Original Research

EAST AFRICAN JOURNAL OF PASTORALISM
Volume 4 Issue 2

Introduction and Capacity Building on an Innovative and Improved Small Scale Concentrated Feed for Sheep Fattening in Marsin Woreda, Somali Regional State, Ethiopia.

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ABSTRACT

Feed and water scarcity in quality and quantity is among noted production constraints along the value chain. Feed production covers requirements only in exceptional good years; the deficit reaching 35% in normal years and 70% in bad years (FAO, 2015), the technologies and knowledge generated so far have been confined to on-station experimentation and lacked participatory evaluation to facilitate technology or knowledge transfer in this Garwan kebele,Marsin woreda and the aim of the project was to introduce sheep fattening technologies for yearling breeds of black head Somali Sheep to attain the required market weight of 30kg and to capacitate the community about the shoat fattening technologies by practical training. The study was 10 sheep per pastoralists and a total of one hundred sheep's included in this study, then randomly assigned to two treatments by drawing lot: control and finishing group and The formulation of the feed for the experiment for sheep was Wheat bran (49.5%), Noug cake (49.5%) and common salt (1%). The responses of sheep to the feed supplementation that the average initial body weight was 15.01 while the average final body weight was 24.18 and the average total weight was 8.17 for sheep's fattening performance. Average daily weight gains was 75.40 g/d and there was no significant difference (P>0.05) in final body weight and total weight gain between the entire agro-pastoralist.

Key Words: Feed, Fattening, Sheep, Wheat bran, Noug cake, Marsin, Garwan

1. Introduction

Feed and water scarcity in quality and quantity is among noted production constraints along the value chain. The estimated numbers of sheep and goats in Ethiopia is about 29.33 and 29.11 million, respectively (CSA, 2015). In Ethiopia, livestock fattening practices by farmers mostly lay on the natural pasture (Zeleke and Getachew, 2017). Traditional fattening practices might not take in to account the nutrient requirement of animals, the level of feeding being either above or below the animal requirements. In such conditions, livestock production mainly depends on increase of animal numbers rather than productivity per animals. Production increment through increase of sheep numbers only may not meet the meat demand of growing population (Shapiro et al., 2015). The productivity of animals could be increased through improving daily body weight gain of the animals. Animal fattening is an opportunity for employment and is a means of income generation for the poor, especially the landless and widowed women (Worku et al., 2016). Rams fattening is an efficient income-generating option for small-scale farmers and is a source of family employment. Ethiopian female exhibited better skills in sheep husbandry compared to male household (Kiflay, 2016).

However, they are unable to realize substantial benefits due to their low level of business experience, access to technology and participation in local markets. The market supply of sheep & goat originates in small numbers from highly dispersed small producers that supply non-homogenous animals to local markets. Presently, due to the low productivity of the animals and the absence of market-oriented production systems, the volume of marketed surplus is very low. Because of poor link of producers and other actors in the chain to the critical support services, live animals supplied to the market by pastoralist and farmers do not meet the quality attributes required by diverse market actors. The export market obviously demands sheep that weigh up to 25 to 30 kg at yearling age while most indigenous shoat breeds are commonly slaughtered at around yearling age when their body weights are 18-20 kg **(IAR, 1991)**. Moreover, abattoirs' report indicated that the market has been constrained by lack of consistent and uniform supply of the required weight at younger age.

Feed and water scarcity in quality and quantity is among noted production constraints along the value chain. Feed

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Article Information:
Article Received for review: 20 March 2023
Article Reviewed: 15 May 2023
Revised Comments: 20 July 2023
Accepted for publication: 20 October 2023 Available Online: 31 December 2023
How to Cite this Article:
Muktar M H (2023): Introduction and Capacity Building on an Innovative and Improved Small Scale Concentrated Feed for Sheep Fattening in Marsin Woreda, Somali Regional State, Ethiopia. East African Journal of Pastoralism, 4(2):31-35.

production covers requirements only in exceptional good years; the deficit reaching 35% in normal years and 70% in bad years (FAO, 2015). Therefore, developing feeding packages that support the existing traditional production and the emerging private producers and exporter is the timely intervention for increased production and productivity to meet the demand for meat and live animal export market.To improve this scenario, various research activities have been undertaken in different parts of the country. Various attempts have been made during the last couples of decades to develop technology and generate information to avert these problems and improve production and productivity.

