Scoping Study on Urban and Peri-Urban Livestock Production in Addis Ababa, Ethiopia

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Addis Ababa, founded in 1886, has been growing in three directions: south, east and west. The total area of the present city boundary is about 54,000 ha with built up area of 23,000 ha. This is a fast growth considering that the area of the city was only 6,000 ha before 1875. Much of this growth has come about by converting about 200 ha of agricultural and forestland to urban use every year. The city is divided into 6 zones, 28 woredas and 328 kebeles. The city has 2.7 million inhabitants with an annual population growth rate of well over 5 percent. This constitutes 4 percent of the country's total and about 28 percent of its urban population. Central Statistics Authority's projected population for the city by 2030 is 5.1 million.

The fast growth of the city can be attributed to three factors: natural increase, boundary expansion, and rural-urban migration. Rural-urban migration is said to account for over 40 percent of this growth, and is mainly due to serious rural poverty, job seeking, displacement of people because of wars, natural disasters and men released from military service. The high rate of population growth in the city has significantly contributed to fast local deforestation, swallowing-up of agricultural land, massive unemployment and huge economic and social problems including shortage of housing, poor social and infrastructure services, and mounting sanitation and environmental problems and hunger.

Addis Ababa, being located in the centre of the country, is well served by 5 major roads from all four corners of the country. The roads facilitate transport of people and farm produce from the countryside, import of industrial and consumer goods from abroad, and movements of goods from the city to rural areas, and commodities for export. It is also served by air and one rail line to the port of Djibouti. Urban infrastructure is not sufficiently developed in view of the vast horizontal expansion of the city in the last thirty years.

Urban and peri-urban livestock production constitutes an important sub-sector of the agricultural production system in Ethiopia. The livestock numbers in major urban and peri-urban areas in 2001 were estimated at 169,264 cattle, 64,767 sheep, 22,630 goats 15,886 donkeys and 415,680 chickens. Regarding dairy cattle there are around 40,000 crossbred and pure exotic cows in urban and peri-urban areas of the country. In the Addis Ababa milk shed alone there are about 58,535 cattle (27,249 crossbred and 31,241 local breed) and 2,916,360 chickens. From an economic point of view, cattle and poultry are the most important of all livestock, although goats and to lesser extent sheep, and equines make significant contribution in the urban economy and in the diet.

Ethiopia also has 7,000 species of flowering plants and most are flora for honeybees; 10 million honeybee colonies exist in the country, the largest in Africa. The current annual honey production is estimated to be 25,000 tones. This amounts to 23.6% and 2.1% of the total honey production in Africa and the world, respectively; making the country the leading honey producer in Africa and one of the largest in the world. The annual production of beeswax is also estimated at 3,000 tones. This ranks the country as the fourth largest beeswax producer in the world next to China, Mexico and Turkey. It is estimated that over 1000 beekeepers and between 3000 and 5000 beehives exist in Addis Ababa.

The contributions of urban livestock production system to overall development include income and employment generation, poverty alleviation, and improving human nutrition and health. Urban livestock production system is complex with diverse activities including

production, processing and marketing and several technologies at each level in the commodity chain that make up a system. Each activity of the system is affected by diverse biological and social factors and their interactions. In addition, the major technical and non-technical problems associated with these livestock production systems such as policy issues, land rights and ownership, availability and cost of inputs (genotype, feed resources, trained personnel, animal health) need to be addressed.

The urban poor livestock keepers in and around Addis Ababa provide high quality food, services and other valuable products to the ever-increasing urban population. For the urban poor, livestock keeping in various forms is a way of ensuring household food security and income generation. Livestock production provides employment opportunity to household members, use of wasteland and available household or neighbourhood waste, use of marginal land and resources. It also provides opportunities for household income generation, used as a reserve bank where animals or products could be sold out to cover household expenses, school fees, and medical expenses. Spending on livestock also provide cushion during times of difficulty.

Livestock production strategies vary among households of the urban poor. It could be a single species or a multiple species activity, depending on availability of resources and market opportunities. Optimisation of space and feed resources would lead to a combination of dairy production, small ruminant production and poultry production. These animals are often complementary in resource use efficiency. Some households tend to specialize in livestock keeping and keep only dairy animals, poultry or donkeys.

Age composition of livestock keeper indicated that about 57% are above 50 years old, the majority (83%) are married and 17% are widowed. About 47% livestock farms are owned by women indicating their important role in livestock management and production. The level of education of owners of these farmers is very low and about 55% are either illiterate or have minimal elementary schooling. Farming is the main occupation for the majority (75%) of livestock keepers in Addis Ababa, up to 40% of the farm owners are retired civil servants.

Species composition of livestock kept by urban producers indicated that about 33% of household keep only diary cattle, 6.7% keep dairy cattle and poultry, 13.3% dairy cattle and small ruminant and 20% of household have diary cattle, poultry, small ruminants and donkeys in combination. The average number of diary cattle, sheep and poultry holding per household is 7, 6 and 1365 animals. Households in Addis Ababa had average holdings of 8 cattle, 6 sheep and 12 poultry.

Number and breed composition of dairy cattle per household indicated that almost all livestock keepers in both locations own dairy cattle. The number of animals per household varies from farms that have around 2 cows to those which have up to 20 cows; the average number of diary cattle per household is 8 animals. The proportion of local zebu, pure exotic and crossbred cows are 8%, 37% and 61% of total dairy cows.

Sheep are the most important small ruminant kept by urban livestock owners. About 50% and 13% of urban livestock producers own sheep and goats respectively. The number of sheep per household varies from farms that have 3 sheep to those which have 10 sheep, with the average number of 7 animals per household, while the number of goats per household varies from farms that have 2 goats to 12 goats.

Poultry are the other component of livestock activity practiced by urban livestock producers. About 53% of livestock keepers rear poultry. The number of chickens per household varies from one chicken to those which have up to 2,000 chickens. The proportion of local, exotic and crossbred cockerels constituted 13%, 68% and 19% of all total poultry respectively. The percentage of local hens in the flock was 25%, exotic breed hens 63% and those of crossbred hens were 12% of the total hen population. Poultry production is probably the lowest from of animal production in urban centres. Chicken production either for meat or eggs is a major part time occupation by the urban poor. In fact, children are encouraged to start business and learn how to manage animals through poultry production. They are expected to care for them, feed them and manage them. Income generated from the sale of chickens or eggs is left to the children to cover expenses such as school expenses (pen, pencil, exercise books), school fees, and in some cases to cover the expenses for clothing or school uniforms. Any extra money is often left to the mother to cover other household expenses.

The contribution of donkeys in urban centres is of paramount importance. Donkey pack transport is an enterprise in urban areas that can be and often is undertaken by disadvantaged or disabled persons. The donkey transport service is said to be affordable, convenient and readily available at disposals with the operators that provide the loading and unloading as well. In Addis Ababa grain market about 800-1200 donkey transport operators depend on the business for their livelihoods. They provide a door to door service so perishable products such as vegetables can arrive safely with less damage and stress than in they had to be transferred from one means of transport to another and back again.

Use of donkeys in transport in urban areas has the potential to provide the users/operators with a steady income and use of donkeys for transporting household chores can particularly assist women in their daily activities. The minimum monthly net income of a donkey transport operator is estimated to by Birr 125 (15$ US). The sole purpose of keeping donkey by the households in and around Addis Ababa is literally for power use as a means of transport. Donkey are found to play a crucial role in offering transportation services to urban communities in the study areas.

Donkeys have been used to transport a wide range of goods from one place to another thereby relieving humans from drudgery and facilitating the marketing system of urban areas. The range of various items that are transported by donkeys include: grain s from market to home and *vice versa*; grains to grinding mills and back home; grains from market to home; cash crops or vegetables to markets; fuel wood; dung cake and charcoal to markets; fetching water from the source to home; earthen ware to and from markets; livestock feeds to and from markets and construction materials like sand and stone. The loading capacity of donkeys is between 50-100kg and the pack transport per day by a donkey is likely to work up to 0.5 t/km several times a week. The age at which donkeys start working is about 3-4 years and their effective service life is about 13 years.

The contribution of livestock activities to household income varies from 10% to 100%. Livestock activities contribute more than 75% of total household income for 43% of the producers, 50 to 75% of total household income for 20% of the producers and less than 25% of total household income for about 7% of the producers.

Grass hay, agro-industrial by-products and commercial concentrates are the major feed resources used by urban livestock keepers. About 87% urban livestock producers heavily rely on purchased hay. Crop residues (teff, wheat and lentil straw) are used as main roughage used by 50% of urban livestock keepers. Green feed such as grass and legumes are used by 23% of

the households. Traditional brewers' grains and molasses, liquor residues are also used as livestock feed. Household waste is used as animal feed by 47% of households. A high proportion (93%) of livestock producers provide supplementary feed to their animals. Agro-industrial by-products and commercial concentrate are the main supplementary feed used by urban livestock producers.

