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CATTLE SELECTION CRITERIA AND FATTENING PRACTICES IN URBAN AND PERI-URBAN KEBELES OF DESSIE AND KOMBOLCHA TOWNS, ETHIOPIA

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ABSTRACT: The aim of this research was to investigate cattle selection criteria and fattening practices in urban and peri-urban kebeles of Dessie and Kombolcha towns, Ethiopia. In this study, structured questionnaire was administered to a total of 337 cattle fattener households. Complete enumeration techniques were applied to select urban and peri-urban kebeles. The results indicated culturally cattle fattening management activities were left to males and age, castration condition, sex, breed/type, farming condition and growth stage were the identified cattle selection criteria for fattening in both towns. As per group discussion, in both study towns peri-urban cattle fatteners were practiced cattle fattening in dry and wet season whereas urban cattle fatteners only practiced in dry season. In both study towns peri-urban cattle fatteners (100%) were dominantly fatten cattle once per year and on average one fattening duration take three, four and five months based on 24.8%, 52.3%, 22.8% and 33.3%, 28.4%, 38.3% households response, respectively. 100% of urban cattle fatteners were dominantly fattened cattle twice per year and on average one fattening duration has taken two months, and two and half months based on 75.6% and 24.4% of urban fatteners response in Dessie town, respectively; whereas, 62.1% and 37.9% of urban fatteners in Kombolcha town reported two, two and half and three months of duration, respectively. Therefore, to boost up the newly emerging urban as well as peri-urban cattle fattening sector scientific intervention should be initiated for further improvement in fattening practices based on the generated information.

Keywords: Cattle, Fattening system, Peri-urban, Urban

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INTRODUCTION

Cattle fattening is an effective tool for poverty alleviation and has become an important business of the small farmers as well as urban dwellers. Particularly, the sector is good opportunity for employment and income generation for the rural poor, especially landless, destitute and divorced women (Ahmed et al., 2010). However, expansion and productivity is constrained quantitatively and qualitatively by inadequate and imbalanced nutrition, sporadic disease outbreak, scarcity of water, lack of appropriate livestock extension services, insufficient and unreliable data to plan the services, and inadequate information to improve animal performance, marketing, processing and integration with crop and natural resources for sustainable productivity and environmental health (Aynalem et al., 2011).

Improvement in cattle productivity can be achieved through identification of production constraints and introduction of new technologies or by refining existing practices in the system. In Ethiopia, the cattle production system in different agro-ecological zones is not studied fully and farmers' needs (EARO, 2001). Particularly, there is little information available on cattle fattening practices and cattle selection criteria for fattening in urban and peri-urban areas. To develop a sustainable beef cattle production system which starts at the farmers' level for production and ending at consumers' level for consumption, it is necessary to find out the existing beef cattle production systems. Therefore, to plan and develop improved cattle fattening practices, it is very important to

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investigate the existing cattle fattening practices (Teshager et al., 2013). Generally, assessment of the cattle selection criteria for fattening and fattening practices is a prerequisite to bring improvement in cattle productivity in the current study towns. Hence, the present study was conducted to appraise the assessment of the cattle selection criteria for fattening and fattening practices in urban and peri-urban kebeles of Dessie and Kombolcha towns of Ethiopia.

