

Sheep Fattening as a Business and its Associated Challenges in the Tamale Metropolis, Ghana

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ABSTRACT

The study was carried out in the Tamale metropolis to assess sheep fattening as a business and its associated challenges. Fifty (50) farmers were selected randomly, and a questionnaire was administered to them. Data were analyzed using SPSS. The study revealed that most (90%) of sheep fatteners in the metropolis were males. It also showed that the majority (75%) had at least primary education and (24.7%) had no formal education. Majority (40%) of the farmers were within the age group 21-30 with the age group 51-60 years being the least. Most (80%) of the fatteners self-finance the business. Most of them fatten both sexes (90%) of animals and the majority (66%) buy mature animals for fattening. Most (73.5%) of the respondents fatten sheep for income generation, with other reasons being food security, prestige, and employment. The challenges they face in the industry include feed and water scarcity, diseases and mortality, theft/loss of animals and accidents. The price of sheep at sale was determined by bargaining through visual estimation of size and condition scoring. Most of them sell their fattened sheep at home. It was therefore concluded that sheep fattening in the Tamale metropolis small-scale business. Farmers should be educated on general management and husbandry practices to help reduce production losses.

Key words: *fattening practices, income, feedlots, sheep, own flock.*

INTRODUCTION

One of the important components of Ghana's agriculture is the livestock sector, including poultry, which plays a multifaceted role in providing livelihood support to the rural population (MoFA, 2016). The main contribution of the livestock sector to the national economy is food and nutritional security as it provides animal protein to enhance the nutritional status of the human population. It provides employment opportunities to a large part of the population, particularly in the rural areas. It provides prospects for wealth creation, income enhancement, coping mechanism against crop failure, financial

security and improvement in rural livelihoods (MoFA, 2008; 2016). The major livestock species kept in Ghana include cattle, sheep, goats, pigs, poultry, grasscutter, rabbit and guinea pigs (MOFA, 2016).

The common sheep breeds in Ghana are the West African Dwarf sheep (Djallonke), the Sahelian and the crossbred of these two breeds. The Djallonke constitute the most predominant breed (Baffour-Awuah *et al.*, 2007; MOFA, 2016; Fuseini, 2021).

The production of sheep helps to meet cultural obligations example in the north

chiefs sit on skin. Others use skin for religious prayers and sacrifices. Animal droppings can be used to fertilize soil and fish pond. It can also be used to produce bio-gas for domestic use. The bones and blood can be used to prepare meal to feed other animals. Their meat is readily acceptable by people of different cultural and social backgrounds (Opong-Anane, 2013). Their production does not require expensive building and equipment (Ibrahim *et al.*, 1998).

Despite their importance, there are constraints to sheep production. Among these constraints are scarcity of feed, slow growth rate, high mortality due to deficiency of nutrients and gastrointestinal parasites. These have been recognized as the most important constraints (Adams and Ohene-Yankyera, 2014), together with poor management of nutrition, health and breeding (Opong-Anane, 2012). Sustenance for livestock (cattle and small ruminants) is almost entirely dependent on grazing of natural pastures and rangelands within the Savannah woodlands, unimproved pastures and bush fallow, with extreme seasonal variation in quantity and quality (Opong-Anane, 2012). These limitations prevent full exploitation of the sheep industry to meet the growing demand for animal protein in the country. Shapiro *et al.* (1993) suggested that appropriate feed packages will make sheep fattening an economically viable system.

Large quantities of meat, meat and dairy products are imported each year to partially meet the demand and supply of animal protein from local sources (MoFA-SRID, 2014).

Fattening is therefore one of the key areas that needs much attention to increase the output per individual animal without necessarily increasing only their numbers. Supplementary feeds in the form of crop residues and cut-fodder (leaves from browse trees and shrubs) are provided to ruminant livestock particularly during the dry season. Where opportunities of sales

during festivities arise, ruminant livestock are fattened with additional feed inputs such as wheat, maize and rice bran. The bulk of the feed in the extensive production systems lacks adequate nutrients for satisfactory productivity (Opong -Anane, 2012). Supplemental feeding is therefore critical in these systems (Opong -Anane, 2012).

Fattening is the intensive feeding of highly nutritious feed to promote fast growth and fat deposition to achieve desired carcass quality (Alemu, 2007). This targets the local markets that have high demand for fat animals. Such systems can be applied to sheep as they can easily adapt to an intensive system of production under feed lots (Pasha, 2006). This could be an economically viable strategy compared to systems where animals are kept for a long period of time with consequent cyclic changes in weight gain and weight loss. Sheep fattening has been recognized as a potential profitable activity that promote the income of small holder farmers (Shapiro *et al.*, 1993; Pasha, 2006).

The price of fattened sheep depends on so many factors including body condition, castration, age, colour, health and weight. Even though the northern Ghana has the potentials in sheep production, there is no compiled data and reliable information on sheep fattening and marketing systems practiced. Therefore, this study was aimed to assess sheep fattening as a business, its associated challenges and marketing systems in the Tamale metropolis.

MATERIALS AND METHODS

Study Location

The study was conducted in the Tamale metropolis. It is the administrative capital of the Northern Region. Tamale features a tropical wet and dry climate under the Koppen's Climate Classification. The metropolis experiences one rainy season from April to September or October, with a peak in July and August. The dry season is usually from November to early April. The mean day time temperature ranges

from 28°C to 43°C. Geographically, the metropolis lies between latitudes 9°16 and 9°34 North and longitudes 0°36 and 0°57 West (SARI, 2015). The Tamale metropolis population is 672,000, a 4.67% increase from 2020, (Ghana Statistical Service, 2021).

Sampling Procedure and Sample Size

Both purposive and simple random sampling was used in getting respondents for the study. Ten (10) communities in the Tamale Metropolis were used for the study. The communities surveyed were Kuku, Jakarayili, Changli, Dagbandabi Fong, Kobilmahagu, Vittin, Lamashegu, Kalariga, Kakpayili and Gbewaa. These areas were chosen purposively based on a preliminary survey that revealed the presence of fatteners in those areas and ease of accessibility. Questionnaire was used to collect information from fifty (50) sheep fatteners. Visual observations were also used as one of the primary tools for obtaining data. In each community five (5) respondents were selected randomly from the identified sheep farmers (fatteners) to answer the questionnaires.