Stall-feeding is the main management system used for dairy cattle and small ruminants by majority of livestock keepers in the city. About 83% of dairy owners and 67% of sheep and goat owners use stall-feeding systems. Poultry are kept to scavenge their own feed by 44% of the households. Only 38% of the households keep poultry in separate houses.

Government organization such as the Ministry of Agriculture (MoA) and private veterinarians are the most important sources of veterinary service for urban livestock producers. About 30% get veterinary services from MOA, 10% from NVI, 37% from private sources and the remaining 23% use both MOA and private veterinarian as sources of veterinary services for their animals. Drug shop is available in and around their village for 57% of livestock producers in the city/town and not available for the rest 40%. The average distance used to travel to drug shop was 5.5 km. Regarding veterinary drugs, 46% of households all inputs (drugs) were available; they were not available for 43% and the remaining 10% had no idea on availability.

The Addis Ababa Agricultural Development Bureau is the only government development organization responsible to provide extension services for urban farmers in and around Addis Ababa city. Research and teaching institutes: the Debre Zeit and Holetta Agricultural Research Centres under the Ethiopian Agricultural Organization (EARO), the International Livestock Research Institutes, National Veterinary Institutes under Addis Ababa University and Alemaya University of Agriculture are the main organizations involved in urban livestock production activities. The proportion of livestock farms visited by extension staff at different times was 50% of total urban livestock keepers. Veterinarian and animal production expertise and to lesser extent extension agents are the most important extension workers that used to visit urban livestock production farms.

Despite the importance of urban livestock production, they always tend to face problems associated with environmental and public health issues. Manure handling, urine, smell, flies tend to be a problem where livestock are kept. Manure from cattle, however, is a major source of revenue in Ethiopia. It is often collected, made into cake and sold as fuel for cooking purposes, and provides a year round income for the urban poor livestock keepers.

Under stall-fed production system of dairy animals, housing for animals is minimal and animals do not usually get enough exercise. Lack of knowledge on proper feeding practices, housing, milking and other management systems exposes animals to diseases of intensification such as lameness, mastitis, tuberculosis, reproductive wastage, reproductive diseases such as brucellosis and other diseases of public health importance. Shortage of space, feed, sub-optimal production levels in these animals is also a major problem. Animals are also left to scavenge on what ever is available on sidewalks and streets and as a result are exposed to traffic accident. Lack of quality control in milk and meat production also becomes a public health hazard. Due to lack of proper housing, animals are also exposed to theft.

In general, the capacity of Addis Ababa livestock production systems is very limited and undeveloped to cope with the rapidly growing population of the city. The major constraints include lack of marketing infrastructures including space for parking and storage; inadequate

waste disposal system and sanitation facilities, and poor planning and management, lack of knowledge, lack of credit services and absence of development policy, poor research-extension services, shortage of trained man power and training institutions in this sub-sector, lack of access to appropriate technologies, shortage of inputs, poor processing and handling of products and absence or lack of organized producers' marketing cooperatives.

In order to promote and develop the livestock sector in the country, the Federal Democratic Republic of Ethiopia has recognized the need for organizing the marketing the livestock industry and with the objectives of promoting the domestic and export marketing of animal, animal products and by-products through increasing the supply and improving quality, it has established the Livestock Marketing Authority in 1998. As a primary step towards overcoming milk-marketing problems in Addis Ababa, the Authority has taken the following actions:

- Stakeholders have been identified
- With the participation of the representatives of the major suppliers the existing problems of the dairy industry have been assessed
- As a preliminary step, a joint committee of the representatives of producer cooperatives having a mandate of looking into designing strategies for establishing and strengthening marketing cooperatives and establishing own processing plants have been formed
- To facilitate cooperative formation, the Government has issued cooperative proclamation and the regional states have already established "Cooperative Formation and Promotion Bureaus
- As improved marketing of dairy products will increase food insecure households' cash income and create links between producers and consumers, the Government has also been encouraging the private sector to invest in dairy processing and distribution of milk and milk products

Recently, an initiative by the FAO was taken to address the problems of urban agriculture. A Sub-Regional Workshop was held on 'Feeding Cities in the Horn of Africa' in Addis Ababa, from May 7 – 9, 2002. The workshop brought the leaders of Addis Ababa, Nairobi, Dar es Salaam, Kampala, Khartoum and Djibouti and a declaration was signed to support urban agriculture.

Although there are encouraging steps being taken at the national and international levels to improve urban and peri-urban agriculture, there are a number of issues that need to be addressed in order to recognize, develop and ensure the sustainability of the production system. Despite the importance of supply and distribution of safe and quality livestock products to the inhabitants of the city, it seems there is a lot which needs to be done by the city government to improve the situation. This includes improvement in transport network between rural and urban areas; provision of parking and marketing space, drainage and toilet facilities; and improvement in market information.

The following are measures recommended:

- Assess the potentials and constraints of urban and peri-urban livestock production systems; and identify the required policy support and strategic approaches to develop the sector. The objective should be to formally recognise the sector and integrate it in urban planning.

- Promote and strengthen livestock producers associations or cooperatives. Establish and strengthen voluntary marketing cooperatives, unions and federations that will have mandates for input supply, processing and distribution

- Avail adequate land to producers

- Improve information system on livestock and livestock product marketing

- Support the development of micro and small enterprises through micro-finance and training services

- Put more attention on environmental sustainability and regenerative production system

- Ensure access to employment, credit and income generating opportunities for women

- Provide and implement sanitary inspection and quality control

- Train and improve awareness of livestock producers, processors and traders on the importance of improving the quality of food

- Strengthen institutional capacity of food inspectors and regulators

- Establish a department within the city government to look after livestock and livestock products markets

- Capacity building at grass-roots level in planning, managing and implementation, and monitoring and evaluation of development programs;

- Establish new markets

- Continuous upgrading and expanding of existing markets in terms of transport systems, space and sanitation facilities

- Establish animal products processing units, increase the number of slaughter houses and support the participation of the private sector in the provision of the service

1. Introduction

Addis Ababa, the capital city of Ethiopia, was founded in 1886 and currently has a total land area of about 54,000 ha. The city has 2.7 million inhabitants with population growth rate of over 5 percent. This constitutes 4 percent of the country's total and about 28 percent of its urban population. The city is administratively divided into 6 zones, 28 *Woredas* and 328 *Kebeles.* Addis Ababa is the largest city in the country and is the seat of the Organization of African Unity (OAU), United Nations Economic Commission for Africa (UN-ECA), many diplomatic missions, international organizations and non-governmental organizations indicating a substantial population of expatriates. Unlike the cities of developed countries, urban agriculture is one of the mainstay occupations of the population.

Today the human population in the tropics and sub-tropics is growing at an unprecedented rate. Urbanization particularly is advancing at a much more rapid rate. Report of World Bank revealed that by the year 2025 the urban population of sub-Saharan Africa would be growing at 6.9% per annum as compared to 3.1% of the total population of the region. Consequently, in 25 years time about 55% of the region's people will live in towns and cities compared to 30% currently. In and around Addis Ababa, the high rate of population growth has significantly contributed to fast deforestation, swallowing of agricultural lands, massive unemployment and huge economic and social problems including shortage of housing, poor social and infrastructure services, mounting sanitation and environmental problems, and hunger.

The Health Bureau has placed two health officers in each *Woreda* to regularly carry out inspection and quality control of food, beverages and water supplies, and food processing centres and, to a limited extent, food production establishments. However, shortage of trained staff, and operational resources including finance and transport has made its operation very limited. Along with this rapid increase in urbanization, there is anticipated income growth among the different segments of urban population. This all leads to increased demand for protein of animal origin particularly milk and meat products.

2. Supply and Distribution Activities of Livestock Products

Michael (2002) reported the food consumption patterns and the food supply systems in Addis Ababa. Food consumption in Addis Ababa is increasing because of significant increase in the size of the population, and the existence of large size of low income groups who tend to spend large portion of their income on food. As urban food demand increases, increasing amount of food is being supplied from new and possibly more distant production areas. This in turn is putting huge demand for improved infrastructure including transport, storage and processing facilities.

Table 1 Project population and food demand requirement for Addis Ababa

Year	Population (000)	Cereals (tons)	Meat (tons)	Milk (litres)
2000	2,395	5,613,750	523,950	115,568,400
2010	3,328	7,488,000	698,880	154,152,960
2020	4,246	9,553,500	891,660	196,674,720
2030	5,080	11,445,750	1,068,270	235,629,840

Source: Wolday Amha and Kifle Eshete, Food Supply and Distribution Systems in Addis Ababa, February 2002

These figures show that both the population and the demand for major food items is likely to increase by over 30 percent in the period of 2000 to 2010, and over 27 percent during 2010 to 2020, and more than double in three decades (2000 to 2030) underlining the need for improved food supply and distribution system.

