



ASSESSMENT OF GRAZING LAND STATUS, UTILIZATION PRACTICES AND ASSOCIATED CONSTRAINTS IN SOUTH ARI DISTRICT, SOUTHERN ETHIOPIA

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Article info	Abstract
Received: 2024-11-15 Accepted: 2025-03-04 Published: 2025-06-30 DOI-Crossref: 10.32649/ajas.2025.188137 Cite as: Kuke, K., Tadele, Y., and Olbamo, T. (2025). Assessment of grazing land status, utilization practices and associated constraints in south ari district, southern ethiopia. Anbar Journal of Agricultural Sciences, 23(1): 107-116. ©Authors, 2025, College of Agriculture, University of Anbar. This is an open-access article under the CC BY 4.0 license (http://creativecommons.org/licenses/by/4.0/). 	Grazing lands are crucial in sustaining livestock production, particularly in regions where pastoralism is a primary livelihood strategy. This study evaluates the status of grazing lands, their utilization practices, and the constraints affecting their productivity in South Ari District, Southern Ethiopia. A multi-stage sampling technique was employed to select 196 respondent households, ensuring a representative assessment across different altitudinal zones. Results indicate that household grazing landholdings did not vary significantly across altitudes ($P>0.05$). The primary feed resources available in the district include natural grazing pastures, crop residues, improved forages, and conserved hay. However, the quality and availability of grazing lands have shown a marked decline over time, primarily due to agricultural land expansion (70.83%) and overgrazing (29.17%). Furthermore, 79.47% of respondents reported not implementing any grazing land improvement strategies, and 87% followed a continuous grazing system, exacerbating land degradation. Key constraints limiting livestock productivity in the district include feed scarcity, erratic rainfall patterns, excessive stocking rates, and suboptimal grazing land management. These challenges highlight the

urgent need for targeted interventions, including sustainable grazing management practices, policy support for controlled land use, and improved forage development programs. Implementing integrated land management strategies will be essential in reversing degradation trends and enhancing the long-term productivity of grazing systems in the region.

Keywords: Grazing lands, land degradation, livestock feed resources, pasture management, South Ari District.

تقييم حالة أراضي الرعي وممارسات الاستخدام والقيود المرتبطة بها في منطقة جنوب آري، جنوب إثيوبيا

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الخلاصة

تعتبر أراضي الرعي أمراً بالغ الأهمية في دعم إنتاج الثروة الحيوانية، وخاصة في المناطق التي يشكل فيها الرعي استراتيجية أساسية لسبل العيش. تقيم هذه الدراسة حالة أراضي الرعي وممارسات استخدامها والقيود التي تؤثر على إنتاجيتها في منطقة جنوب آري، جنوب إثيوبيا. تم استخدام أسلوب أخذ العينات متعدد المراحل لاختيار 196 أسرة مستجبة، مما يضمن تقييماً تمثيلاً عبر مناطق ارتفاع مختلفة. تشير النتائج إلى أن حيازات الأراضي الرعوية للأسر لم تختلف بشكل كبير عبر الارتفاعات ($P > 0.05$). تشمل موارد الأعلاف الأساسية المتاحة في المنطقة المراعي الطبيعية ومخلفات المحاصيل والأعلاف المحسنة والقش المحفوظ. ومع ذلك، أظهرت جودة وتوافر أراضي الرعي انخفاضاً ملحوظاً بمرور الوقت، ويرجع ذلك في المقام الأول إلى التوسع في الأراضي الزراعية (70.83%) والرعي الجائر (29.17%). وعلاوة على ذلك، أفاد 79.47% من المستجيبين بعدم تنفيذ أي استراتيجيات لتحسين أراضي الرعي، واتباع 87% نظام الرعي المستمر، مما أدى إلى تفاقم تدهور الأراضي. تشمل القيود الرئيسية التي تحد من إنتاجية الثروة الحيوانية في المنطقة ندرة الأعلاف وأنماط هطول الأمطار غير المنتظمة ومعدلات التخزين المفرطة وإدارة أراضي الرعي دون المستوى الأمثل. تسلط هذه التحديات الضوء على الحاجة الملحة للتدخلات المستهدفة، بما في ذلك ممارسات إدارة الرعي المستدامة ودعم السياسات لاستخدام

الأراضي الخاضعة للرقابة وتحسين برامج تطوير الأعلاف. سيكون تنفيذ استراتيجيات إدارة الأراضي المتكاملة ضروريًا لعكس اتجاهات التدهور وتعزيز الإنتاجية طويلة الأجل لأنظمة الرعي في المنطقة.

