



DETERMINANTS OF ADOPTION OF IMPROVED CATTLE FATTENING PRACTICES AMONG SMALL-SCALE FARMERS IN KWARA STATE, NIGERIA

Banjoko, I. K., Oladejo, A. Q., Abdulrauph, B. and Shuaib, O. M.

Kwara State Polytechnic

Corresponding Author's Email: from2ukay@gmail.com, **GSM:** 08035276521

ABSTRACT

This study assessed the extent and determinants of adoption of improved cattle fattening practices among small-scale cattle farmers in Kwara State, Nigeria. A three-stage sampling technique was used to select 176 cattle fatteners across the Kwara Agricultural Development Project (KWADP) zones. Primary data were obtained through personal interviews with the sampled fatteners, using a well-structured questionnaire. Likert-type scale measured adoption of ten fattening management practices, while an Ordinary Least Squares (OLS) regression model identified the socio-economic determinants of adoption. Results showed that regular feeding (mean = 2.97) was the most widely adopted practice, followed by salt and potash supplementation (2.44), while weighing of cattle (1.25) and vaccination (1.31) were least adopted. No respondent recorded a low overall adoption level; the majority (58.0%) recorded a moderate level and 42.0% a high level, with percentage weighted scores ranging from 37% to 100%. The OLS model explained 67% of the variation in adoption level ($R^2 = 0.67$). Years of fattening experience, range size and household size were positively and significantly associated with adoption at 1% level ($p < 0.01$), whereas cost of feeding and herd size were negatively and significantly associated with it at 5% level ($p < 0.05$). Non-farm income was positive and significant at the 10% level ($p < 0.10$). The study concludes that years of fattening, range size, household size, cost of feeding and herd size are the determinants of adoption of improved cattle fattening practices in the study area. It recommends targeted extension training on weighing, vaccination and disease control, together with support for building farming experience and non-farm income diversification, to raise adoption.

Keywords: Adoption, Determinants, Cattle, Fattening, Small-scale, Farmers.

INTRODUCTION

The adoption of improved agricultural and livestock management practices remains one of the most extensively studied pathways to enhancing smallholder productivity and income across Sub-Saharan Africa (Ibrahim-Olesin *et al.*, 2025). In cattle fattening, an enterprise involving the procurement and intensive management of feeder cattle over a short cycle to achieve rapid weight gain, adoption is not a singular yes/no decision but a graduated process encompassing multiple complementary practices, including regular feeding, deworming, vitamin supplementation, castration, sanitation, vaccination, vector control, weighing, and record-keeping (Anza & Tesfaye, 2025). This management package reflects the multidimensional nature of cattle fattening, wherein profitability hinges on the combined implementation of several husbandry and health practices rather than any single intervention (Maro *et al.*, 2024). The extent to which small-scale farmers adopt this full complement of practices, and the household- and farm-level factors driving such adoption, directly determines how much of the enterprise's potential profitability is realised in practice (Oguche *et al.*, 2026). Recent Nigerian evidence indicates that adoption of improved livestock and farm management practices is typically partial rather than complete, and is shaped by a recurring set of socio-economic factors. Ibrahim-Olesin *et al.* (2025), in a study of regenerative agricultural practice usage among maize farmers in Kwara State, found overall usage to be moderate, with marital status, education, access to extension services, farming as a primary occupation, and market access emerging as significant determinants of adoption level. Similarly, Kamara *et al.* (2025), examining gender disparities in the adoption of improved soybean management practices in Borno State, reported that although both male- and female-led households adopted improved practices, adoption intensity varied with socio-economic constraints such as input cost and market access, with extension contact and credit access identified as key levers for enhancing adoption intensity. These findings align with the broader pattern reported by Oguche *et*



al. (2026) for livestock species choice in South-West Nigeria, where education, land tenure, and credit access significantly influenced farmers' production decisions.

