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Assessment of Knowledge, Attitude and Practice of Smallholder Farmers on Market-oriented Sheep Fattening in North Shewa, Ethiopia

A Preliminary Report

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December 2022

Introduction

North Shewa is one of the zones in Amhara Region of Ethiopia that has untapped potential for small ruminant fattening. Livestock in North Shewa zone includes 1,704,407 cattle, 1,941,024 sheep, 823,550 goats and 2,000,196 poultry (CSA, 2021). These herds are of different genotypes. The zone has suitable agroecologies for the production of small ruminants. Recently, agribusiness has expanded around Debre Berhan City, the zone's capital. This has led to an increase in feed by-products, which could help increase the productivity of the fattening animals. The zone's proximity to the country's capital, Addis Ababa, and the high demand for meat in the domestic market as well as in Middle Eastern countries are some of the opportunities that exist to boost the sheep fattening business (Mekuria et al., 2018).

However, small holder farmers in the zone use traditional fattening methods and they often fatten small numbers of sheep targeting sales during festive seasons and when cash is required. Grazing of crop residues is the main feed source to fatten rams. A lack of scientific and technical know-how in the fattening practice limits farmers' ability to fully exploit the economic opportunities along the sheep fattening value chain. Unexploited productivity potential of the sheep breeds constraints growth of the fattening enterprise (Animut and Wamatu, 2014; Mekuria et al., 2018; Bezabh, 2022)

One of the main socio-economic problems of the North Shewa Zone is high population growth which leads to high youth unemployment (Negatu, 2013; Neway, 2022). In this regard, sheep fattening can create employment opportunities in a relatively short period of time and can be used as a strategy to improve livelihoods. Small ruminants can also help reduce malnutrition and improve food security issues in nutritionally insecure areas. In addition, the sector can also support agricultural growth, which could improve the country's overall economic that could enhance the overall economic progress. (Mekuria et al., 2018).

Recently the Amhara regional government has developed a strategy to improve livestock fattening in the region and transform the traditional subsistence livestock production methods to market oriented systems (Bezabh, 2022). One of the priority areas in this context is the development of small ruminant fattening. To expand the sector, it is necessary to understand the knowledge and attitude of the target population about rams fattening. The International Center for Agricultural Research in the Dry Areas (ICARDA) has developed a project aimed at increasing the knowledge, attitude and practice of sheep fattening among youths in three villages in North Shewa, namely

namely Gudo Beret, Abamote and Mehal Amba. The aim of the assessment is to understand the knowledge, attitude and prevailing sheep fattening practices among small holder farmers in the project sites. To do this, a baseline survey was conducted prior to the implementation of the project.

Methodology

Source of data

This report used primary data collected from three villages in the North Shewa Zone of Amhara Regional State, Ethiopia. The target population of this study were youth between the ages of 18 and 35 years living in villages of Gudo Beret, Abamote and Mehal Amba villages of the sample zone. Crop production and livestock rearing is the main source of livelihood for most of the population in these villages. Longitudinal data comprising a baseline study and end-line survey will be conducted to examine the effects of the sheep fattening intervention. The baseline study was conducted on December 22-28, prior to begin of the project implementation. A follow-up survey will be conducted after three fattening cycles.

Sampling technique

The sample size of the study participants was determined according to the knowledge, attitude and practice (KAP) assessment formula by Arsham (2007), using primary data collected from the study population. That is, N = 0.25/(SE)2, where N refers to the minimum sample size and SE is the standard error with a 95% confidence level. Instead of the converted 0.05 margin of error, using a smaller standard error increases the accuracy of the estimates (Ikehi et al., 2019; Nanjundeswaraswamy, 2021). Accordingly, we used 0.0409 standard error and the sample size was set at 150. The sample was then evenly distributed among the study sites. As shown in Table 1, there are 50 persons per site, a total of 150 participants, including 60 males and 90 females.

Table 1: Distributed of sample size by intervention status and study site.

Location	**Male**	**Female**		**Total**
Gudo Beret	18	34		52
Abamote	22	26		48
Mehal Amba	20	30		50
Total	***60***	***90***		***150***

To select the study participants, a list of individuals willing to participate in the ICARDA's sheep fattening intervention were identified in collaboration with the local government administrative offices. Using this sampling frame, 50 individuals with some reserve individuals were selected based on a simple random sampling technique.

