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Research Article

Livestock Production Challenges and Improved Forage Production Efforts in the Damot Gale District of Wolaita Zone, Ethiopia

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This study was conducted to identify major livestock production constraints and improved forage production efforts in the Damot Gale district. Four representative kebeles, two associated with our NGO project and two from nonproject outreach activities, were selected. Forty farmers from each kebele were randomly chosen for the purpose of individual interviews using a semistructured questionnaire. Data collected were analyzed using SPSS (version 20) and Excel. The topmost livestock production constraint was feed shortage where a larger proportion of farmers (75.6%) suffered from the problem with higher ($p \leq 0.01$) severity in nonproject intervention areas. Of these, 38.6% were challenged for a period of three months while another 61.4% suffered for about four months. Purchasing grass (31.4%) and concentrate (33.5%) and feeding enset (*Ensete ventricosum*) leaf (21.49%) were the most commonly adopted coping mechanisms to alleviate feed shortages during the dry season, while using purchased grass and enset leaf was the main coping strategy in nonproject intervention ($p \leq 0.01$) areas. The majority of households (90.75%) participate in improved forage production regardless of farm size. Desho grass (*Pennisetum pedicellatum*) (71.38%) and elephant grass (*Pennisetum purpureum*) (42.63%) are the most common improved forages in both study areas. These forages are produced for the purpose of two or more functions (feed, cash, and preventing erosion) that vary ($p \leq 0.01$) among intervention status. Major niche locations adopted for improved forage production include farm land, soil and water conservation structures, and perimeter fencing. Greatest constraints on improved forage production were seed/material shortage followed by land shortage and lack of awareness. Project intervention ($p \leq 0.01$), tropical livestock unit (TLU) holding ($p \leq 0.01$), and forage seed/planting material access ($p < 0.05$) were identified as factors (among others) having significant relationship with improved forage development. Strong extension services and efficient input delivery for farmers are vital to support profitable livestock production and resource utilization.

1. Introduction

Livestock production is a crucial component of agriculture that can support livelihoods and food security of large numbers of people in developing world. Likewise, this sector plays a significant role in income generation, food and nutrition security, draught power and source of manure for about 85% of rural populations who depend largely on livestock and crop production systems in Ethiopia. About 15 to 17% of the gross domestic product (GDP) and 37 to 87% of household incomes are contributed from the overall livestock sector, including ruminant and nonruminant production [1, 2].

Ethiopia has a large livestock population, with an estimated 60.39 million cattle, 31.3 million sheep, 32.74 million goats, 11.32 million equines, and 1.42 million camels [3]. Despite the large number and importance of these animals, their productivity is low due to a number of factors such as inefficient management, poor infrastructure, poor marketing and credit facilities, feed shortages both in quality and quantity, and health constraints [4–6]. Among these, shortage of feed was identified as one of the primary constraints in livestock production [7]. One of the recommended profitable options to address this challenge is improved forage production using strategies suitable for a given farming system [8].

The objective of this study was therefore to identify major livestock production challenges and improved forage production strategies for feed-related constraints in the study areas. The output will be utilized by different research and development stakeholders to design production and resource utilization strategies to overcome existing constraints.

2. Materials and Methods

2.1. Description of the Study Area. Damot Gale is one of the districts of the Wolaita zone in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia within the coordinates of 6°53′0″ and 7°6′30″N and 37°46′0″ and 37°58′ 40″E [9] with an altitude range of 1612–2964 m.a.s.l. It is located in the east Rift valley at a distance of 370 km to the south of Addis Ababa and at about 140 km to the west of Hawassa, which is the capital city of Southern Nations Nationalities and Peoples Regional State (SNNPR). The district has an area of 410.1 km^2 with a human population of 151,079 [10]. The district has two major agroecology regions, Highland (26%) and Midland (74%), with annual rainfall in the area ranging from 900 mm to 1400 mm with minimum and maximum temperatures of 12°C and 25°C [11]. The administrative center of Damot Gale is Boditi shown in Figure 1.

