

Research Article

Traditional cattle fattening practices in Karat-Zuria and Arba Minch-Zuria Woredas, South Ethiopia

Dereje Dea^{1*}, Ermias Eramo¹, Getnet Kebede¹, Deribe Gemiyo²

¹Livestock Research Work Process, Arba Minch, Ethiopia

²Livestock Research Directorate, Siltie, Ethiopia

(Received: December 09, 2025; Revised: July 04, 2026; Accepted: July 07, 2026; Published: September 12, 2026)

*Corresponding author: Dereje Dea, E-mail: dereadea12@gmail.com

Abstract

Smallholder cattle fattening is a key livelihood activity in south Ethiopia, providing income, meat, and draft power. This study assessed traditional cattle fattening practices, herd characteristics, feeding strategies, and market patterns in Karat-Zuria and Arba Minch-Zuria Woredas. A total of 104 households (66 from Karat-Zuria, 38 from Arba Minch-Zuria) were interviewed using structured questionnaires and field observations. Results showed that fattening practices were predominantly male-dominated (92.3%), with local cattle breeds preferred (63.5%). Farmers in Karat-Zuria preferred older cattle (>6 years), fed animals more frequently (5.64 ± 1.93 times/day), and fattened cattle for longer durations (5.3 ± 2.49 months) compared to Arba Minch-Zuria. Feeding was largely non-standardized, relying on local supplements. Seasonal fattening peaked during festivals (55.8%), and market destinations varied geographically. The findings highlight the need for improved feeding, age selection, and extension services to enhance productivity and profitability in smallholder fattening systems.

Keywords: Cattle fattening, Feeding practices, Market access

Introduction

Livestock production plays a vital role in the livelihoods of smallholder farmers in southern Ethiopia, where mixed crop–livestock systems dominate rural economies (Amejo, 2024). Cattle fattening, in particular, serves as an important income-generating activity, contributing to household food security, asset accumulation, and market participation (Ayalew *et al.*, 2013). Despite its potential, the productivity of traditional cattle fattening systems remains constrained by limited access to improved feeding, poor management practices, inadequate breed selection, and inconsistent market orientation (Belachew & Melaku, 2019). Understanding existing practices, livestock ownership patterns, and farmer preferences is therefore crucial for designing effective interventions aimed at improving fattening performance and overall livestock productivity.

The present study assessed cattle fattening practices in Arba Minch Zuria and Karat Zuria districts of southern Ethiopia, focusing on respondent demographics, livestock holdings, breed preferences, selection criteria, feeding management, and supplementary feeding practices. These two districts represent distinct agro-ecological and socio-cultural settings, influencing livestock production dynamics and resource availability. The results indicate notable differences between the districts in terms of herd composition, fattening management strategies, and feed utilization patterns.

By documenting these variations, the study provides evidence to guide location-specific technical support, extension interventions, and strategic planning for improving cattle fattening efficiency. The findings also

contribute to a broader understanding of how smallholder farmers utilize local breeds, adopt feeding technologies, and manage fattening operations under resource-limited conditions. Such insights are essential for informing development initiatives that aim to enhance productivity, promote sustainable livestock systems, and support farmer livelihoods in southern Ethiopia.

Materials and methods

Study area

The study was conducted in Arba Minch Zuria and Karat Zuria districts of South Ethiopia. These districts represent two distinct zones (Konso and Gamo, respectively) where mixed crop–livestock production is the dominant livelihood system. Livestock, particularly cattle, play a central role in household income generation, fattening activities, and local market supply.

Study design

A cross-sectional survey design was employed to collect information on respondent demographics, livestock holdings, and breed preferences, cattle selection criteria, feeding practices, and fattening management. The study focused on farmers actively engaged in livestock production and cattle fattening activities.

Sampling procedure and sample size

A purposive sampling method was used to select the two districts based on the prevalence of cattle fattening activities. Within each district, representative kebeles were selected purposively. From the selected kebeles,

respondent households were chosen using simple random sampling. A total of 104 respondents participated in the study: Arba Minch Zuria: 38 respondents and Karat Zuria: 66 respondents.

Data collection methods

Data were collected using a semi-structured questionnaire which included both closed and open-ended questions. The questionnaire captured information on: socio-demographic characteristics (sex, age), livestock ownership by species (cattle, goats, sheep, equines, and poultry), breed preferences and availability, criteria for selecting animals for fattening, fattening management practices (age category, duration), feeding systems and supplementary feed use and types of supplementary feed available and preferred.

Variables measured

The key variables measured include:

Demographic Variables are sex of respondent (male/female) and age (years).

Livestock Holding Variables: herd/flock size by species and ownership differences by district

Fattening Management Variables: breed used for fattening, selection criteria (age, body condition, weight, and breed type), fattening duration, feeding practice and supplementary feeds used.

Feed Availability Variables: locally available feed resources and preference ranking for supplementary feeds.

