

Challenges and Opportunities of Urban Dairy Cattle Keeping and its Role in Poverty Reduction of Livelihoods in Hosanna Town, Southern Ethiopia

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Abstract

This study was conducted in Hosanna town, Hadiya Zone, Southern Ethiopia with the objective to identify the challenges and opportunities of urban dairy cattle keeping. A total of 100 key informants were selected randomly and the questionnaire was administered. The male respondents were in larger proportions 70% in the district. The largest percent of the respondents in the study were able to read and write. The mean age (years) of the respondents in the district was 42.92. 100% of respondents in the study keep cattle primarily for milk. Constraints frequently mentioned by dairy cattle keepers in the study area are inappropriate waste management, high cost of inputs (feed and drugs), availability of water, cost and quality of concentrated feed and grass hay, and poor reproductive performance of dairy cows, poor availability of AI technician and a shortage of semen. Increasing recognition of the importance of urban dairy cattle keeping was mentioned as a best opportunity for keepers during focus group discussion. Of the 100 respondents, 60 reported that urban livestock farming contribute to both food security and income generation, 15 reported urban livestock farming contributed to both employment and income generation and 5 reported it contributed to food safety. This study showed that for women urban dairy keeping is a more important activity in terms of income generation. This study also point out that there is a tendency towards a higher workload for women and that child labor, especially girls, is common. In general, the capacity of Hosanna dairy cattle production systems is very limited and undeveloped to cope with the rapidly growing population of the city. Research should address gender issues and strive to develop appropriate technologies, such as improved butter churning, that are focused on the needs of women.

Keywords: Farming, Income generation, Contribution, Constraints.

Introduction

Urban livestock production constitutes an important subsector of the agricultural production system in Ethiopia. Growing poverty, hunger and lack of formal employment opportunities, as well as the special opportunities provided by the city including the growing demand for food, proximity to markets and availability of cheap resources such as urban organic wastes and wastewater – have stimulated the development of diverse agricultural production systems in and around cities. These systems are often specialized in perishable products, such as green leafy vegetables, milk, eggs and meat, and exploit vacant open spaces. This development has important potential and responds to some of the key challenges facing the cities. However, UA may also have negative effects, however, if certain associated risks are not considered and proper preventive and guiding measures not taken [1].

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Urban livestock production constitutes an important subsector of the agricultural production system in Ethiopia. From an economic point of view, cattle and poultry are the most important of all livestock, although goats, sheep and equines make a significant contribution to the urban economy and to the diet. Thus, urban livestock production plays a substantial role in reducing poverty and contributing towards food security in the city. Yet, livestock keepers in the urban are still receiving little attention in terms of policy, institutional and technical support targeted at their needs. The contributions of urban livestock production to overall development include income and employment generation, poverty alleviation, and improvement of human nutrition and health. The urban livestock production system is complex. It involves diverse activities, such as production, processing and marketing, and several technologies at each level in the commodity chain that makes up the system. The major players in the production, processing and marketing of these products are women [2].

Growing poverty, hunger and lack of formal employment opportunities, as well as the special opportunities provided by the city including the growing demand for food, proximity to markets and availability of cheap resources such as urban organic wastes and wastewater have stimulated the development of diverse agricultural production systems in and around Cities. Urban agriculture presents opportunities in support of alternative livelihood strategies, it is not without environmental impacts.

Urban agriculture is an integral part of the urban system. Food security means that safe and nutritious food is consistently available, accessible, and reasonably priced. Urban agriculture improves food security by providing healthy and plentiful substitutes for purchased food, especially for poor households. Households that practice urban agriculture are also more likely to have access to a wider variety of nutritious foods such as vegetables and animal products. Urban agriculture can also provide people with a primary or supplemental income. Therefore; the objective of this paper was to identify the challenges and opportunities of dairy keeping and to identify role of urban dairy cattle keeping in income generation for households.

