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ADDIS ABABA UNIVERSITY
COLLEGE OF SOCIAL SCIENCE
DEPARTMENT OF GEOGRAPHY
AND ENVIRONMENTAL STUDIES

THESIS TITTLE- Assessing the contributions of urban agriculture to improved livelihoods and environmental protections:-The case of vegetable producers in Bole sub city , Addis Ababa.

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Abstract

The main focus of the study is to assess the contribution of vegetable urban agriculture to improved livelihoods of the urban farmers and urban environment protections and focused on assessing the impact of the adopted urban agriculture policy and strategy on the production, profitability and developments of vegetable urban agriculture .The study was conducted in Bole sub city, Addis Ababa. Simple random and purposive sampling techniques were used to get a total of 70 respondents. Data were collected using questionnaires, semi structured interviews and personal observations. Both qualitative and quantitative methods were used to analyze the data.

The findings of the study showed that as vegetable urban farming contributed to improved livelihoods of the vegetable producing urban farmers particularly by creating employment opportunity , by improving the food availability, accessibility situations , access to health services for the vegetable producing urban farmers , and vegetable urban farming has not contributed to improved access to educational service , nutritional food consumptions and to urban environment protections of the city of Addis Ababa in particularly through productive reuse of urban organic waste and wastewater .

The production , profitability and development of vegetable urban agriculture still constrained by shortage of land , clean water supply , poor irrigation infrastructure and lack of access to quality seeds, organic fertilizers, and lack of access to financial and credit and the city administration of Addis Ababa has not made deliberate efforts on implementing the adopted urban agriculture policy .To further strengthen the potential positive contribution of urban agriculture , the city administration of Addis Ababa have to facilitate the urban farmers access to the municipal vacant spaces , to clean and safe water supply, to productive quality seeds and compost fertilizers with the aim to ensure sustainable livelihoods for all of the poor vegetable producing urban farmers and environmental protections of the city through productive use of urban waste .

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List of Acronyms and Abbreviations

BOFED	Bureau of Finance And Economic Development
BoTID	The Bureau of Trade and Industry Development
CSA	Central Statistical Authority for Ethiopia
DOS	Department of statistics
ENDA	Environmental Development Action
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization
IDRC	International Development Research Center
IWMI	International Water Management Institute
MDGs	Millennium Development Goal
MoFED	Ministry of Finance and Economic Development
ORAAMP	Office for the Revision of Addis Ababa Master Plan
RUAF	International Network of Resource Centers on Urban Agriculture
UA	Urban Agriculture
UN-Habitat	United Nations Human Settlements Program
UPA	Urban and Peri-Urban Agriculture
WFP	World Food Program
WHO	World Health Organization

CHAPTER ONE

1. Introduction

1.1 Background of the study

Urbanization is growing rapidly in both developed and developing countries. In many developing countries, urban growth is driven by high birth rates and by a mass of rural to urban migration (FAO , 2014).

For most developing countries, rapid population growth is becoming a great challenge, the growth of urban population that is living in poverty in Africa and Asia are outpacing urban growth by a wide margin. Around 30 percent of the developing world's urban population (770 million people) is unemployed or working with incomes below official poverty lines and the urbanization process in low income countries of the world is accompanied by high levels of poverty, food insecurity, unemployment, and environmental problem (FAO , 2014).

In order to end urban poverty, and to improve the urban poor livelihoods, food security, and to enhance urban waste management many cities in developing and developed countries approved and stimulated the development of urban agriculture as one of an alternative strategy . (RUAF , 2014) . Urban agriculture is the growing of plants and the raising of animals within and around cities (Veenhuizen, and Danso, 2007, p.1).

Urban and peri-urban agriculture is the production of different types of crops (grains, root crops, vegetables, mushrooms, fruits), animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (e.g. aromatic and medicinal herbs, ornamental plants, tree products) (Van Veenhuizen , and Danso 2007 . p 1).

Urban agriculture uses urban resources like land, water , labor, urban organic wastes and provides fresh food, income , and generates employment opportunity especially for the poorer sectors of the populations, and reduce urban poverty , enhance local economic development and urban environmental management through recycles urban wastes (Van Veenhuizen , 2007 . p.7).

Addis Ababa is one of the cities booming over the last decades ,however this urban development goes together with rapid urban population growths due to high birth rate and high rate of rural to urban migrations (job seekers) which are outpacing the economic growth of the city to support the increasing urban poor (BoTID, 2013)

In Addis Ababa the number population growing rapidly with 2.8 percent of annual growth rate (CSA , 2007) and the rapid population growth of in the city of Addis Ababa is becoming a great challenge and the process of urbanization in Addis Ababa accompanied by high levels of urban poverty, urban unemployment, and growing food insecurity. Moreover poor infrastructure facilities and lack of well-built and wide resource base pose formidable challenge to fulfil the basic requirements of to the ever increasing of the urban residents and has challenged the city of Addis Ababa to ensure food security for the urban poor (BOFE,2010).

According to the report of Bureau of Finance and Industry of Addis Ababa (BOFE, 2010) due to the effect of rapid population growth poverty in the city of Addis Ababa increasing from time to time and increasing urban poverty goes hand in hand with growing food insecurity and unemployment and environmental problems.

Like in many developing cities of the world , the city government of Addis Ababa recognized the developments of urban agriculture under the Bureau of Trade and Industries Development (BoTID) of Addis Ababa as one of the core process for successes and adopted urban agriculture as one of the strategy to end urban poverty , food insecurity, high rate of urban unemployment and environmental problems of the city . (BoTID , 2013) .

To this effect, by taking Bole Sub City as a case study this research assessed the contribution of vegetable urban agriculture to improved livelihoods, urban environment protection and assessed the contributions of the urban agriculture policy and strategy on the productivity, profitability, developments of vegetable urban agriculture in the past years .

1.2 Statement of the problem

Urban agriculture contributes to local economic development, poverty alleviation, food security, the social inclusion of the urban poor and women, as well as to the greening of the city and productive reuse of urban wastes for environmental protections of the city (BoTID , 2013) .

Vegetable urban agriculture supports to ensure the food security and provides decent employment and generates decent income for the urban poor and provide a quick return to meet a family's daily cash requirements for purchasing other households needs and makes productive use of urban resources, such as the vacant land in cities, waste water and make use of recycled organic waste (Moustier , 1999 , as cited in Albert , 2012, pp. 134 - 135) . Urban agriculture has a potential to ensure food security and to provide reliable employment opportunity and to generate income for the urban poor and the disadvantaged groups of the society such as women, the disabled, the elderly and the unemployed youth in particular (FAO , 2014) .

In the case of Addis Ababa, over the past decades many urban residents have been practiced urban agriculture on the riversides of city of Addis Ababa . However, urban agriculture had not contributed to sustainable livelihoods, food security, and poverty alleviation of the urban farmers and to local economic development, environmental protections of the city of Addis Ababa in the past decades (BoTID, 2013).

The potential role of vegetable urban agriculture to improved food security, sustainable income generations or creations, poverty alleviation of the urban poor households and to environmental protections of the city of Addis Ababa is constrained by shortage of land, lack of clean and adequate water supply, lack of financial resources, lack of access to improved fertilizers and lack of access to quality seeds. (BoTID, 2013).

In addition to these, insufficient considerations with research and extensions services for urban agriculture were the main problems for not exploiting the potential positive contributions of vegetable urban agriculture in Addis Ababa (BoTID, 2013). And Limited effort in putting pro poor and supportive urban agriculture policy frameworks by the Ministry of Agriculture in its policy, limited awareness on the potential role of urban agriculture, neglecting small holder urban producers as economic units is the major problems for the productivity, profitability and developments of urban agriculture (BoTID,2013).

Hence, due to all these challenges urban agriculture over the year has been practiced by many urban poor households in traditional forms and generations of the benefits of urban agriculture were less than the expected. (BoTID,2013).

To overcome the constraints on the productivity, profitability and developments of urban agriculture in Addis Ababa and to promote the potential positive contributions of vegetable urban agriculture to food security, livelihoods of the urban poor, and to economic development and environmental protections of the city of Addis Ababa; Initiated the city governments of Addis Ababa, and national authorities to develop pro poor urban agriculture developmental policy and strategy (BoTID , 2013) .

The city administration of Addis Ababa city in 2013 has adopted urban agriculture policy and strategy to promote the productivity , profitability and development of urban agriculture on Addis Ababa Ababa with the aim to eradicate urban poverty and improve the livelihoods of the urban poor community and to sustainable environmental managements of the city through sustainable utilizations of natural resources and the productive reuse of urban wastes .BoTID , 2013) .

In this regard, after the developments of urban agriculture policy and strategy for the city of Addis Ababa, the city government mobilized the urban residents to engage in urban and peri urban agriculture and many poor urban inhabitants engaged in urban agriculture with the aim to improve their food security and livelihood (BoTID,2013).

However, there is no research that examines the current contributions of vegetable urban agriculture to improved livelihoods , urban environment protection and there is no any research that examines the contributions of the adopted urban agriculture policy and strategy to productivity, profitability and developments of urban agriculture .

