infrastructure (such as weighing stations, loading ramps, and shelters), access roads, and transport logistics. By integrating these services into the market environment, both the profitability of traders and the taxable value of transactions are increased, ultimately boosting revenue for government authorities (Porter, 1985; Ayodele & Abah, 2020).

Furthermore, Nemec and Wright (1997) observe that partnerships and technological innovations—such as financial technologies (fintech)—can be instrumental in streamlining market operations, reducing informal leakages, and improving transparency in revenue collection systems. Mobile payment platforms, digital levies, and market information systems offer practical tools for improving efficiency and expanding the government's capacity to collect and monitor market-generated income.

By conceptualizing the link between cattle market operations and revenue enhancement through the dual lenses of market efficiency and value chain theory, this study contributes to literature by offering a structured framework to assess the revenue potential of livestock markets. Unlike previous studies that treat these markets in general terms, this work operationalizes specific market functions such as infrastructure quality, transaction volume, governance, and service integration—as key predictors of fiscal outcomes. This approach offers a practical and policy-relevant pathway for optimizing internally generated revenue (IGR) in livestock-based economies like Adamawa State.

The modern cattle market is a dynamic and complex system influenced by global demand, technological advancements, and evolving consumer preferences. With increased efficiency in production, supply chain integration, and access to real-time market data, producers and stakeholders can make more informed decisions. These developments have significant implications for revenue generation, offering both opportunities for higher profitability through value-added products and market diversification, as well as challenges related to price volatility and sustainability demands. The following considerations underscore key contributions that can be leveraged to enhance value in today's cattle market.

Role of Innovation and Technology: Programs like Indonesia's i-Ternak integrate fintech solutions into cattle value chains, enhancing efficiency, reducing costs, and providing better market access for farmers. These innovations not only improve individual earnings but also strengthen the government's capacity to collect revenue from formalized transactions (Ma, et al., 2024; Eyasmin, Ghosh, 2024, Rashid et al., 2023)

Commercialization and Environmental Factors: Research on commercialization determinants shows that factors like herd size, market accessibility, and product quality directly influence market participation and efficiency. However, commercialization efforts need to address environmental concerns, such as emissions from livestock production, to ensure sustainability (Belay et al., 2021; Eyasmin, Ghosh, 2024; Godde et al., 2021)

Revenue enhancement through the formalization of cattle markets is increasingly recognized as a viable strategy for expanding internally generated revenue (IGR), particularly in livestock-based economies. Formalization involves implementing structured policy interventions, establishing certification protocols, standardizing revenue collection procedures, and strengthening governance mechanisms. According to Rota (2016) and the National Livestock Transformation Plan (NLTP, 2019), such formalization improves transparency, reduces leakages, and facilitates better compliance with tax and levy systems—key outcomes that directly enhance government revenue.

In line with the study's objectives, market infrastructure such as fenced enclosures, access roads, veterinary services, and loading facilities is critical not only for ensuring orderly transactions but also for creating an enabling environment where regulatory frameworks can be effectively enforced (Ogunyemi & Lawal, 2020). Similarly, market governance and management practices including oversight by market committees, local government involvement, and digital revenue tracking—have a significant bearing on how effectively revenue is captured and accounted for (Ajayi & Salisu, 2021).

Another key indicator is the volume and frequency of cattle transactions, which determine the taxable throughput of a market. Markets with higher transaction volumes tend to generate more fees from activities like slaughtering, loading, and market access, thus directly contributing to revenue enhancement (Adebayo et al., 2017). Furthermore, compliance with regulatory frameworks, especially with regard to licensing, levies, and trader registration, enables local authorities to maximize potential revenue while reducing informal practices that often result in untracked income (Yusuf et al., 2018).

Finally, innovations in cattle market operations—such as the adoption of financial technologies (fintech) for digital fee collection and mobile-based market information systems—have proven effective in increasing transparency, reducing human interference, and expanding the tax base (Ma et al., 2024; Nemec & Wright, 1997).

