The Contribution of Urban Agriculture to Food Security of Individual Urban Farmers in Yeka Sub City, Addis Ababa

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Abstract

The study aimed to assess the contribution of urban agriculture to food security of households in Woredas [Districts] 1, 2, and 3 of Yeka Sub-City, Addis Ababa. The research covered the entire population (86) as the size was manageable. The primary data were collected mainly through household survey, focus group discussion (FGD), and key informant interview. Descriptive statistics, frequency, and the Pearson correlation coefficient were used for the analysis of quantitative data. Data from key informants and focus group discussion were transcribed, thematically classified, analysed and interoperated . The research followed purposive sampling technique in order to select the study area. As it contains the largest number of individual farmers practising urban agriculture compared to the other Sub-Cities. World Food Programme Food Consumption Score Analytical Tool was employed to measure the food security status of a given household. Findings showed that 74.4% of the households studied were food-secure while 24.4% and 1.2% of the households were mildly and severely food insecure, respectively. It was also revealed that there is significant relationship between food security status and income. Urban agriculture contributes to one-third of the total income of the household. On top of urban agriculture, urban farmers in Yeka Sub-City of Addis Ababa earn their income from informal livelihood activities. Urban agriculture proved to play a significant role in improving the households' food security and income.

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It has provided employment, cheap food and nutrition. Lack of farmland and water were the main challenges of urban farmers. Institutional support makes a difference in improving urban farmers productivity and thereby their food security status. Agricultural inputs like land and water are serious challenges of the urban farmers. Hence, in consultation with urban farmers, relevant government offices and non-governmental organisations that are active in the area have to work in better integration and attempt to address the challenge of urban farmers. Unused and wasted plots of land should be identified and be provided to the urban farmers. Training has to be given based on needs. These minimise waste of resources and help utilise the scarce resources for the improvement of the sector and to the benefit of the urban farmers.

Keywords: Urban agriculture, food security, individual urban farmers, Yeka Sub-City, Addis Ababa

Problem Statement and Objectives of the Study

The World Bank Independent Evaluation Group (IEG) reported that one billion people around the world are chronically poor (IEG 2011). In a related context, FAO (2013) estimated that the number of hungry people in the world at 842 million. Among them, 239 million were in Sub-Saharan Africa, which is the 2nd largest next to Asia and the Pacific with 578 million. Nearly all of the hungry people were in developing countries.

According to the United Nations (UN)/Habitat (2012), about 80% of the population of Addis Ababa city lives in slum areas. Slight increases in food prices and unavailability of land for cultivation can push many individuals and families into hunger. FAO (2010) stated that the urban poor spent larger per cent of their income on food; and that makes them highly vulnerable when food prices rise or their incomes fall. As a result, they are highly affected by the disproportionate spike of world hunger. FAO estimates that in the wake of global food price inflation in 2007/2008, and the subsequent economic recession, the hunger affected population in the world has risen by at least 100 million and reached more than one billion people (FAO 2010). The poor are affected by global economic downturn which reduced their employment opportunities and income levels. With this in mind, there is a growing movement to improve agriculture within the city.

The Resource Centre on Urban Agriculture and Food Security (RUAF) (2012: 2) defined urban agriculture as "the growing of plants and the raising of animals within and around cities". Urban agriculture can be subdivided into two categories: 1) intra-urban agriculture, which takes place within the inner city and is mostly subsistence-oriented; and 2) peri-urban agriculture, which takes place in the urban periphery, and is mostly market-oriented) (RUAF 2012).

The urban poor in Ethiopia, particularly in Addis Ababa, are increasing because of the rapid rate of urbanisation and its negative consequences. As Degefa (2008) stated, high birth rate and migration from rural areas are the two major causes for high rate of urbanisation. Rapid urbanisation in Addis Ababa city has been increasing the food demand of the residents. To meet their basic needs the poor in Addis Ababa have been engaged in diversified livelihood activities ranging from informal trading to urban agriculture. However, the real potential of urban agriculture in Addis Ababa, alike in several developing countries' cities, in satisfying the basic needs of the poor by increasing income, creating employment opportunity and protecting the environment, etc. faces challenges that arise from unfavourable urban policy (Getahun, 2005).

This study attempted to explore the contribution of urban agriculture in enhancing the food security status of the poor in Yeka Sub-City of Addis Ababa, focusing on individuals who are practicing urban agriculture with the support of Progressive Integrated Community Development Organisation (PICDO). The study shades more light on how a community can address food insecurity and inadequate food availability. The main beneficiaries are women-headed who earn their living by petty trading and other labour works in addition to farming. There is no official document which provides the exact number of people who are involved in urban agriculture in Yeka Sub-City. However, it is estimated that about 50, 627 people are engaged in urban farming in Addis Ababa, of which 8000 people are in vegetable production (Eyasu 2000). In 2009, PICDO identified that there are 86 individuals engaged in urban agriculture in the three *Woredas* [districts].

The author of this article believes that this study will enhance our knowledge about the role of urban agriculture in improving the food security status of urban poor. It generates valuable information that can inform similar studies and development endeavours that may be conducted in the future.