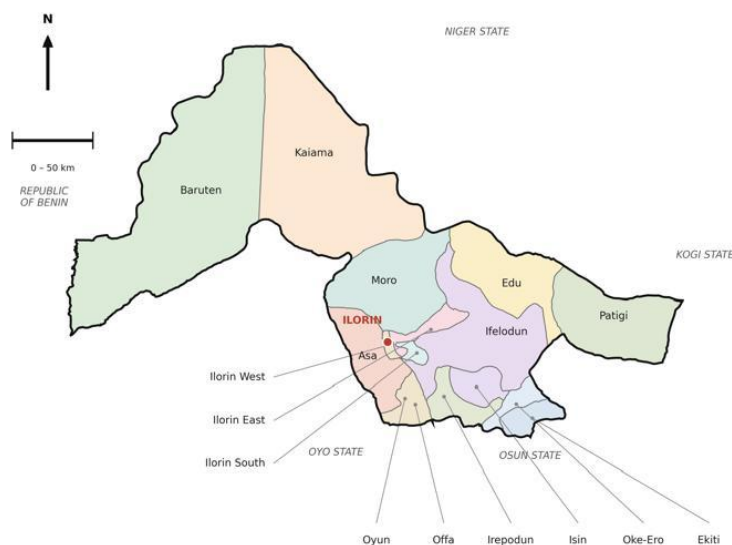
Within Kwara State, livestock production constitutes an established, though still largely traditional, component of the farming system, undertaken by settled and semi-settled Fulani households alongside crop-livestock smallholders (Abdulazeez *et al.*, 2026). Nigeria's livestock sector is increasingly transitioning towards a more commercial, value chain-oriented production system, driven by rising domestic demand for beef and the imperative for improved market efficiency. This transition necessitates investment in animal health, market infrastructure, processing facilities, and coordinated value chain development to enhance the productivity and profitability of cattle enterprises (Kasuwar Kuka, 2025). As the livestock sector becomes increasingly market-oriented, improving cattle productivity depends on the adoption of integrated management practices spanning nutrition, animal health, growth monitoring, and farm record-keeping, rather than isolated interventions (Food and Agriculture Organization [FAO], 2023). Understanding the current level of adoption, together with the socio-economic and institutional factors influencing farmers' uptake of these complementary practices, is therefore essential for designing effective extension and livestock development interventions (Mapiye & Dzama, 2024).

Despite the growing emphasis on commercial livestock development in Kwara State, empirical evidence on the extent to which small-scale cattle fatteners have adopted recommended fattening management practices, and the socio-economic factors influencing their adoption, remains limited. This study addresses this gap by examining the extent of adoption of recommended cattle fattening management practices and identifying the socio-economic determinants of adoption among small-scale cattle fatteners in Kwara State. The findings offer empirical evidence to inform extension strategies and policy interventions aimed at enhancing cattle fattening productivity and commercialisation.

MATERIALS AND METHOD

The Study Area

The study was conducted in Kwara State, located in the North-Central geopolitical zone of Nigeria, lying approximately between latitudes 8°00' and 10°00' N and longitudes 3°30' and 6°25' E. The State shares boundaries with Niger State to the north, Kogi State to the east, Ekiti, Osun and Oyo States to the south, and the Republic of Benin to the west. It covers approximately 36,825 km² and comprises sixteen Local Government Areas grouped into three senatorial districts (Kwara Central, Kwara North and Kwara South), with Ilorin as the state capital. The State falls within the Southern Guinea Savannah ecological zone and experiences a tropical wet-and-dry climate characterized by annual rainfall ranging from about 1,000 to 1,500 mm and mean annual temperatures of approximately 30–35°C. These agroecological conditions support diverse crop and livestock production, including cattle, sheep, goats and poultry, under predominantly extensive and semi-intensive production systems.



KWARA STATE

Showing the 16 Local Government Areas

Kwara State lies in the North-Central geopolitical zone of Nigeria. It is bounded by Niger State to the north, Kogi State to the east, Oyo, Ekiti and Ondo States to the south, Oyo State to the south-west, and the Republic of Benin to the west.

LOCAL GOVERNMENT AREAS

- | | |
|-----------------|-------------|
| 1. Asa | 9. Irepodun |
| 2. Baruten | 10. Isin |
| 3. Edu | 11. Kaiama |
| 4. Ekiti | 12. Moro |
| 5. Ifelodun | 13. Offa |
| 6. Ilorin East | 14. Oke-Ero |
| 7. Ilorin South | 15. Oyo |
| 8. Ilorin West | 16. Patigi |

LEGEND

- State boundary
- LGA boundary
- State capital (Ilorin)

Capital: Ilorin Land area: 36,825 km²
 Geopolitical zone: North-Central Senatorial districts: 3

Boundary data: GADM / geoboundaries administrative boundaries (Nigeria, ADM2). Projection: geographic (WGS 84).