Data analysis

Data were coded and entered into Microsoft Excel and analyzed using descriptive statistics such as frequencies, percentages, and means (SPSS, 20). Results are presented in tables and narrative form to compare fattening practices between Arba Minch Zuria and Karat Zuria districts. Comparisons are focused on demographic patterns, livestock ownership differences, breed and feeding preferences and fattening strategies.

Results and discussion

Respondent demographics

The majority of the respondents accounted were male than female of the total sample (Table 1). This male-dominated pattern suggests that livestock-related activities aligns with typical gender participation trends observed in livestock production and management systems across southern Ethiopia (Kinati & Mulema, 2018; FAO *et al.*, 2020). The low female representation may reflect cultural norms and gender roles that limit women's direct involvement in livestock decision-making and ownership (FAO, 2011).

The mean age of respondents in Arba Minch Zuria and Karat Zuria Woredas was 42.94 ± 10.41 years and 42.36 ± 10.51 years, respectively. This is indicating a relatively mature farming population actively engaged in livestock production and smallholder livestock farmers are predominantly middle-aged, reflecting the labor-intensive nature of livestock management.

Livestock holding

Cattle

The average number of oxen and cow per household was higher in Karat Zuria, reflecting the greater reliance on draught animals in this district. The higher variability in Karat suggests heterogeneous herd sizes among households, likely influenced by landholding size, access to feed, and economic capacity. Cattle remain central to smallholder livelihoods, providing milk, income, and draft power (Table 2).

Small ruminants

Arba Minch Zuria reported higher mean numbers of bucks while Karat Zuria maintained more does. This distribution suggests a potential emphasis on breeding stock management in Karat to enhance herd expansion. Kid numbers were slightly higher in Arba Minch Zuria compared to Karat Zuria, indicating moderate reproductive performance across both sites. Sheep populations were largely concentrated in Karat Zuria than Arba Minch Zuria. Such differences may be attributed to agro-ecological suitability, forage availability, and cultural preferences for small ruminants (Table 2).

Poultry holdings

Poultry production showed considerable variability (Table 2). Arba Minch Zuria households reported higher average numbers of chickens, hens, and cocks compared to Karat Zuria. This variability may be associated with the small sample size in some households and differences in access to feed and veterinary care. Poultry serves as a critical source of protein and supplemental income, corroborating earlier reports on rural smallholder systems in Ethiopia (Fentie *et al.*, 2013).

Equine holdings

Donkey populations were more prominent in Karat Zuria than in Arba Minch Zuria, reflecting the district's reliance on pack animals for transport in topographically challenging areas. Mules were absent in Arba Minch Zuria but small amount present in Karat (Table 2). The low numbers of mules overall highlight their specialized use in transport rather than widespread livestock production.

Beekeeping practices

Beekeeping was more prominent in Arba Minch Zuria with modern hives per household than Karat Zuria (Table 2). The higher variability in Arba Minch may indicate

adoption differences, resource availability, or market orientation. Transitional and traditional hives were primarily observed in Karat Zuria, suggesting differential technology adoption may be influenced by extension services and cultural practices (Anza & Yemane, 2024). Beekeeping contributes to income diversification, ecosystem services, and nutritional security.

The comparative analysis illustrates distinct patterns of livestock and beekeeping systems in the two districts. Karat Zuria tends to have higher numbers of large ruminants and draft animals, reflecting its agricultural emphasis on cattle-based production. In contrast, Arba Minch Zuria exhibits higher numbers of goats, poultry, and modern beehives, suggesting a more diversified livestock system. Understanding these differences is essential for designing location-specific interventions aimed at improving productivity, genetic improvement, and sustainable resource management.

Preferred breed for fattening

The results show that the majority of respondents across both districts preferred local breeds (either castrated or uncastrated) for cattle fattening. A considerable proportion of respondents from Karat Zuria Woreda specifically preferred local castrated animals, while none from Arba

Table 1: Distribution of respondents by sex (frequency) and age (mean)

Respondent Sex (%)	Location		
	Arba Minch Zuria	Karat Zuria	Total
Female	2 (1.9)	6 (5.8)	8 (7.7)
Male	36 (34.6)	60 (92.3)	96 (92.3)
Age (mean)	38 (42.94±10.41)	66 (42.36±10.51)	

Minch Zuria Woreda mentioned this category. A smaller fraction (7.7%) of respondents in both areas indicated a preference for a mix of local, Boran, and South Omo local breeds (Table 3).

This finding implies that local breeds dominate cattle fattening practices in both study areas, likely due to their adaptation to local environmental conditions, availability, and lower purchase cost. The higher preference for castrated local cattle in Karat Zuria Woreda may reflect better market orientation and traditional knowledge that castration improves fat deposition and meat quality a perception consistent with previous findings (Tekalign, 2019).