About 48 percent of the cattle marketed in Addis Ababa come from southern and eastern parts of the country and about 26 percent from northwestern places, all 300 to 400 km distances. The major sources of fish are the lakes in the Rift Valley that are already showing significant trend of being rapidly exhausted from over exploitation.

2.1 Distribution of animal products

The distribution of animal products in Addis Ababa are as follows:

Livestock: There are 4 major cattle markets (Kera, Karalo, Siemen Gebeya and Akaki) and 31 markets for sheep and goats in various parts of the city. Some of the markets for sheep and goats are very small and a few are large, but all operate in unmarked open public lands. The markets for livestock lack fencing, access to water and roads. Driving animals on foot to these markets usually creates traffic jams and blocking of pedestrian walkways. It also generates sanitation problem.

Meat: There are a number of slaughterhouses and over 500 butchers in the city. Government owns all the slaughterhouses. Annually, close to 178,000 animals are slaughtered at the large slaughterhouse, Kera, and almost 24,000 animals at the Karalo slaughter house and distributed by trucks to a large number of butchers in the city. Also, a large amount of meat

(about 28,700 tons per year) is supplied by small towns at the periphery of the city including Sebeta, Sululta, Burayu and Dukem. In addition, part of the demand of the city population for meat especially sheep and goat meat (close to 12,000 tons per year) is catered by illegal slaughtering. The buyers of meat include individual households, hotels and restaurants, hospitals, and other institutions like schools.

Milk: the sources of milk to the city are basically three. Dairy Development Enterprise, a government entity, produces and collects milk from farms in the periphery of Addis Ababa and distributes the milk to various outlets. Sebeta Agro Industry, a private enterprise, also produces milk in its Sebeta farm and collects milk from Sebeta and Debre Zeit areas and distributes its supply in hotels and shopping centres. In addition there are small dairy farmers mostly with 5 to 10 cows. The small farms produce close to 35 million litres of milk annually of which 73% is marketed directly to consumers and institutions as raw milk.

Fish: Fish consumption in Ethiopia is far too small as the demand is insufficient and unstable as much of the consumption is done during the fasting periods (March, April and August) for Orthodox Christians, and demand is rather low at other times. Both government and private enterprises supply fish products.

Despite the huge importance of food supply and distribution to the inhabitants of the city, it seems there is a lot which needs to be done by the city government to improve the situation. This includes improvement in transport networks between rural and urban areas; provision of parking and marketing spaces, draining and toilet facilities and improvement in market information.

3. Urban and Peri-urban Agriculture

Urban agriculture plays an important role in the economic life of Addis Ababa concerning the supply of vegetables, livestock products and fuel wood. There is some kind of farming activity going on in about 25 Woredas out of the 28 Woredas in the city. There are mixed farms of crops and livestock in peri-urban areas and specialised farms within the urban areas.

Urban and peri-urban livestock production constitutes an important sub-sector of the agricultural production system in Ethiopia. The peri-urban and urban diary systems in the Addis Ababa milk shed have been characterized (Tegegne *et al*, 2000). The livestock numbers in urban and peri-urban areas in 2001 were 169,264 cattle, 64,767, sheep, 22,630 goats, 15,886 donkeys and 415,680 chickens (MOA, 1999). Regarding dairy cattle there are around 40,000 crossbred and pure exotic cows used for milk production in urban and peri-urban areas of the country. If we take the case of the Addis Ababa milk shed there are about 58,535 cattle (27,249 crossbred and 31,251 local breed), and 2,916,360 chickens (MOA, 1999).

From an economic point of view, cattle and poultry are the most important of all livestock although goats and to a lesser extent sheep, and donkeys make a significant contribution to the urban economy and diet. Yet livestock keepers in urban areas are still receiving little attention in terms of policy, institutional and technical support targeted at their needs.

3.1 Urban agriculture

Small farms are found in Woredas where the great majority of households make their living in non-farming activities even though some of the households depend entirely on farm production. The specialised farms include vegetable production along river courses within the city as well as dairy and poultry production. Groups use the polluted water from rivers to grow vegetables. The sources of pollution are raw human waste and untreated effluents from industries dumped in streams and along riverbanks. The destruction of the dams and the flooding of their fields for at least three months every rainy season, lack of marketing outlets/shops to sell their produce, and capital shortage seem to be the major constrains vegetable growers face. Poor people who live in cowed areas also grow vegetables and raise animals for home consumption and for sale.

There are also specialised dairy and poultry farms in the city. Apart from Government production under the Dairy Development Enterprise (DDE), there are 5,167 dairy farms with 58,568 dairy cows. Most of the farms (93%) have one to 5 cows while the rest have 6 or more cows. Annual milk production is about 44 million litres (an average of 2 litres per cow per day). The major constraints faced by dairy farmers include shortage and high costs of feeds, low price of milk, heavy taxation, marketing and management problems. The major poultry farm belongs to ELFORA, a private enterprise, where there are about 340,000 chickens and capacity to produce about 18 million eggs annually. In addition, there are also some 29 small poultry farms with a total number of birds of about 350,000. Production of poultry products is constrained by lack of adequate space/land, problem of feed availability and short supply of day old chicks.

3.2 Peri-urban agriculture

Outside the main city centres, there are 23 Kebeles/Peasant Associations in Zone 3 (Woreda 17,19 and 28) and in Zone 6 (Woreda 26 and 27) where almost over half the households make their major source of living from agriculture and livestock keeping. Over 11,743 ha of land is operated by about 4,197 farmers as mixed farms where cereals, pulses and root crops are produced and livestock are raised. There are 7 Service Co-operatives in these farm communities with about 3,500 members and a capital of Birr 470,098.

3.3. The dairy system

Belachew (2002) summarized results of a survey on dairy product marketing (1994) in Addis Ababa and its peri-urban areas. He indicated that the major milk production constraints in urban areas were:

- lack of adequate feed both in quantity and quality
- prevalence of diseases and poor health service delivery
- poor genetic potential.

In addition to these factors, recent information received from the Producers' Association also indicates that urban dairying has substantial milk and milk products distribution problems.

There are 5167 dairy farm households that own 33,242 heads of indigenous and 28,924 exotic cattle. Assuming 5.5 persons of average family household size, about 28,419 persons directly live on incomes earned from the sub-sector. Thus, dairying activities play substantial role in reducing poverty and contributing towards food security of the city.

3.4 Milk production and market supply

According to the information of the Agricultural Development Bureau of the City Administration, milk produced (litres per annum) by different sources is as follows:

Urban dairy farmers	=	34,649,450 (79%)
Dairy Development Enterprise	=	4,513,625 (10.3%)
Peri-urban farmers	=	4,684,600 (10.7%)
Total	=	43,847,675

Out of the total volume, about 36 million litres (83%) is sold annually in the city. The share of urban dairy farmers in the annual milk supply to the market is about 79%, indicating the fact that urban dairying plays a significant role in the liquid milk market of Addis Ababa.

The contributions of urban and peri-urban livestock production system to overall development include income and employment generation, poverty alleviation, and improving

human nutrition and health. The urban livestock production system is complex with diverse activities including production, processing and marketing and several technologies at each level in the commodity chain that make up a system. Each activity of the system is affected by diverse biological and social factors and their interactions (Rey *et al*., 1993). In addition, the major technical and non-technical problems associated with these livestock production systems such as policy issues, land rights and ownership, availability and cost of inputs (genotype, feed resources, trained personnel. animal health) need to be addressed. In this study the characteristics of production systems, species of livestock used, breed, genotype, breeding system, feed resources and feeding system in urban and peri-urban livestock production in Ethiopia is assessed.

4. Case Study on Cattle, Small Ruminant and Poultry Production Systems in and Around Addis Ababa

4.1 Material and Methods

4.1.1 Location of the study

This study was conducted in two locations namely: Addis Ababa representing an urban city and Debre Zeit town representing an urban town. Addis Ababa is situated at a latitude of 9^0 3' North and 38^0 43' East and an altitude of 2408 meters above sea level. The average minimum and maximum annual temperature are 9.4 and 23.2C respectively and the mean annual rainfall is 1201 mm. The pattern of rainfall is bimodal, in which the long and heavy rainfall is received during the months of June to September, while the short and small shower is received during February to April.