In summary, the literature strongly supports the view that the strategic development of cattle market operations through improvements in infrastructure, governance, transaction volume, compliance, and innovation hold significant potential for enhancing government revenue. This study builds on these

insights by empirically testing the influence of these operational variables on revenue performance in Adamawa State, thereby contributing a practical, context-specific framework to the existing body of knowledge.

MATERIALS AND METHODS

In this study, government revenue enhancement is the dependent variable (DV), conceptualized as the process through which government increases its internally generated revenue (IGR) through formal mechanisms such as market taxes, levies, licensing fees, and other statutory payments. According to Olaoje and Aladejebi (2019), revenue enhancement involves strategic reforms and innovations targeted at widening the revenue base and minimizing leakages. In the context of cattle markets, this implies harnessing the economic activities within these markets to generate sustainable and traceable revenue streams.

The independent variable (IV), cattle market operations, refers to the set of infrastructural, managerial, and transactional activities that facilitate the buying and selling of cattle in a given location. As defined by Ayoola et al. (2021), cattle market operations encompass aspects such as market infrastructure, volume of trade, governance and regulatory compliance, service integration (e.g., veterinary care and transportation), and information availability. These indicators are used in this study to examine how efficient market functioning can contribute to revenue growth.

Adamawa State, located in northeastern Nigeria, is chosen for its prominence in livestock farming and its strategic role as a cattle trade hub. Key markets such as Mubi, Gombi, Yola and Numan were selected for the study due to their size, accessibility, and contribution to the regional economy.

Target Population

The target population for this study comprises cattle market participants in these markets, specifically traders, buyers, and market officials operating in selected major cattle markets across: Mubi, Gombi, Yola and Numan.

To obtain a representative sample, a sampling frame was developed using market attendance registers, trader associations' membership lists, and records provided by the local government market offices. Based on this data, the estimated total number of registered cattle market participants across the selected markets was 1,240 as shown in Table 1 below:

Table 1: Sampling Process

Market	Estimated no. of Cattles Participants	Proportion of Total %	Sample size Allocated
Mubi	400	32.46	48
Ngure	300	24.19	36
Gombi	280	22.58	34
Numan	260	20.97	32
Total	1240	100	150

Source: Basila and Gabriel, 2025

A proportionate stratified random sampling technique was employed to ensure fair representation across the markets. Each market formed a stratum, and the number of respondents selected from each was determined using the Yamane (1967) formula for sample size calculation fig. 1 given below:

Fig. 1: Sample size calculation

$$n = N / 1 + N(e)^2$$

Where:

n = sample size

N = population size (1,240)

e = margin of error (0.08, or 8%)

$$n = 1240 / 1 + 1240(0.08)^2 = 1240 / 1 + 7.936 = 1240 / 8.936 \approx 139$$

$$n = \frac{1240}{1 + 1240(0.08)^2} = \frac{1240}{1 + 7.936} \approx \frac{1240}{8.936} \approx 139$$

$$n = 1 + 1240(0.08)^2 = 1 + 7.936 = 8.936$$

$$1240 / 8.936 \approx 139$$

The sample size was rounded up to 150 respondents to account for possible non-response and ensure analytical robustness. Respondents within each market were selected using simple random sampling from the trader lists and market rosters.

Data Collection Methods: Surveys and Questionnaires, structured surveys to collect data on market infrastructure,

management, volume of transaction, compliance with regulation, support system and technology. Questions addressed challenges faced by stakeholders and their suggestions for market improvement. Observation, on-site visits to cattle markets to evaluate infrastructure, pricing practices, and transaction processes.

Inferential Statistics: To examine the relationship between cattle market operations (independent variables) and revenue enhancement (dependent variable), the following techniques were used:

Pearson Correlation Analysis: To assess the strength and direction of bivariate relationships between individual market operation variables and revenue performance.

