

Full Length Research Paper

Smallholder farmers' livestock production and marketing in Bahir Dar Zuria District, Northwestern Ethiopia

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The objective of the study was to assess the livestock production and marketing system in smallholder systems of the area. Two kebeles were selected from Bahir Dr Zuria district based on livestock production experience and accessibility to road. Primary data were collected using semi-structured questionnaire and supplemented with key informants and secondary data sources. The average land holding in the area was 0.73 ha of total land with 0.53 ha cropland and 0.2 ha private grazing land. With regard to labor allocation for livestock, family labor was involved in 91.18% of respondents while in the rest hired labor herded, fed and watered livestock. With regard to water sources, the major source of water for livestock in the households was river (89%) while the remaining respondents use dug well for their livestock. Frequency of watering livestock was twice a day (51%) in dry season and once a day (44.3%) in the wet season. Most of respondents (53.65%) sell their live animals during religious festivities followed by selling during the season of critical feed shortage (24.45%). The perception of household heads indicated that the livestock holding in the last five years of the family increased in most of the respondents (51%), followed by decreased condition (33%) and remained constant for the rest of the respondents (16%). Overall, it is important to assist livestock producer to enable them benefit most from livestock and their products.

Key words: Bahir Dar Zuria, Khatadulis, livestock marketing, livestock production.

INTRODUCTION

Ethiopia is believed to have the largest livestock population in Africa (Central Statistical Agency (CSA), 2016). The livestock sector has been contributing considerable portion to the Ethiopia's economy immensely supporting economic development of the

country. Livestock rearing in Ethiopia not only contribute for economic development but also the livestock products and by-products in the form meat, milk, hides, egg, cheese and butter provide nutritious diet for Ethiopian people (Endalew and Ayalew, 2016). Also, it plays an

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important role in providing export commodities such as live animals, hides, and skins to earn foreign exchanges to the country. Furthermore, livestock are used as draft power for cultivation for land and crop threshing besides their role as means of transport (CSA, 2016). As livestock is a “near-cash” capital stock, they serve as insurance in times when crop fail to give yield due to droughts (Ehui et al., 2002). Regardless of the huge livestock available, it appears that the country is getting inadequate benefit from this resource, that is, below the potential both at national and smallholder economy levels mainly due to low productivity. Among the major setbacks, feed and water shortage, disease and poor veterinary services, lack of appropriate technology, limited attention, poor extension (Shapiro et al., 2015) and problems related to policy and strategy for livestock development can be mentioned as factors that contribute to underutilization of the resource. The driving forces behind these factors include vulnerability contexts like population pressure, agricultural intensification and degradation of natural resources, shocks through drought and floods and erratic rainfall especially in dry areas. Though knowledge of livestock production is studied earlier, integration of production and marketing of livestock was limited in the study area. Therefore, it is important to conduct assessment on the livestock production system and marketing systems in the study area. The objective of this paper is to assess livestock production systems of peri-urban areas of district northwestern Ethiopia.

MATERIALS AND METHODS

Description of the study area

Bahir Dar Zuria district approximately covers an area of 1,283.6 km, and includes 32 kebeles, three of which are partially included in the study because of their accessibility and resources. The District is bounded in the East by South Gonder Zone, in the West by Mecha and Achefer Districts and by Lake Tana, Yelimanadensa District in the North and South, respectively. The topographic features of the district indicate that approximately 48% can be defined as rolling, 32% hilly, 13% mountainous, and 7% valleys. The altitude ranges from 1,750 to 2,300 m above sea level (m.a.s.l.). Agriculture is the main stay of the people in the study area as it contributes about 100% of the population with in the area depends on this sector of the economy (CSA, 2016). However; it is subsistence, low in production and productivity and backward in its production system and cultural practices involved. In addition to this, land holding of the farmers, which is the main input of agriculture, is small and highly fragmented as a result of increasing population pressure from time to time (Bahir Dar Zuria Office of Agriculture (BDZoA, 2015).

Sampling and study design

Households possessing at least one farm animal in Bahir Dar Zuria district represented the study population. This study was designed to assess the livestock production and marketing status of smallholder farmers in the study area. To undertake this study, descriptive method was employed. This method was selected

because the nature of the problems needs a wide description and investigation. In other words, descriptive research helps to describe and interpret the trend of events that are taking place now and practices that have influenced the current once (Bhattacharjee, 2012).