Much of the technologies and knowledge generated so far have been confined to on-station experimentation and lacked participatory evaluation to facilitate technology or knowledge transfer in this Garwan kebele, Marsin woreda . The result of recent study on evaluation of feeding options on indigenous blackhead Somali Sheep and goat to attain export market weight indicated that strategic supplementation with agro-industrial by products mainly a supplementary ration made of 50% Noug cake and 50% wheat bran for sheep and 75% Noug cake and 25% wheat bran for goat was found to be the most economical way of attaining the highest weight gains of 30kg in 120 days' time and also the result indicated breeds have a better potential to attain export market weight at an earlier age. Therefore, this project is aimed to introduce and capacitate of those outsmarted improved sheep fattening technology in Garwan kebele, Marsin woreda with the following objective:-

- To introduce sheep fattening technologies for yearling breeds of black head Somali Sheep to attain the required market weight of 30kg and to capacitate the community about the sheep fattening technologies by practical training.
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2. Materials and Methods

This introduction and capacity building activity was conducted on the pastoralists in Garwan kebele,Marsin District,Somali Region during April 2022 up to April 2023 who are pastoral and is a community that their livelihoods directly depends on the livestock rearing, on the other hands they rely on the rainfall as the rainfall in this kebele is not reliable even during the rainy seasons. Furthermore, prolonged recurrent droughts is common in this area. This introduction and capacity building activity were conducted on the pastoralists in Garwan kebele, Marsin District, where when it occurs community loses many more livestock.The dominant livestock species are camel, goat and sheep (shoats). Cattle and shoats are more important in the area since wealth is determined by livestock holdings, particularly camel and shoat's ownership. With all this potential and opportunities in the Zone, there is no admirable livestock production output. Therefore, by transferring economically feasible sheep fattening technology to this area can bring the bigger impact to the livelihood of the community and it also encourages fattened livestock legal border trade.

Table 1: Participants of the day

Sl No	No of PAPREG and non PAPREG members participated the field day	Male	Female	Total
1	PAPREG members	4	6	10
2	Other agro pastoralist	5	5	10
3	DAs and experts	4	2	2
4	Woreda and kebele administrators	10	2	12
	Total			**34**

2.1. Implementation process

This study is designed to evaluate concentrate based sheep fattening technology to attain market weight demand at on-farm level through participatory approach. Then one PAPREG was formed/selected based on interest, willingness to accept technology and become model for pastoralists in the study area. After that The selected pastoralists were randomly assigned to two treatments by drawing lot: control and finishing group. The pastoralists were asked to bring their selected sheep to Garwan kebelle that is 10 sheep per pastoralists and a total of one hundred sheep included in this study. On the first day of the arrival to kebelle the sheep were treated against internal and external parasites.The formulation of the feed for the experiment for sheep was Wheat bran (49.5%), Noug cake (49.5%) and common salt (1%). Feed were introduced gradually to experimental animals with increment within ten days' period. Sheep in the finishing group were provided a supplementary for a period of 120 days while the control groups were maintained only on grazing. During the experimental period's, all the animals were allowed to graze freely for a day and the supplementation given at the evening. At the beginning and end of the experiment price were estimated by forming a panel of three local live sheep dealers and the average estimate were used for the economic analysis. Live weight of the animals was measured at ten days' interval after overnight fasting and mean daily live weight gain were calculated by regressing live weight on days of feeding. General linear mode of SAS system (SAS and Inc, 2002) used for analysis of the data collected.