Overview of Conceptual and Related Literature

The contribution of urban agriculture to food security and healthy nutrition is significant and therefore urban agriculture was one of the most important strategies to achieve the Millennium Development Goals (MDG) 1. Food production in the city is often a response of the urban poor to inadequate, unreliable and irregular access to food and low purchasing power. Most cities in developing countries are not able to create sufficient income opportunities in urban areas (Argenti 2000 cited on FAO 2007). Lack of income translates directly into lack of food more in urban settings than in rural areas. The costs of supplying and distributing food from rural to urban areas, or of importing food for cities, are rising continuously and urban food insecurity is expected to increase (Argenti 2000, cited in FAO 2007). Mougeot stated that "a regular supply of home grown food can make a considerable difference to the lives of the urban poor. It does not only contribute to improved nutritional health but also may free up some of a family's cash income for non-food expenses such as education" (Mougeot 2006: 13). Also Axumite (1994) argued that urban agriculture can contribute much to regulating the problem of undependable supplies of food in cities. She has also stated that urban agriculture is important to bring food prices down by increasing production and under-cutting the farmers' market prices where food is more expensive. However, there are also researchers who believe that urban agriculture alone will not be enough to achieve food security for the urban population (RUAF 2009). The concept of food security, however, is used to emphasise access to food rather

than merely availability of food. It also incorporates the need for a healthy food. Urban households must benefit both. According to Maxwell (1999), the nature of urban food insecurity in Ghana has changed from the problem of feeding the cities or maintaining aggregate supply to that of access at household and individual levels. The responses of urban households to the economic crisis are normally the focus of efforts to combat poverty and food security. Poor urban consumers spend 60% to 80% of their income on food in Ghana. Here, urban agriculture becomes a plausible option as it contributes to the aggregate supply, particularly of fresh and perishable plant-origin and animal-origin food as well as food production at home for home consumption and better nutrition (Maxwell 1999). Urban agriculture has enormous potential to improve the livelihoods of the urban poor in developing countries (Gundel 2000). According to Chambers and Conway (1992: 9),

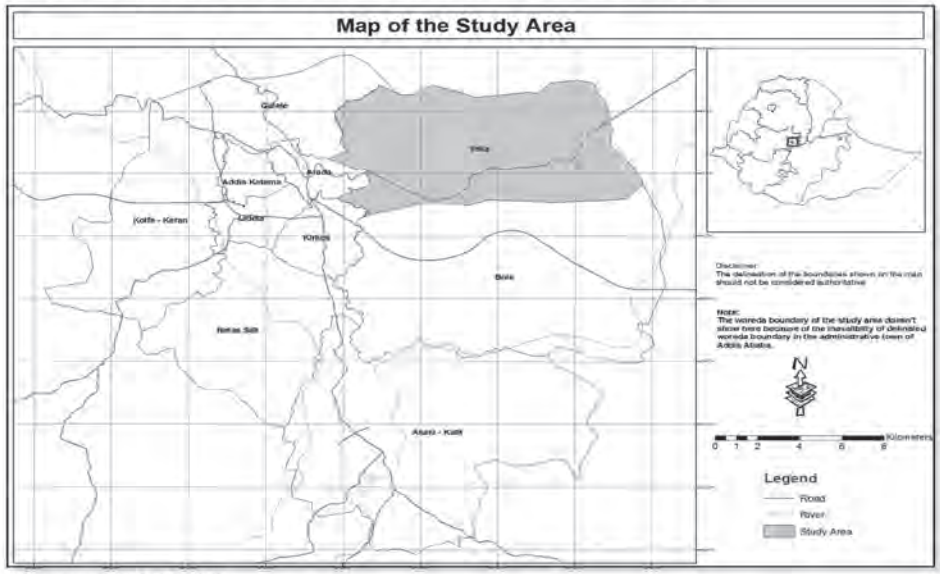
> *A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks [and] maintain or enhance its capabilities and assets, while not undermining the natural resource base.*

Urban agriculture makes a significant contribution to the livelihoods of urban population in ensuring food security and providing income generation in the developing countries (FAO 2007; Smit *et al.* 1996; Axumite 1994). Lynch (2002) states that in some cities of Australia and Canada, urban agriculture plays a major role by occupying 35% of the land area, employing 36% of the population, and may supply up to 50 % of urban fresh vegetables. In Addis Ababa, for example, urban farming has significant contribution to the livelihoods of urban households as compared to other livelihood options, and among urban farmers, more than 65% of the households' income is derived from farming (Theodros 2007).

Methods

Both qualitative and quantitative methods were used for collecting and analysing data for this research. The study area Yeka Sub City (see Figure 1) was purposively selected for it contains the largest number of individual farmers practising urban agriculture compared to the other Sub-Cities.

Figure 1. Location of the Study Area in Addis Ababa City



Source: CSA (2008)

The primary data were collected through household survey, focus group discussion (FGD), and key informant interviews. The household survey was conducted by using structured questionnaire. The questionnaires are verbally presented to respondents, with the answers filled in the questionnaire by the interviewer. A total of three FGDs were selected. Two of the groups were women with twelve participants each. The third FGD participants comprised 8 men. Key informants were drawn from Addis Ababa Urban Agriculture Core Process officers, Woredas agriculture officers and PICDO project officers who are directly or indirectly involved in the area of the research topic.

Frequencies of meals and dietary diversity were used as proxy indicators of household food security. In this study, households were asked to recall types of food items their members consumed over the seven days prior to the survey date as well as to indicate the number of days the food type was consumed. Using standard World Food Programme (WFP) Vulnerability Analysis and Mapping (VAM) analytical method, the items consumed were grouped into eight food groups (staples, pulses, vegetables, fruits, meat and fish, sugar, milk, and oil). These different food groups were given weights based on nutritional density; animal proteins were given the highest weight. A consumption score was calculated combining information on dietary frequency and dietary diversity. Then, thresholds (cut off points) were used to classify households as having poor, borderline or acceptable consumption levels (WFP, 2008b). At household level, research has shown that dietary diversity and frequency are good proxy measures of food security (WFP, 2008b). Using a 7-day recall period, information was collected on variety and frequency of different foods and food groups to calculate a weighted food consumption score. Weights were based on nutritional density of the foods. Cut-off points or thresholds were established to enable analysis of trends and to provide a benchmark for success. Households were then classified as having either 'poor', 'borderline', 'acceptable' or 'good' consumption based on the analysis of the data (WFP, 2008b).