Data Collection

Data was collected from both primary and secondary sources. The questionnaire contained both closed and open-ended questions. The primary data were collected from the administration of semi-structured questionnaires. Secondary data was obtained from relevant text books, journals and theses.

Data Analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 (IBM SPSS, 2011). Data were subjected to non-parametric test of Chi-Square, descriptive was chosen under the option, and asymptotic only was selected under the exact option, to determine the distribution of the qualitative traits.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of Respondents

From the survey, it was found that most (90%) of the respondents were males, an indication that sheep fattening in the metropolis is a male-dominated activity (Table 1). Chi-square test ($X^2 = 19.20$, $P < 0.00$) revealed a significant difference between the gender of sheep fatteners in the Tamale Metropolis. It has been reported (Assefa and Ayza, 2020) that males dominate sheep fattening in Ethiopia. The finding confirms reports by Braimah (2021) in Sagnarigu District, Fuseini (2021) in Tolon District, and Adams and Ohene-Yankyera (2014) that ruminants are reared mostly by men in the northern region of Ghana. The small number (10%) recorded for women sheep fatteners in this study could be attributed to their male partners still expressing ownership over their farm animals hence preventing them from engaging in the sheep fattening business fully. Another reason may be attributed to societal customs and norms in sub-Saharan African countries, where males control household productive assets (O'Sullivan, 2017). The greater proportion of male sheep farmers (fatteners) is very crucial for easy and fast technological adoption and transfer since men are mostly the decision-makers in most African societies (Dariba *et al.*, 2021; Turkson and Naandam, 2006). Similar results have been reported across sub-Saharan African countries (Turkson and Naandam, 2006; Baah *et al.*, 2012; Oyesola and Ademolaa, 2012). In contrast, Fakoya and Oloruntoba (2009) reported a high female participation in small ruminant farming in Osun-state, Nigeria. All (100%) of the respondents were Muslims. This was probably due to the Muslim dominance in the Northern region capital (Ghana Statistical Service, 2010; 2021).

The study also revealed that majority (40%) of the sheep fatteners in Tamale Metropolis were within the age group of

21-30 years, followed by age range of 15 – 20 (32%) years, with the age group 51-60 years being the least (8.0%). Chi-square test ($X^2 = 12.00$, $P=0.017$) showed a significant difference between the age groups of sheep fatteners. Approximately 82% of sheep-fattening farmers in the Metropolis fell within the active labour force (Table 1). This trend is good for the future improvement of sheep fattening

business in the Metropolis. Similar findings have been reported for sheep fatteners in Ethiopia (Assefa and Ayza, 2020). This finding agrees with Nuhu (2004), Boo (2009) and Abdulai *et al.* (2021) who reported that majority of livestock farmers are youth. This may be attributed to the fact that the sheep-fattening business has been seen by the youth as a lucrative and profitable venture.

Table 1: Demographic Characteristics of Respondents

Parameter		Frequency	Percentage (%)	Chi-square	P - Value
Sex	Male	45	90	19.20	<0.001
	Female	5	10		
Age group (yrs)	15-20	16	32	12.00	0.017
	21-30	20	40		
	31-40	5	10		
	41-50	5	10		
	51-60	4	8		
Educational Level	Middle Sch/JHS	5	10	10.00	0.017
	SHS	25	50		
	Tertiary	9	18		
	No formal Edu.	11	22		
Sheep fattening as minor occupation	Yes	35	70	4.481	0.034
	No	15	30		
Major occupation	Formal service	5	10	8.09	0.088
	Crop farming	11	22		
	Trading or business	16	32		
	Specialized skill work	18	36		
Source of finance for fattening	Self/Individual	40	80	49.20	<0.001
	Formal loans	2	4.0		
	Family	6	12		
	Inheritance	2	4.0		
Fattening experience (years)	Less than 5	3	6.0	32.90	<0.001
	5 - 10	30	60		
	11 - 15	13	26		
	16 - 20	2	4.0		
	Above 20	2	4.0		

This finding, however, disagrees with earlier reports (Abdulai, 2001; Gong, 2005) who observed that livestock farmers are predominantly old. Perhaps fattening operations are not the same as conventional livestock rearing and requires more energetic people (those still in their youth).

Education is relevant if farmers are to access and apply livestock technology appropriately (Paltasingh and Goyar, 2018). The study shows that most of the sheep fatteners are literates, with about

78% of the fatteners having at least primary education and 22% having no formal education. The high level of literacy among the fatteners will promote understanding and use of innovative information and technology in the fattening industry. In contrast, Assefa and Ayza, (2020) reported 56.25% illiteracy for sheep fatteners in Ethiopia. This finding again disagrees with that of Adams and Ohene-Yankyera (2014) and Apiiga (2006), who indicated that most ruminant farmers in Ghana are illiterates. Fattening operations may be quite different from the

kind of ruminant farmers these authors (Adams and Ohene-Yankyera, 2014; Apiiga, 2006) studied, which may account for the difference. The results from this study, however, is consistent with Esenu (2005) who reported that approximately 75% of livestock farmers had attained at least primary level education with 24.7% reported to have had no formal education. Seventy percent (70.0%) of the respondents have their main occupation and hence use sheep fattening as secondary occupation. There was no significant difference among the main occupations of respondents. However, numerically higher percentage (36%) of the respondents were engaged in skilled work (carpentry, masonry, mechanics, tailors) as their main occupation, followed by trading or business (32%) and the least (10%) being those in the formal services (teaching, nursing, lecturing etc.). In contrast, Assefa and Ayza (2020) reported that in terms of occupation, almost all of the sheep fatteners in Ethiopia (98.75%) were predominantly engaged in subsistence farming and produce cereal crops such as maize, and sorghum, etc. for their house consumption. This may explain

why most of them (80%) are able to self-finance their sheep fattening businesses since they have income generation sources. The chi-square test ($X^2 = 49.20$, $P < 0.001$) showed a significant difference between the sources of funds for sheep fattening in the Metropolis. An appreciable proportion (30%) of the respondents depends on sheep fattening as their main occupation (Table 1). This suggests that the business could be adopted by policy makers and organizations working on poverty reduction in Ghana to reduce poverty among the populace including women.

Chi-square test ($X^2 = 32.90$, $P < 0.001$) showed a significant difference between the sheep fattening experience among the farmers involved in the study. More than half (60%) of the fatteners had between 5 – 10 years' experience in the sheep fattening business (Table 1). This trend is a sign that the business might be good and profitable. It also suggests that sheep fattening experience is available to tap for new entrants if the business is to be used to target poverty reduction.