Zone 2 is located west of Addis Ababa on the Jimma road, Zone 3 is located northeast of Addis Ababa on the Debre Berhan road, Zone 4 is located north of Addis Ababa on the road to the north and north western part of Ethiopia and Zone 5 is located on north west of Addis Ababa on the Wellage road. All sites are outlets from Addis Ababa to different directions and have similar climatic conditions to that of Addis Ababa.

Debre Zeit is located 45 km south east of Addis Ababa, at 9^o N and 39^o E, about 48 km East of Addis Ababa. The area has an altitude of 1850 m and receives an average annual rainfall of 800 mm and a mean annual temperature of 18.5 ^{o}C. Two major soil types dominate the area: light soils on well-drained plateaus and terraces; and heavy black clay soils on poorly to imperfectly drained land forms. The light soils have been classified as an *Inceptisol / Alfisol* and the heavy soil as *Vertisol.*

Debre Zeit is located close to the major urban centres, Addis Ababa, Nazreth and Modjo, where both small and large scale urban and peri-urban commercial dairy are booming. Highest concentration of livestock research and training institutions are found in Debre Zeit. (Faculty of Veterinary Medicine (AAU), National Veterinary Institute (NVI), and the International Livestock Research Institute (ILRI)). This concentration of institutions makes sharing of human resources, facilities and experience quite easy. Moreover, large quantities of agro-industrial by-products are produced from industries that are located close to Debre Zeit. (flour-mills, oil mills, sugar factories). This facilitates research undertakings targeted towards optimal use of the by-products that are disposed from these industries.

4.2 Study approach

a) Review of published literature relevant to the sub-sector (proceeding, annual reports and other scientific findings)

b) Collection and analysis of secondary data (ongoing and recently completed projects), annual and progress reports were collected from research organizations, development organizations, NGOs and public organizations in the areas.

c) Field visit and group discussion with government, NGO's, private and smallholder farmers

5. Results and Discussion

5.1 Major characteristics of livestock keepers in the city

5.1.1 Age composition and marital status of household heads

Age composition, original place and marital status of livestock owner are presented in Table 2. Results on age composition of livestock keepers indicated that 3.3%, 50% and 46.7% are less than 30, 30 to 50 and greater than 50 years old respectively. About 60% of urban livestock keepers quote urban areas as their birth place, the remaining 40% came to urban centres from different areas at different times. The majority of urban livestock producers are married (83%) and 17% are widowed.

Table 2. Age composition, original place and marital status of urban livestock keeper

	Addis Ababa		Debre Zeit		Total	
Age class of respondent	No	%	No	%	No	%
<=30	1	5	0	0	1	3.3
30 to 50	8	40	7	0.7	15	50
>= 50	11	55	3	0.3	14	46.7
	20	100	10		30	
Original place of household head						
Town	11	55	7	0.7	18	60
Rural	9	45	3	0.3	12	40
	20		10		30	100
Marital status						
Married	16	80	9	90	25	83.3
Widowed	4	20	1	10	5	16.7
	20		10		30	100

5.1.2 Sex, occupation and educational status of urban livestock owners

Results on sex composition indicated that about 46.7% livestock farms owned by female and 53.3% by male household livestock keepers. The level of education of these farmers ranges from illiterate to above secondary school (diploma). From the total households, about 27%, 40% and 7% of urban livestock keepers have completed elementary school, secondary school, diploma education, respectively while 26% are illiterate. The trend was similar at both locations. However, the proportion of households with elementary school education and

that of illiterate were highest in Addis Ababa, while the proportions of households with secondary school and diploma level education were higher in Debre Zeit town (Table 3).

Results on occupation of livestock keepers (Table 3) indicated that of total households 10%, 27%, 56%, 7% are active civil servants, retired civil servants, farmers and traders by occupations, respectively. Farming is the main occupation for the majority (75%) of livestock keepers in Addis Ababa followed by retired servants (20%), while 40% of livestock owners in Debre Zeit are retired servants. The proportion of livestock keepers that are civil servants are lowest in both Addis Ababa (5%) and Debre Zeit (20%).

Table 3. Educational status, sex and occupation of livestock keepers

	Addis Ababa		Debre Zeit		Total	
Level of education	No	%	No	%	No	%
Elementary	7	35	1	10	8	26.7
Secondary school	7	35	5	50	12	40
Diploma	0	0	2	20	2	6.7
Degree	0	0	0	0	0	0
Illiterate	6	30	2	20	8	26.7
Total	20		10		30	100
Sex of respondent						
Female	9	0.45	5	0.5	14	46.7
Male	11	0.55	5	0.5	16	53.3
Total	20		10		30	100
Occupation of respondent						
Civil Servant	1	5	2	20	3	10
Retired	4	20	4	40	8	26.7
Farmer	15	75	2	20	17	56.7
Trader	0	0	2	20	2	6.7
Total	20		10		30	100

Table 4. Sex and age compositions of households

Location	Female children < 12	Male children <12	Male children 13-18	Female children 13-18	Male adult >18	Female adult >18	Total family
Addis Ababa							
No	15	18	15	18	25	29	120
%	12.5	15	12.5	15	20.8	24.2	
Debre Zeit							
No	2	5	6	11	12	15	51

Location	Female children < 12	Male children <12	Male children 13-18	Female children 13-18	Male adult >18	Female adult >18	Total family
%	3.9	9.8	11.8	21.6	23.5	29.41	
Total							
No	17	23	21	29	37	44	171
%	9.9	13.5	12.3	16.9	21.6	25.7	

5.1.3 Household size by age

Household size and age structure of urban livestock keepers is presented in Table 4. Overall average household size is 5.7 persons/family with average household size 6.0 and 5.1 in Addis Ababa and Debre Zeit, respectively. Of the total household members, the proportion of children less than 12 years age is 10% for girls and 13.5% for boys. The proportion of children between 13 to 18 years age is 12.3% for female and 6.9% for male. The proportions of male and female adult household members above 18 years age is 21.6% and 25.7% of total household members, respectively.

5.1.4 Household activities and sources of income

The major household activities of urban livestock keepers are presented in Table 5. Livestock production is a primary activity for 63.3% and secondary activity for 36.7% of households, trade is a primary activity for 10% and secondary for 13.3%, crop production is primary for 13.3% and secondary for 3.3% of the livestock owner in urban area. While 3.3% of household use livestock plus crop as secondary activity and government employee as primary activity for 13.3% of household heads. However, about 46.7% of livestock owners have no secondary activity.

Livestock keeping, crop farming, trade and government salary are primary and/or secondary sources of income for livestock keepers in the city. Livestock farm is the primary source of income for 66.7% and secondary sources of income for 37% of the households in the city. About 10% of households use crop as primary sources of income and 5% as secondary sources of income, while government salary is a primary source of income for 16.7% and secondary sources of income for 15.8% of urban livestock keepers. The remaining 6.7% of households use trade as a primary and 31.6% as secondary sources of income (Table 6).

Table 5. The major activities of urban livestock owner households

	Addis Ababa		Debre Zeit		Total	
Primary activity	No	%	No	%	No	%
Crop	3	15	1	10	4	13.3
Livestock	15	75	4	40	19	63.3
Livestock + Crop	0	0	0	0	0	0
Trade	0	0	3	30	3	10

	Addis Ababa		Debre Zeit		Total	
Primary activity	No	%	No	%	No	%
Government employ	2	10	2	20	4	13.3
Total	20		10		30	
Secondary activity						
Crop	0	0	1	10	1	3.3
Livestock	6	30	5	50	11	36.7
Livestock + Crop	0	0	1	10	1	3.3
Trade	2	10	2	20	4	13.3
Gov't employee						
None	12	60	2	20	14	46.7
Total	20		10		30	

Table 6. Major sources of income of livestock producer households

	Primary sources of income						Secondary source of income					
	AA		DZ		Total		AA		DZ		Total	
Primary income	No	%	No	%	No	%	No	%	No	%	No	%
Crop	3	15	0	0	3	10	0	0	1	11.1	1	5.3
Livestock	15	75	5	50	20	66.7	4	40	3	33.3	7	36.8
Livestock + Crop	0	0	0	0	0	0	0	0	2	22.2	2	10.5
Government salary	2	10	3	30	5	16.7	3	30	0	0	3	15.8
Trade	0	0	2	20	2	6.7	3	30	3	33.3	6	31.6
Total	20		10		30		10		9		19	

AA = Addis Ababa; DZ = Debre Zeit; No= number of household

5.2 Farming characteristics of livestock keepers in the city

5.2.1 Land holding

Overall average total farm size of urban livestock keepers is 0.42 ha/household. Livestock keepers in Debre Zeit have larger farm size (0.52 ha) than those in Addis Ababa (0.38 ha). Overall average land owned per household was 0.26 ha, with average of 0.38 ha at Addis Ababa and 0.03 ha at Debre Zeit. Only livestock keepers in Debre Zeit town rent land (average of 0.65 ha/household). Overall average land allocated for livestock and crop production is 0.02 and 0.32 ha per household, respectively. Average land allocated for livestock and crop production were 0.02 and 0.15 ha in Addis Ababa and 0.02 and 0.65 in Debre Zeit, respectively. Total average land allocated for residence is 0.03 ha with average of 0.04 ha in Addis Ababa and 0.02 ha in Debre Zeit.