2.2. Research Design, Sampling, and Data Collection Procedures. Descriptive research design was used for this study. After consultation and discussion with concerned officials about the objective of the study, four representative kebeles (two from our NGO project intervention and two nonintervention areas) were selected based on road accessibility. Eighty farmers (40 from each kebele) were randomly selected from each study area (project intervention and nonproject intervention), out of the model farmers (who actively engage on different community-based activities) for the purpose of individual interviews (by considering the two representative kebeles as one unit). A total of 160 households were selected using the sample size formula, $n = (N/(1 + N(e^2)))$ [12]. Simple random sampling technique, using random number generator, was used to select individual farmers. Margin of error (maximum variability) of 5% was considered. Key informant interviews were conducted with experts from the district and the study kebeles. Secondary data were also reviewed from previous district reports, journals, and proceedings. Data collected included socioeconomic characteristics, major livestock production constraints, improved forage types produced, forage seed sources, and forage production niches.

2.3. Data Analysis. Following the completion of field data collection, data were coded, organized, summarized, and analyzed using Statistical Package for the Social Sciences (SPSS version 20). Descriptive statistical analysis was conducted through custom table. Binary logistics regression analysis was carried out to determine the effect of project intervention, household characteristics, resource holding, and input provision (independent variables) on efforts of improved forage production (dependent variable). Index was calculated using the following formula with MS-excel package.

$$\text{Index} = \frac{[(N * F1) + (N - 1 * F2) + \ldots + (1 * Fn)]}{\sum[(N * F1) + (N - 1 * F2) + \ldots + (1 * Fn)]}, \quad (1)$$

where N = maximum level of rank, $F1$ = frequency of the 1st rank, $F2$ = frequency of the 2nd rank, and Fn = frequency of last rank.

Model equation for logistic regression analysis is as follows:

$$Y = a + \beta 1\text{PI} + \beta 2G + \beta 4E + \beta 5\text{AFM} + \beta 6\text{LH} + \beta 7\text{TLU} + \beta 8\text{FSA} + \text{€}, \quad (2)$$

where Y = dependent variable (existence of forage production), a = constant, β = coefficient of the predictor variable, PI = project intervention, G = gender variable, E = education level, AFM = active family member, LH = land holding, TLU = tropical livestock unit, FSA = forage seed access, and € = error term.

3. Results

3.1. Livestock and Land Holding. Livestock and land holdings in the project intervention and nonintervention areas are presented in Table 1. Almost all farmers possess livestock regardless of number and species. Among the class of ruminant animals, sheep (2.56) holding was the highest followed by cow (1.68) and calf (1.65). Chicken were common in both study areas. Sheep account for the major small ruminant holding. Possession of equine was almost negligible. Average land holding is below one hectare with no significant variation among farmers in project intervention and nonproject intervention areas.

3.2. Livestock Production Challenges. Table 2 shows the different livestock production challenges identified in the study area. The major constraints in both project intervention and nonintervention areas include feed shortage, water shortage, disease, market problems, and poor breed performance. Feed shortage was the primary constraint in both areas. Water, which ranked 3rd among constraints in

