Assessment of Production and Marketing System of Goats In Dale District, Sidama Zone

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Abbreviations used in the text

SSA	Sub Saharan Africa
MoA	Ministry of Agriculture
CSA	Central statistics Authority
SNNPRS	Southern Nations Nationalities and peoples Regional State
WAD	West African Dwarf
FAO	Food and Agricultural Organization
IMPACT	International Model for Policy Analysis of Agricultural Commodities and Trade
AFRCSM	Sub Moist
SH	Sub Humid
IPMS	Improving Productivity and Marketing Success
KA	Kebele Administration
Fig	Figure
Eg	Example
TLU	Tropical Livestock Unit
AFM	Age at First Mating
AFK	Age at first Kidding
WA	Weaning Age
AKI	Average Kidding Interval
LS	Litter Size
Masl	meter above sea level
No	Number
Km	Kilometer

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Assessment on Production and Marketing System of Goats in Dale District, Sidama Zone

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Abstract

Production system and marketing study was undertaken using on 120 sample households to identify and describing goat production systems, to determine production potentials, opportunities and challenges of goat's production and to describe marketing systems. Three The households were drawn from different location and represented three agro-ecologies; Moist Weyina Dega, Dega and Moist Kola. Sampled households were interviewed on socio economic characteristics, flock structure, reproductive performances of goats, feed resources and feeding, routine husbandry management systems and marketing using a pre-tested formal questionnaire. Flock monitoring to identify off take and acquisitions like birth, purchase, transfer and disposal like sales, slaughter, death was carried out for about seven months (September to March). Three primary, one secondary and one terminal markets were studied at Dale, Tula and Hawasa, respectively using Rapid Marketing Appraisal (RMA) technique. The average family size was 7.5± . 247 per household, out of which 5.6% of the households were females and there was no significant difference ($p<0.05$) in family size among the three-agro ecologies. About 75 % of interviewed male households and 50% female households were literate. The overall mean livestock holdings was 13.1 ±1.16. Among the three-agro ecologies, the average livestock holdings in Moist Kola was significantly higher than in Moist Weyina Dega and Dega. The overall mean goat holdings per household was 5.98 and there is a wider range of variations in flock sizes in agro-ecologies??. The o*verall mean AWA, AFM, AFK, AKI, was 5.2, 9.7, 14.9, 8.6 and 16 months, respectively. Overall mean litter size was 2.07 and lifetime kidding age (parity) was 13.2 months. AWA in Moist Dega was 6.47± 45 , and was significantly longer ($p<0.05$) than in Moist Weyina Dega and Moist Kola. Similarly, the average AFM was 16.13 months in Moist Dega, and was significantly longer ($P<0.05$) than in Moist Kola but. Moist Weyina Dega was intermediate of the two-agro ecologies. AKI was 8.56, 7.27 and 8.57 months in Moist Dega, Moist Weyina Dega and Moist Kola, respectively and varied significant ($P<0.05$) among the three agro ecologies. Mean LS for Moist Kola and Moist Weyina Dega was significantly($p<0.05$) lower than that of Moist Dega. Goats in Moist Kola have shown long lifetime kidding or parity (P) of 16.27 years, which is significantly longer ($P<0.05$) than that of the other two agro-ecologies. Feed resources for goats varied among agro ecologies. Shrubs and trees are the major feed sources for free foraging goats in the Moist Kola but, feeds from crop by products, crop residues, enset and fruit parts, vegetables and chat leftovers are the main feed sources for tethered and herded goats of Moist Weyina Dega and Dega. Lack of feed, diseases and marketing are the major constraints affecting goat's production. The increasing demand for goat meat, the awareness of rural goat herder about the current price and willingness and attempt to carry out small scale goat fattening activities to utilize the current goat market, the conduciveness of the environment and sufficient man power in the three agro ecologies are the encouraging opportunities to improve goats production and marketing.*

Key words *Goats, Agro ecology, Reproductive performances, litter size, kidding interval, age at first mating, Parity, Feed resources, crop residue, bushes and shrubs*

1. Introduction

Goats account for about 30% of Africa's ruminant livestock and contribute to about 17 and 12% of the total meat and milk production, respectively. Sub-Saharan Africa (SSA) accounts for over 60% of the total goat population in Africa, with estimated 147 million goats representing about 80 indigenous breeds or strains distributed across all agro-ecological zones and ruminant livestock production systems (Lebbie, 2004).

Goats are highly adapted to a broad range of climatic and geographic conditions and are more widely distributed than any other mammalian livestock. The unique features of goats which include selective feeding behavior that enables them to select the most nutritious part of plant, fast reproduction, consumption of diversity of plant species and low capital requirement makes them very important especially for the poor at densely populated mixed farming areas.

Moreover, goats are capable of producing more milk on less feed and are not adversely affected by declining range condition as cattle. They also have a significant socioeconomic role in rural areas and especially in societies where women are among the most resource poor people in Africa.

According to the most recent estimates, Ethiopia has 23.4 million goats (MoA, 2004). Contrary to the general assumption that goats in Ethiopia are generally considered

associated with arid and semi arid lowlands, about a third of the national goat's population is found in agricultural highlands (Workneh, 2003; Nigatu, 1994). In Southern Nations Nationalities and Peoples Regional State, (SNNPR), about 2.7 million goats are kept by small flock holders at wider range of agro ecological zones (CSA, 2003). In the Sidama zone about 183,462 goats are reared and contribute to 6.7% of the Regional goat's population. Among the woredas (districts) in Sidama Zone, Dale Woreda has about 17,248 goats contributing to 17.1% of the total goat's population in the Zone (CSA, 2003).

Dale Woreda is the biggest and densely populated district among the ten districts of the Sidama Zone having suitable climatic diversity for plant growth that favors goat production. The diversity of plant species grown, availability of agricultural and agro-industrial by-products and integration of goats into the farming system makes the area suitable for goat production. In the district, due to rapid population growth and subsequent expansion of farmland, grazing land is shrinking and has reached a stage where it could not support large ruminant production. In such a circumstance, goat production has a role in serving as a source of income through sale of kids and milk production. In recent years, the demand for goat meat is continuously rising presumably due to the growing export market for goat. However, despite the huge number of goats that are reared by smallholders and agro pastoralists in the district, productivity of the goat and their system of production has received little attention in research and development endeavors.

In the diagnosis and program design of the project entitled “Improving Productivity and Market Success (IPMS)of Ethiopian Farmers” project, goat production and marketing was considered as one of the priority commodities in Dale Woreda. In this regard, assessment on the supply and demand of live animals for both the domestic and export markets was identified to be an important research issue. Proper description of the production and marketing systems and identification of the actual production constraints as well as potential productivity of goats in the woreda is fundamental to any intervention that will be designed and executed for the benefit of smallholders in the area. It was also hypothesized that differences in agro-ecological zones results in different performance levels of goats, their socio economic importance and their management system.

The objective of this study was, therefore, to study goat’s production and marketing system. Specific objectives were to :

- identify and describe goat production systems
- determine production potentials
- describe marketing systems and identify opportunities and challenges of goats production.

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2. Literature Review

2.1. Production systems

Small ruminants in tropical Africa are kept under traditional extensive systems. In the arid and sub humid zones, cattle are reared with sheep and/or goats. In the humid zone, animals generally graze freely, with access to household and kitchen wastes when available (Ademosun, 2003***)***. Production systems are identified on the basis of contribution of the livestock sub sector to the total household revenue. Almost all the goat production systems in southern Ethiopia have been designated as "traditional" (Workneh, 1992). These traditional production systems include pastoral, agro-pastoral, agricultural and urban.

Production systems are segregated according to the degree of dependency on livestock and livestock products for income or food, type of agriculture practiced in association with livestock and mobility and duration of movement. Accordingly, more than 50% of household income comes from livestock and in arid areas where there are little or no cropping activity, owners travel longer distance year round looking for forage and water along specific orbits are classified as pastoral system. In the semi arid regions, 10-50% of the income comes from livestock and agriculture production is practiced along with livestock management and production. The system is either transhumant or sedentary and is classified as agro-pastoral. The sedentary agricultural system is where income of less than 10% is derived from livestock/livestock products and livestock production is secondary to crop production (Wilson, 1988; Workneh 1992). Urban and peri-urban production system is practiced in town and cities by wage earners who invest cash on goat production for short-term profit (Ibrahim1998).

In pastoral system land assumes more importance whereas in agro pastoral, agricultural and urban/peri-urban system labor is more important. As intensification increases, labor becomes more important than land. The urban system is capital intensive since farmers invest cash to buy goats or sheep to fatten for sale during peak demand. In this system the high wage for labor is the main constraint (Ibrahim, 1998). According to the same author, in the pastoral system small ruminants obtain their feed from rangelands. In agro-pastoral systems rangeland is used but crop residues assume more importance. In most agricultural systems, crop residue, household waste and forages are used for feeding small ruminants.

Traditional livestock farming is very diverse and is dependent on climate and soil, and is very much linked to the availability of local resources either plant growth or the species and breed of animals reared. Traditionally extensive systems of production share common characteristics such as limited number of animals per unit area relatively limited use of advanced technology low productivity per animal grazing and the use of agriculture-on farm by products (Boyazoglu, 2002).

2.2. Growth and reproductive performance

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A study using West African Dwarf (WAD) goats owned by 45 farmers indicated that in the wet season goats had access to either fodder banks or natural pasture, after crop harvest goats roamed freely. The result of these two grazing systems indicated that mean litter size was 1.67 $\pm$ 0.08 and 1.56 $\pm$ 0.06, respectively, and was affected by parity ($P<0.05$). Births accounted for 87% of all entries while multiple births accounted for about 68 % of all the kids (Ikwuegbu *et al.*, 1994).

Field performance of goats in the humid southeastern regions of Cote d'Ivoire, reported that the uncorrected litter size was 1.52. Annual kidding rate was 234.1%, and this high reproductive performance was achieved due to the short kidding intervals in three kidding over a period of two years. Number of kids born per year in Djallonke does varied between 2.0 and 2.7 (Armbruster, 1993).

In South Africa mean kidding percentage, (number of kids born per doe per year), for maiden does was 76% and that older does 64%. Abortion rate was 29%, and the high incidence of abortion may be indicative of inadequate nutrition during the last stage of pregnancy (Mahanjana, 2000)

Kidding rate and litter size of goats kept in southern Ethiopia was reported to be 80% and 1.03, respectively (Girma *et al.*, 2000). According to these authors, low litter size obtained was attributed to the fact that most goats were in their first parity. Kids could attain body weight of up to 20 kg at less than one year of age (Girma *et al.*, 2000)

Preliminary survey of indigenous goat types and goat husbandry practice in Southern Ethiopia indicated that the highest litter size of 1.35 (n=2463), two quadruplets, 48 triplets and 755 twins were recorded for home bred and purchased does implying the multiple birth frequency of 32. 68

%. This goat type may be categorized as a dual-purpose type (Workneh, 1992).

On farm study conducted on Arsi Bale goat types in Boricha District Sidama zone and Arsi Negele District (Oromia), by Behailu and Samuel, (2003) indicated that more mating was observed between December and February with the highest kidding occurring between June and August. Age at first kidding was reported to be 441±101 days (c.v. =40 days), fertility rate of 65.9% prolificacy 1.4% kids per birth, and kidding interval of 282±87 days (c.v. 24%). In the Boricha district of the Sidama zone, reported 1.1 kids per birth of litter size, 325±92 days kidding interval and 586±87days (c.v. =15%) for age at first kidding.

A recent on farm monitoring of goats conducted in Adami Tulu by Tatek *et al.* (2004) indicated that average prolificacy, parturition interval, litter size were 121%, 8.07 months and 1.21, respectively. These authors also reported that among the total births, about 36.3% were twins and triplets. The same authors from their on farm growth performance assessment of Arsi Bale goats also reported that birth weight, weaning weight and pre- weaning growth rate were 2.23 kg, 8.39 kg, and 72.21 g/day, respectively.

2.3 Description of goat types in the study area

According to the classification by Farm Africa (1996), goats in study area fall under the Arsi-Bale type. The Arsi-Bale goats are described as short legged, hairy, short and erect ears and horns with predominantly dark color. The Sidama goats according to Farm Africa are synonymous with Arsi-Bale, and described as medium sized, slender, convex head profile, horizontally carried ear, shorthaired and backward oriented horn (Nigatu, 1994).

Arsi-Bale breed is found throughout the Arsi and Bale regions up to altitudes of 4000 masl. They are also found in the higher altitudes of Sidama and western Hararge. The goat breed is found in all the agro-pastoral lowlands of the Rift Valley from Lake Abaya in the south-to-south Shoa in the north. Arsi-Bale goats are kept in small flocks in mixed farming systems in the highlands, as well as in the agro-pastoral systems in the lower altitudes (Farm Africa, 1998).

The Sidama goat is from Arsi Bale type and distributed throughout with the Sidama ethnic group. Bale mountains manifest hairy coat apparently due to the influence of Gishe (Arsi-Bale) goats in Bale. The population size of this goat type is estimated to be about 150,000 based on official estimate of goat's number in the Sidama area of about 6500 square kilometer. This goat type is spread across three-production system in Sidama. Flock sizes are three to four times bigger in agro-pastoral system than in the highland agricultural zone (Workneh, 1992).

Woyto Guji goat types related to Arsi Bale goat found in southern Sidama North Wolayita, and South Omo mainly kept by pastoral ethnic group. More notably this goat type inhabits those areas in Sidama known to be endemic with trypanosomiasis especially to the south of Lake Abaya and Western Genale Catchments area (Farm Africa, 1996).

2.4. Feed resources and feeding system

The survey conducted on indigenous goat type in Southern Ethiopia revealed that in pastoral and agro-pastoral systems of Southern Ethiopia; rangelands provided the only source of feed throughout the year. Both Sidama and Borena agro-pastoralists supplement goats with thinning of maize and sorghum and crop residues during the wet and dry seasons In agricultural areas not only crop residue but also chopped fodder, browses and kitchen wastes are supplied to goats. Goats also graze on fallow land in agricultural systems perennial crop growing areas, presumably due to limited pastureland (Workneh, 1992)

The potential of crop residues as livestock feed increases with rising population density, while the demand for them depends on the livestock population density and the alternative functions of crop residues in the farming system. At the village level, stocking rates differ greatly between individual farmers. Stock-poor farmers may have excess to feed, while stock-rich farmers, despite having more cropland and higher crop yields, may be short of feed. In mixed cropping systems with long growing seasons, intercropping may restrict the access of livestock to crop residue, such that the residues of early-maturing crops may decompose *in situ* without being grazed (Leeuw, 2003).

Increased livestock holdings will stimulate mono cropping or the intercropping of crops of similar cycle length. In the future, rising demand for locally grown crops and for livestock products may lead to higher use of inputs, resulting in higher crop and crop residue yields, feed budgeting and the allocation of feeds to different classes of stock ranked according to their revenue-earning capacity. New cropping patterns may evolve that allocate larger shares of land to grain legumes and roots/tubers. This will diversify and enhance crop residue quality, a process that can be further promoted through the inclusion of by-products in feeds (Leeuw, 2003).

Perennial crops (enset and coffee) are common in areas with a high population density such as Sidama. The system of feeding is predominantly free grazing. Tethered feeding is practiced around perennial crop growing areas in Sidama. Some farmers provide crop residues, thinning of maize or sorghum, kitchen waste and chopped browse. Provision of mineral supplements in the form of natural licks and table salt is common among the Sidama people. Kids are sometimes provided with supplements (Farm Africa, 1998)

Livestock feed scarcity is often the major cause of livestock mortality during drought in the Enset (*Enset ventricosum*)-livestock mixed farming systems in the Kokossa district of the Bale highlands in southeastern Ethiopia (Desta, 2004). Livestock mortality associated with feed scarcity was investigated in the livestock-enset, enset-livestock and enset-livestock-cereals production systems of the Ararso, Jafaro and Bokore sub districts of Kokossa, respectively, using farmers' perceptions during a drought year in 1998, an average rainfall year in 1999 and a wet year in 2000. Livestock mortality was variable between years and between farming systems. Greater livestock mortality occurred during the drought than in an average or wet year. Generally, mortality was greater in the livestock-enset and least in the enset-cereals-livestock production system. Among livestock, cattle experienced greater mortality than small ruminants and equines (Desta, 2004).

Total feed demand depends on the overall local stocking rate, but the ratio of supply to demand varies across seasons and years as well as between individual farms. Variability in ratios between farms is greatest where communal grazing land is scarce, as for example in the Ethiopian highlands, Rwanda and Kenya. Where access and use of feed is entirely farmer-controlled, benefits from intensification of the crop subsystem can translate directly into higher livestock,

modest increments in input levels can double the output of cereal crop residue, which, having full control, the farmer can manipulate and manage so as to increase feed supplies and effective use by livestock. When farmers perceive the true value of their crop residues they often reassess them as a marketable commodity and start to engage in trade in feeds. This allows stock-poor producers to extract added value when intensifying their own cropping enterprises (Leeuw, 2003).

The goats can be left to forage free-range for part of the day but are brought in to be fed the main part of their ration. In the dry season, free-range goats will only find dry vegetation or crop residues in the fields (stubble grazing). These may supply some energy, but the protein content is very low. Even by cutting and carrying such foodstuffs to enclosed animals it will be hard to meet their requirements. Goats can be fed fruits and vegetables like cassava or sweet potatoes, or the leaves of these plants, if available. Banana peelings, and sugar cane tops are also suitable, although not so nutritious. Feed supplements will also have to be given, if goats are enclosed during the rains, fresh grasses, legumes, tree foliage should be cut for them. Fodder trees are useful for this. Crop thinning or cuttings (maize, etc.) can also be fed, as well as weeds. Sweet potato vines are very nutritious (Jansen, 2004).

The effect of different feeding systems was conducted using Somali and Arsi Bale goats' It was found that Somali goats managed under semi-intensive system returned a higher profit margin than the goats managed under extensive and intensive systems (Getahun *et al*., 2005). These authors suggested combining grazing with concentrate supplementation is potentially more profitable than either grazing without concentrate supplementation or pen feeding with no grazing.

On the other hand, the marginal rate of return for Arsi-Bale goats was negative in all the three systems. The loss of money encountered in goats managed under the extensive system was relatively lower than the goats under other treatments. The additional income from supplementation of concentrates does not justify the additional cost accompanied with it for these goats. Grazing seems the only viable option for Arsi-Bale goats during the dry season. Repeating this experiment during the wet season to generate data for the whole year would gave more conclusive result since the availability and quality of feeds, cost of variable inputs and prices of the animals varied from season to season (Getahun *et al*.,, 2005).

Forage legumes could be established under maize with out reducing the grain or stover yield. Leaf defoliation up to 50% did not affect the grain or stover yield components or the yield of under sown legume (AFRC, 2004). In the highlands, where common grazing areas have been declining due to population pressure, crop thinning and weeds from the cultivated land provide a large part of supplementary feed available to the goats. Thus, the size of cultivated area has to be considered as a limiting factor. However, there is no evidence to show that land is any more limited to the total flock out put than the total labor at the disposal of the household than the biomass of goats to be maintained (Workneh, 2004).

.According to a study conducted in Belessa (Amhara region of Ethiopia) the feed available in *Kola* agro-ecology is good compared to *Dega* agro-ecology. The critical feed shortage season in Belessa Woreda is from January to the end of June, depending on the on set of rainfall. If the rain starts early in the season (May), all the private and communal grazing land as well as forest and shrub are a good source of feed so that livestock will not face feed shortage. However, during drought years or delays in the start of rainfall, feed and water shortage are major problems and high livestock mortality is common.

The study conducted in Amhara region found that ownership of various types of livestock has declined, and there has been a significant change in utilization of feed resources: while use of communal grazing lands, private pastures, woodlots and forest areas as feed sources has declined, the proportion of households using crop residues and purchased feed has increased. In addition, the proportion of households with better access to *woreda* towns significantly improved ownership of oxen and goats, while improvement in access to all-weather roads reduced ownership of oxen (Benin *et al.*, 2002).

The study conducted at Addilo (SNNPR) and Kofole (Oromia) areas also showed that lack of feed which is directly related to shrinking farm size, was ranked as the major constraint by Addilo respondents, while small ruminant disease was ranked as top most priority problem at Kofole (Getahun, *et al.*, 2006).

2.5 Health and major diseases affecting goat production

Animal health problems of various origins are among the numerous factors responsible for poor goat production and productivity. Farmers classify diseases on the bases of clinical sign, severity, onset and duration of the disease and considering species and age it affects. Farmers' indigenous knowledge that was handed down over generations in handling and treating livestock health problems are enormous and are still useful in Ghinchi area Oromia region (Ethiopia) (Yosef, 2002) An integrated multi disciplinary research and development approach with the full participation of the farming community is of paramount importance to improve their livestock husbandry and management practices and to improve and make use of an age-old enormous knowledge in handling and treating different animal health problems (Yoseph, 2002).

A study on ectoparasites on small ruminant was carried out in three districts (woredas) of the eastern part of Amhara regional state, Ethiopia, from November 2003 to March 2004. The result indicated that out of 752 goats examined, 56.4% of goats were infested with one or more ectoparasites. The ectoparasites identified in goats were Linognathus spp., 28.3%; ticks, 22.2%; Sarcoptic mite, 6.1%; and Ctenocephalide spp., 8.1%. In goats, the risk of Sarcoptic mange infestation in the low and midland was 4.6 and 5.0 times higher than the highland respectively (?????)

2. 4. Marketing and profitability of goats

2.4.1. Market structures and marketing channel

Markets are important for agricultural growth and sustainable development. Lack of markets, or poor access to those markets that exist, not only affects farmers and livestock herders locally in rural areas, but is a drain on the potential of the entire country. Creating local and national markets and improved access to them, allows specialization and diversification into new agricultural products that make profits for rural households and decrease poverty and hunger. Marketing channel describes the movement of a product or commodity from the site of production to the place of consumption. It may include transportation, handling and storage, ownership transfers, processing, and distribution (Pinkerton, 2002).

The marketing channels that small stock farmers were mostly aware of are butchers, middlemen/traders and individuals. Some farmers still believe that financial assistance policy projects were useable even though they have been phased out. The most used marketing channels individuals ranked as the most favored, then butcheries as the second most favored and middle

men as the third favored. The least favored was financial assistance policy projects while the rest were largely seen as unfavored. The usage of other marketing channel is very low. Auction and cooperatives are none existent (Nsoso, 2004)

The growing demand for small ruminants in local and international markets, the improving transportation infrastructure, and the experience of farmers in small ruminant keeping are practical opportunities to enhance the contribution of the sector. Furthermore, research on the complex cause–effect relationships is needed to derive policy implications (Getahun, 2006).

Efficient and integration of marketing determine the tradability of products and the accessibility of market to farmers. Improving market efficiency contributes to the increased level of food security by reducing consumer prices, increasing returns to producers or both. That is returns to better supply of food. A study conducted in SNNPR State by Million (2003) indicated that inadequate transport network, limited number of large interregional traders with inadequate storage and working capital high handling costs, inadequate market information system weak bargaining power of producers, and lack of processing facilities have contributed to inefficient livestock market in the region.

2.4.2. Live animal marketing systems and demand for meat

The marketing of goats and goat products in the tropics is very variable, and depends on location and prevailing production conditions. Traditional production trends tend to be associated with local marking conditions. Uncertainty and lack of assessment for reasonable prices are the main marketing problems, which are resulted due to unorganized marketing. In an organized marketing system there is usually assurance of reasonable prices for quality products and these

are linked to reliable supply sources. In the traditional marketing system, it is a small enterprise, the overhead cost is low and the products are sold in the simplest possible way. Labor is plentiful in rural area, but the capital investment is small. The market is essentially low income and consumers look for cheapest meat available and buy in small quantity, however, as affluence increases, as the same time standards of living change, people will be prepared to pay higher prices and consume more meat (Devendra, 1982).

Demand for meat is largely festival-led, and thus, predictable with well-set patterns for buying reason. Stock movements between markets is unregulated and increasingly disorganized and may add up to 12% to the final sales prices with a corresponding loss of condition on the part of the animals (Peter, 1998).

For the period from 1998 to 2020, The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) predicts developing countries aggregate consumption growth rates of meat and milk to be 3.0 and 2.9% per year respectively, compared to 0.8 and 0.6%, respectively in developed country. Aggregate meat consumption in developing countries is projected to grow by 72 million metric ton between 2003 and 2020, whereas, the corresponding figure for developed countries is 9 million metric ton (Delgado, 2005). The study also revealed, based on empirical data, that population growth, urbanization and income growth in developing countries are fuelling a massive increase in demand for food of animal origin. These changes in the dietary pattern of billions of people could significantly improve the well being of many poor people in rural areas (Ehui *et al.*, 2003).

Henning Seinfeld (2004) indicated that, globally, per caput food consumption continues to

increase both in the developing and industrialized countries, as well as in countries in transition, as a result of increasing average per caput real incomes. Changes are also occurring in the type of food consumed. With increasing incomes, demand for greater food variety and for higher value and quality foods such as meat, eggs and milk, increases. Between 1997/1999 and 2030, per caput meat consumption in developing countries is projected to increase from 25.5 to 37 kg per person compared with an increase from 88 to 100 kg in the industrialized countries (Seinfeld, 2003). The same author also revealed that wide regional and country differences are also evident in the quantity and type of animal products consumed—reflecting the traditional preferences based on availability, relative prices and religious and taste preferences. Sub-Saharan Africa has had low levels of animal products consumption that have changed little over the last 30 years. While an increase in food consumption is predicted, only minor increases are projected for animal products consumption.

