Role of Urban Agriculture for Livelihood Improvement, Waste Management and Greening in Case of Hawassa City

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Abstract

Background: Urban agriculture is one of the strategies to enhance the livelihood of the urban community, ensure food security and nutrition. Despite, the increasing development of the practice in Hawaassa city, its environmental and societal perspectives had been neglected. Moreover, the increase in urbanization due to several social-economic reasons has become a challenge for urban agriculture practices.

Methodology: This study was aimed at investigating the roles of urban agriculture on livelihood improvement, waste management, and urban greening. A purposive random sampling technique was employed to select sample households. Besides questionnaire surveys and key informant interviews were used to elicit necessary information while literature analysis supplemented the data.

Result: It was found that urban agriculture in the study area is maintaining the cultural experience of the local society, generating income, and introducing saving habits. It has also improved the esthetic value of the city via utilization of the organic waste. Hence, urban agriculture in the city is compatible with urban job creation, price adjustment, and provision of a green urban environment.

Conclusion: Urban agricultural practices should keep the phase of increasing urbanization in the study area.

Introduction

According to Chalmin and Gaillochet (2009), the municipal and industrial wastes released measure about 4 billion in recent times. In developing countries like Ethiopia, most of the waste generated is organic sourced from food materials, animal and plant-based products and agricultural residues containing degradable carbon. In developed countries waste management has been improving being supported by the emerging technologies and reduce, reuse as well as recycle principles however, land filling and incineration remain the major ways of waste management in developing world creating a problem of lost resources and generating health as well as environmental threats and social problems.

People from different societies are migrating to urban center in search of job employment from the rural parts of the country. This in turn created problems of overpopulation and number of poor dwellers in urban areas of our country. Moreover, the rainfall dependent agriculture also create problem to urban settlers during the absence of the rain fall and reduced production due to different climatic factors. Therefore, urban authorities faced challenges of creating adequate employment, providing basic services and other socially sustainable strategies (African Studies Centre, 2006). Consequently, cities are fast becoming intervention and planning centers for strategies that aimed at eradicating hunger and poverty and improve livelihoods to enhance food security and nutrition for the urban poor and vulnerable households (Darkey et al, 2014, Mireri, 2010).

So, urban agriculture is one of the strategies that enhances livelihood of the urban community in order to overcome the aforementioned (Hovorka and Keboneilwe, 2004). More importantly urban agricultural

production is to improve food and nutrient supply of the urban society especially the poor (undernourished) as recognized by international policy-makers (FAO, 2012). So, a sustainable urban agriculture sector is critical to food security and livelihoods, which is suggested as a key component of a green economy, alongside other sectors (Musvoto et al, 2015). However, urban agriculture reveals that most urban farming produces are for subsistence (Mireri, 2010).

While agriculture presents opportunities for supporting urban green economic growth, there are challenges. Primarily, scarcity of land to support urban agricultural production is raised (Musvoto et al, 2015). Systems providing food that can be directly consumed by nearby residents could offer many benefits for growers, consumers, and the community. However, even with these systems, justifying the use of urban land for agriculture based on the production functions alone can be a challenge (Lovell, 2010). Second, relatively low market values of agricultural commodities, therefore, the limited potential for low levels of agricultural production to impact on local economies (Musvoto et al, 2015). This study is, therefore, initiated to investigate the contributions of existing urban agriculture to the livelihoods of settlers, urban waste management and urban greening.

Statement of the problem

The old-fashioned waste management practices in different cities of Ethiopia pose monumental challenge for municipalities. Until recently, only two Cities in the country had a controlled solid waste disposal system (Degnet, 2008). Most of the solid wastes generated are organic and could be used for urban agricultural practices that can in turn improve waste management.

Traditional farming activity has been familiar practice in most cities of Ethiopia including the Hawassa city and even the capital Addis Ababa city. In Hawassa city most of the early residents have cultivated tubers, raised chickens and some of them even kept dairy animals inside their home compound. The later comers to the city have supported their livelihood through informal and very small-scale urban farming. The urban agriculture then was only household oriented and the products were only used by the households who grow crops and slaughter animals for their own consumption. Due to increasing population and the issue of food security, the government has introduced more advanced urban agricultural practices in to the city. Currently, there is widespread practice of raising livestock for milk in the city. Tubers and other food items are grown in and around the city with high market supply. A lot of eucalyptus trees are grown in the city for market that supports the lives of many residents. Despite, the increasing development of the practice, the environmental and societal perspectives of the urban agriculture had been neglected or given less attention. There is a growing use of organic waste for the ongoing farming and production of organic fertilizers from decomposable waste materials. The practice has immense contribution in minimizing waste in the city which should be investigated to further improve the effort and alleviate environmental deterioration.