Therefore, this research assessing the contribution of vegetable urban agriculture to improved livelihoods of the vegetable producing urban farmers in Bole Sub City, and on urban environmental protection through productive reuse of urban wastewater , organic waste and the research assessing the contributions of the adopted urban agriculture policy and strategy to productivity , profitability and development of vegetable urban agriculture in the city of Addis Ababa .

1.3. General objective

The general objective of the study is to assess the contribution of vegetable urban farming to improved livelihoods, and urban environment protection.

1.4. Specific objectives

1. It is to assess the nature and forms of vegetable urban agriculture in Bole Sub City;
2. It is to examine the contribution of urban agriculture towards food security in terms of food availability, and accessibility for the vegetable producing urban farmers;
3. It is to assess the contribution of vegetable urban productions to improved livelihoods of the vegetable urban farmers and to environmental protections of the city of Addis Ababa;
4. It is to identify the constraining and facilitating factors for the growth of sustainable vegetable urban farming in Addis Ababa; and
5. It is to suggest necessary strategies that can promote and sustain the growth and development of vegetable urban agriculture productions in Addis Ababa;

1.5 Research Questions

1. What is the nature and forms of urban agriculture practiced by urban farmers?
2. How does vegetable urban farming contributed on the food security, and livelihoods of the urban farmers?
3. How does vegetable urban farming contributed to urban environment protections through productive reuse of urban waste water and organic waste.
4. What are the major constraints and problems faced by urban farmers?
5. What policy and strategy exist that support the productivity, profitability and developments of the urban agriculture to improved livelihoods of the vegetable urban farmers?
6. What policy, strategy, program, and support are needed from governmental or any other nongovernmental organization to stimulate and promote sustainable vegetable urban agriculture practice in the city of Addis Ababa

1. 6 Significant the study

The study provides appropriate and better relevant evidence based information on overall the extent to which vegetable urban agriculture contributed to livelihoods, food security, poverty reductions of the vegetable producing urban farmers, and urban environment protections of the city through productive reuse of urban organic waste and urban waste water.

The study can help a lot to indicate the extent to which the adopted urban agriculture policy and strategy is effective and efficient on promoting sustainable pro poor vegetable urban agriculture production, profitability and development.

The study contributes a lot to identify the current constraints or challenges on the productivity, profitability, and developments of vegetable urban agriculture and the study suggest possible facilitating mechanisms (factors) in area where necessary strategy or support are required or needed by the urban farmers .

1.7 Scope and limitation of the study

The study focused on assessing the contribution of urban agriculture to improved food security, and livelihoods of the urban farmers, and environmental protections of the city through productive reuse of urban organic waste and waste water by taking the vegetable producers in Bole sub city as case study. In additions to these, the study also focused on assessing the contributions of the adopted urban agriculture policy and strategy to sustainable production, profitability and developments of vegetable urban agriculture in Addis Ababa.

The study excludes urban agriculture that is practiced by private commercial enterprises and the study excludes the environmental and healthy effect of urban agriculture or the negative effects of urban agriculture on urban environment and healthy of the urban community.

During this study, the researcher has came across with numbers of limitations. Some of the limitations were lack of relevant, related data and current availability and comparable data on the overall state and nature of vegetable urban agriculture in Addis Ababa.

1.8. Organization of the thesis

The thesis organized and presented in five chapters.

Chapter one is the introduction part about the study and it gives an overview introduction about the study, statement of problems, and general objective, specific objectives of the research and the research questions, and scopes. In general chapter one gives an overview for the reader about the overall nature of the study.

The second chapter is the review literature part and the review literature consist both theoretical and empirical evidence about the overall contributions of vegetable urban agriculture to improved food security, and livelihoods, and to poverty reductions and environmental protections in different countries of the world.

The review of the literature contains some of the key challenges facing the cities in developing countries such as poverty , food insecurity , and environmental problems and provides about definition of urban agriculture and summarize some of the contributions of urban agriculture to improved food security, livelihoods , poverty reduction, and environmental protections in different countries of the world and the problems on the productivity , profitability and developments of urban agriculture and provides theoretical and conceptual policy dimensions and perspectives of urban agriculture and for showing the role of planners and policy makers in the context of mapping or developing sustainable urban agriculture for sustainable urban socio economic , and environmental development . Chapter three presents the research methodology, which consists of the research design, method of data collection, sampling method and method of data analysis.

Chapter four present the results from the study and discuss the results on the overall state and nature of vegetable urban farming in Bole Sub City and on the contributions of vegetable urban farming to food security , livelihoods of the vegetable producing households and environmental protections of the city of Addis Ababa and the problems on vegetable urban agriculture productions , profitability and developments in Bole Sub City , Addis Ababa , and discuss about the effect of the adopted urban and peri urban agriculture policy and strategy on production and developments of vegetable urban agriculture .

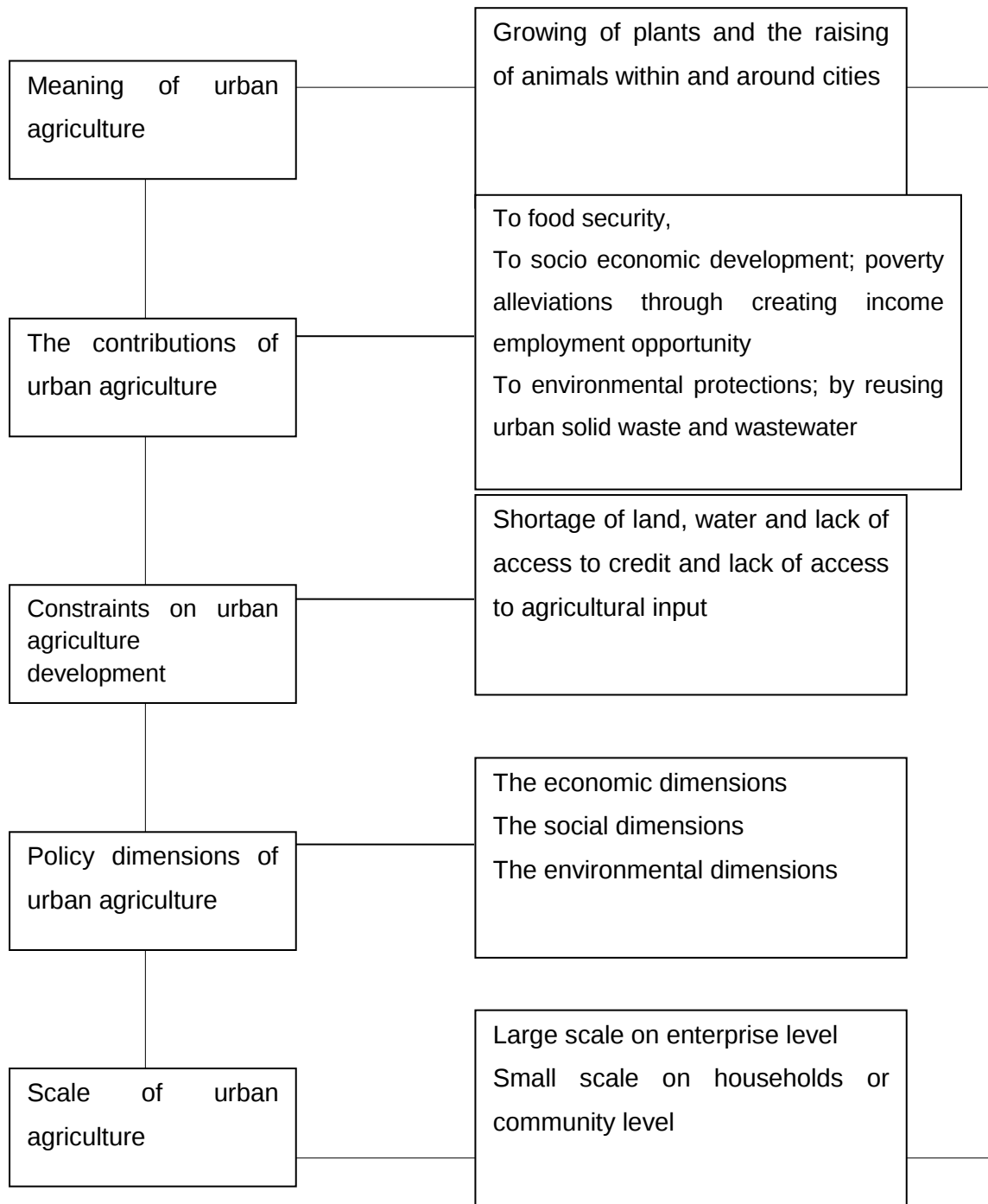
Chapter five present the conclusion parts of the research ; which is based on the findings from the study and present the recommendations part ; which is important to address the problems on vegetable urban agriculture productivity , profitability development and to further strength, enhance

the profitability , production , developments of vegetable urban agriculture with the view to increase the contributions of vegetable urban agriculture to improved food security , livelihoods of the urban farmers and to achievement of overall socio economic and environmental development goals of the city of Addis Ababa .