MATERIALS AND METHODS

Description of the study Area

The study was conducted in Dessie and Kombolcha towns. Dessie is located in northern part of Ethiopia in Amhara National Regional State, South Wollo Zone at a distance of 400 km from Addis Ababa, Ethiopia. Its astronomical location is at 11°8′N -11^0 46' North latitude and 39°38′E- 41013' East longitude. Relatively it is bounded by Kutaber *Woreda* in the north, Dessie Zuriya *Woreda* in the east, and by Kombolcha town in the south. The topography of Dessie is a highland type surrounded by 'Tossa' mountain (Dawit, 2013). Its elevation ranges between 2,470 and 2,550 meters above sea level (http://en.wikipedia.org/wiki/Dessie, retrieved in December 2014). Annual maximum and minimum temperatures of Dessie are 23.7^{o}C and 9^{o}C, respectively, recorded in 2015 (Kombolcha meteorology station). Dessie is one of the reform towns in the region and has a city administration consisting of municipality, 10 urban and 6 peri-urban *kebeles*. Kombolcha is an industrial town found in the north-central part of Ethiopia in South Wollo Zone of the Amhara Regional State of Ethiopia. It is situated at a distance of 377 km from north of Addis Ababa, 505 km from the Regional capital city, Bahirdar, 23 km from the zonal town Dessie and 533 km from port Djibouti. Astronomically, the town is located at about 11^{0}6' N latitude and 39^{0}45' E longitudes. The delimitation of the town is bounded by Dessie Zuria Woreda in the North East and North West, Kalu Woreda in the South and Albuko Woreda in the South West (Muluwork, 2014). Mean annual rainfall is 1046 mm while annual maximum and minimum temperatures are 28.1^{o}C and 12.9^{o}C, respectively, recorded in 2015 (Kombolcha meteorology station). The town is located in a range of altitudes between 1,500 and 1,840 m above sea level. Kombolcha is one of the reform towns in the region and has a town administration municipality, 5 urban and 6 peri-urban kebeles (Eskinder et al., 2010).

Sampling procedure and sample size

Based on objectives of the research and the parameter required pre tested structured questionnaire was prepared. The questionnaire comprised data or information on livestock holding and reasons, fattening experience, reasons of cattle fattening, livestock production systems, and cattle fattening systems and cattle fattening structure. Accordingly, those urban and peri-urban kebeles where cattle fattening is practiced, were considered in both study towns. Accordingly, 3 and 6 urban, 4 and 6 peri-urban *kebeles* were selected from Dessie and Kombolcha towns, respectively. Complete enumeration technique was applied to select urban and peri-urban *kebeles*. Due to manageable number of cattle fatteners, complete enumeration technique was applied to select individuals from urban and peri-urban *kebeles* of Kombolcha town. While, systematic random sampling technique for peri-urban and complete enumeration technique for urban cattle fatteners was applied to select individual household in Dessie town. In peri-urban kebeles of Dessie town, sampled households were determined based on the principle of probability proportional to size'. The sample size (n) was determined using the formula recommended by Arsham (2007), $N = 0.25/SE^2$ where: N: number of sample, SE: standard error, with the assumption of 4% SE. Consequently, 190 (41 urban and 149 peri-urban) from Dessie and 147 (66 urban and 81 peri-urban) cattle fatteners household from Kombolcha town were selected and interviewed.

Data collection and analysis

A single visit formal survey was employed to collect all the required data. To strengthen the survey data, group discussions were held with individuals who have knowledge and experience on cattle fattening practices. In addition, key informant interviews were made with towns and kebeles Agricultural Experts, and Development Agents. Field observation was carried out to take different pictures. Researcher personal observation together with his practical experience in the study towns related to cattle fattening were also incorporated. Accordingly, focus group discussions and key informant interviews were conducted between February and April, 2016 whereas the household level surveys were carried out in May, June, July and August of the year 2016. Consequently, all the collected data were coded and entered into a data base using statistical package for social sciences (SPSS). Descriptive statistics such as mean, percentiles, and frequencies were used to analyze the data using the SPSS statistical software (SPSS for windows, release 20, 2011).