About 47% of households had total farm size of 0.05 ha, 37% between 0.05 to 0.1 and 17% of households had greater than 0.1 ha. About 60%, 27% and 13% of households had their own land lower than 0.05, between 0.05 to 0.1 ha and greater than 0.1 ha, respectively. Land allocated for livestock is lower than 0.01 ha for 50%, between 0.01 to 0.02 ha for 27% and greater than 0.02 ha for 20% of households in Addis Ababa. Land allocated for residence is lower than 0.01 ha for 20%, between 0.01 to 0.02 ha for 60% and greater than 0.02 ha for 20% of livestock keeper households in Addis Ababa (Table 7). Livestock keeping is a full time activity for 23% of the households and part time activity for the rest 76% of households.

Table 7. Average farm size and land use patterns of urban livestock keepers

	Addis Ababa		Debre Zeit		Total	
Types of farm	No of household	%	No of household	%	N	%
Full time	3	0.15	4	0.4	7	0.23
Part time	17	0.85	6	0.6	23	0.76
Total	20		10		30	
Farm size						
< 0.05 ha	6	0.3	8	0.8	14	0.46
0.05 to 0.10 ha	10	0.5	1	0.1	11	0.36
> 0.01 ha	4	0.2	1	0.1	5	0.16
Total	20		10		30	
Land owned						
< 0.05 ha	8	0.4	10	1	18	60
0.05 to 0.10 ha	8	0.4	0	0	8	26.7
> 0.01 ha	4	0.2	0	0	4	13.3
Total	20		10		30	
Land for livestock						
< 0.01ha	11	0.55	4	0.4	15	50
0.01to 0.02 ha	6	0.3	3	0.3	9	30
> 0.02 ha	3	0.15	3	0.3	6	20
Total	20		10		30	100
Land residence						
<= 0.01ha	2	0.1	4	0.4	6	20
0.01to 0.02 ha	13	0.65	5	0.5	18	60
> 0.02 ha	5	0.25	1	0.1	6	20
Total	20		10		30	100

5.2.2 Livestock holding by species and number

5.2.2.1 Species compositions

Livestock holding and species composition per household are presented in Table 8. Results on species composition indicated that about 33% of households have only dairy cattle, 7% of households keep dairy cattle and poultry, 13% dairy cattle and small ruminant and 20% of household keep dairy cattle, poultry, small ruminant and donkey in combination.

Table 8. Type of livestock species kept by urban livestock producers

	Addis Ababa		Debre Zeit		Total	
Type of livestock species	No	%	No	%	No	%
Cattle	9	45	1	10	10	33.3
Cattle + Poultry	2	10	3	30	5	16.7
Cattle + SR	1	5	3	30	4	13.3
Cattle + Poultry + SR	5	25	0	0	5	16.7
Cattle + Poultry +SR + Donkey	3	15	3	30	6	20
Total	20		10		30	100

SR = Small ruminant

Average number of dairy cattle, sheep and poultry holding per household was 7, 6 and 136 animals. Household at Addis Ababa had average holding of 8, 6 and 12 cattle, sheep and poultry respectively, while households at Debre Zeit had average holding of 6, 7 and 409 cattle, sheep and poultry, respectively (Table 9).

Table 9. Average number of livestock holding by species in urban

Dairy				Sheep			Poultry		
Dairy	AA	DZ	Total	AA	DZ	Total	AA	DZ	Total
Mean	8	6	7	6	7	6	12	409	136
Min	3	2	2	2	6	2	1	3	1
Max	19	15	19	10	9	10	29	2000	2000
Range	16	13	17	8	3	8	28	1997	1999
HH	20	10	30	10	5	15	11	5	16

5.2.2.2 Dairy cattle production

Results on number and breed composition of dairy cattle per household indicated that almost all of livestock keepers in both locations own dairy cattle. The number of animals per household varies from 2 to 20 cows, the average number of dairy cattle per household is 8

animals with 8 animals at Addis Ababa and 6 animals at Debre Zeit. From total dairy cattle keepers about 57% of households own 4 to 10 cows, 26% less than 3 cows and 17% of households own greater than 10 dairy cows. The proportion of cows, heifers and calves from the total dairy animals were 67%, 5% and 13 %, respectively. The genetic composition of the animals used for dairying range from pure zebu to pure temperate dairy cattle. The proportions of local zebu, pure exotic and crossbred cows were 8%, 37% and 61% of total dairy cows kept by the urban livestock keeper respectively, exotic breed heifers and crossbred heifers constituted 39% and 61% of total heifers in the herd. The proportion of local zebu, exotic breed and crossbred calves were 16%, 22% and 62% of total calves, respectively.

5.2.2.3 Small ruminant production

Sheep are the most important small ruminants kept by urban livestock owners. About 50% and 13% of urban livestock producers own sheep and goat respectively. The number of sheep per household varies from those with 3 sheep to those with 10 sheep, with average number of 7 animals per household; the number of goats per household varies from farms that have 2 goats to 12 goats.

5.2.2.4 Poultry keeping

Poultry are the other component of livestock activity practiced by urban livestock producers. About 53% of livestock keepers in urban (55% in Addis Ababa and 50% in Debre Zeit town) keep poultry. The number of chickens per household varies from farms that have about 1 chicken to those which have up to 2000 chickens with average number of 136 chickens per household. The proportion of local, exotic and crossbred cockerels constituted 13%, 68% and 19% of all total poultry kept by urban livestock keepers respectively. The percentage of local hens in the flock was 25%, exotic breed hens 63% and those of crossbred hens were 12% of total (Table 10).

Table 10. Numbers and breeds of poultry used by urban livestock producers

Loc	Hen				Cockerels				Chickens				
	Local	Exotic	Cross	Sub-tot	Local	Exotic	Cross	Sub-tot	Local	Exotic	Cross	Sub-tot	Total
DZ	13	27	0	40	2	4	0	6	0	2000	0	2000	2046
	32.5	67.5	0	100	33.3	66.7	0	100	0	100	0	100	0
AA	17	49	14	80	2	17	6	25	0	0	0	0	105
	21.3	61.3	17.5	100	8	68	24	100					
Total	30	76	14	120	4	21	6	31	0	2000	0	2000	2151
	25	63.3	11.7	100	12.9	67.7	19.4	100	0	100	0	100	0

Table 11. Types of shelter used for livestock

	Addis Ababa	Debre Zeit	Total

Housing	No household	%	No household	%	No household	%
Indoor	18	90	7	70	25	83.3
Outdoor	0	0	3	30	3	0.1
Both	2	10	0	0	2	6.7
	20		10		30	

The number of years in which livestock production was practiced by urban livestock keepers ranged from 20 year to more than 40 years (Table 12). The proportion of urban households that have kept livestock for less than 20 years was 33% (30% of Addis Ababa and 40% of Debre Zeit), 20% of total households have kept livestock for 20 to 40 years, the remaining 47% (50% of Addis Ababa and 40% of Debre Zeit) have kept them for more than 40 years. The majority of the parents of urban farmers have kept livestock for the majority of their lives (90% of household at both locations).

Table 12. Number of years for which livestock keeping was practiced and experience of parents in livestock keeping

	Addis Ababa		Debre Zeit		Total	
Date of keeping livestock, years	No household	%	No household	%	No household	%
<=20	6	30	4	40	10	33.3
20 to 40	4	20	2	20	6	20
> 40	10	50	4	40	14	46.7
	20		10		30	
Did your parents keep livestock						
Yes	18	90	9	90	27	90
No	2	10	1	10	3	10
Total	20		10			

5.2.2.5 Labour utilization by urban livestock producers

Hired labour, owners, family members and relatives keep livestock in the city. About 30% of households in the city used hired labour for livestock activities, 40% by household head, 10% of households by household head and family members, 10% by household head plus hired labour, 3.3% by children. The remaining 3.3% of household use relatives for livestock keeping activities. For 90% of household in the city, their parents used to keep livestock and for the rest 10% their parents were not used to keep livestock species at all (Table 13).