Sampling Procedure and Sample Size

A three-stage sampling technique was employed to select respondents. Kwara State is divided by the Kwara Agricultural Development Project (KWADP) into four agricultural zones: Zone A (Baruten and Kaiama), Zone B (Edu and Patigi), Zone C (Asa, Ilorin East, Ilorin South, Ilorin West and Moro), and Zone D (Ekiti, Ifelodun, Irepodun, Offa, Oyo, Isin and Oke-Ero). In the first stage, one Local Government Area (LGA) was purposively selected from each of the four zones; Baruten (Zone A), Edu (Zone B), Asa (Zone C), and Irepodun (Zone D); based on their relatively high concentration of cattle fattening activities, as identified through consultations with KWADP extension personnel and a preliminary reconnaissance survey. In the second stage, two villages were randomly selected from the list of cattle-fattening communities in each selected LGA, resulting in eight villages across the four zones. In the third stage, 22 cattle fatteners were selected from each village using a snowball sampling technique. Initial respondents were identified with the assistance of village leaders and livestock extension agents and subsequently referred other cattle fatteners within the community, owing to the absence of a formal sampling frame. This yielded a total sample of 176 respondents (8 villages × 22 respondents), all of whom provided complete and valid responses for analysis.

Data Collection

Primary data were collected using a well-structured questionnaire administered through personal interviews. The instrument captured information on respondents' socio-economic characteristics, the extent of utilisation of ten specific fattening management practices (regular feeding, deworming, vitamin supplementation, castration, vaccination, regular sanitation, salt-and-potash supplementation, vector control, weighing, and dipping), as well as farm- and institutional-level variables hypothesised to influence the level of adoption.

Analytical Technique

The extent of adoption of individual fattening management practices was assessed using a 3-point Likert-type scale (Always used = 3, Sometimes used = 2, Rarely used = 1), from which a mean adoption score and percentage weighted score were computed for each practice and used to rank them accordingly. Overall adoption level for each respondent was subsequently classified as low (below 33%), moderate (33–66%), or high (above 66%), based on the aggregate percentage weighted score across all ten practices.

The determinants of the extent of adoption were examined using an Ordinary Least Squares (OLS) multiple regression model, implicitly specified as:



$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}) + e$$

where Y represents the extent of adoption of improved fattening practices, and the explanatory variables (X_1 – X_{13}) comprise age, years of fattening experience, range size, gender, cooperative association, amount of credit received, access to extension services, cost of feeding, herd size, government tax, household size, household income, and non-farm income, with e denoting the stochastic error term. The linear functional form was selected on the basis of its superior overall fit and consistency with the underlying data structure.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The socio-economic profile of the 176 sampled cattle fatteners in Kwara State revealed that the enterprise is predominantly male-dominated, with male household heads accounting for 93.2% of respondents. The mean age of respondents was 56 years, with 85% falling within the economically active age bracket of 21–60 years, and mean household size was 11 persons. Respondents possessed an average of approximately 19 years of fattening experience, with the majority (60%) rearing indigenous cattle breeds better adapted to the local savannah environment. The full socio-economic profile of the respondents is presented in Table 1. Most respondents (72.7%) were married, and about 91% had received some form of education, with Quranic education (44.3%) the most common and only 5.7% having attained tertiary education. Livestock production was the primary occupation of 49.4% of respondents while 41.5% were primarily crop producers, indicating that fattening is typically undertaken within a mixed crop–livestock system rather than as a stand-alone enterprise. A majority (64.7%) had between 11 and 20 years of fattening experience. Taken together, these characteristics describe a mature, highly experienced but largely informally educated population of fatteners, a profile consistent with that reported by Abdulazeez *et al.* (2026) for livestock group participants in Kwara State.



Table 1: Socio-economic Characteristics of the Respondents (n = 176)

Characteristics	Frequency	Percentage
Gender		
Male	164	93.2
Female	12	6.8
Age (years)		
≤ 25	2	1.1
26 – 35	11	6.3
36 – 45	11	6.3
46 – 55	64	36.4
56 – 65	64	36.4
> 65	24	13.6
Household size (persons)		
< 10	33	18.8
11 – 20	138	78.4
> 20	5	2.8
Marital status		
Single	9	5.1
Married	128	72.7
Divorced	21	11.9
Separated	16	9.1
Widowed	2	1.1
Level of education		
No formal education	16	9.1
Adult education	20	11.4
Primary	28	15.9
Quranic	78	44.3
Secondary	24	13.6
Tertiary	10	5.7
Years of fattening experience		
1 – 10	11	6.3
11 – 20	114	64.7
21 – 30	36	20.5
> 30	15	8.5
Primary occupation		
Livestock production	87	49.4
Crop production	73	41.5
Trading	6	3.4
Fishing	2	1.1
Civil service	8	4.5