The viability of goat's enterprise depends not only on technical and biological efficiency, but also, on a well organized marketing system. At present goats markets are characterized by poorly managed and unrealistic carcass grading, pricing, inadequate promotion of goat meat and inadequate and inefficient transport system. These problems will have to be corrected if goat production is to be improved (Shumba, 2004).

Marketing has a significant role in increasing livestock production. Livestock herders can strongly be initiated by increased price and marketing situations. Marketing enhance producers to focus more on their animal productivity. However, there are factors affecting livestock marketing and domestic livestock trade in Ethiopia and other neighboring countries. These

problems are particularly pronounced in distant areas away from large cities and urban centers. These are poor infrastructures, high transport costs, taxation, intermediate costs and cartels. It suffices to say that livestock are the most repeatedly taxed agricultural commodity group in the region in route to their final destinations. For example, traders pay as many as 20 types of taxes between points of purchase and destinations/ final exit points in Sudan, traders in Ethiopia are also subjected to paying transit and sales taxes of widely varying nature within the country. Kenya livestock traders may not pay fees and taxes as in many places as in Sudan or Ethiopia (Yakob, 2003). The same author indicated that transport constitute a major cost factor in livestock trade whether in Ethiopia, Kenya or Sudan. In Kenya transport costs constitute between 25-40% of the total price, the same holds true for Sudan and Ethiopia.

In addition to problems encountered due to taxation and transport too many middlemen affect the efficiency of the livestock markets. In the Sudan livestock may change hands 2 to 6 times until they reach the terminal market). Even then, the final transaction in the terminal markets is also carried out through middlemen on commission basis. Terminal livestock prices as a result, end up 3 or 4 times higher than the producer's price (Yakob, 2003).

2.4.3 Market information system and its influence on price

The existing livestock markets are loosely integrated due to lack of sufficient market information. Thus, a market information system is required that allows stakeholders to get information on quantity and price, both on the domestic and foreign markets. There is no information as to the extents of competitive marketing prices and farmer-sellers being able to do

more than to accept what traders offer. Commercial transactions are dominated by the traders, and largely to their advantages (Peter, 1998). Furthermore, market research is critical to identify problems and constraints in the marketing systems and to know the requirements of the external market, and to design policies and regulations that allow to have effective production and marketing system internally and to match supply with the external demand (Belachew, 2003).

A review of structure performance and development initiatives about livestock marketing in Ethiopia by Ayele *et al.* (2003) indicated that the available research results for livestock marketing in Ethiopia are outdated. Current knowledge on livestock market structure, performance and prices is poor and inadequate for designing policies and institutions to overcome perceived problems in the domestic and export marketing systems. In particular, information is required on the incentive structure, spatial and temporal bottlenecks and price and information structure throughout the marketing chain including the export market.

According to Ayele (2003), available time series (livestock number and price) data are valuable because they can be useful to relate and model the effects of external shocks (e.g. policy changes, livestock development projects, climatic variations, regulations and taxes) to the marketing system. Recent information on location specific marketing constraints, livestock sources, prices, margins, stock marketing routes and market information endowments are unknown. How prices and margin volatility are affected by other variables (e.g. season, climate variation, crop prices) is also unknown for any tier of the livestock marketing chain.

The formulation of future livestock marketing policy that aims to improve the current system can benefit from historical data, but will also require current market information. If Ethiopia's

livestock is to compete successfully in the export market, particularly in its traditional outlets, e.g. the Arabian Peninsula, minimizing inefficiency in the domestic market and understanding the opportunities in the export market will be critical (Ayele, 2003).

Increasing the volume of export without considering the production potential of the country affect the total animal production of the country. For example Sudan's ambitious export program is aimed at reaching an export volume of some 10 million shoats a year. Given the chance, Ethiopia and Kenya could also like to increase their export volume to the maximum, the question is; how can each country determine what it can export without significantly affecting its resource base. Available data on the off-take volume of livestock is far from accurate in all the three countries. For example, annual off-take figures for the major terminal markets in the Sudan show too wide variations from year to year to be reliable (Yakab, 2003).

*2.*4.4. Profitability of goats production

One means to create and conserve pastoral wealth is to encourage more timely sales of animals and investment of proceeds in endeavors that enhance human capital and diversify local economies where possible. Such strategies will only be possible if marketing channel can be improved and rural financial services are made more accessible (Getachew, 2003). The same author revealed that the livelihood of the smallholders is highly dependent on the cash income derived from livestock and livestock products. Alleviating constraints to marketing, improving market information and upgrading marketing infrastructures will potentially increase the welfare of smallholder producers and urban consumers and improve the national balance of payments. The more farmers are aware of the market demand and price, the higher will be their bargaining power that could improve their income through getting a larger share of the consumer spending.

Market infrastructural and institutional set-ups will improve the access of producers to potential markets whereby they could supply more volumes with higher share of the end market price.

These improvement measures will raise the household income and purchasing power of producers and local traders, which in turn will create positive impacts on the local economy. On the other hand, when income of the producers increases through better access to information, market and infrastructure, they could improve production, both in terms of quantity and quality, thereby benefiting consumers.

A study conducted in Nigeria, Imo State, indicated that the gender-perceived production constraints; the relative contributions of these ruminants to the farm household net income; and the implications of these contributions to loan repayments if production is assigned on gender basis. Results showed that within the ruminant class of livestock, small ruminants, particularly goats, dominate the others, followed by sheep and then, cattle. Their relative contribution to total farm household net income follows the same order (Oguoma, 2003).

3. Materials and Methods

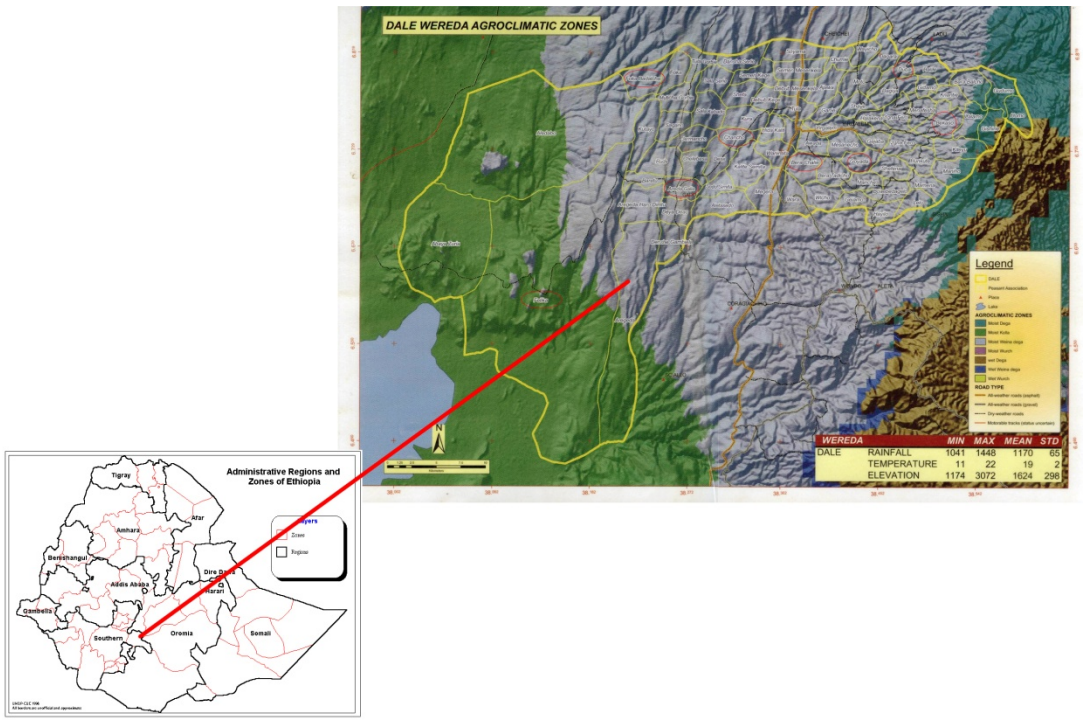
3.1. The study site

3.1.1. Description of the area

The study was conducted in Dale district in the SNNPR State, Ethiopia. Dale district is the biggest district among the ten districts in Sidama Zone. It occupies 1411 km^2 of land area and situated at about 320 km south of Addis Ababa (IPMS, 2005), at 6.45N and 38.23E (Lemma, 1996). According to the recently available agro climatic zone classifications, the district is found in two different sub zones (SM1-2) and (SH2-7) (MoA, 2002). The first one (SM1-2) is hot to warm sub- moist lakes and the Rift Valley. At the western part of the district around Lake Abaya bordering Humbo district of Wolayita zone, having an altitude of 1170 masl. The second one is Tepid to cool Sub humid Mountains (SH2-7), covering 3200 masl, in the middle and the eastern part of the district.

The regional government of SNNPR in 2006 split the former Dale district in to three Woredas, namely: Wonsho, Dale and Loka Abaya districts. in which the first represents moist Dega agro-climate having altitude ranging from 2300 up to3200 masl, while the latter two are under the category of moist weyina Dega from 1500 to 2300 and moist kola from 1170 up to 1500 masl. This study was conducted in the previous Dale district that covers all the three-agro climatic conditions.

For the purpose of this study the former Dale districts was classified based on the elevation map of IPMS. Seven Kebele Administrations were categorized under moist Dega (Wonsho) that have an altitude range of >2300 to 3200 masl. (here after referred to as Wonsho district). The moist Weyina Dega<2300 up to 1650 and moist Kola <1500 up to 1170 masl covers 63 and 6 KAs, respectively and (here after referred to as Dale and Loka Abaya districts, respectively) (Figure, 1).



3.1.2. Population and farming system

Dale district is subdivided in to 76 Kebele administrations. The population is estimated at about 369,548 of which women account to 57.6% (CSA, 2003). The main livestock species in the Woreda are cattle, goats and sheep and estimated to be 225,698, 31443 and 30152, respectively. Also there are 19,233 equines used for draft service. The major crops are coffee, enset, maize, haricot bean and chat (IPMS, 2005).

The district has two main farming systems namely, coffee livestock system which is found east

of the main high way that transverse Dale from north to south and haricot bean livestock system found at western part of the high way. In the latter system, haricot bean and goats are considered as the priority commodity. Besides, the main system, two systems with minor area coverage are found at two opposite extremes one in the extreme east at high altitude where farmers grow cereals and horticultural crops and herding cattle, sheep and goats while the other at extreme west bordering Lake Abaya, focusing on livestock production mainly goats and cattle.

The mean annual rainfall at Awada research sub center in Yirgalem town is 1314 mm. There are two cropping seasons in the area. The first season starts at the mid of February and end up on the late April, locally known as "Belg" which is used for pasture production and also for Maize, root and tuber crop cultivation. The second and the big season locally known as "Meher", that starts at the beginning of June and end up at the end of November (Abebe, 2000; IPMS, 2005).

3.2. Sampling methods and data collection

3.2.1. Sampling techniques

The study was conducted using formal as well as informal methods. Multistage sampling technique was employed. In the first stage, Kebele Administrations (KAs) that are the lowest administrative unit, involved in the study were selected using stratified sampling technique. Agro-climatic distribution of the Woreda (district) was used in order to stratify the Kebeles in the district.

In the Second, stage, proportional allocation techniques was used in order to determine the number of sample Kebele from each stratum. As a result, a total of eight i.e. 1, 6, and 1 Kebeles from moist Dega (Wonsho district), moist Weyina Dega (Dale district) and moist Kola (Loka

Abaya district) were selected, respectively. On the third stage, random sampling technique was used to identify Kebeles that were included in the survey study. Finally, households that were participated in the study were selected using simple random selection method after identifying the goat owners from the community using purposive sampling method.

3.3. Surveying methods

3.3.1. Reconnaissance survey

Reconnaissance survey was carried out in the selected eight Kebeles in order to identify the existing system of production. Informal interviews were conducted using key informant such as knowledgeable people, elders' popular and experienced farmers. Furthermore, extension staffs from agricultural office and representatives from Kebeles administrations had participated during group discussions.

3.3.2. Diagnostic survey

After having conducted group discussions, a questionnaire was developed, pre tested and translated into Amharic. Eight enumerators, one for each Keble, were recruited and trained for two days. There after, diagnostic survey was carried out using local language (Sidamigna). In this cross sectional survey, 15 farmers from each Kebele and a total of 120 participants, from 8 Kebeles were involved and interviewed. The number of households interviewed was, 15, 90 and 15 from moist Dega, moist weyina Dega and Moist Kola areas, respectively. The questionnaire consisted of main parameters like household structure, production system including, breeds and breeding, feeding, animal health situations and disease control, etc. The questionnaire used to get

pertinent information in the study is in Appendix Table 5.

3.3.3. Flock monitoring

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Sixty participants were involved in the flock monitoring study on a continuous basis for a period of seven months (September to March). Body weight of animals in the flock was measured and recorded at the beginning of the study period. Data on health and disease situations, production and reproductive performances, disposal of goats (sales, death, transfer, slaughter), labor utilization and other traditional husbandry practices were collected during the monitoring period using six trained enumerators that were assigned to each selected study site. Furthermore, the researcher on a monthly basis supervised data collection. Data collection sheets used for the monitoring study are presented in Appendix Table 6.

3.3.4. Statistical methods

Data entry and statistical analysis were performed using SPSS computer package. Statistical analysis like Frequency, percentages, mean, range standard deviation and standard errors were used to describe qualitative data. Analysis of variance was used means were compared using Tukeys and Newman's tests. Data were tested for homogeneity of variance using Leven's test (Zar, 1996) in order to ensure that the assumption for the F test was not violated.

4. Results and Discussions

4.1. Demographic characteristics

Out of the 120 respondents, the majority (94.2%) were male and the overall mean age of respondents was 39.31±2.82 years with an average age of 34.2±3.24 years in Moist Dega, 40.1±1.40 in Moist Weyina Dega and 39.4±2.64 years in Moist Kola agro-ecologies. The proportion of respondents above sixty years was very low (6.67%) and most of them (93.33) were between 19 and 60 years(Fig 1 a). There was a slight increase in mean age of respondents from Moist Dega and weyina Dega to Kola. However, the difference is not statistically significant (Annex table 1). The mean age indicated that respondents were adults with experience in goat keeping. Examining the marital status further validates this, in that nearly 95% were all married. The percentage of divorced, widowed and un-married was 3%, 1%, and 1%, respectively.

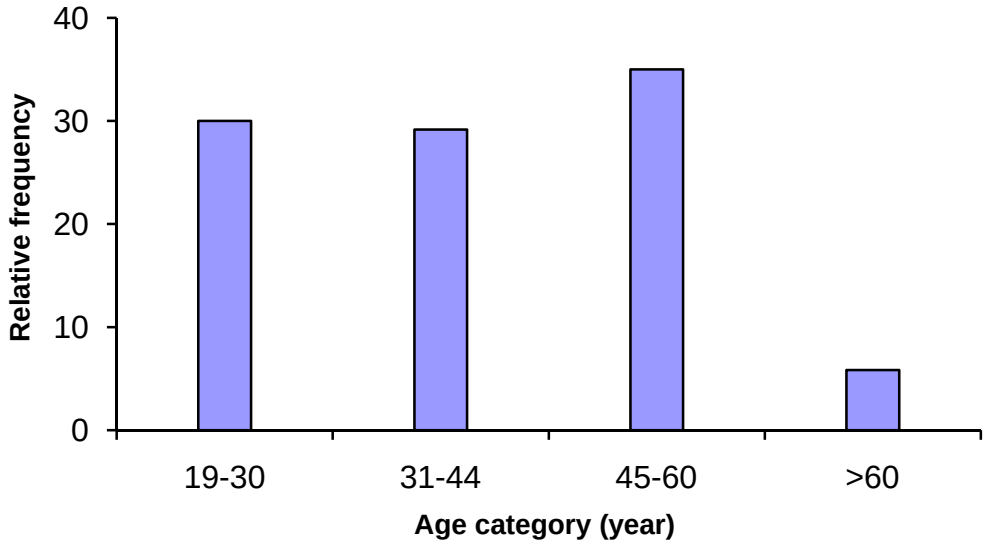
Table 1. Mean age of the household included in the diagnostic survey.

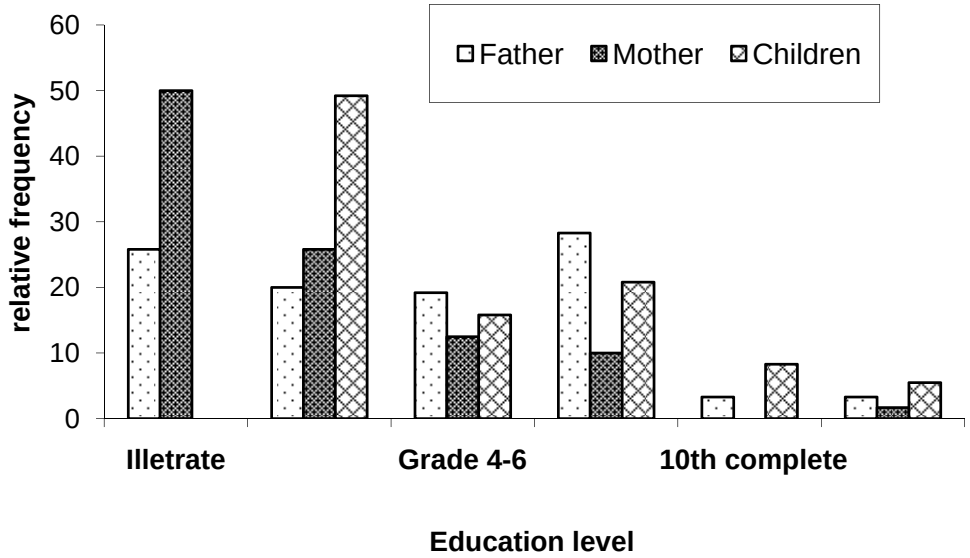
Agro ecology	N	Mean	Std. Error	Minimum	Maximum
Moist Dega	15	34.20a	3.241	20	65
Moist Weyina Dega	90	40.15a	1.406	1	90
Moist Kola	15	39.44a	2.643	20	61
Over all	120	39.31	1.178	1	90

Out of the interviewed male-headed households, 75% were literate, and on the other hand, only 50% of females (spouse) were literate. Considering males who attended school, proportionately, a higher percentage (28%) attended grade 7-10 than elementary grads 1-3(20%) and 4-6(19%). Some 4% were 10^{th} grade complete or above. The high proportion (7 to $10^{th)}$ is recorded at moist weyina Dega (Dale). This area is different from the other two-agro ecologies by having secondary schools and more accessible to urban centers (Yirgalem and Wondo towns). Some of the herders were those who interrupted learning from junior schools and attracted in to farming activities. Where as, Female representation decreases in higher grades by nearly 50% compared to their numbers in elementary grades i.e., 26% in grades 1-3 compared to 13% and 10% in grade 4-6 and 7-10, respectively (Figure, 1b). Educated female is by far less than that of males in the community. This is to be expected because families in most developing countries are reluctant to send their female children to school. However, this situation has been improving in recent years. During the time of the survey, all children of the interviewed household that reached school age (>7years) were sent to school and therefore no illiterate children were encountered (Fig, 1b). This indicates that, the communities in the studied area are quite aware of the benefits of sending children (including girls) to school. The availability of schools within a reasonable distance from homestead (a school within Kebele) is the other encouraging factor for children's education.

The overall mean family size per household was 7.5±0.247 and was not significantly different ($P<0.05$) among the three agro-climatic zones. Relatively higher family size per household was recorded in Moist Weyina Dega (7. 9 ±0. 29) followed by moist Kola (6.8±0. 47) and moist Dega (6.4±0. 58). This value was higher than the national, 5.2 person and regional- (SNNPR), person average (CSA, 2003). On the other hand, these values are lower than the findings of Workneh

(1992) who reported average family size of 9.1 and 13.1 persons, respectively for agricultural systems mainly growing perennial crops in the highlands of Sidama and for agro-pastoral production systems in SNNPR but comparable with average family size estimate (5.7 persons) of mixed farming area in east Ethiopia, Gursum, (Workneh, 2000).





Average land holding per household was significantly different among the three-agro- ecologies ($p < 0.001$). On average, households in moist Dega (Wonsho) possessed significantly large land (2.18 hectare/hh) than those in Weyina Dega (1.27 hectare/hh) (Table 2). The average value for Kola was (1.77 hectare / hh), was intermediate between the two.

Due to small land size and large family size per household, the ratio of family size to house hold land holding was significantly high in Moist Weyina Dega than sparsely populated Dega and Kola agro ecologies. The reason for high population in Moist Weyina Dega as expressed during group discussions was mainly related to the conduciveness of the area for cash crop production such as coffee and chat which is quite an attraction to new comers who consider production and trading of coffee and chat as a good source of income. Also once established, migration from Weyina Dega to other parts is minimal.

The overall mean livestock holding per household also varied across the three-agro ecologies, ($p < 0.005$) (Annex Table 2). Average holdings per household in Moist Dega 9.4 animals per household and Weyina Dega 11.9 animals per household were comparable but were less than half of the value for an average household (24.4 animals per household) in moist Kola district (Table 2).

On the other hand, livestock to land ratio per household for Dega (4.64 animals per hectare) is significantly lower than the livestock density per hectare per household in the other two agro ecologies (Table 2). Relatively low livestock holdings coupled with large land area per household in Dega may account to the sparse density of animals in Dega. In addition, people

from the Dega move their flock to the lowlands around Lake Abaya during the dry season in search of grazing, and this may have also contributed to fairly low livestock density in the Dega ecology.

Table 2 Family size, land and livestock holdings per households in the three-agro ecologies

	Agro ecology		
	Dega	Weyina Dega	Kola
No. of respondents	15	90	15
Average family size/HH	6.5[a]	7.87[a]	6.81[a]
Average No of persons/HH/hectare	3.26[a]	10.31[b]	5.06[a]
Mean total land holding/HH (hectare)	2.18[a]	1.27[b]	1.77[ab]
Land use			
Crop land	1.83	1.11	1.56
Grazing land	0.28	0.088	0.17
Forest land and others	0.05	0.065	0.10
Average total livestock holding/HH	9.40[a] (TLU 3.47) [a]	11.9[a] (TLU 4.44) [a]	24.4[b] (TLU 10.82) [b]
Mean livestock holding household^{-1}hectar^{-1}	4.64 [a]	11.95b [b]	14.66 [b]

Note that means value that bear the same letters are not significantly different from each other at 5% level of significance

All the categories of livestock species shown in the Table 3 are found in all the three agro-ecologies but species composition varies depending up on the type of climate. Cattle and goats constitute equal proportion to the livestock density in Kola and Weyina Dega. In Dega however, cattle are given first priority and sheep are as important as goats accounting nearly 50% of the livestock density.

The importance of sheep in Dega agro ecology is a typical feature of a highland area as sheep are better adapted to cooler climatic conditions than the hot lowlands. Even then, goats in the surveyed uplands moist Dega (Wonsho district) were equally important as sheep indicating that they are quite adaptive to cooler areas. This finding therefore refutes the usual misconceptions that of goats play a very minor role in highland agricultural system.

Table 3 Mean livestock holding of households by species

Species	Moist Dega	Moist Weyina Dega	Moist Kola
Cattle	4.13	5.13	10.93
Goat	2.57	5.76	12.47
Sheep	2.21	0.70	0.48
Equine	0.57	0.31	0.49
Herd size	9.48	11.9	24.37
TLU	3.47a	4.44a	10.82b

TLU Source ?????????????

4.2. Income source

The majority of respondents in the three districts ranked crop as first priority source of income for the family and followed by income generated from animals and animal products. Trading and labor although are less important as source of income, trading appears relatively important in Moist Dega than the other two agro ecologies. In moist Dega (Wonsho) farmers during off-season engaged in part time trading. They bring vegetables from Dega to Moist Weyina Dega (Dale) and take coffee and sugarcane to Moist Dega and make profit to use as a source of income for the family.

Among crops, coffee and chat income took the first place in Moist Weyina Dega, Enset and vegetables income in Moist Dega, and maize and haricot bean in Moist Kola. Goats are important source of income in Moist Kola agro-ecology. Although farmers have diversified income sources, 15% of the respondents ranked goats as first, while 63% as second major source of income in the Kola agroecology.

4.3. Goats in the three agro ecologies

On the basis of phenotypic characterization, goats in the studied areas are of two types. The goats in the highland district Wonsho (Moist Dega) that is adjacent to Bale resembled Arsi-Bale goat type and possess hairy coat. The Moist Kola goats that are found around Laka Abaya are similar to the Sidama goat type (Workneh, 1992). These goats are fairly similar to those in Moist Weyina Dega (around Dale district) but they differ markedly from the highland Dega goats. The Sidama goat type are bigger in size than the Arsi-Bale goats found in the Moist Dega (Wonsho), whereas, the midland goats found around Dale district are intermediate in size.