Methodology

Description of the Study

The study was conducted in Hosanna town which is located at a distance of 232 km from Addis Ababa capital city. Hosanna town administration is the capital of Hadiya zone. The town is divided in to 3 sub towns consisting 8 kebeles. Regarding to location, the astronomical location of the town is found in geographic coordinate between $07^{\circ} 33'N$ latitude and $35^{\circ} 52'E$ longitudes respectively. According to the traditional climate zone classification, as a result of the effect of altitude, the climatic condition of Hosanna is classified under Woina Dega. The altitude of the study ranges from 776 meters to 2220 meters above sea level. This range of altitude enables the study to have different amount of temperature and rainfall through of the year. According to the National metrological service agency, the mean annual temperature

is estimated to be 16.9°C . The town receives an average of 1500-1800 mm rainfall annually (Hosanna Town Finance and Economic Development Office, 2014).

Sources of Data

Two types of data collected, primary and secondary data. The primary data was collected from the field to get first-hand information about the problems constraining the development of urban dairy cattle keeping as well as the effects of urban dairy cattle keeping to household livelihoods in Hosanna in terms of food security, employment creation and farm incomes and opportunities favoring urban dairy cattle keeping was collected.

Secondary was collected from any documented materials on effects of urban dairy on household livelihoods and problems constraining and favoring urban dairy keeping development.

Sample Size and Sampling Method

The town was surveyed through single rapid exploratory field visits for gathering available information about private farms in the town, enterprises engaged in farming activities and to get secondary information from different offices related with agriculture and urban development. The town consists of a total of 8 urban kebeles under three subtowns. One kebele was selected randomly from each sub town. Then 30 households were selected randomly from each selected urban kebele. Ten (10) Hosanna Municipality workers were interviewed separately. So that total sample under the study was 100.

Statistical Analysis

The SPSS statistical computer software (SPSS, version 20) was used to analyze the survey data and descriptive statistics (mean, standard error and frequency) was also performed.

Results and Discussions

General Characteristics of the Respondents

Percent sex, educational background and mean age (years) of the respondents are presented in Table 1. The male respondents were in larger proportions 70% in the district. The largest percent of the respondents in the study were able to read and write. This is not in line with [3] in Dedo district reported the percentage (30%) for literacy. As

Table 1: Background of the respondents.

Descriptor	Hosanna	
Sex of the respondents	N (100)	%
Male	70	70
Female	30	30
Educational		
level of the respondents	100	%
Illiterate	10	10
Read and write	30	30
Primary school	30	30
Secondary school	20	20
Diploma and above	10	10
Age of the respondents	Mean±SD 42.92 ± 11.99	

indicated in Table 1, majority of respondents in the study had attended certain level of education.

The mean age (years) of the respondents in the district was 42.92, which is similar with age of the respondents (41.00) reported by [3] in three districts of Jimma zone of Western Ethiopia. Urban agriculture contributed to livelihoods of the respondents in several ways. These are economic, social and ecological. Majority of the respondents were young and middle age. These are people who are energetic and in their prime age and if well supported can contribute the growth of our country.

Purposes of Keeping Dairy Cattle

Farmers keep cattle for multiple purposes like milk, meat, blood, hides, and horns as source of income [4,5]. Socio-cultural functions of cattle include their use as bride price and payment of fines in settling disputes in communals [6]. They are also reserved for special ceremonial gatherings such as marriage feasts, weddings, funerals and circumcision. Cattle are given as gifts to relatives and guests, and as starting capital for youth and newly married men. They are used to strengthen relationships with in-laws and to maintain family contacts by entrusting them to other family members [7]. The results of individual interviews with respondents in the study show that cattle have multipurpose functions. But the major functions of the dairy cattle in the study area are milk production and source of income.

Total number of respondents in the study ranked milk as a primary purpose and source of income as secondary purposes of keeping dairy cattle. As shown in Table 2, 100% of respondents in the study keep cattle primarily for milk. Similarly, [8] reported that 99.4% of the respondents in Hararghe kept oxen primarily for milk, while 86.6% of the respondents kept cows for sale of milk. According to the result of the study, almost all the respondents were owned cross breed dairy cows because their primary objectives were milk production and generating income. (Table 2).