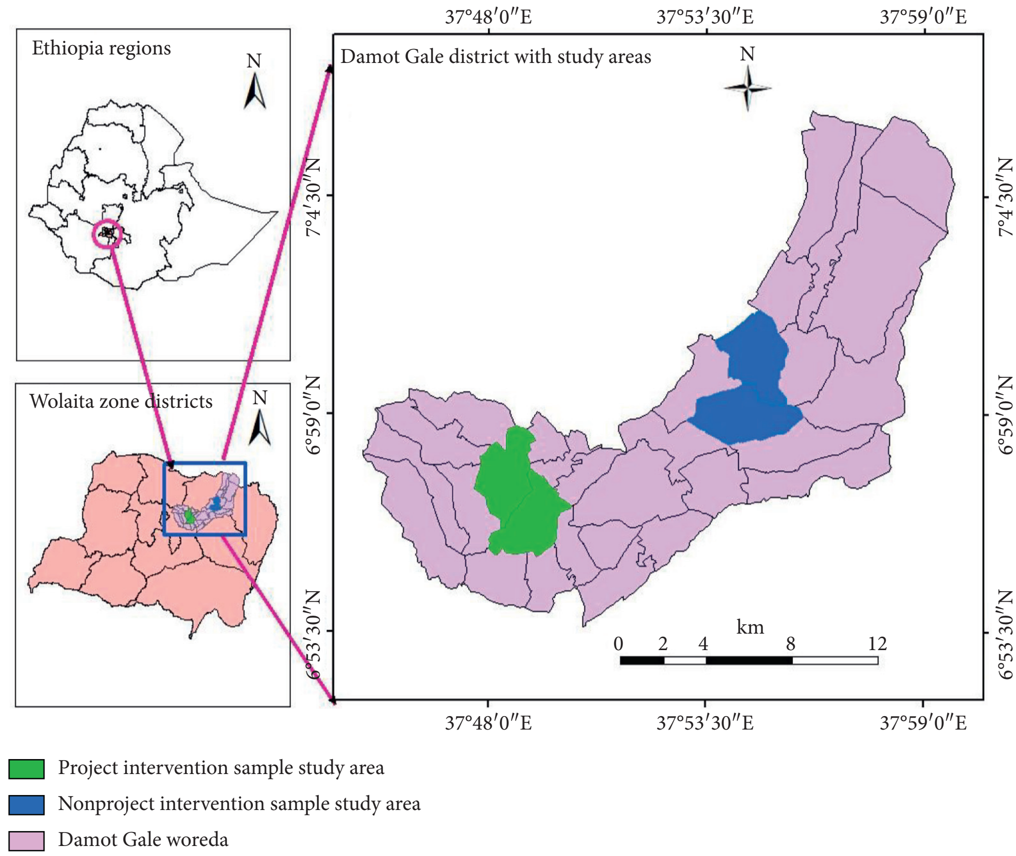

Figure 1: Map of study area.

Table 1: Livestock holding per individual household in the study areas ($N = 160$).

Description	Project intervention		Nonintervention		F	p value
Livestock species	Mean ± SD	Range	Mean ± SD	Range		
Ox	0.51 ± 0.57	0.00–3.00	0.60 ± 0.61	0.00–2.00	0.88	0.351
Cow	1.68 ± 1.38	0.00–6.00	1.86 ± 1.33	0.00–5.00	0.78	0.379
Bull	0.30 ± 0.46	0.00–2.00	0.25 ± 0.49	0.00–2.00	0.44	0.507
Heifer	0.44 ± 0.57	0.00–2.00	0.49 ± 0.57	0.00–2.00	0.31	0.581
Calf	1.65 ± 1.90	0.00–7.00	1.96 ± 2.12	0.00–5.00	0.96	0.328
Sheep	2.56 ± 3.21	0.00–16.00	2.43 ± 3.37	0.00–11.00	0.70	0.792
Goat	0.00 ± 0.00	0.00–0.00	0.16 ± 0.92	0.00–7.00	2.50	0.116
Donkey	0.10 ± 0.3	0.00–1.00	0.08 ± 0.27	0.00–1.00	0.31	0.579
Mule	0.01 ± 0.11	0.00–1.00	0.00 ± 0.00	0.00–0.00	1.00	0.319
Chickens	1.78 ± 3.20	0.00–17.00	1.63 ± 2.17	0.00–10.00	0.12	0.729
Land holding (hectare)	0.64 ± 0.39	0.05–2.00	0.62 ± 0.50	0.05–3.13	0.12	0.725

SD = standard deviation; N = number.

the nonproject intervention area, is the second most important constraint in the project intervention. Disease problems scored 3rd and 2nd in project intervention and nonintervention areas, respectively. Constraints related to market and production performance are ranked fourth and fifth in respective order.

Table 2: Major livestock production challenges.

Constraints	Intervention		Nonintervention	
	*N (index)	Rank	*N (index)	Rank
Feed shortage	396 (0.33)	1	380 (0.32)	1
Water shortage	288 (0.24)	2	280 (0.23)	3
Disease	276 (0.23)	3	294 (0.25)	2
Market problem	147 (0.12)	4	145 (0.12)	4
Poor breed performance	93 (0.08)	5	101 (0.08)	5

N is the sum of the products of frequency and score and is obtained by adding the multiplication of the frequency and score given for each rank level. The 1st rank level is given the highest score (5).

3.3. Livestock Feed Shortage and Coping Mechanisms. Percentages of farm households with feed shortage, time of shortage, and coping mechanisms are presented in Table 3.