Cattle fattening practices

Age of cattle for fattening

The majority of fattened cattle were older than 7 years, followed by those aged 6–7 years (Table 4). In Karat Zuria Woreda, most fattened cattle were older than 6 years, indicating that farmers prioritize mature animals, likely for faster weight gain and higher market value. In Arba Minch Zuria, farmers fatten slightly younger cattle (4–7 years), which may reflect availability constraints or strategic selection for better growth potential. Age at fattening is critical, as younger animals may have higher growth potential but require longer fattening duration, while older animals may gain weight faster but at lower feed efficiency (Aksoy *et al.*, 2008). Fattening older cattle (>7 years) is consistent with practices in smallholder systems where farmers aim to maximize live weight before slaughter, especially in areas where younger stock is reserved for breeding. This pattern aligns with findings from Tadesse *et al.* (2021), who reported that smallholder farmers in

Table 2: Mean livestock holdings across locations

Livestock Type	Arba Minch Zuria			Karat Zuria		
	N	Mean±SD	%	N	%)	Mean±SD
Cattle						
Ox	36	2.78±1.56	100	66	100	3.21±1.85
Cow	32	2.38±1.09	88.9	50	75.8	3.44±3.22
Calf	24	2.50±1.09	66.7	36	54.5	2.28±1.49
Small ruminant						
Buck (Goat)	20	3.60±1.90	55.6	62	93.9	2.84±2.16
Doe (Goat)	22	5.55±3.80	61.1	62	93.9	6.58±5.02
Kid (Goat)	20	4.10±1.91	55.6	60	90.9	3.67±2.70
Ram (Sheep)	4	2.50±2.12	11.1	44	66.7	2.36±1.68
Ewe (Sheep)	2	3.00	5.6	50	75.8	2.44±1.56
Lamb	2	2.00	5.6	34	51.5	2.06±1.34
Poultry						
Cock	22	3.36±2.20	61.1	46	69.7	2.22±1.41
Hen	20	4.70±3.06	55.6	52	78.8	4.15±3.26
Chicken	8	6.00±5.35	22.2	36	54.5	4.39±2.17
Equine						
Donkey	12	1.33±0.52	33.3	36	54.5	2.22±1.59
Mule	0	—	0	2	3	1
Bee keeping						
Modern Beehive	12	8.17±10.83	33.3	12	18.2	2.83±3.54
Transitional Beehive	0	—	-	4	6.1	3.50±2.12
Traditional Beehive	0	—	-	2	3	1

Table 3: Distribution of respondents by preferred breed for fattening and location

Preferred breed for fattening	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total
Local, Boran and South Omo	4 (3.8%)	4 (3.8%)	8 (7.7%)
Local (either castrated or not)	34 (32.7%)	32 (30.8%)	66 (63.5%)
Local castrated	0 (0.0%)	30 (28.8%)	30 (28.8%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

Table 4: Age of cattle at fattening by location

Age of Cattle (Years)	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
>7 yrs	6 (5.8%)	40 (38.5%)	46 (44.2%)
6–7 yrs	14 (13.5%)	22 (21.2%)	36 (34.6%)
4–5 yrs	10 (9.6%)	4 (3.8%)	14 (13.5%)
2–3 yrs	8 (7.7%)	0 (0.0%)	8 (7.7%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

southern Ethiopia prefer mature animals for fattening due to their higher initial body weight and immediate market readiness. Emphasizing the optimal age for fattening (usually 4–6 years) could improve feed conversion efficiency and economic returns.

Sex of cattle used for fattening

The majority of farmers fatten male cattle only, while a smaller proportion fatten both male and female cattle (Table 5). Preference for male cattle is primarily driven by faster growth rates, higher market value, and better feed conversion efficiency compared to females, which may be kept for breeding or milk production. These findings are consistent with previous studies in southern Ethiopia, where male cattle are preferred for fattening due to their superior growth performance, while females are selectively fattened depending on household needs and market opportunities (Tadesse *et al.*, 2021).

Number of cattle fattened

The results on the number of cattle fattened per household across the two study districts are presented in Table 6. The findings revealed that the majority of respondents fattened one to two cattle, followed by three to four cattle. In general, Karat Zuria Woreda accounted for a larger proportion of households engaged in cattle fattening (64.7%) compared to Arba Minch Zuria Woreda (35.3%). This indicates that small-scale cattle fattening is the dominant practice in both woredas, with relatively more households in Karat Zuria participating. This pattern is consistent with the findings that most rural households in Southern Ethiopia fatten a small number of animals due to limited feed availability, financial constraints, and inadequate access to improved fattening technologies. Similarly, Lijalem *et al.* (2016) noted that livestock production systems in Ethiopia are characterized by smallholder farmers with restricted resources, resulting in limited herd sizes for fattening. The relatively higher

Table 5: Sex of cattle used for fattening by location

Cattle sex for fattening	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Male	32 (30.8%)	48 (46.2%)	80 (76.9%)
Both (Male and Female)	6 (5.8%)	18 (17.3%)	24 (23.1%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

Table 6: Number of cattle fattened per household

Cattle Fattened per Household	Arba Minch Zuria Woreda (%)	Karat Zuria Woreda (%)	Total (%)
1–2	28 (35.9)	50 (64.1)	78 (76.5)
3–4	4 (28.6)	10 (71.4)	14 (13.7)
>5	4 (66.7)	2 (33.3)	6 (5.9)
Total	36 (35.3)	66 (64.7)	102 (100)

proportion of cattle fatteners in Karat Zuria Woreda may be attributed to better market access, stronger livestock trading culture, which encourage farmers to engage more actively in fattening activities. The development of livestock marketing infrastructure and input supply chains greatly influences the intensity of fattening practices in rural communities.