Table 2. Reasons for fattening sheep

Parameter	Frequency	Percentage (%)	Chi-square	P - Value
Reasons for fattening sheep (N = 49)				
Income generation	36	73.5	70.80	<0.001
Food security	2	4.1		
Prestige	2	4.1		
Employment	7	14.2		
Any other reason (cultural and religious)	2	4.1		

Reasons for Fattening Sheep

Table 2 shows the main reasons given by farmers for fattening sheep. More than half of the fatteners (73.5%) interviewed gave income generation as the foremost reason for fattening sheep. This confirms earlier reports that sheep fattening is a potential profitable activity that promotes the income of small holder farmers (Shapiro *et*

al., 1993; Pasha, 2006). Other reasons for fattening sheep include food security, prestige, employment and for other reasons (cultural and religious) (Table 4). The findings agree with Diriba *et al.* (2021) who reported that small ruminant farmers fatten animals purposely for income generation. It also confirms the findings of Adams and Ohene-Yankyera

(2014) who reported that ruminants are reared mainly for income generation. About 70% of fatteners use sheep fattening as a secondary occupation with only 30% using the fattening as their major occupation. This observation supports what has been reported in other parts of Africa (Tsedeke, 2007; Solomon *et al.*, 2010; Nurlign, 2020). According to Animut and Wamatu (2014), the primary reason for fattening sheep is the perceived profitability of the business which is acknowledged by fatteners, National Research Centers, Bureaus of Agriculture and Livestock Resource Development Promotion Agencies.

Criterion for selecting sheep for fattening

Chi-square test ($X^2 = 43.40$, $P < 0.001$) showed a significant difference between the sex of sheep used for fattening (Table 3). Though rams are preferably used for the fattening business, most of the respondents (90%) fatten both rams and ewes. This seems to explain why majority of the farmers source their fattening sheep from their own flock. Fatteners indicated that their main targeted source is the rams bred in their flock, but they do not also hesitate to fatten unproductive and spent female sheep. This corroborates report by Animut and Wamatu (2014) and Assefa and Ayza (2020) that rams are mainly used for fattening, though culled females are also fattened (Animut and Wamatu, 2014). Rams are fattened because they grow faster. All respondents stated that they do not castrate their rams for fattening since that violates the qualities required for the selection of rams for sacrifice during the Muslim festival. This suggests that in Muslim-dominated region like the Northern region (GSS, 2021), Muslims are the major customers of the fatteners, since they may need the fattened sheep for religious sacrifices. In contrast, Animut and Wamatu (2014) reported that in many places within Ethiopia, castration of

fattening sheep is practiced with the intention of making the animals docile, grow faster and fatter.

Chi-square test ($X^2 = 8.80$, $P < 0.117$) showed no significant difference between the sheep breeds used for fattening. This suggests that no particular breed is preferred to be used for fattening in the study areas. This confirms what Animut and Wamatu (2014) reported from Ethiopia, that there is no breed preferred countrywide for its superior value in production, quality traits or fattening potential. Even though there was no difference in breeds used, majority (30%) of the respondents do fatten crosses between the Djallonke (local breed) and the Sahel (long leg) probably because of heterosis.

The majority of the respondents (66%) preferred using or buying mature sheep for fattening. This may be to shorten the fattening duration and avoid its consequent production cost, thus increasing profit margin. Similar findings have been reported (Animut and Wamatu, 2014; Assefa and Ayza, 2020). Most respondents across the survey gave preference to one year old sheep for fattening (Animut and Wamatu, 2014). It has been reported from Ethiopia, that Washera, Horro, Bonga, Woliata, and Afar sheep can enter fattening at 3 to 4.5 months of age, immediately after weaning. Cooperative fatteners in Horro Gudru, respondents in Keffa zone, Woliata Zone and peri-urban sheep fatteners in Amibara of Afar Region stated that sheep enter fattening at the age of 4-6 months (Animut and Wamatu, 2014). A large-scale farm at Beke uses sheep of 4 months of age for fattening. There is therefore no standard weight at which a sheep can be fattened. Almost all sheep fatteners stated that they did not have a target weight at which to place sheep for fattening (Animut and Wamatu, 2014).

Table 3: Criterion for selecting sheep for fattening

Parameter	Frequency	Percentage (%)	Chi-square	P - Value
Sex				
Male sheep	5	10	43.40	<0.001
Both male and female sheep	45	90.0		
Breeds				
Djallonke	9	18	8.80	0.117
Sahel	10	20.0		
Crosses	15	30.0		
Mixed pure breeds	3	6		
Mixed pure breeds and crosses	13	26		
Age				
Younger (< 6 months)	17	34	36.2	<0.001
Matured (\geq 6 months)	33	66		

Table 4: Sources of sheep for fattening and other species of animals being fattened with sheep

Parameter	Frequency	Percentage (%)	Chi-square	P - Value
Sources of sheep for fattening (N = 48)				
Own flock	23	47.9	17.03	0.002
Market/bought	10	20.8		
Colleague famers	2	4.2		
Family	5	10.4		
Inheritance	8	16.7		
Other species of animals being fattened alongside sheep (N = 34)				
Cattle	4	11.8	4.88	0.181
Goats	16	47.1		
Pigs	6	17.6		
At least two of these species	8	23.5		

Sources of sheep for fattening and other species being fattened alongside sheep

Table 4 showed that majority of sheep fatteners (47.9%) in the Tamale Metropolis source sheep meant for fattening from their own flock of sheep, followed by purchase from market and the least was from colleague farmers either by exchange or purchase. The chi-square test ($X^2 = 17.03$, $P = 0.002$) showed significant difference between the sources of sheep for fattening (Table 4). This result has revealed that farmers may have noticed increased profit margin by sourcing from their own flocks as compared to other sources, especially the market. This confirms what was observed by Animut and Wamatu (2014).

Even though the chi-square test ($X^2 = 4.88$, $P = 0.181$) did not indicate any significant difference between the other

animal species fattened alongside sheep, majority of the fatteners (47.1%) who stated they fatten other species, also fatten goats (Table 4). The preference for fattening goats alongside sheep may be due to similarities in managing sheep and goats, which may be housed together and even maintained under similar nutritional management. The finding corroborates what other researchers (Assefa and Ayza, 2020; Nurlign, 2020a) have reported. A proportion of the respondents (17.6%) fattening pigs alongside sheep suggests that some Muslims either defy all odds and keep pigs probably for income or those involved do not know that pig keeping is forbidden (haraam) in Islam. Thus, suggesting the likelihood of economic incentives to push people beyond their religious limits. This is because all

respondents were Muslims in the study area.