Data were verified by cross-checking the filled-in questionnaires, that were also edited and coded. Coded data were entered into computer using the Statistical Package for Social Scientists (SPSS) Version 15 and described using descriptive statistics to determine averages, frequency distributions, minimum or maximum values of household characteristics, cross tabulation, mean, median, standard deviation, etc. MS-Excel was also used for drawing graphs depending on its convenience. Qualitative information gathered from key informants and focus

group discussion participants (FGD) were transcribed, thematically classified, analyzed and interperated. Data from the two sets of approaches complemented each other.

Results and Discussion

The research involved individual farmers in Yeka Sub City of Addis Ababa who were beneficiaries of the Progressive Integrated Community Development Organisation (PICDO)[2]. This section presents the results and discussion of the features of urban agriculture in the Sub-City, its contribution to food security of the individual farmers, and to dietary diversity of the households.

Features of Urban Agriculture in Sub-City

Reasons for Engaging in Urban Agriculture

According to the survey and FGD participants, urban farming involves different people. Their reasons of involvement also vary. All the respondents (100%) unanimously indicated that the three primary reasons are to ensure food security, to get employment, and lowness of income (Table 1). Nearly 70% of the survey respondents said they engaged in urban farming for covering non-food expenses of the household. According to the FGD participants, non-food expenses, which they usually face in short of income include house rent payments; membership payments for community-based social associations, such as *Edir*[1] and *Equib*[2], medical expenses; purchase of cosmetics, clothing; and payments for utilities, such as electricity and water. They cover significant portions of these expenses from the sale of vegetables and other urban agriculture produces. Related to this Mougeot (2006) argued that home-grown food can make a difference to the lives

1* Edir is one of the traditional forms of cooperatives mainly stand for performing burial ceremonies, to condolence, and also to offer assist financially and labor with the deceased family member to overcome difficulties arise due to occurrence of death in member's family.

2* Ekub is a financial form of traditional cooperative formed voluntarily. It is a rotating saving and credit type association whose members make regular contributions to a revolving loan fund.

of the urban poor and it also can free up some of family's cash income for non-food expenses. The focus group discussants added that economic benefits of urban farming were the basic reasons of their engagement. The focus group discussants reported that their nutrition improved and their economy was better off after they engaged in urban agriculture. Urban agriculture has positive impact on health. In this regard, researches show that urban agriculture has enormous contribution to the urban poor in terms of food security, nutrition, income generation, food production, and community wellbeing (Brown and Jameston 2000). Mougeot (2006) found out that the quests for food security and income generation were the two major forces that drive people from all walks of life to cultivate in city .

Table 1. Reasons for engaging in urban agriculture in Yeka Sub-City of Addis Ababa

Reasons	N	%
To ensure food security	86.0	100.0
To get job opportunity	86.0	100.0
Low income	86.0	100.0
Experience in agriculture	17.0	19.8
Lack of skills in other jobs	11.0	12.8
Others (to cover non-food expenses)	60.0	69.8

Source: Field data (2013)

Respondents' having previous experience in agriculture and lack of skills in other jobs were reported as reasons for engaging in urban agriculture by 19.8 per cent and 12.8 per cent of the participants.

Types of Urban Agriculture Precticed by Households

As indicated in (Table 2), all of the respondents were involved in vegetable production. Only 12.8% and 4.7% of the respondents were engaged also in poultry production and sheep rearing and fattening, respectively, along with vegetable production. Participants of the women focus group discussants show that most of them used to run sheep fattening and poultry production along with vegetable production. Nonetheless, challenges such as lack of veterinary

services, shortage of feed, shelter, and labour have compelled them to fully shift to vegetable production. The key informants disagreed with the idea of unavailability of veterinary services. They rather reported that urban farmers are provided with veterinary services and training sessions organised for the urban farmers to help them acquire basic knowledge about managing poultry and sheep rearing, including problems related to diseases. The key informants added that the problem may relate to the urban farmers commitment, scarcity of space, a relatively higher investment need and poor management practices. Generally, the low level of urban farmers' participation in livestock production can be linked with waste management, the scarcity of urban land, and the relatively high initial investment. The FGD participants indicated that they were very much satisfied with their engagement in vegetable production in terms of food availability in the household and increment of their income. Therefore, it can be argued that vegetable production is competent in ensuring food security and providing cheap food to the household. Lynch (2002) suggests that in some cities in Australia and Canada, urban farming supply up to 50% of fresh vegetables to the urban population.

Table 2. Type of farming in Yeka Sub-City of Addis Ababa

Type	N	%
Vegetable production	86.0	100.0
Sheep rearing and fattening along with vegetable production	4.0	4.7
Poultry production along with vegetable production	11.0	12.8

Source: Field data (2013)

Types of Vegetables and the Place for Vegetable Growing

From data presented in Table 3, it can be deduced that in the study area, vegetable gardening was a very common farming activity. While lettuce, tomato, and cabbage were the major produces grown by all farmers, pepper, beetroot, garlic and cucumber were grown only by some. Regarding the amount they produced from each kind of vegetables, the FGD participants in both male and female groups reported that most of them do not have the knowhow to record the amount they produced, consumed and the proceeds. Recording the amount produced and

the proceeds would definitely help farmers to identify marketable and profitable vegetables and plan accordingly for the following season. As Viljoen (2005) argues, a business management skill is as important as the farming skill for urban farmers, particularly for those who produce for market. The same author indicates limited knowledge and skills as a challenge for urban farming.