The majority of farmers (75.6%) at the district level suffered from feed shortages. Significantly higher number of farmers ($p \leq 0.01$) in nonproject intervention areas faced this challenge as compared to nonintervention areas. Among those farmers with a feed shortage problem, about 98.68% faced this challenge during the dry season of the year (February-May). Out of these, 38.6% were challenged for a length of three months (from March to May) while others 61.4% suffered for about four months (February to May) with significant variation ($p \leq 0.01$) between intervention status. Farmers practiced different coping mechanisms, like feed purchasing feed and feeding enset (*Ensete ventricosum*) to alleviate the feed shortage problem. Purchasing grass is the most-adopted coping mechanism in the nonproject intervention area ($p \leq 0.01$) while purchasing concentrate is used most in project intervention areas.

3.4. Seasonal Feed Availability. The seasonal availability and utilization of existing feed resources are presented in Table 4. Crop residues, enset, hay, and concentrate are the major feed resources available and utilized during the dry season in both project intervention and nonintervention areas. In wet seasons, harvested local grass (fresh grass for cut and carry feeding), grazing, and collected fodders (weeds and leaves from different herbs and shrubs) are the major available feeds and are frequently utilized. Dependency on grazing is significantly higher ($p \leq 0.01$) in nonproject intervention than intervention areas while harvested local grass was more available ($p \leq 0.01$) in project intervention than nonintervention areas during wet periods. Improved forages were available and utilized in both the dry and wet seasons of the year with significant variation ($p \leq 0.01$) among intervention and nonintervention areas. The majority of the respondents indicated that there is no problem with concentrate feed availability in both the dry and wet seasons of the year regardless of the cost (Figure 2).

3.5. Improved Forage Production Status. Use of improved forage and the major forage types produced in the study areas is presented in Table 5. A large proportion of farmers (90.75%) in both the project intervention and nonintervention areas have experience on producing improved forages, particularly Desho grass (*Pennisetum pedicellatum)* (71.38%) and elephant grass (*Pennisetum purpureum*) (42.63%) which are most common in the study area. In the project intervention area, Desho grass (99%) is most common, and in the nonproject intervention area, elephant grass (66.25%) is produced by most farmers. In project intervention areas, oat-vetch mixed forage and Guatemala grass (*Tripsacum andersonii*) are newly introduced forage species.

3.6. Purpose of Improved Forage Production. Farmers produce improved forages as a source of cash, for use as feed, for preventing erosion, or for two or more of these functions (Table 6). The majority of the farm households produce forage for more than one function. Most farmers ($p \leq 0.01$) in project intervention areas produce Desho grass for more than two purposes (as a source of feed and cash and for preventing erosion). In contrast, a larger proportion of farm households ($p \leq 0.01$) in nonproject intervention areas produced improved forages mainly targeted only for two purposes (feed and preventing erosion). Elephant grass production is mainly targeted for feed and prevention of erosion.

3.7. Forage Seed/Planting Material Availability. Farmers with forage seed/planting material access, forage seed providers and available forage seed/planting materials are indicated in Table 7. The majority of farm households have access to improved forage seed/planting material in project intervention compared to nonintervention areas ($p \leq 0.001$). Desho grass planting material was more accessible (99%) than elephant grass (15%) in project intervention areas and the reverse is true in nonproject intervention areas. The forage seed/planting material transfer system is free except in a few cases when farmers purchase from other individuals. Inter Aid and "Send a Cow" (nongovernmental organizations) were the main providers of Desho and elephant grass seed/planting material in the project intervention area, whereas the District Office of Agriculture was the main provider in the nonproject intervention area.

3.8. Niches Adoption and Land Allocation for Improved Forage Production. The percent of farmers who allocate cultivated land to forage production and the niches used for improved forage production are given in Table 8. Major niche types adopted for improved forage production include farm land and soil and water conservation structures and around fences. More farmers ($p \leq 0.01$) in the project intervention area allocate land (of different niches) for forage production more than farmers in the nonproject intervention area. Likewise, relatively more ($p < 0.05$) farm land area is allocated for forage production in project intervention areas.

3.9. Constraints for Improved Forage Production. Major constraints that hampered improved forage production are presented in Table 9. Shortage of improved forage seed/planting material was the primary constraint followed by land shortage and lack of awareness. A significantly higher proportion of farmers ($p \leq 0.01$) in nonproject intervention areas faced a planting material shortage than those in project intervention areas, whereas the number of farmers constrained by land shortage was higher ($p \leq 0.01$) in project intervention than in nonproject areas.