Challenges of Sheep Fattening

Majority (55%) of the respondents stated that financial constraint limits their capacity to operate well and expand their businesses (Table 5). The constraints enumerated by the sheep fatteners were feed and water scarcity, diseases and mortality, missing of animals/theft and accidents (Table 5). This has the potential

to lower productivity and reduce profit margins of the fatteners. Braimah (2021) reported similar findings that feed is difficult to provide in the Sagnarigu municipality of the northern region of Ghana respectively. Similar challenges have been faced by sheep fatteners in other parts of the world (Tsedeke, 2007; Solomon et al., 2010; Nurlign, 2020a). However, Animut and Wamatu (2014) reported that sheep fatteners in Ethiopia do not face water scarcity challenge in fattening their animals.

Table 5. Challenges involved in sheep fattening.

Parameter	Frequency (N = 50)	Percentage (%)	Chi-square	P - Value
Feed and water scarcity	14	28.6	28.07	<0.001
Disease and mortality	2	4.1		
Stray or missing of animals/theft	5	8.2		
Accidents	2	4.1		
Lack of capital	27	55		

Management Systems

More than ninety percent (90%) of the fatteners use both extensive (grazing with more supplementation) and semi-intensive (grazing with stall feeding) systems of production management (Figure 1). The extensive system here, unlike the free range system, refers to free roaming of the animals freely to graze, couple with provision of more extra feed (supplements) in the morning, afternoon and evening or morning and evening. Here, the animals are not restricted or restrained in any form, but get use to the times the supplementary feed are provided and return on their own. The major reason given for the wide use of these two systems is that they are less

expensive to use. All (100%) farmers stated that it was less expensive to practice either of these systems compare to the intensive system, since their animals get access to varied feed materials (forage and hay) at no or minimal cost. They only need to spend less to supplement the feeding of the animals. This agrees with Adam *et al.* (2014) who indicated that 61.2% of the farmers in the Tamale metropolis used semi-intensive production system in fattening their animals. Different results have been reported by Assefa and Ayza (2020) who found 60% feedlot system and 40% grazing and stall feeding among sheep fatteners.

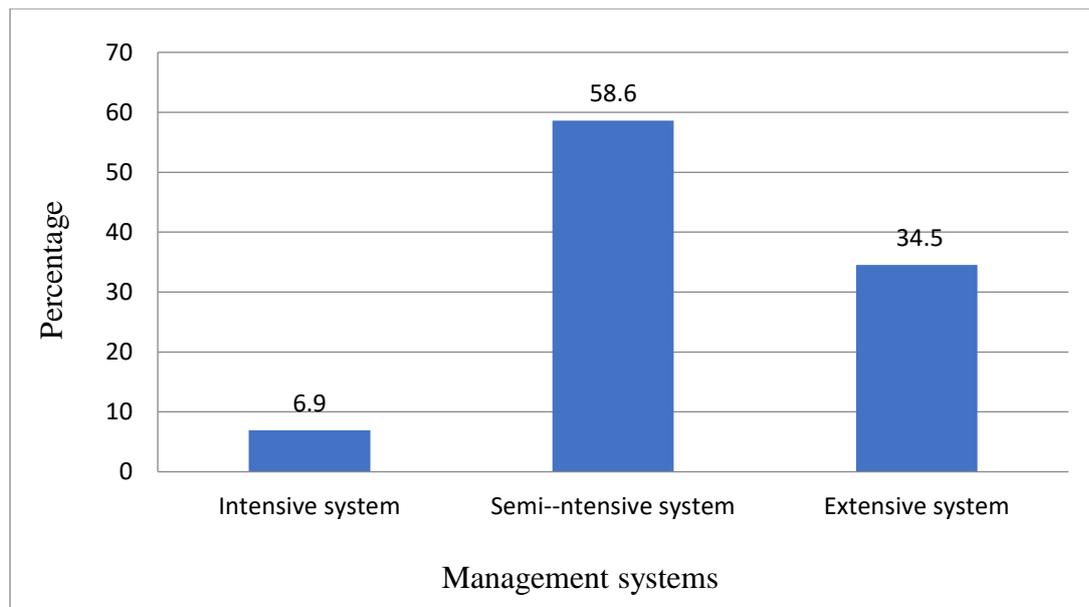


Figure 1. Management/Fattening Systems

Fattening Practices

Feeding and Feed Materials

The results indicated that majority (56.7%) of the respondents provide feed supplements to their animals two times every day, those providing feed *ad libitum* being (23.3%) with minority (6.7%) supplementing once daily (Figure 2). This agrees with Adam (2014) who reported that farmers give feed supplements to their animals. Nurlign (2020a) reported similar frequency of feed supply to fattening sheep in many parts of Africa.

Figure 3 shows that majority (83.3%) of sheep fatteners in the Tamale Metro use grass, legumes, concentrates, kitchen waste, agro and industrial by products, leaves, shrubs and tree branches and varied sort of browse plants alternatively, based on their availability and accessibility to fatten their animals. Ten percent (10%) of the farmers used concentrate only while 6.7% use grasses and legumes only. Many researchers (Tsedeke, 2007; Solomon *et al.*, 2010; Animut and Wamatu, 2014; Estefanose and Tegene, 2015; Nurlign, 2020a) observed similar outcomes in their studies.

