

Zero-Grazing Practices and its Level of Adoption by the Livestock Owners of Ethiopia

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Abstract

This study attempted to assess the status of adoption of zerograzing in Tahtay Koraro, Medebay Zana and Asgede Tsibilaworedas of Tigray region, Ethiopia. The study was conducted in three districts of Medebayzana, TahtayKoraro and Asgede Tsimibla Districts of Tigray Region. Random sampling was used to select 117 sample respondents in six Tabias. The main method of data collection was interview with sample respondents to get firsthand information for the study. Additionally, key informants interview was also employed to supplement the data collected from the sample respondents. Descriptive statistics like mean, frequency and percentage were used to analyze the socioeconomic and institutional characteristics of the respondents. Likert scale used to analyze the perception of rural households towards zerograzing practice. The survey indicated that most of the respondents perceived that zerograzing has better performance in comparison with the remaining other economic subsectors. The findings have also shown that majority (72.6%) of respondents practice zerograzing while 27.4% respondents are non-adopters of zerograzing. This indicates that some of the respondents are still practicing free grazing practices in the study area because of zerograzing demands more inputs, the lack of timely and limited availability of the animal feed and feed resources. Therefore destocking of local animals and awareness creation to community about the importance and management aspects of communal grazing land is important to improve the adoption of zero-grazing practice.

Keywords: Zero-grazing, Communal grazing, Livestock raising, Ethiopia.

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Introduction

Backgrounds and Justification of the Study

Agriculture is the dominant sector of Ethiopian economy, which contributing more than 40% of the GDP, 85% of the employment and 90% of the total export earnings (Diao, 2010). The livestock production is a major symbol of wealth in the country that is strongly respected by communal farmers, and it accounts for 12% of the total GDP and 33% of the agricultural GDP (Solomon et al., 2003). However, the farming methods used by Ethiopian farmers are largely conventional which sometimes not sustainable in terms of environmental preservation (Tranos, 2012).

Communal grazing lands are important sources of livestock feed in the country as well as in the study area which result in overexploitation and degradation of the resource (Solomon et al., 2003; Benin and Pender, 2002). Free grazing system has a negative effect on the conservation efforts, as trampling animals often damage physical conservation structures such as stone terraces and soil bunds in Ethiopia including the study areas. Free grazing and overgrazing contributed significantly to the land degradation problem in the Ethiopian highlands, where grazing on hillsides and other fragile areas is widespread during the rainy season when other sources of feed like stubble grazing and crop residues are in short supply (Gebrehiwet, 2004; Benin and Pender, 2002). The pressure of growing population in the area has forced landless farmers to cultivate soils and graze their livestock on slopes which fosters depletion of communal resources (Tekalign, 2010).

In response of the land degradation, different rehabilitation measures have been launched by government and non-government organizations jointly in the country. Among those measures, continuous setting-aside of degraded land for natural regeneration called area enclosure has been practiced (Yayneshet, 2008). Similarly, a study by Gebreyohannes and Hailemariam (2011) indicate that zero-grazing in Hararghe is a common practice experienced by most farmers for a long time that feed their animals through tethering near crop lands and houses.

However, there are criticisms to adopt zero-grazing practice regarding the economic benefit of the environmental resources (Getseselassie, 2012). Gebreyohannes and Hailemariam (2011) reported this practice is not common in Tigray although efforts

were made to introduce zero (controlled) grazing starting from 2006. If this type of traditional practice is continuing, the ultimate outcome of over grazing and free grazing may lead to deforestation and degradation of these resources which can cause to desertification and will be the challenge to build sustainable agriculture.

In spite that Ethiopian government has outlined and implementing policies on zerograzing and communal grazing lands, free grazing is a major problem due to huge number of livestock. In addition, farmers set local bylaws but the practice and perception of zerograzing is poor. So, little has been done to characterize the practice and perception of farmers about zerograzing in Tigray region. To the extent of the researchers knowledge, no research is conducted about adoption of zero-grazing in the highlands and lowlands of Tigray specifically in the study area. Constituting to this why the farmers in the Asgede Tsimbla District are not willing to adopt zero-grazing and what factors influence on adoption of zero-grazing are not studied.

