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Research Article

Farmers' perception of area closure and its associated factors of participation in degraded grazing land restoration in Sedie-Muja Woreda, Northwest Ethiopia

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Abstract

In many parts of the world, degradation of grazing lands is one of the most serious environmental issues. This study analyzed farmers' perception of area closure and its associated factors of participation in degraded grazing land restoration in Sede-Muja Woreda, Northwest Ethiopia. A cross-sectional research design and a mixed research approach were applied in this study. The 384 sample respondents were randomly selected. Household surveys, interviews, focus groups, and field study techniques were used to acquire the data. A binary logistic regression model was used to identify the determinant elements that affect farmers' participation in the area closure of degraded grazing land restoration. All of the total respondent farmers (100%) have a positive attitude towards multi-functionality benefits of area closures for local farmers. The model results show that the grazing experience (AOR = 2.981, 95% CI = (1.143-7.775), access to safety net program (AOR = 2.787, 95% CI = (1.146-6.77), access to livestock forage (AOR = 4.493, 95% CI = (1.149-14.028), access to extension service (AOR = 2.522, 95% CI = (1.917-6.6397), livestock ownership (AOR = 0.026, 95% CI = (0.008-0.087), improved cattle breeds (AOR = 4.955, 95% CI = (1.944-12.630), access to training (AOR = 3.169, 95% CI = (1.409-7.131), farmers' perception (AOR = 0.085, 95% CI = (0.023-0.310), and communities' consensus (AOR = 4.230, 95% CI = (1.377-12.996) were determinant factors that affect farmers' participation in the area closure of degraded grazing land restoration. To address the current grazing land degradation issues, every one of the relevant authorities as well as communities needs to work together to create modern grazing land management mechanisms such as grazing land enclosures, reduce animal size through improved cattle breeds, implement zero-grazing systems, and ensure the sustainability of existing enclosures.

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Introduction

Communal grazing land degradation is a worldwide problem with particular acuteness in developing countries (Yami et al., 2011). This is the result of both natural and human activities that temporarily or permanently decline in productive capacity (Meseret, 2016). In developing nations, communal grazing lands are significant sources of cattle feed, yet uncontrolled access to these resources can lead to resource overexploitation and grazing field degradation (Gebremedhin et al., 2004; Benin and Pender, 2006). Because of this, the old unrestricted and unregulated grazing method lowers plant cover, which increases soil erosion, decreases soil fertility, decreases soil organic matter, and deteriorates soil structure

(Gebremedhin et al., 2002). In Ethiopia, most community pastures for livestock are owned by the collective. These shared grazing areas have been vital for providing pasture for cattle, but they are increasingly under threat from overgrazing. Because there is no ownership, communities have not been able to manage this sort of land usage (Benin and Pender, 2002). As a result, the majority of grazing lands are grazed and tramped on continuously throughout the year without a break, which causes the extinction of native species and the invasion of new species (Pender et al., 2012). The annual rate of soil loss from grazing land is about <10 t/ha (Asrat et al., 2004). To overcome grazing land degradation, rehabilitation initiatives were put into place in different parts of the Ethiopian highlands. However, the success of these implementations is still in question (Daniel and Mulugeta, 2017).

In the Amhara region, overgrazing has the consequence of eradicating the most palatable and advantageous plant species and reducing the density and diversity of the plant cover. Additionally, it reduces the carrying capacity of the land and its nutrient value while increasing the risk of erosion. The region's annual rate of soil loss is approximately 119 million tons (Desta, 2000). To address these issues, the Amhara regional state began to implement land rehabilitation techniques in the 1970s, which were a component of an extensive campaign to conserve soil and water. The area closure technique is now widely used in northern Ethiopia, especially in the Amhara region, for the rehabilitation, protection, and resting of severely degraded community grazing land to recover its production (Pender et al., 2012). However, these natural resource conservation methods remain unsatisfactory and unsustainable (Daniel and Mulugeta, 2017). This is even though this region is still losing a significant volume of fruitful topsoil, and the risk of destruction of land is growing dramatically.

In Sede-Muja, one of the major issues contributing to the depletion of land resources in several kebeles is community grazing land degradation. This grazing land degradation expanded quickly as a result of the combined effects of both natural and man-made induced factors, resulting in a lower grazing land production capacity (Oniki and Negusse, 2015). To address this issue, many different types of action against communal grazing land degradation programs, rehabilitation plans, and methodologies contained within currently used approaches, such as comprehensive management of watersheds and viable land use management practices, were proposed. In this study area, area closure practices and all rehabilitation measures are being carried out in part through community mass mobilization initiatives used on degraded communal grazing areas. However, those initiatives did not have a significant and long-lasting influence on the issues of communal grazing area degradation (Wolka et al., 2018). The failure to address the issue is due to a lack of consideration for indigenous land management practices, high initial costs that are unaffordable for poor farmers attempting to apply standard techniques in various agro-ecological regions, and a lack of community commitment and sense of ownership (Moges and Taye, 2017).