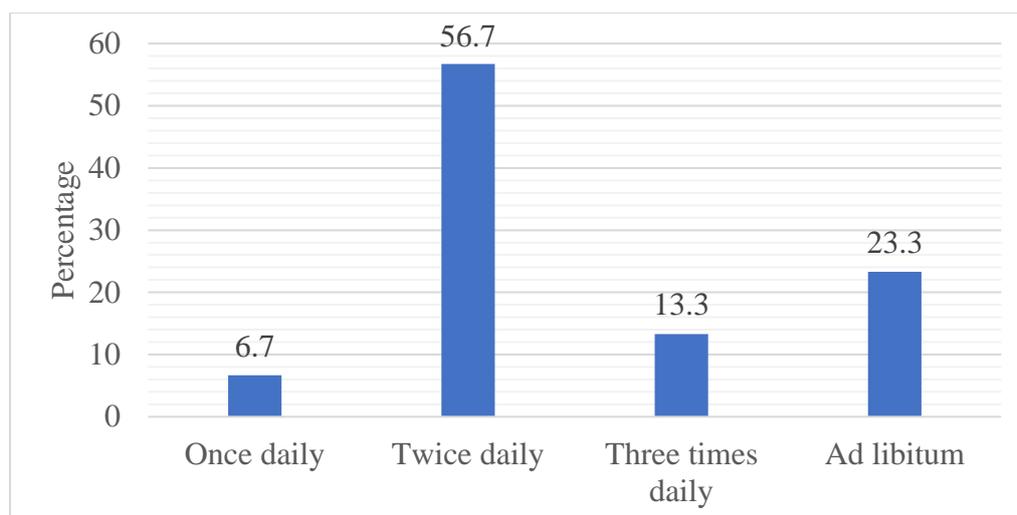


Figure 2. Frequency of Feed Supplementation to Fattening Sheep

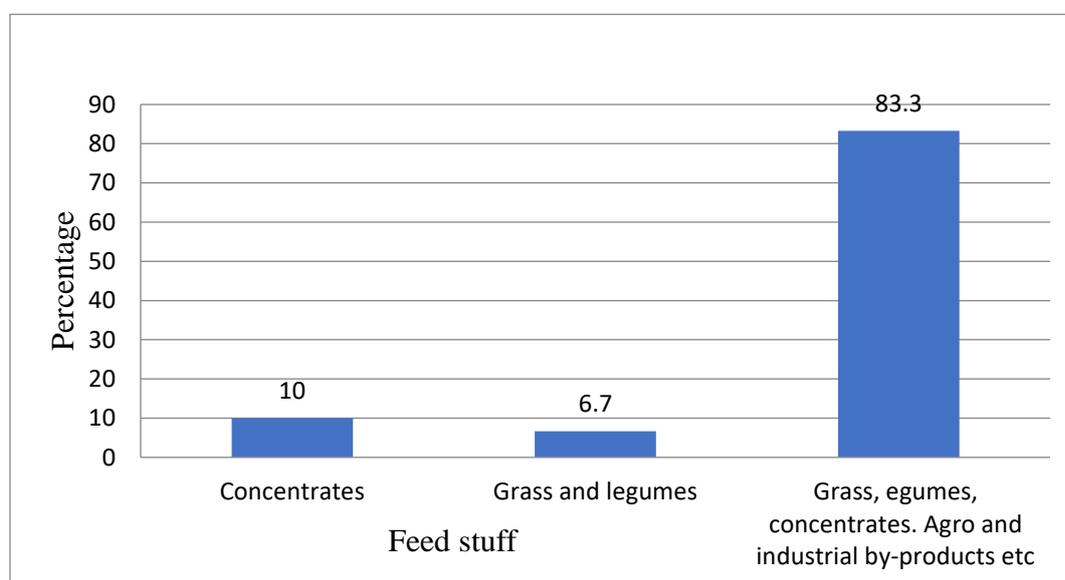


Figure 3. Supplementary Feed Stuffs used for Sheep Fattening.

About 60% of the farmers indicated that they do not provide salt lick for their sheep while 40% of them do provide salt lick. This finding corroborates the work of ESGPIP (2008) who observed that farmers do not provide salt lick for their animals. This may be as a result of ignorance about the importance and/or role of salt lick in the nutrient requirement and subsequent well-being of their animals. Another reason may be lack of funds to purchase some of the key feed ingredients for the formulation. This finding confirms what

Animut and Wamatu (2014) reported among sheep fatteners in Ethiopia.

Water Provision

All the farmers (100%) stated that they supply water to their sheep. This suggests that farmers have recognized the role of water in the growth and health and the general well-being of their animals. This water according to the farmers, are obtained

from various sources in and around the metropolis as indicated in Figure 3 below. Majority (75.9%) of the farmers obtain

water from two or more sources alternatively, depending on the season and availability of water in the sources. This was because some of the sources dry up in dry season. The least source recorded was tap water (10.3%). The results corroborate the report by Animut and Wamatu (2014) that in areas where tap water is available, it serves as a source of water for fattening sheep. Streams, ponds and rivers are other

sources of water (Animut and Wamatu, 2014). In contrast, Animut and Wamatu (2014) found that water for sheep fattening was not mentioned as a major concern in most areas of Ethiopia. These findings however disagree with Adam *et al.* (2014) who reported that farmers do not provide water for their animals in the Tamale metropolis.

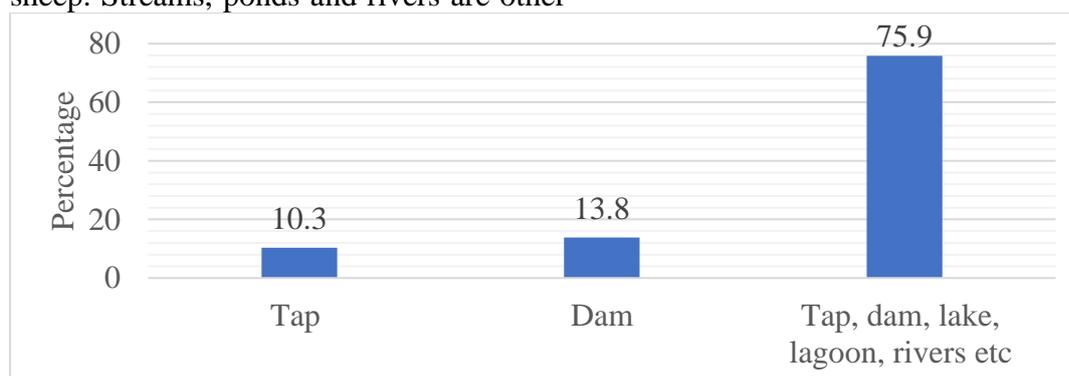


Figure 4. Sources of Water for Sheep Fattening

Identification of Fattening Sheep

Majority (60%) of the fatteners do not use any form of identification to help them easily recognise their animals. This suggests that farmers are either not keeping records or do not take record keeping seriously if they do. This situation could create room for more theft and loss cases in the area. In contrast, Braimah (2021) reported that 63.3% of sheep fatteners practice identification of their animals in Sagnarigu Municipality. The rest of the fatteners (40%) identify their animals by the use of permanent (once kept on the animal, it remains thorough out the life of the animal, e.g tattooing, ear notching), semi-permanent (marks that kept long but for the entire life of the animal, e.g tagging,) or temporal (eventhough they remain for some time, the do not last long