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RESULTS AND DISCUSSION

Family labor and time allocation for cattle fattening practices

In Dessie and Kombolcha towns 95.3% and 100 % of surveyed households, respectively, were allocated only male family member for cattle fattening practices. The current finding disagree with Yidnekachew et al. (2016) who reported that all the family members were participate while managing the fattening cattle at the house hold level. In urban kebeles of Dessie town 78% of the surveyed households was allocate male family member whereas the rest 22% used both male and female family labor. In case of Kombolcha town 100% of the interviewed household's totally left the cattle fattening practices for male family members (Table 2). In Dessie town urban cattle fatteners (100%) was used or allocated their labor throughout the day whereas in peri-urban kebeles 47.7% and 52.3% assigned averagely 2 -3 and 3-4 hours per day, respectively. In Kombolcha town 36.4%, 39.4% and 24.2 % urban cattle fatteners were allocated averagely 2-3, 3-4 hours and throughout a day whereas in peri-urban kebeles 48.1% and 52.9% cattle fatteners allotted averagely 2-3, 3-4 hours per day. As per group discussion cattle fatteners in both study towns allocate time for major cattle fattening activities as presented in Table 1. The overall households (100%) participated in the survey were reported that women's alone were not involved in cattle fattening practices in Dessie and Kombolcha towns. Particularly women have no role in tying and marketing (selling and purchasing) of fattening cattle with the exception that they were involved in the preparation of ration, feeding and manure management. Culturally in both study towns cattle fattening management activities were left to males. The reason behind why females are not involved in cattle fattening was as reported by the respondents has many folds. One of these was women's believed that cattle fattening requires enormous and aggressive energy and the sector is labor-intensive which demand high labor inputs during the period of operation which makes it difficult for females. Another reason was the female headed cattle fatteners by themselves were not ready to run the sector alone, they needs males support with them because of the aggressive nature of fattening cattle. But now a day females live in urban kebleles particularly in Dessie town become part of the business. This may be due to onset of urban agriculture, females organized with males in different cattle fattening association, acquire training about modern cattle fattening practices. In addition, traditional cattle fattening system transformed in to confined system. Therefore, the confined cattle fattening system was easy for proper cattle management and safety for the attendant. On the contrary, adult males were involved almost in all cattle fattening practices activities, such as, feed collection and storage, feed preparation and feeding, salting and watering, housing, tying and cattle cleaning, selling & buying. In addition to this, in decision making process to sell and /or to purchase a given cattle was handled by the males.

Cattle selection criteria for fattening in Dessie and Kombolcha towns; Age of cattle

In Dessie and Kombolcha towns peri-urban cattle fatteners or farmers were totally (100% and 98.8%) respectively, choose the age group of cattle reached 4 and ½ years locally called '*yaderesse*', which means the milk teeth of a cattle totally replaced by the permanent one. The current finding similar to Addisu (2016) and Belete et al. (2010) who reported that cattle fatteners select and fatten mature and much older animals. On the other hand, 78% and 100% of urban cattle fatteners in Dessie and Kombolcha towns, respectively, were first-rate '*Hulet seber'* cattle which mean 3years aged. In Dessie and Kombolcha towns peri-urban cattle fatteners or farmers were totally choose the age group of cattle which reached '*Yaderesse*'. The farmers explained that when cattle reached the indicated age (4 and ½ years) develop better potential to handle farming equipment and able to pool out the equipment from the soil and able to pair with other ox with equivalent energy. In the course of cattle selection peri-urban cattle fatteners particularly farmers was primary focused on oxen which meets the criteria's for farming purpose and jointly in the second step they were focused on cattle which meet fattening criteria. On the other hand, urban cattle fatteners in both study towns were first-rate for those '*Hulet seber'* cattle which mean 3 years aged. The reason behind their selection was they believed that such cattle finished their growth properly, when they put finishing program directly start to build muscle and fat with in short period of time. Cattle age selection of urban cattle fatteners' was mostly influenced by the market condition. If no cattle supply at the market, except old and aged cattle, they forced to pick what they get from the market such as eye, horn and tail damaged cattle with lesser price. Urban cattle fatteners not selected aged and old cattle for fattening purpose because, they believed that aged and old cattle take much feed and long period to be fatten sometimes the animal may not be fatten and return back completely. Apart from these, the customers were not willing to purchase such cattle.

Cattle castration condition for selection

Almost all of interviewed farmers (100%) in peri-urban kebeles of both study towns were point out that most of cattle to be fattened being culled oxen from farming, usually castrates. The current finding agrees with Bezahegn (2014) and Addisu (2016) who similarly reported farmers select castrated cattle for farming. On the other hand,

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urban cattle fatteners in urban kebeles of both study towns were purchased both castrated and UN castrated cattle (100%) for the fattening purpose (Table 2). Traditionally, the farmers bought oxen for farming not for fattening purpose. During the previous year's the major objectives and criteria of respondents in the course of oxen selection were whether or not the oxen can hold the farming equipment in the right or left direction, the behavior of cattle to lay down in the farming land during plowing, the ability to pool and stretch the farming equipment from the soil while plowing, ability of the cattle to pair with other oxen called '*mewajo*', experience of plowing and the aggressive nature of the ox which is related to castration condition. Currently, in all marketing areas farmers were checked the cattle using farming equipment before they provide money. Generally, farmers had chosen castrated animals. Even if non-castrated oxen bought for farming purpose they were castrated before they began farming. This is as a result of easy management of oxen and safe handling of the farming equipment. Peri-urban household's group discussions response indicated that the preference for purchasing younger steers for fattening was a rare case. Generally, farmers in peri-urban kebeles of both study towns were mostly purchased cattle primarily for farming not for fattening purpose. Traditionally, after they were finished plowing activities farmers put oxen for fattening. This practice has negative impact on modern cattle fattening practices and profitability of the sector. This is because, initially the oxen were not selected based on fattening cattle selection criteria.