Table 13. Labour utilization by urban livestock producer for livestock farming activity

	Addis Ababa	Debre Zeit	Total

	No	%	No	%	No	%
Children	1	5	0	0	1	3.3
Hired labour	2	10	7	70	9	30
Owner	10	50	3	30	13	43.3
Owner +Family	3	15	0	0	3	10
Owner+ Hired Labour	3	15	0	0	3	10
Relatives	1	5	0	0	1	3.3
Total	20		10		30	

5.2.3 Sources of animals for livestock production activity in urban areas

There is no dependable source of animal for livestock production in both locations. However, about 90% of households in the city purchase from different markets as sources of animals, while 7% obtain livestock from relatives and the remaining 3% inherit from their parents in addition to purchase. The trend was similar at both locations indicating that about 90% of households utilise markets as the most important source of animals for livestock production while a small number of households (10%) in Addis Ababa and 10% in Debre Zeit obtain livestock from relatives and inherit and purchase from the market.

Private livestock farms and local market are the most important market sources, although, government farms and state farms to a lesser extent are also used as market sources to purchase animals for livestock production. Private farms are used as market sources for 39% households, local market for 32%, local market and private farm for 14%, purchase from local market as well as government farms for 7%, purchase from state farm for 4% and government and private farms for 4% as market sources (Table 14).

Table 14. Major sources of animals for livestock production in urban

	Addis Ababa		Debre Zeit		Total	
Sources of animal	No household	%	No household	%	No household	%
Relative	2	10	0	0	2	6.7
Own saving	0	0	0	0	0	0
Inherited+ purchase	0	0	1	10	1	3.3
Purchase	18	90	9	90	27	90
Total	20	100	10	100	30	
Market sources						
Local	5	27.8	4	40	9	32.1
State farm	0	0	1	10	1	3.6
Government farm	0	0	0	0	0	0
Private farm	7	38.9	4	40	11	39.3
Local + government	2	11.1	0	0	2	7.1

	Addis Ababa		Debre Zeit		Total	
Sources of animal	No household	%	No household	%	No household	%
Local +Private farm	3	16.7	1	10	4	14.3
Government and Private farm	1	16.7	0	1	1	3.6
Total	18		10		28	

5.2.4 Management of livestock species in urban area

Results on livestock management systems used by urban households are presented in Table 15. Stall-feeding is the main management system used for dairy cattle and small ruminants by a majority of livestock keepers in the city. About 83% of dairy owners and 67% of sheep and goat owners use stall-feeding systems while 17% of dairy and 28% of sheep and/or goat owners use grazing systems. Six per cent of households use both types of management in combination for small ruminants.

Poultry are kept to scavenge their own feed by 44% of households and kept with feed in separate houses by 38% of households; the remaining 19% of households use both types of management systems.

Table 15. Type of livestock management systems used by urban livestock producers

	Addis Ababa		Debre Zeit		Total	
	No	%	No	%	No	%
Dairy management						
Stall feeding	18	90	7	70	25	83.3
Grazing	2	10	3	30	5	16.7
Total	20		10		30	
Small ruminant management						
Stall feeding	8	66.7	3	50	12	66.7
Grazing	3	25	2	33.3	5	27.8
Stall feeding and grazing	1	8.3	1	16.7	1	5.6
Total	12		6		18	
Poultry management						
Scavenging	4	36.4	3	60	7	43.8
Enclosed	4	36.4	2	40	6	37.5
Both	3	27.3	0	0	3	18.8
Total	11		5		16	

5.2.5 Labour utilization by urban livestock keepers

Results on Table 16 indicated that about 47% of households had labour constraints for their farm activities, while, 53% had no labour constraints. Hired labour is used by 67% of households (90% in Debre Zeit town and 55% in Addis Ababa city). The remaining 33% of households use own, family and/or relatives for their livestock activities. From those farmers who hire labour about 90% used them for milking, feeding and watering of livestock and 10% use hired labour for all farm activities. The trend was similar at both locations.

Table 16. Labour utilization by urban livestock producers

	Addis Ababa		Debre Zeit		Total	
Labour constraint	No household	%	No household	%	No household	%
Yes	9	45	5	50	14	46.7
No	11	55	5	50	16	53.3
Total	20		10		30	100
Hired labour						
Yes	11	55	9	90	20	66.7
No	9	45	1	10	10	33.3

	Addis Ababa		Debre Zeit		Total	
Labour constraint	No household	%	No household	%	No household	%
Total	20		10		30	100
Activities for which hired labour is used						
All farm activities	1	10	1	11.1		10
Milking, feeding & watering	10	90	9	88.9		90
Total	11		9		20	

5.2.6 Reproductive management

Results on breeding system and preference of breeding system by urban dairy cattle owners are presented in Table 17. The type of mating system used is both AI and Natural Service. Artificial Insemination is the only mating system used by majority (63%) of households (75% of Addis Ababa and 40% of Debre Zeit), while natural service (NA) is used by 20% of households (15% of Addis Ababa and 30% of Debre Zeit livestock owners). The remaining 13 % (10% of Addis Ababa and 30% of Debre Zeit) of urban dairy farmers use both NS and AI in combination. As to the preference of mating system about 67% of households prefer AI as breeding system, NS is preferred by 33% of households. From these farmers who prefer AI source improved genotype was the main reason for 40% of households, while 35% of them prefer AI to minimizing risk of disease introduction, 15% to reduce costs required by bull keeping and the remaining 5% prefer AI to get improved genotype and/or strong animals.

Table 17. Breeding systems used for livestock production

	Addis Ababa		Debre Zeit		Total	
Breeding system	No	%	No	%	No	%
NS	3	15	3	30	6	20
AI	15	75	4	40	19	63.3
Both	2	10	3	30	5	13.3
	20		10		20	
Preference						
AI	14	70	6	60	20	66.7
NS	6	30	4	40	10	33.3
	20		10		30	100
Why prefer AI						
Improve genotype	3	21.4	0	0	3	15
To reduce cost of NS	7	50	0	0	7	35
To get strong animal	1	7.1	0	0	1	5

	Addis Ababa		Debre Zeit		Total	
Breeding system	No	%	No	%	No	%
To prevent disease	0	0	0	0	0	0
1 & 4	3	21.4	5	83.3	8	40
1, 3 & 4	0	0	1	16.7	1	5
Total	14	100	6		20	
Why prefer NS						
To prevent birth difficulty	3	42.9	2	50	5	45.5
AI is not Available	2	28.6	2	50	4	36.4
Poor pregnancy of AI	2	28.6	0	0	2	18.2
Total	7		4		11	

5.2.7 Livestock and livestock product utilization

From an economic point of view, cattle milk, small ruminant and poultry (egg and meat) are the most important of all livestock products, although goats and to lesser extent sheep, and equines make significant contributions in the urban economy and the diet. Average milk used for sale, for calves and home consumption were 31 kg, 9 kg and 1.10 kg/day/household respectively. Proportionally about 78% of total daily milk yield used for sale, 20% for calves and 2% used for home consumption.

5.2.8 Type of livestock species used for sale and home consumption

Results on livestock and their product utilization by urban livestock keepers are presented in Table 18. From an economic point of view, cattle milk and male calves were the most important of all livestock products, although sheep, poultry and to lesser extent goats make significant contribution in the urban economy. From dietary point of view, cattle milk, lamb and poultry meat are the most important of all livestock products used for home consumption, although butter cheese and eggs make significant contribution to urban diet. Male animals (calves, sheep and goats and cockerels) are the main animals used for both sale and home consumption by urban livestock keepers. About 53% of households sell male calves at early age, 30% at old age (fatten and sale when completed breeding and cultivation), the remaining 7% of households kept male calves for home consumption. Small ruminants are sold by 42% and used for home consumption by 58% of households, while 45% and 55% of households use poultry and poultry products for sale and home consumption respectively. Apart from sale and home consumption livestock products are also used as a gifts to the sick, relatives and others. About 67% of households give livestock products for the sick, the needy and relatives during festival. Milk, butter and cheese are the main dairy products used as a gift by 91% of households, while the rest of household use poultry (egg and chicken) including milk as gifts.

The contribution of livestock activities to household income varies from 10% to 100% of total household income. Livestock activities contribute more than 75% of total household income for 43% of urban livestock producers, 50 to 75% of total household income for 20% of urban livestock producers and less than 25% of total household income for 7% of livestock producer households in urban areas.