compared to semi-permanent and permanent ones, e.g paint branding, use of henna) identification marks as indicated in Table 6 below. Some of these identification marks have been very useful since immemorial (Ahmad *et al.*, 2022) and new ones are being developed (Birteeb and Alhassan, 2017) to prevent theft and losses in animal production. Majority (41.7%) of those who use identification, use permanent identification marks while the least used was temporal identification (25.0%). This implies that farmers appreciate the durability of permanent identification marks in order to save time and cost of repeatedly renewing temporal identifications. Similar findings have been reported by other researchers in their studies on sheep fattening (Nurlign, 2020b; Braimah, 2021).

Table 6. Types of Identification used in Sheep Fattening

Identification type	Frequency	Percentage (%)
Permanent identification	5	41.7
Semi-permanent identification	4	33.3
Temporal identification	3	25.0
Total	12	100

Medication

Most of the fatteners (86.7%) stated that they provide medication for their sheep while 13.3% of them said they do not pay attention to the health needs of the animals. The type of medication used is either orthodox or ethno- veterinary care as stated by the farmers. Multivitamin drugs were commonly used to facilitate feed intake in order to make animal put more weight. According to the fatteners, even though they treat some diseases themselves, they occasionally call on veterinary officers when the need arises (critical cases). Some of the fatteners vaccinate their animals against Pest de pesticide Ruminant (PPR) somewhere in October to November, and against anthrax from March to April every year. Others however, have no health regime but quick to attend to any animal suspected to be unhealthy. The reason for treating animals mostly without veterinary officers was to reduce cost of medication since the cost of veterinary services was expensive. This indicates that fatteners are keen on the welfare of their animals in order to maximize profit. This confirms other reports (Braithair, 2021) that sheep fatteners pay much attention to the health of the fattening sheep in the Northern region.

Marketing of Fattened Sheep

Majority (53.6%) of sheep fatteners said there is ready market any time they want to sell their fattened sheep, while 46.4% said there no ready market for their animals. For most rural and peri-urban and urban sheep fatteners, the fattening activities are seasonal. This is mainly linked with market demand seasons for fattened sheep and to a lesser extent due to feed availability for fattening (Animut and

Wamatu, 2014). More than half (61.5%) of the farmers said the market is seasonal. The market is ready and good for sales of their sheep during the Islamic festivities, especially Eid ul Adha when rams are needed for sacrifices. About 30.8% stated that there is ready market for their animals during both Islamic and Christian festivities. Only 7.7% said the market is available or ready for their fattened sheep in the raining season when feed is readily available for their animals to put on weight within the shortest possible time. This finding supports results of other studies (Adams *et al.* 2014; Animut and Wamatu, 2014; Braimah, 2021) who stated that fatteners preferred to sell their animals during religious and social occasions because buyers were more inclined to pay higher prices for the animals than during other times of the year.

Most (86.3%) of the sheep fatteners sell their fattened animals to middlemen (butchers) whilst only 3.4% sell to meat processing factories (Figure 5). Meanwhile, majority (60%) of them sell the fattened sheep at their homes/residence, 30% at local markets (e.g Guu Naa Yili, a popular livestock market in the northern regional capital) and 3.3% sell at other places such as roadsides, grazing areas, abattoirs. This could be attributed to lack of consistent regular market which may compel farmers to continue to keep animals at their homes until such a time they could get good price or chance buyers. Similar findings have been reported from many other studies (Adams *et al.*, 2021; Animut and Wamatu, 2014; Addis, 2015; Braimah, 2021) that farmers sell animals at farm gates or local markets are mostly the destination of the animals.

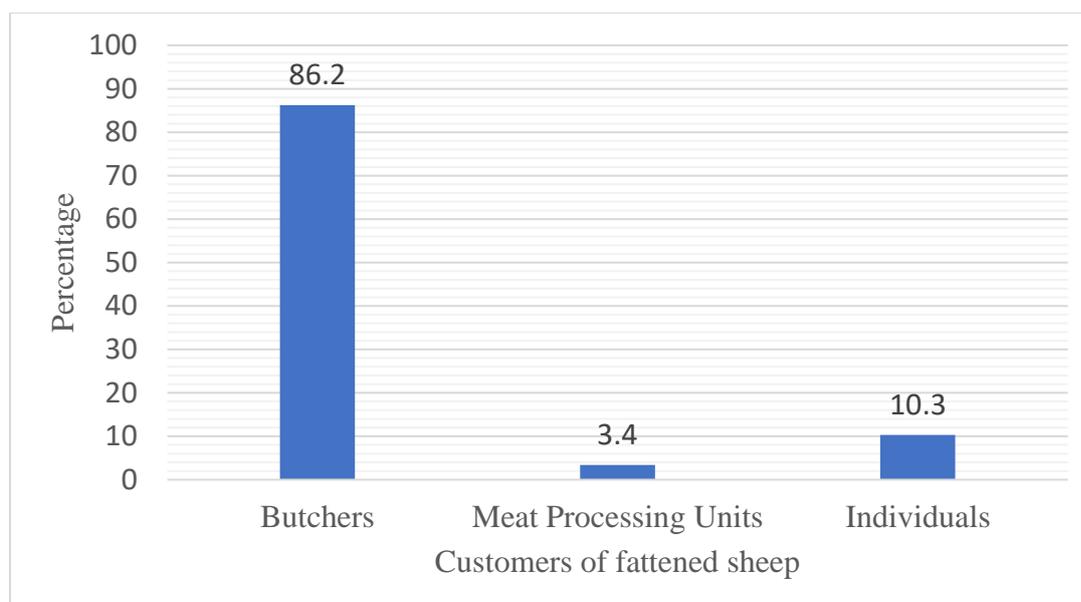


Figure 5. Customers of Fattened Sheep from Producers

The results obtained showed that most (80%) of the farmers determine the price of their fattened sheep by bargaining based on certain factors such as visual assessment of weight, colour, sex, size, signs of disease, breed etc of the animal during sales. Ten percent each of the rest of the respondents determine the price of their animals by weighing, breed, and age of the animal. It was observed that most of the people use visual estimation of size or condition score for purchase and sell of sheep. They believed that visual estimation is the method which saves time and energy and also believe that they will fetch better price through visual estimation than the use of weighing scale. This corroborates the findings of Animut and Wamatu (2014) and Braimah (2021)