Therefore, conducting a study on assessing on adoption of zero-grazing in Asegede Tsimblaworeda with comparative to TahetayKoraro and MedebayZana is important to forward the adoption enhancement of zero-grazing. Therefore, the researchers intend to examine and investigate the factors affecting adoption of zerograzing in the study area. The specific objectives of this study are: To identify farmers perceptions towards zerograzing in the study area; and To assess the status of adoption of zero-grazing in the study districts.

Methodology

Description of Study Area

Medebay Zana Woreda is in the North-Western administrative zone of Tigray region. That has 20 Kebeles (18 rural and 2 urban Kebeles). Its geographical location is in between 38° 20 E longitude and 14° 06 N latitudes. It is bordered with Mereb Leke and Laelay Adiaboworeda in the North, Asgede Tsimbilaworeda in the West, Tahtay Maichew and Naeder Adetworedas in the East and TahtayKoraroworeda in the West. Its area is approximately 1,055 Km². The land use pattern of the Woreda shows that 27,271 hectare is cultivated land; 30,551 hectare is covered with forest and 47,714 hectare with bush and shrubs (MWOoARD, 2014). The Woreda has 138,775 (62,954 males and 75,821 female) total population. The total number of households in the Woreda is 30,685. The

Woredas climatic zones are lowland and temperate with the proportion of 68% and 32% of the area respectively. The altitude of the woreda capital is 1,975 meter above sea level. The daily weather condition runs from 12^oc to 28^oc. The annual rainfall ranges from 500-900 Millimeter.

Agriculture is the mainstay of the economy in the woreda; hence, it provides the largest share of the livelihood for the population. However, it is characterized by lack of access to modern technology, market, low productivity; dependence on rainfall and lack of irrigation practice especially in the lowland part of the Woreda. As a result, the sector remains subsistence in its nature (MWOoARD, 2014). Crop production is considered as an important component in the district. It also mainly produces teff, maize, wheat, sorghum, millet as major crops for household consumption and generating income to cover different household expenses (MWOoARD, 2014). It is estimated that the livestock population is about 462,313 cattle, 101,881 sheep, 51,382 goats, 110,720 poultry, 185,557 camels and 13,035 equines. The major livestock feed resources in the district are natural pasture, crop residues (sorghum, wheat, barley, maize and teff straws) (BoARD, 2017). Therefore, this study mainly focused on the "factors affecting the adoption of zero grazing in the study area.

Tatay-Koraro Woreda is the North-western administrative zone of Tigray region. Its geographical location is in between 15 km west of Shire at 14^o15'40" - 14^o59'00" latitude and 38^o10'35" - 13^o15'40" longitude. It is bordered with LaelayAdiaboworeda in the North, Medebayzanaworeda in the East, AsgedeTsimbilaworedas in the West and Medebayzana and AsgedeTsimbilaworeda in the West with an altitude of from 1034-2464 meter above sea level. The total area of the woreda is 65,549 ha. The land use pattern of the woreda shows that 18,577 hectare is cultivated land; 46,972 hectare is covered with forest, bush and shrubs. The woreda has 80,104(40,062males And 40,042 female) total population. The total number of households in the woreda is 15,430. The annual rainfall ranges from 800-1100 Millimeter. Crop production is considered as an important component in the district. It also mainly produces teff, maize, dagusa sorghum, as major crops grown in the woreda for household consumption and generating income to cover different household expenses (TWOoARD, 2014).

Research design

This study employed a cross-sectional research design. It compares Woredas (administrative districts) which adopt zerograzing to Woredas which don't adopt zerograzing. Therefore, combinations of both qualitative and quantitative data were used for the study.

Sampling Procedure

To conduct the study from the Tigray region, three Woredas, namely Medebay Zana and Tahtay Koraro which have best practice in zero-grazing and AsegedeTsmiblaworeda which has poor practice of zero-grazing were selected. In this study, three stage sampling technique was employed in sample selection processes. In the first stage, the three Woredas were selected purposively due to the fact that there is no such study conducted in these Woredas.