Selection criteria for cattle fattening

The study indicates that farmers primarily select cattle based on body characteristics and coat color, with less emphasis on health or age in some cases (Table 7). In Karat Zuria Woreda, the dominant selection criterion was color except black combined with body size, reflecting local preferences for certain coat colors, which may influence market price or consumer preference. In Arba Minch Zuria, body condition and color combined with body size were the main criteria (11.5%), indicating that physical fitness and appearance are the main considerations in animal selection.

Other combinations, including health, hump size, and age, were used by fewer farmers, suggesting a more complex, experience-based selection process that balances physical traits and perceived growth potential. This practice aligns with previous studies in southern Ethiopia, where body conformation, coat color, and body condition are reported as the most important selection criteria for fattening cattle (Tadesse *et al.*, 2021). The emphasis on non-black colors in Karat Zuria may reflect cultural preferences or market-driven factors, as traders and buyers often prefer lighter-colored animals for festivals and special events. The results also highlight the informal nature of selection, relying on visual appraisal rather than objective measurement, which can influence uniformity of fattened cattle and overall productivity.

Management practices

Feeding frequency

Feeding frequency showed notable differences between the two sites. Farmers in Karat Zuria reported higher feeding frequency (5.64±1.93 times/day) compared to Arba Minch

Table 7: Selection criteria for cattle fattening

Selection Criteria	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Color except black/Body size	3 (5.8%)	16 (30.8%)	19 (36.5%)
Body condition/Color except black/Body size	6 (11.5%)	2 (3.8%)	8 (15.4%)
Body condition/Healthy/Color except black/Body size/Hump size	3 (5.8%)	0 (0.0%)	3 (5.8%)
Body condition/Healthy/Color except black/Body size	3 (5.8%)	0 (0.0%)	3 (5.8%)
Body condition/Healthy/Color except black	2 (3.8%)	2 (3.8%)	4 (7.7%)
Body condition/Healthy	0 (0.0%)	3 (5.8%)	3 (5.8%)
Healthy/Color except black	0 (0.0%)	2 (3.8%)	2 (3.8%)
Body condition/Color except black/Body size/Hump size	1 (1.9%)	0 (0.0%)	1 (1.9%)
Other minor combinations (age, stretching skin, hump size)	3 (5.8%)	4 (7.7%)	7 (13.5%)
Color except black	1 (1.9%)	0 (0.0%)	1 (1.9%)
Body size/Hump size	0 (0.0%)	1 (1.9%)	1 (1.9%)
Body condition/Color except black/Age	0 (0.0%)	1 (1.9%)	1 (1.9%)
Body condition/Color except black	0 (0.0%)	1 (1.9%)	1 (1.9%)
Body condition/Body size	0 (0.0%)	1 (1.9%)	1 (1.9%)
Total	19 (36.5%)	33 (63.5%)	52 100.0%

Zuria (3.79 ± 1.23 times/day). Increased feeding frequency is associated with improved daily weight gain and overall fattening efficiency (Mahmoud *et al.*, 2020). This difference may reflect variations in labor availability, feed resources, or traditional management practices between the districts.

Watering frequency and fattening duration

Fattening cattle in the study areas were watered an average of 4.96 ± 1.92 times per day, with higher frequency in Karat Zuria Woreda (5.64 ± 1.93) than in Arba Minch Zuria Woreda (3.79 ± 1.22) (Table 8). This difference reflects variations in water availability, climate, and management practices between the districts. Frequent access to drinking water is essential for maintaining feed intake, rumen function, and growth performance in fattening cattle.

Fattening duration was longer in Karat Zuria (5.30 ± 2.49 months) than in Arba Minch Zuria (4.00 ± 1.25 months). Longer fattening periods may correspond with the use of older animals or higher body condition targets before sale. Differences in feed availability and growth rates may also contribute to variation in fattening duration.

Feeding and nutrition

The analysis reveals wide variation in the amount and form of feed offered daily to fattening cattle across the two study locations, reflecting non-standardized feeding practices and reliance on local measurement units (Table 9).

A substantial proportion of farmers (36.5%) reported that the feed offered per day was “not measured”, indicating a lack of quantitative feeding management. This practice was more prevalent in Karat Zuria (26.9%) than in Arba Minch Zuria (9.6%), suggesting that most farmers in both areas feed cattle based on visual estimation and experience rather than defined feed ratios.

