CATTLE PRODUCTION AND MARKETING SYSTEMS IN DOYOGENA, DAMBOYA AND TEMBARO DISTRICTS OF SOUTHERN ETHIOPIA

M.Sc. THESIS

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CATTLE PRODUCTION AND MARKETING SYSTEMS IN DOYOGENA, DAMBOYA AND TEMBARO DISTRICTS OF SOUTHERN ETHIOPIA

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As thesis research advisor, we hereby certify that we have read and evaluated this thesis prepared, under our guidance, by Muluken Molla Massebo entitled: Cattle Production and Marketing Systems in Doyogena, Damboya and Tembaro Districts of Southern Ethiopia. We recommend that it be submitted as fulfilling thesis requirement.

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DEDICATION

I dedicate this work to my Mother W/ro Marta Danento for her strength and Kindness

STATEMENT OF AUTHOR

I declare that the thesis hereby submitted for the M.Sc. Degree at the Jimma University, College of Agriculture and Veterinary Medicine is my own work and has not been previously submitted by me or others at another University or institution for any Degree. I concede copyright of the thesis in favor of the Jimma University, Collage of Agriculture and Veterinary Medicine.

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LIST OF ABBREVIATIONS

AFC	Age at First Calving
AFS	Age at First Service
AGDP	Agricultural Gross Domestic Product
ANOVA	Analysis of Variance
ARDB	Agricultural and Rural Development Bureau
ARDO	Agricultural and Rural Development Office
CAADP	Comprehensive Africa Agriculture Development Program
CI	Calving Interval
CSA	Central Statistical Agency
DA	Development Agent
ETB	Ethiopian Birr
FAO	Food and Agriculture Organizations
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focused Group Discussion
FLDP	Federal Livestock Development Project
GDP	Gross Domestic Product
GLM	General Linear Model
Ha	Hectare
HHC	Household Count

ABREVIATIONS (*Continued*)

HHH	Household Head
KT	Kembata Tembaro
ILCA	International Livestock Center for Africa
ILRI	International Livestock Research Institutes
LL	Lactation Length
LMA	Livestock Marketing Authority
LSD	Least Significance Difference
LY	Lactation Yield
m.a.s.l	Meter Above Sea Level
MOA	Ministry of Agriculture
MY	Milk Yield
NEPAD	New Partnership for Africa's Development
PA	Peasant Association
PRA	Participatory Rural Appraisal
SNNPRS	South Nations Nationalities People and Regional States
SPSS	Software Packages for Social Sciences
USD	United States Dollars

BIOGRAPHICAL SKETCH

Muluken Molla, the author was born in Metehara town, Oromia Regional State in 1982 G.C. He started his elementary school education at Debreselam in 1989 and completed his elementary in 1997 and he started his secondary school at Merti Compressive High School in 1998. He continued his secondary school at Adama Compressive High School in 2000, and completed in 2001. Then, he joined Debub University, Awassa College of Agriculture in 2002, and graduated with B.Sc. Degree in Animal and Range Sciences in 2006. After graduation, he joined in the government office in Doyogena Woreda Agricultural and Rural Development Office and served until he joined Jimma University, School of Graduate Studies for the Degree of Master of Science in Animal Production in 2011.

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CATTLE PRODUCTION AND MARKETING SYSTEMS IN DOYOGENA, DAMBOYA AND TEMBARO DISTRICTS OF SOUTHERN ETHIOPIA

ABSTRACT

A study on cattle production and marketing systems was conducted in three selected woredas of Kembata Tembaro Zone Southern, Ethiopia. The specific objectives of the study were to assess cattle production systems, cattle and cattle product marketing systems and to assess opportunities and constraints of cattle production and its products in the study area. Producer's interview was the sources of the primary data while secondary data was taken from Kembata Tembaro Zone Southern, Ethiopia. Stratified sampling method was employed to stratify the Kembata Tembaro Administrative Zone Districts based up on agro ecology as highland (greater than 2500 m.a.s.l.), mid- land (1501 to 2500 m.a.s.l.) and lowland (below 1500 m.a.s.l.). Among each selected agro ecology, two PA's were purposively selected based on cattle potentials. A total of 180 households were randomly selected using systematic random sampling method from the six PA's. Questionnaire based survey as wel as PRA techniques were employed to collect both the quantitative and qualitative data. From the total, 98.9 % of the respondents practiced crop and livestock production. The mean family size was 7.08±2.156 (Mean ± SE) heads per household and it was significantly different (P<0.05) among the three agro ecology. The mean total cattle herd size of the households was 7.44 ±0.272 (Mean ± SE) heads, and significantly different (P<0.05) among the three agro ecology .The mean daily milk yield and lactation yield of the indigenous cow was 1.76±0.043 liters per day per cow and 420.47± 11.831 liters, respectively. The amount of milk yield produced in each respective study areas were significantly different (P<0.05) among the three agro ecology. Age at first calving and calving interval of the local cow were 55.47± 0.441 and 20.52± 0.141months, respectively. In the study area, 72.6 % of the respondents preferred to sell butter than other dairy products. The major crop residues used for cattle feeding was wheat straw (33.9 %). Farmers in the area widely used the crop residues as the cattle feed sources when the feed shortage is occurred during the dry season. About 77.8% of the respondents use the river as water sources for cattle. Majority of the respondents (50.6 %) use the natural mating. Cattle fattening is not well developed so that only 39.4 % of the respondents practice fattening. For those farmers who practiced fattening, they sell their fattened cattle at district's main market. Pastorolosis, Pneumonia, Black leg and Ticks were the major disease

challenges in the areas. In general, cattle production and marketing systems were constrained mainly by feed and water shortage especially during the dry season, resulting in poor performances of the indigenous cows. Future effort should be made to alleviate the major constraints and for effective utilization of the cattle production potential of the study area.

Key words: cattle production, feed sources, cattle disease, constraints to cattle production and marketing systems

1. INTRODUCTION

The agricultural sector in Ethiopia, engaging 85% of the population, contributes 52% to the gross domestic product and 90% to the foreign exchange earnings (CSA, 2008). The sector plays a major role in the national economy and it is the source of income and employment for the rural population (Nigussie, 2001).

Livestock play a significant role directly or indirectly in achieving food self-sufficiency in the country; provides draught power, income to farming communities, means of investment and important source of foreign exchange earning to the nation. Of the total household cash income from crop and livestock, livestock account for 37 to 87% in different parts of the country (Ayele *et al.*,2003), and the higher the cash income, the higher is the share of livestock, indicating that increased cash income comes primarily from livestock. Livestock production is an integral part of the Ethiopian agricultural system. The subsector contributes 12 and 33% to the Total Gross Domestic Product (TGDP) and for Agricultural Gross Domestic Product (AGDP), respectively and provides livelihood for 65% of the population (LMA, 2001). According to the report of Federal Democratic Republic of Ethiopia in 2006/2007 hides, skins and leather products made up 7.5% of the total export value; live animals accounted for 3.1% of the total value of exports during the same period.

Ethiopia has about 49.3 million heads of cattle (CSA, 2009). Despite the large number of livestock, there has been a decline in national and per capita production of livestock and livestock products, export earnings from livestock and per capita consumption of food from livestock origin since 1974. The per capita consumption in compared to other African countries is low (Assegid, 2000). In Ethiopia, the current per capita consumption of milk and meat is 16 liters and 13.9 kg/ year, respectively; which are lower than the African and the world per capita averages, which are 27 liters of milk and 100 kg of meat/year, respectively (FAO, 2009).

Under development and lack of market- oriented production, lack of adequate information on livestock resource, prevalence of animal diseases, illegal trade and inadequate market

information both internal and external are some of the major reasons for the poor performance of the livestock sector (Hurrisa and Eshetu, 2002). The low productivity that is attributed to the low genetic potential of indigenous cattle, in adequate management, poor nutrition and reproductive performance are also commonly causes of low productivity (Arthur *et al*., 1984). Therefore, in order to revert this low productivity trend and to achieve poverty alleviation and food security, documenting and assessment of the local production system (feeding, breeding, disease prevalence, husbandry practices), indigenous knowledge, marketing system, challenge and opportunities of livestock sector in a given farming system is crucial.

In Ethiopia cattle production plays an important role in the economies and livelihoods of farmers (Belete *et al.,* 2010). Cattle together with sheep and goats are the most important sources of live animal and hides and skins for export markets (Daniel, 2008). Cattle are therefore closely linked to the economic, social and cultural live of millions of resource-poor farmers for whom animal ownership ensures varying degrees of sustainable farming and economic stability.

Feed is one of the requisite for livestock production. Livestock feed resources in Ethiopia are classified as natural pasture, crop residue, improved pasture and forage, agro industrial by products, other by-products like food and vegetable refusal, of which the first two contribute the largest feed type (Alemayehu, 2003). Animals depend mainly on natural pastures for their feed requirements. Natural pastures which provide more than 90% of the livestock feed are generally very poorly managed. In the mixed farming mid-altitude areas, better soils are used for cropping and the main permanent natural pasturelands are found on the upper slopes of hills and seasonally water logged areas.

South Nations Nationalities and People Regional State is one of the nine administrative regions of Ethiopian Federal Democratic Republic has an estimated total population of 15,042,531, of whom 7,482,051 were men and 7,560,480 women and with an estimated area of 112,343.19 square kilometers, the region has an estimated density of 133.9 people per square kilometer CSA (2007). The SNNPR is rich in animal resources due to favorable environmental conditions. According to the regional statistical abstract of 2006/07 cattle accounts 11,285,450, sheep 3,618,802, goat 3,927,205, poultry 7, 806, 800, horse 920,182,

mule 108,900, donkey 877,059, equines 47,106 and only 47 camels. Despite the large number of livestock in the region, its role in the overall economy remains less than its potential. Problems associated with markets (domestic and export), outbreak of diseases are among the reasons for failing to exploit the potential of this sector which is reported on annual report of the SNNPR, ARDB (2001).

Kembata Tembaro Zone is one of the administrative zones from SNNPR. It is estimated that the zone had 976,055 heads of cattle, 109,625 heads of sheep, 69,060 heads of goats, 48,802 heads of equines, 660,000 chicken and more than 1.5 million colonies of bees (Zonal ARDO annual report, 2012). The Zone is known in cereal crop production. Accessibility of agro industrial by-products from the area, floor factories, market, roads and other necessary facility makes the zone more suitable for cattle production. But detail marketing system has not yet been compiled. The zone is estimated to have huge supply of crop-residues, lack of proper selection of cattle production, disease, shortage of feeds and scarcity of water, in addition to poor management practice in relation to feeding system, healthcare, watering, etc., may lower the performance of cattle production. Hence, the producer may not get reasonable benefit from their cattle and its products unless appropriate improvement strategies have to be introduced.

There were no detailed studies conducted in the study areas to describe the prevailing cattle production and marketing systems. Therefore, it is crucial to systematically describe the production and marketing systems in order to plan and suggest appropriate area of interventions, identify major constraints and opportunities , cattle production that are relevant for the system. Hence, the evaluation of the prevailing production system and identification of the limitations in production and marketing of cattle would assist to design appropriate improvement strategies. Therefore, the objectives of the study were stated as follows:-

1. To assess cattle production systems in the study area
2. To assess cattle and cattle product marketing systems
3. To assess opportunities and constraints of cattle production and its products in the study area.

2. LITERATURE REVIEW

2.1. The Livestock Production Systems

In Ethiopia livestock production systems can be categorized in to the highland crop- livestock mixed farming systems, the lowland pastoral and agro–pastoral production system, pastoral production system and finally agro-pastoral production system

2.1.1. The highland crop–livestock mixed farming system

The mixed farming includes the crop production as wel as the livestock production practicing together. The highland crop–livestock mixed farming system covered 40% of the country's land area and is located above 1,500 m.a.s.l (NEPAD-CAADP, 2005). Here in the highland mixed farming systems the livestock production systems in together with crop production. About 80% of cattle, 75% of sheep and 25% of goats from the total national livestock holdings are found in this production system (NEPAD-CAADP, 2005). Even if there are a lot of livestock sources in this area, the contribution for country level was so small.

2.1.2. The lowland pastoral and agro–pastoral production system

In this production system the crop production and / or livestock production systems are practiced in comparatively. Here the production systems mainly the livestock production system practiced highly. With the same author like of the first type of production system (the highland crop–livestock mixed farming system) NEPAD-CAADP (2005) indicated that the lowlands in Ethiopia cover about 60% of the country's land area and are situated below 1,500 m.a.s.l. The lowlands are situated in the Eastern, Southern, and Western part of the Central highlands (Afar, Somali, Borena, South Omo, some part of Gambela and Beneshangul). As the far as the livestock structure is concerned, about 20% of cattle, 25% of sheep and 75% of goats of the total national livestock population are found. The lowlands farmers use the livestock and depend on livestock because of for purchasing inputs for their home consumption, buying cloths and grains. Income sources include sales of animals and animal products and hiring out of drought animals to the highlanders (Beruk and Taffese, 2000).

For example, the Borena pastoral system of southern Ethiopia has been traditionally practicing cattle husbandry for wealth storage, milk production and small ruminants for immediate cash income (Solomon and Coppock, 2000).

2.1.3. Pastoral production system

In this production system, livestock production system is totally practiced with or without farming activity practiced. In lowland, pastoralist production system with no or little farming is practiced and cattle and camels are kept to provide mainly milk. The climate in these areas is characterized by low, unreliable and unevenly distributed rainfall and year round high temperatures. Animal production often concentrates around water points and herd size per family is usually large. According to Alemayehu (1985) reported that animals are kept by pastoralists they do not provide inputs for crop production but are the very backbone of the life for their owners, providing all of the consumable saleable outputs listed above and in addition, representing a living bank account and form of insurance against adversity. Beruk and Taffese (2000) stated that the pastoral society, which depends on livestock resources, is able to purchase food grains, cloth and other household items from sale of animals and animal products and hiring out of drought animals to the highlanders.

2.1.4. Agro-pastoral production system

In the agro – pastoral production system, the agricultural production as wel as pastoralists are practiced together. Here cattle and cropping are complementary enterprises in the agro-pastoral system. The two production systems, crop and cattle production are intermingled together where one is supporting the others. Cattle provide milk, meat, draught power and manure. On the other hand, crops provide residues, which are used to feed cattle in drier periods of the year. According to Solomon *et al.,* (1991), cattle and small stock play a critical role in the agro-pastoralist household economy.

2. 2. Dairy Production Systems in Ethiopia

In the country dairying is practiced for a vast number of small or medium or large-sized, subsistence or market-oriented farms. Based on climate, land holdings and integration with crop production as criterion, dairy production systems are recognized in Ethiopia; namely the rural dairy system which is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers; the peri-urban and urban dairy systems (Azage and Alemu, 1998; Ketema, 2000; Tsehay, 2001; Yoseph *et al*., 2003; Zegeye, 2003). The first system (pastoralism, agro-pastoralism and highland mixed smallholder production system) contributes to 98%, while the peri-urban and urban dairy farms produce only 2% of the total milk production of the country (Ketema, 2000).

The rural system is non-market oriented and most of the milk produced in this system is retained for home consumption. The level of milk surplus is determined by the demand for milk by the household and its neighbors, the potential to produce milk in terms of herd size and production season and access to a nearby market. The surplus is mainly processed using traditional technologies and the processed milk products such as butter, ghee, ‘’*ayib”* and sour milk are usually marketed through the informal market after the households satisfy their needs (Tsehay, 2001). Pastoralists raise about 30% of the indigenous livestock population which serve as the major milk production system for an estimated 10% of the country’s human population living in the lowland areas. Milk production in this system is characterized by low yield and seasonal availability (Zegeye, 2003).

Pastoralism is the major system of milk production in the lowland areas. The smallholder milk production system is dominated by subsistence farming (Belete, 2006; Asaminew, 2007). In this system, all feed requirement is derived from native pasture and a balance comes from crop residues and stubble grazing. Cattle are the main source of milk even though they are kept primarily as draught power source with very little or no consideration given to improving their milk production capabilities (Zegeye, 2003).

The highland smallholder milk production is found in the central part of Ethiopia where dairying is nearly always part of the subsistence, smallholder mixed crop and livestock farming. Local animals raised in this system generally have low performance with average age at first calving of 53 months, average calving intervals of 25 months and average lactation yield of 524 liters (Zegeye, 2003). Peri-urban milk production is developed in areas where the population density is high and agricultural land is shrinking due to urbanization around big cities like Addis Ababa. It possesses animal types ranging from 50% crosses to high grade Friesian in small to medium-sized farms.

The peri-urban milk system includes smallholder and commercial dairy farmers in the proximity of Addis Ababa and other regional towns. This sector owns most of the country's improved dairy stock (Tsehay, 2001). The main source of feed is both home produced or purchased hay; and the primary objective is to get additional cash income from milk sale. This production system is now expanding in the highlands among mixed crop–livestock farmers, such as those found in Selale and Holetta, and serves as the major milk supplier to the urban market (Gebrewold *et al*., 2000).

Urban dairy farming is a system involving highly specialized, state or businessmen owned farms, which are mainly concentrated in major cities of the country. They have no access to grazing land. Currently, a number of smallholder and commercial dairy farms are emerging mainly in the urban and peri-urban areas of the capital (Felleke and Geda, 2001; Azage, 2003) and most regional towns and districts (Ike, 2002; Nigussie, 2006).

2.3. Milk and Milk Products Utilization and Marketing System in Ethiopia

2.3.1. Milk and milk products utilization in Ethiopia

The consumption of milk and milk products varies geographically between the highlands and the low lands and the level of urbanization (Ahmed *et al.,* 2003). In the lowlands, all segment of the population consumes dairy products, while in the highlands the major consumers primarily include children and some vulnerable groups such as the elderly and women

(Ahmed *et al.,* 2003). According to the survey made byMOA (1997), in highland mainly in most peri-urban areas 74.6% of the milk produced is either used at home or marketed in liquid form, while 17.5% fed to calves, 8% churned and marketed in to butter oil state and 0.3% is wasted.