The majority of studies were carried out to assess the overall state of grazing land degradation and the impact of area closures for land rehabilitation in various Ethiopian regions. For example, Gebremedhin et al. (2002), Mengistu et al. (2005), Benin and Pender (2006), Mekuria and Aynekulu (2013), Amsalu and Addisu (2014), Mengesha and Denoboba (2015), Manaye (2017), Mekuria et al. (2020), Megersa and Hailu (2021). Nevertheless, such investigates did not recognize the factors that affect farmers' participation in degraded communal grazing land rehabilitation with area closure. Consequently, this study was conducted to assess farmers' perception of area closure and its associated factors of participation in degraded grazing land restoration in Sede-Muja Woreda.

Materials and Methods

Description of the study area

In Ethiopia's regional state, Sedie Muja woreda is found in Amhara regional state, South Gondar Zone. The capital city of the woreda is called Robit, which is far from Addis Ababa by 770 km, 207 km from Bahir Dar, and 107 km from the Zonal capital city, Debre Tabor. The woreda is bounded in the south Simada, in the northeast Tach Gayint, in the west side Lay Gayint, and on the east by South Wollo. From an astronomical perspective, the location is 11°30' 0" north latitude and 38°30' 0" east longitude (Figure 1).

The woreda is elevated between 1,500 and 2,900 m higher than the level of the sea. The woreda has three climatic zones; these are 11% Dega (high land), 41% Woynadega (intermediate elevation), and 48% kola (low land). The average yearly precipitation is 1,000-1,500 mm, with from 16 to 24°C of temperature. Sedie Muja woreda consists of twenty-one (21) kebeles (the smallest administrative unit in Ethiopia) from these 19 rural kebeles and 2 urban kebeles. The research area's terrain is classified by plains (2%), mountainous (25%), gorges (8%), undulating 60%), and water bodies covering 5%. Out of the 116,525 people living in the woreda, 55,605 were men, and 60,920 were women (CSA, 2014). Cattle, sheep, and poultry are the most prevalent forms of livestock in the research area, and due to the rapid population growth, cropland has mostly replaced pasture areas. As a result, straw and crop residues are significant sources of animal feed.

Design and approaches of the research

A cross-sectional research plan and a mixed research approach were implemented in this study. This design is used when the goal of the study is to collect

data from participants not having additional interactions with identical study participants, allowing the investigators to save time and quickly gather required data (Ivankova et al., 2006). The employment of a mixed approach allows you to avoid the weaknesses and limitations that come with adopting a single method (Creswell and Tashakkori, 2007; Creswell and Garrett, 2008).