Even though urban agriculture is one of the strategies that can contribute to food security of urban centers in our country specifically Hawassa city there are some problems that are being challenging. The

Absence of land for keeping animals and cultivation of crops is a primarily concerned problem that obstacle urban livelihoods in general. Then, compound surface cover by cement/bricks perceived as sign of modernization might be due to lack of awareness about land use and side effects of using cemented materials were noticed as problem. Low skills of cultivating crops and rearing animals of the settlers, absence of suitable waste investigation, separation and use for urban agriculture were mentioned problems. Expansion of hotel and other industrial sectors in the city also contributed to the problem. Moreover, overflow of people to Hawassa city for settlement choice due to several social, economic and environmental reasons thereby collapsing urban agriculture opportunities.

Significance of the study

The significant rise in urban population number and the ongoing rural urban migration in Ethiopia necessitate the alleviation of constraints of urban agriculture which has a capability to address malnutrition and food security (Assefa, 2014). Further, improving the feature of urban agriculture will address the leading issue waste management of city centers in Ethiopia. This study will strive to examine the relevance of urban agriculture for livelihood improvement, waste management and its contribution to environmental health. In Hawassa city, the average per capita generation of solid waste is about 0.2 kg/per day per capita (Sibilo and Tamiru, 2015). Most of the wastes generated are organic wastes suitable for urban agriculture. Hence, this study will identify the composition of wastes and its use for farming. The urban agriculture in turn will significantly reduce the impact of waste so; the study will examine the contribution to waste management.

The investigation will, therefore, support further research activities to strengthen the environmental perspective of urban agriculture. This there by paves a way for the development of agriculture in urban and suburban areas of the country. It will serve as an important input to policy makers and practitioners to facilitate decision making implementation of strategies.

Objectives

General Objective

- To investigate roles of urban agriculture on livelihood improvement, waste management and greening in case of Hawassa city.

Specific Objective

- To investigate the socio-economic contribution of urban agriculture to livelihoods of Hawassa city settlers
- To assess importance of urban agriculture to waste management and greening of Hawassa city

Research questions

- What are the socio-economic contributions of urban agriculture?
- What is the importance of urban agriculture in urban waste management?
- What roles urban agriculture can play in urban greening?

Literature Review

Nowadays, urban agriculture has emerged as an optional way of dealing with organic wastes that are the major ones in Ethiopia and other developing countries. According to Food and Agriculture Organization (FAO, 2007), urban agriculture is “the growing of plants and raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, processing, and marketing of products”.

Any agricultural activity that is practiced in cities is considered urban agriculture. According to Bryld (2003), stated that activities related to urban agriculture are rarely isolated from rural areas, city borders are fluent, but are often inter-linked across space and sectors.

Further, Mireriet al. (2006) defined urban agriculture as any kind of crop or livestock production and agroforestry or fuelwood production that is practiced within and outside of cities as per socio-economic and environmental factors. So, family and individual resources, land availability, and location are critical determinants of the type of urban agriculture practiced.

Urban agriculture is widely practiced by most African countries in their backyard gardens mostly for subsistence (Drechsel et al., 2005). Intensification is sought through cultivating high-value crops, increase in productivity on the same area of land, and maximizing the use of available resources, including wastewater (Prain, 2006).

Rapid population growth due to high fertility and migration and the issue of food security in urban areas necessitated the entrance of Agriculture into cities and towns (Vazquez, R, 2001). When it emerged, urban agriculture was merely focused on improving the livelihood of urban communities and ensuring food security, however, its focus developed into much wider dimensions such as the use of urban resources including water, urban organic wastes, and limited land Veenhuizen (2006). Refuse in urban areas either from home or market are usually lost creating environmental pollution or can be disposed of in landfills with little or no return of the biomass to the production site. Hence, urban agriculture not only increases food security by utilizing the nutrient potential of wastes but decreasing the most common urban management problem called waste.