In the second stage, with the collaboration and consultation of Woreda agricultural experts and other stakeholders, out of 61 Kebeles 6 Kebeles were selected because of shortage of time, budget and resources. The Kebeles that adopt zero-grazing more than others that were help to compare adopters with non-adopters. Finally, a total of 117 sample household heads were selected by using systematic random sampling technique from six kebeles in probability proportion to size (PPS) technique.

The sample size for the study was to be determined by the formula of Yamane (1967) to minimize availability of error and bias during sample determination selection for the study. The formula for sample determination is described as follows:

$$n = \frac{N}{1 + N(e)^2} \dots\dots\dots(1)$$

The sample size based on the sampling formula is 99.89. It is increased to 117 to increase validity and reliability of the study.

In addition to the household survey, interviews with 8 key informants were conducted to collect the necessary data. The key informant interview participants included the religion leaders, farmers, youth and women representatives.

Data Type, Sources and Data Collection Method

To get the necessary information about the adoption of zero-grazing for this study, both primary and secondary data were used. The necessary data for this study were collected from respondents by interviewing and secondary sources like reports, that are readily available with agricultural experts of the districts and relevant department heads.

Primary data were collected through a semi structured questionnaire. The necessary information to assess the perception of rural household heads and factors affecting the adoption of zerograzing were obtained mainly through interviewing household heads. Secondary data were obtained to supplement primary data from Agricultural office of the district and other relevant sources.

Method of Data Analysis

Descriptive and econometric modeling approaches were applied to address the specified research objectives. To assess the perception of farmers toward the adoption of zerograzing system in the study area data were analyzed qualitatively by categorization (grouping) of the collected data from respondents.

On the other hand, qualitative data was analyzed by categorization (grouping) of data and information according to their basic character. The category was inclusive and mutually exclusive; more over data were to be coded according to inclusive category (open-ended answers) and deductive category (for closed ended answers).

In addition, quantitative data were analyzed using techniques such as frequency, mean, average standard division, variances, percentages, besides mean comparisons of independent samples and relation of sample category with variables in questions. The t-test and chi-square tests were used to see the presence of statically significant differences or systematic association respectively, between those Kebeles which adopt and do not zerograzing in terms of some hypothesized variables.

The t-test for continuous, and chi-square tests for dummy/categorical explanatory variables were used to examine data for differences, associations and relationships in terms of some hypothesized variables. Additionally, Likert Scale measurement also used to see the perception of farmers towards the adoption of zerograzing in the study area.

Result and Discussion

Demographic Characteristics of the Respondents

Sex Composition of Respondents

Majority of the adopter farmers are male-headed households in the study area. 83.5% of the adopter and 75% of the non-adopter sample respondents are male headed households. Sex is statistically significant and positive relationship with the adoption decision with χ^2 -value=12.2 at 5% level of significant (Table 1). This implies that, male-headed households had a capability to participate freely in different social organization to have better exposure on the economic sub-sector than their counterparts. Due to the prevailing socio-cultural values and norms, males have freedom of mobility, participate in different meetings and trainings.

Education Level

The education level affects the adoption decision negatively with the χ^2 -value=13.407 at 1% level of significance (Table 1). This implies that the increase in the year of schooling affects the adoption decision with the reference that the increase in year of schooling makes people to engage in different non-farm activities like business, employing in different government organizations to change their livelihood in a sustainable way instead of creating farm jobs in the study area.

Age of Respondents

Age is usually considered in adoption studies with the assumption that older people are easily focus on their own indigenous knowledge rather than adopting new agricultural technologies. With this background in view, age of sample households was influenced the adoption of zero grazing negatively. Accordingly, the maximum and minimum age of the sample households is 88 and 20 year respectively (Table 1). On the other hand, the average age of sample adopter and non-adopter respondents was 44.84 and 47.91 respectively. Therefore, the increase in age makes difficult to participate on zero grazing on which the older farmers have no more capacity to invest on it in a sustainable way.