2.3.2. Milk and milk marketing systems in Ethiopia

The presence of milk and milk product market has a crucial role on the daily activities of the farmers in the livestock production improvements. In Ethiopia, fresh milk is distributed through the formal and informal marketing systems. According to Broken and Senait (1992), dairy marketing system in Ethiopia can be classified in to two subsystems: formal and informal marketing system.

2.3.2.1. Formal marketing system

Formal marketing system, which is usually controlled by the government, includes organized collection, processing and distribution of fresh milk and other dairy products at official, government-controlled prices. The Dairy Development Enterprise of Ethiopia is an example of formal marketing systems in Africa.

2.3.2.2. Informal marketing system

The informal market involves direct delivery of fresh milk by producers to consumers in the immediate neighborhood and sales to itinerate traders or individuals in nearby towns. The transportation of milk for selling can be different among different farmers. The farmers can use their foot, or donkey and horses.

2.4. Productivity of Cattle Milk in Ethiopia

The milk production for local / indigenous breed is very low. The nutrition of the cow feeding, the environment, the breed itself and disease are some of the factors for low productivity of the indigenous breed. According to Mukasa-Mugerwa (1989) average milk production of indigenous cattle per cow is very low and milk production potential such as Boran, Barca, Arsi and Fogera is low and it ranges from 494-809 kg per lactation. The reproductive efficiency of a breeding cow is determined by factors like age at first calving, calving interval and number of services per-conception. However, both productive and reproductive performances are influenced more by genotype and environmental factors such as nutrition, management and climate.

2.4.1. Age at first calving (AFC)

Age at first calving could affect the reproductive and productive performances of the cow. Belay *et al*., (2012) stated that the age at first calving (AFC) of the indigenous cow in Dandi district was 50.59± 6.93 months. According to Solomon *et al* (2009) the age at first calving (AFC) for the indigenous cow was 57 months, and with the same sources of authors cattle in the midland agro ecology gave birth to the first calf earlier in 50 months, in the highlands 53 months and the lowlands 53 months. But the age at first calving for the Boran breed was 41 months (Haile *et al.,* 2009). The mean total AFC for the cross breed cattle in eastern lowlands was 36 months stated by Emebet and Zeleke (2007).

2.4.2. Age at first service (AFS)

It is the age at which heifers attain body weight, body condition and sexual maturity for accepting service for the first time. It influences both the productive and reproductive life of the female through its effect on her lifetime calf crop. Age at first service is influenced by genotype, nutrition and other environmental factors. Mulugeta *et al.*, (1991) reported that AFS for Horro cattle was 55 months, while Gebeyehu *et al.,* (2005) reported 45.4 months for Fogera heifers.

2.4.3. Days open

An increase in the number of days between calving and conception, also known as days open, influences profitability of the dairy industry. The days open has influential factors for the profitability for the intensive dairy farm for a country. The mean total days open for Fogera breed was 305days as reported by Gebeyehu *et al.,* (2005). The length of days open has significant effect on the reproductive performance of the cow. According to Mulugeta *et al.,* (1991), the mean total days open for Horro cattle was 134 days.

2.4.4. Calving interval (CI)

Calving interval is a function of calving-to-conception interval or days open, which is considered to be the most important component determining the length of calving interval, and gestation length, which is more or less constant. Some of the factors affecting calving interval are breed of the cow and the calves, calf sex, calf size, dam age, year and month of calving. As reported by Solomon *et al.,* (2009) the mean total calving interval (CI) for the indigenous cow was 543 days.

2.4.5. Milk yield and lactation length

Milk production is affected by genetic and environmental factors. Among the environmental factors, the quantity and quality of available feed resources are the major ones. According to Solomon *et al.,* (2009) the overall lactation length of the indigenous cow and crossbred was 241 days and 222 days, respectively. However, milk production potential of temperate breed under improved management in tropical environments is higher than that of indigenous breed. The daily milk yield for cross breed cattle was 8.9 kg/day/cow with lactation length of 296 days in urban and peri-urban areas of Addis Ababa (Yoseph *et al.*, 2003b). In most dairy farms a lactation length of 305 days is commonly accepted as a standard. The profitability of short or extended lactation length depends on various factors, including the lactation length persistency.

2.5. Feed Resource in Ethiopia

The major livestock feed resources in Ethiopia are grazing and browsing on natural pastures; crop residues and agro-industrial by-products; and cultivated pasture and forage–crop species (Alemayehu, 1985). Availability and quality of native pastures vary with altitude, rainfall, soil type and cropping intensity. The total area of grazing and browsing in Ethiopia is estimated at 62,280 million hectares, of which 12% is in the farming areas (more than 600 mm rainfall) and the rest around the pastoral areas (Alemayehu, 1985). Natural pastures which provide more than 90% of the livestock feed are very poorly managed in both ecological zones in Ethiopia. In the mixed farming mid-altitude areas, better soils are used for cropping and the main permanent natural pasture lands are found on the upper slopes of hills and seasonally waterlogged areas. In the lowlands where pastoralism is practiced most of the land except for rivers, swamps, lakes and deserts contains natural pasture which may be associated with woodland in the wetter areas.

Cereal straws from teff, barley and wheat are the largest component of livestock diet in the intermediate and highland areas of Ethiopia. At lower altitudes areas maize, sorghum and millet stover occur to a greater extent than at higher altitudes. Teff is grown at intermediate altitudes and barley replaces wheat at the higher altitudes, where pulses are also grown to a great extent (Alemayehu, 1985).

2.6. Beef Production System

2.6.1. Cattle fattening practices in Ethiopia

The traditional, the by-product based and the Hararghe type of beef fattening systems are the three types of beef fattening systems in Ethiopia (FLDP ,1989).

2.6.1.1. Traditional systems

In Ethiopia the traditional beef production systems is mainly practiced under smallholder farming systems. Cattle are kept mainly for draft power, milk and manure production and are usually only sold when they are too old for these purposes, or drought or cash shortages force people to sell. The farmers as wel as the cattle holders purchased the plowing oxen and in case the emaciated oxen when in low price. These emaciated and the plowed oxen are low in meat yield, poor quality of meat and strength of the body to re -plowed for the next phase of the agriculture farm. There is obvious scope to improve this traditional and inefficient system through strategic feeding of good quality forage to fatten animals before they are sold, or to buy and fatten animals sold by others. In average or poor seasons, lowland cattle are rarely fattened and often have to be sold in poor condition at low prices.

2.6.1.2. By - product-based fattening

The by- product-based beef fattening is the type of fattening in which the agro industrial by products such as the Sugar Factory by product molasses, the oil seed by products of noog cake and the Floor Factory by products of the wheat bran are the main sources of feed.

2.6.1.3. The Hararghe fattening system

For the Hararghe types of beef fattening systems, the beef cattle are mainly fattened based on the crop production and the residues. The farmers fattened widely on the highland areas of the fatteners due to the availability of crop production and the crop residues relatively to the lowlands. During excess amount of feed sources the farmers uses cut and carry systems, but during the dry season the crop residues and stubble grazing used.

2.6.2. Livestock marketing system in Ethiopia

Livestock marketing in Ethiopia follows a three-tier system: primary, secondary and terminal markets through which animals go into the hands of small traders and then to large traders, final buyers, which include butchers, meat-processing factories, fattening farms or live animal exporters, purchase livestock at any stage (UNDP-EUE ,2002). Most of the producers sell

their beef cattle and their livestock products at the local market directly to the consumers and small traders at relatively low prices. The reason for selling at the low prices of fattened cattle at the farm gate market is due to trekking of their cattle to the main market or other huge market places , the lengthen of the market places from their dwelling area and the interest to trekking only one or not more than three fattened cattle trekking to the distant market .Due to these unfavourable marketing systems and the discouraging price on the producers' side they are not encouraged to improve the quality and the off-take of their animals (Alemayehu, 2003).

2.7. Economic Importance of Livestock in Ethiopia

As far as cattle production is concerned, cattle have a crucial role for different function. However, the function varies from one production system to others. The draft power have covered and ranked the highest functionary, then next milk and reproduction/breeding (Bulls and Cows) in both of crop-livestock and agro pastoral systems. Most crop/livestock and agro pastoralist farmers manure production have a significant role for their sources of fuel production. In contrast, reproduction/breeding requirements received higher ranks in pastoralist systems and, for female, requirements for breeding outranked the importance of milk production (Workneh, 2004).

2.8. Constraints for Cattle Production

The traditional smallholder dairy system makes up the largest characterized mode of milk production, and uses low input feeding and management requirement and the indigenous Genotypes (Jabbar *et al.,* 1997). The characteristics of the improved dairy production system vary substantially in terms of intensification, management systems; genotype used, type and method of marketing and processing of milk and dairy products.

2.8.1. Shortage of feed

Availability, quality and quantity of feed vary among varies production systems. Cattle largely depend on rangeland grazing or crop residues that are of poor nutritive value. Feed is not uniformly supplied and the quality is poor (Ibrahim and Ololaku, 2000). Natural pasture, browse and bushes accounts to the major food sources of livestock owned by pastoralists. Seasonal fluctuation in the availability and quality of feed has been a common phenomenon, inflecting serious changed in livestock production (Alemayehu, 1998). The feed shortage mostly happens in dry season of the year (Ibrahim and Ololaku, 2000). In contrast, under normal circumstances in lowlands when there is sufficient feed for cow, milk tends to be adequate for consumption as well as for market (Beruk and Tafesse, 2000).

2.8.2. Shortage of water

Since rainfall rather than livestock density determines net primary production and vegetation cover, its variability is the most important climatic factors determining the state of the natural resources base. Hence, rainfall variability and net primarily productivity of the vegetation correspondingly determines livestock production (Sere *et al.,* 1996). Ruminates require water to maintain the water content of the body, and water availability affects voluntary feed intake; less water leads to inadequate intake of dry matter. For animals kept under pastoral production system, the frequency of watering is very important. During the dry season water is available only from wells and some lakes and streams (Ibrahim and Olaloku, 2002). This leads to over grazing around watering points. Water intake increases as watering frequency is decreased and feed conversions efficiency becomes lower as watering interval increase (Ibrahim and Olaloku, 2002).

2.8.3 Animal health care

Animal health care and improved health management is also one of the major constraints of dairy development in Ethiopia, which caused poor performance across the production system. Many of the problems result from the interaction among the technical and non-technical constraints themselves. For instance, poorly fed animals have low disease resistance, fertility problems, partly because the animal health care system relays heavily on veterinary measures.

Moreover, poor grazing management systems continue to cause high mortality and morbidity (e.g. internal parasites), many of the diseases constraints which effect supply are also a consequence of the non-technical constraints, for example, insufficient money to purchase drugs or vaccines (Ibrahim and Olaloku, 2002).

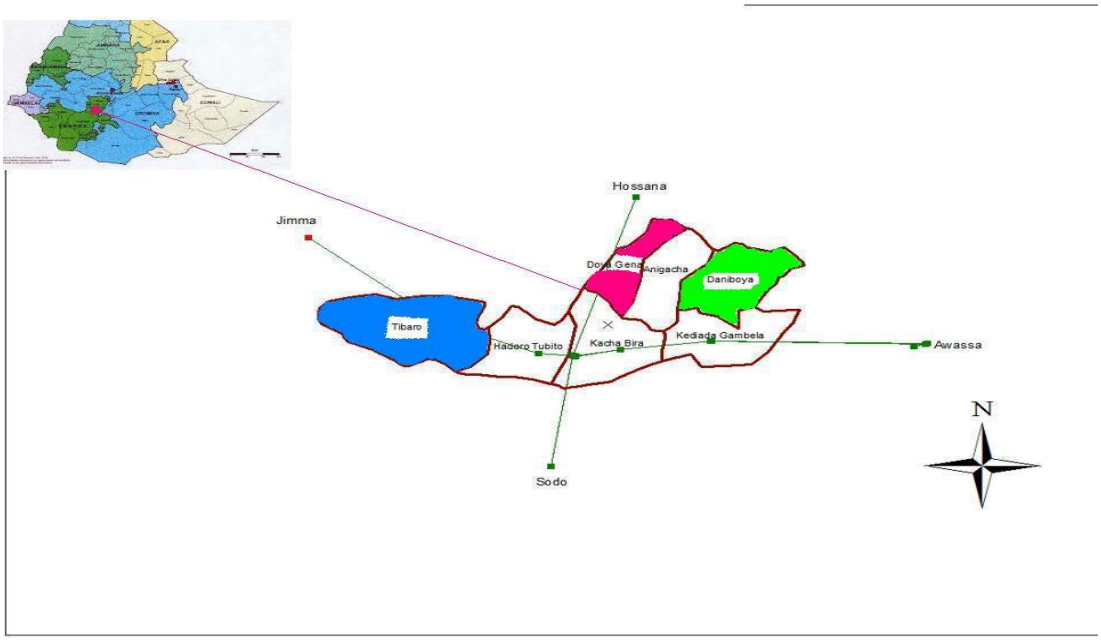
2.8.4. Lack of productive breeds

The livestock genetic resources of Ethiopia's have involved largely as a result of natural selection influenced by environmental factors. This has made the stock better conditioned to with stand feed and water shortages, diseases challenges and harsh climates. But the capacity for the high level of production has remained low (IPS, 2000).The consequence of the low genetic potential of indigenous breed for productive traits makes total national milk production to be low (Mukasa-Mugerwa, 1989).

3. MATERIALS AND METHODS

3.1. Description of the Study Area

This study was conducted in Doyogena, Damboya and Tembaro Districts of Kembata Tembaro Zones of Southern, Ethiopia. Kembata Tembaro Zone is one of the 13 administrative zones in SNNPR found in the South- Western part of Ethiopia. The zone covers a total area of 1523.6 sq. km. and topographically, it lies between elevation ranges of 501-3000 meters above sea level. Astronomical location of the zone is between latitude 7.10 –7.50E and 37.34-38.07N longitude. The zone has three agrological zones, sharing highland (*Dega*) 13.7%, mid-land (*Woina-dega*) 71.17% and lowland *(Kolla)* 11.14%. The annual average temperature and average rain fall of the zone ranges from 12.6-27.5 ºC and 1001-1400 mm, respectively.



Sources: SNNPR Kembata Tembaro Zone Investments Expansion Main Process (2011)

Figure 1.Location sites of the study areas

The Zone has a total population of 768,300 of whom 376,467 are Men and 391,833 Women. While 97,797 (14.36%) are urban inhabitants (CSA, 2007). Durame town is the main city for the zone and located at a distance of about 350 km away from Addis Ababa, South-West of Ethiopia. Kembata Tembaro Zone has seven districts and one administration city. Out of which, seven are the rural districts. Doyogena, Damboya and Tembaro are the three districts out of seven rural districts of the zone selected for this study based on difference in agro ecology .These were composed of highland, mid land and low land areas represented by Doyogena, Damboya and Tembaro Districts, respectively.

Based on the sources from zonal and each district's administrative offices; Doyogena district is located at a distance of 272 km, South West of Addis Ababa, capital of Ethiopia and 62 km from Durame the city of the zone. The district is located an altitude of greater than 2500 meters above sea level and area coverage of 121.5 square kilometers. Mean annual rainfall of the district is 1600 to 2340 mm and the mean annual temperature is 12.6 – 24.5 ^{o}C. Doyogena district is boarded on North by Lemu on South by Kachabira on West by Duna and on East Angacha districts.

Damboya district s located at altitude ranging from 1501 to 2500 meters above sea level, 285 km South West of Addis Ababa, Ethiopia and 30 kilometers from Durame. Mean annual rainfall and mean annual temperature of the district are 1200 to 1800 mm and 19 - 29 ^{o}C, respectively. The area coverage of the district is 151.83 square kilometers. Damboya district is boarded on North by Angacha on South Kedida Gamella on East by Alaba special district and on West Kedida Gamella and Angacha districts.

Tembaro district is located about 360 km from South West Addis Ababa and about 60 km from Durame town. This district is predominantly low land and it is located an altitude of less than 1500 meters above sea level. Mean annual rainfall of the district is 900 to 1100 mm; whereas the mean annual temperature is 27 - 38 ^{o}C. The area coverage of the district is 279.18 square kilometers. Tembaro district is boarded on North by Sorro and Duna districts on South Wolayta and Dawero Zones on East by Hadero Tunto district and on West Jimma Zone.

3.2. Sampling and Data Collection

3.2.1. Sampling procedure

Stratified and random sampling method was used based on agro-ecology zones (highland, mid-land and low land) altitude. The three districts were stratified to peasant associations (PA's) according to their agro ecological variations (lowland, mid- land and highland). The three stratified districts had an altitude range of below 1500 m.a.s.l (lowland), from 1501 to 2500 m.a.s.l (mid-land) and above 2500 m.a.s.l (highland). Doyogena district represented for the highland; whereas Damboya and Tembaro districts represented for the mid land and lowland, respectively. Two PA's from each district were selected based on cattle potential and again from each selected PA's 30 households were selected randomly from those farmers who have cattle. Therefore, systematic random sampling method was used for selecting individual household.

3.2.2. Data Collection

Both the primary and secondary data were collected

3.2.2.1. Primary data

Producer's survey: to generate information from each farmer at house hold level the primary data was used using semi-structured questionnaire. These primary data included information on:- socio-economic characteristics; education, cultural taboos, ethnic, family size, age category, sex and religion ; landholding and use; sources of income; production system ; livestock species and herd composition ; economic importance of cattle's ; animal management (feeding, watering, housing, breeding, calf rearing, disease and disease control) ; marketing system ; reproductive performance (age at first service ,age at first calving ,calving interval) ; gender roles in production (cattle production and products) ; constraints to cattle production and marketing and strategies used to alleviate constraints both for cattle productions and marketing systems.