Extent of Adoption of Cattle Fattening Management Practices

Table 2 presents the extent to which the ten fattening management practices were adopted by respondents in Kwara State. The results in Table 2 showed that regular feeding (mean score = 2.97; 99.0% weighted score) was the most widely adopted practice, confirming that routine feeding is regarded by almost all fatteners in Kwara State as an indispensable daily task. Salt and potash supplementation (2.44) and castration (2.42) ranked second and third, respectively, reflecting farmers' recognition of their roles in enhancing digestion, bone strength, and weight gain. Conversely, weighing (1.25), vaccination (1.31), and dipping (1.37) were the least adopted practices, indicating that record-keeping and preventive/curative health routines remain the weakest components of the fattening management package in the State.

These findings are consistent with the existing literature on smallholder cattle fattening. Anza and Tesfaye (2025) similarly reported that feeding and supplementation were the practices most consistently applied by fatteners in the Gamo Zone of southern Ethiopia, whereas growth monitoring and preventive health routines lagged well behind. Umar *et al.* (2008), working on small-scale cow fattening in Bama Local Government Area of Borno State, and Sarma *et al.* (2014) in Pabna and Sirajgonj Districts of Bangladesh, both observed that routine feeding and supplementation are treated by fatteners as indispensable daily tasks while veterinary and record-keeping routines are applied only sporadically. The particularly low adoption of weighing recorded here (mean = 1.25) mirrors the concern raised by Maro *et al.* (2024), who demonstrated that the performance and profitability of finishing strategies can only be evaluated properly where weight gain is actually measured; in the absence of weighing, fatteners rely on visual appraisal and cannot determine the optimum point of sale. Similarly, the weak uptake of vaccination and dipping accords with FAO (2023) and Mapiye and Dzama (2024), who attribute the persistence of preventive animal health gaps in African smallholder livestock systems primarily to weak research–extension–farmer–input linkages rather than to farmer indifference.

Table 2: Extent of Adoption of Fattening Management Practices

Management practice	Always used Freq (%)	Sometimes used Freq (%)	Rarely used Freq (%)	Mean	Rank
Regular feeding	170 (96.6)	6 (3.4)	-	2.97	1st
Salt and potash	95 (54.0)	63 (35.8)	18 (10.2)	2.44	2nd
Castration	85 (48.3)	80 (45.5)	11 (6.3)	2.42	3rd
Regular sanitation	78 (44.3)	80 (45.5)	18 (10.2)	2.34	4th
Boosting with vitamins	30 (17.0)	46 (26.1)	100 (56.8)	1.60	5th
Vector control	17 (9.7)	58 (33.0)	101 (57.4)	1.52	6th
Deworming	22 (12.5)	31 (17.6)	122 (69.9)	1.43	7th
Dipping	19 (10.8)	27 (15.3)	130 (73.9)	1.37	8th
Vaccination	10 (5.7)	34 (19.3)	132 (75.0)	1.31	9th
Weighing	17 (9.7)	10 (5.7)	149 (84.7)	1.25	10th

Overall Level of Adoption

Table 3 presents the classification of respondents by overall level of adoption, computed from the aggregate percentage weighted score across all ten practices. The results indicated that none of the sampled fatteners exhibited a low level of adoption. The majority (58.0%) recorded a moderate level of adoption, while 42.0% recorded a high level, with individual adoption scores ranging from 37% to 100%. This finding indicates that although cattle fatteners in Kwara State have broadly embraced improved fattening practices as a management approach, complete adoption of the full practice bundle,



particularly weighing and preventive health measures, remains uncommon, leaving considerable scope for productivity and profitability gains through more comprehensive adoption.

The absence of any respondent in the low adoption category, together with the concentration of respondents in the moderate category, echoes the pattern reported by Ibrahim-Olesin *et al.* (2025) for regenerative agricultural practices among maize farmers in the same State, where overall usage was likewise found to be moderate rather than either low or complete. Kamara *et al.* (2025) reached a comparable conclusion for improved soybean management practices in North-East Nigeria, where practices were widely but only partially adopted, with adoption intensity constrained by input cost and market access. The present result therefore reinforces the view that adoption in Nigerian smallholder systems is better understood as a graduated and partial process than as a binary decision, and that the relevant policy question is not whether farmers adopt improved practices but how completely they do so.