Comparing urban farming in different cities might be misleading because city structures and their linkage with surrounding villages are different (Tinker 1994). A study by Kessler (2003), in West African capitals, revealed that differences in crops and inputs of the different farming systems are derived from different economic strategies adopted by the farmers. However, understanding the nature and structures of cities

and setting specific boundaries is helpful for the standardization of the definition of urban agriculture. Especially East African cities, including Hawassa city, are expansive and continually submerging the nearby villages, and hence, the farmers in the villages still continue farming after being part of the cities.

Study Methodology

Description of the study area

Hawassa is the capital city of Southern Nations Nationalities and Peoples Regional State (SNNPRS) and one of the fastest growing cities in Ethiopia (Wondrade et al., 2014). It is located 275 km south of Addis Ababa along the main highway leading to Nairobi, Kenya via Moyale. It lies between 7°3'22.1" N and 38°28'20.8" E. longitude and the altitude ranges from 1,656 to 2,137 mean above sea level. The city administration covers an area of 16,062 hectares (ha) and is sub divided into eight sub-cities with an annual mean minimum and maximum temperature of 13.0 °C and 29.2 °C, respectively and 975.9 mm mean annual precipitation

Sampling techniques and sample size

The study was conducted in Hawassa city, SNNPRS. Representative sub cities were selected based on tangible potential in urban agriculture. Purposive random sampling technique was carried out in which urban agriculture practicing households were randomly selected from sub city.

Literature Analysis

Published books, document reports, journals and internet websites on urban agriculture and waste management was identified and use for this purpose. The literature analysis was emphasized on principles of urban agriculture, its contribution to urban society livelihoods, waste management and greening. This was analyzed in close focus to the experience of other cities.

Checklist to key informants

Checklist was prepared to gather the data on contribution of urban agricultural practices from key informants. The contribution of the urban agriculture towards livelihood, waste management and urban greening was disclosed through well-prepared and purposeful checklist that was supported by key informant interviews.

Household Interview

The interview questionnaire was prepared and targeted the urban agricultural practitioners in the selected sub cities. The sub cities where urban agriculture is widely practiced were identified and then the representative sample was taken purposively based on their suitability and size of urban agricultural practices.

Household Interviews with urban agricultural practitioners constitute dynamic questions to address the roles of urban agriculture. Questions of close ended and open-ended type was helping to elicit both quantitative and qualitative data about the contribution of urban agriculture in Hawassa city.

Result And Discussions

Socio-economic contribution of urban Agriculture in the city

Agriculture in Hawassa city is contributing both socially and economically to the larger society of the city. Especially, the poor households depend on a diversity of strategies to ensure food security, income and well-being (CIP, 2007, Hovorka and Keboneilwe, 2004) due to price inflation of food products in urban centers.

Social contribution of urban agriculture

Socially, urban agriculture is maintaining the cultural experience of the local society by practicing it for several decades. The primary goal of urban agriculture is to support the urban society with food (Hendrickson et al., 2012 as cited in Ibrahim et al., 2015) plus to lessen the highly increasing cost of food items/inputs. The society is involved in cultivating different crops in addition to the locally family food “Enset” and other cash crops like coffee chat, etc. the major crop varieties in the area for home consumption to secure the food demand especially in semi-urban sub-cities of Hawassa city is Maize.

Figure.1: Cultivated Maize crop in Hawassa city

Urban agriculture in Hawassa city consisted of cultivation of different varieties of vegetables and fruits trees both inside/outside of their home garden including Onion, Cabbage (Tikil Gommen), Tomato, Muskmelon (locally named “Ye china Duba”), Avocado, Banana, Mango, etc. using water from lake Hawssa as irrigation source (Cofie et al., 2003). The society is practicing the cultivation of the mention vegetables and fruits to support their livelihood via consumption and the larger urban population with food contributing to the maintenance of the social organizations of the residents not to be under the impression of social destruction because almost all the hungry people live in developing countries (FAO, 2012). In addition to serving as a source of major and efficient sources of micronutrients (AVRDC, 1996) compared to other crops, vegetables, and fruits in Hawassa city today is being used as a strategy to covert the lakeside cultivation. This is to prevent Hawassa Lake from pollution and encroachment to

some extent, especially; fruit trees are being distributed by the DA experts and planted by the residents having farmland nearby the Lake.