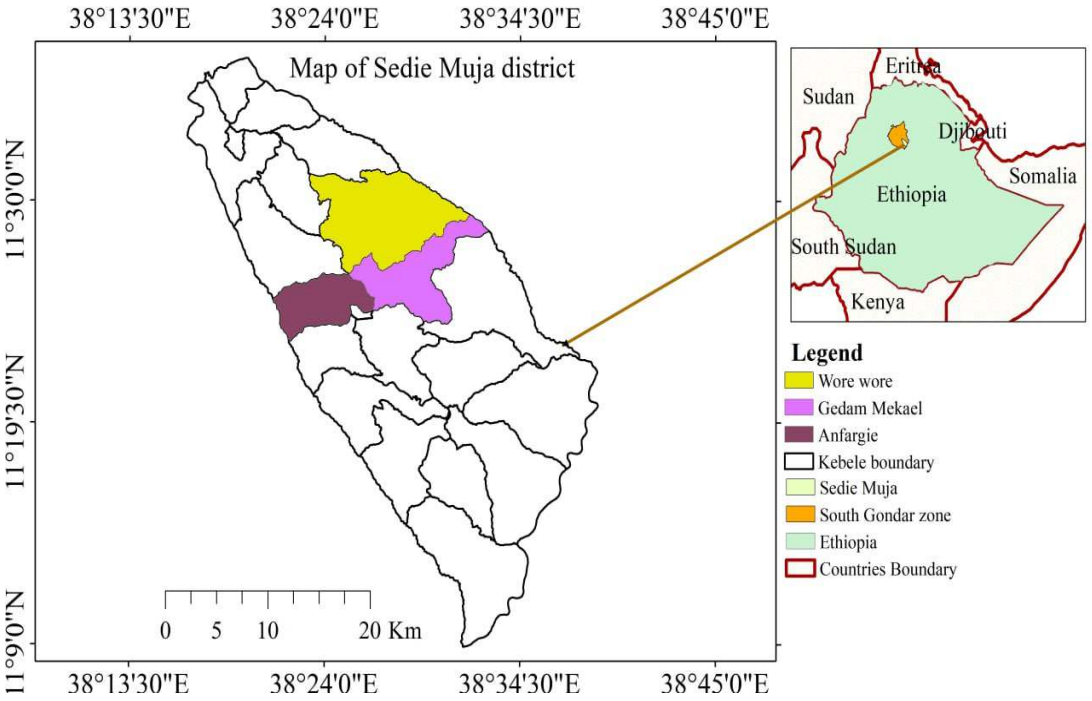

Figure 1. Map of the study area.

Procedures for sampling and estimating sample size

The study area and sample of study participants were chosen using probability sampling techniques as well as non-probability sampling techniques. From South Gondar zone, Sede-Muja woreda had been deliberately selected to be the study geographical area due to the researcher's observation of low levels of acceptance for area closure practice on communal degraded grazing land. In order to fulfill the study objectives and obtain significant representative samples, 3 rural kebeles were chosen from a total of 19 rural kebeles by using simple random sampling techniques. This was done because the problem is the homogenous nature of each rural kebele, and these selected rural kebeles represent the whole. Worewore, Anfaregie, and Gedam Michael are the three simple kebeles of study. Because of cost, time, and measurement procedure constraints, it is impossible to include the entire population in the study area's kebeles (Kothari, 2004). Consequently, the procedures and formula in Yamane (1967) were utilized to calculate the sample size. The formula is statistically expressed as follows: $n = \frac{N}{1+N(e)^2}$, where n is the sample size, N is the total figure of households overall kebeles, e is the study's maximum degree of accuracy of 5% (0.05), and 1 is the likelihood that the event would occur.

$$n = \frac{9536}{1+9536(0.05)^2}$$

$$n = \frac{9536}{1+9536(0.0025)}$$

$$n = \frac{9536}{1+23.84}$$

$$n = \frac{9536}{24.84} = 383.8969404186795$$

$$n = 383.8969404186795 \approx 384$$

$$n = 384$$

The 384 sampled households were again allocated to every chosen kebele through the use of probabilities of proportionate sample size method to create an equivalent representation of the participants at every particular kebele using the following mathematical equation: $ni = \frac{n \times Ni}{\sum Ni}$, where n indicates the sample size of the research, ni indicates the number of households in the i^{th} kebele, and Ni represents the overall number of households in the i^{th} kebele (see Table 1). Following the allocation of 384 overall representative samples for all three designated rural kebeles, a basic random sampling method was employed to choose the sample households from each sample kebele.

Data collection methods

The research area's physical and socio-economic features were analyzed using supplementary information acquired through published materials, such as newspapers, research papers, organizational reports both quarterly and annually, and other written

documents. To gather the primary data, household surveys, interviews, focus group discussions, and filed observations were employed. The main method of data gathering is the household survey, which gathers information from a sample of household farmers. The household survey questions have been developed using both closed-ended and open-ended question types.

Table 1. Overall sample households of the study area.

Kebeles	Overall Household			Sample Household		
	Male	Female	Total	Male	Female	Total
Wore wore	1,372	1,217	2,589	55	49	104
Anfaregie	994	776	1,770	40	31	71
Gedam Michael	2,350	2,827	5,177	95	114	209
Total	4,716	4,820	9,536	190	194	384

Source: CSA (2014).

First, the questionnaires for the household surveys were written in English, translated into Amharic during distribution to sample respondents, and then reinterpreted into English for data analysis and processing. A questionnaire has been carried out to gather statistical information on the farmers' perception of area closure and variables that may affect their involvement in the rehabilitation of degraded communal grazing land with area closure. In order to ensure the authenticity and consistency of the information, a survey of households was carefully examined by agents for development and study area's woreda Agricultural Office extension specialists. Simple adjustments were made in response to the professionals' comments and advice, such as removing and revising questions with complicated or confusing concepts.