Participatory Rural Appraisal (PRA). Of the PRA tools Focus Group Discussion (FGD) was used. Discussions with different bodies like; Development agents, Keble's Manager, Expert in rural development office of the respective districts, Elders, Women delegate's, Cattle holder and Youth delegates have participated during the discussions.

3.2.2.2. Secondary data

Unpublished secondary data on cattle productions and marketing systems from each study areas (Doyogena, Damboya and Tembaro Districts) of Agricultural and Rural Development Office and Kembata Tembaro Zone ARDO were collected. Among the data like; cattle populations, cattle productions and marketing constraints in the areas, extensions services provisions, and trends of cattle populations in the area were recorded.

3.3. Data Analysis

The data obtained from the primary producer's questionnaire were checked and entered into the Microsoft office Excel sheet .All the surveyed data were analyzed using Statistical Package for Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, Illinois, USA, 2007). Descriptive statistics was employed to analyze qualitative data; while statistical variations for the numerical data was subjected to one way analysis of variance (ANOVA) using the general linear model (GLM) procedure of SPSS. Mean comparisons was carried out using LSD tests. Level of significance also considered at $P<0.05$ .The following model was used for the quantitative variables;

$Yij= \mu + A\ i + eij$ where; Yij= the dependent variable; μ = the overall mean;

Ai = the altitude variations effect and eij = the error term.

4. RESULT AND DISCUSSION

4.1. Socio- Economic Characteristics

The socio economic characteristics of sampled households namely: family status, gender aggregates, educational category and religion of the respondents are presented below.

4.1.1. Household characteristics

Family size, sex and age structure of the farm families in the three agro ecology are presented in Table 1. The overall mean family size of the study area was 7.08 persons per household. The mean family size in highland (6.42±0.198), midland (6.73 ±0.265) and lowland (8.10±0.314) were significantly ($P < 0.05$) different. The mean family size of this study is higher than 5.14±0.8 persons per household in Fogera district (Teshome, 2009) and the national average 4.6 persons per household CSA (2011). In contrary, it is comparable to 7.26 heads per household obtained in Wolayta by Ayantu (2006). However, it is smaller than 9.68 persons per household in West Hararghe by Dereje (2011). This result showed that there were enough family labour sources for livestock herding and agricultural activities.

Among the overall respondents, the highest male headed was found in highland (88.3 %); whereas the least male headed was in lowland (78.3 %) district. The overall male and female headed of the respondents were 84.4% and 15.6%, respectively. The result found in the current study for male headed is higher than 78.3% in Darolabu District of Western Hararghe (Dereje, 2011), but it is lower than 96.6% of the households were male headed reported in Jimma Zone (Oumer, 2011). The current study showed that there were high proportion of marriage and low frequency of divorced or widow. Sex of the household head were not significantly ($P \geq 0.05$) different among the three districts.

The overall mean age of the households in the study area was 46.68 ±0.698 years. The mean age of the household head in the current study is higher than 39.7±0.88 years in Meiso district (Kedija, 2007), but it is more or less comparable to 45.93 with standard deviation 11.5 years in Bure district (Habtemariam, 2010).

Table 1.Demographic structure of the respondents in the study areas

Variables	Agro ecology						Overall	
	Highland		Midland		Lowland			
	HHC	%	HHC	%	HHC	%	HHC	%
Sex of HHH :	N=60		N=60		N=60		N=180	
Male headed:	53	88.3	52	86.7	47	78.3	152	84.4
Female headed:	7	11.7	8	13.3	13	21.7	28	15.6
Mean age (SE) of HHH	45.95 (1.13)		46.57(1.15)		46.68(1.34)		46.68(0.698)	
Age category								
< 6 years	40	28.2[a]	48	33.8[b]	54	38.0[c]	142	100
6-15 years	154	30.0[a]	172	33.5[b]	187	36.5 [c]	513	100
16-60 years	179	30.9[b]	173	29.8[a]	228	39.3 [c]	580	100
> 60 years	12	30.0	11	27.5	17	42.5	40	100
AFS (SE)	6.42(0.198)[a]		6.73 (0.265)[b]		8.10(0.314)[c]		7.08(0.161)	

**HHH = Household head, HHC= Household count, SE = Standard error, AFS =Average family size; Means having different superscript within the same row were significantly different at P<0.05*

When comparison was made by age groups between the studied districts, there was a significant difference ($P < 0.05$) for the age group of less than 6 years, in between 6 to 15 years and in between 16 to 60 years of age. On the other hand, there was no significant difference found among the studied areas for the age group greater 60 years. The result showed that majority of the household's members were at the productive stages (16 to 60 years old) and they are greater capability to advance new technology for the contribution of livestock herding and agricultural productivity improvements.

Among the whole respondents of midland 8.3 % the households were not educated; whereas 28.3 %, 50.0 % and 13.3 % of the households respectively have completed adult, primary and secondary school. Majority of the households head in midland received primary level of education. The highest proportions of the households received primary level of education (50 %) were found in midland. In same manner, 15.0% of the household headed in highland had no formal education (Table 2).In highland had the highest percentage of the household head that attained the secondary level of education, indicating that the district had the most potential for the agricultural sector to introduce and advance the new technology. The highest percentage of adult literate (63.3 %) and the lowest level of secondary educated (6.7 %) were found in lowland.

Table 2.Literacy level of the respondents in Kembata Tembaro Zone

Educational level	Highland		Midland		Lowland		Overall	
	HHC	%	HHC	%	HHC	%	HHC	%
HH head	N=60		N=60		N=60		N=180	
No formal	9	15.0	5	8.3	3	5.0	17	9.4
Read and write	19	31.7	17	28.3	38	63.3	74	41.1
Primary	23	38.3	30	50.0	15	25.0	68	37.8
Secondary	9	15.0	8	13.3	4	6.7	21	11.7

**HH = Household, HHC= household count, N= number of respondents*

The dominant religion in midland (68.3%), highland (98.3%) and lowland (75.0%) districts was protestant. There is no Muslim household head found in both of highland and lowland; whereas in midland 10% of the households headed were Muslim. The overall average of respondents for the various religion is shown in Figure 2. The current finding in relation to religion does not correspond with the study conducted at Bure *woreda* by Habtemariam (2010) who reported 98.9 % of the households were Orthodox Christians followers and 1.1% of the households were Muslim followers. This could be attributed to long time history of

missionaries around the study districts. Among the three districts there was significant variations (P<0.05) in religion followers.

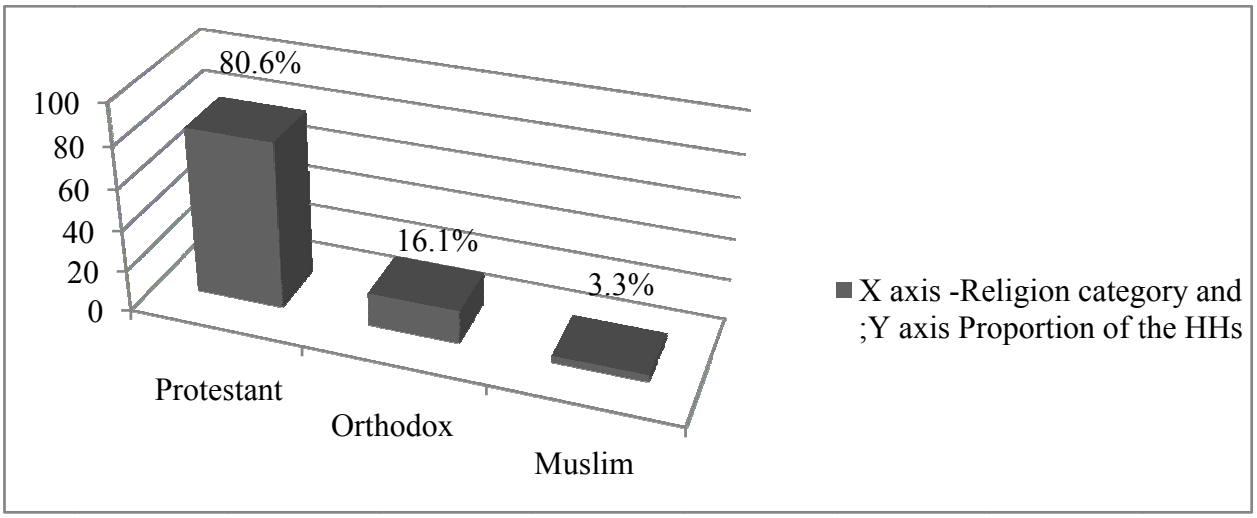
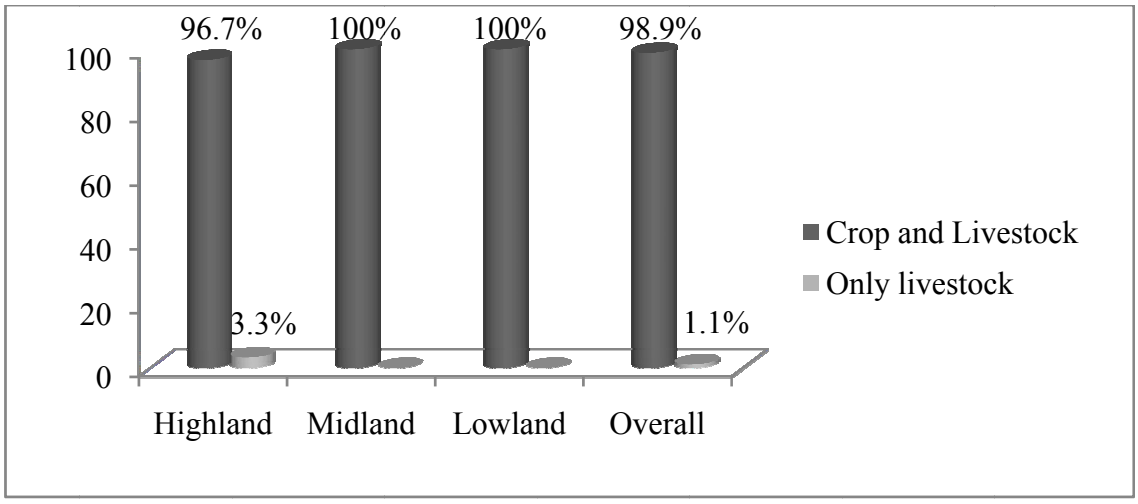


Figure 2.Religion of the household head in the study areas

4.1.2. Agricultural activities

In the study area, crop – livestock mixed farming systems were mainly practiced. Among the overall respondents, 98.9 % of the respondents were undertaking the mixed crop and livestock farming systems (Figure 3). In midland and lowland agro ecology majority of the respondents used the mixed crop and livestock farming systems; whereas in highland only 1.1 % the respondents were women household's head that were widow and oriented themselves on dairy production systems. There was no any significant difference (P≥0.05) among the three agro ecology. The current finding on farming system under on crop and livestock farming systems is higher than 79.7 % of the households at East Shoa Zone by Philimon (2012) and 49.3 % the study conducted in Borena Zone by Daniel (2008).



Where; X-axis =Agro ecology and Y –axis = Income sources

Figure 3.Agricultural activities undertaken by the farmers in the study areas

4.1.3. Land owner ship

Relative frequency of landholding categories and average landholding size in highland, midland and lowland are presented in Table 3. Majority of the respondents used their own land for crop production .The mean land holding of households in highland (0.76±0.039 ha), midland (1.09±0.042 ha) and lowland (1.29± 0.055 ha) agro ecology were significantly different ($P<0.05$). Mean landholding of the households in highland was significantly smaller than average land holdings in midland and lowland.

The mean land holding of the households in the study area was 1.05±0.031 ha. The result found in the current finding is higher than the regional average of 0.89 ha per household conducted by Ethiopian Economic Policy Research Institute (2001), but it is smaller than the national average of 1.18 ha given in the Agricultural Sample Survey CSA (2007/2008) .The present finding is much smaller than similar study 3.05 ha per household in Ilu Aba Bora Zone (Teshager, 2012). Majority of the farmers in the area used the land for crop production. In the highlands, farmers could have additional rent land for crop production (for example they rent for wheat and bean crop production) since the area is potential for wheat production due to the environment and soil of the area.

Table 3.Relative frequency of landholding in the study areas

Landholding (ha)	Highland		Midland		Lowland		Overall	
	HHC	**%**	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**
Less than 1	54	90.0	30	50.0	16	26.7	100	55.6
1 to 1.5	5	8.3	27	45.0	33	55.0	65	36.1
1.6 to 2.0	1	1.7	3	5.0	8	13.3	12	6.7
2.1 to 2.5	0	0.0	0	0.0	3	5.0	3	1.7
Total	60		60		60		180	
Mean (SE)	0.76(0.039)[a]		1.09(0.042)[b]		1.29(0.055)[c]		1.05(0.031)	

** HHC = household count, SE = standard error; Means having different superscript on the same row were significantly different at P <0.05*

4.1.4. Sources of income

The crop sale was the major sources of cash for the households in highland and midland agro ecology. The income sources from crop sale in midland and highland had significant role than that of lowland (P< 0.05). The reason for high production of crop was due to the potential of the areas for crop production with suitable environment and soil than that of lowland. On the other way, the sources of income from the sale of livestock and its products were the highest in lowland (71.7 %) than in midland (5.0%) and highland (18.3%). The sale of livestock and its products in midland and highland were insignificant contribution as cash sources. The total proportion of the households that generating income sources from live animals and its product, crop production and others source were 31.7 %, 61.7 % and 6.7 % , respectively.

Table 4.Diversity for income sources of the respondents

	Highland		Midland		Lowland		Overall		P
Income sources	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**	
Live animals and its products	11	18.3	3	5.0	43	71.7	57	31.7	*
Crop production	46	76.7	48	80.0	17	28.3	111	61.7	*
Others	3	5.0	9	15.0	0	0	12	6.7	*

*Others include trade, rent services of equines, selling of fruits, vegetables, off farm and enset by products ("kacha"); * P<0.05 significantly different.*

4.1.5. Family labor sources in the study districts

Majority (77.2 %) of the respondents' labor sources for cattle production and management from family members (Table 5). Unpaid family workers constitute the highest proportion (56%) of the population in agricultural households who were engaged in agricultural activities at country level CSA (2003). And about 38 % of the working population was own account workers working in their farms working alone or with the help of family members but without hiring labor. The sources of labor were significantly different (P<0.05) agro ecologies.

Table 5.Labor sources for cattle managements in the study areas

Sources of labor	**Agro ecology, Average (%)**			
	Highland (N=60)	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**
Family	88.3 [c]	75.0 [b]	68.3 [a]	77.2
Both Family and Hired	11.7 [a]	25.0 [b]	31.7 [c]	22.8

Means on the same row with different superscripts were significantly different at P<0.05

4.1.6. Livestock composition and cattle herd structure

Livestock structures and compositions of the sampled households are presented in Table 6. Farmers in highland, midland and lowland had 41.23%, 44.10% and 55.06 % of cattle, respectively. This result showed that cattle were the most popular of the livestock population in the studied area, followed by chickens, sheep, donkey and goats; while, horse was the least popular livestock in the overall study areas. Cattle were more dominant in lowland (55.06 %) than in midland (44.10 %) and highland (41.23 %). The reason for the dominance of cattle in lowland was because cattle are the main income sources.

Table 6.Livestock composition of the household respondents

Variables	Highland		Midland		Lowland		Overall	
	Heads	%	Heads	%	Heads	%	Heads	%
Cattle	348	41.23	420	44.10	675	55.06	1443	47.73
Sheep	68	8.06	62	6.51	54	4.40	184	6.09
Goats	10	1.18	27	2.83	97	7.91	134	4.43
Donkey	49	5.81	47	4.93	43	3.51	139	4.59
Horses	20	2.37	22	2.31	26	2.12	68	2.25
Chicken	349	41.35	375	39.35	331	27.00	1055	35.00

Goats were more dominant in lowland (7.91 % of heads) than midland (1.18 % of heads) and highland (1.18 % of heads). The average number of horses (2.25 % of heads) was the least in the overall livestock structure. Among the overall average of the three agro ecology, the highest composition of livestock structure was cattle (47.73 % of heads) than other class of animals. The current finding for cattle population is smaller than 54.3% of the proportion of cattle from the livestock herd size in Arsi Zone by Teklay (2008) and it is more or less comparable to 48.6 % of heads in Illu Aba Bora Zone by Teshager (2012).

Table 7.Cattle herd structure by the household respondent's

Herd type		Highland		Midland		Lowland		Overall	
		Mean	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Breeding bulls		0.08	0.036	0.10	0.039	0.08	0.036	0.09	0.021
Oxen		0.70	0.060	0.63	0.063	0.53	0.069	0.62	0.037
Heifers		0.45	0.084	0.38	0.083	0.43	0.073	0.42	0.046
Cows		2.33 [a]	0.116	3.47 [b]	0.241	5.43 [c]	0.191	3.74	0.145
Calves	M	1.07 [a]	0.116	0.97 [a]	0.111	1.98 [b]	0.135	1.34	0.078
	F	0.90 [a]	0.111	0.98 [a]	0.127	1.78 [b]	0.141	1.22	0.079
Mean cattle holding /HH		5.53 [a]	0.290	6.53 [b]	0.486	10.25 [c]	0.377	7.44	0.272

**HH = household, SE= standard error of mean, M=male, and F= females; Means having different superscripts within the same row were significantly different at P<0.05.*

Mean cattle holding per household was significantly (P < 0.05) higher in lowland (10.25 heads) than in midland (6.53 heads) and highland (5.53 heads). The average cattle holding in highland (5.53 heads/ household) are lower than 10.8± 0.7 heads per household the study in Highlands and Central Rift Valley (CRV) of Ethiopia (Zewdie, 2010). The reason for lower average of cattle herd size per household in highland agro-ecology zone was due to vast crops farming activity in highland compared to the mid – altitude and lowland areas that use cattle for draught power. The mean cattle holding of the current study area was 7.44±0.272 heads per household which is more or less comparable to 7.3±3.84 heads per household in Fogera district (Teshome, 2009). However, the mean cattle holding in Illu Aba Bora Zone was 11.2±0.48 heads per household (Teshager, 2012) which is higher than the current finding. Regarding herd composition, the mean of breeding bull, cows, male calves, female calves, heifers and oxen were 0.09, 3.74, 1.34, 1.22, 0.42 and 0.62 heads per household, respectively. The mean cow holding per household of the current study is smaller than 4.10±2.04 heads per household in Metema district of North Gonder (Tesfaye, 2008).