Multiple Linear Regression Analysis: This was the primary tool used to determine the extent to which cattle market operational variables jointly and independently predict government revenue enhancement. The regression model was specified as in Fig 2 below:

Fig. 2: Regression equation model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$$

Where:

Y = Revenue Enhancement (dependent variable)

X₁X₁ to X_nX_n = Market operation variables (e.g., infrastructure, governance, transaction volume, compliance, innovation)

B₀ = Intercept

B₁ to β_n = Regression coefficients

ε = Error term

Software for Analysis

All analyses were conducted using Statistical Package for Social Sciences (SPSS) Version 26. This enabled efficient data coding, cleaning, and output generation. The choice of regression analysis aligns with the study's objective to quantify the influence of multiple predictors (market operation variables) on a single outcome variable (revenue enhancement). This method has been widely used in similar studies on market efficiency and public finance (e.g., Adebayo et al., 2017; Yusuf et al., 2018; Rota, 2016).

RESULTS AND DISCUSSION

The demographic and socioeconomic profile of respondents, as presented in Table 2, reveal a significant gender imbalance in the cattle market showing 83.3% male participants and the female accounted to 16.7% which aligns with patterns of Adamu and Mohammed (2020) suggesting male predominance. Occupational distribution indicates half of respondents 50% were cattle traders, 30% were herdsmen, 10% were transporters, and another 10% were market officials. This distribution reveals a substantial proportion of respondents are directly engaged in primary cattle trade activities, in which case Adebayo and Okunlola (2019) posit that such occupational concentration underscores the pivotal role of trade intermediaries and herders in sustaining the cattle market chain. The others (transporters and market officials) in the value chain reflect the supporting role necessary for market coordination and logistics. For veterinary service 41.3% reported access availability and 58.7% lack access suggesting a wide gap in animal health management with adverse implication for cattle productivity and disease control consistent with Nuru et. Al., 2021 who posit that inadequate veterinary outreach and limited extension support as a constraint in pastoral and livestock marketing system across Nigeria. Access to the market was another constraint to marketers, 26% affirm adequate access compared to 74% who affirms inadequate access. This result indicates an asymmetry of information which leads to inefficiency in price negotiations, market timing and overall profitability consistent with the report of Yusuf and Ahmed (2018). Furthermore, access to credit was also limited with 27.3% reported having access and about 72.7% have no access suggesting most participants rely on personal savings and other informal means of financing. This corroborates the observations of Ibrahim and Suleiman (2020) whom attributed stringent collateral requirements and lack of aware as hindrance to institutional loans. Collectively, males' dominance, occupational clustering around trading and herding, low veterinary service access and limited institutional loan access characterizes the cattle market in the region.

Table 2: Descriptive Statistics in Frequencies and Percentages

Variable	Category	Frequency	Percentage
Gender	Male	125	83.3
	Female	25	16.7
Primary Occupation	Cattle Trader	75	50.0
	Herdsmen	45	30.0
	Transporter	15	10.0
	Market Official	15	10.0
Access to Veterinary	Yes	62	41.3
	No	88	58.7
Access to Market Info	Yes	39	26.0
	No	111	74.0
Access to formal credit	Yes	41	27.3
	No	109	72.7

Source: Basila and Gabriel, 2025

The regression analysis result presented in Table 3 reveals that market infrastructure, market information availability, veterinary services and credit availability significantly predict revenue generation among cattle market participants ($R^2 = 0.62$, $F(4,145) = 23.8$, $P < 0.001$). Among these predictors credit availability exhibits the strongest positive influence on daily revenue ($\beta = 0.65$, $t = 6.77$, $p < 0.01$), indicating that traders with greater access to financial resources are more

capable of expanding their operations and achieving higher income levels. Market infrastructure also demonstrate a significant positive effect ($\beta = 0.48$, $t = 5.21$, $p < 0.01$) suggesting that adequate facilities enhance trading efficiencies and sales outcomes. Similarly, market information availability ($\beta = 0.29$, $t = 3.13$, $p = 0.002$) positively influenced revenue emphasizing the importance of timely information for price negotiation and decision making.