Secondly, they were used aged oxen for fattening which led to cost incurring fattening process. Such oxen takes much feed and takes long time to be fatten. The meat comes from such type of fattened cattle become hard-hitting. But nowadays there is slight modification while purchasing cattle. On the other hand, urban cattle fatteners were purchased both castrated and UN castrated cattle for fattening purpose. This is because cattle type they were purchased majorly depends on the accessibility of cattle in the market. Most of the time urban cattle fatteners have no broad option to choose what they want. Simply they purchased the cattle regardless of considering the case whereas if the market allows to choosing, they were inclined to the castrated one. But now days, due to consumers' preference particularly cattle traders comes from Addis Ababa urban fatteners were emphasis on the use of UN castrated cattle for fattening purpose. Addis Ababa cattle traders and in general Addis Ababa cattle market needs UN castrated cattle. This may due to the shift of preference of the consumers from fatty to lean meat which is related to health. Apart from this, urban cattle fatteners reported that UN castrated cattle's were fatten with short period of time and with less cost than the castrated one. Again, the butcher house and hotel owners in the current both study towns believed that the meat comes from UN castrated cattle score higher weight (kg) than castrated one. Castrated cattle make them more profitable when they were sell out the meat in kilogram base without cooking for those customers who take the meat in their home. Therefore, to full fill the need of local market in both study towns urban cattle fatteners were feed castrated and un-castrated cattle. This is due to the local market preferred fatty cattle locally called '*Choma*'. In addition cattle fatteners were reported that castrated cattle become fatty with in short period of time and they are easy for fattening management. Farmers also preferred such cattle for farming purposes. In contrast, UN castration cattle have potential to gain weight fast and lose their weight fast after they gain weight. They create difficulty for fattening management and fattening equipment. Such cattle not demanded by local market.

Table 1 - Major activities of cattle fattening practices in Dessie and Kombolcha towns

Cattle fattening activities	Total time allocated	By whom
Feed collection and transportation	2 -3 months	Male mostly
Supplementary ration preparation	2 hour per day	Male and females
Feeding equipment preparation & cleaning	45 minutes per day	Dominantly females
Salting and concentrate feeding cattle's under feeding trough	2 hour per day	Male and females
Cleaning fattening cattle	1hour per week	Male only
Farm or barn cleaning	1hour per day	Dominantly females
Cattle purchasing	5 hour per day	Male only
Cattle trekking	2 - 8 hour per day	Male only
Decision making to sell and purchase a given cattle and selling and purchasing	1 to 2 weeks	Male only
Sun light exposer of cattle in exercising area	3 hour per day	Male and females
Dry roughage supplementation at open shade area	3 hour per day	Male and females
Water collection and watering using water trough	30 minute per day	Male and females
Tying and untying cattle from barn and open shade	30 minute per day	Male only
Medication and support	10 minute	Male only
Market information collection from cattle traders	30 minute per week	Male only

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Table 2 - Time allocation, gender contribution, sex, average age and cattle type selection, source, frequency and duration of cattle fattening in urban and peri-urban *kebeles* of Dessie and Kombolcha towns