Methods of data analysis

Methods for qualitative and quantitative data evaluation have been implemented for the datasets used in this investigation. The qualitative data gathered through field observation, focus group discussions, and formal and informal interviews were examined using qualitative methods of analysis. A quantitative approach was used to analyze the numerical information obtained from participants via household survey questionnaires. Both descriptive and inferential mathematical approaches were used to evaluate the gathered data. The descriptive and inferential statistics were calculated using the SPSS software package, version 20. Descriptive statistics like frequency and percentage were computed using a table. Bivariate analysis was primarily used to examine the variables that were individually associated with the dependent variable. To account for all possible factors, all variables related to the dependent variable in the bivariate analysis having an estimate of less than or equal to 0.25 have been considered in the final model of the multivariate binary logistic regression analysis. Finally, the variables with statistically significant associations with farmers' level of participation were recognized using multivariable binary logistic regression analysis. The variables with significant associations with farmers' level of participation were identified using the adjusted odds ratio (AOR), 95% confidence interval (CI), and p-value (0.05). A p-value of 0.05 was used in this study to declare a result statistically significant.

Binary logistic regression model description

Based on the model concept from (Gujarati, 1995), the binary logistic regression model was used to investigate the factors influencing farmers' participation in degraded communal grazing land rehabilitation with area closure. The binary logistic regression analysis equation is as follows:

$$\mathrm{In(Y)} = \left(\frac{\mathrm{Y}}{1-\mathrm{Y}}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \cdots + \beta_n x_n + \mathrm{U_i}$$

where: Y is the estimated likelihood farmers' degree of involvement in degraded communal grazing land rehabilitation with area closure), which is represented by 1 = participated and 0 = those who do not participate, 1-Y is the estimated likelihood of the non-participants of the degraded communal grazing land rehabilitation with area closure), β_o represents the stable term, β_n's are coefficients of explanatory variables that are determined, X_1 to X_n are explanatory variables, and u_i represents the term corresponding to the error, and this has a normal distribution about refer to 0 and Q^2.

Variable descriptions in the estimation of models

Outcome variable: The outcome variable is binary in nature; it was coded as "1" if the farmer actively participated in the restoration of degraded communal grazing land with area closure as "0" otherwise (1 = participant, 0 = non-participant).

Explanatory (Independent) Variables: Farmers' decisions to participate in degraded communal grazing land rehabilitation through area closure were thought to be impacted by a variety of variables. Based on the brief review of the research study, eleven explanatory variables have been proposed to describe farmers' involvement in degraded communal grazing land rehabilitation with area closure (Table 2).

Table 2. Explanation and evaluation of explanatory variables.

Explanatory Variables	Variable types	Explanation and measurement
Farmers' grazing system experience	Dichotomous	1 = Cut-and-carry, 0 = Open grazing
Access to productive safety net program (PSNP)	Dichotomous	1 = yes; 0 = otherwise
Access to livestock forage	Dichotomous	1 = yes; 0 = otherwise
Access to frequency of extension services	Dichotomous	1 = yes; 0 = otherwise
Livestock size owned by the household	Continues	In tropical livestock units (TLUs)
Ownership of improved cattle breed	Dichotomous	1 = yes; 0 = otherwise
Access to training	Dichotomous	1 = yes; 0 = otherwise
Access to private grazing land	Dichotomous	1 = yes; 0 = otherwise
Access to farmland	Dichotomous	1 = landholding; 0 = otherwise
Communities' consensus during area closure planning and demarcation	Dichotomous	1 = increase, 0 = otherwise
Access to alternative private trees for fuelwood and construction	Dichotomous	1 = yes; 0= otherwise

Results and Discussion

Farmers' awareness towards the benefits of area closure practice to degraded grazing land restoration

According to Tefera et al. (2005) and Grey and Joosten (2016), area closures support and guarantee the realization of the three pillars of sustainable development: the social, economic, and environmental benefits. About 43.5% of respondents said that area closure practices are important for environmental benefits. These benefits include the ability to significantly restore degraded grazing lands, restore native trees that grew after the area closure was established, and attract various wild animals back to the area after the area closure was established. It also reduces downstream soil erosion, increases surface roughness, ensures precipitation of infiltration, improves soil depths and organic matter, increases water stored in the soil, increases wood and vegetation cover, reduces the risk of flooding, promotes the reemergence of springs and streams, balance the water cycle, and contribute to the carbon stock by improving vegetation cover and increasing resilience to climate change impacts. In general, the greatest role of environmental benefit derived from area closures is the development of biodiversity and improving the ecosystem. In addition to the environmental advantages, about 28.6% of respondents said that area closures had positive effects on the social aspects of their local communities (Figure 2). The intangible advantages people derive from area closures are known as socio-cultural advantages. Among these benefits, increased security of land use rights, it helps to preserve natural and cultural landscapes and is a source of various ecotourism opportunities and recreational activities and improvements to people's psychological well-being. Similarly, 27.9% of the participants indicated that area closures have an impact on the local community's economy (Figure 2).