Veterinary services ($\beta = 0.22$, $t = 2.45$, $p = 0.015$) were also significant, implying that livestock health intervention contributes to improve marketable value and profitability. These findings align with the prior studies underscoring that

access to market infrastructure, finance and support services collectively enhances productivity and income generation within cattle market system, particularly.

Table 3: Regression Analysis - Predictors of Revenue Generation

Predictor Variable	Beta (β)	t – Value	Sig. (p – Value)	Interpretation
Market Infrastructure	0.48	5.21	0.000**	+ ve
Market info availability	0.29	3.13	0.002**	+ ve
Veterinary Services	0.22	2.45	0.015*	+ ve
Credit availability	0.65	6.77	0.000**	+ ve

Source: Basila and Gabriel, 2025

Significance levels: * $p < 0.05$, ** $p < 0.01$ * **Dependent Variable:** Daily Revenue Generated $R^2 = 0.62$, $F(4,145) = 23.8$, $p < 0.001$

The thematic analysis given in Table 4 below reveals key challenges affecting cattle market operations and revenue generation. The most frequent cited issues were poor infrastructure mentioned by 16 of the 20 respondents who emphasized the need for basic facilities such as loading ramps, zinc sheds, and water cisterns to improve trading efficiency. Improved infrastructure is critical to enhancing market performance. Markets with better facilities attract more participants, resulting in increased transaction volumes and higher revenue. The findings align with studies that emphasize the importance of physical and institutional infrastructure in market development as (Verbeke et.al, 2009; Eric, 2022). Inefficiencies in tax collection hinder revenue enhancement. Poor market information followed closely by 14 respondents, with suggestions for notice boards and bill boards to enhance information flows. Adopting digital tools, such as mobile payment systems and real-time market information platforms, can modernize market operations and ensure accountability. Similar initiatives in Indonesia, such as the i-Ternak program, have demonstrated the potential of

fintech to enhance value chains and revenue (Mafimisebi et al, 2013; Abdi et al., 2024). Next was inadequate veterinary services which was reported by 12 respondents suggesting drugs availability to sustain animal health, followed by stringent credit policies, mentioned by 11, and exploitations by security agents at various check points across the country were highlighted as institutional constraints, with respondents recommending government grants and reduced check points. These findings reinforce Ibrahim and Suleiman's (2020) observations. In the overall, the theme underscores infrastructural, informational and institutional gaps as major concerns to effective cattle market development and sustainable revenue generation. Additionally, the prevalence of informal transactions leads to significant revenue losses. Formalization efforts, such as registering traders and implementing standardized payment systems, could mitigate these losses. This aligns with empirical evidence from markets in sub-Saharan Africa (Bizimana et al., 2016; Williams et al., 2006).

Table 4: Thematic Analysis from Interview Responses

Theme	Frequency out of 20	Common suggestion
Poor infrastructure	16	Loading ramp, Zinc shade and Cistern
Poor market info	14	Provide notice boards, bill board
Inadequate veterinary services	12	Drugs and robust veterinary services
Exploitation by security agents	10	Reduction of security check point and Policy formulation
Stringent credit policy	11	Government financial support (Grants)

Source: Basila and Gabriel, 2025

CONCLUSION

The study highlights the need for comprehensive policy interventions, including: Improved infrastructure investments, simplified and transparent tax systems and collaborative governance involving local authorities and traditional leaders. Cattle market development in Adamawa State offers significant opportunities for enhancing government revenue. This study fills a critical gap by empirically examining how specific operational components of cattle markets, as infrastructure, governance, compliance, and innovation affect government revenue generation in Adamawa State, a dimension that has been largely overlooked in previous research which focused more on livestock productivity and trader livelihoods than on market-driven fiscal outcomes. Further, infrastructural deficits, reforming tax systems, and leveraging technology are important strategies for achieving this goal. Future studies could explore the impact of specific interventions, such as digital payment adoption, on market efficiency and revenue.

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