Results on breed composition of dairy cattle per household indicated that almost all of livestock keepers in Hosanna own dairy cattle. They own mostly cross breed cows than pure local and exotic breed. Respondents indicated that the own different breed composition like cattle, sheep, poultry and donkey. Average number of dairy cattle, sheep and poultry holding per household was 4, 2 and 7 animals. This study is not in line with the study conducted by [9].

Major breeding problems most frequently reported during focus group discussions and interviews that affect herd productivity were late age at first calving, postpartum anoestrus, long calving interval, breed problem, seasonality, heat detection problems, animal health problems, inadequate AI services and shortage of skilled man power. Environmental factors such as unavailability of feed both in quantity and quality, diseases and parasitic burden contribute much to these problems. Abortion and calving difficulty were also reported as breeding problems. [10] in Essera district reported that inaccessibility to AI services, difficulty of getting inseminator, fear about the small size of

local cows to carry the pregnancy and deliver the offspring of improved breeds and lack of awareness were problems limiting the success of breeding in the study.

Feed Resources and Feeding System

As per [11] inadequate supply of feed both in quantity and quality is the single most important problem for low productivity of livestock. Based on interviews and focus group discussions made in the study area (Table 3), natural pasture for communal/ individual grazing/ cut and carry system (28.4%), and crop residues (11.6%) were found to be the major feed sources for cattle in the study area. Natural pasture that was utilized by both grazing or cutting, concentrates and byproducts were also found to be feed sources for dairy cattle in the district. Similarly [12] in Dandi district, [13] in Aleta Chuko district and [10] in Essera district reported that natural pastureland was the feed source for the cattle.

The availability of feed for cattle in the study shows seasonality according to the respondents and focus group discussions. Crop residues from crops are more important feed sources especially in the dry season when grazing pasture is less covered which is obtained either by purchasing or gift. Conservation of different crop residues is a common practice in the district mostly when there are available sources of crop residues in dry season. Communal and individual grazing lands throughout the study were reported as more useful sources of feed in the wet season. During focus group discussions and interview, utilization of improved forages was also reported as sources of feed for cattle. (Table 3).

Seasonal supplementation of mineral locally known as '*bole*' was found common in the study. Pipe water was reported to be the common source of water for dairy cattle in the study. The larger proportions of urban dairy producers located in Hosanna towns are highly reliant on purchased hay as there is no available land for hay/crop production. Crop residue (teff, wheat and other straw) is used as source of roughage used by urban dairy keepers and some of them were not practiced to feed crop residue for their animals.

Table 2: Percent of respondents reporting major functions of cattle in Hosanna.

Purposes	Rank	N (100)	%
Meat	-	-	-
Milk	1 st	100	100
Draught	-	-	-
Manure	3 rd	100	100
Source of money	2 nd	100	100
Cultural	-	-	-

Table 3: Major sources of feed in the district.

Sources of feed	Percent (%)
Natural pasture	28.4
Improved Forages	6.7
Hay	10
Crop residue	11.3
House made leftover	8.6
By products and concentrates	35

Challenges affecting urban dairy cattle farming

As in urban agriculture generally, urban livestock keeping is not only practiced by the poor. Different social groups have different reasons to engage in urban livestock keeping.

Livestock keeping for the urban poor takes place under challenging circumstances as indicated in these studies. Resources, such as space, capital and feed are limited, and the institutional and legal environments appear to be unfavorable. However, the continuing existence and increasing importance of urban livestock keeping for the poor indicate that the positive aspects of urban livestock keeping outweigh the negative aspects. (Table 4).

Constraints frequently mentioned by both men and women livestock keepers in the study are Inappropriate waste management, high cost of inputs (feed and drugs), availability of water, cost and quality of concentrated feed and grass hay, and poor reproductive performance of dairy cows, poor availability of AI technician and a shortage of semen. Based on table indicated above and focus group discussion, the weaknesses and constraints which affect the present situation of urban dairy keeping in Hosanna town are the following:

Inappropriate waste management: there is strong evidence from all the case studies that animal waste disposal in its current form causes environmental and public health problems, which will become even more severe as urban livestock numbers increase.