Table 1: Personal Characteristics of the Respondents

No	Variable	Description	Adopter		Non-adopter		χ^2 -value	P-value
1.	Sex		N	%	N	%	12.2	0.012**
		Male	71	83.5	24	75		
		Female	24	16.5	8	25		
		Total	85	100	32	100		
2.	Education	Illiterate	13	15.3	07	21.9	13.407	0.001***
		Literate	00	00	00	00		
		Grade	1-4	34	40	08	25	
		Grade	5-8	33	38.8	11	34.4	
		Grade	9-10	05	5.9	05	15.6	
		Grade 11 & above	00	00	01	3.1		
		Total	85	100	85	100		
No	Variable		Adopter		Non-adopter		t-value	P-value
1.	Age		Mean	SD	Mean	SD	-2.124	0.012**
			44.84	10.282	47.91	14.084		
2.	Labor		3.38	1.626	3.00	1.586	5.124	0.045**
No	Variable		Adopter		Non-adopter		t-value	P-value
1.	Land size in hectare		Mean	SD	Mean	SD	3.666	0.009***
			0.97	0.64	60.77	0.462		
2.	Livestock holding		6.9412	4.3544	6.9375	5.34571	2.494	0.019**
3.	Additional income		17531.76	3079.69	12045.93	3545.89	3.509	0.033**

Source: Own survey, 2018

Labor Availability

The availability of active working labor force in the household is considered as the number of individuals who resides in the respondent's house to perform production activities. Large available labor force is assumed as an indicator of performing more to the household tasks in the family. Based on this fact, availability of family labor is an input which is important for increasing the production performance of the sub-sector in the study area.

The total sample households had family labor ranging from 1-5 adult equivalents. In this study, the average family size of the sample households was 3 persons with the maximum and minimum family size of 7 and 3 persons per family with the total respondent's average farming experience of respondents is 20 years.

The average labor force of sample adopter and non-adopter households were 3.38 and 3.00 respectively. Hence, the family labor shows that, there is significant mean difference between both adoption categories with the t -value=5.124 at 5% significant level (Table 1). Therefore, the higher the family labors the higher the probability to adopt zerograzing in the study area. This is due to the fact that, this technology needs manpower from sowing to the final harvesting of the crop.

Total Land Holding

Land is the single and most important production resources base for any economic activity especially in rural and agricultural sector. Land holding and ownership is crucial factor for agricultural production and adoption of agricultural innovation for the farm community. Land in the study area is too scarce in Medebay Zana followed by Tahtay Koraro district mainly due to population pressure and average land size per farmer was 1 hectare. In this study, the average land holding of sample adopter and non-adopter sample respondents was found to be 0.97 and 0.64 hectare respectively (Table 1).

The t -test analysis result show that, land holding had statistically significant and positive relationship with adoption with ($t=3.666$; $p=0.009$) at 1% level of significance. Therefore, this stated that, there is a significant mean difference between adopters and non-adopters sample respondents selected for the study. This implies that farm households with relatively large farm size had adopted the technology more than those with small farm size. This states that the sub-sector needs land to give optimum result at farmers' level.

Livestock Holding

Livestock holding is an important indicator of wealth status for the farm community which is hypothesized to have positive relationship with the adoption of the sub-sector. It is an important source of cash, manure, draft power and food for the agricultural community. The livestock holding of the sample households is ranging from 1.013-13.520 TLU implying

the existence of variation among the households in livestock ownership. The average livestock holding in TLU of the adopter and non-adopter sample households was 6.9412 and 6.1375 TLU. Consequently, livestock holding in TLU had statistically significant relationship with the adoption of zero grazing with ($t=2.494$, $p=0.019$) at 5% level of significance in the study area (Table 1).

Institutional Characteristics of the Respondents

Participation in Training

Respondents' participation in training is important for making people to be acquainted with the required knowledge and skills on zerograzing in the study area. It shows that 80% and 43.8% of the adopter and non-adopter sample respondents were participated on training related to zerograzing respectively. Therefore, the χ^2 -test result revealed that training show that statistically significant relationship with the adoption of decision of the sub-sector with $\chi^2=14.571$ at 1% level of significance. This implies that farmers who got training had well equipped with the necessary technical know-how of the economic sub-sector and there is a probability to adopt the sub-sector easily than those who had not undergone training.