Table 3. Types of vegetables and the place for vegetable growing

Variables	Frequency	%
Lettuce	86	100
Tomato	86	100
Cabbage	86	100
Pepper	14	16.3
Beet root	25	29.1
Garlic	19	22.1
Other	9	10.5
The Place for Vegetable Growing		
Backyards	36	41.9
Open space/communal	39	45.3
Road side	11	12.8
Total	86	100

Source: Field data (2013)

As shown in Table 3, 45.3% of the respondents cultivate on communal land and 41.9% on backyards; while 12.8% of respondents produce vegetable on road side. The key informants reported that some of the farmers without backyards had got a chance to farm on PICDO nursery sites. The FGD participants stated that they are happy to work in a communal land and grateful to PICDO for providing them with communal land for free. However, these respondents expressed also their feelings of insecurity as the land is temporarily given to them by the NGO. Lack of ownership was felt seriously. The participants also noted that farmers who privately owned houses have better opportunities of cultivating vegetables in their backyards. But, most discussants said they did not own houses and live in privately-rented houses that undermine the practice of farming. The absence of use-right of available spaces inhibits practicing farming in confidence and investing more in the existing plot of land. Also the researcher observed some farmers producing vegetable by using different materials like sack, barrel, and tire where land or

space is scarce. However, as a result of lack of awareness and resources, many residents do not cultivate vegetable because of want of good size of plot of land. Mougeot (2006) argue that urban agriculture is space-conscious where it can be practiced everywhere, including small gardens, corridors, backyards, and roof tops. However, it should be noted that, due to the size of the plot of land, harvests remain small as opposed to larger spaces or communal lands. In the current study area it was found out that the larger the space, the greater the total produce; and the higher their incomes and the better their food security status.

Purpose of Vegetable Production and Target Consumers

The main purpose of agricultural activities in the study area is for home consumption, which was reported by about 89.5% of households (see Table 4). For 10.5% of the respondents, agricultural produce is for sale. The FGD participants also explained that their vegetable production is mainly for own consumption and this amounts to 80% of the total production. As it was discussed in the literature, the production of vegetable helps urban farmers to save 10%–30% of food expenses while contributing to reducing food insecurity by providing direct access to home-produced food to households (Atkinson 1992). The FGD participants reported that women were the main actors in the process of production and making decisions on the consumption of the produce. This is in conformity with the findings by FAO (2008) which showed that women are responsible for the day-to-day family subsistence. And women's access to income from the sale of vegetable and their decision-making on household food consumption and expenditure results in improvement of household food security and nutrition. Studies in Africa, Asia and Latin America confirmed that women tend to spend higher proportion of their income than men on food for the family (FAO 2008). The rest of the vegetable, mostly cabbage and lettuce, is sold to consumers in the local market. It was also learnt that none of the farmers sell their produce to either retailers or wholesalers.

As a result, urban agriculture contributed to improving food security by availing food and nutrition for the household; by improving income, as well as to strengthening the social bond among the community.

Table 4. Purposes of Urban Agriculture in Yeka Sub-city

Variables	N	%
Market	9	20.5
Home consumption	77	89.5
Total	86	100

Source: Field data (2013)

Main Actors in Providing Support for Urban Farmers in Yeka Sub-City

As can be seen from Table 5, most farmers (84.9%) got support from family members, including their husband and economically-active children. According to the focus group discussants, their neighbours also played a significant role in looking after their houses and younger children while they were engaged in the farming activities. According to Axumite (1994), in Ethiopia, family members and neighbours play a great role in urban farming. While some members devote their spare time in the farming activity, some share the load of the household activities like shopping and taking care of toddlers. This support enables urban farmers to give more time for their work, get extra labour and knowledge, and boost their production as a result.

Table 5. Main actors in providing support in household farming

Actors	Frequency	%
Family members	73	84.9
Others	13	15.1
Total	86	100

Source: Field data (2013)

Access to Training

Urban farmers should get training for them to be equipped with skills, knowledge, practices and principles that enable them enhance production and productivity. Training based on the actual needs of participants is very important to enhance the potential of the trainees in performing their duties with better efficiency.

Accordingly, with the intention of improving the knowledge and skills of farmers, the majority of respondents (82%) were trained on different topics like livestock

and poultry production and management, post-harvest handling and crop rotation (Table 6). The organisation named PICDO took the initiative to train urban farmers. The key informants from PICDO were also asked to state about who facilitated the trainings, their frequency, duration and topics. Accordingly, it was learnt that the majority of the farmers were trained once, on average for 5 days. This is acknowledged to contribute in boosting their skills and knowledge.

Almost all participants of this study indicated that training programmes are aimed at core factors that improve urban agricultural performance. FGD participants reported that farmers who got training performed better in production and selling compared to those who didn't get the opportunity. However, their better performance seems to be linked also with other factors, such as like commitment, experience, and proper use of farm inputs. According to the key informants, most farmers lack the basic business and financial management skills. For this reason, it is common to see them without the knowhow of registering what they produce, consume and sell.

The five days training given only once for the urban farmers, the majority of whom are with skills no more than reading and writing, and who are unskilled and ill-equipped, is by no means sufficient. According to FAO (2008), need-based basic and refreshment training programmes are significantly important for urban farmers to remain in the business and boost their production. It also pointed out that practical training that improves knowledge and skills of urban farmers in areas of land use; business management; agricultural inputs like improved seeds, water, credit services, and agricultural implements; waste management; and market are crucial in boosting production, and ultimately the income of the urban poor.

As discussed earlier, nearly all farmers produce only vegetables. Some of the training initiatives aimed at improving livestock and poultry production and management training that were given for all urban farmers across the board did not take in to account the interest of farmers, availability of capital and space.

In general, findings reveal that training endeavours were inadequate in terms of duration; frequency and relevance (see Table 6).

Table 6. Types of agricultural training and the number of participants among the study households in Yeka Sub-City

Theme of training	Frequency	%
Compost making	80	93
Compost use	79	91.9
Fertiliser application	82	95.3
Pest management	83	95.3
Livestock and poultry	86	100
Post-harvest handling	84	97.7
Crop rotation	83	96.5

Source: Field data (2013)

Access to and Use of Technologies

Application of technologies enormously increases the level of agricultural production. Urban farmers in the study area apply technologies in their vegetable farming. As indicated in Table 7, all respondents use improved technologies. According to the focus group participants, the inputs they were getting from the NGO were not sufficient and suggested a need of support of the agricultural offices of the *woredas*. The findings reveal that the credit service is so limited. Only 18% of the respondents got access to credit from *Woreda* agricultural offices to diversify their sources of income. FGD participants consider credit as a basic tool to improve household food security, as it enables to start and expand a business. They reported that the availability of this crucial input is limited. In this regard, the insufficient financial service seems to have partly contributed to the urban farmers' limitation of themselves to a very small scale production and subsistence level of farming. Hence, PICDO or the *Woreda* Agricultural Offices should think of facilitating for better credit services, say, for example, by linking these farmers with credit service providing agencies.