Chapter two

2. Review of Related Literature

2.1 Conceptual frame work of the review of literature



2.2 Forms and nature of urban agriculture

urban agriculture is the productions of perishable products, such as green leafy vegetables, milk, eggs and meat on the vacant spaces of the municipals , is an activity concerned in growing of different plants and raising of animals and processes and distributes a diversity of agricultural products from both plants and animals through using human, land, and water resources (FAO, 2014).

Urban agriculture may take place inside the cities or in the peri-urban areas of the municipal open lands. Urban agriculture may take place on lands which is found on homestead or on the backyard sides of the residence (farming on back yard and open spaces around residential areas) or on land away from the residence (off plot) and the activity may take place on private land ; on lands that are owned, or leased or on public land such as on public parks, areas conserve for other purpose , along roads, streams and railways, and semi-public lands such as lands found inside schools, hospitals ,prison and church or mosque (De Zeeuw, and Marielle,2009, p . 3) .

The scale of urban agriculture activities may vary from small-scale commercial gardeners to large scale commercial enterprises, the production of urban agriculture ranges from subsistence types of production to mechanized production and processing systems at large scale enterprise level (van Veenhuizen, and Danso, 2007. p. 1).

2.3. The General Importance of Urban Agriculture

Urban agriculture has important potential to address some of the key challenges that cities in developing countries faced from achieving sustainability such as urban poverty, food insecurity ,and unemployment , environmental problems of the cities (RUAF , 2014) .

Urban agriculture highly recognized by international organizations like UN-Habitat and FAO because they argued that urban agriculture can contribute for achieving the Millennium Developmental goals (MDG) particularly in reducing urban poverty and hunger (MDG 1) and (MDG 7) ensuring environmental sustainability. FAO supports the developments of urban and peri-urban agriculture because it provides employment, income, and access to food for urban populations and reduce food insecurity and it is estimated that about 800 million people worldwide engage in urban agriculture (FAO ,2014) .

Urban agriculture has been practiced throughout the world for thousands of years and many number of poor urban households in developing and developed countries have been engaged in urban agriculture to get out of poverty and generate income for their livelihoods, It is estimated that 200 million urban residents produce food for the urban market, and urban agriculture provides 15 to 20 percent of the world's food (Armar-Klemesu,2000; as cited in De Zeeuw, and Marielle, 2009, p.11).

According (Adejumo ,2003), commercial horticulture provides appealing outlook for the environment by greening the environment ,and promote the development of healthy community , social values of the communities and promote economic development. Thus, the practice of horticulture in three main ways. First, plants enhance the economic and social values or developments of the community. Second, horticulture activity promotes the development of healthy community by utilizing carbon gasses (gases that are generated in the cities) during plants' photosynthesis and then oxygen is released as byproduct which is the most important air for human beings , Third, it enhance environmental management and it provides appealing outlook for the environment (; as cited in Albert ,2012, p. 134 - 135).

Urban agriculture contributed to urban food security, to local economic development, poverty alleviation and social inclusion of the urban poor in particular, and to environmental sustainability by greening and by productive reuse of the urban wastes (Marielle et al,2013).

The benefits of urban agriculture include:

- It provides access to nutritional food, providing , provide emergency supplies of foods for urban poor and supply food to urban markets, and food processing industries;
- It provides employment opportunity and income for urban women , unemployed youth and elderly people and in general for a whole of the urban poor .
- It uses urban waste water and reuse urban organic waste as fertilizers for urban agriculture and for animal feeds;
- It provides fuel wood for urban residents, and reduce environmental pollution and temperatures for healthy environment, and contributes to inclusive green growth, clean, and resilient environment and offer recreation opportunities and provide better living environment. It helps cities to become more resilient to climate change by maintaining green open spaces and by enhancing vegetative cover and by productive reuse of urban organic wastes reduces methane emissions from landfills, reduces the public cost of waste management, reduce environmental and health problems especially in areas where there are shortage of waste management services and urban organic waste provide nutrients to the soil (World Bank, 2012, ; as cited in Marielle et al,2013. P. 3 - 4).

2.4 The importance of urban agriculture to food security

The rapid growth of the urban population and the low nutritional levels of the urban poor, the rise of cost for foods raised the development of urban agriculture in many countries of the developed and developing nations as one of the strategy to address the urban challenges because urban agriculture provides a substantial contribution to food security and enhance the nutritional level for the urban poor in many developing countries. (FAO , 2014) .

In Africa, the poor are mainly engaged in urban agricultural production with the aim to to supplement their family food needs , to improve diets for their families , and to get additional incomes and to supplement their income and to get an attractive and alternative income source to badly paid wage labour (Marielle et al,2013).

According (WHO, 2003) , food production in and around the city in many developing countries contributed for the urban poor to have adequate, reliable and regular access to food, and enhanced the purchasing power of the urban poor and reduce vulnerability for the urban poor by diversifying food sources and livelihoods opportunities (as cited in Marielle ,et al .2013 . Pp. 3).

Urban agriculture enhanced the welfare of poor urban populations in some cities of African countries. Urban agriculture enhanced the food security and nutrition of the urban producers and urban agriculture improve both food intakes and access to a cheap source of proteins and the quality of the food; and poor urban families involved in farming eat more fresh vegetables than other families in the same income category and urban agriculture contributed to improved food availability and nutritional status of the producers (Nugent, 2000).

Urban households that are involved in urban farming or gardening have better and more diverse diet and consume more vegetables than non-farming households of the same wealth class and these households are in most cases more food secure than households that are not practicing urban agriculture. In addition to these producing one's own food provides benefit for the urban farmers in monetary savings and in free up cash for other household expenses, such as water, medicines, rent, schooling, and clothing (Marielle et al , 2013,) .

Poor people in developing countries generally spend a substantial part of their income on food, and poor urban households spending more of their income on food than other households expense or needs .Food often makes up one of the major expenses for households, and self-grown food reduced well-known challenges that the urban poor face, especially the dangers of meeting their household

food requirement and nutrition security from the market. Involving in vegetable urban agriculture and consuming the productions or foods from their own farms saves household expenditures on food and saves money for others households expense and the money can be used to compliment household diets by purchasing other nutritious food items from the market such as fish, fruits and meats (Mougeut, 2005 ; as cited in van Veenhuizen , p. 7) .

Urban agriculture contributes to food diversification through increased the availability of household disposable income for more diverse foods available at the households home and contributes for the households to become more food secure (Zezza and Tasciotti, 2010; as cited in Arku et al, 2012, p. 8).

Urban agriculture supply fresh perishable products such as vegetables and in Africa, vegetable urban farming's supplies about 70% of the source of foods to urban residents and the consumption of vegetables is a significant source of food for the urban poor in Africa (de Bon et al. 2010; as cited in Arku et al, 2012, p. 7).

Urban agriculture improved access of the urban poor to fresh and nutritious food by producing their own foods, and the income gained from the sale of the productions reduced the costs or the expenditure on food and food involves fewer intermediaries and less transport, cold storage, processing, and packaging this reduced the energy consumption (Moustier and Danso 2006; as cited in De Zeeuw, and Marielle, 2009, p. 13 - 14).

As the data compiled by RUAF foundations, in city Hanoi (2.7 million inhabitants). 80 percent of the vegetables (118,628 tones), come from the Province of Hanoi, from an area of 7,095 ha of urban gardens and fruits and vegetable Products from Urban and peri urban agriculture make up a very large part of the supply of vegetables to urban markets, such as (Tixier and de Bon, Huber, 2000) ; In Brazzaville, 65 percent of the vegetables for urban markets come from its urban gardens and the urban gardens in Brazzaville accounts about 80 percent of the leafy vegetables supply for the urban market; in Bangui, 100 percent; in Bissau and Antananarivo, 90 percent (of the vegetable supply comes from urban agriculture(Moustier, 1999) ; In Havana, urban agriculture has improved the supply of fresh produced vegetables and ensured for the urban farmers and for other urban food consumers to have greater stability and availability of leafy vegetables in the city of Havana (Murphy and Novo,2000) ; In Dakar, the Niayes zone which constitutes only 3 percent of Senegal's land surface, produces nearly 80 percent of vegetables in the country's demand or vegetable urban farming provides 80 percent of the vegetable demand of the City or 80 percents of the vegetable supply for the city of Dakar comes from urban agriculture (Mbaye and Moustier, 1999) ; In Shanghai, urban and peri urban agriculture provides 60 percent of vegetables demands of urban and

peri-urban areas. The city administration manages 300 000 ha of land for food production. Over 800 000 citizens (one in six) are actively involved in production alone and In China the 14 largest cities produce 85% or more of vegetables. Both solid and liquid wastes are well managed to maximize yields and keep the city clean for sustainable environmental protections (Yi-Zhang and Zhang, 2000) (Ruaf foundations 2008, as cited in De Zeeuw, and Marielle, 2009, p . 13 - 14).