4.1.7. Housing systems

Majority of (*73.9* %) of the respondents keep the cattle within their residences (Table 8). The households keeping the cattle in house of this study is greater than the study conducted in Fogera district (Belete, 2006) who reported 64% of the respondents keep the cattle in house. The practice of keeping of cattle with the farmers residence is differ from the practices in Illu Aba Bora Zone (Teshager ,2012) and in Jimma Zone (Oumer, 2011) which the majority of the respondents housed the cattle in open fenced barn and closed types of houses. Farmers in the study areas keep the cattle and other animals with their home residences due to fear of wild animals like hyena.

Table 8.Types of housing and its importance in the study areas

Factors	Agro ecology, Average (%)			
	Highland (N= 60)	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**
Type of Housing				
Keep cattle with people home	76.7	70.0	75.0	73.9
Others	23.3	30.0	25.0	26.1
Importance of Housing				
To protect hot climate	0.0	1.7	5.0	2.2
To protect cold climate	5.0	0.0	0.0	1.7
To protect animals from wild animals	38.3	43.3	56.7	46.1
To protect animals from theft	16.7	1.7	8.3	8.9
All of the above	40.0	53.3	30.0	41.1

**Others includes like keep the animal sole home in group , in separate home and outside barn .*

4.1.8. Purpose of cattle rearing in the study districts

Among the total, 52.2 % of the respondents indicate the purpose of rearing cattle is milk production. In lowland (30.0%) keeping the cattle for milk was significantly (P<0.05) different from midland (66.7%) and highland (60.0 %).

Table 9.Purpose of rearing cattle in the study areas

Purpose of keeping cattle	Agro ecology, Average (%)				
	Highland (N=60)	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**	**P**
For milk purpose	60.0 [a]	66.7 [a]	30.0 [b]	52.2	*
For meat purpose	0.0 [a]	0.0 [a]	5.0 [b]	1.7	*
For milk and meat purpose	8.3	30.0	11.7	16.7	*
For drought purpose	20.0 [c]	0.0 [a]	11.7 [b]	10.6	*
To income sources	11.7[c]	3.3 [a]	8.3 [b]	7.8	*
To increase the household income	0.0 [a]	0.0 [a]	28.3 [b]	9.4	*
To save the family against risk	0.0 [a]	0.0 [a]	1.7 [b]	0.6	*
To use as the sources of food	0.0 [a]	0.0 [a]	3.3 [b]	1.1	*

**Means on the same row with different superscripts were significantly different (* P<0.05)*

The households keeping cattle for the purpose of milk in the highland area of the current study (60.0%) is more or less comparable to 62 % of the households in the highland areas of Debre Birhan, Jimma and Sebeta (Zewdie, 2010). The current finding for the purposes of keeping cattle is more or less similar to the study conducted in Western Showa by Jirenga (2007), Horro district by Agere (2008) and Mekonnen *et al.,* (2012). The present result agreed with the study conducted in Illu Aba Bora Zone by Teshager (2012) who reported that the respondent's keep their cattle mainly for milk and traction.

4.1.9. Access of farmers to information and training

The source of information is a base to increase production and productivity in the small scale farmers especially in the rural part of the country. Majority of the respondents got information about improved cattle production from the kebele extension development agents (DA). About 72.8 % of the respondents got the information from the kebele development agents (DA) with no significant variation (P≥0.05) among the three agro ecology (Table 10). Only 10 % of the respondents got the information from farmers association; whereas 8.3 % proportion of the respondents obtained the information from others sources like when they go to town for market exchange and purchasing agricultural inputs. The remaining 8.3 % of the households did not have the information at all; they do have only their own traditional knowledge. Almost noon (0.6 %) of the respondents used Media (radio and newspaper) as the sources of information. The overall average of the respondents obtained the information from extension development agent (DA) of this study is greater than 33.7% in East Shoa Zone (Philimon, 2012). This result (10%) also shows comparatively high participation of farmer association in the area than obtained for the pastoral (4%) in Borena Zone (Daniel, 2008).

Table 10.Sources of information for cattle production for the study areas

	Agro ecology, Average (%)				
Information sources	**Highland (N=60)**	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**	**P**
Radio	1.7 [b]	0.0 [a]	0.0 [a]	0.6	*
Farmer's association	20.0 [b]	5.0 [a]	5.0 [a]	10.0	*
Extension agents(DA)	78.3	73.3	66.7	72.8	ns
None	0.0 [a]	0.0 [a]	25.0 [b]	8.3	*
Others	0.0 [a]	21.7 [c]	3.3 [b]	8.3	*

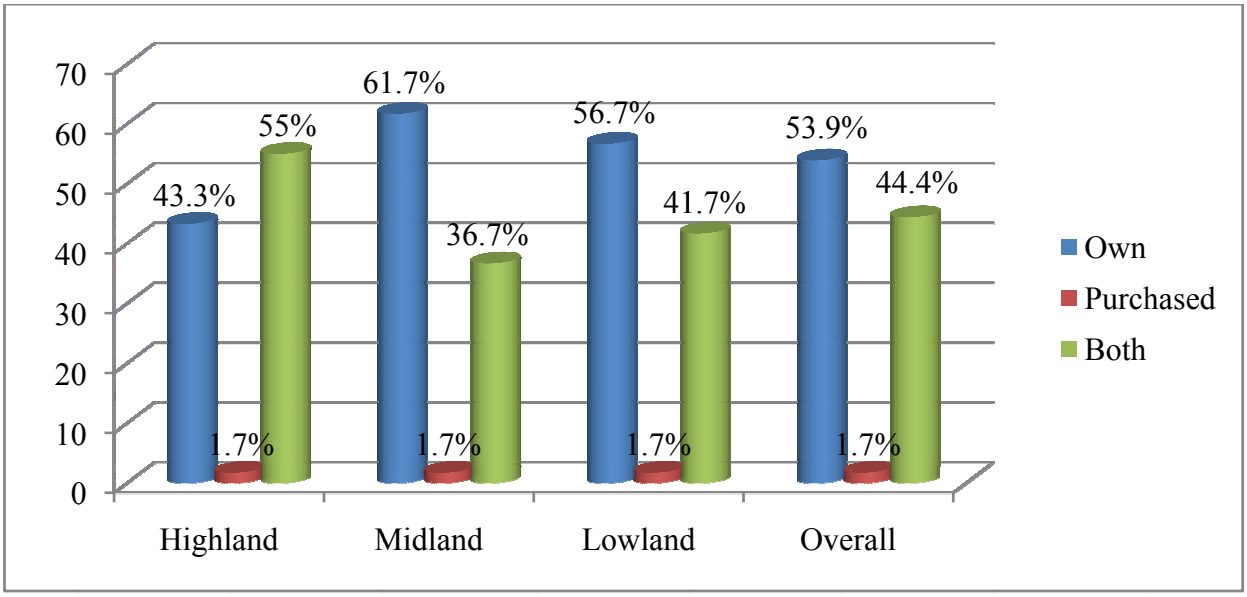
**Means on the same row with different superscripts were significantly different at P<0.05; others includes farmers got the information when they go to town for market exchanges, DA= Development agent; ns= not significant.*

4.2. Feed Sources in the Study Districts

Crop residues and natural forage crop species are the main feed sources for cattle.

4.2.1. Feed sources used for cattle in the study areas

About 53.9 % of the total respondents used their own forages and others feed sources as the sources of feeds for their cattle (Figure 4). Some of the respondents who have additional income sources; they purchased concentrates as the supportive feed sources. Only 1.7 % of the total respondents used the industry by products and others feed sources. In midland, there is the highest proportion of the households (61.7 %) was detected for using own feed production than highland (43.3 %) and lowland (56.7 %). Majority of the respondents in the study areas afford their money for crop production inputs like fertilizer, improved variety seeds, herbicides and pesticides due to this reason there is smallest proportion of the households is detected for purchasing cattle feeds. The proportion of the households used both (own and purchased) of the feed sources found in the current study is smaller than 76.4% in East Showa Zone by Philimon (2012).



Where; X-axis = Agro ecology and Y- axis = Sources of cattle feeds

Figure 4.Sources of feeds in the study areas

4.2.2. Types of crop residues and feeding practices

Different types of crop residues which are used for cattle feed are presented in Table 11. Concerning importance of different types of crop residues across the different agro ecologies, higher proportion of wheat straws was used in highland (73.3 %) and followed by midland (33.3 %), but it has no contribution in lowland due to the variation in suitability of altitudes for growing the various crops. But, higher proportion of maize stalk (51.7 %) was used in lowland. In addition to that the availability of ample sources of wheat straws in highland, farmers use the straws for urea treatment as supportive feed sources for dairy cattle especially the feed shortage occurred during the dry season.

In highland and midland, farmers give priority to pregnant and lactating dairy cattle for feeding the residues and then followed by drought animals. Only 5.0 % of the total respondents use the faba bean straws as the sources of cattle feed; whereas 6.1 % of the respondents use teff straws, especially for fattening by combining with industry by products like noog cake and wheat bran. The highest proportion of the respondents (15.0%) is detected in lowland that were used teff straws.

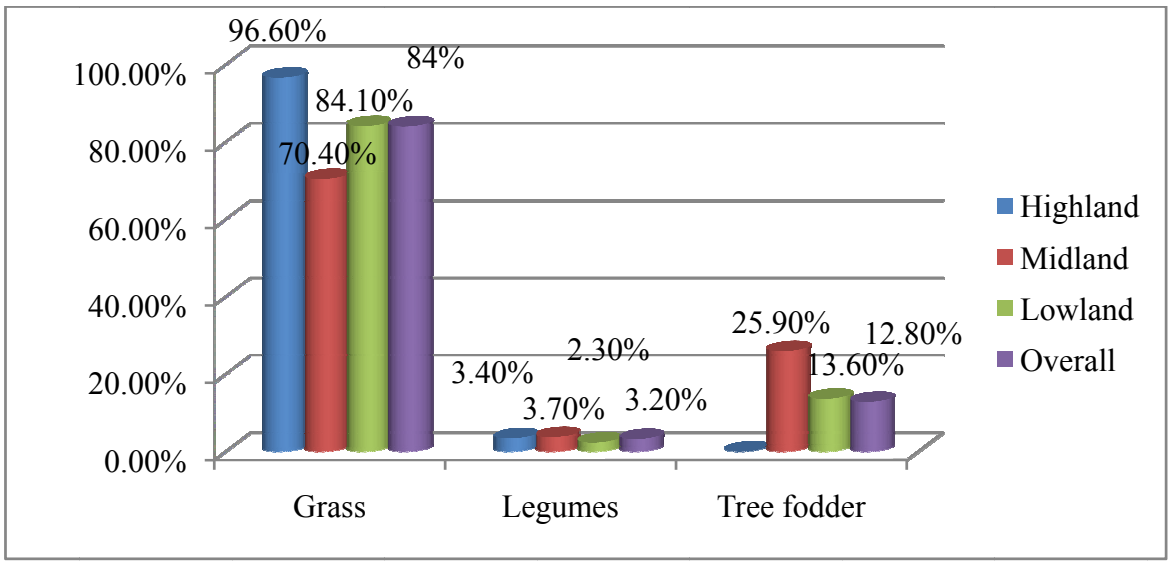
Table 11.Types of crop residues used for cattle feeds in the study areas

Types of crop residues	**Agro ecology, Average (%)**			
	Highland (N=60)	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**
Teff straw	0.0	3.3	15.0	6.1
Barley straw	15.0	0.0	0.0	5.0
Wheat straw	73.3	33.3	0.0	35.6
Maize stalk	1.7	38.3	51.7	30.6
Faba bean straw	10.0	5.0	0.0	5.0
Sorghum stalk	0.0	20.0	33.3	17.8

4.2.3. Experience of farmers on the development of fodder crops

Majority of the farmers in the study areas practiced the development of forages. Among the overall, 84.0 %, 3.2 % and 12.8 % of the respondents established grass, forages legumes and tree fodder crops, respectively. In highland, 96.6% of the respondents established improved grass and it is greater than midland (70.4%) and lowland (84.1%). The current result for cultivated improved grass is higher than the study in Illu Aba Bora Zone (Teshager, 2012) who reported 61.7% the respondents use the improved grass.

Due to easy management for feeding and dual purpose for soil conservation and animal feed sources the farmers in the studied areas preferred the improved grass .As far as the development of forages legumes is concerned; it is more or less comparable in midland (3.7%), highland (3.4%) and lowland (2.3%) (Figure 5). There was no any respondents replied for tree fodder development in highland; whereas there was 25.9% in midland and 13.6% of the households in lowland established improved fodder trees for their cattle feeds.



Where; X –axis = Types of improved forages and Y – axis =Agro ecology

Figure 5.Types of fodder crops used for cattle feeds

4.2.4. Types of feed supplements used for cattle

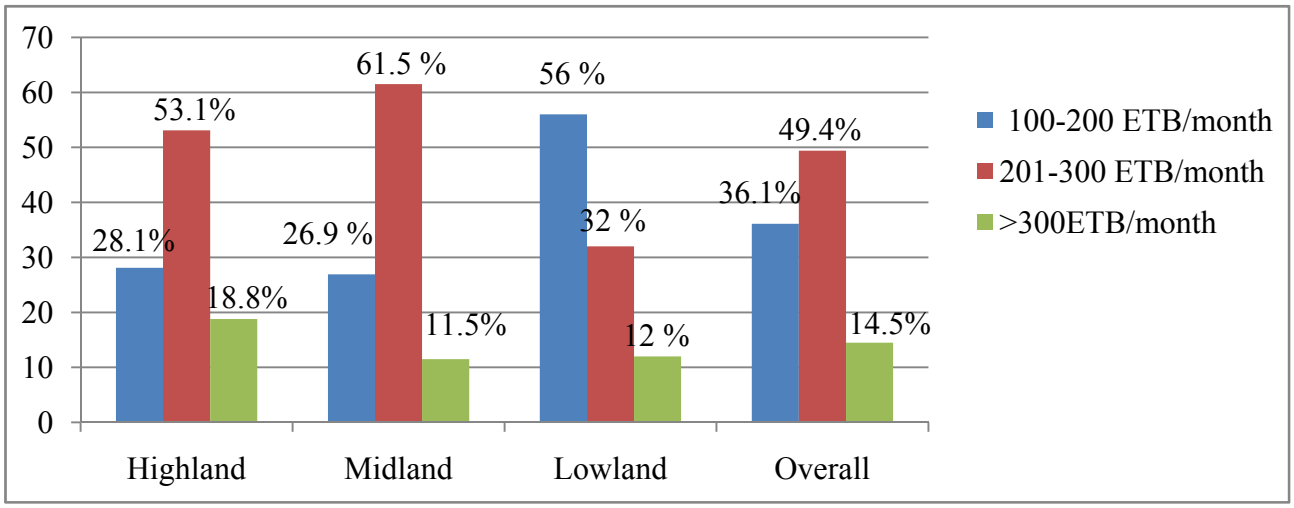
Among the overall, 46.7% of the respondents used supplements for their cattle in addition to the forages and crop residues; whereas the remaining 53.3 % of the respondents didn't purchase the supplements due to different reasons like financial problems ,distances to the place of market and the small number of animals. The concentrates used for cattle are cotton seedcake, noog cake and wheat bran. Overall 98.8% of the respondents purchased wheat and corn bran and the remaining *(N=1)* only 1.2 % purchased cotton seed cake for different purposes for their cattle feeding. Farmers in the study areas purchased different types of supplements for different types of cattle (for lactating cows, pregnant cows, male calves, beef cattle and others types of cattle) Table 12.

Table 12.Feed supplementation practices by respondents in the study areas

Factors	Agro ecology, Average (%)			
	Highland (N=60)	**Midland (N=60)**	**Lowland (N=60)**	**Overall (N=180)**
Do you purchase supplements?				
Yes	55.0	43.3	41.7	46.7
No	45.0	56.7	58.3	53.3
Types of supplements				
Cotton seed cake	3.0	0.0	0.0	1.2
Wheat and corn bran	97.0	100	100.0	98.8
Class of cattle fed the Supplements				
Lactating Cows	68.8	73.1	84.0	74.7
Pregnant Cows	0.0	3.8	0.0	1.2
Male calves	3.1	0.0	0.0	1.2
Beef cattle	28.1	7.7	16.0	18.1
Others	0.0	4.8	0.0	4.8

**Others includes female calves, sheep and goats*

Farmers in the study areas spent some amount of money to purchase cattle feeds. Among the overall respondents (*N=180*), 36.1 % of the households spent from 100 to 200 ETB per month. As far as the cost for purchasing the feed is concerned there was no any significant (P≥0.05) variation among the three agro ecology (Figure 6). Farmers could not afford more amounts of feed costs due to lack of enough capital.