Parameters	Dessie town (%)			Kombolcha town (%)			Total mean N=337
	PUK n= 149	UK n = 41	Total n=190	PUK n= 81	UK n = 66	Total n=147	
Time allocation							
• 2-3 hours/day	4.7 (71)	0.0 (0)	37.4 (71)	48.1 (39)	36.4 (24)	42.9 (63)	40.2 (134)
• 3-4 hours/day	52.3 (78)	0.0 (0)	41.1 (78)	52.9 (42)	39.4 (26)	46.3 (68)	43.7 (146)
• Throughout a day	0.0 (0)	100 (41)	21.6 (41)	0.0 (0)	24.2 (16)	10.9 (16)	16.3 (57)
Family involvement							
• Male	100 (149)	78.0 (32)	95.3 (181)	100 (81)	100 (66)	100 (147)	97.7 (328)
• Both (male & female)	0.0 (0)	22.0 (9)	4.7 (9)	0.0 (0)	0.0 (0)	0 (0)	2.3 (9)
Sex preference							
• Male	100 (149)	100 (41)	100 (190)	100 (81)	100 (66)	100 (147)	100 (337)
• Female	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Cattle preference							
• Castrated	100 (149)	0.0 (0)	78.4 (149)	100 (81)	0.0 (0)	55.1 (81)	66.8 (230)
• Both	0.0 (0)	100 (41)	21.6 (41)	0.0 (0)	100 (66)	49.9 (66)	35.8 (107)
Average age preferred							
• *'Yaderese'*	100 (149)	22.0 (9)	83.2 (158)	98.8 (80)	0.0 (0)	54.4 (80)	68.8 (238)
• *'Hulet seber'*	0.0 (0)	78.0 (32)	16.8 (32)	1.2 (1)	100 (66)	45.6 (67)	31.2 (99)
Cattle breed/type selection							
• Local	100 (149)	0.0 (0)	78.4 (149)	100 (81)	0.0 (0)	55.1 (81)	66.8 (230)
• Local and hybrid	0.0 (0)	100 (41)	21.6 (41)	0.0 (0)	100 (66)	44.9 (66)	35.8 (107)
Farming condition							
• Cattle comes from farming	100 (149)	0.0 (0)	78.4 (149)	100 (81)	0.0 (0)	55.1 (81)	66.8 (230)
• Both	0.0 (0)	100 (41)	21.6 (41)	0.0 (0)	100 (66)	49.9 (66)	35.8 (107)
Growth stage selection							
• Young	0.0 (0)	100 (41)	21.6 (41)	1.2 (1)	100 (66)	45.6 (67)	33.6 (108)
• Old	100 (149)	0.0 (0)	78.4 (149)	98.8 (80)	0.0 (0)	54.4 (80)	66.4 (229)
Source of cattle							
• Owen farm	91.9 (137)	0.0 (0)	72.1 (137)	37.0 (30)	10.6 (7)	25.2 (37)	48.7 (174)
• Market	8.1 (12)	100 (41)	27.9 (53)	63.0 (51)	89.4 (59)	74.8 (110)	51.3 (163)
Frequency of fattening							
• Once per year	100 (149)	0.0 (0)	78.4 (149)	100 (81)	0.0 (0)	55.1 (81)	66.8 (230)
• Twice per year	0.0 (0)	100 (41)	21.6 (41)	0.0 (0)	100 (66)	49.9 (66)	35.8 (107)
Average duration (months)							
• Two month	0.0 (0)	75.6 (31)	16.3 (31)	0.0 (0)	0.0 (0)	0.0 (0)	8.2 (31)
• Two and half	0.0 (0)	24.4 (10)	5.3 (10)	0.0 (0)	62.1 (41)	27.9 (41)	16.6 (51)
• Three month	24.8 (37)	0.0 (0)	19.5 (37)	33.3 (27)	37.9 (25)	35.4 (52)	27.5 (89)
• Four month	52.3 (78)	0.0 (0)	41.1 (78)	28.4 (23)	0.0 (0)	15.6 (23)	28.4 (101)
• Five and above	22.8 (34)	0.0 (0)	17.9 (34)	38.3 (31)	0.0 (0)	21.1 (31)	19.5 (65)

PUK = peri-urban *kebele* UK=urban *kebele* *numbers in the parenthesis indicate the number respondent*

Sex selection

Totally (100%) in the urban and peri-urban *kebeles* of both study towns cattle fatteners were select male cattle for fattening purpose (Table 2). The current finding agrees with Fikru (2015) who reported that cattle fatteners prefer to fatten steer (52%) and bull (48%). Female cattle were not demanded due to so many reasons, for instance, females particularly cows are very expensive, municipality slaughtering houses discouragement and protection from such cattle to be slaughtered and cow may happens pregnancy at the middle of fattening. In addition even if females used in fattening program they generate less profit and the disadvantage weighted. Generally, unless otherwise exceptional case occurred related to disease in their reproductive organ and udder or purchased with great discount cattle fatteners in both study towns were not used female cattle's for fattening purposes.