According the study by (Jansen et al. 1995) in peri-urban Ho Chi Minh City, over 70 percent of the urban farmers revenues comes from the sale of vegetables productions and year-round vegetable farming generated net incomes of US\$500/ha per person(as cited in van Veenhuizen , 2007, p. 36)

According (frayne, 2005) , In Windhoek, Namibia, urban and peri-urban agriculture provides economically benefit for the urban poor from their production activities and households involved in urban agriculture saved a significant amount of money which is an average of 60 Namibian dollars a month on food expenditure . Since food constitutes a major share of the expenditures of a poor urban household, such savings can be substantial and the cash freed up can be used for other livelihood essentials (water, medicines, rent, schooling and clothing) (as cited in Marielle and 2009 ,p . 13) .

2.5 The economic impacts of urban agriculture

Increasing the productivity of labor is central to achieving Millennium Development Goals especially for reducing poverty (Goal # 1), reducing unemployment and creating stable income is vital for addressing other MDG goals.

The mismatch between the mounting urban populations and the availability of employment opportunity in industrial or manufacturing sectors, and in the absence of formal jobs in many African cities; urban agriculture significantly served as an important source of employment for the urban poor and urban agriculture created vital employment opportunity for urban residents (Zezza and Tasciatti, 2010; as cited in Arku, et al, 2012, p. 8).

Urban agriculture creates employment opportunities for 800 million urban dwellers and reduce the high rate of urban unemployment, and contributed to local economic development by creating meaningful employment for the urban residents and improved the living standards of the urban resident (Axel and Wilfried , 2008).

Urban agriculture is particularly important source of employment for people who may not successfully compete for formal sector jobs and for peoples with low skill and for vulnerable urban peoples. It is estimated that 40% of urban dwellers in Africa are actively engaged in urban agriculture in one way or other related sectors .(Zezza and Tasciatti, 2010; as cited in Arku, et al, 2012, p. 8).

Urban food production, processing and marketing promote local economic development by creating income and employment. Opportunity for many poor urban households and urban agriculture policies is part of a local economic development policy that focuses on income generation and employment creation for a whole range of producers from home-based to community-based . Beside growing crops or rearing animals, urban agriculture provides other employment opportunities, such as: agricultural input production and delivery activities; such as the collection of urban organic wastes and the production of compost or animal feed from collected organic wastes and sale of agricultural inputs and the development of related micro-enterprises: productions and sale of processed products such as meals, jams, and other food products. (Moustier and Danso, 2006).

Urban Agriculture makes contribution to the urban economy development by generating employment for many number of poor urban producing households by generating incomes equivalent or higher than the official minimum wage rate (Moustier and Danso 2006).

As argued by (Weinberger and Lumpkin , 2007) , urban horticultural products are contributing to the increasing domestic and international food demand, urban agriculture widening market access for urban poor in lagging regions of the world and helping residents in lagging regions to escape poverty through production of staple crops (as cited in Albert ,2012, p. 135) .

According to (Smith et al ,(1996) urban agriculture created employment opportunity for 80% of the families in Libreville (Gabon), 68%of urban dwellers in six Tanzanian cities, 45% in Lusaka (Zambia), 37% in Maputo (Mozambique36% in Ouagadougou (Burkina Faso) and 35% in Yaoundée (Cameroon) . The urban farming's uses family labor for producing crops (as cited in De Zeeuw and Marielle, 2009, p. 12).

Since the late 1980s, employment in Lomé's market vegetable-growing business multiplied several times (from 620 in 1987 to 3000 in 1994), vegetable-growing business contributed to reduced food imports and rising local unemployment in Lome (Mougeut ,2005) .

Vegetable urban farming contributes to the livelihood strategies of the urban community and contributes to household food and nutritional security, create informal employment, contributes to income diversification of the urban farmers through sales of surplus produce or savings on food expenditures, and more broadly promotes urban food supply systems and promote environmental sustainability by making use of the disposal urban waste (Marielle , et al , 2013) .

As (Weinberger , 2007) , argued horticultural practice is one of the solutions to poverty alleviation in cities of developing countries (as cited in Albert, 2012, p. 135).

Vegetable urban farming in Ghana generated monthly net income range from US\$30 to \$US70 per small holding vegetable producing households and the income can go up to US\$ 200 or more. These amounts normally exceed official annual minimum salaries, and sometimes the income the farmers earn from vegetable urban farming is equivalent to the official minimum wage in the formal sector or to a basic government workers salary and vegetable urban farming helped the households to get out of poverty (Drechsel et al , 2008) .

As (Lustig and McLeod, 1997) argued vegetable urban farming in Lagos, Nigeria helped the urban farmers to get out of poverty and urban agriculture significantly contributed to economic development of Nigeria (as cited in Albert, 2012, p. 134) .

Ezedinma and Chukuezi, (1999) ,argued that ornamental plant and flower production is profitable urban agricultural activity and the producer households obtained annual benefits from US\$ 400 up to US\$ 4700 (Nigeria) or US\$ 5000 (Lomé) . In addition to these the urban farmers obtained benefits from the processing and marketing activities (e.g. ghee making, preparation of street foods, and cleaning/packaging food for sales to small local shop, and supermarkets) (cited in De Zeeuw, and Marielle, 2009, p . 14)

The data from the Kumasi study showed that the urban farmers with 0.05 and 0.2 ha by year-round irrigations earn annual income ranges from 400 to 800 USD an income twice greater than the rural farmers and Irrigated vegetable production has enabled the urban farmers to step forward over the poverty line and provides remarkable high profits for the vegetable producing households (Drechsel et al , 2008) .

In Dar es Salaam full-time production of certain vegetables or garden farming created an income of \$US 60/month 30% greater than the average salary. The same is true for Nairobi families in slum areas; the urban farmers sold relatively little of their productions and consumed their own output. These families' standard of living exceeded that of neighboring non-farming families (Nugent, 2000, p. 76).

In Shanghai, China, 60 per cent of vegetables are produced in the urban and peri-urban areas of the City. In terms of the Gross Domestic Product (GDP), urban agriculture contributed 2% in Shanghai (China), (Yi-Zhang and Zhang, 2000; as cited in De Zeeuw and Marielle, 2009, p.11).

2. 6 The social benefit of urban agriculture

Food insecurity for the individual of any age is an increasing problem of developing countries and Diseases like AIDS and malaria break down the family structure. Urban agriculture has the potential to empower each of these social groups to recover food security for their well-being (Smith et.al, 2001) .

Urban agriculture functions as an important strategy for poverty alleviation and social integration of disadvantaged groups such as immigrants, HIV-AIDS affected households, disabled people, female-headed households with children, elderly people without pension, youngsters without a job and urban agriculture contributes to integrate disadvantaged groups more strongly into the urban network and to provide disadvantaged groups with a decent livelihoods opportunity and to prevent social problems (Gonzalez and Murphy,2000; as cited in van Veenhuizen , p. 3) .

Urban farming improves social equity by improving the health and productivity of poorer populations and provides an opportunity for poorer populations to earn additional income. Urban agriculture benefits vulnerable low-income poor farmers in terms of improving the health of low-income poor farmers and generate decent income to vulnerable low-income poor farmers thus, urban agriculture makes strong positive social contributions and urban agriculture often helps the weakest members of poorer communities in Tanzania ; a group that includes the aged, youth, women, migrants, immigrants, refugees, and people in long term civil crises urban agriculture generate employment and income for those who have the fewest employment opportunities (Smith et.al, 2001; p. 12).

Urban agriculture is a way for decent livelihoods for vulnerable groups, day wage earners and helps the unemployed to become entrepreneurial. For example women growing hydroponic vegetables in the slums of Bogotá, created incomes that exceed the vegetable producing women heads husband's salaries. (Smith,et al, 2001).

In Peru Mujer, Lima , a non-governmental organization (NGO) administered a comprehensive and well-planned community gardening program with providing training, extension, marketing, and processing support and this community gardening program contributed to improved food security, nutrition, and health of 5,000 families in Lima and most of the community gardens, each consisting of about 40 plots of 60-200 square meters, the farming activity were practiced by low and middle income of women and the growing bio intensive vegetables mainly used for consumption. This program showed that as urban agriculture brings improvements to women's lives and beyond the contributions of vegetable urban farming to women's nutrition and income also the farming activity helped the women's to have better self-image, higher standing within the family, and elevated social and economic position within the community (Andress,2000; as cited Smith et.al, 2001, p. 13).

The study by (Bénédicte, 1993), In Cairo , Egypt, following the October 1992 earthquake 10,000 families obtained apartments in a new housing complex on the desert plateau east of the city for resettlement , the relocated community or residents from Cairo to the desert area engaged in gardening as a new opportunity to mitigates the hostile environment provided by the new housing at the desert environment and combined multifunctional food production gardening with other purposes such as greening , planting herbs and vegetables and some gardens were planted for decorative and rest , shade plants and raised small livestock.Urban agriculture contributes to a well-being of the relocated community in a new neighborhood in the desert near Cairo by improving its aesthetics and solidarity and gardening has contributed for dislocated households to adjust themselves to new environments , the densely planted ground-level gardens offered an important recreational functions for the relocated community since no collective public facilities (public park) were provided on site , the gardens mitigated some of the high food prices at the neighborhood market and helped the community to adapt with this new and harsh environment (as cited in Smith et.al, 2001, p. 13 - 15) .