The color of goats varied in the three-agro ecologies. The Moist Dega goats are black and grey with some red color, and goats in moist Weyina Dega around Yirgalem town are fawn, grey and white. The Loka Abaya goats are predominantly white in color, with some fawn and black (Figure 3). During group discussion, flock holders indicated that large size; white colored goats with thick and straight horn (such as shown by Fig., 2) have better market value and are fast marketable than other colored goats. This criterion was verified by about 67.9% of the

respondents interviewed during study period.

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Figure 3 typical goat flocks in moist kola (Loka Abaya). Note: the typical white color

dominance and bucks with straight horn.

4.4. Flock size and structure

There is a wider range of variations in flock size. 12.5 ±2.186 Goats per household was registered in Moist Kola, which is significantly higher ($P<0.05$ Annex table 5) than flock size in Moist Dega (2.67±0 .361) and in Moist Weyina Dega (5.46± 0.549). The largest holding registered in Moist Kola, Felka Kebele (31 goats) and the smallest holding (1) was recorded at the Moist Weyina Dega and Dega (Bokasso and Bera Kebeles, respectively). The over all mean flock size for all the study site was 5.98±0.547 (Table 4) of which 53.5% were does, 13.4% castrates, 13.8% bucks, 10.6 doe kids, and 8.8% buck kids of less than six months of age.

The overall mean flock size is lower than previously average flock size (7±9) for densely populated perennial crop cultivating farming systems in the highlands as well as in agro pastoral societies in semi arid areas of Sidama, SNNPR (Farm Africa, 1996). It is higher than the average flock size 4.7 and 13.6 goats per household reported for Karapokoto and Tchein agro-pastoral tribe in Kenya and Chad, respectively (Ibrahim, 1998). Where as, it is lower than values reported for most small stockholder farmers holding 1 to 40 goats per household in Kweneng district of Botswana (Nsoso, 2004).

The breeding stock consists of 63.4% female (including all age from young kids up to old doe) and 36.6% all age male flocks. This proportion is lower than the over all average of 75.8% female reported by Workneh (1992, Nigatu *et al.,* 2005). The proportion of male goat in the

presently investigated areas was low in the flock. Farmers in the studied area mainly retain female goats in the flock for replacement purpose and remove male goats either by directly selling them or castrating and feeding them prior to selling. The ratio of female to male is 4:1 and the proportion of does is smaller when compared to the previous findings of Workneh (1992) who reported a doe to buck ratio of 11:1 and closer to (5:1) ratio of agro-pastoral society in South Ethiopia, which was reported by Nigatu et al., (2005). The reason for the reduction of the doe number was discussed with respective flock holders in each Keble. Accordingly, they said that young farmers (children above 18) when separated from their parents they share livestock mainly female goats to establish their own flock using female does as foundation stock. Hence this may have caused a gradual fell in does per household. So this may have contributed to the present low ratio of does to buck compared to values reported a decade and half ago by previous workers (Workneh 1992).

Table 4 Number of goats per household

Agro-ecology	N	Mean	Std. Error	Minimum	Maximum
Moist Dega	15	2.67[a]	.361	1	5
Moist Weyina Dega	90	5.46 [a]	.549	1	28
Moist Kola	15	12.47[b]	2.186	3	31
Total	120	5.98	.547	1	31

Note. Means with the same letters are not significantly different at 0.05 level of significant

4.5. Reasons for keeping goats

Farmers keep goats for many reasons, the major reasons being that they are the source of food, cash and a form of savings (Ibrahim, 1998). In Moist Kola (Loka Abaya), goats are mainly kept as a means of savings i.e., farmers accumulate money as a hedge against emergency by keeping large flock of goats; the second reason for keeping goats is sales to generate income (Table 5). In addition to these two major reasons, farmers also viewed the uses of goats for milk production (13.3%) meat (10%) or both (1.7%). On the other hand, only (1%) of respondents considered goats as a sign of social status (prestige).

Besides these major reasons, in Moist Weyina Dega some respondents (2.5%) used goat's manure for fertilizer. Farmers with no cattle reared goats for the purpose of manure, because, enset particularly at its early stage require high amount of manure. In this coffee and enset growing midland, traditionally farmers decompose manure and kitchen wastes by depositing on the back yards in the form of heap. After a long period of decomposition they used the compost for back yard vegetables, enset and coffee as organic source of fertilizer. With this regard, goats contribute manure for agricultural system, which is returned to the crop production system (nutrient cycling) to benefit vegetable garden, food crop and cash crops enhances the sustainability of the system (Ibrahim, 1998).

During group discussion, the community members strongly stressed on that goats can be easily sold in the nearby markets whenever there is an urgent need for cash, hence they protect cattle from being sold for minor problems. The reasons are similar with the result from traditional

small stock farmers survey by Nsoso (2004) in Botswana, who indicated that most farmers sell their goats because of urgent cash needs. The present findings on the other hand, is different from the results of a study on rural community farming system in South Africa which indicated meat consumption as major reason for keeping goats (Braker *et al.*, 2002).

In Moist Weyina Dega (near Yirgalem town Dale) and in Moist Dega (Wonsho) farmers use goat milk and there were some farmers who had no other alternative source of milk for their children. Furthermore, goats are slaughtered for home consumption occasionally, for example, when there is birth in the family or when a respected guest visits the family. In contrast to the report of Farm Africa, (1996) people in Sidama have no tradition or culture of slaughtering goats during "Fitche" (The new year celebrated by Sidama people, based on cultural calendar of Sidama).

Table 5 Purposes of Keeping goats

Purposes	Moist Dega	Moist Weyina Dega	Moist Kola	Total
Savings	6.7	46.7	61.6	38.3
Sales	32.6	26.7	28.8	29.17
Milk	20.6	10	0.83	13.3
Meat	26.6	10	0.83	11.6
Milk & meat	6.7	4.4	0	4.8
Manure	6.7	2.27	0	2.5
Prestige	0	0	8	0.8

Farmers in moist Dega has significantly long years of experience in keeping goats than Moist Kola ($P<0.05$). But, herders in Moist Weyina Dega (Dale) didn't differ in experience of keeping goats from these in other two-agro ecologies (Annex table). The experience ranged from one year up to 50 years and the mean was 9.7 years (Table 6). Most of respondents in the studied sites had longer time of involvement in goat husbandry, which is quite desirable to improve the goat production center.

Table 6 percentages of farmers in the three-agro ecologies with different years of experiences in goat husbandry

Experience in Year	Moist Dega	Moist Weyina Dega	Moist Kola	Total
0-5	20	35.5	40	34.1
06-10	26.7	32.2	40	32.3
11-15	20	7.7	6.6	9.2
16-20	0	14.4	6.6	11.1
21-25	13.3	2.2	0	3.3
26-30	20	4.4	6.7	6.6
>30	0	3.3	0	3.3

Aspects of flock dynamics was studied by asking farmers were interviewed about their flock size before two years and these values were compared with current flock size to determine flock dynamics. The results indicated that the over all mean flock size before two years in the three agro ecologies was 6.21 goats/HH and at present is 5.98. This indicated a reduction in flock size by almost 3.71% in two years time. Similarly, the mean number of sheep before two years was 1.53 per household but now the mean holding of sheep per household is 1.06. Compared to the mean number of goats, the reduction in flock size of sheep is higher (Table 7).

Although goat flock size reduced when considering the overall mean, but this is not the picture when considering by agro ecology: For example, flock size did show increase in Kola, and even the reduction is not the same in Dega and Weyina Dega. Although the overall mean flock size of goats reduced at present when compared with what it used to be two years ago, flock dynamics differed in the three agro ecologies. For example, in Moist Dega, mean goat number per household reduced from 4.93 to 2.67, which is a 45% reduction in two years time (Table 7). But the reduction in Moist Weyina Dega was only 12%. Contrary to these two agro ecologies, goat flock size has showed increase by 63% in Moist Kola (Table7)

Table 7 Goats and sheep numbers per household before two years and at present as recalled by flock holders

	Moist Dega		Moist weyina Dega		Moist Kola	
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error
Number of goats before two years	4.93	1.026	6.21	.755	7.63	1.640
Number of goats after two years	2.67	.539	5.46	.576	12.47	2.162
Number of Sheep before two years	2.27	.870	1.63	.405	.44	.273
Number of sheep after two years	1.13	.413	.92	.152	.56	.288

The preference of the community to keep goats instead of sheep has increased because of several socio economic factors. Discussions with key informants and flock holders showed that farmers appreciate the capability of goats to produce meat and milk better than sheep, with minimum input. The fact that goats are able to consume diverse plant species that cannot be easily consumed by sheep or cattle (eg. chat leftover and pods and broken seeds of haricot bean), was also mentioned as the other desirable feature of goats. The opinions were in agreement with the findings of Ibrahim (1998) who reported goats as being more effective at selectively grazing and efficiently convert feed in to milk better than other dairy animals.

4.7. Reproduction

Farmers in the three agro ecologies agree with two major breeding seasons of goats, namely September to October and between March and April however, some differences were observed among the three agro ecologies (Table 8). In Moist Dega, respondents rated the two periods with

almost equal proportion (53.3% to 46.7%, respectively). And the latter is similar with the report of Behailu and Samuel (2003) that reported breeding season for goats in Boricha (Sidama) and Arsi districts, mainly at the beginning of the small rainy season (Belg) that favors the vegetative growth and production of browse trees and shrubs

Likewise, about half the respondents in Weyina Dega and Kola agree that September and October are periods of high births. On the other hand, the proportion of respondents in these two agro-ecologies who rated March and April as peak birth time were lower compared to these in Dega. i. e. about 1 in 3 in Weyina Dega and 1 in 4 in Kola. Rather, some respondents in weyina Dega (12%) and proportionately considerable number in Kola (20%) said their goats breed throughout the year. This indicated that goats in Kola are more efficient in their reproduction followed by these in Weyina Dega than in Dega.

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Based on the discussions with key informants, it was gathered that in Moist Weyina Dega and Moist Dega, April and May is the time of weeding and thinning of annual crops and some perennials like Enset and banana. Hence, increased availability of feed from crop residue may provoke on set of heat and subsequent breeding for goats. There fore, goats that conceived during these months will deliver during September and October after 150 days of gestation period. Likewise, feed is more available during October and November due to the availability of young maize and sweet potato, so that, goats can be provided with fresh leaves of maize and potato together with grain parts. Hence this may trigger on set of heat and goats mated during these months deliver in March and April. The Moist Kola (Loka Abaya) study site has vast area of communal rangeland, which is suitable for goat's production. Therefore, this may account for the increased rate of year round breeding activity, observed in this agro ecology.

Table 8 Percentage of respondents indicated months with the highest number of birth

	Classification in Agro ecology%			Total
	Moist Dega (N=15)	Moist Weyina Dega) Kola (N=90)	Moist Kola (N=15)	All the three agro ecologies (N=120)
Through out the year	0	12.33	20	11.1
September-October	53.3	50	53.33	50.8
March-April	46.7	35.5	26.67	35.9
June & July	0	2.2	0	1.72
Total	100	100	100	100

4.7.1 Age at first mating

Age at first mating (AFM) varied by agro ecology although observed differences were not significant at 0. 05 level of significance (Table 7). Age at first mating is influenced by genetics and environmental factors that determine the age at puberty. The over all mean for AFM is 9.76±. 243. Sidama goat types in Moist Kola (Loka Abaya) reached puberty at a mean age of 8.73 months. In Moist Weyina Dega and Dega areas kids reached puberty at 9.73 and 10.33 months, respectively. This age is closer to the findings of Workneh (1992) who reported the age at first kidding for Sidama goats to be less than 12 months. Where as, it is lower than reported by Behailu and Samuel (2003) for Arsi Bale goats on farm level, which was found to be 14 and 16 months for Arsi Negele and Boricha, respectively. The present estimate of age at puberty is somewhat greater than the value of 6 to 7 months reported for indigenous goats in South Africa that was reported by Mamaboli (2005).

4.7.2. Age at first kidding

The age at first kidding (AFK) was significantly different among the three-agro ecologies ($p<0.05$). The over all mean of age at first kidding is 14.88± .245. In Moist Kola the lowest mean age at first kidding 13.73±0.77 months was reported and it is significantly different ($P<0.05$) from the mean age of these in Moist Dega16.13±0.61 (Table 9). In Moist Weyina Dega, the mean age at first kidding was 14.86±0.29 months and it is intermediate between the values of the two-agro ecologies (Table 9). These estimates were shorter than the value reported by Workneh (1992) for Sidama goats (18 months) and comparable to the value reported by Wilsen et al.

(1989) for Togo, Sahil and Maradi goats, which was 15, 13 and 14 months, respectively.

4.7.3. Kidding interval

The interval between two parturitions is the kidding interval. Kidding interval generally declines with age suggesting the younger kids take longer to regain body condition after kidding. The over all mean of kidding interval (AKI) for the three agro ecologies is 257±0.16 days. The mean kidding interval for Loka Abaya Sidama type goats in Moist Kola was 7.27± 0 .267months, which was significantly lower ($P<0.05$) than the value of the other two agro ecologies(Table 9). The value in Moist Weyina Dega was 8.56±0.18 months, which was again significantly shorter than the value of Moist Dega (10±0.352 months. The value for the Loka Abaya is comparable with mean values reported for Arsi Bale goats , 8.7 months (Tatek, 2004) but comparable with that of Arsi Bale goat type in adjacent district, Boricha, (339 days) Behailu and Samuel, (2003). Also, comparable with Mootse goats in South Africa, (8.4) months and west African Dwarf Goats (8.3 months) in Southern Nigeria (Ikwuegbu *et al.*, 1996). On the other hand, the mean kidding interval of goats in Moist Weyina Dega around Dale District and those of Moist Dega (Wonsho study sites) are quite high compared to the above-mentioned literatures values.

Key informants indicated that the variation in kidding interval is largely associated with variation in management system. For instance, goats provided with free ranging extensive system at Moist Kola (Loka Abaya), have shorter kidding interval. For example, at Felka (one of the study site at Loka Abaya), there is vast rangeland with diverse browse species where goats free forage. Here, individual flock holding is large and the number of bucks left in the flock is large (about 4:1 ratio) This may have contributed to the observed shorter kidding interval of goats in this area

(Moist Kola) as compared to the other sites. The other reason that contributes for the shorter kidding interval in Kola agro ecology may be the availability of divert browse species which provide opportunities for the goats better selection and there by optimize their nutrient intake. According to Alemayehu (2003), browse trees or shrubs are important animal feed in Ethiopia; they provide protein, vitamins and mineral elements, which are lacking in grassland pastures.

4.7.4. Weaning age

Weaning age (WA) varied among the three-agro ecologies. It is mainly dependent on genetics and environmental factors. The over all mean of age at weaning is 5.19±0.124 months. In Moist Kola (Loka Abaya) goats reached weaning age at 4.3±0.316 months, which was significantly lower ($P<0.05$) than those in Moist Dega agro-ecology. Feed is more available in Kola (Loka Abaya) area as discussed earlier and farmers do not use goat milk and it is completely left for kids to suckle. Because of better feeding, does become in heat within shorter time after kidding once pregnant owners forcefully wean kids in order to give sufficient time for the pregnant doe to improve its condition for the subsequent birth. Goats in Moist Weyina Dega had significantly lower weaning age 5.09±0.129 months ($p<0.05$) than these of Moist Dega but no significant difference was observed with Moist Kola (Table 9).

Table 9 Mean values for various reproductive parameters of goats in the three-agro ecologies (The number investigated were 15 in Dega and Kola, and 90 in Weyina Dega)

		Mean	Std. Error
Weaning age for kids	Moist Dega	6.27a	.452
	Moist Weyina Dega	5.09b	.129
	Moist Kola	4.73b	.316
	Overall mean	5.19	.124
Age at first mating	Moist Dega	10.33a	.728
	Moist Weyina Dega	9.83aa	.271
	Moist Kola	8.73a	.765
	Overall mean	9.76	.243
Age at first kidding	Moist Dega	16.13a	.608
	Moist Weyina Dega	14.86ab	.290
	Moist Kola	13.73b	.700
	Total	14.88	.251
Kidding interval	Moist Dega	10a	.352
	Moist Weyina Dega	8.56b	.177
	Moist Kola	7.27c	.267
	Overall mean	8.57	.156

Mean with the same letter has not significantly different at 0.05 significant levels at

4.7.5. Litter Size

The over all mean Litter size for the three agro ecologies is 2.07±0.13. Mean Liter size of goats in Moist Kola (2.33 ±0.35) and in Moist Weyina Dega (2.21±0.15) were significantly higher ($P<0.05$) than in Moist Dega, but no significant difference was observed between the two agro ecologies (Table 9). In some areas of Moist Weyina Dega and almost in all parts of the Moist Dega (41.7%), farmers reported single kidding. In these two areas, six respondents (5%) reported triplets and the remaining reported no uniform kidding. Litter size was also found to vary from parity to parity. The result in Moist Kola and Moist Weyina Dega are higher than the average

litter size (1.3) reported previously reported for the Sidama goat type (Farm Africa 1996) and for goats in Boricha district Southern Ethiopia (1.03), (Girma *et al.*, 2000). On the other hand, the latter two literature values are comparable with the mean litter size of goats in Moist Dega found in the present study.

The pattern of litter size increased as the age of does advanced. At first kidding the litter size in most cases is single, and increases to twins to the middle age, then remains constant after fifth and sixth parity, as confirmed during group discussion. In rare cases some goats produce triplets at their peak reproductive age. The over all mean age of lifetime kidding (parity) is 13.05±. 3 year. The possible lifetime kidding (parity) was estimated to be12.07±0.13 and12.68±0.32 ($P<0.05$) in Moist Dega and Moist Weyina Dega, which were significantly lower ($P<0.05$) than the value of Moist Kola, i.e. 16.07±0.93 months (Table 10). There is no significant difference ($P<0.05$) between Moist Dega and Moist Weyina Dega agro-ecologies.

Table 10 Litter size and parity of goats in the three agro ecologies

Reproductive performance				
Litter size	Moist Dega	15	1.13a	.091
	Moist Weyina Dega	90	2.21b	.157
	Moist Kola	15	2.33b	.347
	Total	120	2.09	.130
Parity	Moist Dega	15	12.07a	.740
	Moist Weyina Dega	90	12.68a	.323
	Moist Kola	15	16.27b	.928
	Total	120	13.05	.303

4.7.6.Culling

Culling is a common practice in all the three-agro ecologies. Forty nine respondents (40.8%) culled their goats due to poor body condition, 40 respondents (33.3%) reported poor production as the main cause of culling, and 24 respondents (20%) reported older age and the rest 5.9 % indicated the combination of health, reproduction color and bad animal characteristics as the major factors for culling goats from the flock. This being the overall situations, differences were noted among the studied agro-ecologies, which respect to reasons for culling. In Moist Dega and Weyina Dega, the three factors, namely poor body condition, poor productivity and older age were the main reasons for culling goats (Figure 4). On the other hand, in Moist Kola, poor production was the single most important reason for culling as indicated by more than 70% of respondents (Figure 3)

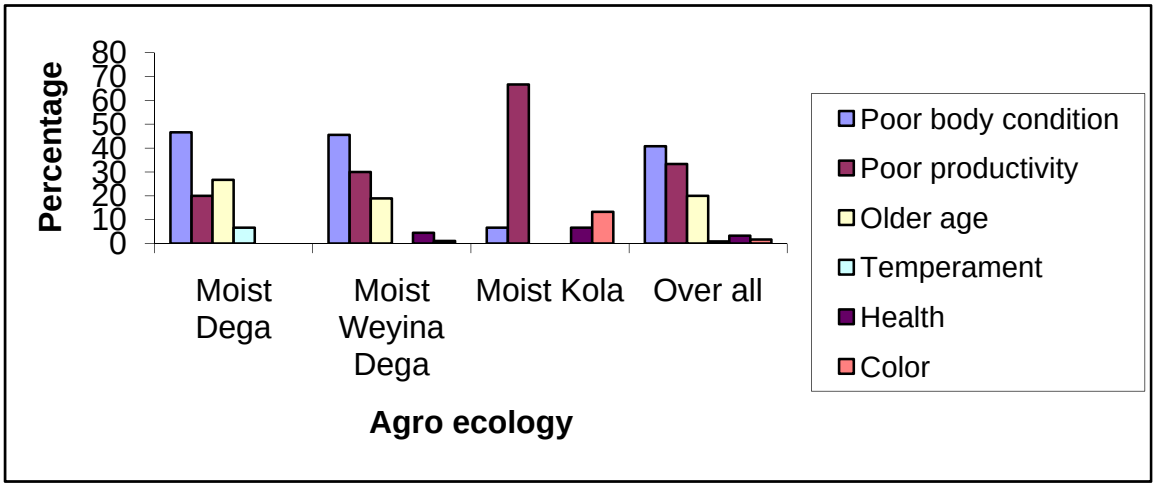

Figure 4 Percentage of respondents who suggested different reasons for culling goats in the three-agro ecologies

4.7.7. Age at first service for bucks

There was no significant difference among the three-agro ecologies regarding age at first service for bucks. Bucks reached age for service at the age of 11.13, 12.04 and 10.4 months at Moist Dega, Moist weyina Dega and Moist Kola agro ecologies, respectively (Table 11). These values are generally within the range reported by Workneh (1992) for Sidama goats (7 to 24 months).

Overall majority of respondents (51 %) reported that the source of bucks is from neighbors from their own farm (42.5%), but few (6.67%) said they purchased bucks from out side (Table 11). However, differences were observed regarding sources of bucks in the three agro ecologies. In Moist Kola, majority (60%) owned their own bucks for breeding purpose and some 40% said they use neighbors buck. The trend is more or less similar in Moist Weyina Dega (Table 11). On the other hand, in Moist Dega, majority (53%) said the use of neighbors buck and only 2.7 % possessed their own breeding buck. Also considerable numbers (20%) said the use of purchased buck, which is fairly uncommon in the other two agro ecologies (Table 12).

Table 11 Age at first service for bucks by agro ecology classifications

Agro ecologies	N	Mean	Std. Error
Moist Dega	15	11.13[a]	1.238
Moist Weyina Dega	90	12.04 [a]	0.424
Moist Kola	15	10.40 [a]	0.486
Total	120	11.73	0.360

Table 12 Percentage of farmers that use different sources of breeding bucks and mating systems

Source of bucks for breeding	Classification in Agro ecology			Total
	Dega	Weyina Dega	Moist kola	
Own farm	26.7	53.3	60.0	51.0
Purchased	20.0	5.6	0.0	6.67
Neighbors	53.3	41.1	40	42.5
Total	100	100	100	100

4.7.8. Selection of breeding bucks

Criteria for selecting breeding bucks include size, conformation, color, and horn pattern (Table 4). About 55.8% of the flock holders indicated that they focus on large size, wider body conformation, thick horns and white or red color when selecting breeding bucks. Some 24.2% stated that they mainly consider size alone as the basic criteria, and the remaining (20%) considered horns and body conformation as selection criteria. However, there were variations among agro ecologies investigated in this aspect as well. In Dega size was the most important criteria for selecting breeding buck as viewed by about 80% of the respondents (Figure 5). Whereas, in Moist Weyina Dega, most (>70%) used combination of criteria for the selection while in Kola these that use size alone and combinations of the criteria were nearly 1.1(Fig 5).

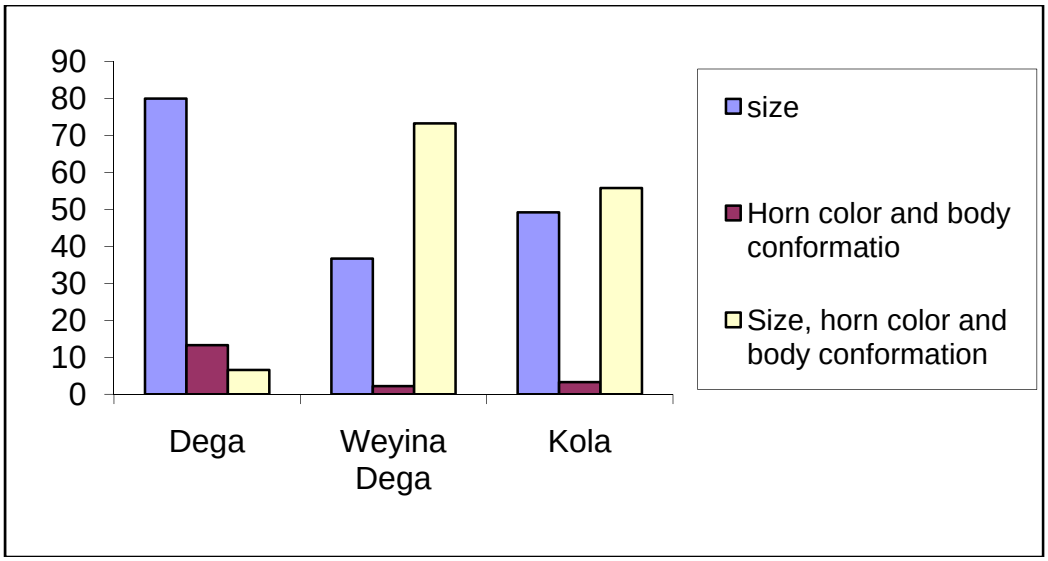

Figure 5 Criteria for selecting bucks

Controlled mating is usually practiced at Moist Weyina Dega (Dale) and Dega (Wonsho) because, tethering is commonly used system of management in these agro ecologies and goats fed by cut and carry system. Therefore, goats are not allowed to free foraging, the owners follow the heat period of the doe and allocate bucks for mating. Thus, in these two agro ecologies, farmers have better control over breeding activities and have better opportunities for selecting breeding bucks. Uncontrolled or open mating is common in Moist Kola free ranging goats. No restriction to browse and tethering is unusual; goats can mate with known or unknown bucks on the field during browsing. This type of management is extensive and doesn't give chance to select productive flock and it may expose to goats that have inferior production.