Data collection procedure

A structured survey tool was used to collect quantitative data from sample villages in North Shewa Zone. Ten data collectors who are animal science researchers from Debre Berhan Agricultural Research Center were recruited. The data collection team was selected considering their professional background in sheep fattening and their familiarity with the study sites. To ensure the quality of data collection process, a one-day training was for enumerators was conducted. Based on the inputs received from the data collectors and a questionnaire pre-test, necessary adjustments to the questionnaire were made prior to the actual study period. The completeness of the data collected was verified by the lead investigators. The survey was conducted taking into account ethical consideration that need to be account during selecting of study participants and data storage.

Statistical Analysis

Data management and analysis were conducted using STATA 16. The current report gives indications of the initial situation of the study participants in terms of knowledge, attitude and practice of market-oriented sheep fattening before exposed to the ICARDA's intervention. Using various types of descriptive statistics including mean, frequency and percentages, we first summarized the basic characteristics of the study respondents. The distribution of knowledge, attitude and practice of sheep fattening was then categorized based on different social strata.

Results

Demographic characteristics of the participants

Background characteristics of study participants during the baseline study are reported in Table 2. Among the study respondents, the proportion of females (60%) is higher than that of men. More than 74% of the respondents are below 35 years. Those above 35 years were predominantly women. The result show that the participants had different levels of education. The largest group

(48%) have primary level of education. 24% have no education. 47.3% of the respondents are married while 38% are single. All participants are fluent Amharic speakers.

Table 2: Demographic characteristics of the survey participants

Variable		Frequency	Percentage
Sex	Male	60	40.0
	Female	90	60.0
Age	15-25	58	39.2
	26-35	45	30.4
	>35	45	30.4
Level of education	No education at all	46	30.7
	Primary	73	48.7
	Secondary	20	13.3
	College diploma	2	1.3
	informal education	9	6.0
Marital status	Single	53	35.3
	Married	71	47.3
	Widowed	9	6.0
	Divorced	17	11.3

66% are self-employment, 8.7% are in full-time employment and 29% are caregivers for relatives (Table 3). The major source of livelihood is livestock farming (30%) and crop farming (62%). The average monthly income of the respondents was found to be ETB 1682 (USD 32; with standard deviation of 2482 (USD 48)). The monthly income level of the respondents ranged from zero to ETB 15000 (USD 288). The average household income was found ETB 2018 (USD 39, with a standard deviation of ETB 2593 (USD 50)). Result further shows that 43% of the respondents experienced an increase in income in the 12 months prior to the date of the survey, while 32% experienced a decline in income.

Knowledge of sheep fattening

The level of knowledge on market-oriented sheep farming was determined. Participations reported that the age of the sheep can be determined from their body (14%) and front teeth (67%), (Table 4). About 8% did not know any method to estimate the age of sheep. Most of the respondents (72%) agreed that knowing the age of sheep is important for marketing decisions. Knowledge on various activities such as castration, quarantine, deworming, and vaccination was also assessed. There is consistent evidence that participants are well informed about the importance of castration (93%), quarantining (92%), deworming (99%) and vaccination (95%).

Table 3: socio-economic status of the survey participants

Variable	Responses	Frequency	Percentage
Current work	Fulltime employed	13	8.7
	Self-employed	99	66.0
	Part-time job	1	0.7
	Schooling	1	0.7
	Gap year	3	2.0
	On incapacity benefit	1	0.7
	Caring family member	29	19.3
	Not currently working	3	2.0
Main occupation	Livestock farming	45	30.2
	Crop farming	93	62.4
	Business	3	2.0
	Informal employment	1	0.7
	Not currently working	3	2.0
	Other	4	2.7
Change in income from main source	Increased	60	42.6
	Decreased	45	31.9
	Remained the same	27	19.2
	I do not know	9	6.4