2. 7 Environmental contributions of urban agriculture

Most cities in developing countries produce more wastewater and organic solid wastes. For most cities the disposal of uncontrolled wastes on vacant lands and rivers has become a serious problem for the urban environment and for the health of the community and cities today face acute problems in managing the urban waste disposal and urban agriculture can solve this problem by turning urban wastes into a productive resource and urban agriculture contributes to environmental sustainability by offering a range of potential co-benefits for the local environment, through using waste water for irrigation and for producing crops to human and livestock consumption and through using organic waste rather than using fresh water or artificial fertilizers as input (Marielle et al, 2013. p. 8).

2.7.1 Waste water and urban agriculture

Wastewater and solid waste collection systems are costly for a city administration, and most municipalities in developing countries do not have the capacity to serve an entire city. Due to inadequate waste collection and processing systems urban wastes illegally are dumped and decomposes on the streets, Since conventional treatment is very costly most wastewater is allowed to be discharged and dumped untreated water into water bodies or wastes which dumped on open space and along rivers or streams and sewage discharge into ocean estuaries, bays, rivers, and groundwater causing pollution and putting the public health and the environment at risk (Axel and Wilfried , 2008 p . 45 - 52).

Decentralize reuse of gray waste water in urban agriculture can help to reduce the competition for freshwater between agriculture and domestic and industrial uses and enhanced and decentralized reuse of urban solid and liquid wastes reduces the city's costs for wastewater treatment plants, and the local reuse of wastewater for urban agriculture reduces its discharge into rivers, canals, and other surface water, and such activity reduce health risks and environmental problems (Marielle et al, 2013. p. 8).

Urban and peri-urban farmers from different class groups in developing countries in Asia and Africa their livelihoods depend on urban horticulture, fodder production , dairy activities, agro forestry, orchard keeping, and floriculture and aquaculture through using urban wastewater (van Veenhuizen , 2006).

The main reasons for the use of gray waters or fresh (untreated) wastewater in urban agriculture provide nutrient for the soil and plants and the nutrients increase soil fertility and increase the productivity of vegetable urban farming's and saving costs spending on fertilizers (Axel and Wilfried , 2008 p . 45 - 52).

Farmers may use wastewater for irrigating their farms when they lack access to other sources of water or because of municipal waters high price; particularly in and around cities in arid and semi-arid zones , many farmers prefer wastewater over freshwater or groundwater because of the nutrients it provides to the soil. Use of wastewater for irrigation is now a common practice in countries as hydrological diverse as Tunisia, Mexico, Jordan, and Singapore. (Robson,1991; as cited in smith et al 2001; p. 32).

In Amman , Jordan only 40 percent of wastewater is collected and treated and 40 per cent of the population use gray water to irrigate their gardens and this amounts of water used by 500,000 people in the city alone, and 16 percent of the households in Amman already practice UPA, mainly for the production of fruits, vegetables and herbs. The annual value of UA in Amman is US \$4 million - already 2.5 percent of the total value of agriculture in Jordan. In addition to this in Jordan, the per capita water availability is 148 m³/p/y and the per capita water availability decreasing at higher rate. Due to the effect of this, in Jordan there is less or scarce fresh water availability for urban Agriculture. Thus , to address this threat (less or scarce fresh water availability for urban agriculture) the urban farmers started treating and reusing domestic wastewater in UPA and this activity helped the urban framers to improved food security and sustainable income generations (Faruqui , 2002).

In Hyderabad, majority of vegetable the producers are women and wastewater irrigated vegetable urban agriculture practiced mainly by women and vegetable urban farming with wastewater irrigation significantly contributed to livelihoods and food security of the resource poor urban resident . In Hyderabad, India, every day about 600 million liters of wastewater enters the Musi River and about 2,108 hectares of land in and around Hyderabad irrigated by untreated urban effluents that are released from a number of small- and medium-scale industries and by waste water collected from the municipal sewerage ; wastewater irrigated urban agriculture generated an estimated Rs 1 million per day , para grass production and sale generated an estimated annual income of USD 4.5 million (INR 202 million) to the local economy of Hyderabad. In India , 73,000 hectares of land were irrigated with urban and industrial wastewater (Buechler and Devi 2002).

In Ghana, wastewater in urban areas are treated and vegetable urban farming are irrigated with wastewater and an average dry season farm size of 0.5 ha land irrigated with waste water provide livelihood support for the urban farmers in the peri-urban areas of Ghana ,

In and around Kumasi by using wastewater the urban farmers earned an average of US\$ 340/ha per season the urban farmers with freshwater and it was found that wastewater farmers earn US\$ 340/ha per year (Drechsel et al , 2008) .

2.7.2 Organic solid waste and urban agriculture

Using organic solid waste in Urban agriculture reduces the public cost of waste management, reduce environmental and health problems and provides a better living environment, especially in areas where lacks waste management services and productive reuse of waste water and urban organic wastes provide nutrients and using organic solid waste in urban agriculture reduces methane emissions from landfills and can generate a good price and contributes for the urban farmer to use less chemical fertilizers and using less chemical fertilizers will prevent problems related to the contamination of groundwater and provide nutrients to soil . In addition, compost-making create employment and provide income for the urban poor (Axel and Wilfried , 2008)

Recycling organic waste through composting could provide mutual benefit for municipalities and farmers. On the one hand, recycling urban organic waste could contribute to the promotion of urban agriculture particularly through using the organic matter as a soil conditioner and fertilizer by urban farmers with the aim for providing nutrients. on the other hand, it can helps to protect and conserve cities and towns space from waste disposal and reduce the costs of landfills as well as to enhance municipal solid waste management for sustainable environmental protections (Danso and van Veenhuizen , 2007 p. 50) .

For centuries, farmers over the world have used composted organic waste to fertilize and enrich soils and city governments of Philippines have developed city wide programs to collect, compost, and sell organic waste , for example In Manila, Philippines, the municipality combined recycling of organic waste with a poverty alleviation scheme. There is an increasing number of private or municipal initiatives to collect household waste and organic refuse from vegetable markets and agro-industries to produce compost or animal feed and the collaboration between informal waste collectors and the private sector contributing to urban waste management (Duran et al, 2006) .

Cities in most developing countries, most urban organic wastes are often illegally dumped or burned and the use of biological organic waste in urban agriculture has many advantages. It turns waste from a problem into a productive resource, reduces the public cost of waste management and provides a better living environment, especially in areas not receiving waste management services (Axel and Wilfried , 2008).

In China, solid waste is an old tradition in several Chinese cities , the organic waste has been used by Chinese farmers to produce compost and to fertilize the soils for the production of vegetables, fruit, animal and fish feed and waste is collected by a municipal corporation , vegetable urban farmers and the process of collection, transportation, processing is labor intensive and the organic waste collected from the city is composted in the countryside or in municipal composting site and sold to urban farmers to use it as fertilizer in their farms and also to used it as an input to pig and fish feed . For example , In Shanghai, the Bureau of Environmental Sanitation collects most of the city's human waste from seepage from public toilets, septic tanks, dumping stations and shipped out in sealed barges and the waste is composted for 10-30 days, sometimes with other matter such as dead plants, and then sold to farmers to use it as fertilizer . In addition to this the Shanghai Resource Recovery and Utilization Company produce a range of products from the disposal of urban waste and the company maintains a network of 500 purchasing and processing centers throughout the 10 towns of the metropolitan municipality (Robson, 1991; as cited Smith, et al, 2001, p. 34) .

Degraded open spaces and vacant land are often used as informal waste dumpsites , a source of crime and source of health problems however when such zones are turned into productive green spaces, not only an unhealthy situation is cleared, but also the neighbors will passively or actively enjoy the green area, may also positively impact upon the greening and cleaning of the city by turning derelict open spaces into green zones and maintaining buffer zones and with positive impacts on the micro-climate (shade, and temperature) (Marellie et al , 2013) .

In general, urban food production contributes to reduction of the ecological footprint of the city by reducing the energy needed to transport the food from distant areas consumed by a city. By producing fresh food close to the city, less energy use is used in transport, cooling, storage, processing and packaging and urban forestry contribute to disaster risk reduction and adaptation to climate change by reducing runoff, keeping flood plains free from construction, reducing urban temperatures, capturing dust and CO₂, while growing fresh food close to consumers reduces energy spent in transport, cooling, processing and packaging, and productive reuse of urban organic wastes and Wastewater provides nutrients for the soils and for the growth of crops, reduce methane emissions from landfills and reduced energy use in fertilizer production (RUAF , 2014) .

In East Calcutta, India, the Municipal Corporation leases about 800 hectares of former dumping plots to produce compost and grow vegetables with intensive farming methods and the intensive farming generates employment for about 20,000 people, small-scale cooperatives produce 150-300 tons of compost per day and helped the urban farmers to fetch high prices in Calcutta and the organic substrate is rich in nutrients, and mixed into the soil. This traditional farming is reduced the use of chemical fertilizers and pesticides and contributed to sustainable environmental management (Christine, 1993; as cited in Smith, et.al, 2001, p. 21).