4.7.9. Purpose of keeping bucks

About 42.5% percent of the respondents said they keep bucks for mating only, but 57.5 % of the respondents keep bucks for additional benefits (Table 13). The latter group said that after using bucks for breeding, they fatten for a short period and sell them for cash. This system was common in Moist Dega and mixed farming Moist Weyina Dega who kept very small flocks of goats.

Some of the smallholder farmers in the coffee producing mid lands (Weyina Dega) community purchase bucks and doe kids during the time of coffee harvest (October). The time of coffee harvest is the time when money is available and they usually spend the extra money for purchasing bucks and doe kids. After a certain period of time they retain the kid doe in the farm for breeding and sell out the bucks after a shorter period of intensive feeding. Children and poorer members of the community establish their initial stock through this means in addition to the profit they get from selling fattened male goats. Respondents estimated the age of culling bucks to range from 7 to 12 years.

Table 13**.** Reason for keeping bucks in the three agro ecologies

Reason	Classification in Agro ecology			
	Moist Dega, %	Moist Weyina Dega, %	Moist Kola, %	
For mating	20.0	60.0	42.8	51.0
Socio cultural reasons	6.67	4.28	0.0	5.0
Both for mating and socio cultural reasons	73.3	35.7	57.2	44.0
Total	100	100	100	100

4.8. Milk Production

During the survey time, the majority of respondents, 70% had milking doe while 30% said they do not use goat's milk in the family diet (Table 14). Goat milk is highly adapted in the midland areas of Dale where cow milk is not sufficiently available for those poor densely populated cash cropped smallholders. Although, the amount of milk produced from goats is very small, there is cultural belief about medicinal value of goat's milk and it is mostly used for infants elderly and sick family members.

About (79.8%) of the respondent's uses goat's milk for infants where as some (20.2%) said that all the family members use goat milk although infants and elderly people are given priority (Table 14). A mean amount of milk produced per day from a lactating doe was estimated at 0.33 liters. Where as in Kola agro ecology, goats have relatively better yield and it is not uncommon to find goats that produce up to 0.5 liter per day (Figure 6).

Table 14 Goat milking and milk utilizations

Response on milking goats					
			Milk utilization in the family		
Do you use goat milk	**Frequency**	**Percent**			
Yes	84	70			
No	36	30	**Infants**	67	79.8
			All the family	17	20.22
Total	120	100	**Total**	84	100.0

Figure 6 a lactating doe taken from a flock at Moist Kola district, Loka Abaya. The doe is at its 3rd parity and had twins. It produced 0.5 litters of milk /day.

4.9. Flock monitoring

Two hundred forty goats were monitored and the flock was observed from September 2006 to March 2007. During this period (Table 15), 156 female goats of different age group were monitored. A weight of the total flock was measured using weighing scale and chest girth measurements. In Moist Kola a mean average weight of does which are >= 2 years of age was recorded to be (76.6± 2.3 cm) which is the highest measurement than the moist Dega (71.9±. 9) and similar with Moist Weyina Dega goats (74.1±1.2).

During the study period the major route of entries in to the flock is birth, purchase and transfer. According to the collected data, 25.8%, and 5.8% were birth and purchase, respectively and only 0.9% was transfer. Out of the total birth observed (41.5%) were twins, (4.9%) were triplets and

(53.6%) were single birth were observed.

Mean kid weight at birth is significantly different among the three-agro ecologies ($P<0.05$) (Table 14). The highest birth weight was recorded in Moist Kola (2.9 Kg) and it is significantly higher ($P<0.05$) than the other two-agro ecologies. The lowest weight was observed in Moist Dega (2.2Kg) and Moist Weyina Dega has an intermediate birth weight (2.5 Kg). The practice of weaning kids from their does differ according to the system of management in the three agro ecologies. The weaning weight for all the three agro ecologies was recorded after 120 days of birth. So the mean weaning weight at specified period in Moist Kola was (11.5±0.53 Kg), which is significantly higher ($P<0.05$) than Moist Weyina Dega (9.2±0.26) and Moist Dega (8.25±0. 35) (Annex Table 7). It is different from that of the interviewed results, because weaning age is different in all agro ecologies and mainly determined by the herders' management system. But, for the purpose of our study all kids after specified period (120 days) were recorded in all agro ecologies in order to identify the weaning weight.

The variation in weaning weight is due to the experience of farmers in using goat milk for household consumption. In moist Kola herders completely allow kids to suckle their does, where as in moist Dega farmers milk their goats and partial allow kids to suckle. But, in Moist Weyina Dega, although the farmers used the milk for home consumption, they provide supplementary feed for goats and their suckling kids prior to milking time.

Table 15. Mean (±SE) for birth weight and weaning weight of goats in the three agro-ecologies

	Agro ecologies	N	Mean	Std. Error	Minimum	Maximum
Birth weight, Kg	Moist Dega	8	2.15	0.050	2.00	2.40
	Moist Weyina Dega	16	2.53	0.076	2.00	3.20
	Moist Kola	8	2.87	0.106	2.20	3.20
	Total	32	2.52	0.065	2.00	3.20
Weaning weight, Kg	Moist Dega	8	8.25	0.365	7.00	10.00
	Moist Weyina Dega	14	9.22	0.260	8.00	11.00
	Moist Kola	8	11.50	0.534	9.00	14.00
	Total	30	9.57	0.305	7.00	14.00

On the other hand, the major exit routes were sales (20%) and death (13.3%). the highest sales were observed in September and October. And the highest death was observed during November. The observed percentage of mortality is also different from reported percentage (10.9%) the reason for the highest death was the diseases know as Sheep/Goat pox occurred in the two Kebeles of Moist Kola (Felka and Foka Bedelicho), the disease out break was observed in the month of October and controlled by isolating and vaccinating the healthy flock. However, it was killed the old and weak goats and kids by affecting the mouthpart and inhibiting browsing, and finally resulted on death.

Table 16.Number of goats that entered and exited from the flock

	N	Sum	Mean	Std. Deviation	Percent
Number of goats initial	50	240.00	4.80	4.238	
Number of kids born	35	62	1.77	0.877	25.33
Number of goats purchased	9	14	1.99	0.32	5.8
Number of goats transferred	1	2.00	2.00	.	.83
Number of goats died	16	32.00	2.00	2.338	13.3
Number of goats sold	28	56.00	2.00	2.177	23.3

4.9. Feeding systems

4.9.1. Feed resources

Goats feeding system differed in the three-agro ecologies. In Loka Abaya, most respondents (86.7%) said goats commonly feed on tree leaves, like Acacia species and Olea Africana (Table17) In addition, some (13 .3%) said crop residues like maize at young stage, haricot bean after harvesting the seed, banana (*Musa paradisiaca*) and Enset (*Enset ventricosum*) leaves and stem parts are given for goats during the dry season. This management practice is advantageous because it adds variety to the diet and helps to meet the nutrient requirements for maintenance and production (Devendra, 1982).

Regarding the proportions, in moist Weyina Dega (Dale) the majority (66%) of the respondents indicated that, the major feed for goats is crop byproducts from parts of Enset, Banana, chat,

sweet potato haricot bean, weeds and tinning of annual crop (Table 15). Due to the declining trend of communal pasture, bush and forestland are less available in cash crop producing midland areas. Thus, with a decline with woodlots and forest areas as feed sources, the proportion of households that use crop residues and purchased feed has increased. As a result, the number of animals reared by smallholder has reduced gradually and the system of management and feed utilization has changed over time from free range extensive management to tethering and cut and carry feeding system.

Where as, in Moist Dega (Wonsho) and Moist Kola (Loka Abaya), the majority 46.7% and 86.7% of participants, respectively indicated that shrubs bushes and tree branches are the major sources of feed for goats (Table 15). The browsing supplies some of the goats needs, but manual feeding provides the greater part. In the dry season free-range goats will only find dry vegetation or crop residues in the fields. These may supply some energy, but the protein content is very low (Jansen, 2004).

Table 17. Percentage of respondents that suggested different feed sources.

	Classification in agro-ecology			
	Moist Dega	Moist weyina Dega	Moist Kola	
Crop by products like parts of Enset, haricot bean, chat and banana, weeds of plants and tinning of crops and some bushes and shrubs	26.7	66	0	52.5
Bushes or shrubs only	46.74	4	86.7	20
Crop residue kitchen wastes chat left over banana and Enset parts	13.3	10	13.3	10.8
Other supplements (Wheat bran)	13.3	20	0	16.7
Total participants	100	100	100	100

During group discussions herders identified important trees and shrubs that are highly palatable and selected by goats (Table 18). Each agro-ecology has important tree species specific for that area and these palatable trees and shrubs are declining due to overgrazing and bush encroachments. Especially in Moist Kola (Loka Abaya) study site, palatable trees like *Balanite aegiptica*, *Maytenus ovatus*, *Rhamus prinoides* etc. have been declining species and are being replaced by less palatable bushes.

Table 18. Shrubs and trees commonly fed to goats in the three-agro ecologies

Agro ecologies	Vernacular name	Scientific name
Moist Dega	Hecho	*Vernonia amygdallina*
	Sato	*Erica arborea*
Moist Weyina Dega	Ejersa	*Olea africana*
	Badano	*Balanites*
	Shisho	*Tragia spp*
	Garbicho	*Chionotrix latifolia*
	Chucho	*Maytenus ovatus*
	Uticho	*Acacia spp*
	Avocado	*Avocado*
Moist Kola	Ejersa	*Olea africana*
	Dawawessa	*Maytenus ovatus*
	Chucho	*Maytenus ovatus*
	Uticho	*Acacia spp*
	Garbicho	*Chionotrix latifolia*
	Xadicho	*Rhamnus prinoides*

4.9.2. Supplementary feeding

Flock holders in the study area of Dale provide feed supplements in the morning before the animal turning out for grazing and in the afternoon when the animal return home. The main feed types supplemented were all parts of Enset from tuber-pseudo stem to tip part of leaves, banana leaves and stem, chat after removing the edible and saleable part. Furthermore, sweet potato vine, haricot been residue, maize from early stage to post harvest are commonly used supplements during harvest time of these crops. Even then, supplemental feeding by cutting and carrying such feed stuff to enclosed animals hardly meets the nutrient requirements of the animals as supplements are often poorly nutritive (Janson, 2004).

Some respondents in Moist Dega (13.3%) and in Moist Weyina Dega 20% used wheat bran for

lactating does and fattening goats as supplementary feed by purchasing from Yirgalem town. In mixed farming densely populated areas of Dale Weyina Dega, fruit leaves mainly Avocado and Banana (*Musa* paradisiaca), and Chat (*Catha edulis*) leftovers are important feed for goats. The latter is also most important cash crop in Eastern Ethiopia as a whole, which appears to have expanded in recent years with the liberalization of the economy. The leftover chat provides a large amount of browse supplement for livestock, especially goats (Workneh, 2000).

During group discussions herders indicated that white stem banana is very much preferred by among banana varieties that are locally grown by farmers as well as any other type of crop residue. As a result farmers often integrate white banana in the backyard not only for the purpose of sales but also because of its high palatable nature and selectivity of the plant by goats.

There are seasonal variations on feed availability; respondents identified the months with surplus feed production and also months with significant feed shortage (Table19). About 65.5% of the respondents said that feed for goats is available from April to October, while 81.7% respondents indicated January to March as a period of critical feed shortage.

Table19. Different periods of the year rated according to availability f surplus feed in the three agro ecologies.

	Classification within Agro ecology			
	Moist Dega	Moist Weyina Dega	Moist Kola	
April-October	86.7	58.8	66.7	63.3
December-March	0	2.2	0	1.67
July -October	6.67	1.1	20	4.17
October-November	0	28.9	0	21.6
September-November	6.6	8.9	13.67	9.17

Months from May to October are in the rainy season; shrubs, bushes and other types of plants are adequately available. In Moist Kola (Loka Abaya) during this time feeds from shrubs, trees and bushes are available and surplus. On the other hand, in cash crop producing Moist Weyina Dega (Dale), even though annual and perennial crops occupy land, feeds like weeds, thinning of crops and tree trunks can support goats. According to Workneh (2004) in the highlands, where common grazing areas have decreased due to population pressure, crop thinning and weeds from cultivated land provide a large part of supplementary feed available to the goats. Between September and December feed is surplus because of crop harvest and the aftermath used as feed of goats.

Table 20. Periods of the year when feed shortage occurs in the three agro ecologies

	Classification within Agro ecology			
	Moist Dega (n=150)	Moist Weyina Dega (n=90)	Moist Kola (n=15)	
January-March	93.3	78.9	86.67	81.7
May-October	6.67	7.8	0	6.7
October-February	0	1.1	6.67	9.1
April-June	0	2.2	6.67	2.5
Total	100	100	100	100

4.9.3. Management system

Tending goats is the responsibility of the family as a whole however; there is a division of labor among family members and this is based on the management system. The management system is different in the three agro ecologies. According to data collected from respondents, in Moist Weyina Dega (Dale) and Moist Dega (Wonsho) districts, 57% of goat herders tethered their goats near their farmstead using long or short rope based on the size of the land. About 25% of the participant farmers herded their goats around their residence along the farm borders, fence sides, fallow and marginal lands (Table 21). Tethering small around homestead where goats are provided with crop residues is also common and family members who stay at home are usually engaged in looking after the goats while feeding (Figure 7).

Fig 7. Goats being looked after by midwife during supplemental feeding of crop residue (Haricot bean). This type of management is common in Weyina Dega (Dale) areas where goats are tethered and looked after by mid wives

Information gathered during group discussions indicated that tethering is popular with small holders because of shortage of grazing land in the predominantly cropping area of moist Weyina Dega and Dega agro-ecologies. This system also reduces labor inputs. This is important because labor shortage is common, especially during the rainy season, when most people are engaged in other farming activities. Conversely, farmers with large size animals herd their goats because labor is available and herding large flock of goats is difficult (Davies, 2003).

Table21. System of management classification in the three agro- ecologies (% of respondents)

Management system	Classification in Agro ecology			
	Moist Dega	Moist Weyina Dega	Moist Kola	Total
Herding in the bushes	0	2.2	46.67	7.5
Herding around the farmstead	13.33	22.2	13.33	20
Unherded but browse in the bush	6.67	12.2	40	15
Tethering	80	63.3	0	57.5
Total	100	100	100	100

Extensive management of goats is dominant at Moist Kola Loka Abaya where free ranging of goats is common. The system is advantageous for goats since it gives opportunity to select and freely forage from the bushes. In all the three agro ecologies mainly male children below 15 carry out herding. But in Moist Weyina Dega and Moist Kola, households take the part of herding (43.3% and 40%), respectively. In moist Kola and Moist Weyina Dega male children below 15 ages carry out herding, while in Dega the participation of households in herding goats is low because households in Dega pass their time with grazing animals (cattle and sheep) and

mainly male children look after goats. Sanitation of goat house is the responsibility of female children, which accounts 93.3, 86.6, and 54.4% in Moist Kola, Moist Dega and Moist Weyina Dega agro ecologies respectively (Table 22). Unlike the division of labor carried out for routine activities, sales and purchase of goats is entirely the responsibility of households.

Table 22. Responsibility of family members in goat management

	Herding			Sanitation			Health management		
	Moist Dega	Moist Weyina Dega	Moist Kola	Moist Dega	Moist Weyina Dega	Moist Kola	Moist Dega	Moist Weyina Dega	Moist Kola
House hold	20	43.33	40	0	2.2	0	46. 4	53.3	66.7
Spouse	0	0	0	6.67	14.4	6.7	13.7	16.67	6.6
Male children>15	20	3.33	0	0	0	0	26.3	12.22	0
Female children>15	0	0	0	6.67	11.1	0	0	0	0
Male children<15	46.7	45.5	53.3		4.4	0	0	14.44	26.7
Female children <15	13.33	4.44	0	86.67	54.4	93.3	13.7	8.9	0
All the family > 15	0	3.4	6.67	0	3.33	0	0	5.5	0
	100	100	100	100	100	100	100	100	100

4.10. Water sources and watering

Compared to cattle and sheep, goats are efficient in using water. They have a low rate of water turn over per unit of body weight (Devendra, 1982). In the three-agro ecologies of Dale, four types of water sources are available namely: river, pond, hand dug well and streams are commonly used (Table 23). Ponds are the main water sources in the Moist Kola (Loka Abaya) especially during the wet season (April to September). During the rest of the year, most of the flock holders trek their goats to Lake Abaya, and Blatte River (Table 24).

Table 23 Water sources during wet season in the three-agro ecology as responded by flock holders

Water source	Classification in Agro ecology			Total
	Moist Dega	Moist weyina Dega	Moist Kola	
Hand dug well	13.33	24.4	6.67	20.8
Pond	13.33	18.6	80	25.8
River	66.67	27.9	13.33	31.7
Stream	6.67	26.7	0	20.8
Hand dug well, and spring	0	2.3	0	0.9
Total	100	100	100	100

In Dega rivers are common water sources during wet and dry seasons (also hand dug wells are also more used during the dry season) In Moist Weyina Dega all the four sources water are commonly used during both seasons (Table 24)

Table 24 Water source during dry season, classification by Agro ecology

Water source	Classification in Agro ecology			Total
	Moist Dega (N=15)	Moist weyina Dega (N=100)	Moist Kola (N=15)	
Hand dug well	27	29	6	26
Pond	0	19	69	31
River	67	29	25	33
Stream	6.6	21	0	10
Pipe	0	2	0	0
Total	100	100	100	100

In Moist Dega and Weyina Dega, the majority of respondents 53.3% and 56.7%, respectively travel less than a kilometer to water their goats during the dry season (Table 25) said they travel less than a kilometer to water their goats during the dry season. On the other hand 33.1% and 15.6 % of the respondents in Dega and Weyina Dega respectively. Still substantial proportion of households (27.8%) in the Weyina Dega agro-ecology travel up to 10 Km to water their stock. In moist Kola during dry season 86.7% and 13.3% of respondents travel to watering point 6 to 10 km and above 10 km, respectively (Table 25). But, during the wet season only 20% of respondents in Moist Kola travel 6-10 Km to water their goats and can be available within less than 1Km for most of them. Similarly, water is available with in less than a kilometer for most (>75%) of farmers in the other two agro-ecologies (Table 26).

Table 25 Distance to watering points during the dry season, percentage in agro ecology

Distance, Km	Classification by agro-ecology (%)			Total
	Moist Dega (N=15)	Moist Weyina Dega (n=90)	Moist Kola (N= 15)	
<1	53.33	56.67	0	49.2
1-5	33.33	15.55	0	15.8
6-10	13.33	27.77	86.7	33.3
>10	0	0	13.33	1.7
Total	100	100	15	100

Table 26 Distance to watering points during the wet season as responded by flock herders in the three-agro ecologies

Distance	Classification by agro-ecology (%)			**Total**
	Moist Dega (N=15)	Moist weyina Dega (N=90)	Moist Kola (N=15)	
<1km	80	76.7	60	75
1-5km	20	22.2	20	21.7
6-10km	0	1.1	20	3.3
Total	*15*	*90*	*15*	120

Watering frequency varied according to location and season. During the dry season, Moist Kola (Loka Abaya) herders water their goats every second day, whereas in moist Weyina Dega and Dega >90% of the respondents provide their animals with water once a day or it is freely available (Table 26).

Table 27 Watering frequency as responded from the three-agro ecology

Watering frequency	Classification by agro-ecology (%)			Total
	Most Dega (N=15)	Moist Weyina Dega (N=90)	Moist Kola (N=15)	
Freely available	40	16.67	33.3	21.67
Once a day	53.3	80	10	75
Every 2nd day	6.67	3.33	66.7	3.33
Total	100	100	100	100

The quality of water depends on the source and location of water. During discussion with farmers in Moist Weyina Dega, (around Gidabo and Weima river sides), they said that, the quality of water deteriorates by the mucilage discharged from coffee pulperies which is directly dislodged in to the rivers, thus giving bad odor and off flavor to the water and reduces the water intake of goats. However, there was no evidence and nothing is known about the side effect on goat production.

4.11. Housing

Housing system for goats depends on the size of flock. In the moist Kola (Loka Abaya) district, the system of house is different from that of Dale and Moist Dega (Wonsho). The Moist Kola area herders (Loka Abaya) used separate house for their goats. Suckling kids are separated from their does and used the same house with family. Discussion with key informants and field observation in Felka and Foka Bedelicho (Kebeles in moist Kola study area of Loka Abaya) revealed that some herders use open enclosure, while in Moist Dega and Weyina Dega, goats

share the same house with the family.

The materials used for housing also vary according to the economic status of the family. Very small numbers of herders (10%) build goat house using corrugated iron sheet for roofs and wood and mud for wall construction. Where as, the majority of flock holders (90%) construct goat houses using grasses for roofs and wood and mud for wall and floor.

4.12. Diseases

Animal disease is one of the major problems affecting goat production. Six major diseases attacking goats were identified and reported by flock owners (Table28), of which trypanosomes ranked first accounting 36% of the respondents in the Moist Kola (Loka Abaya) area. Traypanosomosis is classified in-group II diseases constitutes the main disease constraints to ruminant productivity in Sub Saharan Africa (Ibrahim, 2002). According to the Author, the disease is widely distributed and transmitted by vector, strongly influenced by the environment and the production system known to depress productivity and cause mortality. In Moist Kola it is an important disease during wet season and farmers are trying to control by organizing Tsetse controlling group in the four Kebeles of Moist Kola. This group has contributed money and purchase acariside from tsetse eradication program. They are working in collaboration with Agricultural and rural development offices at Woreda level and IPMS Dale coordinating office. Sheep pox is also identified as the major disease of small ruminants affecting goats.

During discussions carried out at Felka Kebele Moist Kola (Loka Abaya), the herders of this

area reported that they move their goats from Lake Abaya to Moist Weyina Dega before the onset of tsetse infestation (before May) in order to avoid the risk of the disease. Tsetse flies multiply during the wet season (May to June), according to the discussions with the herders in Bokito and Felka, and the disease attacks goats in wet season.

The other important diseases were heart water (17%). and sheep and goat pox (12%). goat pox, locally known as "*Fuso*", is highly contagious disease of goats, causing a significant loss of body condition ends up with death. In field observation pox lesions were found on the skin and mouthpart and prevents feeding partially at early stage and gradually the animal stops eating. There is no traditional treatment identified and known by local healers. However, the disease can easily be prevented through mass vaccination. This calls for; strengthening and providing veterinary service. On the other hand, internal parasites were seen to be health problems of goats in Moist Dega and Moist Weyina Dega (Dale Chancho Kebele) and partially at Loka Abaya when herders move to the Lakeside. The disease causes weight loss, emaciation and finally death.

There is no as such a strong veterinary service provided particularly for lowland flock holders. As verified during group discussions, there has been no vaccination given during the last five years against any type of goat diseases. There is no veterinary clinic in the Moist Kola area. The district has one main clinic at Yirgalem town serving the Moist Weyina Dega flock holders and another clinic serving more than 12 Kebeles around Moist Dega (Wonsho). The distance to veterinary clinics vary according to agro ecology. Despite having a large flock of goats, Moist Kola (Loka Abaya) area herders have no access to veterinary service. Farmers have to travel

more than 20 km in order to get service. Such circumstances force them to buy veterinary medicines from illegal sources.

The major diseases reported are presented in Table 20. Problems related to goat's health management were discussed with the respondents and the problems are presented in order of importance. About 35.8% of the respondents reported a lack of veterinary clinic as the major problem, 20.5% the shortage of veterinarians, and 20% showed inaccessibility to the road, and 14.2% high price of drugs. A few respondents (2.5%) showed the shortage of medicine and 6.7% did not have problem of disease (Table 29).

Table 28 Constraints in animal health delivery in major agro ecologies.

Constraints in animal health	Classification by agro-ecology							
	Moist Dega (n=15)		Moist weyina Dega (n=90)		Moist kola (n=15)			
	N	%	N	%		%	N	Percent
Lack of veterinary clinics	5	33.33	28	31.11	10	66.67	43	35.83
Shortage of skilled labor	2	13.33	23	25.56	0	0	30	20.5
Inaccessibility to road	1	6.67	18	20	5	33.33	24	20
High drug price	5	33.33	12	6.67	0	0	17	14.2
No problem related health and disease	0	0	8	8.87	0	0	8	6.67
Shortage of medicine	2	13.33	1	1.11	0	0	3	2.5
Total	15	100	90	100	15	100	120	100

Health problems vary from place to place. In moist kola (Loka Abaya), the major problems are lack of veterinary clinics and inaccessibility to veterinary service, as they have to travel longer distance. i.e. Abaya to Yirgalem. In moist Dega (Wonsho) the high cost of vet. Drugs are the challenge due to vet service in accessibility. Where as, in moist weyina Dega (Dale), the magnitude of the problem is lower compared to that of the two agro ecologies. At Dale (6.67%) respondents didn't have problem while 31.11%, 25.56%, and 20.00 % of respondents in this area reported the lack of clinics, shortage of veterinary personnel and inaccessibility to road, respectively (Table 28). The total number of skilled labor working in Dale clinic is four. This number is insufficient to provide services required by flock holders in the rural as well as urban and per urban areas of Dale.