2.2. Field day and visit

After when the PAPREG members fattened their sheep with concentrated, field day and visit were arranged at Elele kebele PAPREG members, neighbor farmers, DAs and experts from livestock office to know and understand. (Table 1). The concentrated feed preparation, management and the advantages and disadvantages of the technologies as shown the table 1 below

3. Results and Discussion

3.1. Training and Awareness Creation

Training was the main approach employed to create awareness about the technological options being demonstrated among the pastoralists in order to capacitate the pastoralist beneficiaries, Development Agents(Das) and the

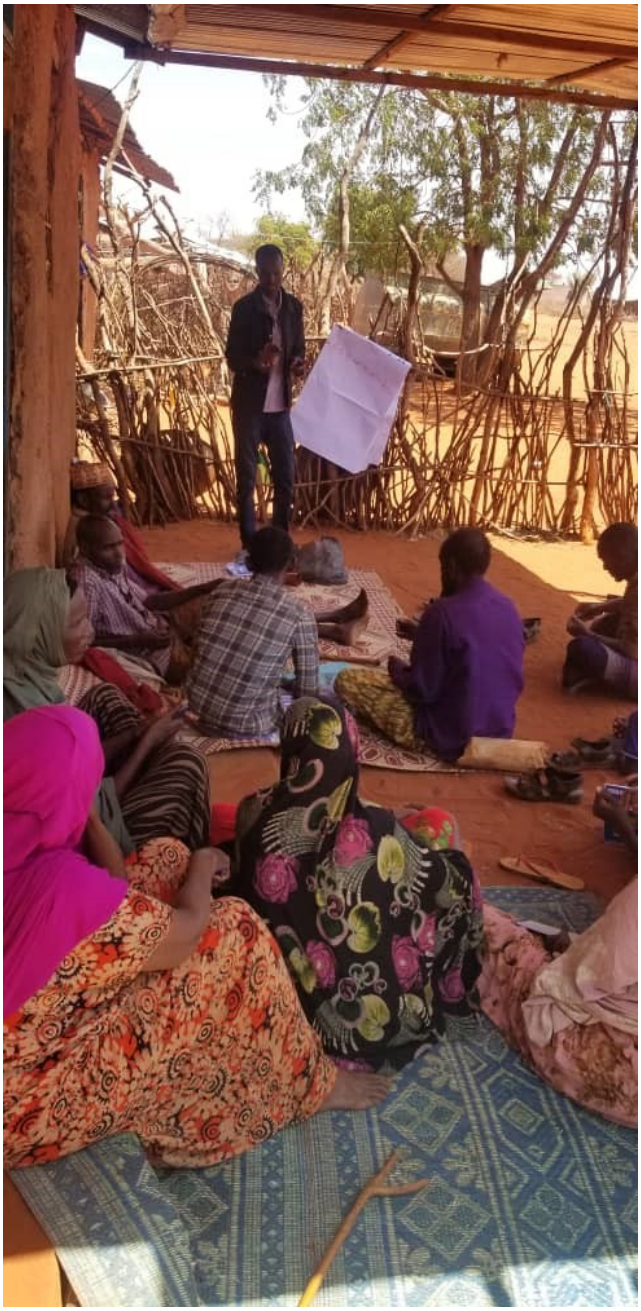

Figure 1: Awareness creation training about technology options.