Market Access

Access to market is important for the producers to get attractive market price through reduction of transportation cost. In this study, the sample farmers on average travelled about 8.5067 Kms to sell their agricultural produce in general and fattened animal in particular. When compared the average travelled distance of adopters and non-adopters, sample households had 7.1271 and 9.9863 Kms to arrive at the market centers to sell their produce respectively. Additionally, market access had statistically significant and negative influencing with the adoption decision with the χ^2 -value=7.586 at 1% level of significance (Table 2). Therefore, the increase in market distance make farmers to get out-dates market information and becoming out of adopting zero grazing in the study area. On the contrary, farmers nearby to the market centers had the opportunity to get production inputs easily to adopt new innovation to overcome their own production problem. Additionally, those farmers have the probability to get market linkage with input

supply office. They also had an opportunity to get market information from diversified sources such as agricultural experts, mass media, traders and others like informal discussion with their peers in different social organization.

Access to Credit Service

Access to credit service is the source of finance for the medium and lower income households to buy inputs for agricultural production. The credit service in the study area is given in kind and cash form especially credit services delivered for agricultural production system. Most of the zerograzing adopter farmers got the loan in kind especially the improved seeds and fertilizers; because, those are only obtained from input supply office in collaboration with Dedit Microfinance, Multi-purpose Kebele Cooperatives and the Woreda Cooperative Union. Additionally, 91.8% and 53.1% of the adopter and non-adopter sample households accessed credit services. The chi-square analysis result revealed that access to credit service shows statistically significant association with the adoption decision with $\chi^2=22.734$ at 1% level of significance (Table 2). This might be due to that those farmers who have access to credit service had more probable to adopt the sub-sector than otherwise. It is also important to solve financial shortfalls of the farm community.

Social Participation

In the realm of the rural and agricultural development the importance of social capital is perceived as a willingness and ability to work together. Rogers (1995) conclude that, "the heart of the diffusion process consists of interpersonal network exchanges between those individuals who have already adopted an innovation and those who are then influenced to do so".

The respondents' participation in social organization had significant relationship with the adoption of zero grazing with ($\chi^2=13.874$; $p=0.000$) which is consistent with the positively hypothesized relationship with adoption decision (Table 2). Therefore, respondents participated in social organization had a role on adopting zerograzing in the district. Because, participation in social organization in the study area is mainly focused on socio-economic aspects which is important to develop an awareness on adoption of new agricultural innovation to overcome production problem in the district.

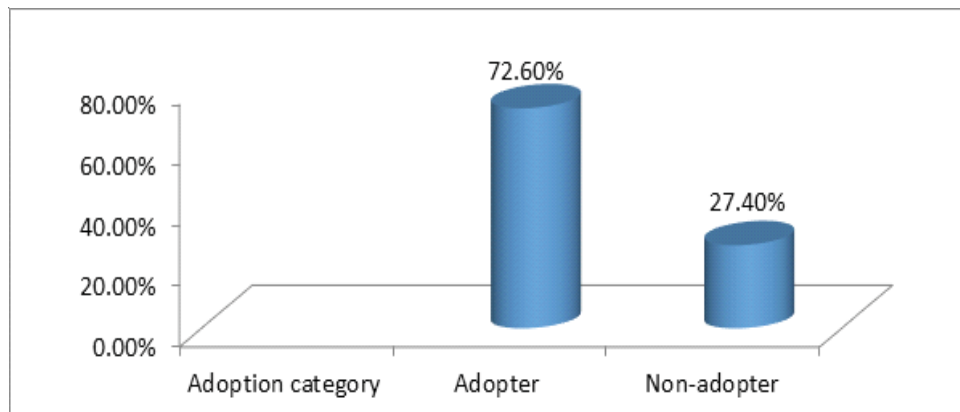
Table2: Institutional Characteristics of the Respondents

No	Variable	Description	Adopter		Non-adopter		χ^2 -value	P-value
			N	%	N	%		
1.	Training participation	Yes	68	80	14	43.8	14.571	0.000
		No	17	20	18	56.2		
		Total	85	100	32	100		
2.	Access to market	Yes	82	95.5	26	81.3	7.586	0.006
		No	03	03.5	06	18.7		
		Total	85	100	32	100		
3.	Access to use credit was it service	Yes	78	91.8	17	53.1	22.734	0.000
		No	07	08.2	15	46.9		
		Total	85	100	32			
4.	Social participation	Yes	85	100	27	84.4	13.874	0.000
		No	00	00	05	15.6		
		Total	85	100	32	100		