Where; X- axis = Agro ecology and Y- axis =Costs afford

Figure 6.Costs spent for purchasing cattle feeds

4.3. Waters sources

Majority of the respondents (77.8 %) use water for their cattle from the river (Table 13). The remaining 10.6 %, 2.8 % and 8.9 % use water for their cattle from ponds, ground walls and others sources like spring water and tape water, respectively. The highest proportion (86.7%) of the households use the river as the source of water for their cattle was found in lowland. The source of water from river in the highland area of the current study is higher than 40 % of the households in the highland areas of DebreBerhan, Jimma and Sebeta by Zewdie (2010). The total average of the households use the river of the current finding is greater than 23.9 % of the households in East Shoa Zone by Philimon (2012). About 52.3 % of the respondents faced scarcity of water during the dry period. This result is higher than 34% of the households in Ilu Aba Bora Zone by Teshager (2012).

Farmers used different techniques in order to overcome water shortage problems. Among the methods of employed to cope with the problem includes:-digging the ground water (4.2 %), by moving long distances (54.5 %) and 41.2 % of the households by providing moist plants like *enset* leaves and roots parts. Farmers in the study area spend more time in order to find watering point particularly during the dry period. Majority of the respondents (69.0 %) travelled a distances of 0.25 to 1 kilometer to the watering point. In the Highlands and Central Rift Valley (CRV) of Ethiopia (Zewdie, 2010), 54 % of the respondents could trek their cattle a long distances greater than 5 kilometers per day for drinking which is greater than the current study. In addition to water scarcity there was also some water related problems in the study areas (Table 13). Among the problems, there were problems related to parasites, unhygienic (impurity) and others like wastages during transportations.

Table 13.Water sources, ways of drinking and related problems in the study areas

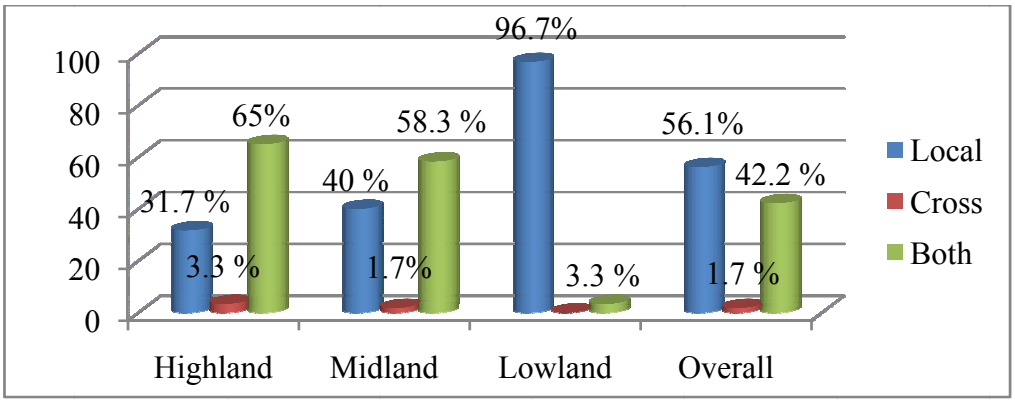
Variables	Agro ecology							
	Highland		Midland		Lowland		Overall	
	HHC	%	HHC	%	HHC	%	HHC	%
Sources of water								
Nearby river	42	70.0	46	76.7	52	86.7	140	77.8
Pond	4	6.7	11	18.3	4	6.7	19	10.6
Walls	2	3.3	0	0.0	3	5.0	5	2.8
Others	12	20.0	3	5.0	1	1.7	16	8.9
Water related problems								
Scarcity	42	70.0	35	60.3	16	26.7	93	52.3
Parasites	3	7.0	3	7.0	37	61.7	43	24.2
Unhygienic or impurity	15	25.0	16	27.6	7	11.7	38	21.3
Others	0	0.0	4	6.9	0	0.0	4	2.2
Length of water points								
From 0.25 to 1.0 kilometers	37	67.3	50	84.7	33	55.0	120	69.0
From 1.0 to 2.5 kilometers	17	30.9	6	10.2	17	28.3	40	23.0
From 2.6 to 4.0 kilometers	1	1.7	3	5.1	10	16.7	14	8.0

4.4. Cattle Breeds and Breeding Techniques in the Study Areas

4.4.1. Breeds of cattle

Because of simple management, in the current study 56.1% of the households used the indigenous breed for production; while the remaining 42.2% and 1.7 % use both of the breed and the cross breed, respectively (Figure 7). The existences of local breed in lowland were higher (96.7%) than in midland (40.0 %) and highland (31.7 %). This is probably due to the agro ecology of the district is totally lowland and farmers are forced to gives high attention to livestock since their source of income was mainly cattle. With similar study in Ilu Aba Bora Zone (Teshager, 2012) and in East Shoa Zone (Philimon, 2012) due to the agro ecology effect of the areas, in lowland there was relatively the highest proportion of the indigenous breed of cattle were dominant.

The existence of local breed detected in lowland area of the current study (96.7 %) is smaller than 100 % of the households used the local breed in the lowland area of central rift valley (Ziway) by Zewdie (2010). The total average of the households having cross breed for the present study (1.7 %) is more or less comparable to 1.1 % of the households in Ilu Aba Bora Zone (Teshager ,2012).



Where; X- axis =Agro ecology and Y- axis = Breed of cattle

Figure 7.Breeds of cattle owned by the households in the study areas

4.4.2. Breeding techniques

Two types of breeding techniques are practiced in the study area. These are natural breeding and artificial insemination.

Out of the overall respondents *(N=180)* of the current study 50.6 % of the households use natural mating only. There was a significant *(*P<0.05*)* variations among the three agro ecology in using the natural mating (Table 14). Due to lower accessibility to artificial insemination services; lowland farmers preferred the natural mating in order to adapt their environment. Using of natural mating for the current study is lower than 98.3 % of the households use in the natural mating for the study area in North Gonder (Azage *et al.*,2009).

For the natural breeding techniques farmers selected the best type of bull in the area based on the performance of the bull. They are also used some behavior; body confirmation, milk production and the drought power potential of the bull as criteria of selection.

Table 14.Types of breeding techniques employed by farmers in the study areas

Breeding Techniques	**Agro ecology**								
	Highland		**Midland**		**Lowland**		**Overall**		**P**
	HHC	**%**	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**	
Natural mating only	34	56.7 [a]	21	35.0 [b]	36	60.0 [a]	91	50.6	*
Artificial insemination	0	0.0	2	3.3	0	0.0	2	1.1	**ns**
Both techniques	26	43.3 [a]	37	61.7 [b]	24	40.0 [a]	87	48.3	*

**Means on the same row with different superscripts were significantly different (P<0.05), HHC=Household count and ns= not significant*

About 1.1 % of the households used the artificial insemination technique; whereas 48.3 % of the respondents use either of the two techniques (Table 17) based on availability and feasibility. There was no significant variation in using of AI systems ($P \geq 0.05$) among the three agro ecologies. The use of AI in the current study was lower than similar study made in Fogera *Woreda* (9.4%) by Belete (2006). Among the reasons mentioned by the farmers for not using effective AI technique are; lack of any information about it (5.3 %), 71.6 % of the households have other options to get the improved breed, 3.2 % of the households don't have any interest to use AI, 14.7 % of the households replied that the environment disfavor the managements of improved breed and 5.3 % of the households raised others different reasons.

4.5. Productive and Reproductive Performance of Dairy Cattle

4.5.1. Milk yield

The mean daily milk yield of the indigenous cow in the study area was 1.76± 0.043 liters/cow/day (Table 15). The current finding is higher than 1.65 liters per day by Horro cattle in Western Oromia (Mekonnen, *et-al.*, 2012) and 1.31±0.03 liters/cow/day in Ilu Aba Bora Zone by Teshager (2012). The average milk yield of the indigenous cow per day in highland (2.09 liters /cow /day) was significantly higher than midland (1.86 liters/cow/day) and lowland (1.35 liters/cow/day). The larger amount of milk per cow produced in the highland area was due to the smaller density of cattle kept in a place of barn and grazing area than the mid land and the low land areas. In highland, there is also good provision of management in relation to feeding, watering, housing for lactating cows. The overall mean milk yield of a local cow for the current study is more or less comparable to 1.76± 0.89 liters/cow/day the study conducted in Dandi district by Belay *et al.,* (2012) and it is less than1.9± 0.045 liters/cow/day in Metema District by Tesfaye (2007).

4.5.2. Lactation length

The average lactation length of a local cow in highland (9.2 ±0.159 months) was significantly higher (P<0.05) than midland (8.2 ±0.147 months) and in lowland (7.2 ±0.124 months).This could be attributed to good provisions of managements in relation to feeding for lactating cow in highland than partially to midland and lowland .The overall average lactation length of indigenous cows in the study areas was 8.2 ±0.103 months (Table 15). The overall average lactation length of local cows of the current study is smaller than 9.5 months in East Shoa Zone Oromia (Lemma *et al.,* 2005) and 9.57 months for Horro cattle in Western Oromia by Mekonnen, *et al.,* (2012).

4.5.3. Lactation yield

The lactation yield of local cow was significantly different (Appendix 6) among the three agro ecology (P<0.05).The average lactation yield in liters per cow found in highland (542.56±3.928) was significantly (P<0.05) higher than in midland (391.48±8.037) and in lowland (309.34±16.529). The mean lactation yield of indigenous cow for the current study was 420.47±11.831 liters (Table 15), which is greater than a similar study in Degem (399.5 liters/ cow /lactation) district by Ababu *et al.,* (2004) and 324.0±10.274 liters per cow per lactation in Metema District by Tesfaye (2007). In contrary, the result found in the current finding is smaller than 475.85 liters of Horro cattle as verified in Western Oromia by Mekonnen, *et al.,* (2012).

4.5.4. Weaning age

There was significant variations (Appendix 7) among agro ecology on weaning age of the calves at (P<0.05). The total weaning age of a calf for this study was 7.75±0.086 months and it is smaller than 10.57 ± 0.13 months in Ilu Aba Bora Zone (Teshager, 2012). In highland, the average weaning age of a calf was higher than midland and lowland. The weaning age was delayed in the highland due to the longer lactation period of cow so that the calves being suckled for longer time compared to the mid land and lowland. The calves were also kept in the barn with the dam so that they have the opportunities to get the dam and suckle.

Table 15.Productive and reproductive performance of indigenous cows

Variable	Agro ecology							
	Highland		Midland		Lowland		Overall	
	N	Mean(SE)	N	Mean(SE)	N	Mean(SE)	N	Mean(SE)
DMY (liters)	60	2.09 (0.044) [c]	60	1.86 (0.059) [b]	60	1.35 (0.049) [a]	180	1.76(0.043)
LY (liters)	60	542.56 (3.928) [c]	60	391.48 (8.037) [b]	60	309.34(16.529) [a]	180	420.47(11.831)
WA (months)	60	8.37 (0.158) [c]	60	7.65 (0.154) [b]	60	7.23(0.090) [a]	180	7.75(0.086)
LL (months)	60	9.18 (0.159) [c]	60	8.19 (0.147) [b]	60	7.19(0.124) [a]	180	8.19(0.103)
AFC (months)	60	50.95(0.503) [a]	60	55.18(0.725) [b]	60	60.27(0.506) [c]	180	55.47(0.441)
CI (months)	60	19.72(0.231) [a]	60	20.43(0.147) [b]	60	21.40(0.284) [c]	180	20.52(0.141)

Productive and reproductive performances of local cows with different superscript within the same row were significantly different (P<0.05); N = Number of respondent, SE = Standard error, DMY =Daily milk yield, LY =Lactation yield, WA =Weaning age of calves LL =Lactation length, AFC = Age at first calving and CI= Calving interval.

4.5.5. Age at first calving (AFC)

The mean age at first calving of a local cow in lowland was significantly higher than midland and highland (P<0.05). This is because in lowland there was high population of cattle so that the larger proportion of cattle density grazes in the small area of grazing and the management was also poor as compared to other areas. In highland and midland due to the availability of good sources of forages, back yard grass (legumes) and small number of cattle grazing per square area of the grazing land the cows may be achieved early relative to the lowland.

The overall mean age at first calving of cows in the study area was 55.47 ± 0.441 months and it is higher than 47.61 months for local Fogera cow at Metekel Ranch by Addisu and Hegede (2003) and the study conducted at Andessa Cattle Breeding and Improvement Ranch (ACBIR) (40.6 ± 8 months) for Fogera Breed (Gebeyehu *et al*., 2005). Similarly, the overall mean age at first calving of cows obtained the present finding was also higher than result reported value 50.83 ± 0.36 months at Metekel Cattle Breeding and Multiplication Ranch by Melaku *et al.*,(2011) .

4.5.6. Calving interval (CI)

The mean calving interval of a local cow in midland, highland and lowland were 20.43 ±0.147, 19.72±0.231and 21.40±0.284 months, respectively and significantly different (P<0.05). This variation could be associated with the difference in management practices like feeds and feeding systems and stress conditions such as high temperature and draught. For this reason duration of calving interval is too long in lowland area.

The overall mean calving interval (CI) of the local cows obtained in the present study was 20.52± 0.141 months (Table 15) .The result found in the current study is higher than the reports of Getinet *et al.*, (2009) for Ogaden cattle (492± 13.2 days) and the mean calving interval (18.76±0.23) months in Illu Aba Bora Zone by Teshager (2012) . In contrary, the result is smaller than 22.19±7.73 months of the study in Dandi district by Belay *et al.,* (2012). The calving interval of a local cow in the study areas were significantly different (P <0.05) in the three agro ecology (Appendix 8).

4.6. Milk and Milk Handling Practices

4.6.1. Milking practices

Farmers in the study areas practice milking two to three times per day (Table 16). Milking takes place in the morning between 7:30 to 9: 30 A.M, in the mid day from 1:30 to 2:30 P.M and finally at the night from 8:30 to 10:00 P.M. Farmers used different techniques in order to get more milk like provisions of good forages before milking. The majority of the households in the studied areas practiced hand milking.

Among the respondents, 76.1% of the households practiced morning and evening milking (Table 16). Twice a day milking was practiced among fewer households compared to those reported from Illu Aba Bora Zone (Teshager, 2012).

4.6.2. Milk processing practices

The time taken for the fermentation of milk, butter yield and the length of butter storage in different areas is presented in Table 16. From the total respondents, 90.0 % of the households have experience of producing cottage cheese. In the study area majority of the households' kept the milk to sour before churning. About, 77.8 % of the households know the purpose of fermenting milk; whereas the remaining 22.8 % have limited knowledge on the value of fermentation.

The reasons for fermenting milk is to facilitate butter making process and the sour milk gives good pleasant aroma and taste for the different milk products. In addition to that the process of fermentation should be necessary to obtain other milk derivatives like butter milk, cheese and whey. The fermentation process also increases the shelf life of the milk products for instances butter and cheese.

In the study area, farmers used different ways to determine whether the fermented milk is ready for churning or not. Among these techniques, 51.5 %, 25.7 %, 19.2% and 3.6 % of the total respondents used firmness of the fermented milk, milk volume, others like smell of milk

and the color of milk, respectively. Majority of the farmers determine the readiness of fermentation milk for churning by the way firmness of the curd.

Table 16.Frequency of milking and milk processing in the study areas

Variables	Agro ecology							
	Highland		Midland		Lowland		Overall	
	HHC	%	HHC	%	HHC	%	HHC	%
Milking Time	N=60		N=60		N=60		N=180	
Morning and evening	54	90.0	41	68.3	42	70.0	137	76.1
Morning, Mid day and evening	6	10.0	19	31.7	18	30.0	43	23.9
Do you process milk?								
Yes	60	100.0	55	91.7	47	78.3	162	90.0
No	0	0.0	5	8.3	13	21.7	18	10.0
Do experience on fermented milk?								
Yes	59	98.3	42	70.0	39	65.0	140	77.8
No	1	1.7	18	30.0	21	35.0	40	22.2
Indicators of milk ready for process								
Volume of the FM	27	45.8	11	19.6	5	9.6	43	25.7
The color of the FM	4	6.8	0	0.0	2	3.8	6	3.6
Firmness of curd	28	47.5	30	53.6	28	53.8	86	51.5
Others	0	0.0	15	26.8	17	32.7	32	19.2

FM=fermented milk and others include smell of milk and also the color of milk

4.6.3 Milk equipment for churning

Majority of the respondents use clay pot for churning process of fermented milk. Among others, 87.2 % of the households use clay pots for the churning process (Table 17).

Table 17.Types of milk equipment used for churning in the study areas

Types of churning equipment	Highland		Midland		Lowland		Overall	
	HHC	**%**	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**
Clay pots	55	91.7	53	88.3	49	81.7	157	87.2
Others	5	8.3	7	11.7	11	18.3	23	12.8
Total	60		60		60		180	

**HHC= household counts; others includes churning materials made from wooden*

During churning, when there is the formation of gas in the pot; farmers avoid these accumulation of gas with a small hole just on top of the pot which was fixed with a wooden plug then within a short time interval they released the gases for a few minutes until the pressure built inside the pot was totally released. Also again, the wooden plug was pulled out to release a few drops of milk and to check whether butter granules have been formed or not. While checking whether the butter granules are there or not; a drop of the processed milk was rubbed between the thumbs and pointing finger to see the fat formed or not.

Figure 8.Churning equipment (clay pot) and locally processing of sour milk by women

4.6.4. Frequency of churning

The farmers in the study areas churn the fermented milk in the morning to prevent the melting of butter granules during the churning process. The highest churning frequency was found within three days interval in both seasons (Table 18).