Table 4: Knowledge of respondents on market-oriented sheep fattening

Item	Responses	Frequency	Percentage
Age of sheep determination	Looking at their body	9	14.1
	looking their front teeth	43	67.2
	The size of their skin hair	4	6.3
	Interest to mate with the females	3	4.7
	do not know	3	7.8
Importance of determining the age	To make purchase and sale decision	103	71.5
	To select for fattening purpose	23	16.0
	To use for breeding purpose	2	1.4
	To estimate the quality of meat	1	0.7
	For removing purpose	6	4.2
	I do not know	9	6.3
It is important to castrate sheep	Yes	139	93.3
	No	1	0.7
	I do not know	9	6.0
It is important to quarantine newly purchased sheep	Yes	138	92.0
	No	10	6.7
	I do not know	2	1.3
It is necessary to deworm newly purchased sheep before fattening	Yes	148	98.7
	No	2	1.3
	I do not know	-	-
It is necessary to vaccinate the sheep before fattening	Yes	143	95.3
	No	6	4.0
	I do not know	1	0.7

As shown in Table 5, 51% of the participants knew the nutrient types, while about 17% did not know the nutrient types. 71% stated that they were familiar with the two main feed classes, roughages and concentrates. The result further showed that less than half of them were informed about different dietary supplements (protein, minerals, and vitamins). 49% of the respondents did not know how to balance feeds to meet the nutrient requirement of sheep. 78% of the participants were aware of how to treat poor quality roughages to increase palatability and nutritional value. Finally, the result showed that a large majority (91%) of the respondents knew how to use feed and water troughs.

Table 5: Extent of knowledge on sheep feeding.

Item	Response	Freq.	%
Know the nutrient (water, carbohydrates, fats (lipids), protein, minerals, and vitamins) found infeed	Yes	74	49.3
	No	21	14.0
	I do not know	55	36.7
Know two main classes (Roughage and Concentrate) of feedstuffs	Yes	106	71.1
	No	14	9.4
	I do not know	29	19.5
Know nutrient requirements of animals vary for maintenance, growth, production, and reproduction	Yes	76	51.0
	No	21	14.1
	I do not know	52	34.9
Balance feeds to meet the nutrient requirement of sheep	Yes	82	55.0
	No	32	21.5
	I do not know	35	23.5
Treat poor-quality roughage to increase palatability and nutrient content	Yes	114	77.6
	No	8	5.4
	I do not know	25	17.0
Use to feed and water troughs to feed my sheep	Yes	135	91.2
	No	6	4.1
	I do not know	7	4.7

In terms of perceptions of the various activities involved in sheep farming, almost all respondents (97-98%) totally agreed that using feeding troughs is better than feeding sheep from the floor and using water troughs is better than that watering sheep directly from the river/fountains/ponds. Most of them (71%) also accepted that the age of the rams at the beginning of fattening affects growth. Also, 85% stated that castrated rams grow faster before fattening than non-castrated rams. Only 22% of the participants totally agreed that vaccination of rams before fattening increases the risk of mortality, while more than 69% disagreed with this statement. Finally, a large proportion of respondents (94%) believed that deworming rams before fattening promotes growth.

Table 6: Perception on sheep fattening management.

Items	Level of agreement									
	Completely Agree		Partially Agree		Neither, nor		Partially Disagree		Completely disagree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Using feed troughs is better than sheep feeding from the ground	145	98.0	3	2.0	0	0.00	0	0.00	0	0.00
Using watering troughs is better than drinking from the river/well/ponds	144	96.6	5	3.4	0	0.00	0	0.00	0	0.00
age of rams at the beginning of fattening will affect growth	97	70.8	28	20.4	1	0.7	3	2.2	8	5.8
castrating rams prior to fattening grow faster than uncastrated rams	124	84.9	11	7.5	1	0.7	7	4.8	3	2.1
Castrating rams prior to fattening will increase growth	124	84.9	15	10.3	2	1.4	2	1.4	3	2.1
Vaccinating rams prior to fattening increases the risk of mortality	31	21.8	1	1.7	1	1.7	11	7.8	98	69.0
Deworming rams prior to fattening will increase growth	139	93.9	7	4.7	2	1.4	0	0.00	0	0.00

Consideration and practice of sheep fattening

Table 7 shows the proportion of study participants who have ever considered undertaking sheep fattening as a business. Majority of them (77%) have already considered getting started. Interest in practicing fattening was relatively higher in Abamote (83%) than in the case of Gudo Beret (73%) and Mehal Amba (76%). The intention to get involved in sheep fattening was higher among men (92%) than among women (68%). There were also differences in the decision to engage in sheep fattening based on educational status. Those with some level of education were more interested in starting their own business compared to the uneducated.