Water availability: at present urban livestock keeping competes for water resources with humans as the demand for water for this activity is not taken into account by the supply services. In many slums water has to be bought and therefore other water sources, which are often contaminated, are accessed for livestock.

Poor livestock health and high cost of veterinary services: the case studies show that animal health is often poor due to inadequate husbandry practices. Poor livestock keepers seldom vaccinate their livestock, especially not smaller species such as goats, sheep and chickens. Due to the high cost of veterinary services and livestock drugs, treatment is sub-optimal.

Feed availability and quality: feed availability is a particular constraint for larger livestock species such as cattle, which are usually zero-grazed. Feed quality is a problem for free-roaming livestock as there is no or very limited control over feed sources. The Nairobi case study shows that foraging at waste dumps is common in the slum s.

Low production level: due to limited feed availability, poor quality and poor management practices, the production level of livestock is generally low.

Poor networking and organization among the poor livestock keepers: poor livestock keepers are not organized and can therefore not express their demands in a concerted way.

Lack of research and services provision: information access and adoption of improved technologies is limited

for poor urban livestock keepers. This is made worse by the fact that existing services are not tailored to the needs and circumstances of the poor (e.g. extension services and training courses promote species which are less relevant for the poor).

Limited knowledge of livestock husbandry practices: as information sources and advice services are lacking, poor livestock keepers often have limited knowledge of livestock husbandry practices. As result of this study, opportunities for the future development of urban dairy keeping are the following:

Increasing recognition of the importance of urban dairy cattle keeping was mentioned as a best opportunity for keepers during focus group discussion. This study indicates that there is an opportunity to achieve substantial impact through capacity development of poor livestock keepers as current production levels are constrained by poor management practices.

Organization and networking among poor urban livestock keepers to improve access to information and other services: urban livestock keepers are becoming more aware of the potential benefits of organization and networking as a means to access information and services and improve marketing strategies.

Market development: increasing urbanization and hence demand for food products may have positive impacts on the development of urban livestock keeping.

Table 4: Challenges of urban dairy cattle keeping.

Constraints	Rank	N	Index
Inappropriate waste management	1 st	95	0.16
	2 nd	5	
	3 rd	-	
Water availability	1 st	75	0.14
	2 nd	19	
	3 rd	6	
Feed availability and quality	1 st	85	0.15
	2 nd	15	
	3 rd	-	
Poor livestock health and high cost of veterinary services	1 st	40	0.11
	2 nd	37	
	3 rd	23	
Lack of research and services provision	1 st	18	0.09
	2 nd	34	
	3 rd	48	
Limited knowledge of livestock husbandry practices	1 st	52	0.12
	2 nd	35	
	3 rd	13	
AI access (technician and semen shortage)	1 st	53	0.12
	2 nd	12	
	3 rd	35	
Other constraints (shortage of capital, land and extension services)	1 st	35	0.11
	2 nd	42	
	3 rd	23	

N=number of respondents Index= sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) given for each constraint divided by sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for all constraints.

Improved animal waste management: available technologies for animal waste disposal (improved composting technologies and biogas production) provide an opportunity to improve current waste management practices.

Improved urban/rural linkages: this study indicated that current rural urban linkages are weak. However, there is an opportunity to improve these linkages for fodder production and animal waste disposal.

Urban dairy farming as a means for income generation

People in cities and towns in low-income countries demand and eat a more varied diet than rural dwellers. This more varied diet comprises more legumes, fruits, meat, milk, egg and fish compared with the rural staple food-based diets. The demand for these different components of urban diets opens for urban and peri-urban agriculture. This kind of farming is mainly small-scale and often operated by women, yet contributing to a significant share of the food in many cities in low-income countries. Also, the rural dwellers moving to cities often bring agricultural practices with them for income and food and nutrition security reasons. During focus group discussion, the respondents and key informants said that they practiced urban dairy keeping for food security and income generation. They get food supplements as a source of proteins from livestock in form of milk, eggs and meat. This helps them save money which would otherwise been used to buy the food. These savings plus the income earned from sale of surplus farm produce is then used to meet other family expenses. Control over and access to basic inputs, such as land, labour, and capital mean that middle-income families are often heavily involved in urban agriculture, including livestock keeping, as a commercial activity to supplement household incomes.