كلمات مفتاحية: أراضي الرعي، تدهور الأراضي، موارد الأعلاف، إدارة المراعي، منطقة جنوب آري.

Introduction

Natural grass-based communal pastures in Ethiopia are declining due to conversion of lands to crop agriculture and settlements (12 and 20). The grazing lands comprise a diverse composition of vegetation and a large number of species, and are used as main feed sources for grazers and browsers (17). The majority (54.54%) of the country's animal feed comes from green fodder (grazing) from natural pastures followed by 31.13% from crop leftovers (9). The gross domestic product (GDP) of the nation is significantly dependent on the production of livestock on natural grazing pastures (2). During the wet season, the most important feeds are grazing lands in the different altitudes of Ethiopia.

Natural grazing and browsing practices in Ethiopia include communal or private grazing, cut-and-carry feeding, hay, and crop wastes (15). Grazing land areas have been degrading over time (1). The major causes of this are climate variability, population pressure, scarcity of rainfall, wind and soil erosion, encroachment of invasive species, overgrazing, lack of proper grazing land management practices, and associated changes in land use and land cover (6 and 10). Such changes have influenced the productivity, and the sustainable utilization and management of grazing land ecosystems (4). The shortage of feed sources is the leading bottleneck in increasing livestock production in Ethiopia (10).

Knowledge of the status and nutritive value of the natural grazing lands is essential for their efficient management, utilization, and improvement. South Ari District has tremendous potential in livestock production as well as natural pasturelands supporting free-grazing with a variety of agro-ecologies (16). Understanding existing grazing land status, their utilization, and related constraints is important for identifying appropriate research and development interventions to enhance their vitality and productivity. Lack of documented information on feed resources particularly the status of grazing lands, and utilization and management practices is a critical issue in the district. Therefore, this study was designed with the objective of evaluating the status of grazing land, its utilization practices, and associated constraints in South Ari District.

Materials and Methods

Study Area: The South Ari District of the Ari Zone lies within the geographic coordinates of 6°4'30" N and 36° 30'-37°E at altitudes ranging from 500 to 3418 meters above sea level (masl). It comprises 33 kebeles (28 rural and 5 municipal) characterized by highland (20%), midland (70%), and lowland (10%) agro-ecologies. Average annual rainfall and temperatures range from 601 to 1600 mm and 10.1 °C to 27.5 °C, respectively (16).

Sampling and Sample Size: Multistage purposive and random sampling procedures were employed for this study. In the first stage, South Ari District was selected based on its high cattle population and natural pasture potential with free-grazing practices. The district was then classified into three regions based on their agro-ecology as highland (2300 to 3418 masl), midland (1500 to 2300 masl), and lowland (500 to 1,500 masl). In the third stage, 6 kebeles were randomly selected from the different agro-ecology areas i.e., *Weset* and *Dordora* (highland), *Zomba* and *Goydamer* (midland), and *Tembel* and *Mendri* (lowland). At the fourth stage, households having livestock production experiences were identified and listed in each kebele, and finally, respondent households were randomly selected from the list.

The total number of respondent households was determined based on the Cochran (1977) formula:

$$n_o = \frac{Z^2 * (p)(q)}{d^2}$$

where, n_o = desired sample size, Z = standard normal deviation (1.96 for 95% confidence level), $p = 0.15$ (proportion of population to be included in sample i.e. 15%), $q = (1-p)$ i.e. (0.85), d = degree of accuracy desired (0.05), with 5% error terms.

Accordingly, the total number of respondents selected and interviewed was 196 comprising 80, 61, and 55, respectively from the highland, midland, and lowland agro-ecologies.

Data Collection: Primary data were collected using a questionnaire survey. Livestock and fishery resource experts familiar with the local language was recruited and trained on way of handling and administering the questionnaire. The questionnaire was prepared in English, translated into the local languages and pre-tested and re-adjusted prior to actual data collection. The questionnaire had a prescribed response format to enable rapid collection of data and covered household characteristics, feed resource availability, utilization practices, status of grazing lands, and related constraints.