While majority of participants (78%) had ever considered starting to fatten sheep for sale, actual engagement in sheep fattening was limited. Only 38 (25%) were actively fattening sheep during the survey period (Table 8). Current engagement of males (32%) was higher than that of females (21%). Across the study sites and based on gender, sheep fattening was higher among the men living in Abamote (45.5%) and less common among women living in Mehal Amba village (16.7%) (Figure 1).

Table 7: Consideration to start a sheep fattening business.

Stratifier	Have you ever considered to start sheep fattening?			
	Yes		No	
	Freq.	%	Freq.	%
Study site				
Gudo Beret	35	72.9	13	27.1
Abamote	38	82.6	8	17.4
Mehal Amba	29	76.3	9	23.7
Sex				
Male	46	92.0	4	8.0
Female	46	68.3	26	31.7
Age group				
15-25	46	88.5	6	11.5
26-35	27	75.0	9	25.0
>35	28	66.7	14	33.3
Education				
No education	25	58.1	18	41.9
Primary	56	90.3	6	9.7
Secondary	12	70.6	5	29.4
College diploma	2	100.0	0	0.0
Informal education	7	87.5	1	12.5
Marital status				
Single	36	81.8	8	18.2
Married	53	80.3	13	19.7
Widowed	6	66.7	3	33.3
Divorced	7	53.8	6	46.2
Total	**102**	**77.3**	**30**	**22.7**

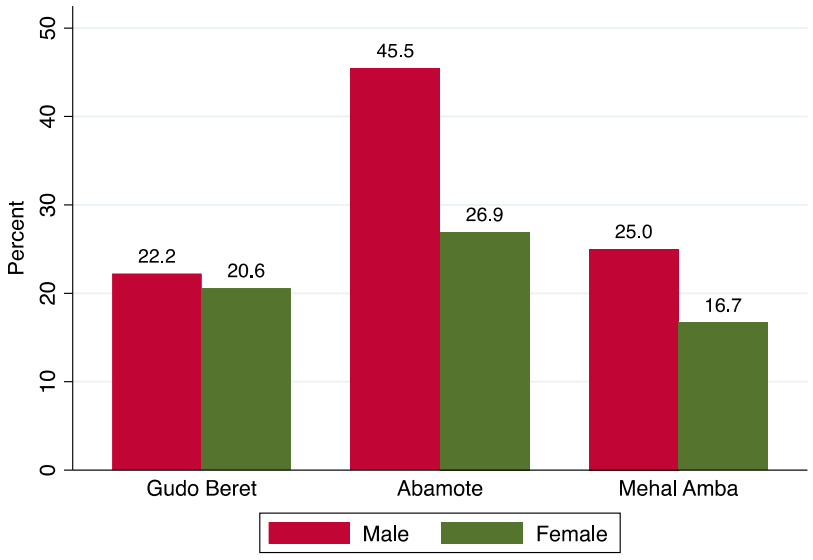

Fig 1: Current sheep fattening practice study site and sex.

Relatively more young people between the ages of 15 and 25 fatten sheep than those over 35. Participation in sheep fattening was more common among educated people. Only 13% of respondents with no formal education, and 31% with basic primary education were engaged in sheep farming. In terms of marital status, single people (30%) were more involved in sheep farming than divorced people (6%).

Need for technical services and technologies in ram fattening

The survey assessed previous experience and interest in receiving technical support related to sheep fattening practices and technologies. About 56% had learned about improved methods of sheep fattening (Table 9). They had previous information on ram selection (64%) and feed improvement methods (27%). On the contrary, most of them had not undergone any training in marketing skills and ruminant health problems. The two most important sources of information about sheep fattening technologies were reported to be family members and government organizations. Only less than 3% of the respondents had ever obtained information about fattening technologies from mass media such at radio and television.

Figure 2 shows the main aspects of production practices and technologies for small ruminants that small holders would like to learn. About half of the study participants would be interested in technical support related to ram selection of rams for fattening. 37% would like to learn about improved feeding methods. Less than 5% of the respondents are interested to learn about castration of sheep, ram identification methods, sheep health and disease prevention.