3.10. Logistic Regression Analysis for Selected Determinant Variable on Forage Production. Significant determinant factors for effective forage development in the study district are presented in Table 10. Based on the result of binary logistic regression analysis, project intervention ($p \leq 0.01$), tropical livestock unit (TLU) holding ($p \leq 0.001$), and forage seed/planting material access ($p \leq 0.05$) were identified as factors (among others) having significant relationship with improved forage development. The likelihood of improved forage production practice in project intervention areas was

Table 3: Feed shortage problems, season of occurrence, and coping strategy ($N = 160$).

Description	% of respondents			X^2	p value
	Intervention	Nonintervention	Overall		
Feed shortage				21.19	0.001
Yes	60.00	91.20	75.60		
No	40.00	8.80	24.40		
Seasons of feed shortage				22.474	0.001
Dec–Feb (3 months)	0.00	2.74	1.37		
Mar–May (3 months)	37.50	37.06	37.23		
Jun–Aug (3 months)	0.00	0.00	0.00		
Feb–May (4 months)	62.50	60.31	61.40		
Coping mechanisms				27.844	0.001
Purchase grass	23.33	39.47	31.40		
Purchase crop residue	16.67	5.26	10.96		
Purchase concentrate	43.33	23.68	33.51		
Feed enset leaf	16.67	26.32	21.49		
Reduce stock	0.00	5.26	2.63		

Table 4: Seasonal availability and utilization of feed resources ($N = 160$).

Feed resources	% of respondents					
	Dry season		Wet season		Both seasons	
	Intervention	Nonintervention	Intervention	Nonintervention	Intervention	Nonintervention
Collected fodder	0.00	0.00	12.50	16.30	0.00	0.00
Concentrate	10.00	12.50	1.30	0.00	22.50	22.50
Crop residue	88.80	81.30	0.00	1.30	2.50	6.30
Cultivated forage	0.00	0.00	1.30	0.00	3.80	0.00
Desho grass	2.50	0.00	2.50	7.50	95.00	35.00
Elephant grass	1.30	0.00	0.00	2.50	12.50	55.00
Enset	16.00	26.30	0.00	0.00	0.00	1.30
Food waste	1.30	1.30	0.00	0.00	1.30	0.00
Grazing	1.30	1.30	7.50	17.50	51.30	53.80
Hay	17.50	21.30	0.00	0.00	1.30	5.00
Local grass	1.30	6.30	28.80	6.30	10.00	26.30
X^2	6.44		21.597		57.522	
p-value	0.598		0.003		0.001	

Chi square was tested at 5% significant level.

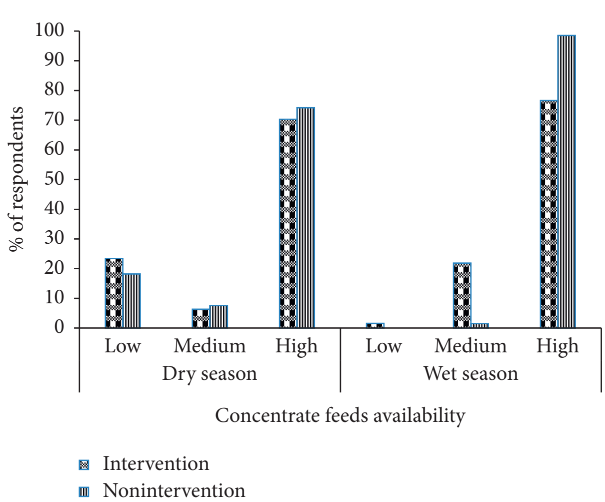

Figure 2: Availability of concentrate feeds in the study area.

92.265 times higher than nonproject intervention sites. Farmers with higher TLU holding were 26.993 times more likely to produce improved forage compared with those households with lower TLU holding. On the other hand, better seed/planting material access increased the likelihood of improved forage development by 11.983 times.

4. Discussion

4.1. Livestock and Land Holding. There were no significant differences in livestock holdings between project intervention and nonintervention areas. Ruminant animal holdings in the current study were similar to reports for the Anelemo district of Hadiya zone, SNNPR [13]. Average total livestock kept by individual households in the current study is lower than reports in another area [14]. This could be due to the limited availability of feed resources [15].