Cattle types/ breeds used for fattening

All of cattle fatteners in peri-urban areas of both study towns (100%) were reported that they used local cattle type for fattening purpose. On the other hand, (100%) urban cattle fatteners in both study towns were used local as well as hybrid cattle type (Table 2). All of cattle fatteners in peri-urban areas of both study towns were reported that they used local indigenous cattle type for fattening purpose. Ordinarily, peri-urban cattle fatteners or farmers were fattened their draught oxen and commonly fatten mature and much older animals for shorter durations. In addition, they believed that hybrid and exotic cattle were not manageable for farming purpose and such oxen takes long period to train them. Due to such reason, farmers were purchased cattle from their native

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areas and near neighbours. Because they were believed that cattle comes from other areas not be active for farming and adapt the area with short period of time or takes long time to adapt. On the other hand, urban cattle fatteners in both study towns were used local as well as hybrid cattle type for fattening purpose. There are four types of cattle in the current study towns and adjacent area. Raya Azebo cattle type in the north, Afar Danakil cattle type in the north east, Wollo high land zebu in the north west and south of the study area and intermediate cattle type which is a combination of all is found in the adjacent areas of Dessie Zuriya, Kutaber *Woreda*, Kombolcha, Albuko, Hayik, Afar (bati, mile), Raya Azebo, Kobo and Alemta. In the current both study towns particularly urban cattle fatteners were used dominantly Raya Azebo cattle type for the fattening purpose due to their better frame, full and large skeletal development. Yet again, Raya Azebo cattle type was better adaptation ability in relatively hotter areas just like Kombolcha and ability to hold muscle. On the other hand, Wollo highland zebu cattle comes from Kutaber, Woreeilu, Borena, Tenta, Ajibar, Mekaneslam was short relative to Raya Azebo and Afar cattle type and mainly used for farming purpose. In both study towns the urban cattle fatteners were reported that Wollo high land zebu cattle type was not dominantly selected in the first order for fattening purposes because of short anatomical structure and less ability to hold muscle. Such cattle type become small after fattening locally called '*Tikelel yilalu'* and less attract consumers in the market. In addition, the butchers also explained that they were less profitable because of small carcass yield compare to Raya Azebo cattle type.

On the other hand, the overall cattle fatteners described that the meat comes for Wollo highland zebu cattle were better tasty, flavour and aroma than Raya and Afar cattle type. Afar cattle were not selected for fattening purpose due to their long horn and difficulty for confined fattening management. Because they are wild and less adapted to the new environment particularly in Dessie town. In addition, cattle fatteners in both study towns were believed that horned cattle take long time to be fatten. The current study similar to Zewdu et al. (2008) and Dereje et al., (2008) who reported based on results of cluster analysis, it is concluded that, morphologically, at least three distinct cattle types are found, namely the Wollo Highland Zebu (comprising of cattle from Gimba, Were-Ilu and Kutaber sites), the Raya Sanga (Raya/Kobo site) and the Afar Sanga (Afar site). The fourth cluster is considered as intermediate cattle that are found in the adjacent areas of Sanga and highland zebu cattle types. The Wollo highland zebu cattle type comprises compact animals with short legs, ears and horns with coat color being dominantly black. On the other hand, the Raya and Afar Sanga cattle types found in lower altitude areas have longer legs, ears and horns reaching to maximum measurements for the Afar cattle. In both study towns urban as well as peri-urban cattle fatteners were not happy to fatten pure exotic cattle type. Because, at farmers level such cattle not manageable for farming. Such cattle required better and huge feed. Yet again, based on urban cattle fatteners and consumers report, the meat was not juicy, flavoured and aromatic likes local and hybrid cattle types. Consumers were not happy to purchase and slaughter such cattle meat. Due to such meat leads the discontinuation of consumers and purchaser marketing linkage. Generally, urban cattle fatteners dominantly used Raya Azebo cattle type for fattening purpose. Because such cattle comes from Raya and Hayik adopt better in Kombolcha area. But in Dessie town urban cattle fatteners used a combination of Wollo highland zebu and Raya Azebo cattle types.