Table 8: Current sheep fattening practice

	Practice of sheep fattening			
	Yes		No	
	Freq.	%	Freq.	%
Study site				
Gudo Beret	11	21.2	41	78.8
Abamote	17	35.4	31	64.6
Mehal Amba	10	20.0	40	80.0
Sex				
Male	19	31.7	41	68.3
Female	19	21.1	71	78.9
Age group				
15-25	18	31.0	40	69.0
26-35	11	24.4	34	75.6
>35	9	20.0	36	80.0
Education				
No education	6	13.0	40	87.0
Primary	23	31.5	50	68.5
Secondary	4	20.0	16	80.0
College diploma	1	50.0	1	50.0
Informal education	4	44.4	5	55.6
Marital status				
Single	16	30.2	37	69.8
Married	19	26.8	52	73.2
Widowed	2	22.2	7	77.8
Divorced	1	5.9	16	94.1
Total	**38**	**25.3**	**112**	**74.7**

Table 9: Experience and interest in sheep fattening technical services

Item	Response	Freq.	%
Previously learned about fattening of rams practices and technology	Yes	84	56.0
	No	66	44.0
the most important thing learned up to now related to fattening of rams practices	selection of rams for fattening	55	64.0
	Improved feeding practice	23	26.7
	health of sheep and disease preventive measures	2	2.3
	castration of sheep	4	4.7
	sheep marketing skills	2	2.3
Source of information about fattening of rams practices and technology	family members/friends	52	60.5
	governmental agricultural workers	24	27.9
	non-governmental originations	8	9.3
	Mass media (radio and tv)	2	2.3
Agreement about only very few smallholders are interested in technical services for fattening their sheep	Yes	75	50.7
	No	73	49.3
Reasons for only few of them are interested in technical services for fattening their sheep?	They think that they have enough knowledge about sheep fattening	39	52.0
	They think that technical services are irrelevant for them	2	2.7
	Most of technical services are not applicable to the study area (e.g checking weight of sheep or using identification method)	7	9.3
	They are busy to participate in technical supportive programs	19	25.3
	other	8	10.7
Aspects of sheep fattening technical services are difficult for smallholder farmers	selection of rams for fattening	36	24.2
	Improved feeding practice	65	43.6
	health of sheep and disease preventive measures	16	10.7
	castration of sheep	3	2.0
	using identification method	4	2.7
	sheep marketing skills	15	10.1
	other	10	6.7
Aspects of sheep fattening where smallholder farmers need help in order to perform better	selection of rams for fattening	58	40.0
	Improved feeding practice	57	39.3
	health of sheep and disease preventive measures	18	12.4
	castration of sheep	1	0.7
	using identification method	2	1.4
	sheep marketing skills	2	1.4
	other	7	4.8

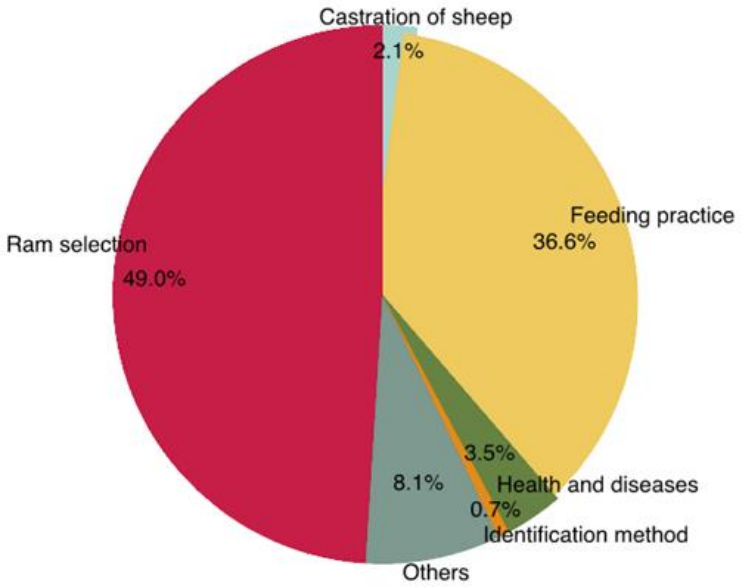

Figure 2: Aspects of sheep fattening that smallholders want to learn

To reduce poverty and address socioeconomic inequality, it is also necessary to encourage women's participation in the agricultural sector including ruminant fattening activities. Among the study participants, 55% felt that the majority of women farmers were less interested to engage in sheep fattening sheep (Table 10). This is due to limited knowledge on improved fattening practices and lack of time to attend technical advisory programs. Most espondents recommended that women should receive training in ram selection of rams for fattening and marketing strategies.