On the other hand, the urban poor engage in urban livestock keeping as a response to limited alternative livelihood options and food insecurity. This category of livestock keepers lacks the control over and access to basic inputs, is seldom able to access support services and is either harassed or ignored by the city planners [14]. Contradicting opinions exist over who the main urban livestock keepers are. Whereas Foecken (2000) concludes that livestock keeping in urban areas in East Africa is an activity which becomes more common as income rises, some research findings note that 72% of those practicing urban agriculture and livestock keeping in Uganda fall into the low-income bracket.

Urban dairy farming as a means for employment

Majority of the respondents indicated that employment and income generation were the benefits from the urban dairy farming. Of the 100 respondents, 60 reported that urban livestock farming contributed to both food security and income generation, 15 reported urban livestock farming contributed to both employment and income generation and 5 reported it contributed to food safety as shown in Table 5.

Gender and dairy cattle production

Women are usually responsible for feeding large animals, cleaning the barns, milking dairy cattle, processing milk and marketing livestock products, but they received the assistance of men, female children and/or other relatives. Younger children, especially girls between the ages of 7 and 15, are mostly responsible for managing calves, chickens and small ruminants, while men and older boys are responsible for treating sick animals, constructing shelters, cutting grass and grazing of cattle and small ruminants. The role of women in managing animals that are confined during most of the year is substantial and they are critically involved in removing and managing manure, which is often made into cakes and used or sold as fuel. In this regard, women have the major role in minimizing environmental pollution and public health problems related to urban livestock production. The result of this study is in line with [9].

Benefit from projects/programmes, take measures to strengthen women's participation even further, ensure that the benefits reach women and men and they must include follow up and monitoring stages to check and make sure that interventions have met women's practical and strategic gender needs [15].

The information obtained from the different case studies demonstrates that there are gender differences in urban livestock keeping. The Hosanna case study showed that for women urban livestock keeping is a more important activity in terms of income generation. As women are also usually in charge of the provision of family food the contribution of urban livestock keeping to food security is more important for them. This study also point out that there is a tendency towards a higher workload for women and that child labour, especially girls, is common.

In terms of livestock ownership there are also clear gender differences. Whereas men usually own improved breeds and larger livestock, women tend to keep local breeds and small livestock. Men also seem to dominate the decision making processes in terms of livestock management, especially when it comes to economic decisions like buying and selling livestock and products. Decision-making was shared between men and women despite males are dominant in decision making processes. There is no sufficient data available from the case study or from other secondary sources to analyze the distribution of benefits obtained from urban dairy keeping within the family. This is however an important aspect which would require further investigation.

To enhance the status of women and to increase their productivity in urban livestock production, and to strengthen

Table 5: Contribution of urban livestock farming to total household.

Contribution	Frequency	Percent
Food security only	10	10
Employment and income	15	15
Income only	5	5
Food security and Income	60	60
Food safety	5	5
Employment only	5	5
Total	100	100

their decision-making power and leadership, recognition of their role and creation of favourable policy are essential pre-conditions. Research should also address gender issues and strive to develop appropriate technologies, such as improved butter churning, that are focused on the needs of women. It is also essential to train women on the use of technologies, gender concerns, leadership and assertion techniques and business management and investment techniques to increase opportunities for economic gains.

Conclusion

Despite the importance of urban dairy production, they always tend to face problems associated with environmental and public health issues. Constraints frequently mentioned for urban dairy farming during key informants interview and focus group discussion in the study area were inappropriate waste management, high cost of inputs (feed and drugs), availability of water, cost and quality of concentrated feed and grass hay, and poor reproductive performance of dairy cows, poor availability of AI technician and a shortage of semen.

The contributions of urban dairy production system to overall development include income and employment generation, poverty alleviation, and improving human nutrition and health. Urban dairy 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. 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 neighborhood 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. In general, the capacity of Hosanna dairy cattle production systems is very limited and undeveloped to cope with the rapidly growing population of the city.