Ploughing condition of cattle during selection for fattening

All of peri-urban cattle fatteners or farmers in Dessie and Kombolcha towns were used their own draught oxen for fattening purpose. On the other hand, urban cattle fatteners 100 % in both study towns were used both cattle which has and has no tillage experiences (Table 2). Mostly urban cattle fatteners were conditional during purchasing because the cattle selection process mainly depends on the cattle availability on market and the price. If there is better supply they preferred young but well framed and matured cattle and those cattle has no experience of plough and those cattle are unsuccessful during tillage. Unsuccessful oxen in tillage operation marketed with low price without competition with farmers.

Months of cattle fattening and seasonal management

As per group discussion, in both study towns peri-urban cattle fatteners or farmers were practiced cattle fattening in both dry and wet season. But mainly farmers were feed cattle during wet season after the end of main land preparation seasons '*Mehar*' (June –July- August and September). Peri-urban cattle fatteners or farmers in the current both study towns were purchased oxen around April, May and June and use them for tillage operation for '*Meher*' season. Upon finishing land preparation and sowing activities, they begin the feeding program starting from July up to October so as to finish and marketed them October to December. This is due to the availability of green feeds comes from farm such as '*Wokiya*' different weeds collected from the planation plot and green hay comes from the adjacent plantation area called '*Wober*'. Regardless of cattle weight gain farmers kept the cattle in wet season. Besides, conditionally according to the feed resources availability, farmers were practiced cattle fattening in dry season. But mostly they were used the stored feed resources especially hay and different industrial by

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products come from the adjacent urban areas. On the other hand, all of urban cattle fatteners (100%) in both study towns were not practiced cattle fattening in wet or cool and rainy season particularly in July, August, September and October due to difficulty to manage fattening cattle and cattle's needs a lot of feed resources with less gain. Instead, urban cattle fatteners dominantly practices fattening from November to June. In the indicated months there is relatively hotter environmental condition. In the current both study towns starting from the end of September urban cattle fatteners were twitch their hands to market to collect cattle used for fattening purpose and accumulates different feed resources such as hay and different factories byproducts like wheat bran, Dried Brewery Grain, poultry litter and leftover of human feed processing enterprises. In both study towns and in the adjacent *Woredas* in October, November and December the cattle and feed prices are relatively lower. There was better availability of feed and cattle resources in the market relative to other months. In addition, no feed resources competition between farmers and urban cattle fatteners. This is because of peri-urban cattle fatteners or farmers in both study towns were used chiefly different feed resources come from their own farm. Farmers were not considered feed ingredients come from their farm as a cost. Secondly, almost all of farmers were ready to sell cattle and collect cash income for the purpose of different expense like student cloth, exercise books and for laborer expense for different ceremony '*Debo*' to harvest and collect different crops and pasture.

Source of cattle for fattening

According to survey result all of cattle fatteners in Dessie and Kombolcha towns were obtained fattening cattle from their own farm (62.2%) and market (33.3%). Purchasing from market was the sole source for urban and for those peri-urban cattle fatteners who have no livestock in both study towns (100%). Those peri-urban cattle fatteners or farmers who have livestock acquire cattle for fattening from their own farm (Table 2). The current result cattle similar to Fikru (2015) who reported fatteners obtained fattening cattle from farm-gate (62.2%), primary market (33.3%) and secondary market (4.5%).

Anatomical and physical considerations to purchase cattle for fattening

In Dessie and Kombolcha town's cattle fatteners whether used purchased or own cattle for fattening purposes, most cattle fatteners were considered different anatomical and physical criteria as mentioned in Table 3 and Figure 1.