Table 18. Livestock product utilization and contribution of livestock to household income

	Addis Ababa		Debre Zeit		Total	
Cattle	No	%	No	%	No	%
Sale	13	65	3	30	16	53.3
Home consumption	1	5	1	10	2	6.7
Breeding	3	15	3	30	6	20
Draft	0	0	0	0	0	0
1, 3 &4	3	15	3	30	6	20
	20	100	10	100	30	100
Small ruminant						
Sale	6	40	4	44.4	10	41.7
Consumption	9	60	5	55.6	14	58.3
	15	100	9	100	24	100
Poultry						
Sale	7	46.7	2	40	9	45
Consumption	8	53.3	3	60	11	55
	15	100	5	100	20	100
Product gift						
No	6	30	4	40	10	33.3
Yes	14	70	6	60	20	66.7
	20	100	10	100	30	100
Type gift						
Dairy product	14	93.3	5	83.3	19	90.5
Poultry products	0	0	0	0	0	0
Both	1	6.7	1	16.7	2	9.5
	15	100	6	100	21	100
Livestock contribution						
<=25%	3	15	6	60	9	30
25 to 50%	0	0	2	20	2	6.7
50% to 75%	5	25	1	10	6	20
> 75%	12	60	1	10	13	43.3

	Addis Ababa		Debre Zeit		Total	
Total	20	100	10	100	30	100

5.2.9 Decision maker on sale of livestock products

Results on decision-making on sale of livestock products in Table 19 indicated that male household leaders were the main decision makers on sale of livestock products for 53% of urban livestock owner households and female household leaders for 23% of urban livestock producers. For the remaining 23% of households, decision on sale of products was done jointly by male and female.

During the study livestock keepers were asked whether they wanted to expand their farms (see result in Table 19); accordingly, about 73% of livestock keepers needed to expand their livestock farms. Of these keepers most of them (59%) want to expand dairy cattle production only, 18% dairy cattle + ruminant + poultry together, 4.5% only poultry and 4.5% dairy + small ruminant in combination. Increased income, to get enough products for home consumption, income + home consumption, and income + hobby is the main reasons for expansion of their livestock activity for 68.2%, 22.7%, 4.5% and 4.5% of livestock producers who need to expand their livestock activities. While 27% of urban livestock producers do not need to expand their livestock farms, capital shortage, feed shortage and space is the main problems for 12.5%, 12.5% and 62.5% of household who do not need to expand their livestock activities (Table 19).

Table 19. Decision maker on sale of livestock products

	Addis Ababa		Debre Zeit		Total	
Decision makers	No	%	No	%	No	%
Husband	11	55	5	50	16	53.3
Wife	4	20	3	30	7	23.3
Both	5	25	2	20	7	23.3
Total	20	100	10	100	30	100

5.2.10 Stockist, drug shop and services

Results on the sources of veterinary services, availability of drugs/drug shops is presented in Table 21. Government organizations (MOA and NVI) and private veterinarians are the most important sources of veterinary service for urban livestock producers. About 30% of households get their veterinary services from MOA, 10% from NVI, 37% from private sources and the remaining 23% use both MOA and private veterinarian as sources of veterinary services for their animals. Drug shops are available to 57% of livestock producers in the city/town and not available for the rest 40%. The average distance used to travel to drug shops is 5.5 km. Regarding the availability of drugs, for 46% of households all inputs (drugs) were available; they were not available for 43%, the remaining 10% have no idea on availability of drugs.

Table 20. Farmers that want to expand or not and reasons for expanding or not expanding

	Addis Ababa		Debre Zeit		Total	
Do you want to expand your farm	No	%	No	%	No	%
Yes want to expand	16	80	6	60	22	73.3
No I do not want to expand	4	20	4	40	8	26.7
Total	20	100	10	100	30	100
Why you want to expand?						
Increased Home consumption	0	0	1	16.7	1	4.6
Increased income	10	62.5	5	83.3	15	68.2
Increased income + home	5	31.3	0	0	5	22.7
Increased Income + Hobby	1	6.3	0	0	1	4.5
Total	16	100	6	100	22	100
Which species want to expand						
Dairy cattle	10	62.5	3	50	13	59.1
Small ruminant	0	0	0	0	0	0
Poultry	0	0	1	16.7	1	4.6
Dairy & small ruminant	1	6.3	0	0	0	0
Dairy & poultry	2	12.5	1	16.7	3	13.6
Dairy, small ruminant & poultry	3	18.8	1	16.7	4	18.2
Total	16	100	6	100	22	100
Why not want to expand						
Capital shortage	1	25	0	0	1	12.5
Feed shortage	1	25	0	0	1	12.5
Land shortage	1	25	4	100	5	62.5
Not willing	1	25	0	0	1	12.5
Total	4	100	4	100	8	100

Table 21. Sources of veterinary services and inputs used by urban livestock producers

	Addis Ababa		Debre Zeit		Total	
	No	%	No	%	No	%
Sources of veterinary service						
MOA	6	30	3	30	9	30
Private shop	7	35	4	40	11	36.7
Vet. Institute	1	5	2	20	3	10

	Addis Ababa		Debre Zeit		Total	
	No	%	No	%	No	%
1&2	6	30	1	10	7	23.3
Total	20		10		30	
Availability of drug shop						
Yes	5	25	7	70	12	40
No	14	70	3	30	17	56.7
Others	1	5	0	0	1	3.3
Total	20		10		30	
Distance travelled to drug shop, km						
Mean	4.95		6.6		5.5	
Min	1		1		1	
Max	12		45		45	
Range	11		44		44	
No	20		10		30	
Do they have all inputs						
Yes	9	50	4	40	13	46.4
No	7	38.9	5	50	12	42.9
I don't know	2	11.1	1	10	3	10.7
Total	18		10		28	
Decision Making on purchase of input						
Household head (male)	12	60	3	30	15	50
Female	4	20	4	40	8	26.7
Both	4	20	3	30	7	23.3
Total	20		10		30	
Type of problem						
Availability	6	30	1	10	7	23.3
Cost	0	0	1	10	1	3.3
Both	1	5	1	10	2	6.7
None	13	65	7	70	20	66.7
	20		10		30	

Decision on purchase of inputs were made by male for 50% of household (60% of Addis Ababa and 30% of Debre Zeit), by female for 27% (20% of Addis Ababa and 40% of Debre Zeit) and both male and female jointly for 23% (20% of Addis Ababa and 30% of Debre Zeit) of livestock keepers in urban.

Different constraints that affect livestock production in the city/town were investigated. High cost of inputs is the most important constraint reported by 80% of livestock keepers in urban (95% in Addis Ababa and 50% of Debre Zeit town). Problems like Access to land, market, space feed shortage and animal diseases technical advices, lack of skill were reported by 63.3%, 56.7%, 56.7%, 46.7%, 56.7% and 36.7% of urban livestock producers, respectively. Shelter, lack of clean water, reproductive wastage and management were also reported as constraints affecting urban livestock production by 13.3%, 10% and 13.3% of livestock owners in urban respectively.

5.2.11 Participation in livestock field day/training and extension programs

The major sources of information on livestock production for livestock producers are parents, training/workshop, MOA and research institutions/researcher and radio communication for 87%, 37%, 30% and 30% of urban livestock producers respectively, although, NGO's, neighbours/friends of livestock owners, field visit and to lesser extent newsletters are used as information sources by 7%, 17%, 17% and 3% of livestock producers, respectively.

Participation on field day and training

The number of urban livestock producers that attended livestock farmer field days was very small - only 23.3% (20% of Addis Ababa and 30% of Debre Zeit livestock keepers) of total livestock producers attended. In similar way, the percentage of farmers that attended farmers training courses on livestock production was 33% (35% of Addis Ababa and 30% of Debre Zeit town livestock keepers). From these farmers about 20% were trained by Addis Ababa Agricultural Development Bureau (MOA), 7% by Debre Zeit Agricultural Research Centre (DZARC) and 7% by the International Livestock Research Institute (ILRI). The majority (67%) of urban livestock keepers did not attend any farmers training courses on livestock keeping. Animal feed and feeding, calf management, dairy and poultry management are the topics covered during farmers training courses. So far about 40% of livestock keepers have attended training course on dairy management, 10% on animal feeds and feeding, about 30% of them on animal feed + calf management + dairy cattle management, and 10% on animal feed and dairy cattle management (Table 22).

Table 22. Field day and training of urban livestock keepers

	Addis Ababa		Debre Zeit		Total	
Field day	No	%	No	%	No	%
Yes	4	20	3	30	7	23.3
No	16	80	7	70	23	76.7
Total	20	100	10	100	30	
Training on livestock production						
Trained	7	35	3	30	10	33.3
Not trained	13	65	7	70	20	66.7
Total	20		10	100	30	
Training organization						
National research	0	0	1	33.3	1	10

	Addis Ababa		Debre Zeit		Total	
ILRI	0	0	2	66.7	2	20
Ministry of Agric	6	85.7	0	0	6	60
Others	1	14.3	0	0	1	10
Total	7		3		10	
Training topic						
Feed	0	0	1	33.3	1	10
Feed, calf management & dairy	3	42.9	0	0	3	10
Feed & dairy management	0	0	1	33.3	1	10
Calf & dairy management	1	14.3	0	0	1	10
Dairy management	3	42.9	1	33.3	4	40
Total	7		3		10	10
Gender						
Male	1	14.3	1	33.3	2	20
Female	0	0	0	0	0	0
Both	6	85.7	2	66.7	8	80
Total	7		3		10	

5.2.12 Organizations/Institutes that provide extension services

Table 23 presents extension services available to livestock keepers. Ministry of Agriculture: Addis Ababa Agricultural Development Bureau is the only government development organization responsible to provide extension services for urban farmers in and around Addis Ababa city.