A total of 90 respondent farmers (30 from each *Kebele*) were used to conduct the assessment and sample was determined using the formula:

$$n = \frac{N}{1 + N(e^2)} \quad (\text{Yamane, 1967})$$

Where n is sample size computed, N is the total households in the study area and e is the level of precision.

Methods of sampling

The study was conducted in three Kebele's which were purposely selected based on livestock population and accessibility. From each Kebele, thirty livestock producers were randomly selected and used for interview. Semi-structured questionnaire was used to collect the data on feed storage and feeding system, feed sources, access to feeds, livestock and livestock marketing problems, trends of livestock holding and perceptions on status of livestock trend. In addition, to questionnaire interview, 4 key informants in each Kebele were used to get additional information to complement the primary data obtained from direct interview. Moreover, district and Kebele agricultural officers were included as key informants for the study. Focus group discussions with a group discussion containing 6 participants were held in each Kebele in public areas on key topics of management, nutrition and watering. The collected data was systematical coded and analyzed with Statistical Package for Social Sciences (SPSS) (version 20 2011). Descriptive statistics such as frequency (%) and mean were employed to present the qualitative variables obtained from the survey.

RESULTS AND DISCUSSION

Household characteristics

The household characteristics of respondents are shown in Table 1. The overall educational characteristics of respondents in Bahir Dar Zuria districts was found with characteristics that the majority of household heads (39%) were illiterate followed by those that can read and write (25.5%) while comparable proportion of respondents completed high school (25%). The report of illiterate class in the three districts is higher than recent reports (Asmare et al., 2016). The overall result of educational characteristics was higher than educational characteristics reported by different authors in Ethiopia (Sisay, 2006; Bedasa, 2012) and percentage of illiterate family members (31.5%) reported in Burie Zuria district, Ethiopia (Adebabay, 2009).

The average age of household heads of respondents was 49.2 years which was higher than Atalay et al. (2015) who reported 43 years for Metekel Zone of Amhara Region and Assefa et al. (2014) who reported an average age 37 years in Oromia Region. The overall educational characteristics of respondents in Bahir Dar Zuria districts was found with characteristics that the

Table 1. Household characteristics of respondents (N=90).

Characteristics of respondents	Percentage [N]
Sex of HH	
Male	65.25 [59]
Female	34.75 [41]
Total	100 [90]
Education level	
Illiterate	39 [35]
Elementary school completed	25.5 [23]
High school completed	28.5 [26]
College graduate	7 [6]
Total	100 [90]

HH=household.

majority of household heads (39%) were illiterate followed by read and write (25.5%) and comparable proportion of respondents were high school completed (25%). The report of illiterate class in the current finding was higher than recent reports in northwestern Ethiopia (Mekuriaw and Asmare, 2014; Asmare et al., 2016). Higher literate class has advantage on the good acceptance of technologies like trainings, improved agricultural technologies and adopting them for better live improvement. It has been stated that low level of education of the households can have an influence on the transfer of agricultural technologies and their participation in development (Mulugeta, 2005). The mean family size of respondents is comparable to earlier reports in northwestern Ethiopia (Mekuriaw et al., 2011; Gebretsadik and Negash, 2016) and comparable to the result of Assefa et al. (2014) for other regions of Ethiopia which was 6-7 per household.

Household income

The major source of income for all households in the study area was crop (64%) followed by crop and livestock (26%) and the remaining (10%) were dependent on livestock as source of income. Moreover, all respondents (100%) reported that their additional income is from the sale of Khat (*Khat adulis*). Respondents also indicated that the income of *Khat adulis* is obtained from fresh leaves selling to merchants. Like many similar areas of Ethiopia, Khat is grown in Bahir Dar Zuria district as the area has suitable altitude and environmental variables appropriate for the plant. In the study area, Khat crop can be harvested around the year, thereby becoming a source of continuous revenue for the farmer. The economically important parts of the plant are its young leaves and tender twigs, which are chewed for their stimulating effect. It is not uncommon to come across

many farm ladies selling their plants to willing buyers in the local market throughout the day. Khat chewer population of the area is increasing from time to time in similar fashion with different areas of Ethiopia (Kandari et al., 2014; Assefa et al., 2014).