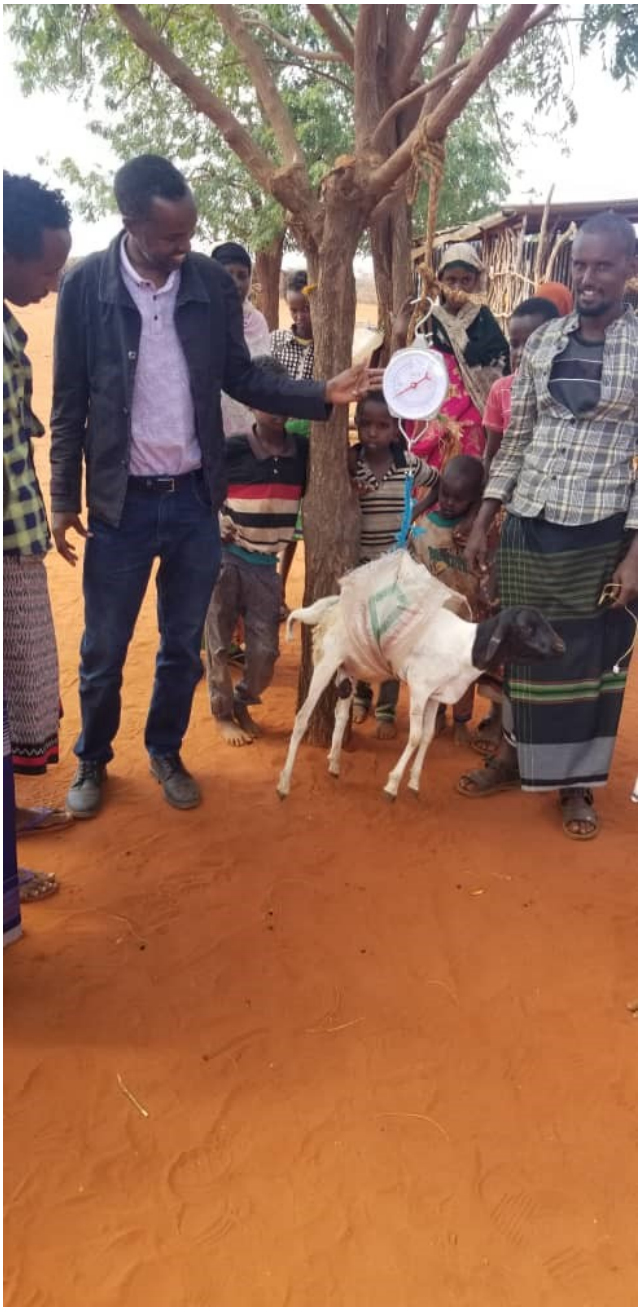

Figure 2: Capacity building training

district livestock bureau experts' knowledge and skill. A multi-disciplinary team constituting of animal production and extension researchers from Jigjiga University jointly carried out the training and capacity building activities (Fig 1&2)

3.2. Effect of supplement intake

Average daily supplement were adjusted according to ten days' interval body weight gain of the animals in the entire group. This indicate that the animals consumed the same in the entire group and there was no significant difference (P>0.05) in supplement intake. The supplement was given to the animals based on the recommendation and on average 0.6 kg/head/day were given for all experimental animals.

3.3. Reponses of the sheep to the feed supplementation

The responses of sheep to the feed supplementation in all pastoralist were indicated in table 1. All the sheep's performed better in all the groups. The average initial body weight was 15.01 while the average final body weight was 24.18 and the average total weight were 8.17 for sheep's fattening performance. (Table 2).Average daily weight gains

Table 2: LSM ± SE of sheep fattening performance

Variables	Mean ± SE
IBW (kg)	15.01 ± 1.34
FBW (kg)	24.18 ± 1.86
TWG (kg)	8. 17 ± 2.60
ADG (gm)	75.40 ± 2.11

Table 3: Partial cost analysis for goat fattening supplemented with noug cake and wheat bran

Parameters	Supplemented(ETB)	Non-supplemented (ETB)
Average selling price	4868.6	2260.2
Total feed cost(ETB)	2160	-
Total variable cost(TVC	3210.4	-
Total return(TR)	3818.2	1235.4
Net income(NI)	607.8	210.6
MRR	0.16	-

ETB = Ethiopian birr; NI = change in net income; TR = change in total return; TVC = change in total variable cost; MRR = marginal rate of return.