2.8 Policy dimensions of urban agriculture

The main policy dimensions and perspectives on urban agriculture is helpful to integrate urban agriculture in sustainable city development planning and enable the authority to consider in designing alternative policy measures or scenarios for the development of sustainable intra and peri urban agriculture.

The social policy dimension refers mainly to subsistence-oriented types of urban agriculture that form part of the livelihood strategies, particularly for the urban poor; subsistence-oriented types of urban agriculture includes home gardening, community gardening, institutional gardens at schools and hospitals, open field farming home gardening, community gardening, institutional gardens at schools and hospitals, and open field farming at micro scale with low levels of investment. These systems show little direct profitability but have important social impacts such as enhanced food security, social inclusion, poverty alleviation, community development, HIV-AIDS mitigation etc. As well as the social perspective is mainly associated with subsistence oriented types of urban agriculture as part of the livelihood strategies for the urban low income households; this types of urban agriculture is focus on producing food and medicinal plants for home consumption and some cash is generated from sales of surpluses reducing family expenses on food and will helps households to multiple additional income sources for their survival and medicines.(RUAF, 2014).

The urban and peri urban agriculture systems show little direct profitability, but have important social impacts such as social inclusion, poverty alleviation, community development and HIV-AIDS mitigation. In general, if a local government concerned about addressing growing food insecurity and about certain vulnerable categories of the population and the policy may focus on the social dimension of urban agriculture. (Danso and van Veenhuizen, 2007)

urban agriculture policies is part of a local economic development policy that focuses on promoting local economic development by creating income and employment opportunity for many poor urban households and for a whole range of producers from home-based to community-based urban food production, processing and marketing systems . The economic policy dimensions and the economic perspectives mainly concerned with intensive and market oriented types of urban agriculture. These types of urban agriculture usually involve small-scale family-based enterprises and sometimes larger scale entrepreneurial farms run by private investors or producer associations . (Danso and van Veenhuizen , 2007) .

The economic policy dimension and perspectives focused on the developments of market oriented types of urban agriculture. The activity include food production, such as irrigated vegetable production and stall-fed dairy production, and includes productions of non-food products such as flowers and ornamental plants, medicinal and aromatic herbs. Activities are undertaken by small scale, family-based enterprises and the activities are undertaken by larger scale, entrepreneurial farms run by private investors or producer associations. These commercial farms are associated with small-scale and larger enterprises involved in the processing, marketing of agricultural products and in delivering of inputs (such as seed, compost, fodder, agro-chemicals). These types of urban agriculture have a more pronounced economic impact and higher profitability and their externality for the city and urban population tend to be higher. A local government concerned about the economic development of the city may focus on the economic dimension or perspectives of urban agriculture with the aim to encourage subsistence urban farmers to move into the market sector for decent , reliable and sustainable employment and income generations (RUAF , 2014) .

Urban agriculture policies is part of environmental protections and management policy that focuses on promoting sustainable urban agricultural practices by emphasizing the reuse and recycling of waste water and organic waste. Urban agriculture contributes for environmental sustainability and offers a range of co-benefits for the local environment, through reuse of wastewater and organic waste. In this vein, urban agriculture can contributes to ecological sustainability by using urban wastewater and organic waste rather than using fresh water or artificial fertilizers as inputs (Marellie et al , 2013) .

The ecological policy dimensions and perspectives refers to the type of urban agriculture that can play a role in environmental management and protections through nutrient recycling via decentralized composting and reuse of organic wastes and wastewater , through reducing risk of contamination of soils and water caused by intensive use of agro chemicals, health risks derived from the use of contaminated water for irrigation and risks of zoonosis and urban agriculture can

provide food and generate incomes to the urban poor . In addition to these , ecological policy dimensions and perspectives mainly focus on the development of urban agriculture that can provide important services demanded by urban citizens for sustainable environmental management such as reusing of organic wastes and wastewater, urban greening, improvement of the urban climate, (by providing shade, oxygen, and dust reduction, etc.) , keeping flood plains or earth quake prone areas free from construction , providing landscape management (by creating buffer zones) and by providing opportunities for leisure and recreational activities, and water storage mitigation (Danso and van Veenhuizen , 2007) ,

Local authorities mainly concerned to address the poor urban living climate, growing waste management problems, or the negative environmental or health effects of the urban areas. Thus, the policy may concentrate on the environmental dimension or perceptive of urban agriculture; on a policy that promote a shift from high input commercial agricultural production towards sustainable and multi-functional environmentally co friend urban agriculture activity . In order to allow or enable such a combination of functions, urban agriculture should / have to adopt agro ecological production methods , link up urban agriculture with eco-sanitation and sustainable waste management, as well as with the urban planning and management of parks, nature and recreation areas (Danso and van Veenhuizen , 2007).

2.9 Constrains of urban agriculture

According to (Mougeot ,2000), lack of positive government policy on and recognition of urban agriculture as a viable sector are prevalent in most developing countries. Most policies on agriculture, food, health, nutrition and environmental policies are silent on urban agriculture. Lack of official recognition of urban agriculture often leads to a feeling of insecurity among urban farmers, thereby limiting their commitment to investment in this sector. Many of the urban development studies in developing countries concentrate on housing, urban services, and non-agricultural informal activities and exclude or give little attention to urban agriculture. Despite its existence and its ability to provide maintenance to the urban poor, urban agriculture has been underestimated and treated as an imperceptible temporary phenomenon.

Urban agriculture is being threatened by urban sprawling and infrastructure developments that are competing with urban farming for available space and scarce resources such as water for irrigation, similarly, some credit agencies, researchers, development agencies and market agents generally do

not view urban agriculture as a significant industry (Marielle et al .2013). As a consequence, the sector' benefits are not being fully realized by those urban development planners or agency.

According to (Mougeot ,2000) Lack of access to farming land, shortage of clean and adequate water supply as well as lack of access to farming inputs Such as seeds, fertilizer, and pesticides are the most critical constraints to urban agriculture .

2.10 Rapid urbanization and urban agriculture in Ethiopian context

As stressed throughout the above review literature Urban agriculture had contributed to socio economic development and environmental protections and management in different countries of the world and urban agriculture makes a significant contribution on addressing current urban problems; Such as on reducing urban poverty, urban unemployment and food insecurity, environmental problems of Addis Ababa, in general to address many of the concerns of ecological, economic and social sustainability.

2.10.1 The challenges of Addis Ababa for sustainability

In most developing countries, especially those in sub-Saharan Africa, urban poverty has increasing due to the effect of rapid population growth. Increasing urban poverty goes hand in hand with growing food insecurity and malnutrition in the developing cities and environmental problem (FAO , 2014) .

In Ethiopia, urban poverty exaggerated by high rate of urban population growth. The main factors underlying rising urban population revolve around natural population growth and rural-urban migration and urban poverty has been aggravated by the increase in population that is beyond what the urban economy can support and rapid urbanization, particularly the growth of large cities in conjunction with the associated problems of unemployment, poverty, inadequate health facilities, poor sanitation, urban slums and poor infrastructure facilities pose a formidable challenge in many developing countries ; they lack well-built and wide resource base that adequately fulfils basic requirements associated to their ever increasing urban residents and such a fast rate of population growth it is outpacing the growth of city's economic development (Bureau finance and economic developments of Addis Ababa , 2012).

Addis Ababa is one of urbanized city in Ethiopian , Urbanization is moving at high growth rate with 2.8 percent of total annual population growth rate, and construction is one of the sectors that has increased rates of rural to urban migration (by job seekers) which is increased the living standards of urban poor households and these aggravated urban poverty , urban unemployment , food insecurity and environmental problems in the city of Addis Ababa .These development and the global rise in the cost of living which have led most urban households to engage in informal activity to meet basic households requirements .(BoTID ,2013). Addis Ababa is one of the rapidly

urbanizing cities in Ethiopia , however 29.6 percent of its population is living in poverty and urban unemployment in Addis Ababa it is estimated about 17. 9 percent (UNDP, 2012).

2.10.2 Forms and nature of urban agriculture in Addis Ababa

According to the bureau of Addis Ababa urban agriculture office, urban agriculture is a traditional practice in Ethiopia. The urban-based population is used to keeping cattle, sheep, and chickens, or growing rain fed crops such as maize and vegetable production (vegetables) within the city boundaries, on the plots adjacent to their houses and along the river sides of the city. This production is mainly for household consumption, with a small proportion for sale.

Horticultural activities refers to producing different crops like Fruits, vegetables and flowers and the climate, various soil types and access to water make Addis Ababa favorable for producing fruits, vegetables for home consumption and flowers . Fruits include citrus, mango, papaya, avocado, pineapple, passion fruit, apples and strawberries. Vegetables include potatoes, cabbage, cauliflower, okra, eggplant, tomato, celery, cucumber etc. (Bureau of Addis Ababa urban agriculture office, 2013).