Table 3: Classification of Respondents by Overall Level of Adoption

Adoption level	Frequency	Percentage
Low adoption (< 33%)	0	0.0
Moderate adoption (33% - 66%)	102	58.0
High adoption (> 66%)	74	42.0
Total	176	100.0

Determinants of the Extent of Adoption

Table 4 presents the OLS regression results for the socio-economic factors influencing the extent of adoption of improved cattle fattening practices in Kwara State. The results of regression model explained 67% of the total variation in the extent of adoption ($R^2 = 0.67$), with the F-statistic significant at the 1% level, indicating a good overall fit. Years of fattening experience was positively significant at the 1% level, suggesting that more experienced fatteners adopt a greater proportion of recommended practices. Range size was positively significant at the 5% level, implying that farmers with larger landholdings are better able to construct the additional sheds and facilities required for fuller adoption, whereas cost of feeding was negatively significant at the 5% level, indicating that rising feed costs discourage complete adoption of the fattening package. Household size was positively significant at the 1% level, likely reflecting the availability of family labour to manage multiple adoption-intensive tasks, while herd size was negatively significant at the 1% level, possibly because farmers with larger herds prioritise herd expansion through breeding over intensive per-animal management. Non-farm income was positively significant at the 10% level, indicating that farmers with supplementary income streams are better positioned to finance the full range of fattening inputs and practices. Age, gender, cooperative association, amount of credit received, access to extension services, government tax, primary occupation, and household income were not significant determinants of adoption in the study area.

These results correspond closely with earlier evidence. The positive and highly significant effect of fattening experience is consistent with Ibrahim-Olesin *et al.* (2025) and Oguche *et al.* (2026), who both found that accumulated farming experience raises the probability and the intensity of adoption, as farmers acquire the tacit knowledge needed to implement a fuller practice bundle. The negative effect of feeding cost supports the conclusions of Ameh *et al.* (2026) and Kamara *et al.* (2025), who identified input cost as a principal constraint on adoption intensity, and is consistent with the feed-cost pressures documented by Kasuwar Kuka (2025) along the Northern Nigerian meat value chain. The positive effect of non-farm income likewise accords with Oguche *et al.* (2026), who reported that access to liquidity from outside the enterprise enables farmers to finance improved practices.

Two results diverge from the literature and merit comment. First, the non-significance of access to extension services is at variance with Ibrahim-Olesin *et al.* (2025) and Mapiye and Dzama (2024), both of whom report extension contact as a key determinant of adoption. This divergence most plausibly reflects the limited and largely crop-oriented extension coverage available to cattle fatteners in the study



area, so that the variable captures the fact of contact rather than the receipt of livestock-specific advice. Second, the negative sign on herd size runs counter to the scale effect that might be expected, but supports the interpretation of Sarma *et al.* (2014) that fatteners holding larger herds shift their management objective away from intensive per-animal finishing towards herd expansion through breeding, thereby diluting the attention given to the fattening package itself

Table 4: Factors Influencing the Extent of Adoption of Improved Cattle Fattening Practices

Variable	Coefficient	Std. Error	t-value
Constant	1.9429***	0.4418	4.40
Age	0.00000025	0.00000068	0.37
Years of fattening experience	0.0363***	0.0074	4.93
Size of range	0.1151**	0.0548	2.10
Gender	-0.2719	0.1799	-1.51
Cooperative association	0.0853	0.7432	0.11
Amount of credit received	-0.0000564	0.0000468	-1.21
Access to extension service	-0.3796	0.4604	-0.82
Cost of feeding	-0.2622**	0.1070	-2.45
Herd size	-0.6900***	0.1166	-5.92
Government tax	-0.0161	0.0165	-0.98
Household size	0.0322***	0.0089	3.63
Primary occupation	-0.0741	0.0747	-0.99
Household income	0.00000016	0.00000085	0.19
Non-farm income	0.0000028*	0.0000015	1.88

$R^2 = 0.67$; $F(14,160)$ significant at 1% level

CONCLUSION AND RECOMMENDATIONS

The study concludes that adoption of cattle fattening in the study area is significantly and positively influenced by years of fattening experience, size of range, household size and non-farm income, and negatively influenced by cost of feeding and herd size. Also, small-scale cattle fatteners in study area have moderately-to-highly adopted the cattle fattening management package, with regular feeding almost universally practised but weighing, vaccination and dipping considerably under-adopted. Based on these findings, the study recommends that:

- (i) Extension agencies should intensify targeted training on the currently under-adopted practices, particularly routine weighing and vaccination, since these have direct implications for monitoring weight gain and reducing disease-related losses.
- (ii) Programmes that build fattening-specific experience through structured mentorship or farmer field schools should be prioritised, given the strong positive influence of experience on adoption.
- (iii) Input-cost-reducing interventions, such as bulk feed procurement schemes or feed subsidy arrangements, should be explored to counter the discouraging effect of rising feeding costs on full adoption.
- (iv) Policies that support non-farm income diversification for fattening households should be encouraged, given its positive association with fuller adoption of improved fattening practices.



REFERENCES

- Abdulazeez, M. A., Abdulrahman, O. L., & Olooto, F. M. (2026). Assessment of male and female participation in livestock group activities in Kwara State, Nigeria. *FUDMA Journal of Agriculture and Agricultural Technology*, **12**(1): 62-68. <https://doi.org/10.33003/jaat.2026.1201.09>
- Ameh, B. O., & Effiong, M. O. (2026). Profitability analysis of small-scale cattle fattening in Maiduguri metropolis, Borno State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, **6**(1B): 53-62.
- Anza, A., & Tesfaye, T. (2025). Fattening practices, marketing systems and body weight estimation of beef cattle in Arba Minch Zuria District, Gamo Zone, Southern Ethiopia. *Ethiopian Journal of Natural and Computational Sciences*, **5**(2): 839–857. <https://journal.uog.edu.et/index.php/EJNCS/article/view/1143>
- Food and Agriculture Organization of the United Nations. (2023). The state of food and agriculture 2023: Revealing the true cost of food to transform agrifood systems. FAO. <https://doi.org/10.4060/cc7724en>
- Ibrahim-Olesin, S., Adefalu, L. L., Aderinoye-Abdulwahab, S. A., Kayode, A. O., & Mohammed, S. B. (2025). Usage of regenerative agricultural practices by maize farmers in Kwara State, Nigeria. *Discovery Agriculture*, **11**: 161-178. <https://doi.org/10.54905/disssi.v11i23.e3da1611>
- Kamara, A. Y., Kamsang, L. S., Mustapha, A., Kamara, A. Y., Kolapo, A., & Kamai, N. (2025). Gender disparities in the adoption of improved management practices for soybean cultivation in North East Nigeria. *Journal of Agriculture and Food Research*. <https://doi.org/10.1016/j.jafr.2025.102032>
- Kasuwar Kuka, M. G. (2025). Establishing a resilient meat value chain in Northern Nigeria for sustainable economic growth. *Journal of Emerging Trends in Economics and Management Sciences*, **16**(3): 345-356.
- Mapiye, O., & Dzama, K. (2024). Strengthening research-extension-farmer-input linkage system for sustainable smallholder livestock farming in Africa: Progress and prospects. *Tropical Animal Health and Production*, **56**: 363. <https://doi.org/10.1007/s11250-024-04210-9>
- Maro, E. P., Laswai, G. H., Sangeda, A. Z., Selemani, I. S., & Shem, M. N. (2024). Effects of finishing strategies on the performance and profitability of Boran crossbred cattle. *Asian Journal of Research in Animal and Veterinary Sciences*, **7**(4): 307–324. <https://journalajravs.com/index.php/AJRAVS/article/view/315>
- Oguche, M., Oke, F. O., Kariuki, J., Oloo, R., Potthast, T., Chagunda, M. G. G., & Birner, R. (2026). Economic potential and production determinants of selected neglected and conventional livestock species in Ogun and Oyo States, Nigeria: A comparative case study. *Veterinary and Animal Science*, **32**: 100597. <https://doi.org/10.1016/j.vas.2026.100597>
- Sarma, P. K., Raha, S. K., & Jorgensen, H. (2014). An economic analysis of beef cattle fattening in selected areas of Pabna and Sirajgonj Districts. *Journal of the Bangladesh Agricultural University*, **12**(1): 127–134.
- Umar, A. S. S., Alamu, J. F., & Adeniji, O. B. (2008). Economic analysis of small scale cow fattening enterprise in Bama local government area of Borno State, Nigeria. *Production agriculture and technology*, **4**(1): 1-10.