Table 29 Diseases and percentage of respondents in the study area

Diseases		Classification by agro-ecology			**Total**
Local name	English name ??	Dega (N=15)	Weyina Dega (N=90)	Moist Kola (N=15)	
Shillo	Trypanosomisis	0	50.7	46.7	*37.9*
Harisho	Heart water	46.7	17	6.7	*21*
Fusso	Goat pox	0	10.7	46.7	*15.8*
Deisha	Colt parasites	46.7	10.7	0	*15.8*
Bijajo	External parasite	6.7	1.53	0	*2.1*
Feed poisoning	Toxicity	0	9.33	0	*7*
Total		100	100	100	100

Diseases affect all age groups of goats. The goat herders recalled mortality that occurred during last year and the summarized data indicate that out of 718 goats recorded, 78 goats (10.9%) died during the last twelve months (November 1998 to October 1999). The proportion among different age group of goats was 42.7 % does (including doe kid), 39.2% bucks (including buck kids) and 17.9% kids less than three months of age.

According to informants 30% of mortality was attributed to disease, 3.3% was due to predators, and 2.5% due to accident. The majority (63 %) of the respondents encountered no death in the flock during the study period. The highest prevalence of diseases was observed between January and March (Table 30).

Table 29 Months of the highest goat mortality

Months	Moist Dega (N=15)	Moist Weyina Dega (N=90)	Moist Kola (N=15)	Total (N=120
January	20	20	6.67	18.33
February	0	8.9	0	6.67
March	20	5.6	40	11.67
April	13.33	5.6	0	5.83
May	6.67	26.7	13.33	22.5
June	6.67	20	6.67	20.83
July	0	6.67	33.33	9.17
October	0	6.67	0	5
Total	100	100	100	100

February, January and May were where high death rate was recorded. The reasons were found to be the disease out break following the small rainy season. In Moist Kola (Loka Abaya), especially in May herders move from the lowland near Abaya Lake to the upper part of Felka Kebele in order to prevent their goats from tsetse attack. During this movement the attacked goats will die due to trypanosomisis. Kids born during dry season (February and January) die due to the shortage of feed.

4.13. Constraints to goat production

Lack of feed, diseases, shortage of land and marketing are the most important problems in their order of importance. In the three-agro ecologies, the majority (48.3%) of the respondents identified the lack of feed as the first problem and 30.8% of the respondents identified disease as the major problem affecting the expansion and productivity of goats. Some 15.0% of the respondents indicated shortage of land as the main problem and the rest 6% of the respondents identified marketing and money problems as the major drawbacks in the development and expansion of goat production (Fig 8).

Major constraints affecting goat's production vary from ecology to ecology in priority. In the Moist Dega, 46.8% of the respondents indicated that shortage of land is the most important problem and 26.7% of the respondents rated feed as the second major problem. The rest like: disease, marketing and capital were identified as miner problems affecting the expansion of goat's husbandry. In the Moist Weyina Dega farmers (56.67%) identified the lack of feed as the major problem of the respondents, followed by disease (24.5%). Shortage of land, market and capital were shared the remaining 14.5 %.

In the Moist Kola, 80% of respondents were identified disease as the most important problem followed by the lack of access to market (13.3%). The problems of feed, land and money were miner in affecting expansion of goat's husbandry in this agro ecology.

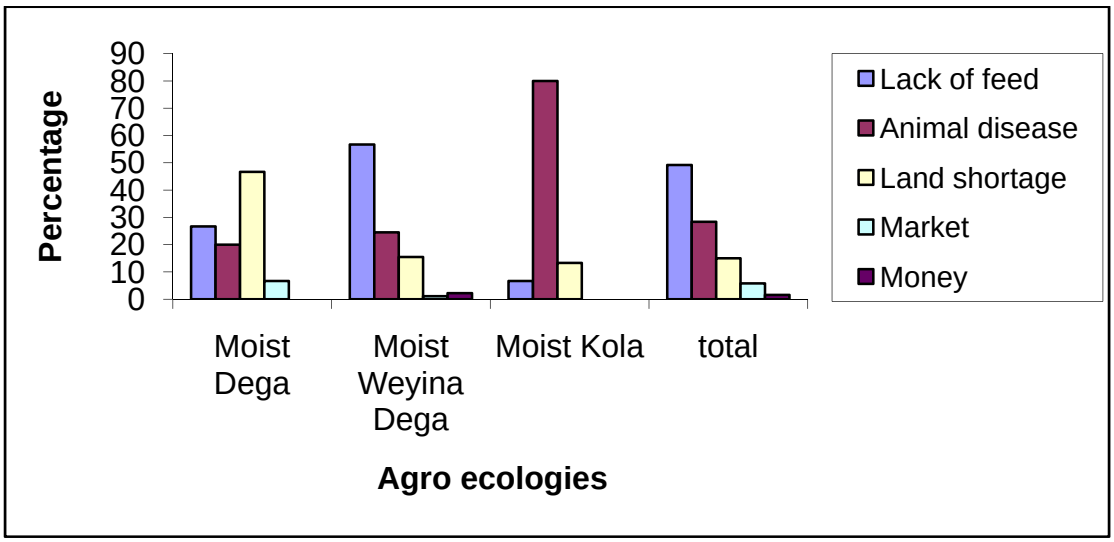

Figure 8 Problems affecting the expansion of goat production as identified by respondents in the three-agro ecologies

5. Marketing

5.1. Marketing structures, locations and marketing systems

In the three selected primary markets located in three agro ecologies, livestock of all species (cattle, sheep and goats) were sold and purchased in every market days. The first primary market is Bokasso located in Moist Dega agro ecology (Wonsho). It is the smallest market compared to the other two markets (Sasamo Deala and Hantate), the predominant species marketed were sheep and goats. The market also consists of young bull, heifers and calves. The number marketed estimated up to four hundred per week (up to two hundred animals every market day). The area has all season roads with 12 km distance from Yirgalem town crossing Shebedino on the way to Hawasa. No electric and Telecommunication facilities are available; there is no fence, and animals marketed on open area. Local traders after purchasing the animals they trek animals to secondary and terminal markets.

The second market was Sasasamo Deala; Moist Weyina Dega (Dale) this market is bigger than Bokasso market here; the predominant livestock species are goats followed by cattle and sheep. The market is situated at 7 km west to Yirgalem town, and has dry season road, which is 6 km apart from the main Addis Ababa to Moyle transversal highway. No market structures except collection yard or fences, feeding and watering troughs are available.

Hantate market (Moist Kola) is the third and the biggest primary market that is found at Loka Abaya district (newly established district that was separated from the former Dale). This market is the biggest market accommodating the large number of livestock species predominantly goats

and followed by cattle and sheep. The market is located 21 km apart from Yirgalem town and 61 km from Hawasa terminal market. It has fenced market place constructed by Kebele administration of Hantate in order to control the inlet and out let for the purpose of taxation.

5.2. Marketing system participants in the three primary markets

Market participants in Bokasso (Wonsho market at moist weyina Dega) were producers, retailers and small-scale traders. Here, the sellers are producers, retailers and local traders from surrounding Kebele administrations (KAs) such as Bokasso, Duba, Dagia Haroshifa and Tuticha. The latter two Kebeles are from neighboring districts such as Shebedino and Arbegona, respectively.

In the second market at Naramo Deala the market participants were also producers from near by KAs such as: Weininata, , Gane, Kege, Dasse, Bera and Chume the densely populated mixed farming cash cropped Kebele administrations (KAs) of Dale district wholesalers and retailers from nearby community and mainly from Yirgalem town. The sellers are producers and small-scale local traders (selling not more than 2 goats) and the buyers are local butcheries, Restaurants and Hotels of Yirgalem town.

In Hantate market (The biggest market at moist kola area or in Dale district accommodating up to 500 animals per week and up to 250 every market day), the number of producers involved was large but the number of traders was small when compared to other adjacent markets and, in relation to the number of marketed goats. The reason was discussed with producers and traders in the market; it was found out that the distance of the market from Hawasa and Yirgalem towns and inaccessibility to transport facilities might have affected the traders to come to the market and participate continuously in buying and selling processes. The price of goats in this market is relatively lower than the other two markets. It was verified by group discussions and by the price estimate data collected from producers during survey time. But, this condition is changing due to some facilities like road and electricity that are recently developing in the new district (Loka Abaya).

Among the market players, some of the buyers are producers. Producers' purchase goats for two main reasons. Firstly, for rearing for the purpose of milk or for other multi purposes of goats, farmers who have no other cattle purchased goats as foundation flock, especially those young

farmers who recently separated from their family due to marriage. Secondly, farmers purchase goats during the time when money is available (coffee harvesting season) and keep goats for a certain period, resale again during cropping season and used for input purchasing like fertilizer and seeds.

The producers were an important market players bringing small size to large flock of goats to the market with different age group including old doe with their lactating kids (Fig 1). The buyers were traders from Tula (near Hawasa town), *Derara* big market at ***Boricha*** district and *Hawasa* towns. Also, producers buy goats from market for the purpose of rearing, they identify and select by looking at the body conditions, the size color and its litter size (prolificacy) by simple observation and by asking back history about the goats from the owner.

5.2. Mode of marketing and setting price

Pricing is based on body conditions. Body condition is estimated on assessing muscle and body cover over the loin and chest area. However, there is no standard price for different body condition scores. No weighing scales used for any type of animal. By holding especially the chest part up, they also estimate the weight and condition of the goat. Most farmers in rural areas agree “the worst pest” they face nowadays is low price and researches so far have not found adequate measures to help. Many agricultural research and development institutions have realized that, small-scale farmer’s key concern is not only agricultural productivity but also better price (Thomas, 2005).

It was also observed that price was negotiable by brokers. Market participants also confirmed the presence of this experience during discussions. The middlemen ask the producer about the price and his approximation and maximum expectations, and the minimum possible price. And at the same time he will ask the buyer how much he/she affords. Successful middleman (broker) gets for their service amount of ranging from 2 – 4 birr per animal from both the seller and buyer (Fig, 9).

Figure 9 Assessing body condition of goats in the market

The prices of small ruminant's peak during religious festivals and are low during the cropping season. Furthermore, price depends on animal attributes such as weight, sex and followed by the time of religious festivals like Easter, New Year, and Christmas.

Therefore, the price for all age of goats in the months between Septembers to December has escalated up and lowers at February and March and again rises up to the end of April. In general, these conditions revealed that, the price determined not only by the attributes and the current status of goats, but also seasonality in association with availability of money, supply and demand has played a significant role in determining prices of goats.

5.3. Reason for selling goats

The data collected from goat producers at their farm gate (residential area) showed that, the majority (64.2%) respondents have sold their goats during the last 12 months. The main reason to sale goats at house hold level (60.8%) was purchase of input for crop production, for payment School fees, and to utilize for other routine house hold expenses.

Figure 14 reasons for selling goats responses from interviewed participants

In moist weyina Dega, Some goat holders (5%) sale their flock in order to de-stock the size that helped to resist the shortage of feed encountered during dry season. Also there were subsistence goat herders in moist Weyina Dega (Dale) that buy goats during the time when feed and money is available (October), and sale it again on the mid of January and February after feeding the subsequent three months, there by getting some amount of profit obtained from feeding margin they fulfill the cash needed by the family.

In Felka (one of the moist kola Kebele at Loka Abaya), the main reason for selling goats was disease that forced the respondents (24%) to sale their goats. It was observed during the study period that of flock holders sold their goats due to the out break of sheep and goats fox which

was highly contagious disease affecting the whole part of body and immediately pass on to other flocks. Hence, the flock holder’s strategy was they isolated and sold the healthy goats in order to minimize the risk of contamination.

The other sellers are traders, they buy from primary market and trek to secondary markets and get the difference as a profit.

5.4. Reasons for buying

As discussed earlier, the number and type of buyers vary according to the stage; at primary market buyers were farmers (producers) and traders, while at secondary and terminal markets (in Hawasa and Tula) buyers were traders butcheries restaurants/hotels individual consumers and institutional users.

In the three primary markets of Dale, producers and traders were asked about the reason of buying goats. Some (34%) of farmers, who involved in buying goats, indicated that, goats are bought not only for rearing or for economic purpose but to use them for saving. Later on they sell them and buy input for crop production. The reason might have to be to reduce unnecessary expenses occurred during money available time, and putting cash at hand in rural area may expose for unexpected expenses and unnecessary entertainments when they go to urban markets.

As indicated by interviewed sellers (Producers) during cheapest season purchase goats and kept for shorter period on high plane of feeding and will fetch higher price and thus get good profit i.e. they engaged in trading goats after cropping season The other buyers are also producers who aimed to make money from goat rearing (fig 3).

Figure 10 Old doe with triplet kids came from Felka Kebele Administration (KA). It was bought by producers from Hantate market, Loka Abaya (moist Kola), and used for rearing purpose. The Doe was on its seventh parity produced one single four twins and one triplet kids.

5.5. Types of marketed goats and their price

According to the information obtained from the survey of production system who participated on production system survey, out of 120 respondents 94 respondents or (86.1%) sold their goats in the market and (13.82 %) at farm get for local traders (Table 31).

Goats of every age category (kids to old does, bucks castrates) age of goats were marketed at the three selected primary markets. In Bokasso Market mainly breeding goats (pregnant does and heifers, bucks) are purchased and sold for producers. Besides, meat goats particularly buck is sold for traders coming from Tula and Yirgalem. In Hantate market, all age categories from kids to old doe and goats with triplet litter size were seen in the market (fig. 15). It indicated that, retaining the younger age, replacement stock prolificacy and the sex compositions of goats was not considered farmers design their goats for sales.

Table 31 Type of goats sold in the last 12 months and the place of sales as responded and summarized from the questionnaires

Age and sex class			Place of sales		
Parameters	Frequency	Percent	Parameters	Frequency	Percent
Does including doe kids	8	6.7	Markets	81	86.1
Bucks including buck kids	64	53.3	Traders at farm gates	13	13.82
Sterile doe	10	8.3	Total	94	100.0
Old goats	12	10.0			
No sales	26	21.7			
Total	120	100.0			

Over half of respondents sold males of yearling age. It indicates herders maintain their breeding flock by retaining outstanding males in the flock and sell the undesirable ones and also they prefer male animals to sale whenever they need cash rather than selling female from the flock. This is due to the possibility of getting breeding bucks from other sources (neighbors or borrowing from other locality), or by taking in-heat doe to the place of bucks they can breed does.

Table 32 Highest and lowest price of goats by type and age as estimated by respondents during the study

Parameters	Agro-ecology	Mean price (highest)	Std. Error	Mean price (lowest)	Std. Error
Doe >1 year	Moist Dega	204	14.50	132.67	9.58
	Moist Weyina Dega	200.22	4.41	148.17	12.41
	Moist Kola	182	19.45	93.33	8.98
Bucks>1year	Moist Dega	168	13.80	117.33	9.38
	Moist Weyina Dega	168.67	4.74	125.17	4.45
	Moist Kola	129.33	8.19	106.00	11.20
Castrated male goats>1 year	Moist Dega	340	19.02	250.67	23.91
	Moist Weyina Dega	370.11	9.28	257.00	6.97
	Moist Kola	306.67	21.19	212.67	19.48
Buck kids<1year	Moist Dega	134.67	7.73	99.00	8.02
	Moist Weyina Dega	126.48	4.14	96.94	4.06
	Moist Kola	136.67	10.58	128.00	17.68
Doe kid<1 year	Moist Dega	111.33	6.38	97.00	8.17
	Moist Weyina Dega	119.39	3.29	92.83	3.35
	Moist Kola	116.27	13.89	99.67	10.78
Kids<6months	Moist Dega	94	9.66	45.33	4.26
	Moist Weyina Dega	71.5	13.80	49.61	1.80
	Moist Kola	67	4.74	45.00	3.90

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5.6. Demand and supply in relation to seasonality of price

Supplies increased few days before religious festivals and increased at increasing rate until the celebration date of Festivals, then, started to decline a day after the date of festival. Similarly, the price increased gradually towards the date of ceremony and then starts to decline after the

celebration of the religious holidays.

According to the data collected during a week of Ethiopian Christmas on December 26, 1999 E C. (477 goats) entered the market, it was the highest number compared to the data collected on ordinary market days in Hawasa market from November to February, also the market day on the last week of Easter, Hawasa market was monitored again and found that more than 760 matured and more of male castrated goats were counted entering Hawasa market on Thursday. However, an average number of goats entered Hawasa market during this study period were 235 during ordinary market day.

According to the information obtained from producers and traders, the cheapest time of the year was May to July and to some extent August. This time is the season for Enset plantation and Moist Kola farmers during this time are at maximum need of money, in order to purchase Enset seedlings from highland farmers and farmers at Moist Dega and Kola require input like fertilizer and improved seeds particularly maize and haricot bean.

On the other hand, September is the time for the children to go to school and, farmers need money to purchase necessary items and pay school fee. In Moist weyina Dega, some farmers purchase food items by selling their goats during May and June until the back yard maize matured and reached for consumption.

Goats are the major sources of cash that are sold in higher quantity during these months. Accordingly, the supply increased beyond the amount that was ordinarily demanded by consumers and has a direct effect on current price. Thus the price during these months was much

lesser than that of other months in contrast the supply was higher than other times.

So goats are the most salable animals among livestock species at house hold level, that are used as pocket cash during the time of shortage and no one look for the better price rather than solving urgent problems. Furthermore, a large supply of goats and low number of buyers in the market influence the price of these months when compared to other seasons, Farmers loose bargaining power and sale their goats for the price that is mainly determined by buyers.

There was also the time for expensive prices of goats; and is mainly associated with coffee collecting time (October up to December). Money is available at hands of most people in the coffee producing midlands of Dale (moist weyina Dega), except the two extremes (the area around Lake Abaya at western part of the district, and the extreme highlands bordering Bale of Oromia and Arbegona district from Sidama Zone).

During this period, producers purchased goats for two main reasons. Firstly, to accumulate wealth obtained from coffee sales and to preserve for the time of deficit. Secondly, it is the harvesting time for the crops like maize, haricot bean and sweet potato in moist weyina Dega and wheat and barley for moist Dega areas. With the intention of some farmers to carry out short term fattening program, goats with poor body condition (emaciated due to the shortage of feed) are purchased from other producers and fattened by high plane of feeding which, in turn benefit from compensatory growth. The feed resources used for this are the post harvest residues or the grain part of maize and haricot bean as a feed supplementation.

5.7. Market routes and marketing chains

Respondents identified two market routes. The first one begins from the eastern part from Moist Dega at the border of Sidama and Bale (from Kokosa district of Bale zone). Mainly sheep and some goat come from this area and marketed at Bokasso market (Moist Dega Wonsho). Local Traders purchase these goats and trek to Tula terminal market through Shebedino and sale for butcheries and hotel owners coming from Hawasa. And some traders trek to Yirgalem, Aleta Wondo and Chuko to sale for butcheries Hotels and restaurants (Table 32).

Table 33 Goats trade routes (1st) in Bokasso (Moist Dega Market)

Original place of goats entering to Bokasso Market (Inflows to Bokasso)	Primary market	Final destinations (Out flows from Bokasso market)	Type
Kokosa (Bale), Gorche and Shebedino districts of Sidama Zone.	Bokasso	Tula secondary market and terminate in Hawasa	Sheep, goats
Kokosa(Bale), Gorche and Shebedino districts of Sidama Zone.	Bokasso	Yirgalem, Aleta Wondo and Chuko Secondary markets	Sheep, goats
From Wonsho district (within woreda route)) Kebeles surrounding Bokasso market such as Menafesha, Duba, Goyida, Ferro, Dagia	Bokasso	Tula	Sheep, Goats
From Wonsho district (within woreda route) entering from Kebeles surrounding Bokasso market such as Menafesha, Duba, Goyida, Ferro, Dagia	Bokasso	Yirgalem, Aleta Wondo and Chuko	Sheep, goats

The second route is the bigger in number of goats marketed. It is from the western part of Dale district from the Moist Kola Agro pastoral communities in Felka, Foka bedelicho and Bokito Kebeles, (Fig.33) via Foka Bedelicho and Gorbe (Small farm gets traded by local traders at Loka Abaya District) and trekked to *Derrara* a small town in Boricha district, it is the all commodity market accommodating all livestock species but, goats in higher quantity. Traders collect goats, go through Dimtu (Wolayita), Boricha, and Lokke and finally terminate at Hawasa terminal market.

Table 34 Market routes (2nd) at Loka Abaya Moist Kola

Producers original place and inflow of goats to Hantate Market (Loka Abaya)	Market place	Type of animal	Destination (outflow from Moist Kola (Loka Abaya)
Felka, Foka Bedelicho and Bokito Agro pastoral community in moist Kola, Loka Abaya	Hantate	Goats	Derara market at Boricha district to Yirba, Leku and Tula Secondary markets
Felka, Foka Bedelicho, Aldebo and other Kebeles around Hantate	Hantate	Goats	Tula and Hawasa

The third biggest route is at the western part of Dale at Moist Kola (Loka Abaya). It has no connection with the goat flow of the western part (Moist Dega Wonsho). This area is known by its goat's production, which is located about 88 kilometers western part of Yirgalem town. The herders at this area are agro- pastoralists, (photo 4 and 5) and they herd their goats at the vast range land of Loka Abaya bordering Abaya Lake and Bilate Rive (Fig 6). Producers of this area are from Merera Kebele of Loka Abaya, and local traders purchased from farm gets and trekked to Humbo (the Primary market for Dale and Wolita Producers found at the boarder of Sidama (Dale) and Wolayita Zone (South Omo). Then, the wholesalers and big traders from Sodo Town come to Humbo and purchase goats from Humbo and trekked to Sodo and Bodity, then it will be terminated at Wolayita Sodo terminal market.

Table 35 routes of marketed goats (The Western part of Dale)

Original Area (Producers)	**Market (Inflow)**	**Species**	**Out flow to secondary and terminal markets**

Merera agro pastorals in moist Kola Loka Abaya District	Humbo	Goats	Bodity, Boloso Sore (North Omo) and Wolayita Sodo secondary and terminal markets
Merera agro pastorals in moist Kola Loka Abaya District	Dimtu	Goats	Dimtu to Tula and Hawasa through Lokke
Merera agro pastorals in moist Kola Loka Abaya District	Dimtu	Goats	Dimtu to Yirba and Leku secondary market Tula and Hawasa

Marketing channels is a particular flow line of livestock and is identified by the market participants. The marketing channel known by small stock farmers at primary market level, were producers to producers, producers to local consumers, and producers to local traders and wholesalers to consumers. Local traders and some individual consumers from Yirgalem, Leku and Boricha towns purchase goats from producers at Bokasso Market. The first channel is producer to local traders and then reached to consumer, the second is producer to other producers using for different purposes and the third channel is from local traders to Wholesalers coming from Yirgalem and Tula Secondary markets and finally reached consumers hand directly or through butcheries and restaurants in terminal market Hawasa. The fourth channel is from producers directly to consumers coming from Yirgalem and near by peri urbans.

1 Producers at Bokasso Local traders

2 Producers at Bokasso producers from other KA (for rearing)

3 Producers at Bokasso local assemblers from Yirgalem, Wondo and Chuko

4 Local traders Wholesalers Consumers

But at terminal level in Hawasa and Sodo, the channel connected with butchery houses selling raw and cocked goat meat to consumers, which are known, by their local name Fiyel tibs house. Some passed through municipality Abattoirs and reached the consumers in legal way or Goats also slaughtered in restaurants at a higher number with out entering the standard abattoirs, and also there are individuals that purchased goats from terminal markets (Hawasa and Sodo towns) and slaughtered in their home.

The data collected from Hawasa market from November1st to February 2007 for four months indicated that, A mean number of goats entered in to Hawasa market through the three routes were 275 per market day; it indicated that more than 550 goats per week and a total of 2200 goats per month entered through the three routes, disregarding the number of sheep entering the market per market days. On other hand, the number of butchery houses before five years (2003/2004) were 62 and recent information showed that 154 Restaurants and Hotels are providing goats meat in the form of raw and cooked meat. This butcheries slaughter mainly castrated and fattened steers and goats both castrated and un castrated.

5.8. Market infrastructures and marketing information

The market players mostly known by farmers are local traders and individual consumers. The majority of flock herders (42.5%) of respondents informed about the existing situations of price from market, (48.3%) from neighbors and the rest (9.2%) of the respondents get marketing information from agricultural offices.

Discussions with small stock owners and market participants indicated that, they were not aware of current market prices, out of their residential sites, how ever, Farmers in moist Dega (Dale district) have better advantage of getting current information on goats marketing because of being close to Hawasa town.

Primary markets at moist Dega (Wonsho) and moist weyina Dega (Dale) have no fence, where as, Loka Abaya (Hantate market) has a fence and it can accommodate more than 500 animals at once. On the other hand, the secondary markets at Yirgalem and Tula have fences with out any other structures. The purpose of fencing is mainly to control animals in order to collect taxes by waiting at the point of out let, taxation is a must, whether the cattle is sold or not the one who come with the cattle should pay one Ethiopian birr per goat.