Urban vegetable production has been practiced in Addis Ababa for almost three decades by vegetable producers' cooperatives along river banks. The vegetable producers' cooperatives, the production activity it is based on using irrigated cultivation beside the rivers Gefersa, Tinishu Akaki, Tiliku Akaki, Kebena, and Bulbula and other small streams in the city: - Mekanissa, Furi and Saris Cooperative; - Kefetegna 24 and 25 Cooperative; - Shankilla River Cooperative; - Keranio MedhaneAlem (or Kefetegna 24) Cooperative; and – Kebena Bulbula Cooperative. The cooperatives in Addis Ababa they occupied about 1.25% (about 274 ha) of the urban land in Addis Ababa. (Axumite, 1994)

Moreover, the vegetable producers of Addis Ababa are still using hoe for seed bed preparation, spade and hoe to divert river water to their farm land through furrow (furrow irrigation to cultivate their fields) sand filled sacks to build diversion site along major rivers in Addis Ababa and sickles to trim their vegetables (Axumite, 1994) .

Urban farmers in Addis Ababa use traditional tools, extensive wage labor and manure fertilizer use is common in vegetable crop production and generally, family labor is the most common input for urban farming activity and furrow irrigation to cultivate their fields is the most common practice in vegetable production activity. (Hormann and Shawel,1985; as cited in Axumite, 1994 , pp 80) .

The Mekanissa, Furi, and Saris Producers' Cooperative provides a significant proportion of the supply of fresh vegetables to Addis Ababa. The production process is traditional and is mainly based on the accumulated experience of the members and the yield per hectare from the communal farms is very low (Axumite, 1994).

2.10.3 Who are the urban farmers?

According (Axumite, 1994) ,majority vegetable producers in Addis Ababa who engaged in urban agriculture are the urban poor. These are individuals who are not employed or whose salary is too little to sustain their lives. The reason the urban low-income household's decision to cultivate vegetable was led by the need to feed their families and the expectation of improved returns in the absence of better paying jobs and it was a matter of survival. (Tedrwoess, 2007).

2. 10. 4. The contributions of vegetable urban farming to Food security and nutrition in Addis Ababa

Urban agriculture is the response of crisis of scarcity to low-income urban households to the and to low-income full time producer households in Addis Ababa and also the low-income part-time producers in Lusaka (sanyal 1984) and Nairobi (Freeman 1991; as cited in Axumite, 1994, p. 4).

The Office bureau of finance and economic development of Addis Ababa in (2013) stated that as urban farming contributed very little to food security and nutritional in Addis-Ababa and the contribution of urban agriculture were very insignificant and negligible and limited compared to the estimated potential of urban agriculture in Addis Ababa.

On the whole, Ethiopians consume limited quantities of vegetables, not only because of their relatively high cost and limited availability, but also because of traditional eating habits. It was estimated that all urban farmer households consumed a minimum of 10% of the main products from their private plots. The amount of vegetables consumed by the households determined by the availability of the vegetables and by priority decision of the households needs for consumption (Axumite, 1994).

2.10.5 Income generation and employment creation of urban agriculture in Addis Ababa

Urban agriculture has created full-time employment for very few household heads and their spouses, and part-time employment for the children and other members of the households. Urban agriculture has contributed to reduced unemployment within the family group (Axumite, 1994).

According the Addis Ababa Urban Agriculture Department (2013) confirmed that in terms of employment about 7,454 people engaged in vegetable productions activity by organizing into 11 farmer's cooperatives. A recent study by the Ministry of Trade and Industry Development, (MTID, 2010) reveals that the contribution of the urban agriculture productions to GDP of Addis Ababa is less than 1 %. The share of urban agriculture to the regional GDP and its contribution to urban employment in Addis Ababa is insignificant. The number of those employed in urban agricultural activities declined between 2009 and 2014 because of declining urban agricultural land due to expansion of the urban population, industry and commercial sectors. This decline is an indications of high competition for land by different economic sectors in the city (The Bureau of Tade and Industry Development of Addis Ababa, 2013).

The seasonal and perennial rivers and groundwater reserves of Addis Ababa are polluted by industrial and municipal solid and liquid wastes . In terms of environmental protections, according to (BoTID, 2013) in the past decades the compost produced from the organic waste was quite insignificant and very low compared to the amount of organic waste generated in the City.

Despite generating large amounts of solid waste from domestic activities, Addis Ababa does not have adequate waste management facilities. As a result solid waste is often piled on available open grounds, stream banks, and near bridges, where it is washed off into rivers. In addition to these, few of hospitals in Addis Ababa doesn't have waste treatment facilities, and the contagious clinical wastes generated by the hospitals located in Addis Ababa finds its way into the nearby streams that are tributaries . The industrial, municipal solid, liquid wastes and contagious clinical wastes generated by the hospitals discharge waste into nearby stream courses and open ditches and the river is heavily polluted. The high levels of pollution in the water sources of Addis Ababa have impacts on human and animal health, as well as on the urban ecosystem. The polluted river water is used by downstream residents to grow vegetables, which are sold and consumed by inhabitants of the city. (BoTID 2013).

According to EPA (2005) Pathogens transmitted through polluted water causes intestinal infections, and common water-borne diseases in Addis Ababa include typhoid, dysentery and cholera and all of the urban farmers using polluted river water are affected by these pathogens. In addition, it is feared that metals such as arsenic will build up in swiss chard, and chromium will build up in lettuce and the wastewater with high metallic content poisoning the food and the people are also exposed to heavy metal toxicity in the vegetables that are grown using the river wastewater

CHAPTER THREE

3. Methodology

3.1. Description of the study area

The study was carried out in Addis Ababa, the capital city of Ethiopia, Founded in 1886, Addis Ababa is the largest city in Ethiopia, with a population of 2,738,248 with annual growth rate of 2.8% (CSA , 2007) .

Addis Ababa is located in the central part of Ethiopia , with an average altitude or elevation of 2,355 m (7,726 ft) above sea level and the total land area of Addis Ababa is 527 km² (203 sq mi) or with 54,000 hectares of land . (Climatemps , 2012).

Addis Ababa consists of urban and peri-urban areas and divided into ten sub-cities which are Addis Ketema, Akaki-Qality, Arada, Bole, Gulele, Kirkos, Kolfe-Keranio, Lideta, Nifasilk-Lafto, and Yeka sub-cities. The Addis Ababa city Council is responsible administration of the city. Except Arada, Addis Ketema and Kirkos sub-cities the other seven of the sub-cities have urban agriculture offices.(The Bureau of Trade and Industry Development of Addis Ababa,2013).

The city has a constant temperature from month to month and has mild temperatures throughout the year and the mean annual temperature Addis Ababa is 15.9 ° (60.7 degrees Fahrenheit). On average there are 2439 hours of sunshine per year. Rainfall/ Precipitation of Addis Ababa is with total averages of 1089 mm (42.9 In) of Precipitation or rainfall per year, or 90.8 mm (3.6 in) per month. Which is equivalent to 1089 Liters/m² (26.71 Gallons/ft²) and the long wet season is from June to mid-September. (Climatemps , 2012).

The location of Addis Ababa, Ethiopia is at 8°58'N, 38°47'E, and with height of 2,355 m (7,726 ft) above sea level and the climate of Addis Ababa could be grouped Woina Dega climatic zones (sub-tropical types of climate, with 1500 - 2300 m altitude with mean annual temperature of 15 ° up to 20 ° (Climatemps , 2012) Generally, Addis Ababa has a very pleasant, healthy, cool climate; the city sits on a plateau so it benefits from relatively cool temperatures year round. The temperature also stays fairly constant throughout the year because of its proximity to the equator.

The location and climates of Addis Ababa is suitable for urban agriculture for crops like fruit and vegetables. Most of urban agriculture activities in Addis Ababa are located near water bodies, like Aba Samuel Lake, Kality, Kebena and Bulbula rivers, etc. The city is rich with number of rivers for

irrigation purpose. The city also has significant proportion of land for urban agriculture. On the side of those rivers, there are many population who are regularly engaged in vegetable and fruits production to get income for their family food consumption and livelihoods. (BoTID ,2013).