Figure 2: Vegetables and fruit trees cultivated in Hawassa city

In addition to crop cultivation, residents of Hawassa city keep livestock (especially, Tula (Tulu and Dato Kebeles) and Addis Ketema Sub cities) simultaneously. In the central part of the city, dwellers are mainly keeping and interested in Dairy farming including cooperative organizations. Urban agriculture, therefore, strengthens the weak social interaction of urban society via crating cooperative organizations (E.g. Serten Endeg dairy farm cooperative in Diaspora sub-city). So, the society can interact to work together and share a culture of work (Sarah, 2010) and cooperate due to the existence of the urban agriculture practice. One of these cooperative organizations found in diaspora sub-city sells their milk product to a business organization called “Enat Wotet”, implying inter-linkage of the society via marketing due to the existence of high demand for agricultural products. Therefore, it exposes the producers to the city and the wider society obtaining the livestock either from local society or in the form of breed from other sources (For instance, a good hybrid goat was come from Konso District to rare via different Governmental and Non-Governmental Organizations). Urban agriculture, therefore, supplies food and composite for different societies of the city from livestock animal production.

Figure 3: Livestock keeping in Hawassa

In wider understanding, urban agriculture is also being introducing to agricultural technology to be practiced in Hawassa city via intensification strategy. The technologies are adopted either through the invention or further interacting with other pinner institutions/organizations and exposing the local producers to the globe. So, mechanization of urban and semi-urban agriculture will be there due to the existence of the practice in urban areas.

Economic contribution of urban agriculture

Economically, urban agriculture is helping the practitioners and different stakeholders in the society to generate income via employment creation (Veenhuizen et al., 2006) and introduce saving habits to enrich themself financially. In addition, to support and trying to support their family with food the urban population is generating income from cultivating and producing products and by-products of both crops and livestock.

As mentioned, earlier in Hawassa city different households supply a variety of vegetable crops (Potutan et al., 2000; Danso, 2001) produced near the lake to the urban population in order to exchange with money to generate income. Some of the producers, even being vertically integrated as traders, having a market shop locally called “Medeb” selling their produce to different individual consumers in addition to supplying to the wholesalers. In association, therefore, this practice is resulting in agricultural employment creation (Ibrahim et al., 2015; Sarah, 2010; Ionel, 2010) for a number of citizens (daily

laborers on farmland and in Hawassa market) and organizations (E.g. transporters). Beyond the individual producer's income generations, urban agriculture also introduces and makes the existence of microenterprises as "Limat budine" to cooperate and strengthen the socio-economic bond. So, the urban agriculturists are involved in crop production and livestock keeping with the provision of their products to society. In addition to crop by-products, the society is keeping beef cattle, dairy cows, Sheep and goats and polluters, donkeys, etc. More specifically, in the middle of the city the producers are not focusing on the Beef cattle due to the absence of cattle keeping the house as the compound is too small per individual so they are most of the time keeping only dairy cows in a confined area to have Milk and milk by-products for home consumption and semi-commercializing (Teferee, 2003). Therefore, urban agriculture is supplying the city with fruits and vegetables, meats, milk, eggs, and other products (Sarah, 2010).

The urban agriculture in Hawassa city is, in addition to products, resulting in the provision of different agricultural inputs (Like compost, fodders) as illustrated below (Figure 4). These inputs are entirely obtained from urban agriculture and re-used as input again and to generate income via selling to other farmers as fertilizer and feed to increase the product and productivity of urban agriculture. Some are also providing transportation service renting Donkey cart, especially, contributing to the hygiene of Hawassa city plus creating employment (Sarah, 2010) for street dwellers who drive the cart to collect waste and even supporting and facilitating the marketing of other industrial products throughout different market centers of the city (as in developing country and city) with the problem attached to the carts.

Figure 4: Agricultural inputs produced and re-used to clean the city

Urban agriculture and waste management and urban greening

In addition to the socio-economic contribution of urban agriculture in urban centers, it is also a means of waste management and urban greening in Hawassa city.

Urban agriculture and Waste management

A waste from different sources of the city is to be separated to be organically assumed free of toxicity in the form of composite used as a fertilizer in the urban agricultural lands. This, therefore, resulted in the reduction of load on Hawassa city urban landfills to be sustainably used indicting organic matter amendments derived from urban wastes is commonly quoted as one of the greatest environmental benefits of urban agriculture as it can assist with waste disposal (Eigenbrod and Gruda, 2015; Steve H et al, 2016). Urban agriculture beyond waste management also uses waste as a means of income generation. The waste, products of urban agriculture including compost from plant leaves, cattle, poultry, etc. are prepared in the home gardens of the residents (inside or outside of the compound and sold to different users of the city (especially, in the peri-urban sub-cities).