Statistical Analysis: Descriptive statistics such as tables, frequency, percentage, mean and standard error of various parameters were measured. Statistical variations for categorical data were tested by means of cross tabs, with significant differences at $P < 0.05$. Index analysis examined the ranked data through the priority index (PI) using the formula by (22):

$$\text{Priority index (PI)} = \frac{F_1 \times n + F_2 \times n - 1 + F_3 \times n - 2 + \dots + F_n \times n_o}{F_{total}}$$

where, F_1 = frequency of the first rank; F_2 = frequency of the second rank; F_3 = frequency of the third rank F_t = frequency of total respondent; n = total number of considered parameters; n_o = value is given for the least ranked level (for example if the least rank is 4th, and $n - n_o, 4 - 3 = 1 \dots$ then, n_o is always 1); F_n = frequency of the last rank.

Results and Discussion

Household Characteristics: The household characteristics (Table 1) show that male respondents exceeded the 87.7% reported by (7) in the Derashe Special District of

Southern Ethiopia and the 55.58% by (14) in Bahir Dar Zuria District. (21) noted that 68.57% of respondents were illiterate in the Endamehoni District.

Table 1: Demographic characteristics of interviewed households in the study area.

Variables	Agro-ecologies				X ² -Test	P-value
	Highland (N=80)	Midland (N=61)	Lowland (N=55)	Overall (N=196)		
Gender (%)	92.5	83.6	89.1	88.4	2.755	0.005
Male						
Female	7.5	16.4	10.9	11.6		
Educational level (%)						
Illiterate	35.0	19.7	18.2	24.3	15.21	0.100
Read and write	27.5	23.0	40.0	30.2		
Primary	10.0	24.6	21.8	18.8		
Secondary	17.5	24.6	12.7	18.3		
College and above	10.5	8.2	7.3	8.7		

N = Number of respondents; %: Percentage; X²: chi-square.

Available Feed Resource in South Ari Woreda: Table 2 presents the major feed resources available in the district. Natural pasture, crop residues, conserved feed in the form of hay, and improved forages are the most available livestock feed resources ranked from the highest to lowest in the study area. This matches the findings of different research reports in the country. (25) noted that the contribution of natural pasture to feed profile was 56.6% in the Kellem Wellega Zone.

Table 2: Feed resources available in the study area as ranked by respondents.

Livestock feed resource	Agro-ecologies						Overall (N=196)	
	Highland (N=80)		Midland (N=61)		Lowland (N=55)			
	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Natural pasture	0.3837	1	0.3737	1	0.4317	1	0.3970	1
Crop residues	0.3470	2	0.2813	2	0.3494	2	0.3245	2
Improved forages	0.1388	3	0.1568	4	0.0850	4	0.1270	4
Stored feed as hay	0.1305	4	0.1881	3	0.1338	3	0.1514	3

N: Number of respondents.

Similarly, (5) noted that natural pasture grazing accounted for 58.9% in the Meta Robi district of the West Shewa Zone. Crop residues and aftermath grazing were used in the dry season, as mentioned by (24) in northwestern Ethiopia.

Management and Utilization Practices of Grazing Lands in South Ari Woreda: As seen in Table 3 grazing lands in the area have been declining over time, due mainly to the expansion of crop farming and overgrazing. Also, the responding households of all altitudes agree that the quality of the grazing land is deteriorating. According to (19) who studied the lands in Horro and Guduru districts, the major causes of the decline in size were crop farming, spreading urbanization, increases in townships, investments and allocation of land for social services. Similarly, (18) reported that expansion of crop farming through conversion of grazing lands into crop land was the main cause

for the decrease in the size of grazing lands in Bosona, and Horro and Guduru districts, respectively.

(7) indicated that only 6.7% of respondents used manure, 9.7% practiced weeding, and 19.5% did not apply any management activities to grazing lands. (25) also noted that fertilizer application (9%), use of manure (31.81%), removal of weeds and unpalatable plants (4.54%), and manure and weeding (54.54%) as the practices employed in the management of grazing land in Meta Robi District.