Number of sheep fattened per fattening cycle and fattening duration per batch in the Tamale Metropolis

From the total sheep fatteners, 70% of the respondents reported to fatten less than 5 sheep per one cycle, whereas 20% 5-10 sheep per one cycle, and 10% reported to fatten >10 sheep per one cycle in the study area (Table 7). There was significant difference ($X^2 = 13.72$; $P < 0.05$) in number of fattened sheep across the communities in the study area. The greater number of the

respondents fattening less than 5 animals per cycle could be attributed to financial constraints to expand their farms and cater for all their needs. Diriba *et al.* (2021) reported 49.4% for 2-3 sheep per fattening cycle, 37.3% for 4-6 animals per fattening cycle and 13.3 % for greater than 6 sheep per fattening cycle in Ethiopia. According to Duguma *et al.* (2010), farmers on average fatten 3 sheep per fattening period in Fogera district in Ethiopia. Due to major livestock production constraints like in adequate feed supply, inadequate capital, land tenure, diseases, poor market infrastructure, lack of marketing support services and limited market information and etc., sheep fatteners in the study area could not participate in sheep fattening practice to their full potential (Zealelem *et al.*, 2012).

Most of the respondents (74%) fatten a batch within 6-12 months in a fattening cycle and the longest was 1 – 2 years and more than 2 years fattening duration (4% each) (Table 7). This may account for farmers' choice of mature sheep for fattening. Thus, using mature sheep for fattening could reduce the fattening duration thereby increasing their profit margins and avoiding excessive expenses in keeping animals for far too long.

Table 7. Number of sheep fattened per fattening cycle and period used to fatten a batch in the Tamale Metropolis

Parameter	Frequency (N = 50)	Percentage (%)	Chi-square	P - Value
< 5 animals	35	70	13.72	0.033
5 – 10 animals	10	20		
> 10 animals	5	10		
Fattening duration or period used to fatten a batch (N = 50)				
< 6 months	9	18	36.26	<0.001
6 – 12 months	37	74		
1 – 2 years	2	4		
> 2 years	2	4		

CONCLUSION

Sheep fattening is an important business used as secondary occupation in the Tamale Metropolis. The main purpose of sheep fattening in the area is income generation. However, fatteners faced some challenges such as feed and water scarcity, diseases and mortality, accidents as well as theft or loss of animals. This has the tendency of lowering productivity with a resultant reduction in profit margins of the fatteners. No structured or organized marketing system is in place for fattened sheep in the area.

RECOMMENDATIONS

Since the main aim of fattening sheep is to generate income, it is recommended that government and non-governmental organization should help in making sheep fattening appealing to more people especially the youth in order to curb unemployment situations in the country. Education and training of the farmers about management and husbandry practices are also recommended so as to help reduce production losses that occur as a result of poor management and husbandry practices.

REFERENCES

- Abdulai, H. I. (2001). Factors related to women's participation in livestock production in the Savelugu – Nanton and Tolon-Kumbungu Districts of the Northern Region, Ghana. MSc thesis Submitted to the Department of Agriculture Economics and Extension of the school of Agriculture, University of cape coast, Ghana.
- Abdulai, S.G., Alenyorege, B., Yeboah, R.W.N. and Husein, S.M.A (2021). Potentials and Development of the Livestock industry in the Bole District. Proceedings of 1st Joint Ghana Society of Animal production/ Ghana Animal Science Association Conference held at the UDS-ICC, Tamale, 24th-27th August, 2021. 801-817pp.
- Adams, F., and Ohene-Yankyera, K. (2014). Socio-economic characteristics of subsistent small ruminant farmers in three regions of northern Ghana. *Asian Journal of applied science and engineering*, 3(3), 351-364.
- Adams, F., Ohene-yankyera, K., Aido, R. and Wongnaa, C. A. (2021). Economic benefits of livestock management in Ghana. *Agriculture and Food Economics*, 9 (1), 1-17.
- Addis G. (2015). Review on Challenges and Opportunities of Sheep

- Production: Ethiopia. Ethiopia: Department of Animal Production and Extension, Faculty of Veterinary Medicine, University of Gondar; 2015.
- Ahmad, M., Ghazal, T. M. and Aziz, N. (2022). A survey on Animal Identification Techniques Past and Present. *UCIS*, 1 (2) : 17
- Alemu, Y. (2007). Short Term Intensive Fattening of Sheep and Goats for Rapid Improvement in Weight and Condition and also Producer Incomes. ESGPIP Technical Bulletin 11. Addis Ababa: ESGPIP.
- Animut, G. and Wamatu, J. (2014). Prospects to improve the productivity of sheep fattening in Ethiopia: Status, challenges and opportunities. Addis Ababa: ICARDA.
- Apiiga, S. (2006). Ghana: Goats and garlic. *Spore*, 9-9.
- Assefa, A. and Ayza, A. (2020). Assessment of sheep fattening and marketing systems in Duna Woreda, Hadiya zone, Southern Ethiopia. *J Dairy Vet Anim Res.* 2020;9(4):130–135. DOI: 10.15406/jdvar.2020.09.00292
- Baah, J., Tuah, A., Addah, W., and Tait, R. (2012). Small ruminant production characteristics in urban households in Ghana. *Livestock Research for Rural Development.* 24(5).
- Baffour-Awuah, O. Adu, M. O., Gabada, C. and Fynn, K. (2007). Reproductive performance and pre-weaning growth of Djallonke sheep. *Ghanaian Journal of Animal Science* 2&3 (1) 97- 102.
- Birteeb, P. T. and Alhassan, N. (2017). Staining ability of henna (*Lawsonia inermis*) leaf paste as animal identification marker on Djallonke sheep. *Livestock Research for Rural Development*, 29 (10)
- Boo, F. N. (2009). Prospects and constraints of small ruminant production in Talensi-Nabdam District Upper East Region, Ghana. BSc Dissertation, Department of Animal Science, University for Development Studies, Tamale, Ghana.
- Braimah, A. (2021). Assessment Of Sheep Fattening as a Business In The Sagnarigu Municipality In The Northern Region Of Ghana. Diploma Dissertation. Department of Animal Science, UDS, Tamale.
- Diriba, T., Zemene, W., Solomon, D. and Monenus, E. (2021). Assessment of sheep fattening practices under smallholder farmers in Genji district of West Wollega, Western Oromia, Ethiopia. *International Journal of Veterinary Sciences and Animal Husbandry* 2021; 6(4): 18-25.
- Duguma, G., Mirkena, T., Haile, A., Iñiguez, L., Okeyo, A. M., Tibbo, M., Rischkowsky, B., Sölkner, J. and Wurzinger, M. (2010). Participatory approaches to investigate breeding objectives of livestock keepers. *Livestock Research for Rural Development* 2010;22(4):56-62
- Esenu, N. B. (2005). Gender Relations in Livestock production and ownership: implications for household food security in the Teso Farming system (TFS). MSc thesis, school of post Graduate studies, Makerere University.
- ESGPIP (2008). Ethiopia sheep and goat productivity improvement program. 2008.
- Estefanose, T. and Tegene N. (2015). Sheep Production and Marketing System in Southern Ethiopia: the case of Awassa zuria district. *Trop Anim Health Prod.*, 47: 1417-1425. DOI 10.1007/s11250-015-o8521-1. 09-29-2021
- Fakoya, E. O., and Oloruntoba, A. (2009). Socio-economic determinants of small ruminants production among farmers in Osun state, Nigeria. *Journal of Humanities, Social Sciences and Creative Arts*, 4(1), 90-100.