5.9. Consumption patterns, preference and market prospects of meat goats

Trends in consuming goat meat in rural areas have long time existence, however there are some people in moist Dega (Wonsho area) in ancient time that traditionally refused consuming goat

meat. Most of the people in the study site discussed about the medicinal value of goats meat. They culturally know Goat meat by its medicinal value, however it was not so far verified by research work.

In Yirgalem and Hawasa towns before five years commonly large ruminants are used for meat in butchery houses, in recent years butcheries started to provide goat's meat equally with beef as an alternative meat source for their consumers and goat meat became equally preferred by consumers. The number of butcheries and restaurants currently using goat's meat were 25 in Yirgalem town. All butchery men interviewed were using goat's meat in their butcheries and 67% of restaurants and caterers were slaughtering goats and sheep and provide to their customers cooked goat meat and edible offal's in the form of *Dullet.* According to discussion with the owners and people involving in the activities, goat carcass has more dressing percentage than sheep and also the quality of goat meat is better than sheep having a larger proportion of red meat instead of having more fat. An experienced butchery men at Yirgalem town showed that, the exceptional quality of goat's meat is the distributions of fat through out the body instead of being accumulated in specific areas like cattle and sheep. So that, the overall distribution of fat makes goat meat every parts highly palatable, and no or little amount of refusals (wastes) discarded from the carcass and /or offal's of slaughtered goat.

The increasing price of large ruminants in turn increase the price of mea goat t, people accustomed consuming cooked goat meat in the butcheries and restaurants which was not commonly practiced before ten years. The number of goat meat butcheries before five years were 15 but now the total number of butcheries slaughtering goats together with cattle is 154

excluding the number of restaurants and Hotels preparing food from goat meat. Similarly, the price of goats meat in 2003was 16 birr but now it is 36, an increase by 225% with in 5 years of period. In the same way the price for a medium weight and age of meat goat before five years was estimated by participants to be 80-120 birr, but know the highest price for middle age castrate goat was estimated to be 250, 257 and 212 in Bokasso (moist Dega at Wonsho district), Gane (moist weyina Dega, dale district) and Hantate (Loka Abaya district at moist kola) markets respectively. The price is changed and increased at secondary market (Tula) and terminal market in Hawasa town.

The owners of restaurants in Yirgalem town were asked and most of the respondents (88%) indicated that, they purchased goats for slaughter from *Gane* market and some times sheep from Bokasso primary market. There are seasons for cheapest price (July, June and august) but this time is also not convenient for restaurant owners, because the demand for goat meat is very low due to the shortage of money at the hand of consumers both in urban and mainly in rural. Most of the people in the rural couldn't purchase cooked meat or row meat from butcheries during this season. The shortage remains consistent until the maturity and on set of garden coffee in the backyard.

The price for fattened bull and steer is escalating from time to time; this condition gives way for complementary products like mutton, goat and poultry meat. Reasonable price and availability together with its small size makes goats to be slaughtered in the family house or it can be slaughtered in-group by sharing money together.

5.10. Constraints and opportunities in goats production and marketing

Since the study area especially moist kola (Loka Abaya) is with the highest goat potential, and far from urban centers, it needs strong marketing linkages with buyers other than local traders and local butcheries. Attachments with goat exporters, meat processing factories and related big assemblers, may help the producers to get appropriate price for their production and minimizes the money lost in the middle due to unnecessary involvements of middlemen and local traders.

Herders were not market oriented; they didn't consider when to produce goats, even the preferable time of sales was not considered by a majority of the farmers. They clearly discussed that, flock holders sale their goats if and only if they face money problem. No other alternate source of money put aside for emergency cases during money available time especially during coffee harvests. They consider goats as the main source of cash and sale them not by looking for proper market and appropriate time, but they sale as they face money problem.

During price determination, the cost of production like feed, water, mineral supplement, housing, veterinary and labor costs provided by the hose hold and his family members did not taken in to account. Feed from farm, family labor and herbal medicine that was provided from traditional hillers was not included as a cost of production. So that, farmers do not consider the price of goats on the basis of costs incurred to grow or fatten the particular animal.

During our field assessment, we observed that, some farmers have a great potential and suitable ground to handle goats for commercial purposes. But, they were rearing below the potential of

their resource (Feed, house family labor and the proximity to market etc.), they know little about their future goat's buyer, there was no pre hand negotiating system of marketing. Selling and buying process completed in the market between unknown dealers and no pre- hand or post sales agreements (like returning the defective goats back to the owner or re considering the situations before sales once the sales process is over.

Lack of adequate and timely information on price, demand and supply of goats was another problem; the main sources of information are market and neighbor to neighbor communications. It is very limited and not adequate to tell the recent information about the current price of goats, the type of market participants and the existing market channels of meat goats that are currently working in domestic as well as export markets. Although the timeliness and consistency is not clearly known, traders get more information than producer's since they are moving from one market to another and they are from the urban centers. So that, producer's sale with out knowing the current price and demand of their goats. Especially herders living in the moist kola (Loka Abaya), are far from the information about the current marketing situations, they know only the part of the local price and accept the price determined by the traders coming from urban centers.

Transportation problem and in adequate infrastructure are the major problems identified during discussions with traders. Due to inaccessibility to road and distance from urban centers as well as from big livestock markets, they trek animals over longer distance without adequate water and feed. As a result, goats loose weight , which in turn reduce price as well as profit.

There are no private or governmental enterprises or cooperative associations working on

livestock marketing or other related livestock sales and purchasing activities. Most of the small holders in the study site were not the members of any small stock associations or any type of marketing institutions except farmers at Moist Weyina Dega and Dega participating in coffee producers cooperatives. So they were fragmented to help each other to overcome the production and marketing problems. Unorganized nature of the markets resulted on the problems of fragmentations, which are believed to be among factors hampering successful small stock marketing and better marketing channel.

6. Summery and Conclusion

6.1. Summery

Assessment on production system and marketing of goats in Dale district was carried out in the three agro ecologies, comprising one Kebele in Wonsho, Moist Deg, six Kebeles in Dale, Moist Weyina Dega and one Kebele from Loka Abaya Moist Kola agro ecologies. The overall objective of the survey is to study and describe production systems and marketing in mixed farming areas of Dale. The data collected from survey will be used to describe small ruminant production systems and the production potential of the area and to identify constraints and opportunities for goat's production and marketing. Formal survey, focus group discussions and flock monitoring techniques were used to collect data from August 2006 to March 2007.

Information obtained from 120 sample goat holders included household characteristics and resources, socio economic features, traditional goat keeping systems and purposes of keeping goats, feeding systems, feed resources and systems of feed utilizations, health and diseases of

goats, reproduction performances, flock dynamics, flock monitoring and other routine management aspects related to goat production systems. Information on marketing systems and market routes, marketing channels and market players, seasonality of prices in relation to supply and demand of goats were collected and described using Rapid Marketing appraisal (RMA).

The overall mean family size per household was 7.5±0.247, was not significantly different ($P<0.05$) among the three agro-climatic zones considered in this study. An average land holding per household was significantly different in the three-agro ecology ($P <0.001$). On average, households in moist Dega (Wonsho) possessed significantly large land (2.18hectare/hh) than those in Weyina Dega 1.27 hectare/hh (Table1). The average value for Kola was 1.77 hectare / household. Due to small land size and large family size per household, the ratio of family size to house hold land holding was significantly high in moist weyina Dega than sparsely populated Dega and Kola agro ecologies.

Average livestock holdings per household in Moist Dega (9.4 animals per household) and weyina Dega 11.87 animals per household were comparable but were less than the value for an average household (24.5 animals per household) in moist Kola district (Table 2). On the other hand, livestock to land ratio per household for Dega is significantly lower than the livestock density per hectare per household in the other two agro ecologies. Relatively low livestock holdings coupled with large land area per household in Dega is due to the movement of flock from the Dega agro ecology to the lowlands around Lake Abaya during the dry season in search of grazing, and this may have also contributed to fairly low livestock density in the Dega ecology.

All the four categories of livestock species (cattle, sheep, goats and donkey) are found in all the three agro ecologies but species composition varies depending up on the type of climate. Cattle and goats constitute equal proportion to the livestock density in Kola and Weyina Dega. In the Dega, however, cattle are given first priority and sheep are as important as goats accounting nearly 50% of the livestock density. Keeping goats in the study area is for multi purposes, the Moist Kola (Loka Abaya) herders keep goats mainly as a means of savings, selling goats as a means of household income was, the second important reason of herding goats (figure 5). In addition to these two major reasons, farmers also viewed the uses of goats for milk production (13.3%) meat (10%) or both (1.7%) On the other hand, only (1%) of respondents consider goats as a sign of social status (prestige) Besides these major reasons, in Moist Weyina Dega some respondents (2.5%) used goat's manure for fertilizer. Farmers with no cattle reared goats for the purpose of manure, because, enset, the staple food of the people in the study area, particularly at its early growing stage require high amount of manure.

In all the three agro ecologies of Dale district, the breeding season for goats is from March to April (39.4%) and September to October (49.2%). Some of the respondents reported that goat's breed throughout the year (Table 4). The major reasons for seasonal breeding are the availability of feed and the warmer climate that favors goats to on set heat during these months. Goats that are conceived during these months will be expected to kid during September and October. Similarly, on September and October, annual crops (like maize) are on the young stage, the family used the grain part for consumption and the leftover is used as a feed for goats. In addition, sweet potato vine, weeds from haricot bean and coffee are feed supplements for

midland cash cropped area of Dale. Thus, goats conceived during these months and deliver between March and April.

The over all mean for AFM is 9.76±0.243. There is no significant difference (P< 0.05) among the three agro ecologies regarding age at first mating. Sidama goat types at Loka Abaya reached puberty at 8.3 months which is the lowest estimate among the three agro ecologies as well as the reported estimate of Workneh, (1992) which is below 12 months for the same goat type. Significant variation was shown on age at first kidding between moist kola (13.73±0. 6 and moist Dega Dega16.13±0.7. The over all mean for the three agro ecologies was 257±0. 16 days. The mean kidding interval for Loka Abaya Sidama type goats in Moist Kola was 234± 0 .352 days that is significantly lower (P< 0.05) than the other two agro ecologies. The reason for having the lowest kidding interval in Moist Kola was assumed to be the presence of communal rangeland, the availability of browsing shrubs and the free ranging system of goat feeding.

The over all mean age at weaning is 5.19±0.124 months. Similarly, the moist Kola goats weaned at age of 4.3. ±0 .316 months that is significantly lower (P<0.05) than Moist Dega agro ecology. The reason was discussed with key informants and it is feed availability in Kola (Loka Abaya) area, farmers completely allow the kids to suckle their does. Moist Weyina Dega has significantly lower weaning age 5.09±0.129 months (P<0.05) from that of Moist Dega but no significant difference was reported with Moist Kola (Table 6). The highest litter size was reported in Moist Kola 2.33 ±0.347, which is significantly higher than the other two-agro ecologies and also higher than the overall average litter size (1.3) reported for Arsi Bale goat type by Farm Africa, (1996). Mean age of lifetime kidding (Parity) is 13.05±0. 3 year. In Moist

Kola, parity is longer than the other two-agro ecologies and it is significantly higher age of lifetime kidding that contributes for high number of kids per doe.

Feed resources and the system of feeding vary according to variations in agro ecology. In Moist Kola, browse species are the main sources of feeds for goats. In moist Weyina Dega (Dale) the majority (65.5%) of the respondents indicated that, the major feed for goats is crop residues from parts of Enset, Banana, chat, sweet potato haricot bean, weeds and thinning of annual crops.

Because of the shortage of browsing land, tethering system of management by using cut and carry system of feeding became a common system of tending goats in Moist Weyina Dega and Dega agro ecologies. Especially during the rainy season, when most people are engaged in other farming activities tethering is help full in reducing the demand of labor. Extensive system of tending goats is dominant in Moist Kola Loka Abaya where free ranging of goats is popular. The system is advantageous for goats since it gives chance to select and freely forage from the bushes.

Diseases like Trypanosomosis, heart water, goat and sheep pox and parasites are the common diseases affecting goat's production in all the three agro ecologies. In moist kola Trypanosomosis is an important disease, where as heart water and internal parasites are the common diseases in Moist Weyina Dega and Dega agro ecologies. About 35.8% of the respondents reported a lack of veterinary clinic as the major problem, 20.5% the shortage of veterinarians, and 20% showed inaccessibility to the road, and 14.2% high price of drugs. A few respondents (2.5%) showed the shortage of medicine as the main problem.

There are four primary goat markets in the district. Bokasso market represents the moist Dega agro ecology, mainly dominated by sheep and followed by goats. Naramo Dela is bigger than Bokasso and dominated by goats mainly marketed for meat purposes. Hantate is the big market for goats. The predominant species is goats entering from agro pastoral societies like Merera Kebele around lake Abaya. The marketing routes are identified in the district are of three origins. The first one start from eastern highlands bordering Oromia (Bale zone), and flow in to Bokasso Market and out flow from Bokasso Market through two directions. Tula, secondary market is the main out flow of goats from Bokasso Market and Yirgalem and Aleta Wondo towns are the second out flows of goats from this market. The main marketing channels are producers to producers, producers to local traders and then reach to consumers, from producers directly sold to consumers and from traders to whole sellers and then to consumers.

The price of goats fluctuates according to seasonal variations and religious holydays, during coffee harvesting season the price for goats is relatively high and falls down after coffee season. The time one week before and after religious holydays like Easter, Christmas, Meskel of Christians and Id al Arefa and Ramadan of Moslems and the Ethiopian new year, the price raised up and falls down a few days after the celebration of these holydays.

The main marketing problems reported by producers are lake of infrastructures like road, shortage of the means of transportations, lack of information for the producers in Loka Abaya (Merera and Felka) about the current price of goats in Hawasa and in other secondary and terminal markets.

In general, the problems identified by respondents as the main factors affecting goats production and marketing system are lack of feed, disease, shortage of land and inaccessibility to big livestock markets are the most important problems in their order of importance. Having high potential for goat's production and suitable environment to develop small scale and subsistence goat farms to market oriented and big goat production sectors is the main opportunities that were identified by participants in the study areas.

6.2. Conclusions

Considerable differences were seen among the three agro ecologies. In moist Kola livestock holdings indicated that the area having highest potential than the other two-agro ecologies. And it has a potential for goats production. Goats in Moist Kola have appreciable reproductive performances such as: early maturity, short kidding interval, high litter size, short weaning age and weight, extended lifetime kidding (parity) as well as medium body conformation serving for multi purposes and it is extensively milked as compared to the other two agro ecologies and goats in other locations. These peculiar characters have paramount importance for goat keeping agro pastoral societies and crop livestock producing smallholders in Moist Weyina Dega and Dega. Further research investigations are essential in order to identify and select the superior and economically important traits with in this eco type. Thus, livestock research institutions and other related organizations should intervene in improving this eco type in order to utilize our indigenous breed potential.

Crop livestock integration in Moist Weyina Dega and Dega is an important factor that enables smallholders to obtain benefits from compensatory productions of the two sectors. Goats are important integral parts among livestock in these densely populated crop livestock producing areas, as tethering is the most adapted practice of management. Goats can easily be adapted with crop production since weeds and crop leftovers and residual parts of perennial crops (Enset and Chat) are cut, carried and provided to tethered goats. On the other hand, farmers with no cattle keep goats to utilize their milk for their children and manure for their crops. Thus they are a good substitute for the resource poor smallholder who cannot afford money to buy milking cow. Interdependence between goat and crop production is supportive to overcome the problem of land shortage, and it encourages the involvement of all the family members in providing feed for goats and develops the division of labor among family members in the different sectors of household farm activities.

Dale in general, has high potential feed resources for goat's production. Although, goats are more herded by agropastoral society in Moist Kola (Loka Abaya) they are well adapted and serve for all the three agro ecologies. As observed by this study, goats perform better in moist kola on the extensive free foraging system of management. In this agropastoral area, the main problem is bush encroachments that are invading the palatable shrubs and bushes; thus, applying systematic bush control strategies could solve the problem. Moreover, in Moist Weyina Dega the availability of feeds from crop fields and back yards are useful and contribute for the better performance and production of goats in this cash cropped areas. Integrated crop forage production especially under sowing legumes like cowpea with chat and desmodium species

under enset crop is important and it helps to utilize the same land for more than one crop with out affecting the yield of the perennial crops. Crop forage integrations were seen in Moist Weyina Dega around Dale district on the backyard crop- forage production experienced by a few farmers and they are using some tree legumes like pigeon pea, sesbania, leuceanea (also used for coffee shade) by integrating with coffee, and some legumes like desmodium and cow pea with enset and chat crops. These strategies are encouraging and should be supported by further research works in order to verify which type of forage makes the best possible integrations with these types of perennial and annual crops.

Two major diseases of goats namely trypanosomisis and sheep/goat pox was identified as the major disease in Moist Kola, and Heart water and some parasitic infestations in Moist Weyina Dega and Dega agro ecologies. Goat pox can easily be prevented through one time per two years mass vaccination. Once goats are vaccinated against goat pox they can develop anti bodies that will protect them up to two years. The vaccine is produced in Debre Zeit and it is freely available. Hence, the only thing needed from the technical staff is timely arrangements of vaccine program not only for this particular disease but also for other infectious diseases that can be controlled by vaccines. On other hand, Trypanosomosis is economically important disease affecting the wider range of flocks at agro-pastoral societies. The seasonal mobility of the herders to protect their flock from tsetse-infested areas to cooler highlands is an appreciable strategy. Besides this strategy, organizing herders in to cooperatives will be useful that would help them to control tsetse by using acaricide. In this aspect the attempt of IPMS and WARDCO in organizing herders in to tsetse controlling cooperatives is a good start but still it needs close monitoring and supervision. As discussed with key informants at Felka Merera and Bokito

Kebele agro pastoral societies in Loka Abaya, herders could identify the right time of infestation and they know more about actual period of tsetse multiplications and the area that is more favorable for tsetse reproduction. Therefore, applying technical veterinary support and encouraging the participation of the flock herders by selecting and training the Para-vets in tsetse controlling program will be a useful strategy to overcome the hazards of the disease. Heart water and parasite infestations are another problems affecting production of goats in Moist Weyina Dega and Dega areas. Applying available veterinary services using the newly established Farmers Training Centers (FTC) and the animal health graduates of agricultural and vocational training centers will solve the problem. Furthermore, flock herders at Loka Abaya are using traditionally known herbal medicines to treat their sick goats. Further research works are essential in order to identify anti microbial or other effects of this area herbal drugs, and research results and feedbacks on the amount and system of applications etc. will encourage to use the indigenous knowledge of the herders and it will be supportive to the herders to solve their problems by themselves using locally available traditional healers.

Inaccessibility of some area (Loka Abaya, Felka and Merera agropastoral goat herders) for markets and urban centers is a crucial problem for marketing their goats. Herders of Merera and Felka Kebeles travel more than 82 and 20 kms, respectively to bring their goats to Hantate livestock market; otherwise, they have to sale their goats at farm gate or at Humbo (Semen Omo Zone) market. So that, herders may discourage to engaged in market oriented production and they fell to target market value while rearing goats and they couldn’t benefit from the existing market situations. This can be solved by Facilitating market opportunities by connecting the marketing route of this locality with big market players (traders, wholesalers, processors or

exporters) and establishing big and standardized livestock market in near by areas of Loka Abaya will encourage the herders to produce more and to emphasize on their goat flocks.

In general, Dale district has a great potential in goat resource and it is suitable for goats production by having goats with important economic traits like good milk yield, reproductive capacity and appreciable growth performances (>11kg weaning weight) with diversified crop production. Huge number of goat population is found in Kola area. It was proved that during the study period around 8,000 goats were vaccinated against goat pox in the four Kebeles namely: Felka, Aldabo, Areda gale and Foka Bedelicho of Moist Kola agro ecology. Where as, central statistics Authority (CSA 2003) reported only 17248 goats in 76 rural Kebeles, almost a half of this number was counted in the above Kola Kebeles using vaccine dozens. Therefore, it is essential to conduct a census of goats in regional or zonal level that avoids under or over estimation and it helps to know the trend of goats; to plan for the resources needed like vaccines, treatments, and skilled manpower.

Further research investigations regarding the breeding aspects to select and develop positive and most important qualitative and quantitative traits will help the herders of the three agro ecologies as well as the adjacent districts to benefit from their potential resources. The production and the productivity differences as well as management variations among the three agro ecologies were observed by this study. Problems such as feed, disease and market were identified and described according to the differences in agro ecologies. Thus, it is proved that there were differences in goats management system, in reproductive performances of goats, feed resources and feeding system, health status and diseases occurrences, marketing and all aspects of management systems

among the three agro ecologies of Dale. Therefore, development strategies and interventions should focus on the specific problems and opportunities of that specific location rather than implementing the same plan, the same design and resource to different agro ecologies.

7.References

Addisu Abera, Azage Tegegne and A.k.Banerjee. 2002. Slaughter component yield characteristics of some indigenous goat breeds in Ethiopia. EJAP (Ethiopian journal of animal production) Volume 2 number 1 pp, 89-90.

Adugna T., et al., 2000. Nutritional constraints and future prospects for goat production in East Africa. The opportunities and challenges of enhancing goat production in East Africa, a conference held at Debub University, Hawassa Ethiopia, from November 10 to 12, 2000. p43.

African Research Network for Agricultural By-products (ARNAB). 1989. Overcoming constraints to the efficient utilization of agricultural by products as animal feed. Proceedings of the Fourth Annual Workshop held at the Institute of Animal Research, Mankon Station, Bamenda, Cameron, 20 -27 October 1987. ARNAB, Addis Ababa, Ethiopia

Agaje Tesfaye et.al. 2001 smallholder production system and constraints in the highlands of North and West Shewa zones. In: proceedings of Ethiopian society of animal production (ESAP). Vo.9 number 1 Addis Ababa, Ethiopia. p 49

Alemayehu Mengistu. 2003. Country pasture/forage profile. Addis Ababa University, Faculty of Science, Biology Department. Addis Ababa Ethiopia.

Armbruster T. and K.J. Peters.1993. Traditional sheep and goat production in south east Cote d' Ivories. Small ruminant research 11(1993) pp29, 290

Ascalew Tsegahun, et.,al.,2000.National goat research strategy in Ethiopia. The opportunities and challenges of enhancing goat production in East Africa, a conference held at Debub University, Hawassa Ethiopia, from November 10 to 12, 2000. p43.

Ayele Solomon, Assegid Workalemahu, Jabbar M.A., Ahmed M.M. and Belachew Hurissa. 2003. Livestock marketing in Ethiopia*: A* review of structure, performance and development initiatives. Socio-economics and Policy Research Working Paper 52. ILRI (International Livestock Research Institute), Nairobi, Kenya. p16,20.

Benin S., Ehui S. and Pender J. 2002. Policies for livestock development in the Ethiopian highlands. Socio-economics and Policy Research Working Paper 41. ILRI (International Livestock Research Institute), Addis Ababa, Ethiopia. p20.

Carl Jansen and Kees van den Burg. 2004. Goat keeping in the tropics. Agrodok 7, fourth edition: Digigrafi, Wageningen, The Netherlands. ISBN: 90-77073-55-8

Christopher Delgado, Mark Rosegrant, Henning Steinfeld, and Simeon Ehui. 1999.

Christopher Delgado.2005. Rising demand for milk and meat in developing country, international livestock research institute (ILRI) N.W. Washington D.C. 20006.USA

CSA.2003. Central statistical Authority, Ethiopian Agricultural Sample Enumeration, 2001/2002. Southern Nation Nationalities and Peoples Region. Statistical report on livestock and farm implements. Addis Ababa, Ethiopia. pp, 35, 43

Davies A. T. and C.F. I. Onwuka 2003. Conservation of forage for dry season feeding in the humid zone of Nigeria. Department of Animal Nutrition, College of Animal Science and Livestock. Production, University of Agriculture, P.M.B. 2240, Abeokuta, Ogun State, Nigeria.

Desta, Z.H.; Oba, G. 2004. Feed scarcity and livestock mortality in enset farming systems in the Bale highlands of southern Ethiopia. Outlook on agriculture. , v. 33(4), p.277-280. , 11 ref. ISSN 0030-7270.

E. M. Nyambati[1], C.N. Karue[2] and N.K.R. Musimba. 2003. The value of *Acacia* brevispica and Leucaena leucocephala seedpods as a dry season supplement for calves in arid areas of Kenya. Nairobi Kenya.

Ehui S.K., Ahmed M.M., Berhanu Gebremedhin, Benin S.E., Nin Pratt A. and Lapar Ma.L. 2003. *10 years of Livestock Policy Analysis. Policies for improving productivity, competitiveness and sustainable livelihoods of smallholder livestock producers.* ILRI (International Livestock Research Institute), Nairobi, Kenya. 118 pp.

Frank Pinkerton and Lynn Harwell. (2002). Marketing Channels for Meat Goats. http://goats.clemson.edu/NC%20Handbook/market.htm

Getachew Gebru, Solomon Desta, and D. Layne Coppack. 2003. Managing risk in pastoral systems, research and out reach experience of the pastoral risk management. In: proceedings of ESAP (Ethiopian society of animal production) challenges and opportunities of livestock marketing in Ethiopia. Yilma Jobre and Getachew Gebru (Eds) 10th annual conference of Ethiopia society of animal production (ESAP) held in Addis Ababa. Aug.22-24 p149

Getahun Legesse, Marlanna Sigmund, Girma Abebe and Anne valle. 2006. Smallholder sheep and goat production system in southern Ethiopia. Opportunities and limitations. Prosperty and poverity in a Globalized World challenges for Agricultural Research. Bonn, Germany.