Table 3: Status and management practices of grazing land in the study area.

Variables (%)	Agro-ecologies					X2-Test	P-value
	Highland (N=80)	Midland (N=61)	Lowland (N=55)	Overall (N=196)			
Grazing land status	68.8	75.4	70.9	71.7	12.72	0.022	
Decreasing							
No change	31.2	24.6	29.1	28.3			
Causes of diminishing size of pasture land							
Overgrazing/overstocking	36.2	29.5	21.8	29.17	15.43	0.010	
Arable farming (crop expansion)	63.8	70.5	78.2	70.83			
Prioritized causes of quality loss							
Disappearance of palatable species	33.7	49.2	41.8	41.57		0.042	
Invasive species	66.3	50.8	58.2	58.43			
Manage grazing land?							
Yes	8.8	16.4	12.7	12.6	10.09	0.023	
No	91.2	83.6	87.3	87.4			
How do you manage?							
Weeding	6.3	9.8	14.5	10.2	13.04	0.07	
Manure	8.8	13.1	9.1	10.3			
None	84.9	77.1	76.4	79.47			

N: Number of respondent; %: Percentage.

Grazing systems and utilization practices: Table 4 shows the most commonly practiced grazing systems in the study area, with most respondents (92.5%) using the continuous grazing system and only 12.7% practicing zero grazing.

Table 4: Grazing systems practiced in the study area.

Types of grazing (%)	Agro-ecologies				X ² - test	P-value
	Highland (N=80)	Midland (N=61)	Lowland (N=55)	Overall (N=196)		
Zero-grazing	7.5	17.9	12.7	12.7	17.52	0.001
Continuous grazing	92.5	82.10	87.3	87.3		

N: Number of respondents; %: Percentage.

Major Constraints in Natural Pasture/grazing lands in South Ari Woreda: Major constraints of natural pastures and grazing lands in the study woreda are presented in Table 5. As seen, inadequacy and shortage of feed, rainfall scarcity or drought, overgrazing, deterioration of grazing land, lack of extension support, and poor grazing land management and utilization practices are the main constraints affecting livestock production in south Ari district.

This is comparable to the findings of (23) who identified that feed quality and quantity, ecological deterioration and overgrazing as significant limitations of natural pasture and forage resources in Ethiopia. Similarly, climate change, bush encroachment, expansion of cropping land, increases in human and livestock populations, lack of inputs and training were identified as constraints in Salamago Woreda of South Omo Zone (22).

Table 5: Pasture/feed related constraints in the study area.

Pasture constraints	Agro-ecologies							
	Highland (N=80)		Midland (N=61)		Lowland (N=55)		Overall (N=196)	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Feed scarcity/ inadequacy	0.1907	2	0.2210	2	0.2059	1	0.2009	1
Overgrazing/overstocking	0.2215	1	0.1397	5	0.1654	4	0.1891	3
Grazing land deterioration	0.1629	5	0.1745	3	0.1690	3	0.1641	4
Rainfall shortage/drought	0.1666	4	0.2441	1	0.1987	2	0.1906	2
Poor management and utilization of grazing land	0.0891	6	0.1510	4	0.1581	5	0.1247	6
Lack of extension (government) services	0.1691	3	0.0697	6	0.1023	6	0.1305	5

The low quality and quantity of feed affected the productive and reproductive performance of livestock. (6 and 7) noted loss in body weight, reduction in milk production, and death as the consequences of feed shortages in Derashe Special District and in Ethiopia, respectively.

Conclusions

The most important feed sources in the area are grazing/natural pastures, crop remains, improved forage, and conserved hay. Continuous and extensive grazing was the most common grazing system in the study altitudes. This study found that the decline in grazing land and invasion of grazing land by invader weeds were among the major threats to pasture land. It concluded that feed scarcity, rainfall shortage, and deterioration of grazing land from overstocking, poor management and utilization practices were the main constraining factors for livestock production in the study area. Smallholder farmers in the area should be provided training to create awareness on different grazing land management strategies.

Supplementary Materials:

No Supplementary Materials.

Author Contributions:

Kuratu Kuke: methodology, writing—original draft preparation; Yilkal Tadele and Tekle Olbamo: writing—review and editing. All authors have read and agreed to the published version of the manuscript.

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