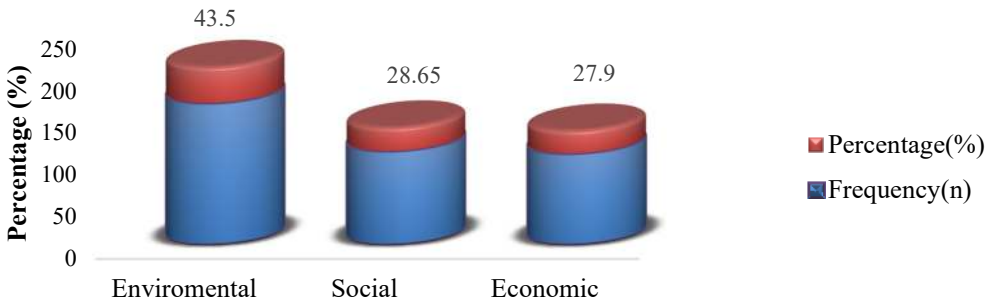

Figure 2. Farmers' awareness of the benefits of area closure practice on degraded grazing land restoration.

Small-scale irrigation practices have increased as a result of groundwater reserves being recharged. This has improved community livelihoods, aided in efforts to ensure food security, increased the availability of animal food through the use of cut-and-carry systems, increased crop land productivity, increased employment opportunities, source of raw materials, investment promotion, and medicinal plant flourishes. As per the findings of a recent study conducted by Grey and Joosten (2016), the presence of communal grazing land enclosures helps households cope with the effects of climate change and variability by

offering grazing reserves, reducing livestock losses during droughts, and improving animal productivity and health. This suggests that farmers who have already acknowledged the advantages of area closures for the social, economic, and environmental domains, as well as the issue of the degradation of communal grazing land, are more likely to embrace and put into practice new sustainable land management techniques and uphold conservation efforts aimed at protecting natural resources.

As indicated, FGDs also reported that ideally, the overall farmers have had a favorable view towards the benefit of area enclosures, but from the practical point of view, they are not managing wisely the existing area enclosures, and they are not interested in expanding the area closures in their local area. The primary factors given for the low favor of expanding area closures were the fact that farmers perceived there would be a scarcity of firewood, construction materials, and grazing land after area closures were enhanced in their local area. The result is consistent with the findings, which stated that local communities have a positive perception of area closure use and, therefore, play a crucial role in the potential growth of area closure practice on degraded communal grazing lands.

Factors influencing farmers' participation in the area closure of degraded grazing land restoration practices

Before applying the logistic regression model analysis, the presence of multicollinearity and goodness of fit were checked. Therefore, in this study, the test of Variance Inflation Factor (VIF) values for every explicating factor was found to be much less than 10. Since, there was no multicollinearity among the variables that explained the result in the final analysis. For the Hosmer-Lemeshow test, the chi-square was 11.559, and the p-value was 0.116. As a result of this value being greater than 0.05 (50), the observed and predicted models are identical (Abreu et al., 2008). As a result, the expected data were fitted.

The model summary of the binary logistic regression results of the Cox and Sneller R-square and Naelkere R Square indicated that the explanatory variables together explain 67.9% and 92.9% of the change in the variable being studied, respectively. The goodness-of-fit test result is larger than 0.05 (50%), and the model predictions corresponded to the data to a satisfactory degree. The overall correct prediction of the model was 96.1%, with the correct prediction of "yes" (participant) at 91.4% and "no" (non-participant) at 98.8%. Furthermore, the Omnibus test of Pearson chi-square shows that the goodness of fit test of the model was 435.797 at p 0.01. As a result, the test statistic of goodness-of-fit was fitted, and the proposed model has been made to fit at an allowable level of data. Bivariate analysis revealed that 10 of the 11 predictor variables had a substantial correlation with the dependent variable. The multivariable binary logistic regression analysis found that 8 predictor variables (such as farmers' grazing system experience, access to safety net programs, access to livestock forage, access to extension service, livestock ownership, ownership of improved cattle breeds, access to training and communities' consensus during area closure planning and implementation) were found to be significant (see Table 3).

Farmers grazing systems experience

Other variables being constant, farmers who used open grazing feeding systems were 2.981 times more likely to not have participated in degraded community land rehabilitation with area closure methods than those who used cut and carry cattle feeding systems (AOR = 2.981, 95% CI = (1.143-7.775)). As a result, farmers who have used cut-and-carry animal feeding systems are more likely to recognize the advantage of area closure land management measures and to guarantee the future viability of current land management practices. Whereas unlimited livestock grazing in communal grazing areas and on farmlands disturbs both physical and biologically applied soil and water conservation measures (Asrat et al., 2004; Abate, 2020). In addition, unrestricted grazing of livestock has become a significant obstacle to farmers' participation in communal grazing land rehabilitation with area closure practices and the future sustainability of the study region's existing land management practices.