Regarding other challenges facing the farmers, all respondents replied that lack of regular water supply is a challenge in the area. In most cases, shortage of water becomes serious in the dry seasons as there are no alternatives except their own tap water to manage the problem. The findings have shown that the main source of water for vegetable production in the study area is own tap water or water from

the collective water tap of the municipality. Both services have cost implications. In addition to these services, all farmers use rainwater during the rainy season. Related to this, all of the FGD participants reported rainy season to be the best for production. They also pointed out that due to lack of water storage facilities, they waste the resource and produce lesser compared to their potential. Almost all of the participants agreed to the need of getting larger water tanker for sustainability.

This practice of seasonal farming, limited for lack of water storage facility, has a potential to impede the food supply of farmers. Though tap water is available in the area, urban farmers do not afford to use it for crop cultivation. Hence, farmers practicing urban farming for household consumption may get home-grown vegetables only during rainy seasons. Definitely, this compromises those households' nutrition intake and their food security status as a result. According to FAO (2008), rainwater is a cheap water source that can be harvested with lesser expense and can be managed with less difficulty by local skill. Rainwater harvesting for vegetable growing is a viable option to alleviate the scarcity of water. Thus, capacity building interventions by governmental and non-governmental organisations can help improve the practice and productivity of urban agriculture, and thereby household food security, by sharing and availing rainwater harvesting technologies and skills.

Table 7. Proportion of Respondents having access to and use of agricultural technologies, inputs and services in Yeka Sub-City

Technology/input/service	Frequency	%
Improved seeds	86	100.0
Fertiliser	86	100.0
Pesticide	86	100.0
Compost	86	100.0
Credit	16	18.6
Other	86	100.0

Source: Field data (2013)

Access to Institutional Support

All of the farmers reported that they have accessed from PICDO institutional support in terms of basic agricultural tools, improved seeds and extension advice. They also fill resource gaps by purchasing on the market. According to Timbwe

(2006), urban agriculture is considered as an informal sector of the economy in most countries of the world. Accordingly, the institutional support given to the sub-sector is minimal. Contrary to this tradition, some of the participants in this study reported PICDO was providing technical and material supports to individual urban farmers of Yeka Sub-City.

The government support in this regard was more focused on availing land for PICDO, giving license and facilitating other infrastructure to the NGO working with the poor urban farmers. FGD participants reported their need for more attention and direct support from the government. Getting support related to the provision of agricultural inputs, skills training and credit services for individual farmers are a key in improving the productivity of urban gardening in order to improve the food security of urban farmers (Mougeot 2006). Raising the awareness of the individual urban farmers, promoting the use of improved technologies, and providing information on how and where to access public services are fundamental roles and responsibilities of the concerned offices and officials.

Contribution of Urban Agriculture to Food Security

Household Food Security and Ways Households Feel Food Secured

Data presented in Table 8 indicate that all respondents replied that their food security status improved because of their involvement in urban agriculture. They were also asked to express how they know whether their food supply has improved or not. All respondents considered engagement in urban farming as a way of increasing the availability of food and income for the household. The FGD participants pointed out that they appreciate the contribution of urban agriculture; it has diversified their diet through the consumption of locally-produced fresh and nutritious food. The participants added that as urban agriculture benefited them by providing self-employment, boosting income from sales of surplus productions, and reducing food expenditures. It also contributed to the local market in supplying fresh vegetables that are in excess of the household consumption. According to FAO (2007), urban agriculture plays a significant role in improving the food security status of the community in general and the household in particular

through provision of food and nutrition, and increasing purchasing power. It plays an important role in fighting against poverty by offering permanent and temporary job opportunities and creating substantial income as proved by the urban farmers covered in this study.

Table 8. Ways respondents feel urban agriculture helped increase household food Availability

Response	Frequency	%
Is your household food availability improved		
Yes	86	100
No	0	0
How do you know it?		
Increased food availability	86	100
Diversified source of income	86	100
Increased income	86	100
Job opportunity	86	100

Source: Field data (2013)

Source of Income Apart from Urban Agriculture

As can be seen from the data in Table 9, almost all respondents practiced urban agriculture alongside other jobs. The job types range from formal sector jobs, such as public service to informal sector jobs like petty trading, daily labour and selling of local drink. For the majority (43%) and (47%) of respondents petty trading and daily labour were the other means of income, respectively. Despite the high level of engagement in other informal sector activities, the respondents' engagement in urban agriculture was significant. It appears that income earned from both the informal and the formal sector is inadequate to meet the needs of the households. Therefore, it can be argued that the high level of involvement in urban agriculture alongside other activities aims at supplementing their household income.