Table 5: Improved forage producers and forage type produced ($N = 160$).

Description	% of respondents			X^2	p value
	Intervention	Nonintervention	Overall		
Do you use improved forage?				12.43	0.001
Yes	99.00	82.50	90.75		
No	1.00	17.50	9.25		
Forage type				102.42	0.001
Desho grass	99.00	43.75	71.38		
Elephant grass	19.00	66.25	42.63		
Guatemala grass	38.00	0.00	19.00		
Oat-vetch fodder mix	36.00	0.00	18.00		
Sesbania (*S. sesban*)	1.00	0.00	0.50		
Vetiver (*C. zizanioides*)	1.00	0.00	0.50		

Chi square was tested at 5% significant level.

Table 6: Purpose of improved forage production by farmers as per the response ($N = 160$).

Forage type	Purpose of production	% of respondents		X^2	p value
		Intervention	Nonintervention		
Desho grass	Feed	22.00	20.00	21.51	0.001
	Feed and cash source	20.00	0.00		
	Feed and conservation	20.00	60.00		
	Feed, cash, and conservation	37.00	20.00		
Elephant grass	Feed	33.00	15.00	6.90	0.075
	Feed and cash source	13.00	2.00		
	Feed and conservation	47.00	70.00		
	Feed, cash, and conservation	7.00	13.00		
Guatemala grass	Feed	57.00	0.00		
	Feed and cash source	17.00	0.00		
	Feed and conservation	3.00	0.00		
	Feed, cash, and conservation	23.00	0.00		
Oat-vetch fodder	Feed	86.00	0.00		
	Feed and cash source	7.00	0.00		
	Feed, cash, and conservation	7.00	0.00		

Chi square was tested at 5% significant level.

Table 7: Improved forage seed/planting material accessibility ($N = 160$).

Descriptions	% of respondents		X^2	p value
	Intervention	Nonintervention		
Response for availability			30.86	0.001
Yes	76.00	32.50		
No	24.00	67.50		
Forage seed provider			127.89	0.001
Agriculture office	7.50	78.80		
NGO	75.00	0.00		
Purchased from others	3.80	0.00		
Relatives	3.80	21.30		
DoA and NGO	10.00	0.00		
Available forage seed			77.863	0.001
Desho grass	99.00	37.50		
Elephant grass	15.00	43.80		
Guatemala grass	5.00	0.00		
Oat-vetch forage	40.00	0.00		

NGO = nongovernmental organization; DoA = District Office of Agriculture; chi square was tested at 5% significant level.

Table 8: Niche type and land allocation (ha) for improved forage production ($N = 160$).

Descriptions	% of respondents		X^2	p value
	Intervention	Nonintervention		
Land allocation in hectare			25.354	0.001
0.00–0.05 ha	26.30	65.00		
0.05–0.10 ha	28.70	17.50		
0.10–0.25 ha	43.80	17.50		
More than 0.25 ha	1.30	0.00		
Production niches (ha)	*Mean area*	*Mean area*		
Farm land	0.08	0.03	8.671	0.034
Terrace	0.02	0.02		
Around fence	0.01	0.02		

Chi square was tested at 5% significant level.

Table 9: Major constraints for improved forage production in the area ($N = 160$).

List of constraints	% of respondents		X^2	p value
	Intervention	Nonintervention		
Material shortage	36.30	58.80	13.51	0.004
Land shortage	33.80	20.00		
Lack of awareness	18.80	20.00		
Financial problem	11.30	1.30		

Chi square was tested at 5% significant level.

Table 10: Logistic regression analysis for determinant factors on improved forage production.

Determinants	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)	
							Lower	Upper
Project intervention status	4.525	1.517	8.899	1	0.003	92.265	4.721	1803.345
Household head sex	−1.535	1.009	2.317	1	0.128	0.215	0.030	1.555
Education level	−0.456	0.412	1.225	1	0.268	0.634	0.283	1.421
Active family members	0.219	0.628	0.122	1	0.727	1.245	0.364	4.258
Total land holding	1.115	0.788	2.003	1	0.157	3.050	0.651	14.291
TLU holding	3.296	0.858	14.766	1	0.00	26.993	5.026	144.970
Forage seed access	2.483	1.176	4.460	1	0.035	11.983	1.196	120.104
Constant	−2.301	1.155	3.968	1	0.046	0.100		

The total average land holding per household in both of the target study areas was similar to reports for average land holdings for the Doyogena district (0.5–1 ha) [16]. However, the land holding size in the current study was lower than a report for other areas [14, 17]. This indicates that improved land use planning and forage development strategies need to be intensified to improve forage production within the existing land resource and production system.