According to the interview participants, farmers have not used a cut-and-carry livestock feeding system; instead, they use a free cattle grazing system. This is because there are a lot of cattle, making it challenging to provide fodder through a cut-and-carry system, which makes gathering it using a cut-and-carry technique boring and time-consuming. The result is consistent with the findings of Assefa and Nurfeta (2013). The results suggest that farmers were forced to conduct uncontrolled grazing, leading to a shortage of livestock forage, which has affected the future viability of ways to manage land. Furthermore, stall feeding is simple to implement if a cut-and-carry system of livestock feed is available, allowing us to protect land management practices on both agricultural plots and communal grazing lands from grazing cattle damage and destruction (Devereux, 2014).

Access to a productive safety net program

Other variables being constant, farmers who have not engaged in safety-net programs were 2.787 times more likely to not have participated in area closure practices on degraded communal land rehabilitation when compared to farmers who have access to safety-net programs (AOR = 2.787, 95% CI = (1.146-6.77)). From this result, one can understand that farmers who have not engaged in safety net programs are less likely to have to participate in degraded communal land rehabilitation practices than others who have engaged in safety net programs.

Table 3. Assonated factors with participation of farmers in the area closure of degraded grazing land restoration.

Variables	Farmers' level of participation on area closures			COR (95% CI)	P-value	AOR (95% CI)	P-value
	Category	Participant	Non-participant				
Farmers grazing system experience	Cut and carry	79(46.2%)	92(53.8%)	1	0.000***	1	
	open grazing	61(28.6%)	152(71.4%)	2.14(1.402,3.265)		2.981(1.143,7.775)	0.026**
Access to safety net program	Yes	110(65.1%)	59(34.9%)	1	0.000***	1	
	No	30(14%)	185(86%)	11.5(6.98,18.934)		2.79(1.15,6.77)	0.024**
Access to livestock forage	Yes	43(53.8%)	37(46.2%)	1	0.000***	1	
	No	97(31.9%)	207(68.1%)	2.48(1.502,4.094)		4.493(1.439,14.028)	0.010**
Access to extension service	Yes	109(72.2%)	42(27.8%)	1	0.000***	1	
	No	31(13.3%)	202(86.7%)	16.91(10.06,28.424)		2.522(1.917,6.937)	0.043**
Livestock ownership	Yes	23(9.3%)	223(90.7%)	1	0.000***	1	
	No	117(84.8%)	21(15.2%)	0.019(0.010,0.04)		0.026(0.008,0.087)	0.000***
Ownership of improved cattle breeds	Yes	81(73.6%)	29(26.4%)	1	0.000***	1	
	No	59(21.5%)	215(78.5%)	10.18(6.01,17)		4.955(1.944,12.630)	0.001***
Access to Training	Yes	71(43.3%)	93(56.7%)	1	0.017**	1	
	No	69(31.4%)	151(68.6%)	1.67(1.01,2.543)		3.169(1.409,7.131)	0.005**
Access to farmland	Yes	110(71.4%)	44(28.6%)	1	0.000***		
	No	30(13.0%)	200(87.0%)	16.67(9.92,28.01)		0.587(0.188,1.828)	0.358Ns
Communities' consensus during area closure planning and implementing	Yes	65(89%)	8(11%)	1	0.000***	1	
	No	75(24.1%)	236(75.9%)	25.57(11.732,55.72)		4.230(1.377,12.996)	0.012**
Access to private trees for fuelwood and wood construction	Yes	89(61.8%)	55(38.2%)	1	0.000***	1	
	No	51(21.2%)	189(78.8%)	5.997(3.8,9.47)		0.802(0.282,2.276)	0.678Ns

Note: (N=384), **Significant at p=<0.05, ***significant at p=<0.001, Ns= non-significant, OR=Odd ratio, OR= adjusted odd ratio, CI=confidence interval

Safety net programs that provide households with enough income to protect their assets from depletion and build community assets can help resolve the root causes of food insecurity and environmental degradation. Furthermore, the results are consistent with the findings of Pender et al. (2012). The results suggest that households or those whose families are engaged in safety net programs influence their participation in degraded communal land rehabilitation practices positively by 10%. As a result of the program's intervention, beneficiary households are conserving common lands in general and their farmlands in particular in much better ways as compared to non-beneficiary households.