Table 10: Young women interest in sheep fattening technical services

Item	Response	Freq.	%
Only very few young women farmers are interested in fattening sheep	Yes	81	54.4
	No	68	45.6
Reasons for only young women farmers are interested in fattening sheep	They think that they have enough knowledge about sheep fattening	33	41.8
	They think that technical services are irrelevant for them	4	5.1
	Most of technical services are not applicable to the study area (e.g checking weight of sheep or using identification method)	9	11.4
	They are busy to participate in technical supportive programs	24	30.4
	other	9	11.4
Aspects in sheep fattening that young women prefer to undertake	selection of rams for fattening	61	41.2
	Improved feeding practice	52	35.1
	health of sheep and disease preventive measures	9	6.1
	castration of sheep	4	2.7
	using identification method	1	0.7
	sheep marketing skills	11	7.4
	other	10	6.8
Aspects of sheep fattening technical services are difficult for women	selection of rams for fattening	59	39.3
	Improved feeding practice	34	22.7
	health of sheep and disease preventive measures	14	9.3
	castration of sheep	7	4.7
	sheep marketing skills	27	18.0
	other	9	6.0
Aspects of sheep fattening where women need help in order to perform better	selection of rams for fattening	60	41.7
	Improved feeding practice	48	33.3
	health of sheep and disease preventive measures	14	9.7
	castration of sheep	1	0.7
	using identification method	3	2.1
	sheep marketing skills	11	7.6
	other	7	4.9

Barriers to youth engagement in sheep fattening among youths in North Shewa

A lack of knowledge and skills in improved sheep fattening practices (28%) and limited knowledge (13%) in financial management were cited as key factors hampering market-oriented sheep fattening. The important of technical support and provision of training to enhance participation and benefits from sheep fattening business was cited. This was highlighted as particularly relevant for unemployed youths who do not engage in crop production activities. Some participants

mentioned challenges faced with dealing with negative attitudes of other people when they practice sheep fattening. Most respondents did not consider financial constraints as a major challenge to start rams fattening. Among the respondents, 28% believed that there were no major barriers to start up own business in their locations (Table 11).

Table 11: Barriers faced in order to start up a business among youths in North Shewa

Type of barrier	Freq.	%
Dealing with other peoples' negative attitudes to your plans	18	13.3
Lack of relevant sheep fattening skills	38	28.2
Lack of business knowledge about how to manage finance etc	17	12.6
Lack of previous business work experience	6	4.4
Lack of personal finance to invest in the business	7	5.2
Difficulties accessing finance elsewhere (e.g. banks, family etc)	3	2.2
Lack of useful network	1	0.7
No barriers faced	38	28.2
Others	7	5.2

Conclusion

North Shewa is one of the zones in Ethiopia that has a high potential for expanding small ruminants fattening and thereby to enhance income generation. Findings from this baseline assessment show that while several men and women are interested to starting their own sheep fattening business, only a quarter of them are currently engaged in the sector. There are also considerable variations in sheep fattening practices based on socio-demographic characteristics. Compared to educated people, uneducated youth and women are less interested in participating in this self-employment activity. Similarly, the proportion of women who practice sheep fattening is lower than that of males.

The study shows that there is a good understanding of rearing sheep healthily by quarantining, deworming and vaccinating newly purchased sheep. However, there is limited knowledge to identify different types of feeds and nutrient requirements of animals for maintenance, growth, production, and reproduction. Study participants have an overall positive attitude towards castration of rams and the use of feed and water troughs for feeding and watering. Study

participants indicated that they would like technical assistance in ram selection for fattening and preparation of balanced feed rations for fattening.

It is reported that other people's negative attitudes, lack of knowledge on feeding for sheep fattening and limited business management skills are the main obstacles preventing sheep fattening activities in North Shewa. Therefore, it is important to provide training and mentorship to fill knowledge and skills gaps. In this regard, additional technical support is required for uneducated or minimally educated youth so that to enhance their participation. Women-only groups may provide a safe pathway for women who are mostly uneducated, have limited knowledge and have overwhelming lower self-esteem. Mentoring and motivation may address issues of skills and knowledge gaps and attention currently given to negative attitude from other people. This may be countered by introducing champion farmers to support individual sheep fattening groups.

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