Source Own Survey, 2018

The Status of Adoption of Zerograzing

In the study area there are two types of grazing systems namely zero-grazing and free-grazing. Zero-grazing is a system in which animals are tethering in confined place where feed and water are brought to the animals. Free-grazing is a system that animals graze freely in open areas or in communal grazing lands. Majority (72.6%) of farmers in the three woredas practice zerograzing while 27.4% respondents are non-adopters of zerograzing (Figure 1). Therefore, majority of the respondents are adopter of zerograzing in the study area.



Source Own Survey, 2018

Figure 1: The Status of Adoption of Zero Grazing System

Farmers Perception towards Zerograzing

Farmers perception towards zerograzing is described and measured based on the agreement level of the respondents perceived during the data collection. Perception was measured using a scale with items developed for the purpose of this study. Responses of sample respondents on the perception related were analyzed using Likert type scale. According to the result of the interview with individual households, most of the respondents perceived that zerograzing has better performance in comparison with the remaining other economic sub-sectors. Even if it is highly performed sector, some farmers are discouraged to adopt it because of reasons such as demand more inputs, the lack of timely and limited availability of the inputs in the area specially feed and feed resources. To conclude this, most of the sample households dont adopt zerograzing due to the above discouraging factors. Therefore the extension and research systems have to look into these factors to give solution for the adoption of the sector in a sustainable way (Table 3).

Table 3: Likert Scale Results on Respondents' Perception Towards Zerograzing

No	Responses		Variables/items			
			Technological availability	Input demanded	High production performance	Agro-eco suitability
	Strongly agree	N	12	27	18	24
		%	10.2	23	15.4	16
	Agree	N	32	82	51	65
		%	27.5	70	43.6	43.3
	No opinion	N	07	04	09	06
		%	6.0	3.4	7.7	04
	Disagree	N	53	03	29	43
		%	45.3	2.6	27.8	28.7
	Strongly disagree	N	13	01	12	10
		%	15.3	01	10.2	6.7
	Total	N	117	117	117	150
		%	100	100	100	100
	χ^2 -value		17.9	74.02	12.70	23.8
	P-value		0.00***	0.001***	0.003***	0.007***

Source: Own survey, 2018

Note: *** Significant at 1% level of significance level

Farmers' Perception Towards the Importance of Zerograzing

Zerograzing is important to increase livestock production performance in the study area. Consequently, the increase in the adoption of zerograzing will lead to the households to improve their economic status by selling fattened animal with in limited time. The survey result indicated that, the majority of the sample households perceived zerograzing is important economic sector in the study area especially for those who are adopting the technology in a sustainable way. Therefore, 63.5% of the adopter sample respondents

perceived that zerograzing is more important economic sector to change their livelihood in a sustainable way. On the other hand, 46.9% of the respondents perceived that, zerograzing is important economic sector to change livelihood of households in a sustainable way.

Therefore, the χ^2 -value analysis result revealed that, perception of respondents on the importance zerograzing towards had statistically significant relationship with the adoption decision with $\chi^2=12.700$ at 5% level of significance (Table 4). This implies that, the increase in perception towards the importance of zerograzing is influencing the adoption decision.

Table 4: Farmers' Perception Towards the Importance of Zerograzing

No	Responses	Adopter		Non-adopter		Total		χ^2 -value	p-value
		N	%	N	%	N	%		
1.	Not important	00	00	01	3.1	01	0.8	12.700	0.013**
2.	Less important	01	1.2	01	3.1	02	1.7		
3.	Important	17	20	15	46.9	32	27.4		
4.	More important	54	63.5	12	37.5	66	56.4		
5.	Highly important	13	15.3	03	9.4	16	13.7		
6.	Total	85	100	32	100	117	100		

Source: Own survey, 2018

Note: ** significant at 5% level of significance

Discussion

This study was conducted to assess and identify factors that affect farmers' perception on adoption of zerograzing practice. It also explores the implementation and effectiveness of bylaws to manage communal grazing lands as well as to identify perception of farmers to ward zerograzing. Accordingly, 82.5% of the respondents conducted in the study have supportive perception about adoption zerograzing. Farmers in the three districts do not have equal perception about communal grazing land and do not implement the bylaw equally. The common challenges mentioned by farmers on adoption of zero-grazing are

shortage of feed access, low level of awareness, undeveloped market for livestock and livestock products as well as limited availability of watering points.