4.2. Livestock Production Challenges. Feed shortage, which was identified as a primary constraint, was attributed to unwise feed resource utilization, low forage production, and limited forage species diversification. Water shortage problems could be related to existing infrastructure and technical gaps in the wise use of available water resources as well as poor water harvesting techniques. Disease constraints could be attributed to poor veterinary services and poorly developed technical skills. Market problem could be related to the seasonal inconsistencies of market demand for animal and animal products. Animal breed performance problems could be associated with lack of progress in breed improvement programs. These problems were in line with reports on the Horro and Guduru districts [18]. Consideration of breed performance is the least important problem according to the majority of the farmers. Livestock breed performance problems with lower priority indicate untapped productive potential of local breeds in the presence of good management practices, such as proper feeding, selection for best traits, health care, and all other necessary husbandry practices. Moreover, local breeds are resistant to disease and can perform better under limited feed availability and less intensive management conditions [6, 19, 20].

4.3. Livestock Feed Shortage and Coping Mechanisms. As per the result of the current study, a large proportion of farm households in both areas suffered from livestock feed shortages with significantly higher severity in nonproject intervention than intervention areas. The main period with livestock feed deficiency in the study area started at the end of January and continued to the beginning of May which is in line with reports for the highland of Ethiopia [21]. The feed shortage problem during the dry season in the study area is related to moisture stress that resulted in low herbage growth on existing grazing land [22]. Moreover, crop residues which are serving as the main source of roughage feed during the dry season [13, 23] are low in nutrient content [24]. Many farmers rely on purchased roughage and concentrate, and enset feeding in response to the existing feed shortage.

4.4. Seasonal Feed Availability. Regardless of the biomass, most farmers in both project intervention and nonintervention areas use improved forages in both the dry and the wet season. During the dry period, there is a feed shortage of green feeds, also a common problem in other areas of the country [21]. Crop residues that are poor in nutritive value [25] and hay, to some extent, are the major feed resource used during the dry season in the study area, with a similar pattern in other areas [13]. Nevertheless, there were farmers who use improved forages during the dry season of the year. This trend was in agreement with reports from other areas in which farmers used improved forage during dry periods [13, 26]. This indicated that improved forages are playing a big role in covering the gap of green feed supply during dry periods. Availability of high-protein feeds like legume forages is negligible. This situation requires intensification and expanded availability of improved forages using innovative production strategies and niches.

4.5. Improved Forage Production Status. Desho grass was the most dominant improved forage species adopted in the study area. It was also reported as a common improved forage in other areas in the region [13, 16, 26, 27]. This situation calls for additional effective training and related extension services to inform and encourage farmers about efficient production and utilization systems for this grass. There were few attempts to introduce legume forages and develop management strategies, a subject that needs attention by development and research practitioners in order to increase high-protein feeds in the district.

Improved forage production could be used to overcome feed shortages but is constrained by many challenges including small land holdings, priority given to food crop production, lack of forage seeds, and limited knowledge on forage species and their production systems. This situation was exacerbated by the absence of an improved forage seed provision and transfer system in the area. This requires the attention of concerned stakeholders to design sustainable forage seed transfer systems. In contrast to a report for the Anelemo [13] and Robi districts [28], in which land was the primary constraint, in the current study area, a forage seed/planting material shortage was the primary constraint followed by land shortage and a lack of training and information.

4.6. Purpose of Forage Production. The objective of improved forage production that can serve a multiple role in the study area is consistent with the results reported for the Shashego district of the Hadiya zone [26]. Improved forage production can help boost feed availability and improve crop productivity by conserving soil and water [29, 30]. The limited roles (feeding and erosion only) of forage production in nonproject intervention areas could be related to the lower availability and less intensive production of improved forages. As a result, the forage produced was not abundant enough to provide an excess for sale. Improved forage production can serve as a source of cash in addition to other roles provided that there is sufficient production.