Table 9. Occupational characteristics of sample respondents

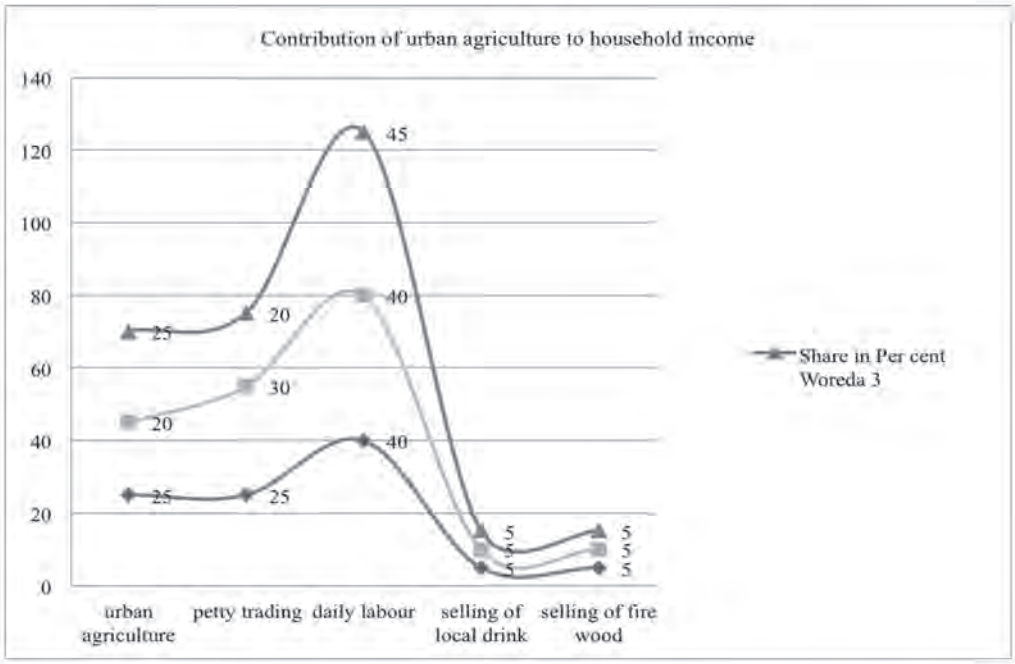
Types of occupation	N	%
Civil servant	2	2.3
Petty trader	37	43.0
Daily labourer	41	47.7
Selling of local drinks	6	7.0
Total	86	100.0

Source: Field data (2013).

Contribution of Urban Agriculture to Household Income

The contribution of urban farming towards household income and results revealed that it contributes a good share to household income (Figure 2). In the year 2011/12, urban farming contributed around 25% of the total household income in Woredas 1 and 3, and about 20% in Woreda 2 (Figure 2). The average contribution of urban agriculture to household income in the three Woredas amounts to 23.3%. This result is not consistent with the findings of a study conducted by Theodros (2007), which showed that the contribution of urban agriculture to household income was over 65% for those organised in cooperatives Hence, we can contemplate that the differences in the levels of earnings from urban agriculture in Addis Ababa may be explained, among other factors, by the possibility that farmers in the cooperatives have better opportunities to tap more income from urban farming than individual farmers do.

Having institutional support and large plot of land can be among the other reasons. However, though at a lower degree compared to what it unfolds for farmers organised in cooperatives, urban agriculture still continued to make a significant contribution to the total household income and food security for the individual farmers.



Source: Field data (2013)

Despite relative absence of a strong policy support, clear direction to the approach of urban farming, lack of enough agricultural inputs and technical support, the contribution of this sector in improving the food security of the farmers is significant.

Figure 2. Comparison of the Contributions of Urban Agriculture with Other Means of Income.

Annual Income from Urban Agriculture in Yeka Sub-City

Descriptive statistics presented in Table 10 revealed that the mean annual income households made from urban agriculture was roughly estimated at 4,744.2 Eth. Birr. This earning makes a significant contribution to household food security as the urban poor spend 60% to 80% of its income on food (FAO, 2015). However, this should be seen guardedly as the farming conditions vary between seasons, between cities and countries.

Table 10. Monetary Value of Respondents' Income from Urban Agriculture in Yeka Sub-City

N		Monetary value (in Eth. Birr)
Maximum		7200
Minimum		1200
Mean		4744.186
Std. Deviation		1842.2
Sum		408000
Percentiles	25	3000
	50	4800
	75	6000

Source: Field data (2013)

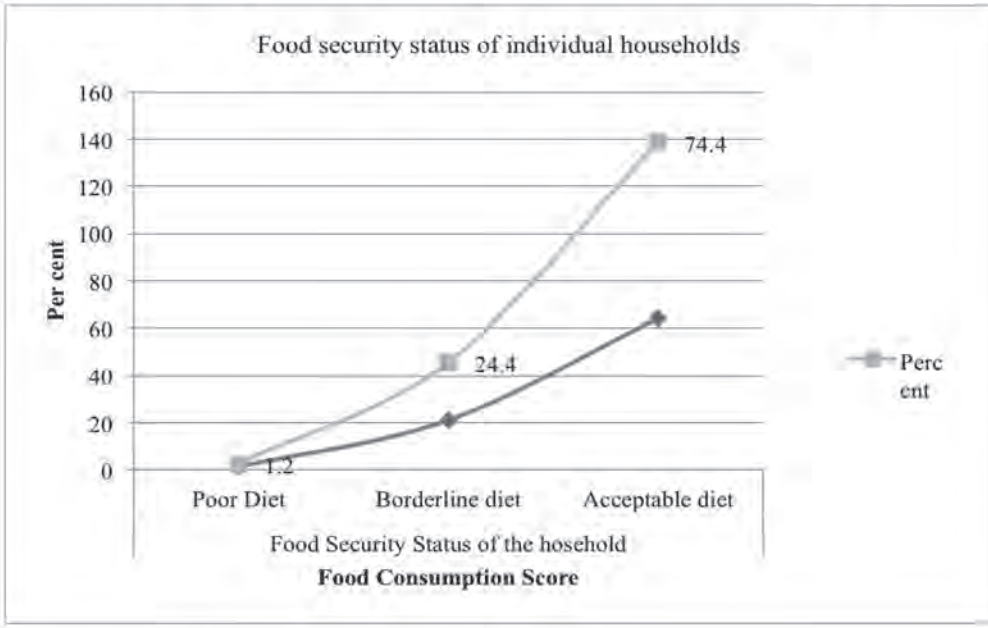
Contributions of Urban Agriculture to Household Food Security and Dietary Diversity in Yeka Sub-City