In Karat Zuria Woreda, nearly one-third of respondents (17.3%) supplemented with 10–20 liters of *Atela* (local brewery by-product) mixed with water, while others (15.4%) combined this residue with measured

Table 8: Watering frequency per day and the fattening duration

Parameters	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total
Watering frequency/day	38 (3.79 ± 1.22)	66 (5.64 ± 1.93)	104 (4.96 ± 1.92)
Fattening duration (month)	38 (4.00 ± 1.25)	66 (5.30 ± 2.49)	104 (4.83 ± 2.14)

Table 9: Quantity of feed offered per day by location

Feed quantity	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Not measured	10 (9.6%)	28 (26.9%)	38 (36.5%)
Not measured + 10–20 liter <i>Atela</i> (local brewery residue)	0 (0.0%)	18 (17.3%)	18 (17.3%)
8–15 kg	12 (11.5%)	0 (0.0%)	12 (11.5%)
18–25 kg	6 (5.8%)	0 (0.0%)	6 (5.8%)
40–60 kg	2 (1.9%)	6 (5.8%)	8 (7.7%)
10–20 feed + <i>Atela</i> mixture	0 (0.0%)	16 (15.4%)	16 (15.4%)
<i>Silicha</i> (goat skin container) full	0 (0.0%)	2 (1.9%)	2 (1.9%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

feed amounts (10–20 kg). This shows that liquid feed supplements such as *Atela* are widely used due to their local availability, low cost, and role in improving palatability and digestibility.

In contrast, respondents from Arba Minch Zuria tended to provide feed in measured quantities (8–25 kg), though the type of feed and accuracy of measurement likely vary. Use of traditional units such as “*Silicha*” (goat-skin bag) for feed measurement indicates localized feeding culture without standardized units.

Supplementary feeding practices

The data show substantial variation in supplementary feeding strategies between Arba Minch Zuria and Karat

Table 10: Supplementary feeding practices used across locations

Supplementary feed type	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Amole/Makado/Ado (salty soil)	10 (11.6%)	2 (2.3%)	12 (14.0%)
Molasses	4 (4.7%)	0 (0.0%)	4 (4.7%)
Molasses/Amole/Makado/Ado	4 (4.7%)	0 (0.0%)	4 (4.7%)
Maize grain boiled	4 (4.7%)	6 (7.0%)	10 (11.6%)
Maize grain boiled+Amole/Makado/Ado or related combinations	0 (2 cases combined)	4 (4.6%)	8 (9.3%)
Concentrate feed (alone or with local additives)	0 (5 combined cases)	14 (16.3%)	14 (16.3%)
Checka atela (local brewery by-product) or related mixtures	4 (4.6%)	6 (7.0%)	5 (11.6%)
Cereals powder mixed with water and salt	0 (0.0%)	12 (14.0%)	12 (14.0%)
Albendazole (deworming supplementation)	8 (9.3%)	10 (11.6%)	18 (20.9%)
Total	34 (39.5%)	52 (60.5%)	86 (100.0%)

Table 11: Major seasons of cattle fattening by location

Fattening season	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Festivals	14 (13.5%)	44 (42.3%)	58 (55.8%)
Dry seasons or Festivals	20 (19.2%)	6 (5.8%)	26 (25.0%)
Dry and wet seasons	0 (0.0%)	8 (7.7%)	8 (7.7%)
Dry seasons	0 (0.0%)	6 (5.8%)	6 (5.8%)
Winter time when crop residue available	2 (1.9%)	2 (1.9%)	4 (3.8%)
Whenever the animal is ready for fattening	2 (1.9%)	0 (0.0%)	2 (1.9%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

Zuria woredas, reflecting both resource availability and market access differences (Table 10).

Overall, the most frequently reported supplements were Albendazole (20.9%), Amole/Makado/Ado (14.0%), and cereals powder mixed with water and salt (14.0%). This suggests that farmers combine nutritional supplementation with health management practices, particularly deworming, to enhance fattening efficiency.

In Arba Minch Zuria Woreda, Amole/Makado/Ado (salty soil) and molasses-based mixtures were common. These local salt sources provide essential minerals such as sodium and trace elements that stimulate feed intake and digestion. The use of molasses (4.7%) also indicates local awareness of its energy-boosting value for fattening animals.

By contrast, farmers in Karat Zuria Woreda showed greater use of concentrate feeds (16.3%) and cereal-water-salt mixtures (14.0%), reflecting better market linkage and access to commercial feed ingredients. The presence of brewery by-products such as Checka atela in both woredas further demonstrates the integration of agro-industrial residues into fattening systems, which is an efficient low-cost feeding practice.

The consistent use of Albendazole and deworming materials across both areas highlights farmers' understanding of the importance of internal parasite control in improving feed efficiency and weight gain.

Seasonality of the fattening

The results indicate that cattle fattening is highly seasonal, with Festivals (55.8%) being the dominant period for fattening in both Arba Minch Zuria and Karat Zuria woredas (Table 11). This is because farmers aim to take advantage of higher market demand and better prices during major religious and

Table 12: Distance of the market for the fattened cattle

Distance to market (km)	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total
Mean distance	38 (7.10±6.88)	66 (5.66±7.41)	104 (6.19±7.19)

cultural holidays such as Easter, Meskel, and New Year, when beef consumption traditionally increases.