4.7. Forage Seed/Planting Material Availability. Though nongovernmental organizations and government extension system are responsible for the distribution of suitable improved forage technologies for farming communities, there is still limitation in the available varieties of forages, especially varieties of legume species. This situation needs special attention by research and development organizations in order to intensify varieties of improved forages to improve the existing agricultural system. The relatively better distribution and availability of forage planting material in the project intervention area could be attributed to sufficient resources and effective utilization of those resources while addressing the technology used by the farmers with an effective monitoring system.

4.8. Niches Adopted and Land Allocation for Forage Production. Forage production niches adopted in the area were similar to reports for the Doyogena district of the Kembata-Tembaro zone, where terrace plantations were the most common type [31]. Larger areas of farm land allocation for forage production by a majority of the farmers in project intervention areas may be related to better provision of seed/planting material and better adoption of improved forages for their multiple roles including as a source of cash. This indicated that choice of niches in the study area depends on the availability of planting material and the level of production [32, 33] rather than farm land size which was not consistent according to a report by Njarui et al. [34]. Moreover, larger farm land allocations of a greater number of farmers in the project intervention area indicated a strong interest of farmers for improved forage production if they are provided planting material with necessary training on production and utilization systems.

4.9. Constraints of Improved Forage Production. The higher number of farmers experiencing a forage planting material shortage in the nonproject intervention area could be attributed to the limited forage seed supply [31]. In contrast, the higher number of farmers with a land shortage problem in the project intervention area could be attributed to more production of improved forage grass that took additional land. This indicated that improved forage production might result in land competition for food crop production. Lack of awareness of alternative improved forages and their production strategies hampered the scaling up of improved forage technologies more than the shortage of land and improved forage seeds. Hence, this situation needs attention to improve the application of different forage development strategies and the introduction of legume forages that can be integrated with other cropping systems.

4.10. Logistic Regression Analysis for Selected Determinant Variable on Forage Production. Among household, farming, and project characteristics, only project intervention, tropical livestock unit (TLU) holding, and access to forage seed/planting technology were the significant factors affecting the likelihood of improved forage production in the district. The significantly higher rate of forage production in project intervention is attributed with proper input (forage technology) provision, efficient training, and continuous follow-up as compared to nonproject intervention. This indicates that, though land shortage is mentioned as a common constraint, farmers are interested to develop forage on different strategies if they are provided with the required forage technology and effective training (linked with proper monitoring) on improved forages development and utilization techniques, which is inconsistent with other reports [26, 35]. Farmers with higher livestock holding, especially dairy cow and draught oxen, were more promoted to produce improved forage which is in line with another report [27]. This could be associated with the intention of farmers to produce more milk and butter, and oxen draught power through better supplementation.

The household characteristics (gender, education level, and family size) in the current study did not show significant relationship with improved forage production. This could be attributed to allocation of more labor force for activities other than forage production. Level of education in the current study did not have significant effect on the development of improved forage technology. This could be because some people with more education level seek other nonfarm income source activities in nearby towns.

5. Conclusion

The top most livestock production challenge in the study area was feed shortage, which commonly occurred from February to May, with higher severity in nonproject intervention areas. Feeding of enset leaf, purchased grasses, and concentrates (mainly wheat bran) were the main coping strategies against feed shortage. Improved forage production, although it would compete for land with food crop production, can make a significant contribution to narrowing the seasonal livestock feed gap, facilitating soil and water conservation, and generating cash income.

Desho grass and elephant grass are the major improved forages introduced in the area which have been serving as the major components of livestock diets and as a cash source (especially Desho grass) in both the dry and wet seasons of the year. Distribution of forages with a significant protein concentration is poor as a result of limited improved forage technology distribution and transfer systems. Forage varieties suitable for the existing agroecology and production systems, especially legumes, need to be distributed to farmers.

A sustainable improved forage seed/planting material transfer system needs to be developed, and strong awareness of improved forage varieties needs to be created. Optimal production and utilization systems as well as efficient animal husbandry practices and proper resource utilization need to be given attention by research and development stakeholders to ensure sustainable forage technology adoption and profitable livestock production. Better efforts observed in the NGO project intervention areas are indicated as an opportunity for government organizations to share best management practices.

Data Availability

All data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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