As illustrated below (Figure 5), the composts are prepared from the waste from combinations of animal and plant by-products with even the existence of some problems of management. Figure 5A is compost prepared from animal dung is with better management as compared with that of Figure 5B (Mixed of animal dung and leaves). The main problem for waste mismanagement mentioned was the partitioned land size of the city in the majority of the sub-cities. In comparison, the problem is exacerbated in urban sub-cities (E.g. Menaharia and Mehal Ketema sub-cities) than that of peri-urban (E.g. Tula sub-city) of Hawassa.

Figure 5: (A) Less managed urban waste (B) Better managed urban waste

Solid waste from Hawassa city can also reduce the bioavailability of soil lead that could exist in the farmland by up to 43% (Brown et al. 2003 as cited in Steve H et al, 2016). However, its excessive usage around the lake Hawassa by the Tulo kebele urban agriculture practitioners could result in soil lead accumulation and negatively impact water quality (Rudisill et al. 2015). In addition, the producers are using different types of chemical inputs including insecticides or pesticides, fertilizers, etc. to increase the product and productivity of urban agriculture to supply more food. This chemical usage could not only harm the environment but can also result in destroying aquatic life diversity especially the fish obtained from Lake Hawassa. Overall, this can indirectly affect the human health (CIP, 2007) of those who consume from urban agriculture in one or another way.

Figure 6: Insecticide/pesticide use round Lake Hawassa

Urban agriculture and urban greening

Here the urban agriculture contributes and plays its greatest role in maintaining and magnifying the beauty and attractiveness (Steve H et al, 2016) of Hawassa city. This indirectly will also be led to the solidification of the tourist attraction of the city and further revenue rising from tourists via services provided. Urban agriculture was being contributing to community and backyard gardens greening of Hawassa areas, improving aesthetics and well-being. The waste was being used to fertilize plantations on the roads throughout the city and the plantation around and inside residences compounds.

Conclusion And Recommendations

People from different societies are migrating to urban centers in search of job. Systems providing food for nearby residents could offer many benefits for growers, consumers, and the community. Hence, this investigation was aimed at examining roles of urban agriculture to livelihood, waste management, and urban greening in the study area. Urban agriculture is found to maintain the cultural experience of the local society. It is generating income for Practitioners and different stakeholders in the society and has introduced saving habits to enrich themselves financially. Urban agriculture in the study area contributes and plays a major role in maintaining aesthetic value of the city through sustainable waste management.

Practice of urban agriculture of the city should be intensive and in line with the increasing urbanization. The environmental aspect of the urban agriculture should also be more emphasis.

Declarations

Ethics approval and consent to participate

An official letter was written by the Wondo Genet College of Forestry and Natural Resources, Hawassa University, with a detailed description of the objective and role of the study. The purpose of this research was clarified for each participant and a consent form was attached to each questionnaire during the interview process. Finally, the respondents guaranteed that their privacy would be protected by a strict anonymity standard.

Consent for publication

All authors agree and consent for the manuscript to be published.

Availability of data and materials

Not applicable

Competing interest

The authors of this paper hereby declare that there are no competing interests in this publication.

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Authors' contributions

Gezehagn Gesese Gelgelo, Fiseha Bekele Teshome and Zewude Lemma Owato designed the proposal and the data collection tools, undertook field work and the analysis, and developed the manuscript. Gezehagn Gesese Gelgelo contributed most in developing the data collection tools, survey design, writing of the manuscript and reviewed. All the authors read and approved the final manuscript.

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Figures

Figure 1

Cultivated Maize crop in Hawassa city

Source: Photo by researchers, 2020

Figure 2

Vegetables and fruit trees cultivated in Hawassa city

Source: Photo by researchers, 2020

Figure 3

Livestock keeping in Hawassa

Source: Photo by researchers, 2020

Figure 4

Agricultural inputs produced and re-used to clean the city

Source: Photo by researchers, 2020

Figure 5

(A) Less managed urban waste (B) Better managed urban waste

Source: Photo by researchers, 2020

Figure 6

Insecticide/pesticide use round Lake Hawassa

Source: Photo by researchers, 2020

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