Food Security Status Based on the Household Dietary Diversity Score

Use of the Food Consumption Score (FCS) allows for comparisons of dietary quality and diversity in households. Based on this analysis, Figure 3 shows that only 1.2% of the respondents had poor consumption or is considered food-insecure. A score of 21 in FCS is a barely minimum cut point. Accordingly, scoring below 21 means a household is not expected to eat at least staple and vegetables on a daily basis and therefore the household considered to have poor food consumption (WFP 2008a). The findings of this study showed that households with "poor" consumption managed to eat only cereals on a daily basis, vegetables three times a week, and edible oil a day in a week. This is considered minimum and a sign of household food insecurity. It is also learnt that 24.4 % of the respondents had borderline diet compared to the cut off point, i.e. between 21 and 35. The value 35 comes from an expected daily consumption of staple and vegetables complemented by a frequent (4 day/week) consumption of oil and pulses (WFP 2008a). In this study, it was found that households with "borderline" consumption were eating cereals, pulses, and edible oil on daily basis, and vegetables and sugar in two to three days with no meat and milk in a week. As shown in Figure 3, high percentage of the respondents (74.4%) had acceptable diet or considered as food secured. According to WFP, households

that score above 35 are considered having acceptable food consumption (WFP 2008a). The FCS of most respondents in this study is classified as having 'good' consumption or acceptable diet. On average, they consumed cereals, pulses, vegetables, oil and sugar seven times in a week. In addition, as some of them had meat and milk in their diet, it can be considered as a more diversified one. The reason for having acceptable diet on top of urban farming could be linked to the engagement of urban farmers in urban agriculture alongside different non-farm income boosting activities.

Figure 3. Food Security Status of the sampled Household in Yeka Sub-City

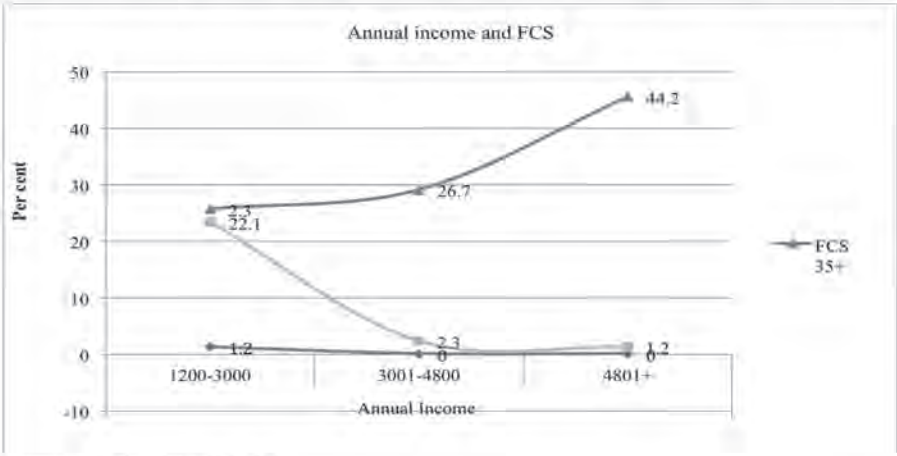


Source: Field data (2013)

Income and Food Security Status

Consumption improves with the improvement of income. As indicated in Figure 4, households (44.2%) whose annual income from the sale of vegetable is above Birr 4,801 fall in the food-secured category as their FCS is above 35. About 25.6% of the households whose annual income is between Birr 1,200 and 3,000 fall in the borderline diet category.

Figure 4. Food Security Status of Respondents with Their Annual Income



Source: Field data (2013)

The data in Table 11 shows the relationship between food security status on the basis of the seven day household dietary diversity score and annual income of the household. Thus, the Pearson's r^3 value is equal to 0.723**, which implies the presence of a positive strong correlation between household dietary diversity or food consumption of household and annual income of the target households. The increment of income positively affects the food consumption habit of the household. However, we cannot make any other conclusion about this relationship solely based on this number. We have to look the Sig. (2-tailed value). In this case, the Sig. (2-Tailed) value is 0.000, which is less than .05. Because of this, we can conclude the presence of a statistically significant correlation between income and household dietary diversity.

Table 11. Correlation between Household Dietary Diversity Score and Annual Income

Variables	Statistical measures	FCS	Annual income
FCS	Pearson Correlation	1.000	.723(**)
	Sig. (2-tailed)		.000
	N	86.000	86.000
Annual income	Pearson Correlation	.723(**)	1.000
	Sig. (2-tailed)	.000	
	N	86.000	86.000

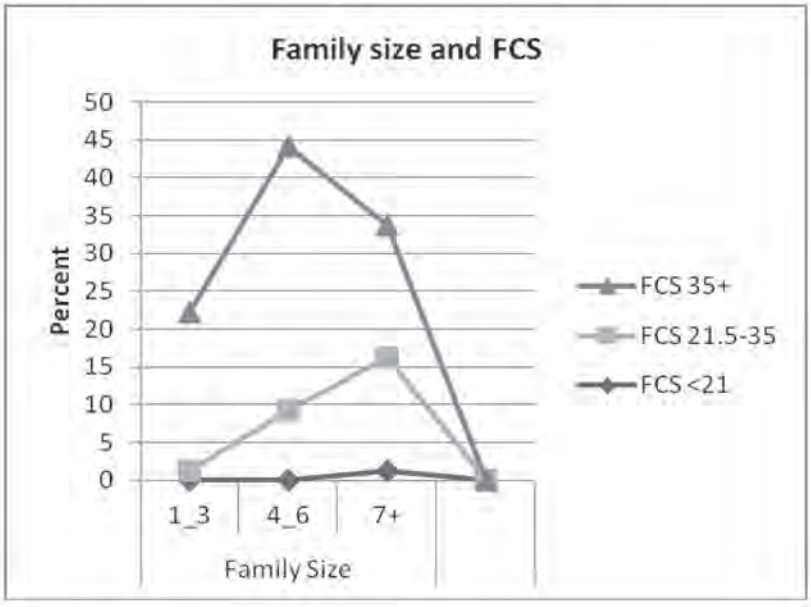
**Correlation is significant at the 0.01 level (2-tailed).