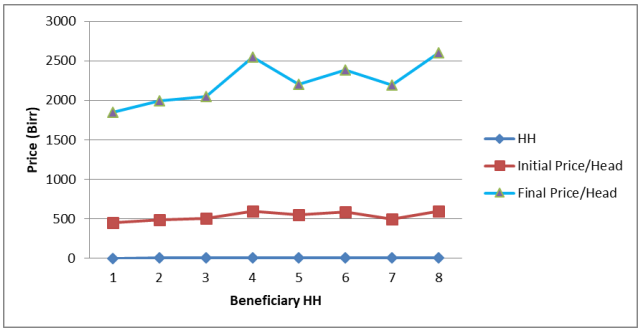

Figure 3: Economic Returns after Selling Fattened Sheep

were 75.40 g/d and there was no significant difference (P>0.05) in final body weight and total weight gain between the entire agro-pastoralist.(Table 2)

3.4. Pastoralists' focus group discussions on feeding technologies

One Focus Group Discussion constituting of 10 pastoralists have been done at Garwan kebelle and thorough discussions have been made regarding how they made use of the feeding technology and the role the technology had on improving their livelihoods.

According to them the average initial prices for goat fettering supplemented with noug cake and wheat bran were 1050.4(Supplemented) and 1024.8(Non Supplemented) , Total feed cost (ETB) was 2160(Supplemented) and Total variable cost(TVC) was 3210.4 ETB . Therefore , net income became 607.8 ETB after supplement and few 210.6 ETB while Non Supplemented.(Table 3)

The feeding technology also had an economical and or livelihood improvement as the net returns obtained from sales of the fattened sheep's was high as compared to their previous ones(Fig 3)

Table 4: Perceptions of the PAPREG members towards the feeding technologies

Advantages of the feed Technology	PAPREG members (10)	Non PAPREGmembers(24)	Over all(34)
Income profitability	6(60%)	10(41.66%)	16(47.05%)
Higher weight gain of the animals	2(20%)	8(3.33%)	10(29.41%)
Shortening of the fattening period	2(20%)	6(25%)	8(23.52%)
Disadvantages of the feed technology			
High cost	6(60%)	11(45.83%)	17(50%)
Shortage of inputs	3(30%)	9(37.5%)	12(35.29%)
Low awareness and skill of the members	1(10%)	4(16.66%)	5(14.7%)

The pastoralist said that they used to face challenges as they tried practicing fattening or finishing small ruminant for sale due to feed scarcities in their locality and their limited knowledge and skills towards utilization of improved feeds and feeding management also hampered their fattening practices. In terms of the advantages they obtained from adopting the feeding technological options, the pastoralist said that apart from the knowledge and skill improvement . Perceptions of the PAPREG members towards the feeding technologies shown that income profitability has advantage , around 6(60%) out of 10 PAPREG members have this perception, at another side ,out of 24 Non member around 10(41.66%) have this perception of income profitability. Disadvantage side, it is shown that feed technology have high cost , 6(60%) out of 10 of members PAPREG have this perceptions, 11(45.83%) ,out of 24 Non members also have this perceptions.(Table 4). Thus it shows definitely income growth take place in the study area after having feed technology besides other factors as shown in (Table 4)

4. Conclusion and Recommendations

The sheep fattening system in the region is traditional. There appears to be almost no production and management technology packages for fattening sheep in the region. The scattered pieces of research activities conducted by research institutions lack practicability and don't relate to the reality on the ground and they fail to address the multifaceted constraints that the sheep fattening system is facing. The beneficiaries of the PAPREGs project gained adequate knowledge and skill theoretically and practically through concentrated feed preparation and feeding, the main lesson drawn the beneficiaries from the project was that in improving the sheep productivity through concentrated feed had motivated other pastoralists in the vicinity. To make the sheep fattening system productive and sustainable, interventions in terms of research, policy and implementation are needed. This should begin with identifying the priority areas and identifying the actions that need to be undertaken. Therefore, it is recommended that this technological option for fast weight gaining be expanded to other agro-pastoralists in the study area and other comparable agro-ecologies and/or production

systems in the region. Furthermore, carrying out additional scaling-up efforts for the technology would enhance private investors to see the region's potential options. The evaluation of the technologies through participatory approach is an other means of technology promotion to large numbers of technologies beneficiaries in areas where there is a need to popularize the technologies.

Conflict of Interest

The author declares that there is no conflict of interests involve in publishing this research paper.

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