Table 18.Churning frequency of milk during dry and wet season

Variables	Highland		Midland		Lowland		Overall	
	HHC	%	HHC	%	HHC	%	HHC	%
Churning frequency in dry season	N=60		N=60		N=60		N=180	
Once in a week	6	10.0	9	15.5	13	25.0	28	16.5
Every three week	3	5.0	0	0.0	9	17.3	12	7.1
Within three days	34	56.7	11	19.0	10	19.2	55	32.4
Within four days	14	23.3	26	44.8	4	7.7	44	25.9
Others	3	5.0	12	20.7	16	30.8	31	18.2
Churning frequency in wet season								
Once in a week	0	0.0	2	3.4	1	1.9	3	1.8
Every 24 hours	10	16.7	15	25.9	37	71.2	62	36.5
Within three days	44	73.3	28	48.3	5	9.6	77	45.3
Within four days	5	8.3	2	3.4	0	0.0	7	4.1
Others	1	1.7	11	19.0	9	17.3	21	12.4

**HHC= household count; others include the frequency of churning is fluctuated*

4.7. Milk and Milk Products Marketing Systems

4.7.1. Milk marketing

Experience of selling milk and its products in the study areas are presented in Table 19 and Appendix 9. Majority of the household respondents sold milk only after processing instead of raw because of low availability, market access, cultural taboos of saling raw milk , etc. In similar study made in Metema District (Tesfaye, 2007), only 2.2 % of the respondents brought the whole milk to the market; whereas the current study higher proportion of the households sale whole milk. In contrary, 61.3 % of the households sold raw milk in North Gonder (Azage *et al.,* 2009) which is significantly higher than the present finding. During focused group discussions, farmers in highland indicated that, selling of the whole milk is not accepted due to traditional taboos; whereas in midland and lowland only some of the respondent's sold the milk in order to full fill their household income.

4.7.2. Milk product marketing

About, 72.6 % of the households preferred to sell butter than other dairy products (Table 19). This is due to the fact that famers can earn better income from sales of butter as compared to other milk products. As far as cottage cheese market is concerned, 17 %, 14 % and 8 % of the households in Doyogena, Tembaro and Damboya districts sell cheese, respectively. During focus group discussions majority of the farmer's sale butter during holidays especially in *Meskel ("Mesala")* because they can earn better income due to higher prices of butter. In highland and midland farmers stored butter for a long period of time in order to have butter with good aroma and taste. Butter selling practice of these farmers is lower compared to reports from North Gonder by Azage *et al.,* (2009).

Table 19.Experience of selling dairy products in the study areas

Variables	Agro ecology							
	Highland		Midland		Lowland		Overall	
	N	%	N	%	N	%	N	%
Do you sell milk?								
Yes	0	0.0	11	18.3	7	11.7	18	10.0
No	60	100.0	49	81.7	53	88.3	162	90.0
Reason for not selling milk								
Duet to traditional taboos	2	3.3	0	0.0	14	26.9	16	10.0
Shortage of milk	26	43.3	30	62.5	26	50.0	82	51.2
Accessibility to market	13	21.7	9	18.8	12	23.1	34	21.2
Due to distance of the market	18	30.0	4	8.3	0	0.0	22	13.8
Others	1	1.7	5	10.4	0	0.0	6	3.8
Dairy product marketed								
Raw milk	0	0.0	2	3.8	0	0.0	2	1.3
Fermented milk	1	1.7	0	0.0	0	0.0	1	0.6
Butter	41	69.5	42	80.8	31	67.4	114	72.6
Butter milk	0	0.0	0	0.0	1	2.2	1	0.6
Cheese	17	28.8	11	18.3	14	30.4	39	24.8

**N= number of respondent households; others includes due to different reasons*

4.8. Beef Cattle Fattening

Beef cattle fattening was not wel developed in the study areas. Only 39.4 % of the households had experience on fattening. The major reasons include shortage of feed; financial problem, they may have other agricultural activities to do, luck of information about its advantages and sufficient family labor sources (Table 20). In Borana Zone Daniel (2008) reported that 52% of the respondents had experienced cattle fattening. The number of households practicing beef fattening is smaller than the households in Illu Aba Bora Zone and reported by Teshager (2012).

Table 20.Beef fattening practices in the study area

Variables	Agro ecology						Overall	
	Highland		Midland		Lowland			
	HHC	%	HHC	%	HHC	%	HHC	%
Do you practice fattening?								
Yes	29	48.3	18	30.0	24	40.0	71	39.4
No	31	51.7	42	70.0	36	60.0	109	60.6
Reason for not practicing fattening								
Due to lack of its advantages	0	0.0	3	7.1	0	0.0	3	3.0
Due to feed shortages	12	52.2	18	42.9	22	61.1	52	51.5
Due to others duties	4	17.4	8	19.0	9	25.0	21	20.8
Due to lack of labor sources	1	4.3	1	2.4	0	0.0	2	2.0
Due to financial problem	6	26.1	12	28.6	5	13.9	23	22.8

In the area fattening program was, mainly practiced by those farmers or traders who are engaged on petty trade business. Farmers participate on fattening business using male calves after end of plowing crop lands. Farmers involved in fattening business usually purchase emaciated oxen when the price of cattle decreases. This indicates that the potential gain during intensive feeding could be lower than the cost incurred unless such efficiency would be justified through further research. In highland livestock sources for fattening mainly come

from the market and own sources (calves age after weaning); whereas in midland and lowland, cattle for fattening were purchased from the market and farm community.

As far as the type of breeds is concerned for fattening, the indigenous breeds were preferred for fattening in the area because local breed was easy for management and in terms of availability. They also added that the local breed consume little amount of feeds as compared to the cross breeds. The other things the farmers raised for their preferences of the local breed was that they can use and consume any roughages that farmers provide and they can tolerate when there is shortage of water and feeds.

4.8.1. Beef cattle market

The beef market in the study area include local kebele market, each respective woreda market, main market at Durame town and Wolaita market at Areka site. In all the study areas, majority of the respondents (71.8%) brought their fattened beef cattle to their respective districts market. The following Table 21 shows the distributions of the respondents' site selections for their market places.

Table 21.Market site for selling fattened beef cattle in the study areas

Market sites	**Agro ecology**							
	Highland		**Midland**		**Lowland**		**Overall**	
	HHC	**%**	**HHC**	**%**	**HHC**	**%**	**HHC**	**%**
Local kebele at village	3	5.7	0	0.0	1	2.3	4	2.7
Woreda town	40	75.5	39	73.6	28	65.1	107	71.8
Durame	0	0.0	1	1.9	0	0.0	1	0.7
Doyogena and Hossana	4	7.5	13	24.5	14	32.6	31	20.8
At Areka	6	11.3	0	0.0	0	0.0	6	4.0

The price of fattened beef cattle in different market site was variable at different market site as well as season. The price for fattened beef cattle in the three selected study district's market ranged between 4500 and 9500 ETB. On average the price of fattened beef cattle in these market areas at different time was in between 6500 to 9500 ETB. This price of fattened beef cattle was higher than similar study in Fogera districts (1600 and 1800 ETB) made by Belete (2006) probably due to variation in time and place of data collection.

4.9. Major Constraints for Cattle Production and Marketing Systems in the Study Areas

As per the information from the respondents during focus group discussions and secondary data from the respective studied areas, there were a number of factors affecting cattle productions and marketing systems. The most important cattle production and market constraints mentioned by the farmer's were; feed and water shortage especially during the dry season, breed improvement (poor performance of the indigenous cow) , shortage of grazing land , diseases and lack of infrastructures like roads and accessibility to market (Table 22) .

4.9.1. Feed shortage

Feed shortage is more sever in the months of January to March and in some cases April and June .To prevent the problems farmers provided the available *enset* root parts because it can hold moist and the farmers also provided different types of crop residues like wheat straw, barley straw, teff straw by mixing with some local beer by products ''*atella"* and maize stock. Farmers used some improved forages in order to alleviate the feed shortages but such efforts are minimal. About 18.9 % of the total respondents faced feed shortage for their cattle particularly during the dry period (Table 22). In Borana Zone by Daniel (2008), 44.7 % of the respondents faced feed shortage which is higher than the current study.

Table 22.Major constraints for cattle production and marketing systems in the study areas

Constraints	Agro ecology, (%)															
	Highland				Midland				Lowland				Overall			
	R1	R2	R3	Index	R1	R2	R3	Index	R1	R2	R3	Index	R1	R2	R3	Index
Feed shortage	18.3	41.7	38.3	0.294	20.0	31.7	25.0	0.247	13.3	15.0	30.0	0.167	18.9	29.4	31.1	0.244
Water scarcity	10.0	3.3	11.7	0.081	25.0	11.7	15.0	0.189	26.7	8.3	16.7	0.189	20.6	7.8	14.4	0.153
Lack of capital	8.3	3.3	8.3	0.066	3.3	0.0	6.7	0.028	0.0	0.0	5.0	0.008	3.9	1.1	6.7	0.034
Disease	3.3	3.3	11.7	0.047	3.3	30.0	15.0	0.142	41.7	33.3	1.7	0.322	16.1	22.2	9.4	0.099
Breed improvement	6.7	6.7	10.0	0.073	28.3	16.7	23.3	0.236	13.3	38.3	25.0	0.236	16.1	20.6	19.4	0.182
Infrastructures	18.3	11.7	6.7	0.142	11.7	5.0	3.3	0.081	5.0	5.0	20.0	0.075	11.7	7.2	10.0	0.099
Market accessibility	1.7	5.0	1.7	0.028	1.7	3.3	5.0	0.028	0.0	0.0	1.7	0.003	1.1	2.8	2.8	0.019
Shortage of grazing land	28.3	25.0	11.7	0.244	6.7	1.7	6.7	0.050	0.0	0.0	0.0	0.000	11.7	8.9	6.1	0.098
Total	100.0	100.0	100.0	1.00	100.0	100.0	100.0	1.00	100.	100.0	100.0	1.00	100.0	100.0	100.0	1.00

Index = *[3 for rank 1) + (2 for rank 2) + (1 for rank 3)] for each of the factor divided by sum of all of the factors.*

**R1, R2 and R3 are the first, second and third ranked constraints, respectively.*

Coping mechanisms for feed shortage is summarized in the following Table 23. About 77.6 % of the respondents use provisions of water enriched plants like *enset*; whereas the remaining 22.4 % of the respondents use multiple responses (storing crop residues, by hay making and providing urea treated straws especially in midland and highland areas). Similar coping mechanism was reported from the study in Borana Zone by Daniel (2008).

Table 23.Strategies used to alleviate feed shortage

Strategies	**Agro ecology, Average (%)**			
	Highland	**Midland**	**Lowland**	**Overall**
	(N=60)	**(N=60)**	**(N=60)**	**(N=180)**
Providing *enset*	55.2	88.7	92.0	77.6
Multiple responses	44.8	11.3	8.0	22.4
Total	100.0	100.0	100.0	100.0

*Multiple responses includes providing; stored hay, crop residues, urea treated straws and backyard forages * significantly different at P<0.05*

4.9.2. Water shortage

About 20.6 % of the total respondents ranked the water scarcity in the first major constraints (Table 22). In Borena Zone (Daniel, 2008), 40.7 % of the households raised water is the major problem in the area and which is higher than the current finding. Water shortage was the major problem for midland and lowland farmers particularly during the dry season. In lowland area of central rift valley (Ziway) by Zewdie (2010) indicated 15 % of the households raised water shortage was the main constraint for their area and which is smaller 26.7 % of the household in the current finding of lowland area.

4.9.3. Breed improvement

Poor performances of the indigenous cows were the major constraint for improvement milk production and productivity in the study areas. From the total, 16.1 % of the respondents ranked the breed improvements in the first major constraints for the improvement of the indigenous cow (Table 22). Breed improvement was ranked in the first major constraint in midland (28.3%) then followed by lowland (13.3%) and highland (6.7%) .

4.9.4. Diseases

Even if the types of diseases were different among the agro ecology, the interviewed households respond that, they have faced different types of cattle diseases in their areas. From the total, 16.1 % of the respondents replied diseases were the major constraints for their cattle production. About 41.7 % of the respondents in lowland ranked diseases in the first major constraints (Table 22).

Based on the secondary data collected from each respective district's governmental health clinic; the types of cattle diseases and parasites which are found in the studied areas were Foot and Mouth Disease , Liver fluke , Lung worm , Black leg , Anthrax , Pneumonia , Ticks , Dystocia , Trypanosomiasis and Pastorolosis (Table 25) . These diseases types were found in different intensity in different districts.

Generally, Anthrax, Pneumonia, Black leg, Pastorolosis and Ticks were the major important disease types and parasites in the whole studied areas. There were significant differences concerning types of disease existed in the three study areas. The differences in existence of diseases in order of importance among the study areas are probably due to the difference in agro ecology. For instances, Trypanosomiasis is the disease type that is mostly found in the lowland area of the current study and similar study in Illu Aba Bora Zone by Teshager (2012). During discussions with the veterinarian in three studied areas; they witnessed that vaccine was given before and the diseases outbreak. But farmers have contrary response and said the vaccine were not enough and not at the proper time to be given.

Farmers in the studied areas used different ways of preventions for the diseases. Among these systems of alleviation, 28.3 % of the households used the local plants like different types of herbs and root parts of backyard forages like *Besana* leaves, *Korch* leaves, Eucalyptus leaves, *Gerawa* leaves, *Kosserete* leaves and 27.8 % of the households used the vaccination; whereas only 9.4 % of the households used vet heath clinic services due to different reasons like the distance of the health center. Similar response of using of traditional ways of treatment method was reported in Metema district by Tesfaye (2007) and in Illu Aba Bora Zone by Teshager (2012), but varying degree of involvement at each study results.

Table 24.Distance of animal health clinic from the respondent's household home.

Distance of the health clinic in Km	**Agro ecology, average (%)**			
	Highland	**Midland**	**Lowland**	**Overall**
	(N=60)	**(N=60)**	**(N=60)**	**(N=180)**
From 1 to 1.5	69.1	75.0	25.0	56.0
From 1.6 to 3	30.9	23.3	55.0	36.6
From 3.1 to 5	0.0	1.7	18.3	6.9
Greater than 5	0.0	0.0	1.7	0.6

N= number of respondents

In all of the studied areas, there existed only the governmental health clinic. Majority of the respondents (56.0%) their residences was located at the distances in between 1 and 1.5 kilometers from health clinic center (Table 24). In lowland, majority of the respondents (55.0%) could travel a long distance (1.6 to 3 kilometers) on average to health clinic; whereas in both of midland (75.0%) and highland (69.1%) travelled 1 to 1.5 km.

Table 25.Ranking of major diseases types by the respondent's in the study areas

Types of Disease and parasites	Agro ecology, Average (%)															
	Highland				Midland				Lowland				Overall			
	(N=60)				(N=60)				(N=60)				(N=180)			
	R1	R2	R3	Index	R1	R2	R3	Index	R1	R2	R3	Index	R1	R2	R3	Index
FMD	3.3	6.7	18.3	0.069	0.0	0.0	3.3	0.006	0.0	0.0	11.7	0.019	1.1	2.2	11.1	0.031
Liver fluke	0.0	10.0	15.0	0.058	6.7	0.0	1.7	0.036	0.0	0.0	0.0	0.000	2.2	3.3	5.6	0.031
Lungworm	0.0	0.0	3.3	0.006	11.7	0.0	0.0	0.059	6.7	0.0	0.0	0.034	6.1	0.0	1.1	0.032
Blackleg	23.3	16.7	18.3	0.203	16.7	33.3	20.0	0.228	13.3	5.0	3.3	0.089	17.8	18.3	13.9	0.173
Anthrax	26.7	30.0	16.7	0.261	30.0	28.3	23.3	0.283	20.0	25.0	18.3	0.214	25.6	27.8	19.4	0.253
Pneumonia	31.7	31.7	15.0	0.286	16.7	33.3	20.0	0.228	0.0	8.3	20.0	0.061	16.1	24.4	18.3	0.192
Ticks	0.0	0.0	1.7	0.003	13.3	0.0	11.7	0.086	25.0	45.0	21.7	0.311	12.8	15.0	11.7	0.134
Dystocia	1.7	0.0	1.7	0.011	0.0	0.0	5.0	0.008	0.0	0.0	1.7	0.003	0.6	0.0	2.8	0.008
Others (Past, Tryp.)	13.3	5.0	10.0	0.099	5.0	5.0	15.0	0.067	35.0	16.7	23.3	0.269	17.8	8.9	16.1	0.146
Total	100.0	100.0	100.0	1.00	100.0	100.0	100.	1.00	100.0	100.0	100.0	1.00	100.0	100.0	100.0	1.00

*Index = [3 for rank 1) + (2 for rank 2) + (1 for rank 3)] for each of the factor divided by sum of all of the factors *others includes Past=Pastorolosis, Tryp=Trypanosomiasis; R1, R2 and R3 are the first, second and third ranked types of diseases, respectively.*

5. SUMMARY AND CONCLUSION

The objectives of the study were to assess cattle production systems, cattle and cattle product marketing systems and opportunities and constraints of cattle production and its products in the study areas. In order to achieve these objectives, primary and secondary data were used. For primary data, standard questionnaire was used for farmers in three agro ecology (highland, midland and lowland) using two peasant associations from each agro ecology and 30 respondents from each PA were considered.

Mixed crop and livestock production systems were dominated in the study areas (98.9%). Cattle were the dominant livestock (47.73%) in the herd structure. The average cattle holding was 7.44 ± 0.272 heads per household. In the area 56.1 % of the total respondents used indigenous breed for production. About 50.6 % of the total respondents use natural breeding system; 1.1% of the households use artificial insemination techniques and the remaining 48.3 % of the total respondents use both of the two techniques. Majority of the respondents (73.9 %) keep their animal with their home residence due to fear of wild animals like hyena.