Land and livestock holding of respondents

The land and livestock holding of respondents is indicated in Table 2. The area is characterized by mixed crop livestock farming system. The average land holding in the area is 0.73 ha of total land with 0.53 ha cropland and 0.2 ha private grazing land. The overall land holding of the study area is lower than 0.98 ha for Debermarkos district (Yayeh et al., 2014). The total land holding of the study area was comparable to the reports of Mekuriaw and Asmare (2014) for Mecha district, northwestern Ethiopia. Generally, the land holding of respondents in the current result is lower than the national average land holding size of 1.6 ha reported by Food and Agriculture Organization - FAO (2008).

The livestock holding of households in TLU (tropical livestock units which represents a mature weight of animals 250 kg) was lower than earlier studies in different areas (Solomon, 2004; Assefa et al., 2014) which were more than 6 TLUs per household in different parts of the country. This small size TLU in the current finding might be resulted mainly attributed to shortage of land to grow feed and lack of knowledge in feeding practices of animals. The general observation indicated that, mixed crop-livestock production system is the dominant farming system in the area livestock being an important component of the mixed farming system and is well integrated with crop production. Livestock species kept by the farmers comprise cattle, sheep, goats, equines and chicken. Cattle are the dominant species, mainly used for draught power, followed by milk and meat

Table 2. The land and livestock holding characteristics of respondents (N=112).

Characteristics	Mean±SD
Total land holding (ha)	0.73±0.32
Crop land holding (ha)	0.53±0.15
Private grazing land (ha)	0.2±0.11
Livestock holding (TLU)	3.5±1.71

Ha=hectare; TLU=Tropical livestock unit.

production, income and manure for maintaining soil fertility. The result is in agreement with reports of Belay et al. (2012) in Dandi district, Oromia region, Ethiopia. In the study area, livestock are integral part of the agricultural systems serving as source of draught power for land preparation, of meat and milk, of income and savings. The purpose of livestock in the current study area is in line with earlier reports for other areas of the country (Assefa et al., 2014).

Labor division in livestock husbandry and marketing

In the study area, family labor was involved in 91.18% of respondents while in the rest livestock are herded, fed and watered by hired labor. Livestock herding was mostly undertaken by the children aged between 6 to 14 years. Adult males and females also herd cattle during the absence of children. Feed collection, milking, health monitoring, selling animals were done by both adult man and woman. Other activities such as milk processing, cleaning cattle shed, selling of milk and milk products, cow dung cake making and calf management were performed mostly by females. It is important to make a difference among the types of responsibility that women have over livestock: ownership, control over decision-making, use rights and provision of labour. In most systems, women provide labour for the various tasks related to livestock but may or may not control the process of decision-making, particularly over the disposal of animals and animal products. Similarly, women may be involved in production, but may or may not own the means of production: livestock, land, water, etc. The majority of live animal marketing except chicken was done by males (97%) while chicken, egg and milk products were sold by females in the household. There are few female respondents (3%) who practice selling of cattle, sheep and equines. Sharing labor for livestock husbandry and marketing of products is in agreement with earlier reports (Assefa et al., 2014).

Livestock feeds and feeding system

The type of available feed resources in the study area

includes natural pasture, crop residue, hay and some indigenous and improved fodder trees like *Ficus thoningii* tree. Similar result has also been reported by Sisay (2006) in North Gondar. Overall, feed resources of the district are characterized by grazing natural pasture (54.2%) followed by crop residue (39.1%) with remaining purchased agro industrial byproducts. The management of livestock feeding was both partial grazing and home feeding. This home/homestead feeding is an interesting feature of livestock feeding which in turn has enormous advantage to promote fodder development and using cut and carry system which has importance to reduce free grazing. The feed resources in the study area are in agreement with CSA (2015) report that indicated grazing is the major type of feed (about 56.23%) followed by crops residue that is 35.06%. Hay and by-products were also used as animal feeds that comprise about 7.44 and 1.21% of the total feeds, respectively.

Water and watering system

The livestock water source and watering frequency of livestock is indicated in Table 3. Among the major livestock production factors, water availability and quality are one of the major limiting inputs as it determines feed availability and quality, health and overall productivity of farm animals. The result indicated that the major source of water for livestock in the households was river (89%) while the remaining respondents use dug well for their livestock. Frequency of watering in dry and wet season variable in the study area and was mainly twice (51%) in dry season and once (44.3%) in the wet season. According to McCornick et al. (2003), water availability can be improved through a number of ways such as construction of wells, pumps, canals, boreholes, tanks, cisterns, reservoirs, water yards, dams and water-harvesting structures. While selecting any given method, there is a need to consider the production system and socioeconomic situation of the farmers.