Access to livestock forage production

Other variables being constant, farmers who did not have availability to alternative sources of fodder were 4 .493 times more likely to not participate in the area closure of degraded communal grazing land restoration when compared to farmers who had access to animal feed (AOR = 4.493, 95 CI = (1.439-14.028)). This conclusion suggests that farmers who do not engage in forage processing development activities are more likely to refrain from participating in degraded communal land rehabilitation practices, even if they are the cause of the existing area closure's unsustainable nature. Due to the open and uncontrolled grazing system, as well as the unsustainable shift from cattle pastures to farmland and residential areas, these communal grazing lands have recently been severely depleted. The result is consistent with the findings of Gebregziabher and Gebrehiwot (2011) and Mengistu et al. (2021).

The results suggest that farmers' unawareness of options for enhanced fodder, as well as their own production strategies, may have hindered the scale-up of enhanced forage innovations as much as a shortage of land or improved forage seedlings. As a result, attention is needed to enhance the implementation of various techniques for forage growth and to introduce leguminous forages that can be successfully combined with other systems of cropping.

Access to extension service

Other variables being constant, farmers who had not gotten better availability of extension service were 2.522 times more probable to not accept and participate in area closure practice on degraded communal land rehabilitation than those who had gotten better access to extension service (AOR = 2.522, 95% CI = (1.917-6.937)**)**. This might be due to the fact that the information farmers obtain from rural development agents enables them to begin introducing recently launched strategies for land management practices on communal grazing lands so as to safeguard their land from grazing land degradation and enhance its fertility. The result is consistent with many researchers like Zewdu and Beyene (2018) and Legesse et al. (2021), who have found that farmers who receive information from extension workers are more likely to be informed about sustainable land management practices. As a result, contact between a farmer and extension agents, as well as information gained, can help to accelerate farmers' attitudes toward sustainable land management practices, as well as farmers' decisions to contribute to natural resources measurements. However, the services provided by service development agents to farmers are not being observed in practice because of a lack of awareness and the absence of time spent on their respective working areas or kebele. Furthermore, the majority of development experts were involved even though they were not performing their duties and responsibilities. Furthermore, they merely performed other administrative duties and served as cabinet members; they prioritized taxation, fertilizer, and other credit services over natural resource conservation.

Livestock ownership

Other variables being equal, farmers with a large number of animals owned were 0.026 times less likely to participate in area closure practice on degraded communal land rehabilitation when compared to those who have a small number of livestock stock (AOR = 0.026, 95% CI = (0.008-0.087)). This result implies that as the framers' cattle holding increases, the farmers' engagement in the closure of degraded grazing land rehabilitation activities decreases. In other words, farmers with small cattle agreed and participated in the area closure of degraded grazing land rehabilitation. The outcome is in line with the findings of Tadesse and Solomon (2014) and Nebere et al. (2021); the findings show that the owner of a small number of animals has a greater interest in using area enclosures to meet their cattle's grazing needs.

In contrast, individuals with a large number of cattle are also unwilling to employ a cut-and-carry grazing technique because feeding fodder grass for that many animals requires more labor and time (Nalunkuuma et al., 2013). As a result, farmers who have a small number of animals have a more positive attitude about the closures of degraded grazing land than farmers who have a great amount of cattle. However, the outcome contradicts the conclusions of Zewdu and Beyene (2018), Danano (2020), Legesse et al. (2021). Those who stated that farmers that have a large number of animals need a huge quantity of feed and hence contribute to forest management and restoration initiatives of degraded grazing land.

Ownership of improved cattle breeds

Other variables being constant, farmers who have not improved cattle breeds had a 4.955 times higher probability of being rejected and not participating in the area closure techniques of degraded communal land restoration when compared to those who have practiced cattle breeding (AOR = 4.955, 95% CI = (1.944-12.630)). This result implies that farmers who had better access to improved cattle breeds were more

likely to participate in the area closure activities of degraded communal land restoration and who practiced cutting and carrying animal feeding systems from the closure area as a source of income than those who did not have access to cattle breeds and stall-feeding systems. However, FGD participants and interviewer farmers in the study woreda pointed out that due to the lack of skill gups of both animal veterinary and animal science kebele experts, there is no livestock crossbreeding using artificial fertilization practices, livestock management practices, and forage development practices.

Improved cow breeds and stall feedings decrease herd mobility stress on agricultural parcels and community grazing land areas, providing the long-term viability of existing land management practices and farmers engaged in the area closure of communal grazing land rehabilitation practices (Melaku, 2021). Improved cattle breeds and stall feedings Improvements are important not only for farmers who participated in the area closure of communal grazing land rehabilitation practices and the sustainability of all types of land management implemented activities as well as for enhancing rural farmers' levels of income since these animals are much more fruitful than indigenous cow breeds (Melaku, 2021).