About 53.9 % of the respondents used their own forages and other feed sources for cattle feeding. Some of the farmers, 44.4 % used both of feed sources by purchasing from the shop and own developed feed sources for cattle feeding purposes. Farmers in the study areas used river, ponds, spring and dip wel water as major sources of water. In the area, 77.8 % of the respondents use the river as the sources of water for cattle though the availability drastically declines during the dry season.

The average daily milk yield of the indigenous cow was 1.76 ± 0.043 liters/ cow / day; whereas the total average lactation yield was 420.47 ± 11.83 liters. The average milk yield and lactation yield was significantly higher ($P<0.05$) in highland than the other two agro ecologies. The average lactation length of the indigenous cow was 8.19 ± 0.103 months. The mean of age at first calving (AFC) and calving interval (CI) for the local cow was 55.47 ± 0.441 months and 20.52 ± 0.141 months, respectively.

Raw milk, fermented milk, butter milk ("*arera"*), whey ("*augot"*), butter ("*burut"*), and cottage cheese ("*ayib"*) are the main dairy products produced and consumed by the consumers and farmers.

Among the total, only 39.4 % of the respondents has fattened beef cattle, due to various reasons like feed shortages (51.5 %), while others 22 .8% and 20.8 % of the households replied that they don't have capital as wel as credit for the purposes of fattening and they do have other duties, respectively.

Cattle diseases are one of the major constraints in the areas. Among the disease types: Anthrax, Pneumonia, Pastorolosis, Ticks, Black leg and Lung worm were the major disease challenges for cattle production in the area. Among the total respondents, 25.6 % of the households ranked the first major challenging disease as Anthrax. Pneumonia was the major disease for highland farmers; whereas 31.7 % of the total respondents ranked the first problem then followed by Anthrax 26.7%. Blackleg, Pastorolosis and Trypanosomiasis are also the diseases types ranked in the first major challenges (17.8% of the total respondents) of the study area. There was strongly significant variations ($P<0.05$) among the agro ecology on the type of disease challenges in the area. In general, cattle production and marketing systems in the study areas were constrained by feed and water shortages during dry seasons, poor performances of the indigenous cow and diseases.

6. RECOMMENDATIONS

Based on the current finding, the following recommendations can be suggested:

- Improving feed availability through improved forage and utilization of crop residues by urea treatments since some farmers at highland are still practicing.
- Further research is needed to design proper breeding strategy of available cattle breeds
- Proper support of animal health services per the problems ranked at each agro-ecology
- Farmers should be organized and get credit services to avoid their financial problems and market access.
- Farmers in the area should get proper training regarding appropriate cattle production and marketing system

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8. APPENDICES

8.1. Appendix I.ANOVA and other tables

Appendix Table 1.ANOVA test on family size per household among the study areas

Source of Variation	SS	DF	MS	F	Sig.
Agro ecology	96.033	2	48.017	11.552	*
Errors	735.717	177	4.157		
Total	831.750	179			

*SS= Sum of Squares, MS= Mean Square, DF= Degree of freedom, Sig = Significant value *P<0.05*

Appendix Table 2.Age of the household of the respondents

Age structure	Agro ecology				Test	
	Highland (N=60)	Mid land (N=60)	Low land N=60)	Overall (N=180)		
	Mean ±SE	Mean ±SE	Mean ±SE	Mean ±SE	F	P
Age of the HHH	45.95±1.13	46.57±1.15	47.53±1.34	46.68±0.69	0.433	ns
Male (<6 years)	0.27±0.058	0.23±0.055	0.35±0.062	0.28±0.034	1.062	ns
Female(<6 years)	0.40±0.064	0.57±0.065	0.55±0.065	0.51±0.037	2.034	ns
Male(6 -15 years)	1.35±0.071 [a]	1.48±0.077 [b]	1.58±0.087 [c]	1.47±0.046	2.232	*
Female(6 -15 years)	1.22±0.079[a]	1.38±0.068[b]	1.53±0.069[c]	1.38±0.043	4.819	*
Male(16 -60 years)	1.75±0.111 [a]	1.77±0.102 [a]	2.37±0.109 [b]	1.96±0.065	10.751	*
Female(16 -60 years)	1.23±0.065[b]	1.12±0.042 [a]	1.43±0.073 [c]	1.26±0.036	6.870	*
Male(>60 years)	0.17±0.049	0.13±0.044	0.17±0.049	0.16±0.027	0.167	ns
Female(>60 years)	0.03±0.023	0.05±0.028	0.12±0.042	0.07±0.019	1.883	ns
Total family	6.42±0.198 [a]	6.73±0.265[b]	8.10±0.314 [c]	7.08±0.161	11.552	*

**Means on the same row with different superscripts were significantly different at P<0.05; ns = not significant; N= Number of respondents, SE= Standard error of mean and HHH = Household head.*

Appendix Table 3.ANOVA test on land holding of the respondent's household

Source of variation	SS	DF	MS	F	Sig.
Agro ecology	8.541	2	4.271	33.591	*
Errors	22.504	177	0.127		
Total	31.045	179			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

Appendix Table 4.ANOVA test on cattle holding per household

Source of variation	SS	DF	MS	F	Sig.
Agro ecology	741.211	2	370.606	40.069	*
Errors	1637.117	177	9.249		
Total	2378.328	179			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

Appendix Table 5.ANOVA test for milk yield per local cow per day

Source of variation	SS	DF	MS	F	Sig
Agro ecology	11.043	2	5.522	62.772	*
Errors	9.060	103	0.088		
Total	20.104	105			

SS= Sum of squares, DF= Degree of freedom MS =Mean square, Sig = Significant value; P<0.05*

Appendix Table 6.ANOVA test on lactation milk yield of a local cow

Source of variation	SS	DF	MS	F	Sig
Agro ecology	1103121.024	2	551560.512	124.926	*
Errors	454755.391	103	4415.101		
Total	1557876.415	105			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

;

Appendix Table 7.ANOVA test for weaning age of local calves

Source of variation	SS	DF	MS	F	Sig
Agro ecology	39.433	2	19.717	17.422	*
Errors	200.317	177	1.132		
Total	239.750	179			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

Appendix Table 8.ANOVA test for calving interval of local cows

Source of variation	SS	DF	MS	F	Sig
Agro ecology	85.633	2	42.817	13.746	*
Errors	551.317	177	3.115		
Total	636.950	179			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

Appendix Table 9.Milk and milk product marketing systems

Factors	Agro ecology , (% Average)				Test
	Highland (N=60)	Midland (N=60)	Lowland (N=60)	Overall (N=180)	P-value
Do you sell milk?					
Yes	0.0	18.3	11.7	10.0	
No	100.0	81.7	88.3	90.0	
Reason for not selling milk					*
Due to traditional taboos	3.3	0.0	26.9	10.0	
Due to shortage of milk	43.3	62.5	50.0	51.2	
Due to market access	21.7	18.8	23.1	21.2	
Market place is so far	30.0	8.3	0.0	13.8	
Others	1.7	10.4	0.0	3.8	

Dairy products to sell					**ns**
Raw milk	0.0	3.8	0.0	1.3	
Fermented milk	1.7	0.0	0.0	0.6	
Butter	69.5	80.8	67.4	72.6	
Butter milk	0.0	0.0	2.2	0.6	
Cheese	28.8	15.4	30.4	24.8	

Others includes due to different reasons; significant at P< 0.05; ns= not significant*

Appendix Table 10.Distance of animal health clinic from the respondents' home

Factors	**Agro ecology , % (Average)**				
	Highland	**Midland**	**Lowland**	**Overall**	**Test**
	(N=60)	**(N=60)**	**(N=60)**	**(N=180)**	**P-value**
Do you have animal health clinic?					*
Yes	91.7	100.0	100.0	97.2	
No	8.3	0.0	0.0	2.8	
Distance of the clinic in Km					*
1 to 1.5	69.1	75.0	25.0	56.0	
1.6 to 3	30.9	23.3	55.0	36.6	
3.1to 5	0.0	1.7	18.3	6.9	
Greater than 5 kilometers	0.0	0.0	1.7	0.6	

**N=Number of the respondents, *; significant at P<0.05*

Appendix Table 11.ANOVA test on cattle health clinic distance

Source of variation	**SS**	**DF**	**MS**	**F**	**Sig**
Agro ecology	18.268	2	9.134	28.352	*
Errors	55.412	172	0.322		
Total	73.680	174			

SS= Sum of squares, DF= Degree of freedom, MS =Mean square, Sig = Significant value; P<0.05*

8.2. Appendix II. Cattle Production and Marketing System Survey

Jimma University College of Agriculture and Veterinary Medicine

School of Graduate Studies

Department of Animal Sciences

2011

Questionnaire –Cattle Production and Marketing System Survey

Enumerator's name _____ Respondent name _____

Respondent name number _____Region _____

District _____ Keble _____

Date interviewed _____Time of interview started _____ Time of interview end____

Section 1.General information

1) Respondent's Status in family: 1. Head 2. Wife 3. Son 4. Daughter

2) Sex: 1. Male 2. Female

3) Age of head of household _____ Years

4) Education of the head of household:

1. No formal 2 .Adult literacy 3. Primary 4. Secondary 5. Beyond secondary

5) Religion of head of the household:

1 .Orthodox 2. Muslim 3 .Protestant 4. Other (Specify) _____

6) Ethnic group of head of the household:

1. Kembata 2. Tembaro 3. Hadiya 4. Amhara 5. Tigray 6. Oromo 7. Other _____

7).Main occupation of the household head: 1. Farmer 2. Retired 3. Trader 4. 1 and 3

8). Household size and composition:

Age group (years)	Number of household members		
	Male	**Female**	**Total**
>60			
16-60			
6-15			
<6			

*** Include all persons living permanently in the household and taking food from the same kitchen.*

9). what kind of agricultural activities are you undertaking?

1. Crop and livestock 2. Only livestock production 3. Crop only 4. Others

10) Which part of your agricultural activity contributes most of the family income?

1. Crop Production 2. Livestock Production 3. Others _____

11) Is there farmers' association and are you a member?

1. There is and I am a member 2. There is but I am not 3. There is none

12) If you are a member what benefits do you get? 1. Credit Service 2. Input Supply 3.Others

13) Do you receive help from a government and non-government Organization? 1. Yes 2. No

14). Have you participated in any development beef production dev't project? 1. Yes 2. No

15) Have you participated in any development dairy production dev't project? 1. Yes 2. No

16) How do you get information on dairying/beef production most of the time?

1. Radio 2. Newspaper 3. Farmer's association 4. Extension agents 5. None 6. Others

17) What are the main purpose of cattle rearing (keeping?) 1. For milk purpose 2. Meat purposes 3. Meat and milk purposes 4. Drought purposes 5. Manure purposes 6. Social functions 7. Income source 8.To increase the household income 9. To safe guard the family against risk such as drought 10. To use the animal products as the source of food 11. Others ** Rank them in order of importance

18) Did you have any formal training in dairying /beef production? 1. Yes2. No

19) If yes, for how long time did you take the training?

1. For a few days 2. For a few weeks 3. For a month 4. If others please specify

20) Where do you take the training?

1. FTCs (Farmer's Training Canters) 2. Woreda level 3. Zone level 4. Awassa 5.If others

II. Herd Structure

21) What type of animal you are keeping?

No.	Type of animals	Amount in number			
		Local	Cross	Exotic	Total
1	Dairy cattle				
2	Oxen				
3	Goats				
4	Sheep				
5	Donkeys				
6	Horses				
7	Poultry				
8	Others				

22) How many of each of the following cattle do you have in your herd?

	Cattle group		Types of Breed			
			Local	**Cross**	**Exotic**	**Total**
A	Milking Cows					
B	Dry Cows					
C	In calf heifers					
D	Young heifers					
E	Calves	Males				
		Females				
F	Steer, Oxen / Sterile /					
G	Cows					
H	Bulls					
I	Others					

23) How much land do you have under control in hectares?

No.	**Descriptions**	**Owned**	**Rented**	**Total**
1	Area under crops			
2	Area under pasture			
3	Perennials(Cash crops ,Fruits)			
4	Others			

III. Housing and Waste Management

24) What is the importance of housing?

1. To protect from hot climate 2. To protect from cold weather 3. To protect animals from wild animals 4. To protect the animals from theft 4. It has no importance for cattle 5. Others

25) Do you have an experience of housing your dairy animals? 1. Yes 2. No

26) If yes, what type of housing system?

1. Simply crashes 2. Open with roof on the top only 3. I keep the animals with the people residence 4. I tethered at the yard 5.others please specify

27) If no, why you don't use house for the dairy animals?

1. They are great in number 2. We don't have stationary place 3. If they acclimatize the outside environment, they became strong enough. 4. If others please specify

28) What are the materials which the house made from?

Types of Materials	Roof	Wall	Floor
1.Corrugated Iron			
2.Grass			
3.Wood			
4.Concrete			
5.Stone			
6.Mud			
7. Others			

29) When do house them?

1. All the time2. Only at night 3. Day time 4.If others please specify_____

30) Do you have any conflict with your neighbor's because of your livestock activities?

1. Yes2. No 3. Sometimes but it is not usual_____

31) How do you dispose the cattle dung from the barn?

1. By drainage system 2. By manual labour3. If others please specify_____

32) How many times you are disposing manure from the barn?

1. Once per day2. Twice per day3. Three times per day 4. More than three times

33) How you are utilizing it most of the time?

1. I do not use it at all 2. It is made in to cow dung cake 3. It is used for soil fertilization

4. It is used for construction purposes 5. If others please specify _____

34) Do you also sell the animals dung cake or decomposed dung? 1. Yes 2.No

35) Where do you usually sell your decomposed dung or cake?

1. At the farm gate2. On the nearby market 3.others_____

36) What is your labor source in the dairy/or beef cattle production?

1. Family labor 2. Hired labour 3. Both

37) At what time labor demand is higher? 1. During the peak of lactation/or during finishing time2. During hay harvest 3. During cow dung preparation 4. Others

IV. Feeds and feeding

38) What is the source of your dairy feed/beef cattle feeds?

1. Own production 2. Purchased 3. Both 4. If others please specify _____

39) Which crop residue are using for feed?

1. Teff straw 2. Barley straw 3. Wheat straw 4. Maize stalk 5. Faba Bean Straw 6. Others

40) For what other purpose do you use crop residues? 1. Use as source of fuel wood 2. Used for construction purposes 3. To make household materials 4. Others _____

41) Do you have an experience of making hay? 1. Yes 2. No

42) If yes, from which land? 1 .Individual Pasture land 2. Crop land (after math) 3.Cultivated grass 4. Roadside grass 5. Community pasture land 6. Other _____

43) If no, what was your major reason?

1. We did not know about its importance. 2. We don't have any feed shortage.3. We can let our animals simply to the dried grass. 4. Since we do have large number of cattle, we can not accommodate all. 5. It has no importance.

44) Do you grow fodder crops? 1. Yes 2. No

45) If yes, which fodder crops? 1. Grass 2. Forage legume 3. Tree legumes

46) If No, what are your major reasons for not growing fodder crops?

1. Insufficient land 2. Insufficient labor 3. Insufficient inputs (seed, fertilizer, and cash) 4. Insufficient draft animal power 5. Feed for animals is adequate 6. No information 7. Others

47) Do you buy any feed supplements for your animals? 1. Yes 2. No

48) Which feed supplements do you buy?

1. Oil seed cake 2. Cotton seed cake 3. Wheat and corn bran and middling 4. Others

49) Why do you buy these feed supplements most of the time?

1. For lactating cows 2. For pregnant cows 3. Male calves 4. Female calves 5.For Beef cattle

50) What kind of concentrate are you usually using to feed your cows and/or beef cattle?

1. Wheat bran 2. Oil seed cakes 3. Formulated ration 4. Bone meal 5. Others

51) From where do you buy your concentrate feeds? 1. From the farmers' association 2. Ministry of Agriculture (ARDO) 3. From private retailers 4. from the industries 5. others

52) How much do you spend on feed / month? 1. 100-200 ETB 2. 201-300 ETB 3. >300 ETB

53) Did you come across shortage of animal feed? 1. Yes 2. No

54) If yes, can you mention at what months feed shortages exist? 1._____ 2._____

55) If yes, what was your solution to alleviate your problem? 1._____ 2._____

V. Water Resources and Quality

56) What sources of water are you using for your dairy animals and/or beef cattle?

1. The city pipeline 2. The nearby river 3. Pond 4. Walls 5. Others

57) Do you usually transport the water or bringing the animals to the rivers or pond?

1. Transport the water 2. Bringing the animals to the river or pond 3. Others_____

58) What is your main water related problem?

1. Scarcity 2. Parasites such as leaches 3. Unhygienic/impurity 4.Others _____

59) How far the water points from your home? _____ Kms round trip.

60) Do you think availability of water is a major constraint in dry period? 1. Yes 2. No

61) If the answer is yes, how did you alleviate the problem?

1. By digging the ground water 2. By going long distance to the river. 3. Others

VI. Breeds and Breeding Techniques

62) What is the breed of your dairy and/or beef animals?

1. Pure breeds 2. Exotic breeds 3. Local/indigenous 4. Cross 5. Both (local and cross)

63) Do you know the pedigree of your animals? 1. Yes 2. No.

64) What is your breeding system?

1. Natural breeding 2. Artificial breeding 3. Both

65) If your breeding system is natural, what are its mechanisms?

1. We select the best type of bull and we inseminate our cattle 2. We don't have any selection activity; simply we used uncontrolled breeding 3. Others _____

66) Do you have an experience of selection best cattle type for breeding purpose? 1.Yes 2. No

67) If yes what are your parameters used to select the best cattle for breeding purpose?

1. Color coat 2. Behavior of the animals 3. Body conformation 4. Milk production potential 5. Drought power potential 6. Others _____

68) How did you get your crossbred cow?