- Fuseini, J. S. (2021). Flock Composition and Structure of Sheep Reared in Tolon District. BSc. Dissertation, Department of Animal Science, University for Development Studies, Tamale.
- Ghana Statistical Service (2021). Ghana 2021 Population and Housing Census. General Report, Volume 3A. Population of Regions and Districts. Ghana Statistical Service. November, 2021.
- Gong, S. A (2005). Sustainable Livestock production in the Northern Region of Ghana: the role of women in the west Gonjo district. BSc dissertation, Department of Animal Science University for Development Studies, Tamale.
- GSS (2010). Population and Housing Census 2010. Ghana Statistical Service. Census Report.
- Ibrahim, H. (1998). Small ruminant production techniques . ILRI, manual. ILRI, (International livestock Research Institute), Nairobi, Kenya. 207 PP.
- MoFA- SRID. (2014). Agriculture in Ghana. Facts and Figures. Statistical Research and Information Directorate, Ministry of Food and Agriculture, Accra, Ghana.
- MoFA. (2008). Ghana's Livestock Growth Trend. Ministry of Food and Agriculture, Accra. Ghana.
- MoFA. (2016). Ghana Livestock Development Policy and Strategy. Ministry of Food and Agriculture, Accra. Ghana
- Nuhu, A. (2004). Sustainable Development of Livestock in the Northern of Ghana - The role of women in the Saboba-Cheriponi District. BSc. Dissertation, Department of Animal Science, University for Development Studies, Tamale.
- Nurlign, M. (2020a). Sheep Fattening, Marketing Systems and Constraints of Ethiopia: A Review. *World Applied Sciences Journal* , 38 (5): 416-421, 2020 ISSN 1818-4952
- Nurlign, M. (2020b). Development and Evaluation of Community Based Breeding Program for Improvement of Indigenous Goat Production in Habru District, North Wollo, Ethiopia. *World Applied Sciences Journal*, 38(5):416-421.
- Opong-Anane, K. (2012). Ghana's Livestock Sector Review. FAO. Accra, Ghana
- Opong-Anane, K. (2013). Review of the livestock/meat and milk value chains and policy influencing them in Ghana. FAO/ECOWAS.
- O'Sullivan, M. 2017. Gender and Property Rights in Sub-Saharan Africa : A Review of Constraints and Effective Interventions. Policy Research Working Paper;No. 8250. World Bank, Washington, DC. © World Bank.
<https://openknowledge.worldbank.org/handle/10986/28911> License: CC BY 3.0 IGO.
- Oyesola, O.B. and Ademola, A.O. (2012). Gender Analysis of Livelihood Status among Dwellers of Ileogbo Community Aiyedire Local Government Area of Osun State, Nigeria. *American Journal of Human Ecology*. Vol. 1, No.1&2. 23-27. (USA). (60%).
- Paltasingh, K.R. and Goyari, P. (2018). Impact of farmer education on farm productivity under varying technologies: case of paddy growers in India. *Agric Econ* **6**, 7 (2018). <https://doi.org/10.1186/s40100-018-0101-9>.
- Pasha, T. (2006). Feedlot fattening of sheep and goats for quality mutton production. Islamabad: *Livestock and Dairy Development Board*.www.iddb.org.pk/forms/SHEEP BOOK.pdf. 09-29-2021.
- SARI (2015). Annual weather report for 2015. Savannah Agriculture Research Institute, Nyankpala, Tolon District, Ghana. 65 pp.

- Shapiro, B.I., Mohamed-Saleem, M.A. and Reynolds, L. (1993). Socio-economic constraints to strategic sheep fattening: evidence from the Ethiopian highlands. In Lebbie, S.H.B., Rey, B. and Irungu, E K. (1994) *Small Ruminant Research and Development in Africa*. Addis Ababa: International Livestock Center for Africa (ILCA).
- Solomon, G., Azage, T., Berhanu, G. and Dirk, H. (2010). *Sheep and Goat Production and Marketing Systems in Ethiopia. Characteristics and Strategies for Improvement*. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 23. ILRI (International Livestock Research Institute), Nairobi, Kenya, pp: 58
- SPSS (2011). *IBM Statistical Package for Social Sciences (IBM SPSS)*. IBM Corp Released 2011 IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.
- Tsedeke K. (2007). *Production and Marketing of Sheep and Goats in Alaba, SNNPR*. MS.c. Thesis, Hawassa University, Awassa, Ethiopia.
- Turkson, P. K. and Naandam, J. (2006). Constraints to ruminant production in East Mamprusi District of Ghana. *Ghana Jnl agric. Sci.* 39, 155-164.
- Zealealem, T., Anal, A. K. and Gebrezgiher, G. (2012). Assessment of the sheep production system of northern Ethiopia in relation to sustainable productivity and Sheep meat quality. *Int. J. Adv. Biol. Res* 2012;2(2):302-313.