A significant portion of respondents (25.0%) practiced fattening during dry seasons or festive periods, highlighting the dual influence of market opportunities and feed availability constraints. The dry season is often preferred by those who can afford purchased feeds or crop residues, while others depend on post-harvest residues (3.8%) during the "winter" period after crop harvests.

In Karat Zuria Woreda, fattening for Festivals (42.3%) was more common, likely due to better market connectivity and higher turnover of livestock driven by the presence of traders and brokers. Conversely, in Arba Minch Zuria, a higher proportion of farmers (19.2%) fatten cattle specifically during dry seasons or festivals, reflecting a more opportunistic and feed-limited production system.

Only a small fraction (1.9%) of respondents practiced continuous fattening (whenever the animal is ready), suggesting that most smallholders rely on seasonal feed resources and market-driven cycles rather than year-round fattening programs.

Marketing of the fattened cattle

Distance to market

The mean distance to market for selling fattened animals was 7.10±6.88 km in Arba Minch Zuria and 5.66±7.41 km in Karat Zuria (Table 12). The large standard

Table 13: Major market destinations for cattle by location

Market destination	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Shelle	24 (23.1%)	0 (0.0%)	24 (23.1%)
Chano-Mille	14 (13.5%)	0 (0.0%)	14 (13.5%)
Dogato	0 (0.0%)	18 (17.3%)	18 (17.3%)
Baide	0 (0.0%)	14 (13.5%)	14 (13.5%)
Baide and Farm gate merchants	0 (0.0%)	14 (13.5%)	14 (13.5%)
Dogato and Farm gate merchants	0 (0.0%)	8 (7.7%)	8 (7.7%)
Alem-Gebeya	0 (0.0%)	6 (5.8%)	6 (5.8%)
Farm gate merchants and Alem-Gebeya	0 (0.0%)	4 (3.8%)	4 (3.8%)
Baide and Alem-Gebeya	0 (0.0%)	2 (1.9%)	2 (1.9%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

Table 14: Mode of transportation used to reach livestock markets by location

Mode of transportation	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
By foot	38 (36.5%)	26 (25.0%)	64 (61.5%)
Vehicle	0 (0.0%)	26 (25.0%)	26 (25.0%)
By foot and vehicle	0 (0.0%)	14 (13.5%)	14 (13.5%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

deviations indicate substantial variation in market access among households. Proximity to markets can influence marketing decisions, prices received, and selection of animals for fattening

Major market destinations

The results indicate that cattle from Arba Minch Zuria Woreda were mainly sold in Shelle (23.1%) and Chano-Mille (13.5%) markets, while cattle from Karat Zuria Woreda were primarily marketed through Dogato (17.3%), Baide (13.5%), and farm-gate merchants (13.5%). Other smaller but relevant outlets included Alem-Gebeya and combined sales channels such as Dogato + farm-gate and Baide + Alem-Gebeya, which together accounted for a modest share of total market sales (Table 13).

This shows a clear geographic differentiation in market destination patterns between the two districts. Farmers in Arba Minch Zuria Woreda rely mainly on nearby formal livestock markets, possibly due to better accessibility and established market routes connecting them to urban centers. In contrast, Karat Zuria Woreda farmers sell to a wider mix of market outlets, including farm-gate traders and multiple regional markets, reflecting higher market integration and trader involvement.

Mode of Transportation

The results indicate that the majority of respondents (61.5%) in both study areas transport their cattle to markets on foot, reflecting limited access to vehicles and poor road infrastructure (Table 14). This practice was universal in Arba Minch Zuria Woreda, where all respondents (100%) reported trekking animals on foot. In contrast, respondents from Karat Zuria Woreda showed a more diverse pattern: 25% used vehicles, while 13.5% used a combination of walking and vehicle transport.

The higher use of vehicles in Karat Zuria Woreda may be attributed to better road access, closer proximity to market centers, and availability of transport services, whereas the absence of vehicle use in Arba Minch Zuria Woreda suggests market remoteness and limited transport facilities. Trekking animals on foot can lead to weight loss, stress, and reduced market value.

The findings imply that transportation remains a critical bottleneck in livestock marketing efficiency, particularly in remote areas where road networks are underdeveloped and vehicle costs are prohibitive. Improving rural transport infrastructure and access to affordable livestock transport services would significantly enhance marketing efficiency and profitability for smallholder fatteners.

Major factors affecting cattle price

The results show that brokers and middlemen (52.9%) are the most influential factor affecting cattle price determination in both study locations. Respondents reported that brokers often manipulate prices by creating artificial demand or acting as intermediaries who take commissions, thereby reducing the producer's share of profit. This problem was more frequently mentioned in Arba Minch Zuria Woreda (Table 15).

The fasting season (35.3%) was the second most significant factor, particularly in Karat Zuria Woreda, where cattle prices typically decline due to reduced meat consumption among Orthodox Christians. Similarly, taxes (27.5%), animal supply fluctuations (17.6%), and limited number of merchants (15.7%) were also highlighted as determinants of cattle price variation.