1. Purchased from neighbors 2. Purchased pregnant cow from any project (Kalehiot Church Development Agency, Mekan Eyesus Development Agency) 3. Purchased from market 4. Through A.I. 5. Supplied by the MOA 6.If others please specify

69) When you start having cross bred cows?

1. One years ago 2. Two years ago 3. Six months ago 4. Three years ago 5. Others

70) Why you start with Cross breed cows/heifers?

1. Better milk production 2. Higher growth rate 3. Higher weaning weight 4. Better body conformation. 5. If others

71) Why you only stick with Local cows?

1. Better disease resistance 2. Better resistance on heat stress. 3. Better fat content

4. I don't get cross breed 5. Better body conformation 6. Drought purpose 7. Others

72) Do you have an experience of using AI? 1. Yes 2. No

73) If no, why did not use it?

1. We did not know its advantages 2. We did not have any option to get AI service 3. We did not have interest for Crossbreeding 4. Environment will disfavor them. 5. Others

74) If you are only sticking on local animals, what was the source of your bull?

1. Own source 2. From neighbors 3. From everywhere source 4. Others_____

75) What type of a local bull you prefer?

1. Borena type 2. Horro type 3. I used the unknown 5. Arsi type 6) Others_____

76) Do you have any major reason for your preference?

1. Body conformation 2. Milk production 3.Milk quality 4. Better draft power 5. Others

77) What are the major problems in getting cross breeding services?

1. Places are too far 2 .It is often difficult to get the inseminator 3 .Payment for crossbreeding service is too much high 4. I don't hear about crossbreeding

78) What are the major problems in managing crossbred dairy cows?

1. Feed problem 2. Disease problem 3. Lack of labor 4. Lack of water

5. Lack of money 6. Other Rank: 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____

79) Why did you want cross breeding services?

1 .To gets more milk 2. To get more drought power. 3. Other (specify) _____

80) Do you know how much milk liter you obtained from your local cows/day? 1. Yes 2. No

81) If yes, how much liter on average you get? Per day ____ liters, per lactation ____ liters

82) How do you feed milk to the calves? 1. Bucket feeding 2. Suckling

83) If it is a bucket feeding, how many liters and for how long are given?

1. Morning milk _____ lits, for _____ days 2. Evening milk _____ lits, for _____ days

84) What type of feed is given to the calf immediately after weaning?

1. Simply leave to graze in the field 2. We just give crop residues. 3. We don't differentiate with the old one. 4. We don't care them. 5. We give them Local oil seed cake 6. Others

85) When do you start giving hay/concentrate to your calf?

1. After 3 month 2. After 6 Month 3. After 1 Year 4. Other _____

86) If you are giving concentrate and hay to your calf, how much you give per day? ____kg

87) The time of calves achieved for breeding in months _____

88) The length gap of a cow giving a birth after given the first birth in months_____

89) The life time of calf crop of the indigenous cows in numbers,_____

VII. Calf Rearing Practices

90) At what age do you normally wean your calf?

	Breed Type	Age
A	Local	
B	Cross	
C	Exotic	

91) Which method do you use for pre-weaning milk feeding?

No.	Breeds	Feeding systems	
		Bucket Feeding	Partial Feeding
A	Local		
B	Cross		
C	Exotic		

92) After weaning, what do you do with male calves?

No.	Breeds	1.Sell	2.Fatten Them	3.Sell as sire
A	Local			
B	Cross			
C	Exotic			

VIII. Health Condition

93) Do you have any animal health problems? 1 .Yes 2. No

94) If yes, what are the major animal health problems? Please rank in order of importance.

1. Foot and Mouth 2. Liver Fluke 3. Lung Worm 4. Black Leg 5. Anthrax 6. Pneumonia

7. Ticks 8. Blood Urinate 9. Dystocia 10. Other specify_____ Rank:

95) How did you overcome the problem? Explain?_____

96) What are the local plants used for medication to livestock? 1._____ 2._____ 3._____

97) How many km you are goes to get animal health clinic? _____Kms

I X. Manure Disposal and Utilization.

98) Did you collect the manure during the previous year? 1. Yes 2. No.

99) If yes, how much is produced per day? _____ quintals/Bags.

X. Dairy Performance

100). How many times do you milk your cows per day?

1. Morning only 2. Morning and evening 3. Morning, mid day and evening

101) How many months of lactation do you normally have? Just put a tick sign (√).

No.	Breeds	Length of lactations (in months)			
		1-3	4-6	7-9	9-10
A	Local				
B	Cross				
C	Exotic				

102) Do you intend to increase your level of milk production? 1. Yes 2. No

103) If yes, indicate

1. It maintains food production for the household 2. It is profitable 3. Others

104) If no indicate 1. It is not as the crop production 2. It is not profitable 3. Others

105) What are the main constraints for your dairy production?

1. Feed shortage 2. High feed prices 3. Disease 4. High Medicament cost 5. Shortage of land for grazing or forage development 6. Lack of capital 7. inefficient breeding services 8. Market availability 9. All 10. Others please specify _____

106) Could you rank the most important ones?

1. Feed shortage___2.Diseases ____3. Shortage of land ___4 Capital ___5. Market ____

XI. Milk Processing

107) Do you have an experience of processing the dairy products? 1. Yes 2. No

108). If yes, what are the processed products? 1. Butter 2. Butter milk 3. Cheese 4. Ghee 5. Fermented milk 6. Others Rank them in a priority: 1. --- 2. –-- 3. ----- 4. ---- 5. ------ 6. -----

109) Are you a member of any Association or Dairy Development Project? 1. Yes 2. No

110) If yes, what is the benefits you were provided?

1. Credit supply 2. market information 3. Collects our product and sell to the market. 4. Provides inputs with least cost 5. Guaranteed sales outlet 6. Supply the inputs 7. For profit distribution 8. If others please specify_____

111) If yes, what was its obligation?

1. Paying monthly member ship contribution. 2. Participate by labor when ever it is needed.

3. Repayment of credit. 4. If others please specify _____

112) Do you know the purpose of fermenting milk for a certain period of time? 1. Yes 2. No

113) If yes, what was the reason?

1. It gives us good flavor and taste. 2. It helps for churning of fermented milk. 3. It is a means of preservation. 4. Other reasons _____ Rank them with priority: 1. --- 2. ---- 3. ---- 4. --

114) How long the milk will be stored for fermentation before it is processed in to butter?

No.	Length of the time	Wet season	Dry season
1.	Minimum days		
2.	Maximum days		
3.	Average days		

115) what materials do you use to process the milk? 1. Clay pot 2. Other_____

116) Do you have an experience of smoking your milking cans and other related materials?

1. Yes 2. No

117) If yes, what are its advantages?

1. For good and pleasant flavor and taste 2 .For good shelf life of the products 3. For killing microorganisms. 4. Others._____ Rank them; 1. -------- 2. -------3. --------4. ---

118) What are the plants used for smoking your milking equipments?

*1. gerawa 2. Besana 3. Tenadam 4. Others*_____

119) what matters whether the processing is ready or not?

1. Milk volume 2.color of fermented milk 3. Physical compactness of fermented milk 4.others

120) How many hours does it take to churn fermented milk into butter?

No.	Length of the time	Wet season	Dry season
1.	Minimum hours		
2.	Maximum hours		
3.	Average hours		

121) What are the materials used for churning of milk in the process of butter making?

1._____2._____

122) Give the volume of fermented milk churned to produce 1 kg butter?

No.	Total amount (Local unit)	Wet season	Dry season
1.	Minimum amount		
2.	Maximum amount		
3.	Average amount		

123) What about the frequency of churning of fermented milk into butter during wet season?

1. Every two weeks 2. Once in a week 3. Every 24 hours 4. Within three days interval 5. Within four days interval 6. Specify (other)

124) What about the frequency of churning of fermented milk into butter during dry season?

1. Every two weeks 2. Once in a week 3. Every three weeks 4. Within three days interval 5. Within four days interval 6. Specify _____

125) For how long do you store butter before selling? Minimum __ months, maxi __months

126) If, you store your butter for a certain period, do you have an experience of adding something in it? 1. Yes 2. No

127) If yes, what are the materials added?

1. Salt 2. Spices 3. Only cook with heat 4. Others_____

128) What are its advantages? 1. For coloring 2. For taste 3.Others _____

129) Do you process butter milk into cheese? 1. Yes 2. No

130). If yes, what matters the time of cooking?

1. Amount of butter milk 2. Type of material used for cooking 3. The amount of heat is given

131) If yes, how much butter milk is required to produce 1 kg cheese? _____ liters

132) If no, what should be your reason?

1. It will be consumed by the family 2. There is no cheese market 3. We don't want to produce cheese 4. It will be consumed by the calves 5. Others

133) Do you process butter in to other product? 1. Yes 2. No

134) If yes, what are the products?

1. Cooked butter 2. Spiced butter 3. Salted products 4.Others _____

135) If yes, what are the materials used to process butter? 1. _____ 2_____

136) What is the importance of processing butter?

1. For preservation 2. For long period of storage 3. For good flavor and taste 4. For good market value 5.Others _____ Rank them: 1. --- 2. ----- 3. ----- 4. ----

XII. Dairy Product Marketing

137) Do you have an experience of selling the dairy products? 1. Yes 2. No

138) If yes, what are the dairy products you are going to sell?

1. Raw milk 2. Fermented milk (*Ergo*) 3. Butter 4. Butter milk 5. Cheese 6. Whey milk

Rank them in the order priority given: 1. ---- 2. ---- 3. ----- 4. ---- 5. ---- 6. -----

139) Do you have an experience of selling raw milk? 1. Yes 2. No

140) If no, what was your reason?

1. Milk is forbidden to sell due to traditional taboos 2. Shortage of milk. 3. No market access 4. Market place is too far. 5. If others please specify_____

141) which species milk is preferred by the consumers? 1. Cow milk 2. Sheep 3.Goats 4.

142) Do you know why they preferred milk from this species? 1. Yes 2. No

143) If yes, what are the attribute preferred?

1. Color of milk 2.Solid content of milk 3. Fat content of milk 4. Salt content of milk 4. other

144) From which breed of cow do you prefer to sell milk?

1. Crossbreed 2. Local cow in general 3. Borena 4. Fogera 5. I don't know others except Me. 7. All type of cattle.8. Others

145) Is there a demand for milk in your area? 1. Yes 2. No

146) If no, what should be the probable reason?

1. Consumers did not want to buy from other producers. 2. They do have their own cattle for milking 3. Others

147) If yes, where do they get?

1. From the farmers who produce in the area. 2. From the nearby town. 3. Other sources

148) How much is a liter of milk in your village _____ Birr/Litter?

149) How much is a liter of milk in your nearby town _____ Birr/litter?

150) Is there significant price difference in milk of cross-breed and local cow? 1. Yes 2. No

151) If yes, please indicate from which type of milk you get the highest price?

1. From local in general 2. From cross-breed 3. Others

152) Is there any milk taste difference between cross bred and local cow? 1. Yes 2. No

153) If yes, which type of cow milk has the best taste?

1. Crossbreed 2. Borena cow 3. Horro cow 4. Fogera 5. Local cow in general

154) Who from the household delivers the milk to the buyers?

1. Husband 2. Wife 3. Adult male children 4. Adult female children 5. Child 6. All members of the household 7. Hired labor 8.Others Rank them: 1. ----2. ----- 3. ----- 4. ---- 5. -----

155) Is the milk intended for sale been rejected because it had become sour? 1. Yes 2. No

156) If yes, what percent ? 1. 75 % of the time 2. 50 % of the time 3. 25 % of the time

157) which milking is mostly rejected? 1. Morning 2. Evening

158) what should be the main reason? 1. It will be sour 2. Others

159) what is the main reason for being sour?

1 .No buyers. 2. Distance to the delivery point 3 .Due to preservation problem 4. Others

160) How much do you get from sale of the following product/year?

No.	Commodity type	Maximum Birr	Minimum Birr
1	Raw Milk		
2	Butter		
3	Cheese		

161) When is the best time to sell more raw milk? 1. Wet season 2. Dry season

162) What are your probable reasons?

1. We do have more production 2. We do have more market 3. No more fasting 4. Others

163) Do you obtain different prices for butter and cheese depending on how many days you keep it before selling? 1. Yes 2 .No 3 .No Idea

164) who in the household decides, on how the income is spent? (Put check mark)

No.	Income source	Husband (1)	Wife (2)	Both (3)
1.	Income from sale of crop			
2.	Income from sale of animals			
3.	Income from sale of wool			
4.	Income from sale of milk			
5.	Income from sale of straw			
6.	Income from sale of cow dung			
7.	Income from sale of butter			
8.	Income from fire wood			
9.	Income from cheese			
10.	Other incomes			

165) How do you overcome the household problems which have been created?

1. Selling of live animals 2. Selling of Butter 3. Selling of milk 4. Selling of crop

5. Selling of cheese 6. Others __Rank them with the priority: 1. ---- 2. -- - 3. --- 4. --- 5. ----

Section 2.Beef Production, Utilization and Marketing System

I .Beef Production

166) Do you practice fattening? 1. Yes 2. No

167) If no, what is your problem/

1. No advantages 2. No market for the fattened animals 3. Due to feed shortage 5. No interest to practice 6. I do have other duties 7. I don't have family. 8. No credit service

168) If yes when did you start?

1. Six months ago 2. A year ago 3. Two years ago 4. Others

169). If yes, why you were started?

1. It has good market benefit 2. I have been told by the extension agent. 3. Others

170) where do you get the sources of livestock?

1. Own . 2. From community 3. From market 4. Shareholding with other person 5. Others

171) what types of animals are needed by the fattening operation?

1. Aged 2. Animals out of production 3. Dental problem 4. No preference 5. Others

172). what types of breeds are preferred for fattening?

1. Borena breed 2.Horro breeds 3. Fogera breeds 5. Arsi 6. Unknown local 4. Cross . why ?

173) what are the age groups of cattle most of the time used for fattening purpose?

1. Heifers 2. Steers 3. Cows 4. Bulls 4. Oxen, Why it is preferred?

174) how many times do you fatten the animals (cattle) in a year?

1.Only onetime 2. Twice a year 3. Three times 4. Others please specify

175) which months are preferred for fattening? 1.____ 2_____ why this time is chosen?

176) How many months you will keep animals for fattening?

1. One month 2. Two months 3. Three months 4. Four months 5. Five and above months.

177) How do you know whether the animals are fattened or not?

1. By weight measurement 2. By physical body conformation. 3. When the skin became shiny 4. When every bone is covered by meat 4. Others

178) Do you castrate your animals before you start fattening? 1. Yes 2. No

179) If yes, what is its importance?1 _____ 2. _____ 3_____

180) .Did you get extension service from any agents (MOA, NGO, and other?) 1. Yes 2. No

181). If yes, did you get improvement in your capacity? 1. Yes 2. No. Explain?

II. Meat Utilization.

182) Do you consume meat? 1. Yes 2. No

183) If no, what was your reason?

1. We don't have access to meat 2. Culturally it is not possible to eat meat 3. Others

184) If yes, what was your time of consumption?

1. During Main holiday {*Meskel* ("*Mesala"*), Easter, New Year, Epiphany ...} 2. During occasions 3. Any other time 4. Others

185) where do you get this meat for consumption?

1. Own animals 2. Purchasing animals from others 3. Other source 4. From butchers

III. Meat Processing.

186). Do you have any experience in processing meat? 1. Yes 2. No

187) .If yes, what are the processed products? 1. Salted meat 2. Air dried meat 3. Others

188) .If yes, what is the purpose of processing meat?

1. It is demanded by the market. 2. In order to protect spoilage by microorganisms.

189) what are the major times in which meat is processed?

1. During wet season 2. During dry season 3. When there is excess meat. 4. Whenever we are in need of processed meat. 5. When there is a high market demand. 6. Others

IV. Meat and Live Animals Marketing

190) what should be more important to be preferred by the live animals market?

1. Fattened animals 2. Only big weight 3. Lean meat 4. Others

191) what was the price of fattened animals? Minimum_____ Birr. Maximum____ Birr.

192) Do you have an experience of selling meat? 1. Yes 2. No

193) If yes, where do you sell? 1. Farm gate 2. Market place 3. Others

194) .what was your marketing place for selling your fattening animals?

1. Farm gate 2. Kebele market 3. Woreda main market 4. Durame Town market 5. Doyogena / Shinshicho/Mudulla traders.6.Others

195) Which market is more attractive for price of live animals?

196) How many Kms you went to sell your fattened animals? _____ Km.

197) what are the major problems existed in the area? Rank them:

1_____ 2_____

3_____ 4_____

8.3. Appendix III. Check List Presented for Focus Group Discussion

Part I. Production Aspect

1. Major farming activities
2. Major livestock production system of the area
3. Major cattle production constraints and mechanisms to alleviate the problems
4. Available livestock feed resources and way of usage
5. Trend of communal grazing land and problems related with scarcity of land
6. Main source of water and water related problems
7. Overall trend of cattle population in the last five years (decreasing or increasing) what do you think are the possible reasons?
8. Extension services in cattle production

Part II. Market Aspect

1. Cattle marketing system of the area in general
2. Sources of marketing information. Is the source available, reliable, recent and accurate?
3. What are the main Problems/constraints in relation to marketing (price, buyer's problem, accessibility, market structures etc.)?

Part III. Health Aspect

1. Major animal disease affecting cattle growth and productivity of the area
2. Known disease outbreaks emerging frequently. Losses due to the out breaks
3. Indigenous knowledge in coping different diseases
4. Problems related with health input and service provision

Part IV .Credit Service

1. Is credit available, adequate and timeliness? The interest rate, is it profitable, is it beneficial?
2. Problems associated with credit? The opportunities to improve the existing credit service?