Source: Field data (2013)

Family Size and Food Security Status

As shown in Figure 5, households with family size of 4–6 persons exhibited better FCS than households with both lesser (1–3) and greater (7+) family size. This finding tells us that having limited family size compared to household capacity and income is helpful in contributing to the extra demands of the household like labour, experience and knowledge. However, other factors like household members' health status, active involvement in income generating activities and the existing family dynamics among members of the household can affect the household food consumption as well. At the same time, household food consumption and expense remains manageable. Therefore, having manageable size of family members contributes to the status of household food security.

Figure 5. Family Size and Food Security Status of the Respondents.



Source: Field data (2013)

Conclusion

Urban agriculture involves different people from different demographic groups. Men, women, youths and elderly participate in the sector. Family size of households participating in the sub-sector also varies, and average family size of the urban farmers in the study area is six. It has been learnt that family size influences the food consumption of the household. Having average family size of 4–6 persons has been shown supportive in having better household food consumption. According to Axumite (1994), in Ethiopia, family members play a great role in urban farming by assisting their families in providing labour and skill. However, it should also be noted that other factors like household members' health status, active involvement in income generating activities and the existing family dynamics among members of the household can affect, either positively or negatively, their contribution towards the household food consumption.

Vegetable production is more common than livestock production. As vegetable production demands lesser initial capital, skill and space, the majority of urban farmers preferred it to animal husbandry. The urban farmers produce vegetables mostly in their backyards and on temporarily donated communal land. Farmers feel insecurity due to lack of land ownership. The temporarily donated land from an NGO may not last long. Ownership of land gives urban farmers confidence and security to cultivate long-term crops and invest on their plots of land. According to Ellis (2000), ownership of assets gives the individual capacities that are needed to cope with stresses and shocks, and to maintain and enhance capabilities now and in the future. These opportunities contribute to increase production and thereby urban farmers' income and their food security.

Numbers opportunities were provided to urban farmers. Some of those opportunities on animal husbandry were given nearly to all urban farmers. However, most urban farmers had no space to rear cattle. Some training endeavours never considered the needs of the farmers and other factors like space and capital requirement. According to FAO (2008), need-based agricultural inputs such as training opportunities are crucial in boosting agricultural production, thereby enhancing the food security status of urban farmers. This study revealed that some

inputs are inadequately available for the urban farmers. Among other inputs, lack of appropriate agricultural technologies was identified as a challenge. Scarcity of water was found to be the most critical constraint of the urban farming.

Most farmers use their produce for household consumption purpose and sell the surplus to supplement their income. Income earned from urban agriculture is mostly used to cover non-food expenses that include rental and membership payments for community-based organisations, such as *Edir* and *Equib*, medical expenses, purchase of cosmetics, clothing and pay for utilities. Related to this, Mougeot (2006) argued that home-grown food can make a difference to the lives of urban poor and it also frees up some of the family's cash income for non-food expenses.

All urban farmers have different sources of income other than agriculture. Urban agriculture contributes nearly a third of the household total income. Though the contribution of urban agriculture is significant in improving the food security status of the household, still it falls short of fulfilling the needs of the household by itself. There are also debates on the role of urban agriculture alone in alleviating food insecurity of the urban poor (RUAF, 2009). The current study revealed that more strategic interventions, access to agricultural inputs and recognition should be given to the sub-sector for it to live up to the expectations.

The food consumption score of the majority of the households has fallen on the category of acceptable diet. This indicates that the food consumption of the household improved because of the availability of fresh and nutritious food. In fact, other incomes from non-farming activities have a significant contribution in enhancing the household food security as well. The value of Pearson's Correlation coefficient also showed a highly significant association between household food consumption and annual income. Hence, urban agriculture proved to play a significant role in improving household food security, income, and inexpensive food to the household. Lynch (2002) suggests that in some cities of Australia and Canada, urban farming supplies up to 50% of fresh vegetables to the urban population.

Recommendation

- Institutional support makes a difference in improving urban farmers' productivity and thereby their food security status. Shortage of production factors' like land and water is a serious challenge of the urban farmers. Hence, in consultation with urban farmers, relevant government offices and NGOs working in the area had better work in integration to address the challenges of urban farmers.
- Unused and wasted plots of land should be identified and shall be provided to the urban farmers.
- Training opportunities need to be given based on needs. This minimises loss of resources and helps to use scarce resources effectively to fill limitation of the sector and the urban farmers.
- Urban agriculture is a least researched area in Ethiopia and given relatively less attention by policy makers. This research attempted to narrow that gap and has revealed the contribution of urban agriculture in food security of households. To better understand the urban agriculture practice in the entire city or other urban centres and call the attention of policy makers, more researches, dialogue forums and advocacy events should be carried out.

Notes

1. The delineation of the boundaries shown on the map is not official. The *Woreda* boundary of the study areas is not shown here because of the unavailability of delineated boundary in the Administrative City of Addis Ababa.

2. PICDO is a non-profit making local non-governmental organisation based in Addis Ababa. It was established in December 2006. Its mission is to protect poor households, particularly youth and women, from HIV/AIDS; improve their livelihoods; and promote Adolescent Sexual Reproductive Health with special emphasis on reduction in cases of mortality and morbidity due to unsafe sexual practices.

3. If the coefficient of relation (r) is greater than 0, it implies the positive relation and if less than 0 it indicates the negative relationship. Also, if $r>0.5$ the relationship is strong and positive but if $r<0.5$ and $r>0$, the relationship is weak and positive. Again if $r=>-0.5$ and <0, it implies the weak negative relationship and if $r<-0.5$ it implies the strong negative relationship between the variables.

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