100% of farmers in Limate M/Zana district and T/Koraro district were practicing zero-grazing dominantly. Collective (community) action involvement in managing the communal grazing lands in this case contributes for their effective implementation of bylaws. In similar vein study by Benin and Pender (2002) indicates that the shift to zero-grazing in the Ethiopian highlands was associated with areas where land redistribution resulted in a reduction in size of grass plots. Although Kebele May-Aderasha of T/Koraro and Lemilem of A/Tsimibela district were selected on middle and poor Kebele based on their practice, according to this finding 49.1% and 17.1% of the grazing system in the Kebele is zero-grazing which indicates a huge gap with Kebele Lemat of M/Zana which considered as in best practice in managing the communal grazing land effective use of the bylaw. Cattle, donkey and equines are managed by tethering or adopted zero-grazing practice and other animals like goat and sheep through controlled grazing in around home or in their cultivated land.

Therefore, most of farmers in the three districts do not perceive equally the advantage of communal grazing land with benefits of zero-grazing practice and seen to violate the bylaw that they manage their animals through free grazing instead of tethering in a confined place or at home. Farmers in Medebay Zana were found implementing the bylaw effectively through collective or community mobilization followed farmers in Tahtay Koraro district. However, farmers in Asgede Tsimbla district were seen to violate the bylaw and poorly manage the communal grazing lands and poor practice of zero-grazing.

Conclusions

In the study area, there are two types of grazing systems namely zero-grazing and free-grazing in the three selected rural districts. About 72% of farmers in Medebay Zana practice zero-grazing. However, in Asgede Tsimibela majority of respondents practiced free grazing system. There is strong collective (community) action in managing the communal grazing lands in Medebay Zana district followed by Tahtay Koraro district with very strong community action and effective use of bylaws in Tabia May Timiket. However, poor practice and compliance in managing the communal grazing lands is found in Asgede Tsimibela district with ineffective use of bylaws with no equal property right on use to it.

Having good socio-cultural or social laws, best practices of soil and water conservation, good practice of intensification of crop production which left no land for grazing like in Medebay Zana district and in Tabia May Timiket of Tahtay Koraro district. Establishment of emerging towns foreconomic opportunities have good culture of tethering animals in Medebay Zana district and in Tabia May Timiket of Tahtay Koraro district. The current trend of irrigation development and availability of good practice of soil and water conservation could be considered the best opportunities to adopt zero-grazing in the study area.

Shortage of feed in quantity and quality, low level of awareness towards zerograzing, undeveloped market for livestock and livestock products, lack of standards market/ limited availability of watering points in which demand labor to transport water, culture of keeping high number of livestock and limited introduction of improved dairy cows were found the main challenges that farmers face on adoption of zero-grazing practice in the study area.

Recommendations and Policy Implication

- * Awareness creation to the community about zerograzing practice and its benefits is important that can help to shift from free grazing to zerograzing system.
- * Shortage of feed was a main challenge to practice zerograzing system. Therefore, transferring and distributing the rehabilitated hill bottoms and gullies through soil and water conservation to landless youths for economical purpose is an important method to enhance adoption of zero-grazing practice through closing the communal grazing lands. Thus the closed communal lands should be distributed for youths either for honey bee production and other animal production purposes or even for sale of grass which harvested from the closed lands could be solved the shortage of feed access.
- * Irrigated farming could contribute an important role in increasing the production and productivity which ensures rural livelihood and regional food-security. Hence, the extension organizations and the policy makers need to promote and expand demand driven irrigation development to enable farmers to grow forages for livestock production.

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