Getinet Ameha, et. al. 2005. Phenotypic characterization of goat types in northern Ethiopia. EJAP. Ethiopian journal of animal production.V.5 number 1. Addis Ababa Ethiopia p13.

Ghirotti, M. 1998. The role of livestock in mitigating land degradation, poverty and child malnutrition in mixed farming system: the case of coffee growing mid lands of Sidama-Ethiopia. Livestock and the environment international conference World

Girma Abebe, Roger C. Merkeland Tilahun Sahilu. 2002. Enhancing food security and income generating potential of families in Southern Ethiopia through improved goat production and extension, a progress report of an ALO-funded project. In: the opportunity and challenges of enhancing goat production in East Africa. A conference held at Debub University, Hawasa, Ethiopia from November 10to 12, 2000

Githiori, J.B.; Hoglund, J.; Waller, P.J.; Baker, R.L. 2004. Evaluation of anthelmintic properties of some plants used as livestock dewormers against Haemonchus contortus infections in sheep. Parasitology (UK), v. 129(2), p.245-253. ISSN 0031-1820.

Henning Steinfeld. 2004. The livestock revolution—a global veterinary mission. Veterinary parasitology. Volume 125 issues1-2. A selection of presentations given during the 19th international conference of the World Association for the Advancement of Veterinary Parasitology Food and Agriculture Organization, AGAP, Room C-542, Viale delle Terme

di Caracalla, Rome 00100, Italy.p19

Ibrahim Hussen.1998. Small ruminant production technique ILRI manual 3. ILRI. International livestock research institute, Nairobi Kenya.

Ikwuegbu,O.A. G. Tarawali and R. M. Njwe.1996. The role of the West African Dwarf goat in the economy of the smallholder arable farmer in the sub humid zone of Nigeria. Proceedings of the Third Biennial Conference of the African Small Ruminant Research Network, UICC, Kampala, Uganda, 5-9 December 1994. ILRI (International Livestock Research Institute) Nairobi, Kenya. 236pp

Jaitner, J. and Sowe E., Secka Njie and L. Dempfle. 2001. Ownership pattern and management practice of small ruminants in Gambia- implications for a breeding program. Small ruminant research 40(2001)101-108. www.elciver. Com/locate/smallrumres

Lebbie,.H.B. 2004. Goats under household conditions. Small Ruminant Research (The Netherlands), v. 51(2), p. 131-136. ISSN 0921-4488.

Leeuw P.N. de. 2003. Crop Residues in Tropical Africa: Trends in Supply, Demand and Use. International Livestock Research Institute, PO Box 30709, Nairobi, Kenya

Lemma Gonfa.1996. Climatic classification of Ethiopia. Metrological research report series. Addis Ababa, Ethiopia, p45

Livestock Production Programe (LPP, 2005). DFID. Department for international development. http://www,smallstock.info//credits/dfid.htm

Livestock to 2020: The Next Food Revolution Claude Courbois http://www.fao.org/DOCREP/MEETING/004/Y7022E/y7022e00.htm

Mahanjan A.M. and Cronje P.B. 2000. Factors affecting production in a communal farming system in the Eastern Cape region of South Africa. .South Africa Journal of Science 30(20) 150-151

Million Tadesse. 2003. Challenges and opportunities in livestock products and marketing in Southern Nation Nationalities and peoples region. A case study of Wolayita Zone. In: proceeding of the 10th annual conference of the Ethiopian Society of Animal production (ASAP) August 21-23, Addis Ababa, Ethiopia. P

Nsoso S.J. and Monkhei M. and Tihwaafalio. B.E. 2004. A survey of traditional small stock farmer in molepole North Kweneng district, Botwanan Demographic parameters market practices and marketing channel. Livestock research for rural development16 (12) Botswana p8

Nwafor, C.U. 2004. Anthelmintics use for small ruminant production in The Gambia: a participatory and economic benefit-cost analysis. Livestock Research for Rural Development. , v. 16(9), article 68. , 46 ref. ISSN 0121-3784.

Oguoma, N.N.O. 2003. Financing small ruminant operations along gender lines in Imo State, Nigeria. Journal of Agriculture and Social Research (JASR), v. 3(1), p. 13-28. ISSN 1595-7470.

Ogwang, ET. Al, B.H. 1996. Socio-economic aspects of goat nutrition in Swaziland. . Proceedings of the Third Biennial Conference of the African Small Ruminant Research Network, UICC, Kampala, Uganda, 5-9 December 1994. ILRI (International Livestock Research

Institute) Nairobi, Kenya. 236pp

Pagot. J. 1992. Animal production in the tropics. Macmillan press.

Paramasivam, A.; Arunachalam, S.; Sivakumar, T.; Ramesh, V. 2002. conomics of body growth in Barbari goats under intensive, semi-intensive and extensive systems of management. Indian Veterinary Journal. , v. 79(12), p. 40-44. , 6 ref. ISSN 0019-6479.

Peter S. 1998. The international marketing of hides and skins and leathers. MoA/FAO, (Ministry of Agriculture/ Food and Agricultural Oganization.p44.

Rodrigueza,A., Lamaran, a. Muhammed, A., Nisar, A., Shahb and Usman M. Price expectations of sheep and goats by producers and intermidaries in quetta market, Pakistan . Agricultural economics Vol.12, issue1,Appril, 1995 p79

Senait Seyoum.1990. Economics of Small ruminant meat production and consumption issue. Small ruminant research and development in Africa. In: proceedings of the first Biennine small ruminant research net work ILRI, international livestock research institute. Nairobi, Kenya.

Shiferaw, Y.; Yohannes, A. [Yoseph Shiferaw; Aster Yohannes]. 2002. Livestock husbandry and management, health problems and ethno veterinary practices in Ghinchi, west Shewa zone, Ethiopia. In: Towards farmers' participatory research: attempts and achievements in the central highlands of Ethiopia. Proceedings of client-oriented research evaluation workshop. Keneni, G. (ed.); Gojam, Y. (ed.); Bedane, K. (ed.); Yirga, C. (ed.); Dibabe, A. (ed.) p. 325-337. , 7 tables; 6 ref. Ethiopian Agricultural Research Organization, Addis Ababa. Addis Ababa (Ethiopia) : EARO.

Siamba, D.N.; Muhuyi, W.B.; Muia, J.M.K.; Lukibisi, F.B. 2005. The role of Kenya dual purpose goats in drought recovery and food security in marginal areas of Kenya. Tropical Science. , v. 45(2), p. 74-76. , 9 ref. ISSN 0041-3291.

Tatek Woldu, Hailu Dadi, Meiso Guru, and Dadi Galashe.2004. Productivity of Arsi Bale goats under farming management condition: a case study of Arsi Negele In; ESAP (Ethiopian society of animal production).The role of Agricultural universities in transforming animal agriculture in Education, research and development. Tamirat Degefa and Fekede Feyissa (Eds). Proceedings of the 13th annual conference of Ethiopian society of animal production. ESAP., held in Addis Ababa, August 25-27, 2004. ESAP, Addis Ababa Ethiopia. P69

Tefera Sertse and Abebe Wosene, 2006. A study on ectoparasites of sheep and goats in eastern part of Amhara region, Northeast Ethiopia. Small ruminant research. www.elsevier. Com/locate/small ruminants

Teresa Adugna. 2003. Factors influencing adoption of cross bred dairy goats. The case of three districts in Eastern Ethiopia. In proceedings of ESAP (Ethiopia society of animal production) 2004. Animal biodiversity in Ethiopia status and prospects. Asfaw yimegnuhal and Tamirat Degefa (EDS). In: proceedings of the 11th Annual conference of the Ethiopian society of Animal production (ESAP) Held In Addis Ababa, Ethiopia. August 28-30, ESAP, Addis Ababa p332.

Tessema Zewde, Akililu Agide and Ameha sebsibe 2003. Assessments of the livestock production

system, available feed source and marketing situations in Belessa woreda a case study in drought prone area of Amhara. In: proceedings of ESAP (Ethiopian society of animal production) challenges and opportunities of livestock marketing in Ethiopia. Yilma Jobre and Getachew Gebru (Eds) 10th annual conference of Ethiopia society of animal production (ESAP) held in Addis Ababa. Aug.22-24

Trianti Djoharjani.1996. Survey on production systems of dual purpose Etawah goat and its potential for development Livestock research for rural development Volume 8. Number 2.University of Brawijaya, Faculty of Animal Husbandry. Jl. Veteran, Malang 65145. East Java, Indonesia.

Tuah, A. Dzowela.. B and A. N. Said.2003. The performance of sheep and goats fed crop residues in addition to limited grazing in the backyards of small-scale peri-urban farmers. Dept. of Animal Science, UST, Kumasi, Ghana

Workneh Ayalew and Woudyalew Mulatu. 2005. Farmers practices in the management of trypanosomosis in the Gibe Valley, South Western Ethiopia. In: proceedings of ESAP (Ethiopian society of animal production). Participatory innovation and research. Lesson for livestock development. Tamirat Degefa and Fekede Feyissa(Eds).Proceedings of 12th Annual conference of Ethiopian society of animal production. ESAP., held in Addis Ababa, August 12-14 2004. ESAP, Addis Ababa Ethiopia. P63

Workneh Ayalew, Reschkowsky B and king J.M. 2004. Concepts and calculations of net benefits from goats in Ethiopian smallholdings. EJAP (Ethiopian Journal of Animal production. Vo.4 Number 1, p49.

Workneh Ayallew, J.M.King, E.W. Bruns and B.Kischkowsky.2002. Practicalities of sustaining a goat cross breeding programs in Eastern Ethiopia. EJAP (Ethiopian journal of animal production) Vol2, Number1, PP81, 82.

5.**Appendices**

5.1. Appendix table

Appendix table 1 analysis of variance of age of the household

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	454.153	2	227.077	1.372	.258
Within Groups	19359.439	117	165.465		
Total	19813.592	119			

Appendix table 2 Family size comparison in Agro eco logy

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35.144	2	17.572	2.469	.089
Within Groups	832.856	117	7.118		
Total	868.000	119			

Appendix table 3 analysis of variance of livestock holdings comparison in Agro ecology

		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	2280.133	2	1140.067	7.986	.001
	Within Groups	16701.733	117	142.750		
	Total	18981.867	119			

Appendix table 4 analysis of variance for Goat holdings comparison among agro ecologies

	Between Groups	820.578	2	410.289	13.917	.000
	Within Groups	3449.389	117	29.482		
	Total	4269.967	119			
	Between Groups	3.425	2	1.713	5.468	.010
	Within Groups	8.143	26	.313		
	Total	11.568	28			

Appendix table 5 Analysis of variance for Reproductive performances in the three agro ecological zones as responded by farmers

		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	21.225	2	10.613	1.509	.225
	Within Groups	822.767	117	7.032		
	Total	843.992	119			
	Between Groups	21.436	2	10.718	6.361	.002
	Within Groups	197.156	117	1.685		
	Total	218.592	119			
	Between Groups	56.169	2	28.085	11.286	.000
	Within Groups	291.156	117	2.489		
	Total	347.325	119			
	Between Groups	43.336	2	21.668	2.962	.056
	Within Groups	855.789	117	7.314		
	Total	899.125	119			

Appendix table 6 analysis of variance, for Litter size and parity as reported by respondents

		Sum of Squares	df	Mean Square	F	Sig.
Litter size	Between Groups	8.011	2	4.006	7.421	.001
	Within Groups	63.156	117	.540		
	Total	71.167	119			
Parity	Between Groups	182.178	2	91.089	9.419	.000
	Within Groups	1131.522	117	9.671		
	Total	1313.700	119			

Appendix table 7 analysis of variance for Growth Results from flock monitoring

		Sum of Squares	df	Mean Square	F	Sig.
Average weight at birth	Between Groups	2.108	2	1.054	14.066	.000
	Within Groups	2.172	29	.075		
	Total	4.280	31			
Average weaning age	Between Groups	2.997	2	1.499	6.685	.004
	Within Groups	6.277	28	.224		
	Total	9.274	30			
Weaning weight	Between Groups	45.510	2	22.755	17.134	.000
	Within Groups	35.857	27	1.328		
	Total	81.367	29			

Appendix table 8 Questionnaire for diagnostic survey of production system

Hawasa University

Hawasa College of Agriculture

Department of Animal and Range Sciences

2006

Questionnaire –Goat's production system survey

Enumerator Name _____ Date / /

1. Study area Name_____

2. Farmers' Association Name _____

3. Interviewee No. _____

The overall objective of the survey *is to study and describe production system and marketing in mixed farming area. The data collected from survey will be used to characterise small ruminant production systems and the potential productivity of the area and to identify constraints and opportunities for goat's production.*

1. Name of the interviewee _____*Male* [ ] *Female* [ ]
2. Position in the house hold
   Household head [ ] *Spouse of head* [ ]

3. Family size

Children	
Females <15	
Males <15	
Adults	
Females 15-65	
Males 15-65	
Female>65	

Male>65	
Total	

4. Education level of parents and children

Education level	***Mother***	***Father***	***Number of children > 7years***
Illiterate			
Grade 1-3			
Grade 4-6			
Above grade 6			

5. Source of Income

Source	***Rank***	***Specify (what type?)***	***Who in the house hold decide On The income***
Sale of crops			
Sale of animals and their products			
Sale of labor			
Petty trading			
Other_____			

Please rank 1 for most important source of income and 2,3,4,5 for the preceding successive income sources. Again rank 1,2,3,4,5, for decision-making power

6. Which type of animal is the best income generating species for family? Write in the order of importance 1,2,3,4,

Species	Rank	Remark

7. Cost of production inputs excluding feeds (during the previous year).

Material inputs	Cattle	Goat	Sheep
Medicine			
Veterinary services			
Breeding fee			
Salt			
Ropes			

Cleaning materials			
Supplementary feed			
Others			

Do you supplement mineral salt or common salt?
Yes ( ) no ( )
If your answer is yes
When_____
For what type of goats
For kids_____yearlings_____BUCKS_____EWES_____

8. Landholdings

Land use	Land area	Ownership status	Tenure arrangement	If rented, rental shares (%)	Distance from homestead, km	Topography	Soil fertility indicator/s	Observed soil erosion?

Land use: 1 = annual crops; 2 = forest/trees; 3 = grassland; 4 = perennial crops; 5 = fallow; 6= others
Ownership status: 1 = owned; 2 = rented in; 3 = other (e.g. share)
Tenure arrangement: 1 = share cropping; 2 = fixed rent after harvest (leasehold); 3 = fixed rent before harvest; 4 = mortgaged
Topography: 1 = upland; 2 = lowland not flooded; 3 = lowland flooded
Soil fertility: 1 = good; 2 = average; 3 = poor
Erosion: 1 = no; 2 = slight/moderate; 3 = sever Use of communal grazing

Yes [ ]
No [ ]

8.1.How many rainy seasons and the durations of the seasons unimodal ( ) Bimodal( )
Belg from_____to_____
Meher from _____to_____

8.2. Type of grazing land and ownership

Open grassland [ ]

Tree covered grassland [ ]
Bush/shrub grassland [ ]
Swampy grassland [ ]

8.3 What is your major farming activity?

Livestock production [ ] Crop production [ ] Both activities have the same emphasis semi pastoralist[ ]

9. Number of livestock kept

Animal Type	Amount (No)	Age (month)	Breed	Origin	Value (EB)

Animal Types

Cattle
1 = Calf (male)
2 = Calf (female)
3 = Young bull
4 = Bull
5 = Heifer
6 = Cow

small ruminant.
7. Goats
8.Sheep

Equine
40 = Horses
41 = Mules
42 = Donkeys

50 = Poultry

Breed
1= Local
2 = Local/exotic cross
3 = Pure exotic

10-How long have you been keeping goats?

For. _____Years

10.1 Number of different classes of goats kept

Group	No	Ownership status			
		Private	From family	Produced	Purchased
Bucks>1 year					
Does>1 year					

Buck kids6 month- 1 year					
Does kids6 month –1 year					
Kids below 6 months Male Female					

11.What is the major crop production?

Items	***Hectare***	***Remark***
Enset		
Teff		
Barley		
Wheat		
Corn		
Chat		
Maize		
Sweet potato		
Haricot bean		
Sugar cane		
Pulses		
Spices		

11.1. What are the staple foods of the family?

Items	***Rank***	***Remark***
Enset		
Teff		
Barley		
Wheat		
Corn		
Chat		
Maize		
Haricot bean		
Sweet P.		
Others specify 1 2 3		

(Please rank within columns using 1 for most common, 2 for next in the list)

11.2. What is the major cash crop in the household?

Items	***Rank***	***Remark***
Enset		
Teff		
Barley		
Wheat		
Corn		
Coffee		
OTHERS		
1		
2		
3		
4		

(Please rank within columns using 1 for most common, 2 for next in the list)

11.3. How often do you eat meat?

During holidays [ ] Once a week [ ]
Once a month [ ] Twice a week [ ]
Twice a month [ ] More often [ ]

Production system

Purpose of keeping goats

Purpose	Describe your reasons
Meat	
Milk	
Breeding	
Manure	
Blood	
Skin	
Savings	
Wealth status	
Ceremonies	
Income	

Members of household who own goat

	Number of goats	***Reason for keeping goats***
Head		
Spouse		
Head/spouse together		
Sons		
Daughters		

Others (describe) _____		

Members of household and hired labor responsible for goat activities

	Males (> 15 yr)		Females (> 15 yr)		Boys (<15y)		Girls (<15y)	
	Family	Hired	Family	Hired	Family	Hired	Family	Hired
Purchasing goats								
Selling goats								
Herding								
Breeding								
Caring for sick animals								
Feeding								
Milking								
Making dairy products								
Selling dairy products								
Others (specify)								

(Tick one or more boxes in each column and row)

4-Feed and feed utilization

4.1. Browsing *(Tick one or more boxes in each column)*

	Goat	
	Dry season	Wet season
Un herded		
Herded		
Paddock		
Tethered		
Zero-grazing		
Other (specify)		

4.2.The time spent on Browsing_____

4.3.Do goats graze as mixed flock?

Yes [ ] No [ ]

4.4..Do small ruminants run together with cattle?

Yes [ ] No [ ]

4.5.In which months do you encounter shortage or surplus of forage for your Goats

Quantity	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Scarce												
Excess												

4.6.Supplementation regime

	Dry season	*Wet season*
Concentrates	_____	_____
Household wastes	_____	_____
None	_____	_____
Other (specify)	_____	

4.7.Animals that are supplemented *(Tick one or more boxes)*

Adult male animals (> 1 yr.) _____
Lactating animals _____
Pregnant animals _____
Young animals (< 1 yr.) _____

4.4 a. What type of feed do you usually supplement to your animals other than grazing.

Type of goats	Type of feed supplemented	Time	Reasons	Remark
Kids				
Pregnant Does				
Lactating Does				
Sterile female goats				
Castrated				
Uncastrated				

4.5.For how many times you supplement feed for goats

1 Once daily[ ]
2 Twice[ ]
3 As available[ ]

4.6.How do you supplement

1 Separately[ ]
2 On the common place using feeding trough [ ]
3 On the common place using ground[ ]

4.7.If there is no supplementations reason_____
_____

4.8.The major resource feed for goats

Type	Dry season	Wet season	System of feeding	Remark
Natural grazing •1 Communal •2 Private •3 Fallow land				
Crop residue 1 2 3				
House hold west				
Concentrate				
Improved/cultivated forage				

System of feeding indicates cut and carry, tethering and other systems

4.9.What type of plants do you know your goats feed on or graze? (*Please give their local/English name), rank best to least*

a. _____ b. _____
c. _____ d. _____
e. _____ f. _____
g. _____ h. _____

4.10.Source of water *(Tick one or more boxes in each column)*

	Dry season	***Wet season***
Borehole/water well	_____	_____
Dam/pond	_____	_____
River	_____	_____
Spring	_____	_____
Pipe water	_____	_____
Rainwater	_____	_____
Other (specify)	_____	_____

4.11.Distance to nearest watering point for adult animals *(Tick one box in each column)*

	Dry season	*Wet season*
Water at home	_____	_____
< 1 km	_____	_____
1-5 km	_____	_____
6-10 km	_____	_____
> 5 km	_____	_____

4.12.Are kids/ watered with adults Yes [ ] No [ ]

4.13.Frequency of watering for adults

	Dry season	***Wet season***
Freely available	_____	_____
Once a day	_____	_____
Once in 2 days	_____	_____
Once in 3 days	_____	_____
Other (specify)	_____	

4.14.Water quality

	Dry season	***Wet season***
Clean	_____	_____
Muddy	_____	_____
Salty	_____	_____
Smelly	_____	_____

4.15.The system of allotments

1 By taking to water point
2 Using watering troughs in side the shelter
3 The goats move to water point when they need to drink

4.16.Problems related on the major feeds and watering of Goats?

1 Increased level of livestock population
2 Low productivity of natural pasture/forage
3 Cropped land expansion
4 Population growth
5 Other reasons_____

4.17.What are the solutions you suggest to alleviate these problems?

_____

_____

4.18. Do you make hay?

1. **Yes---------- 2. No-----**

4.19.If yes, from which land

1.Pasture land [ ] 2 Crop land (after fallow)[3.others_____

_____4.20. From which crop 1----------2----------3----------

4.20.Do you produce cultivable forage?

1. YES ------- 2. No

4.21 f yes, what type of forage do you have?

1.

2.

3.

4.

4.22.What are the major problems related to cultivated forage

- We don't have idea about improved forage[ ]
- It is difficult to get land to cultivate forage
- Forage seeds and seedling problems
- Others mention

4.23..Have you identified the seasons with surplus or shortage of feed for goats

Yes[ ] No [ ]

4.24.If your answer is yes describe as follows

Type of feed	Time when feed is scarce	Time when feed is excess

4.25.Describe solutions and measures taken to solve the problems_____

_____

4.26.If you are using concentrate as feed supplementations what are the problems you faced

1 It is not locally available [ ]

2 Price increment[ ]

3 Other reasons _____

_____

4.27. Do you purchase feed from out side? 1 yes [ ] 2 No[ ]

If yes from where1- From neighbor farmers2-[ ]Farmers from other Kebelle3-[ ]From market4-[ ]1 AND 2[ ]1,2,AND 3[ ]

4.28.Use of manure and crop residues (during the previous year)

Animals	Ruminants				Non-ruminants		
Manure:	Cattle	Buffalo	Goat	Sheep	Pig	Chicken	Duck
Is manure collected, 1 – **Yes**, 2 – **No.**							

If yes:								
% Used as fertilizer								
% Used as fuel								
% Used for other purposes								
Crops	Crop 1: _____		Crop 2: _____		Crop 3: _____		Crop 4: _____	
Crop residues:								
% Used as feed								
% Used as mulch/compost/left in field								
% Used as housing material								
% Used for other purposes								

4.29.What are the major use of Goats manure? 1----------2----------3----------

4.20.If you are using crop residue what are the major problems you are facing?

1 The shortage of crop residue due to using for multiple purposes
2 Improper utilizations
3 Poor preference by goats due to poor quality
4 Due to the shortage of cropped land the amount of crop residue harvested is low
5 Other reasons_____

5.Housing

5.1.Housing/enclosure for adult goats

With roof ***without roof***

In family house _____ Karaal _____attached with family house___

_____

Separate house _____ Yard _____other specify----------

5.2.At what time your goats use the shelter at night[ ]partially day time[ ]day and night[ ]

5.3.Why do you use the shelter?_____

54.If herded separately or with other animals indicate the time the month and the season

Type of goats	With other animals	Separately	Season / month	Reason	Remark
Bucks					
Does					
Yearlings					
Kids					

5.5.Type of housing material *(Tick one or more boxes in each column)*

	Roof	***Wall***	***Floor***
Iron sheets			
Grass/bushes			
Wood			
Stone/bricks			
Earth/mud			
Concrete			
Other (specify) _____			

5.6. Are kids housed with adults?

Yes [ ] No [ ]

5.7.Do goats graze as mixed flock?

Yes [ ] No [ ]

5.8.Do small ruminants run together with cattle?

Yes [ ] No [ ]

6.Health and predators

6.1Access to veterinary service *(Tick one or more boxes)*

Government [ ]
Private veterinarian [ ]
Shop or market [ ]

Other (specify)
_____[ ]

6.2.Distance to nearest veterinary service *(Tick one box)*

<1 km [ ] 1-5 km [ ] 6-10 km [ ] >10 km [ ]

6.3.What are the measures you take when your goats become sick?

1 I treat them[ ]
2 I slaughter immediately[ ]
3 I will take to clinics[ ]
4 I will sale immediately[ ]
5 I do nothing [ ]

6.4.Do you use traditional medicine?

If yes what type for which disease?

Type of disease	Herbal drugs used	Remark
Anthrax		
Blackleg		
CCPP		
Pasteurolissis		
External		
Internal parasite		
1		
2		
3		

6.5.How do you get the service from vet. Clinics

1 Free of charge
2 With payment
3 With partial payment
4 By credit

6.6.Do you separate sick goats from the flock?