Table 3 - Anatomical considerations and physical observation to purchase cattle for fattening

Anatomical considerations	Physical observation	Local expressions in Amharic
• Age	• Dentition and horn	• *Yaderesee, hulet seber*
		• *Horn smooth (small) and rough (large age)*
• Frame and skeletal development	• Well framed, full and large skeleton	• *Atintu yebesele and atintam*
• Body length	• Lengthy	• *Shintam yehone*
• Height	• Elevated	• *Zeleg yale*
• Color	• Red, black, white and black	• *keyi, sendema,burabure,dalcha, gureaza*
• Body condition	• Not emaciated	• *Betam yalkessa*
• Muscle	• Well-muscled	• *Belit yalew*
• Overall appearance	• Attractive	• *Melke-melkam*
• Back and rear side	• Wide	• *Kitu sefi/fegaraw sefi/ kit kifit*
• Horn size	• Medium	• *Mekekelegna kend*
• Body shape	• Rectangular	• *Yetesetekakele sewnet yalew/wot sewnet yalaw*
• Neck	• Wide and long	• *Angetu sefi*
• Hump	• Well developed and straight up ward hump	• *Ket yale shagna yalew*
• Back bone	• Wide and straight	• *Ket yale wogeb and sefi wogeb*
• Tail	• Wide and up tail	• *Jiratu yetenesa and sefi*
• Dewlap	• Well-developed dewlap	• *Dalga yalew*
• Tie and round	• Broad and wide tie and round	• *Sefi tafa*
• Leg	• Straight leg	• *ket yale egger yalaw*
• Claw	• Wide to hold animal weight and muscle	• *Sefi kote*
• Hide	• Soft	• *Yelala koda*
• Maturity	• Matured but not young	• *Besel yale*
• Any disability	• One of the eyes not functional, broken teeth, no tail	• *Ayinu yetefa, jiratu korata, tirisu yetesebere*
• Abdomen and belly	• Small belly and gut	• *Tinish hode, zergif yalhone*

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Figure 1 - Selected Wollo highland zebu oxen on the phase of fattening

Frequency and duration of cattle fattening

In both study towns peri-urban cattle fatteners (100 %) were dominantly fatten cattle once per year which was mainly practiced year after year following the end of main farming season. On average in peri-urban *kebeles* one fattening duration take three, four and five months based on 24.8%, 52.3% and 22.8% households response in Dessie and 33.3%, 28.4% and 38.3% in Kombolcha town, respectively. On the other hand, 100 % of urban cattle fatteners were dominantly fattened cattle twice per year in both study towns. On average one fattening duration has taken two month, and two and half months based on 75.6 % and 24.4% of urban fatteners response in Dessie town, respectively, whereas, 62.1% and 37.9 % of urban fatteners in Kombolcha town reported two and half and three months, respectively (Table 2).

Generally, urban cattle fatteners in both study towns were commonly fattened cattle twice a year in two different periods or rounds. The **first round** of cattle fattening were undertaken during October—November—December -January due to relatively low price and better availability of both of feed and cattle resources. The **second round** of cattle fattening were commenced for the duration of January –February –March—April and June. This is due to better selling price and no cattle market competition with grass fattener farmers. The current result in line with Addisu (2016) who reported that cattle fattening is starting from mid-February up to June, this may be due to the price of cattle for fattening is low in the market. Peri-urban cattle fatteners in both study towns were fatten cattle mostly once per year in June, July, August, September of the years which is after the end of land preparation of main farming season locally called '*Meher*'. Land preparation of main farming season '*Meher* was locally undertaken with in the month of April- May- June. But, in both study areas particularly urban cattle fatteners via calculated the profit margin at the middle or anytime of the fattening they will sell a given cattle without maintain the fattening duration. Mostly they were applying spread price fattening approach. They focus on the profit as well as the market opportunities. Generally, fattening duration of a given cattle highly depend on the body condition of the cattle in the course of purchasing, the profit margin and the marketing opportunities.

CONCLUSION

As inference in both study towns cattle fattening management activities were left to males. Females are not involved or limited participation in cattle fattening sector in both study towns. Age, castration condition, sex, breed/type, farming condition and growth stage was the identified cattle selection criteria for fattening in Dessie and Kombolcha towns. In both study towns peri-urban cattle fatteners and farmers were practiced cattle fattening in dry and wet season whereas urban cattle fatteners only practiced in dry season. Therefore, to boost up the newly emerging urban as well as peri-urban cattle fattening sector scientific intervention should be initiated for further improvement in fattening practices based on the above generated information.

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Conflict of interests

The authors declare that they have no conflict of interest with respect to the research, authorship, and/or publications of this article. The competing interest is assured by copy right agreement and there is no computing interest in this research paper.

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