Some respondents in Arba Minch Zuria Woreda associated animal color and physical appearance (5.9%) with price differences, reflecting cultural preferences and market-based valuation practices. Seasonal factors such as the ploughing season and festivals also influenced price trends prices often drop during ploughing seasons when farmers are reluctant to sell draught animals and rise during festivals when demand for meat increases.

Overall, these findings indicate that cattle price dynamics in the study areas are governed by a complex interaction of market actors (brokers, merchants), religious fasting periods, seasonal demand, and governmental taxation

Table 15: Major factors affecting cattle price variation by location

Major price factors (Grouped)	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Brokers/intermediaries (alone or combined)	32 (31.4%)	22 (21.6%)	54 (52.9%)
Fasting season (alone or combined)	2 (2.0%)	34 (33.3%)	36 (35.3%)
Number of merchants/buyers	0 (0.0%)	16 (15.7%)	16 (15.7%)
Animal number/supply fluctuation	2 (3.9%)	14 (13.7%)	18 (17.6%)
Tax	16 (15.7%)	12 (11.8%)	28 (27.5%)
Color or physical appearance	6 (5.9%)	0 (0.0%)	6 (5.9%)
Seasonal factors (e.g., ploughing, festivals)	6 (5.9%)	2 (2.0%)	8 (7.8%)
Increasing feed cost	2 (2.0%)	4 (3.9%)	6 (5.9%)

Table 16: Perceived trends of cattle fattening by location

Fattening trend	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Increasing due to high selling price	24 (23.1%)	66 (63.5%)	90 (86.5%)
Decreasing due to feed shortage (maize byproduct)	6 (5.8%)	0 (0.0%)	6 (5.8%)
Decreasing due to increase in live animal and feed prices	4 (3.8%)	0 (0.0%)	4 (3.8%)
Decreasing in dry season and increase in wet season because of feed availability	2 (1.9%)	0 (0.0%)	2 (1.9%)
Decreasing due to increasing feed cost	2 (1.9%)	0 (0.0%)	2 (1.9%)
Total	38 (36.5%)	66 (63.5%)	104 (100.0%)

Table 17: Major cattle fattening constraints by location

Major constraints (Grouped)	Arba Minch Zuria Woreda	Karat Zuria Woreda	Total (%)
Feed shortage (alone or combined)	15 (30.6%)	25 (51.0%)	40 (81.6%)
Water scarcity (alone or combined)	10 (20.4%)	22 (44.9%)	32 (65.3%)
Disease occurrence	9 (18.4%)	13 (26.5%)	22 (44.9%)
Capital shortage	6 (12.2%)	8 (16.3%)	14 (28.6%)
Market information/brokers	4 (8.2%)	7 (14.3%)	11 (22.4%)
Grazing land shortage	5 (10.2%)	1 (2.0%)	6 (12.2%)
Price fluctuation/high cattle or feed cost	2 (4.1%)	3 (6.1%)	5 (10.2%)

systems showing that market inefficiencies remain a major bottleneck in smallholder livestock commercialization.

Perceptions of fattening trend

The majority of respondents (86.5%) from both Arba Minch Zuria and Karat Zuria woredas perceived that cattle fattening activities are increasing, primarily due to attractive selling prices (Table 16). This suggests that market-driven incentives are the major motivation for farmers to engage in fattening enterprises. The trend was especially pronounced in Karat Zuria Woreda (63.5%), where market integration and trading networks are relatively well developed compared to Arba Minch Zuria.

A smaller proportion of respondents (13.5%) indicated a declining trend, attributing this mainly to feed shortages, high cost of feed and live animals, and seasonal variability in feed availability. This pattern underscores the strong influence of feed resource dynamics and input costs on the sustainability of fattening operations. Seasonal dependence on crop residues and agro-industrial byproducts such as maize bran limits year-round fattening, especially in the dry season when feed scarcity peaks.

Feed cost and availability are critical determinants of fattening performance and profitability. Increased market demand and price incentives can offset some production challenges, motivating producers to expand fattening despite rising input prices.

Overall, the results demonstrate that economic incentives remain the main driver of cattle fattening expansion, though feed constraints continue to threaten its long-term viability. Integrating forage development, feed conservation, and price stabilization strategies is therefore essential to sustain the observed positive trend.

Major cattle fattening constraints

The findings reveal that feed shortage (81.6%) and water scarcity (65.3%) were the most dominant constraints affecting cattle fattening in both study areas (Table 17). These were followed by animal diseases (44.9%) and shortage of capital (28.6%), while market-related challenges such as lack of price information and broker interference affected about one-fifth (22.4%) of respondents.

A relatively higher proportion of respondents from Karat Zuria Woreda reported multiple concurrent constraints (e.g., feed shortage combined with water scarcity, disease, and capital shortage), whereas respondents from Arba Minch Zuria Woreda more frequently mentioned feed shortage and grazing land scarcity as their primary concerns.