The result is similar to the conclusions of Nalunkuuma et al. (2013). The results imply that the odds ratio for the number of crossbreeding cattle owned was 1.22 times more likely to positively influence the adoption of a zero-grazing production system.

Access to training and awareness

While other variables were constant, farmers who had not gotten better training were 3.169 times more likely to be non-participants in the area closure of degraded grazing land rehabilitation than those who had gotten access to training about the importance of area closure on degraded communal grazing land rehabilitation (AOR = 3.169, 95% CI = (1.409-7.131)). Farmers' who have better access to training and awareness have better information and perception of the importance of area closure practices on degraded communal land rehabilitation than others who have no access to training and awareness. The result is similar to the conclusions of Grey and Joosten (2016), Megersa and Hailu (2021), and Nebere et al. (2021).

The findings imply that farmers having better access to training and awareness about techniques and benefits of area closure are more likely to be engaged in the area closure of degraded communal grazing land rehabilitation and ensure the long-term viability of existing enclosures by fostering a feeling of ownership among farmers. Both FGD participants and interviewer farmers in the research woreda pointed out that the majority of the communities have not expressed a positive opinion on the further closure of other unprotected areas and amending the current management practices.

Communities' consensus during area closure planning and implementing

While other variables were constant, the farmers' who did not have good consensus during area closure planning and decision-making were 4.230 times more likely to not accept and participate in the area closure of degraded communal land rehabilitation when compared to those who had good consensus during area closure planning and site selection (AOR = 4.230, 95% CI = (1.377-12.996)). The result implies that active community participation is one of the most crucial actions for achieving environmental protection. To accomplish successful and long-term effects, area closure strategies require a collective agreement at the community level (Lemenih et al., 2015). However, gaining community support might be challenging since the majority of common areas of Ethiopia have been used for grazing cattle, which means that it may be hard to persuade residents of the advantages of area closures.

The major communities are reluctant or unwilling to implement area closures on degraded communal grazing lands (Mengesha and Denoboba, 2015). Therefore, the absence of community agreement to establish area closures and maintain land management activities has a significant and unfavorable impact on the sustainability of the implemented measures (Moukrim et al., 2018). The result is consistent with the findings of Nebere et al. (2021). The findings imply that good community acceptance during the land management procedure is essential to the long-term viability of the implemented land management techniques. Furthermore, area closures are essential for the reconstruction of communal lands, which have deteriorated; however, in addition, demand for greater funding for substitute fodder resources in order to persuade the surrounding communities to compromise animal feed as well as additional advantages as ecological restoration is taking place. One of the main reasons for poor land management practice implementation is a lack of community participation in planning and decision-making processes (Nebere et al., 2021). Similarly, interview participants confirmed that farmers' participation in planning and decision-making processes is limited, particularly with regard to area closure practices.

Conclusions

Farmers in the research area have already recognized the importance of area closures in terms of environmental, social, and economic aspects. Consequently, about 43.5%, 28.6%, and 27.9% of respondents said that area closure practices are important for environmental, social, and economic benefits, respectively. In general, the farmers have a positive attitude towards the benefit of area enclosures for the social, economic, and environmental domains,

but from the practical point of view, they are not managing wisely the existing area enclosures, and they are not interested in expanding the area closures in their local area. The primary factor given for the low favor of expanding area closures was the fact that farmers perceived there would be a lack of firewood, construction materials, and pastures after area closures were formed in their local area. The model result indicated that farmers grazing system experience, access to a safety net program, access to livestock forage, access to extension service, livestock ownership, ownership of improved cattle breeds, access to training, and communities' consensus during area closure planning and implementing were found to be strongly associated with their involvement in degraded communal grazing land rehabilitation with area closure.

In order to improve grazing land management in the research area, the woreda agricultural office and rural kebeles development agents (DAs) should reduce communal grazing land degradation by increasing community participation in sustainable land management practices, creating environmental awareness programs and training for local communities to provide a sense of ownership of communal lands, improving government effectiveness, and enforcing various environmental and land use policies and the rule of law. Farmers should manage wisely the existing area enclosures and expand area closures in their local area by improving cow breeds and employing the cut-and-carry method of using grass for animal fodder. All communities ought to be included in the process of planning and making decisions for area closures, as well as enforcing their local norms and regulations to punish farmers who cut trees or open graze on existing area closures. Generally, the study area of degraded communal lands should be excluded from human and livestock interference.

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