Research and teaching institutes: The Debre Zeit Agricultural Research Centre (DZARC) and the Holetta Agricultural Research Centre (HARC) both under the Ethiopian Agricultural Organization (EARO), the International Livestock Research Institute (ILRI), the National Veterinary Institute (NVI), the Faculty of Veterinary Medicine (FVM) under the Addis Ababa University and Alemaya University are the main organizations involved in urban livestock research, development and training activities.

Addis Ababa Agricultural Development office is the only government organization that involved in livestock extension programs (extension package) for urban agriculture including livestock production activities. These extension services are offered through training and visit. There is no extension service offered for urban livestock keepers at Debre Zeit town. The extension package in Addis Ababa town concerns crop production mostly and to lesser extent poultry production (distribution of 5 pullets and one cockerel, exotic pullets and cockerels). So far about 45% of livestock keepers interviewed during case study have benefited from livestock extension services at different times. The proportion of livestock farms visited by extension staff at different times was 50% of total urban livestock keepers. Veterinarian and animal productionists and to lesser extent extension agents are the most

important extension workers that visit urban livestock production farms. The number of times livestock keepers are visited by extension agent is variable: about 27% of livestock keepers are visited at any time at the convenience of the extension workers, 7% when an extension worker is contacted, 3% every month, and 3% every three months; the remaining 50% of urban livestock keepers are never visited by extension workers because most of them (Addis Ababa city) don't have contact with extension offices, while at Debre Zeit town extension services are not provided for town livestock.

National Artificial Insemination Centre (NAIC)

In Ethiopia artificial insemination started in 1938 by the veterinary institutes; in Asmara in late 1950's teaching institute of Agriculture started AI for teaching research purpose. In 1960's the Dairy Development Agency (DDA) provided an AI service to dairy farms around Addis Ababa. Later on the National Artificial Insemination Centre (NAIC) was established in 1981 with the objective of improving milk productivity of indigenous cattle through cross breeding. Currently the centre produces recorded bulls and imported semen of Friesian, Jersey origin. Since the establishment of the centre around 351,032 doses of semen have been distributed in different areas of the country. Most of those inseminations have been done around urban and peri-urban areas of Addis Ababa milk shed. From 1997–2000, 34 % of total inseminations were done in Addis Ababa.

Table 23. Extension services and visit

Extension service	Addis Ababa		Debre Zeit		Total	
	No	%	No	%	No	%
No of household obtain extension	11	55	0	0	11	36.7
Not obtain extension services	9	45	10	1	19	63.3
Total	20	1	10	1	30	
Farmers visited	14	70	1	10	15	50
Farmers not visited	6	30	9	90	15	50
Total	20	1	10	1	30	
Number of time visited						
Never visit	6	30	9	90	15	50
Every month	1	5	0	0	1	3.3
Once three months	1	5	0	0	1	3.3
Any time of their convenience	7	35	1	10	8	26.7
Only when visited	2	10	0	0	2	6.7
When contacted	3	5	0	0	3	10
Total	20		10		30	

6. Feed resources used by urban livestock producers

Grass hay, agro-industrial by-products and commercial concentrates are the major feed resources used by urban livestock keepers (Tables 24 and 25). About 87% urban livestock producers located in the cities and towns are highly reliant on purchased hay as there is no available land for hay/crop production. Crop residue (teff, wheat and lentil straw) is used as main roughage used by 50% of urban livestock keeper the rest 50% were not practiced to feed crop residue for their animals. Green feed such as grass and legumes used by only 23% of the households and the majority of households in urban areas (87%) do not use green feed for their animals.

Traditional brewers grains, molasses, and liquor residues are also used as livestock feed by small number of urban livestock producers. Household waste used as animal feed by 47% of households. About 93% of urban livestock producers feed their animals supplementary feed. Agro-industrial by-products and commercial concentrates are the main supplementary feed used by urban livestock producers. Agro-industrial by-products used as supplementary feed by 67% of livestock producers. These are utilized by mixing two or more ingredients (wheat bran and nouge seed cake) to make concentrate at home or using a single ingredient per se. Commercial concentrate used as supplementary feed by 13% of livestock producers while, 13% of householders use both types of supplementary feed. The remaining 7% do not use any of supplementary feed for their animals (Tables 24 and 25).

Table 24. Types of supplementary feed used for livestock production

-	Addis Ababa		Debre Zeit		Total	
Supplementary feed type	No of household	%	No of household	%	No of household	%
None	2	10	1	10	2	6.7
Commercial concentrate	2	10	2	20	4	13.3
Home mixed agro-industrial products	14	70	6	60	20	66.7
Both	3	15	1	10	4	13.3
Total	20		10		30	100

Table 25. Types of feed used for livestock production in urban areas.

Feed type used	Addis Ababa		Debre Zeit		Total	
Hay	No household	%	No household	%	No household	%
Use	20	100	6	60	26	86.7
Not use	0	0	4	40	4	13.3
Total	20	100	10	100	30	
Crop residues				0		
Use	8	40	7	70	15	50
Not use	12	60	3	30	15	50

Feed type used	Addis Ababa		Debre Zeit		Total	
Total	20	100	10	100	30	
Commercial feed				0		
Use	19	95	9	90	20	93.3
Not use	1	5	1	10	2	6.7
Total	20	100	10	100	30	
Grass and legume				0		
Use	7	35	0	0	7	23.3
Not use	13	65	10	100	23	76.7
Total	20	100	10	100	30	
Household waste				0		
Use	9	45	5	50	14	46.7
Not use	11	55	5	50	16	53.3
Total	20	100	10	100	30	
				0		
Supplementary feed				0		
Use	19	95	9	90	20	93.3
Not use	1	5	1	10	2	6.7
Total	20	100	10	100	30	

6.1 Type of livestock species for which supplementary feed is offered

Dairy, small ruminant and poultry are the most important of all livestock species for which agro-industrial by-products and commercial concentrate are used as supplementary feed (Table 26). About 43%, 18%, 21%, 11% and 7% of urban livestock producers use agro-industrial by-products and/or commercial concentrate as supplementary feed only for dairy cattle, dairy cattle + poultry, dairy cattle + small ruminant, dairy cattle + poultry + Small ruminant and dairy cattle beef cattle + poultry + Small ruminant respectively.

Table 26. Type of livestock species for which supplementary feed is used

	Addis Ababa		Debre Zeit		Total	
Type of livestock supplemented	No	%	No	%	No	%
Dairy	10	52.6	2	22.2	12	42.9
Dairy + Poultry	3	15.8	2	22.2	5	17.9
Dairy + Small ruminant	3	15.8	3	33.3	6	21.4
Dairy + Poultry + Small ruminant	3	15.8	0	0	3	10.7
Dairy + Beef + Small ruminant	0	0	2	22.2	2	7.1
Total	19	100	9	100	28	100

7. Organizations that Support Livestock Production

7.1 Cooperatives

There are two cooperative unions, one at Addis Ababa city and the other at Debre Zeit town. These are mainly involved on marketing and processing of milk from dairy cattle. Dairy processing and marketing cooperatives at Debre Zeit town are the main organizations that support marketing of milk and milk products for its members. About 50% of livestock producers at Debre Zeit town are members of this organization and no livestock producers at Addis Ababa city are members of the organization. The major activities of dairy processing and marketing cooperative are collection of milk from members of cooperatives and selling the collected milk by transporting to private milk processing units at Addis Ababa city. Sometimes the cooperative is used to process the extra milk into local cheese (*ayib*) and then sell at local markets. The organization is not strong; it is at an infant stage in terms of capacity, organization and infrastructure.

8. By-products from livestock farms

Manure from cattle, small ruminants and poultry is the main by-product from livestock production; it is usually processed into a dried product and sold at local markets and/or used fuel for home consumption (cooking of food items). About 43% of householders process and sell manure, 37% for sale and fuel purposes, 10% for sale and free gifts to neighbours, the remaining 10% of households use manure only for fertilizer (3%), fuel (3%) or for sale (4%). Of the total livestock producers in city/town about 30% grow food crops (teff, wheat, lentil and horticultural crops); 67% of them use manure to fertilize their crops.

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