This pattern indicates that cattle fattening is highly constrained by feed and water resource limitations, which may be aggravated by seasonal variability, land-use changes, and feed price fluctuations. The presence of capital and market constraints suggests limited access to credit services and unreliable livestock marketing systems.

Conclusion

Traditional cattle fattening in Karat-Zuria and Arba Minch-Zuria Woredas plays a crucial role in enhancing household income, food security, and livelihood resilience. The system is predominantly based on locally adapted cattle breeds and relies heavily on indigenous knowledge, seasonal feed resources, and locally available supplements such as crop residues and brewery by-products. Farmers mainly prefer older male cattle for fattening, with management practices varying between the two districts in terms of feeding frequency, watering, and fattening duration.

Despite its economic importance, the fattening system is constrained by critical challenges, particularly feed and water shortages, high input costs, animal diseases, limited access to capital, and inefficient market structures influenced by brokers and seasonal price fluctuations. The practice is highly seasonal and market-driven, with demand peaking during religious and cultural festivals. Differences observed between the two districts reflect variations in agro-ecology, market access, and resource availability.

Recommendations

Based on the current findings, the following recommendations are suggested:

- Improve Feed Availability: Promote use of local forage, crop residues, and supplements to ensure year-round quality feed.
- Enhance Fattening Practices: Standardize feeding, housing, and management to optimize growth and reduce fattening duration.
- Strengthen Animal Health Services: Expand access to preventive and curative veterinary care to minimize disease-related losses.
- Support Market Access: Facilitate direct links between farmers and buyers and provide timely market information to increase profitability.

Author contributions

Dereje Dea: Conceptualization, Formal analysis, Writing – original draft. Ermias Eramo: Data curation. Getnet Kebede: Data curation. Deribe Gemiyo: Funding acquisition. All authors approved the final manuscript.

Acknowledgments

The authors thank the farmers, traders, community elders, and development agents of Karat-Zuria and Arba Minch-Zuria Woredas for their cooperation. Appreciation is extended to the local livestock office staff for their facilitation and support during data collection.

References

- Aksoy, A. R., Kirmizibayrak, T., Saatci, M., & Tilki, M. (2008). Effect of age on fattening performance and fattening economy in Zavot male cattle. *The Indian Journal of Animal Sciences*, 78(7), 780-782.
- Amejo, A. G. (2024). *Resilience, sustainability, and the role of livestock in rural food systems: A case study from Ethiopia*. In S. Kukovics (Ed.), *Animal Husbandry - Beliefs, Facts and Reality*. IntechOpen. <https://doi.org/10.5772/intechopen.1006055>
- Anza, A., & Yemane, N. (2024). Production practices, trends, constraints and opportunities of beekeeping in Arba Minch Zuria District, Southern Ethiopia. *Slovak Journal of Animal Science*, 57(4), 3-16.
- Ayalew, T., Duguma, B., & Tolemariam, T. (2013). Traditional cattle fattening and live animal marketing system in different agro-ecologies of Ilu Aba Bora Zone, Oromia, Ethiopia. *Global Veterinaria*, 10, 620-625.
- Aynalem, S., & Workneh, A. Belachew, & Melaku, M. (2019). Beef cattle fattening practices, constraints and future potentials in Ethiopia: A review. *Animal Research International*, 16(2), 3401-3411.
- FAO, IFAD, & WFP. (2020). *Gender transformative approaches for food security, improved nutrition and sustainable agriculture – A compendium of fifteen good practices*. Food and Agricultural Organization of United States. Retrieved from <https://www.ifad.org/en/w/publications/gender-transformative-approaches-for-food-security-improved-nutrition-and-sustainable-agriculture-a-compendium-of-fifteen-good-practices>
- FAO. (2011). *Understanding and integrating gender issues into livestock development*. Food and Agricultural Organization of United States. Retrieved from <https://openknowledge.fao.org/items/9be8e038-0c26-4049-b792-8ddd16f46b20>
- Fentie, T., Abebe, B., & Kassa, T. (2013). Small-scale family poultry production in North Gondar: Characteristics, productivity and constraints. *Livestock Research for Rural Development*, 25(9), 161.
- Kinati, W., & Mulema, A. A. (2018). *Gender issues in livestock production in Ethiopia: A review of literature to identify potential entry points for gender responsive research and development*. International Livestock Research Institute (ILRI).
- Lijalem, T., Daniel, A., & Ermias, T. (2016). Assessment of beef cattle fattening in selected districts of Hadiya Zone, Southern Ethiopia. *Journal of Biology, Agriculture and Healthcare*, 6(5), 167-172.
- Tadesse, B., Yilma, K., & Mekonnen, K. (2021). Beef cattle fattening and marketing practice in Gamo Zone, Southern Ethiopia. *Bioscience Research*, 18(1), 120-129.
- Tekalign, W. U. (2019). Assessment of the traditional cattle fattening system in Damot Woyde Woreda, Wolaita Zone. *International Journal of Advanced Research in Biological Sciences*, 6(11), 43-52.