Sources of water for livestock include drinking water, water contained in feeds and metabolic water (McCornick et al., 2003). Water contained in feeds is highly variable from feed to feed depending on the moisture content, which ranges from as low as 5% in dry feeds to as high as 90% or more in wet feeds. For most domestic animals, metabolic water comprises only 5 to 10% of the water intake, but in the case of sheep it may rise to 15% (von Keyserlingk et al., 2016). Drinking water is a very essential need, though it is much less than the water required for animal feed production.

Perception of trends of livestock holding and productivity

The perception of livestock owners on the trends of

Table 3. Watering frequency of livestock by respondents (N=112).

Frequency of watering	Dry season percent [No.]	Wet Season percent [No.]
Once a day	31.2 [28]	44.3 [40]
Twice a day	51 [46]	28.7 [26]
More than twice	18.2 [16]	31 [28]
Overall	100 [90]	100 [90]

Table 4. Perception of respondents on the trends of livestock holding and productivity (N=90).

Characteristics	Percentage [N]
LS holding per HH	
Increased	51 [46]
Decreased	33 [30]
Constant	16 [14]
Total	100 [90]
LS productivity per head	
Increased	38[34]
Decreased	44[40]
Constant	18[16]
Total	100 [90]

HH=Household head; LS=Livestock.

livestock holding and productivity status is shown Table 4. The trend of livestock holding of respondent indicated there was variation in terms of holding per household. The finding indicated that for most of the respondents the holding increased (51%); holistically, in other respondents there was a decreased (33%) state and in some respondents (16%) there was a decreased state. Nevertheless, the productivity of animals *pe se* remained low as shown in Table 4. The increment in the population of livestock in the study area is in agreement with the reports of CSA (2015). The reason why respondents increased their animals' population might be to compensate livestock productivity through large population of livestock. In other cases, constraints like feed shortage, expansion of crop farming in turn results in lack of pasture land and climate change effects could be the factors that reduce the livestock holdings.

Marketing opportunities

Livestock marketing determinants of respondents is shown in Table 5. Marketing of live animals is an important trade, especially in countries with a large livestock population. During the discussion in groups of different respondents, it has been pointed out that the several destinations of live animal markets were Bahir

Table 5. Livestock marketing options of respondents [N=90].

Marketing seasons	Percentage [N]
Religious occasions*	53.65 [48]
During feed shortage	24.45 [22]
As demand arises	21.9 [20]
Total	100 [90]

*Religious festivity= Easter, Christmas and New Year.

Dar, Tiss Abay, Debre Tabor, Estie, and Hamusit. The majority of respondents (53.65%) sell their live animals during religious festivities followed by selling during the season of critical feed shortage (24.45%). Common avenues for disposal of slaughter cattle are public terminal markets, local auction sale, sale directly on the farm or feedlot, and sale at buying stations. The choice of the most suitable market is not a simple one, and there are no rules for making such a decision. This result is in agreement with earlier reports by different authors (CSA, 2015; Moges and Assefa, 2017).

In the study area, livestock especially fattening cattle and sheep are purchased using subjective visual judgment and price negotiation. The livestock marketing in the study area did not use scientific methods of animal marketing such as live animal grading and price fixation whose marketing is in agreement with earlier reports (Alemayehu, 2003). Although marketing of livestock and livestock products is a major important activity of the household, most of the livestock producers do not have exact market information. However, the respondents have experience of when to fetch high price with producers trying to sell livestock during festive and annual occasions.

Conclusion

The study area is characterized by mixed crop livestock production in which land cultivation with oxen was a common practice. Although livestock are important in the livelihood of farmers, they are affected by changes in climate which in turn determines production and productivity of animals. The majority of household heads and local livestock experts do have information about the proper market information and hence, the marketing

practice is based on the traditional information on the probability of high prices in festivity and annual holidays. Hence, it is important to assist livestock producers to get information how produce livestock and livestock products in reasonable cost and fetch high market price.

RECOMMENDATION

This study has only highlighted information about the awareness of livestock producers on livestock holding, productivity and market information and was not a detailed one which encompassed relatively small size respondents and no modeling of production system.

Hence, it is recommended to have detailed study on the issue to design appropriate livestock production and marketing in the study area.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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