Yes [ ] No [ ]

If no, why not _____
If yes, how do you separate them? _____
During day _____

During night _____

6.7.Do you get vaccination? Yes [ ] No [ ]
6.8 If your answer is yes, when?

1 During disease break out happens [ ]
2 At any time in the year [ ]
3 Before periodical on set of disease break-out

6.9.Which one is preferable?

1 Using traditional drugs[ ]
2 Using standard drugs (modern medicines)[ ]

6.10.Why? Describe the reasons_____

_____

6.11.Problems related to veterinary services

1 There is no health clinic in the Kebelle and it is found in the distant area
2 The shortage of veterinary personnel's
3 High price requested for veterinary drugs and for the service provided
4 Low availability of veterinary drugs

6.12.Mortality in the last 12 months *(Enter numbers)*

		Age category			
		<3 months	***3-6months***	***6-12months***	***>12months***
	Male				
	Female				

6.13.Reasons for death *(Tick one or more boxes, then rank top 3)*

Predators [ ] Disease [ ]
Accident [ ] Poisoning [ ]
Drought [ ] Unknown [ ]
Other (specify) _____ [ ]

6.14.In which months did most of the mortality occur?

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Goat												

7. Reproduction

7.1.Reasons for keeping buck(s)) *(Tick one or more boxes)*

Mating [ ] Socio-cultural [ ]
Other (specify)
_____ [ ]

7.2.Criteria for choice of buck(s)

Size	[ ]	Color	[ ]
Horns	[ ]	Character	[ ]
Availability	[ ]		
Other (specify)	[ ] _____		

7.3.Breeding/mating

Controlled [ ] Uncontrolled [ ]

7.4.Source of buck(s)) within the last 12 months *(Tick one or more boxes)*

Own buck (bred)	[ ]	Own buck (bought)	[ ]
Buck donated	[ ]	Buck borrowed	[ ]
Neighbor's buck	[ ]	Communal buck	[ ]
Unknown buck	[ ]		

7.5.How do you detect the on –set of heat_____

_____

7.6.Which season or month of the year the highest heat of goats observed (the main breeding season) 1_____2._____3._____

7.7.Do you select the best breeding Buck? Yes[ ] No [ ]

7.8.If yes write the criteria used to select the best buck from the flock_____

_____

7.9.Do you select the best replacement female goat from your flock?

Yes [ ] No [ ]

7.10.If yes what are the main criteria's used to get the best replacement?

Breed

1 Fast kidding interval [ ]
2 Body conformation [ ]
3 Prolificacy of their parents [ ]
4 Twining ability and maternity [ ]
5 Other reasons [ ]

7.11.Kidding ability

1 Twice/year
2 Once/year
3 Two-times/three year
4 Not permanent

7.12.Number of kids at birth

1 One at a time[ ]
2 Twins[ ]
3 Triplets [ ]
4 Above triplet[ ]

7.13.Do you have your own buck? Yes [ ] no[ ]

How and at what system meting take place

1 They live together with does[ ]
2 There is specific time and they mix the bucks with in heat female[ ]
3 Other methods used

7.14.If mating is seasonal what are the reasons

1 Availability of feed [ ]

2 Convenient day temperature [ ]
3 To meet with highest birth and service time [ ]
4 Other [ ]

7.15.Can you tell us the following information?

10 Age at first kidding_____
11 Estimated weaning age of kids_____
12 Kidding interval_____
13 Average age of goats for market (marketable age)_____
14 Weight at market_____
15 Estimated number of kids produced in the life of Does (parity)_____
16 Age at first service of Bucks_____
17 Estimated service year of Bucks in the total life period (if estimation is possible)__
18 Number of female goats served by a buck_____

7.16.Time of service after kidding

- No limited time
- After a month
- After two months
- After three months
- More than three months

7.17.After birth how many days the kids stay with their Does_____
7.18 After how many days' kids start feeding by them selves_____
7.19. Additional feeds used for kids at the beginning of browsing time_____
7.20.Kids of poor lactating or died Does are supplemented milk from

1 Cow milk [ ]
2 From other does [ ]
3 Other source or methods used [ ]

7.21.Any systems which make the kids to drop suckling_____
_____
7.22.What are the reasons to separate the kids from suckling?

1 To make Does ready to the second heat
2 To give time to the successive birth
3 To prepare kids for marketing
4 Other reasons

7.23. What are the purposes of male goats, which are excess after selecting the best for breeding

1 They sold immediately [ ]
2 They will entered fattening program [ ]
3 They used for home slaughter [ ]
4 Other purposes [ ]

7.24.Culling due t o age, Female----------years Male----------years

7.25. Flock and herd dynamics

				Total number		
				Before	At present	

				two years		
Cattle						
Goats						
Sheep						
Equines						
Poultry						

Other management conditions

1. Do you castrate?

   Yes [ ] No [ ]

If no, why not _____

If yes, at what age do you castrate?

<3 months [ ]

3-6 months [ ]

>6 months [ ]

2. Reasons for castration *(Tick one or more boxes)*

   Control breeding [ ] Improve meat quality [ ]

   Better temperament [ ] Better price [ ]

   Other (specify) _____

Others

1. Major constraints of goat production in the area

Constraint type	*Give explanation*	*Rank in order**
Lack of feed		
Animal diseases		
Market problem		
Space		
Water shortage		
Other (specify) _____ _____ _____		

** 1= most serious constraint; highest number in the list: the least constraint*

Major problems of goat's production

Disease [ ] market [ ]

Feed [ ] predators [ ]

Water [ ] labor [ ]

What are the solutions you are taking to solve the problems?

Problems ***solutions***

1

2

3

2. What are your most important sources of information on how to care for your goats?
[ ] Family [ ]Neighbors [ ]Radio [ ] Gov. office:_____
[ ] NGO:_____

3. On what basic point you received information

- About feeding [ ]
- Health [ ]
- Breed [ ]
- Others [ ]

4.Have you used the suggestion given?
Yes [ ] No [ ]
5.IF your answer is yes
What are the changes made after suggestions
1
2
3
4
6.Have you participated extension packages in the past years/
Describe the types
1
2
3
4
Advantages
1
2
3
4
Problems
1
2
3
4
7.Do you participate in any goat development project? Yes [ ] No [ ]

8.What benefits did you get as a result of your participation in the project?
[ ] Income, [ ] Milk [ ] Meat
Other_____

9.How much milk do you get from your dairy goat daily?_____ liters

10.Who consumes the milk from the goat?

a) _____

b) _____

11.Do you want to expand your goats farm? Yes [ ] No [ ]

12.If no what are your reasons

1 land shortage for pasture[ ]
2 labour problem [ ]
3 they create damage for the crop farm [ ]
4 I prfere to keep other animals to keep [ ]

13.If you are interested to expand your goats production up to what extent_____
_____

14.What should be the role of government to inhance the productivity of goats in your area?____
_____

15.Do you think that your goats are more productive than any other breeds in your or other localities?How

Posetive aspecs	**poor sides**
1 good conformation and growth [ ]	poor body conditions [ ]
2 producing more than one kid at a time [ ]	Reproductive problems [ ]
3 For their quality skin [ ]	poor quality skin [ ]
4 Color, tail and noise positions [ ]	others [ ]

16.If you are producing goats for meat purpose, how do you utilize

1 During holly days [ ]
2 When meat is requird by family[ ]
3 To invite respect gusts
4 As I get meat type goats [ ]
5 Other reasons[ ]

About improved breeds

1.Did you get improved breeds in the last time Yes [ ] no [ ]

2.If there is no distribution what are the reasons_____
_____
___

3.If distributed when/ _____year

4.The objective or purpose of distribution
for meat[ ] for milk [ ] both meat and milk [ ]

5.Have you gained more advantage from improved breeds/ compred to locals

1 High meat production[ ]
2 High milk production [ ]
3 More prolific [ ]
4 Fast growing other reasons [ ]

6.Describe the poor sides of these breeds_____

_____

7.The major prob lems related to cross breeds_____

_____

8.Suggestions and comments about cross breeds_____

_____

Appendix table 9 Questionnaire format on Rapid Marketing Appraisal(RMA)

Part I
Hawasa University School of graduate studies
Rapid marketing appraisal (RMA), Checklist

1. Goat producers at local/ primary market of Dale (Bokasso Hantate and Deala)

Address Region_____

Zone_____woreda_____ Kebelle_____

Farmer's code_____

1.1 Production

1 Why do you keep goats? And how long have you been keeping?----------
---

---

2 Amount (number) of different classes of goats kept?----------
---

==========---------

---

3 What is the type of production (subsistence, market oriented or commercial)?_____
_____
_____
_____
_____

4 Do you want to expand and intensify your goats' production? How and up to what extent?_____
_____
_____
_____

5 What are the types of inputs used for your goats production?_____----

6 Where did you get your initial stock? Do you have your own breeding----------
---
---)

7 Sources of stock supply?
8 Do you fatten goats for market?
9 Where is the source of goats purchased for fattening?
10 Factors to be considered in order to fatten goats at farm level?
11 For how long the activities of fattening take place?

Short time for ----------month
Medium for ----------month
Long duration for ---------- month

12 Which duration is the best and the most profitable staying period?

Feed source and type of feed

Feed from own field	Feed from out side sources	Remark

1 Which types of feed are important for goat's growth and development? (Exceptional feed types known by their quality to induce fast weight gain)
2 Access to veterinary service? Do you use feed additives in order to fasten the growth and production?
3 Economically important disease affecting goat's growth and productivity?
4 Mortality in the last twelve months? And the causes of mortality?
5 Problems with input supply?

1.2. Marketing and market situations

1.2.1. Purchasing

1 Which seasons of the year is the best time for purchasing goats for your farm? Why is this time preferred for purchasing goats?
2 Do you purchase goats from market?
3 Which market is the most profitable, highly available by goats' population, cheapest in purchasing price etc? What are the reasons for purchasing goats?
4 What are the criteria's used during purchasing goats for your farm? (Age, weight, condition, sex, color, size, breed, etc)?
5 Who is your customer during purchasing goats? Who participate in buying and selling process?
6 What are governmental or traditional regulations to be obeyed during purchasing goats?

1.2.2. Marketing goats (sales)

- When did you start selling goats?
- For whom you sell your goats? (Your usual customer)?
- What are the reasons for selling goats?
- Which market is the best market for selling goats? Why do you prefer this

- market for sales?

The name of the market	Different routs of goats coming to this market	Reason for preferring this market	Frequency of selling	The best time for selling goats

-

- Discuss about marketing access?
- Type, address and destinations of buyers?

Type of buyer	Initial Address (coming from)	Final destinations (take the goats to special locality, mention the place)

1 What are the criteria that are important for sales? (Age, sex, weight, condition, color etc.)Which criterion is important for price determination?
2 Problems encountered during exchange?
3 Opportunities considered for production? Are you producing for market? What is your source of capital? What type of labour used for production?

1.3.Credit service

1 What are your sources of credit?
2 Why did you need credit?
3 Have you repaid the credit you offered last time?
4 Is credit available, adequate, timeliness?
5 The interest rate, is it profitable, is it beneficial?
6 Problems associated with credit? The opportunities to improve the existing credit service?

1.4.Extenstion service

1 Who is your source of information?
2 Have you got new idea about goats' production and management? (Availability, timeliness, accuracy and accessibility)?
3 What is the information, which is important to your activity and what are the benefits, obtained using this information?

Part II

Hawasa University School of graduate studies
Rapid marketing appraisal (RMA), Checklist Prepared to interview
Traders (Retailers, wholesalers, and assemblers)
At local/primary markets of Dale (Bokasso, Hantate, Dela**)**

Region_____Woreda_____

Market place_____Market day_____

Name_____Residence_____

Main work activity_____

1.About business

When did you start trading goats?_____
For how long_____year
Why you prefer trading goats?
What was your source of capital? And how much capital did you invest to start your initial trading? How much capital do you have at current? Is it progressive or regressive? Why?

Source of capital	Amount of initial capital	Amount of current capital	Progressive compared to initial capital	Regressive compared to initial capital	No change	Reasons for good profit	Reasons for loss

What type of goats you are trading? Why do you prefer trading these types of goats?

2.Purchasing

1. Where you buy goats, rank the markets according to the availability, accessibility price and other conditions related to goats marketing
2. Why do you prefer this market?

Market place (rank the best market number1)	Estimated number of goats per market day	The average number of goats you purchase per day	Distance from your residence	More profitable market day	Remark

1 Which type, age, colour, and body condition, are most preferable?
2 Do you transport goats other market places? Where? What is your means of transportation?
3 At what particular season a large number of animals purchased from market
4 What are the relationship among the demand, supply season time and price of goats?
5 The time in with the highest supply and demand in relation to price situations

Estimate the price of the following goats type

	Seasonal variations in price					
	Lowest price	Month	Moderate	Month	Highest price	Month
Castrates						
Does						
Bucks						
Young female						
Young male						

1 Discuss about the reasons for price fluctuations?
2 The criterion's considered during purchasing goats for trading?
    1.
    2.
    3.
    4.

Which criteria of the above is the most important for buying goats for profit

Measurements used in the market to estimate price?

1 For weighting
2 Age determination
3 Body condition estimation
4 Meat quality and tenderness
5 What are price determinant factors

Who is responsible to fix price when you buy goats in the market? Who has a power to determine price?

3.Sales

Which Market place and market day is the best for selling your goats? What are the reasons to prefer this market for sales?(describe in order of importance)

Market place	The best market day for sales	Reasons to prefer the market?	Which marketing structures are available

1. Could you sell all the purchased goats at once on the same market day?
2. Who is your buyer?
3. What is an average price you obtained per goat?
4. Castrated>2year birr-------
5. Uncastrated young <2 years birr----------
6. Does>2years birr----------
7. Young female, <2 years Birr----------
8. Which type goats are profitable? Who is responsible to determine/fix price
9. What are the criteria used to determine price, and which criteria is the most preferable to get the highest price (age, colour, body condition, weight, castration, etc.)?

4.Transportations

1. What is your means of transport (trekking by your self or help of hired labour, ISUZU, other Trucks)
2. If you use the truck, how much money do you pay per goat? How many kilometres you transport, what are the problems related to transportation, how many goats are transported per journey?

Type of transportation	How many goats move at one time	Amount paid per goat	Routes of travel from -- to	Problems related to transportation

5.Market information

1. What are your sources of marketing information? Is the source available reliable recent and accurate?

2 What is the estimated number of goats entered and exist per day in to the market and out of the market respectively? which season has the highest inflow and out flow?

3 What are the main Problems in relation to marketing (price, buyers problem, accessibility, market structures etc.)?

What are the main factors to be considered in relation to buying and selling goats in those market places? Discuss the problems and opportunities in relation to goats trading?_____

_____

_____

_____

_____

Part III

Hawasa University School of graduate studies

Rapid marketing appraisal checklist to interview

Traders (whole sellers, retailers, assemblers)

At secondary and terminal markets (Yirgalem, Hawasa)

1 Where you buy and sell your goats?
2 Why do you prefer this market for sales and purcasing?
3 Which market is the best market for purchasing and sales?

Initial market place for purchasing goats	Final market place for sales	Who is the buyer at final market (Hawassa)	Final destination of the purchased goats	Who is the final collector/assembler at the end	The number of middle men at final market

1 How long have you stayed on trading goats? What is your initial capital and how much capital do you have?_____

2 What is the trend for goats price? Is it increasing or decreasing?_____

3 For whom you sell your goats and who in the market pay the highest price?_____

4 Which types of goats have the highest price in this market? And who is responsible to fix price, how?_____

5 How many goats are marketed at a time? How do you contact with buyers and what do you observe about goats preference of buyers in relation to other species of animals?_____

6 Which criteria (sex, age, condition, castrated, colour, etc) have a great relation with market price? Which one is the best to determine price?_____

7 What is the estimated number of whole sellers; butchery men, exporters, consumers or other buyers come this market at each market day?
8 At what marketing time the price of goats is relatively high and which part of market time the majority of goats are sold?
9 What are the problems encountered in these secondary and terminal markets of Yirgalem

and Hawassa respectively?

Part IV

Hawasa University School of graduate studies

Rapid marketing appraisal, checklist to interview

Butchery men

1 When did you start slaughtering goats for meat?
2 Why do you prefer slaughtering goats? Why not sheep?
3 How many goats slaughtered and sold per day in your butchery?
4 Which type of goats are the most preferable by consumers and which type are profitable for your business

Types of goats Rank (1 for best)

- Young male < 1 year ---------- -
- Young female < 1 year ----------
- Castrated male > 1 year ----------
- Uncastrated male > 1 year ----------

Do you use communal slaughterhouse? Or, you have your own slaughtering place?

1 Are meat inspectors monitoring the slaughterhouse?
2 Which part of the carcass is condemned? Do meat inspectors usually condemn offal's/ which part of the offal?
3 What are facilities available in the slaughterhouse?
4 What are equipments available in your butchery house?
5 How many goats are slaughtered and soled per day? How many reserve goats kept for the next slaughter day?
6 Indicate the time in which the highest and the lowest number of goats slaughtering takes place?

7 Season of the year number of goats slaughtered remark
8 **----------**
9 **----------**
10 **----------**
11 **----------**

12 Who determine the sales price of meat? How much Birr does a kilo of meat cost?
13 Who is responsible to control meat quality and other measurement standards?
14 At what time (season) of the year the price variations for meat occurred

Time increased	Time decreased	Who is responsible to fix the price	Remark

How many times per year does the price of meat increased?
Have you ever herd the time with the price reduction for meat?

What is the price for a kilo of goat's meat before 5 years and now?

Year	Amount per kilo	Reasons for the increased price
Before 5 years (1993)		
1994		
1995		
1996		
1997		
1998		
1999		

Are the numbers of consumers increased or decreased?

What is the average goats number slaughtered per year?

Year	Average number slaughtered	Remark
1995		
1996		
1997		
1998		

1. A medium age and weight goat carcass produces----------kilo of meat
2. The biggest goat carcass weight is ----------k/g
3. What are the taxes paid per year?
4. What is the preference of buyers?

Type of meat preferred	Rank	Reason
Fatty meat		
Moderately fatty meat		
Lean and red meat		

1. How could consumers identify whether the carcass (meat) is from big (expensive) or smallest (cheapest) goat?
2. Is there any price variation in relation of the type and price of goats?
3. What is your means of transportation to bring meat from local abattoirs to your butchery house?
4. What is your opinion in relation to the preference of goat's meat to other types of meats (mutton, beef or poultry)?

Part V
Hawasa University School of graduate studies
RMA checklist to interview
Restaurants and Hotels
At Yirgalem town and Hawasa

Address

Region----------zone----------woreda----------
Kebelle----------House----------work activity

Product supply

What are services provided for consumers?
Processed (cooked) meat----------
Other type----------
Who are your usual consumers?
What is the preference of your consumers?
Goat meat----------
Sheep meat----------
Beef meat----------
Doro wot----------
What are the reasons you understood about the preference of goat's meat in relation to other species?_____
_____
Do you buy meat from butcheries? Or you slaughter goats for your restaurant?_____
_____
_____
What is the current price for a kilo of goat meat? Is there any difference among mutton, cavone and beef meat?_____
_____

Which season of the year is the most demand for meat goat?_____
Which market place and market day is preferable to purchase goats?_____
_____

Why is this area goats are superior from others? By what quality is this area goat's sprier?_____
_____
_____
Average price of goats purchased to slaughter for your restaurant?_____Birr
The type, age colour and condition of goats considered during purchasing goats to your restaurant?_____
_____
What type and quality of meat is most preferable and which type of meat are low in preference?_
_____

What is the trend of price? Compared to the last time?

Year	Price for a kilo of goat meat	Average price for cooked food	Remark
1996			
1997			
1998			

Average weight and age of goats used for slaughtering_____kg_____year

Who in the restaurant is responsible to purchase goats?_____ _____
_____

How is price fixed for processed (cooked) food? Who is responsible to fix price?_____
_____

When do you change the price of food prepared from goat's meat

What are the problems encountered to use goats meat for your restaurants?_____
_____
_____

Especial quality of goat's meat, that is preferable and usually recommended by the consumers?__
_____
_____

Discuss about consumers preference, taxation, market regulations etc., that should be improved and need emphasis by government?_____
_____

Who issue the license and who is responsible to evaluate the quality of restaurants in terms of price, quality and other situations?

Part VIII
Hawasa University School of graduate studies
RMA checklist to interview

Individual consumers (at Yirgalem and Hawasa town)

Address

Region zone woreda

Kebele

Name age

1 Who is your source of goat's meat?
2 How many times you slaughter goats for home consumption? And when do you usually purchase meat goats for home consumption?
3 Why do you prefer goat's meat rather than mutton p[poultry or beef?
4 What are the best qualities of goat's meat preferred by the consumers?
5 Where do you buy goats and from whom you are buying goats? And why you prefer this market for goats purchasing?
6 Which type of goats is most preferable by consumers?
7 Do you think goat's meat substitute beef or mutton? Why is this happen?
8 What part of goat's carcass has especial preference and the parts that are edible saleable and none edible?
9 Which part has the highest price?
10 How do you negotiate price? Who is responsible to fix price?
11 From your long time experience of consumption, which area (locations) of goats are with very important quality and quantity/? What are the reasons?
12 Have you observed seasonal variations in prices, supply and demand? Relate and discuss briefly?
13 What are the substitutes of goat's meat during the time of scarcity?
14 What are the criteria's considered during goats purchasing for consumption?
15 How do you observe the carcass of goat's meat quality (lean meat, fat meat, fat dispersion, bone, edible offal none edible offal etc) in relation to other species?
16 Have you observed especial characteristics importantly preferable by your family and you?
17 Compare the price, quality, quantity and other conditions with meat obtained from butcheries and slaughtered in your house?

Part IX

Hawasa University School of graduate studies
RMA checklist to interview knowledgeable people at Yirgalem and Hawasa town

Woreda livestock production, marketing and cooperatives officers

1 What is the system used to produce and market goats in your woreda?
2 Where is your market place to sale your goats?
3 Where is the potential source of goats to this town? Do you know the existing market channel, can you express, how many channels are working here?
4 Which market is the terminal market? which are the major buyers in primary, secondary and final (terminal) market?
5 What type of buyers (subsistence, market oriented, etc.)
6 Which type of animals offered to market, who is seller and who is buyer? Who is the major supplier regarding goats?
7 Which market do you know as the major source of goats
8 The way that producers or traders transport goats to market and from market?
9 Do you know the number of goats marketed per day at primary market and at Yirgalem market?
10 Who are the major traders?
11 Livestock market which doesn't consists goats as commodity
12 Which are most profitable firma; Butchery men, wholesalers, retailers, producers mention others?
13 How do you express market regulations, W hat is its role?
14 Are all traders are licensed,
15 Are there cooperatives, which are organized to carry out goats marketing activities? Do you have an interest to organize meat goat producers? Is cooperation be a solution to solve problems related to marketing?
16 What are different forms of taxations, and how do you understand the amount and conditions of tax payments? Are the regulations are encouraging goats production?
17 Do you know the reasons why the producers bring their goats for sales?
18 What is the time and frequency of selling goats, why is the variations in time and frequency occurred?
19 Do you know the inflow and out flow of goats to Yirgalem and out of Yirgalem?
20 Where is the destination of the out flow of the marketed goats? What are accesses available in local, secondary and terminal markets? Can you identify and describe?
21 Problems encountered regarding marketing of goats? Do you know big sellers (wholesalers) collectors and transporters of goats to A.A.?
22 What are the relationships between producers, wholesalers, retailers, exporters etc?
23 The extension service given to the farmers, what are the sources, is it up-to-date accurate etc? What are your system of collecting data about goat's production and marketing? How do you monitor the situations?

24 Do you monitor marketing situations?
25 Can you communicate with farmers? How do you exchange information with farmers? Do you get from farmers? Through what mechanism and chain?
26 Are there any opportunities to transfer information and innovations to farmers?
27 What are the financial supports and sources in which the farmers could get in order to enhance and expand their system of production?
28 Source, availability adequacy, timeliness, interest rate and other regulations regarding credit?
29 Problems encountered with credit regulations?
30 The role of cooperatives regarding credit facilities? Is loans repaired annually? What is the trend of the last year?
31 What are inputs provided to develop goat's production?
32 Are there traders associations regarding goats marketing?
33 What type of compensations used if any damage, loss, or any accident occurred during trading of goats?
34 Who is responsible to distribute inputs for goats (in sales basis or other way)?
35 About intensive and semi- intensive farms of goats?
36 Do you inform farmers or traders about the international or national trade of goats or meat of goats? The reasons for high or low demand and supply of goats in the market? Factors affecting demand and supply? Exogenous or endogenous factors?
37 Do you think farmers at distant area have information about current marketing conditions?

Marketing system infrastructure

1 All weather roads available at local farm gets, secondary market or at each stage of sub sector
2 Market places, market structures and main functions?
3 Infrastructures at primary market, secondary and terminal markets? (Watering troughs, feeding troughs, holding chutes, assembly yards etc)
4 Do you get transport access, what is the available transport of the area
5 Is the woreda has processing Center? How big is it and what is its quality?
6 How they communicate with their customers?
7 Road, Tele, electric, and other infrastructures adequate? if not what are missing, and what are excess and unutilised?
8 Opportunities to be considered to improve livestock marketing in general and meat goats in particular?