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Conflict of Interest Declaration Statement and Authors Agreement

This statement is to certify that all Authors have seen and approved the manuscript being submitted. We warrant that the article is the Authors' original work. We warrant that the article has not received prior publication and is not under consideration for publication elsewhere. On behalf of Co-Author, the corresponding Author shall bear full responsibility for the submission.

This research has not been submitted for publication nor has it been published in whole or in part elsewhere. We attest to the fact that all Authors listed on the title page have contributed significantly to the work, have read the manuscript, attest to the validity and legitimacy of the data and its interpretation, and agree to its submission to the Journal of Life Sciences.

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References

1. Veenhuizen RV (2007) Profitability and Sustainability of Urban and Peri-Urban Agriculture. (FAO) Rome.
2. Azage Tegegne (2004) Urban Livestock Production and Gender in Addis Ababa, Ethiopia.
3. Yisehak Kechero, Taye Tolemariam, Aynalem Haile (2013) Characteristics and Determinants of Livestock Production in Jimma Zone/Southwestern Ethiopia. African Journal of Basic & Applied Sciences 5: 69-81.
4. Hurrisa B (2003) Livestock marketing and pastoralism. Proceeding of 3rd National Conference on Pastoral Development in Ethiopia. December 23-24, 2003, Addis Ababa. Pastoral Forum Ethiopia.
5. Osterloh, SM. McPeak, JG. Mahmoud, H. Luseno, WK. Getachew, G (2003) Pastoralist livestock marketing behaviour in Northern Kenya and Southern Ethiopia: An analysis of constraints limiting off-take rates. Nairobi, Kenya.37
6. Chimonyo, MNT, Kusina H, Nyoni HO (1999) A survey on land use and usage of cattle for draught in a smallholder farming area of Zimbabwe. Journal of Applied Science 5: 111-121.
7. Dovie K, Shackleton C, Witkowski E (2006) Valuation of communal area livestock benefits, rural livelihoods and related policy Issues. Land Use Policy 23: 260-271.
8. Etafa A, Esmael Y, kasim K, Debela, M (2013) Cattle Production in West Hararghe: An Opportunity and Constraints Assessments in Darolabu, Odabultum, Gemechis and Chiro Districts, Oromia Regional State, Ethiopia. International Journal of Livestock Production Research 1: 1-15.
9. Azage Tegegne, Million Tadesse, Zinash Sileshi (2002) Scoping Study on Interactions Between Gender Relations and Livestock Keeping Practices in Addis Ababa, Ethiopia, Natural Resources International Ltd, Kent, UK.
10. Tonamo Andualem, Tamir Berhan, Goshu Gebeyehu, Belete Ermias (2015) Characterization of cattle husbandry practices in Essera Woreda, Dawuro Zone, and Southern Ethiopia. African Journal of Agricultural Research 10: 3421-3435.
11. Ulfinia G, Zelalem B, Jemal D, Gemedu D, Chala M, Jiregna D (2005) Survey of cattle production and marketing practices in Danno District, western Ethiopia, using PRA tools. PRA Report
12. Belay Duguma, Azage Tegegne, Hegde, BP (2012) Smallholder livestock production system in Dandi District, Oromia Regional State, Central Ethiopia. Global Veterinarian 8: 472-479.
13. Beriso Kibru, Tamir Brihanu, Feyera Teka (2015) Characterization of smallholder cattle milk production system in Aleta Chukko District, Southern Ethiopia. Journal of Advanced Dairy Researches 3: 132.
14. Waters-Bayer A (1995) living with livestock in town: urban animal

husbandry and human welfare. Keynote paper presented at the Eighth International Conference of Institutions of Tropical Veterinary Medicine. Livestock Production and Diseases in the Tropics: Livestock Production and Human Welfare, 25-29 September 1995, Berlin, Germany. ETC

Foundation, Leusden, the Netherlands.

15. Bogalech Alemu. 1998. Women, Food Security and Agriculture. Proceedings of the Ethiopian Society of Animal Production (ESAP): 9-18.