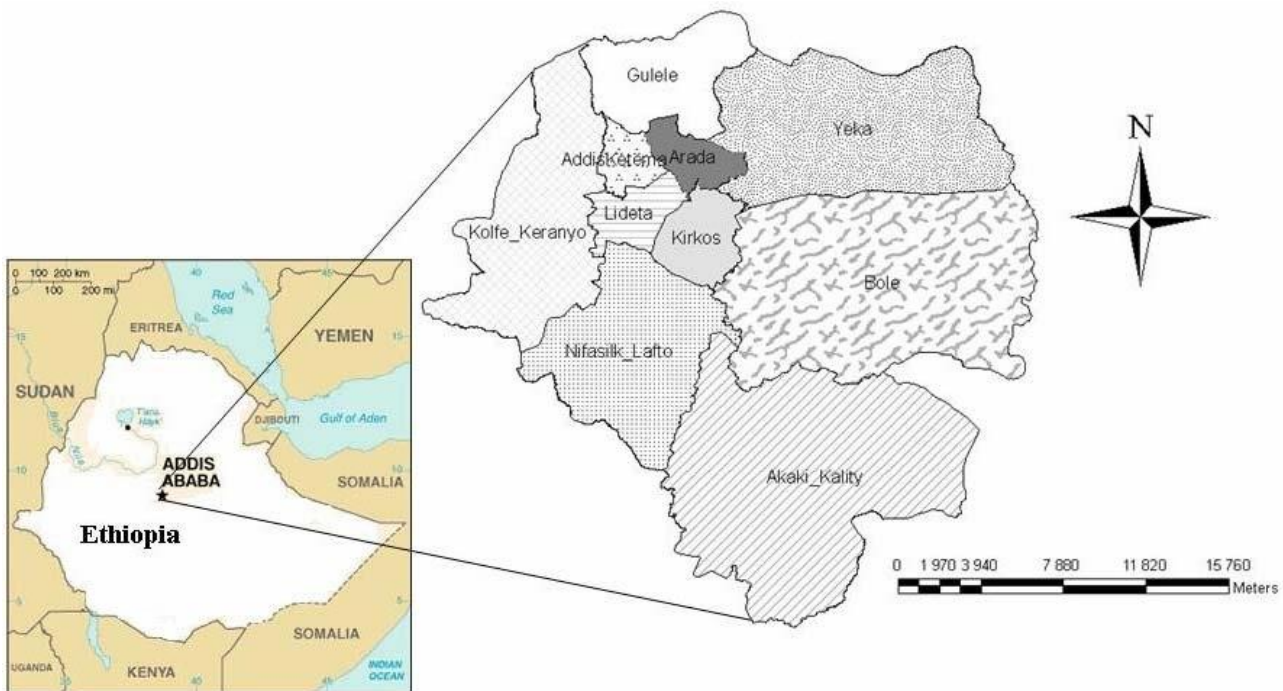


Figure 3.1. Map of Addis Ababa city, Ethiopia

Source: Addis Ababa city Council, 2006.

Urban farming in Addis Ababa city generally divided into two categories: the first category is farming on back yard and open spaces around houses, low-lying areas and along river sides in the city core areas; and the second category is found in peri-urban areas within 30 km distance, Addis Ababa has a subtropical highland climate: with a humid subtropical mild summer climate and mild rainy summers and mild dry winters (The Bureau of Trade and Industry Development of Addis Ababa,2013).

3. 2. Research design

The research employed both quantitative and qualitative methods of research for conducting the study. The quantitative research mainly focused on gathering quantitative data from the urban farmers; for measuring the total amount of income the vegetable urban farmers earned from the sale of the produces; which is very important for analysing the general effects of vegetable urban farming on poverty alleviations and livelihoods of the urban farmers through examining some of the poverty dimensions such as households income status, households food security , households access to educational and medical services .

The qualitative research focused on gathering of qualitative data from vegetable urban farmers and key informants about the overall state of vegetable urban farming practices , the reasons why urban farmers engaged in urban agriculture, how does vegetable urban farming contributed to livelihoods of the urban farmers ,environmental protection of the city of Addis Ababa through productive use of urban waste and about the contributions of the adopted urban agriculture policy and strategy on prompting the productivity , profitability , and developments of urban agriculture and about the current nature of the problems on urban vegetable farming productions, profitability and developments and about the current needs of the urban farmers for the development of sustainable urban vegetable farming practice in Addis Ababa .

In general , the research focused on assessing how does vegetable urban farming contributed to improved livelihoods of the vegetable urban farmers ; through examining the employment and income status of the households , the average monthly income earned by the producers from vegetable urban productions and the food security situations of the vegetable producing households in terms of households food availability and households access to food in the past years and households access to basic social services ; especially in terms of households access to educational and health services in the past years ;which is very important to describe the effect of vegetable urban farming's on vegetable producing households livelihoods and food security . In other words this was carried out for describing the contributions of vegetable urban farming income to improved livelihoods, poverty reductions and to improved socio economic status of the vegetable producing urban farmers.

3.3. Sampling method

To identify the target sample populations, and to collect the required data the study employed both purposive sampling and simple random sampling.

The study employed purposive sampling for selecting the vegetable producing associations, the key informant, the vegetable producing households for interview in Bole Sub City and simple random sampling for selecting the respondents and to administer the questionnaire.

Purposive sampling employed for selecting the vegetable producing associations from the whole of vegetable producing associations in Addis Ababa and for selecting vegetable producing association in Bole Sub City the reason the researcher employed purposive sampling for selecting the vegetable producer association from other vegetable producing associations was the scale and the long experience of the vegetable producing association.

According the information from Addis Ababa urban agricultural head offices in Addis Ababa there are more than 11 urban agriculture associations which are practicing vegetable urban agriculture in Addis Ababa and in Bole Sub City there are seven vegetable producing cooperatives; these are tesfa vegetable pro.cop, Arenguadetekel vegetable pro. Cop, Sertomadege vegetable pro .cop, Bulbula medere genet vegetable pro.cop (. woereda 12), Kebena and bulbula vegetable pro.cop (woereda 4), Tizazeberetaatkeletelemate and yewoeyenfrietesfaeresha producer cooperatives and from the seven vegetable producer association's in bole sub city three vegetable producing associations are purposely selected from the rest of seven vegetable producing associations in bole sub city , Addis Ababa .These associations are Bole-Bulbula vegetable producers' association Bole Kebena vegetables producers association and Mederegenete vegetable producer associations.

The reasons the researcher purposively selected the three vegetable producing cooperatives from the rest of the seven vegetable producing cooperatives in Bole Sub City; were because of the long experience kebena bulbula and mederegenet vegetable producing associations in vegetable urban farming activities and largeness of the scale of their vegetable urban farming activity from the rest of vegetable producing associations in Addis Ababa.

For the purpose of this study, and for selecting the vegetable producing urban farmers (the respondents) from the populations of Kabana Bulbula and Medere genet vegetable urban producing association the researcher employed simple random sampling. In Kebena - Bulbula and Medere genet vegetable pro.cop or producing associations there are a total of one hundred fifteen vegetable producing urban farmers.

From one hundred fifteen vegetable producing urban farmers In Kebena - Bulbula and Medere genet vegetable pro.cop or producing associations , hundred of the vegetable producing urban farmers are the members of Kebena - Bulbula vegetable producing cooperative, and fifteen of the vegetable producing urban farmers are the members of medere genet vegetable producing associations.

To this effect by using simple random sampling a total of seventy vegetable producing urban farmers were selected ; which is by using lottery methods of sampling fifty five respondents are selected from the rest 100 members of bole Kebena Bulbula vegetable producing association and fifteen respondents are selected from the rest of fifteen members of medere genet vegetable producing association.

For further investigations and to get reliable , valid information ; non-probability purposive sampling method were used for selecting the individual vegetable producing urban farmers for interview from the populations of vegetable producing urban farmers in Bole Sub City and for selecting the key informants for interview from Addis Ababa urban agricultural offices .

The Addis Ababa urban agriculture office has five urban agriculture department these are the departments of animal husbandry, aquaculture, agroforestry, urban beekeeping, poultry and horticulture and for the purpose this study the researcher purposively selected six chairperson or leaders from horticulture department ; to this effect from Addis Ababa urban agriculture head office ; in particular from horticulture department two chairperson or leaders of the horticulture department was selected and from Bole sub city urban agriculture head office ; in particular from horticulture department two chairperson or leaders of the horticulture department was selected , and from each of woereda 5 , 4, and 12 urban agriculture offices ; in particular from horticulture department two chairperson or leaders of the horticulture department was selected .

Also , for further investigations and to get reliable information ; non-probability purposive sampling method were used for selecting the individual vegetable producing urban farmers for interview from the population of keben Bulbula and medere genet vegetable producing association in Bole Sub City . The researcher purposively selected six chairperson or leaders of the vegetable producing associations for interview , among the six chairpersons two of the chairpersons are selected from each of the kebena , Bulbula and medere genet vegetable producing association .

3.4 Data collection

Questionnaire, semi-structured interview questions, and personal observation were the main data collection tools for collecting the qualitative and quantitative data for this research. The secondary data were collected from published books, internet sources, reports, and previous studies.

3.4.1 Questionnaire

To collect most of the required data for this study the researcher employed questionnaires. Questionnaires were the main tools for collecting most of the quantitative data for this research, thus majority of the primary data collected through survey questionnaire were by going at the working place of the vegetable producing urban farmers.

The researcher administered survey questionnaires to the selected seventy vegetable producing urban farmers in Bole Sub City and the respondents requested to answer questions about their primary reasons for engaging in vegetable urban farming , about the nature and forms of vegetable urban agricultural practices and about the contributions of urban vegetable farming to food security situations of the urban farmers and the urban vegetable producing households access to basic social services which was very important for describing how does vegetable urban farming income contributed to improved livelihoods of the urban farmers and requested to answer the questions about the type of fertilizer and water used by urban vegetable farmers which was very important for describing the contributions of vegetable urban farming to environmental protections of the city and requested to answer the question about the problem they encountered during their production activity and to answer question about what support the vegetable producing households received and support needed from both Governmental Offices and NGOs for sustainable vegetable urban agriculture productions and development.

3.4.2 Key informant interviews

To get reliable and valid information for the study ; through using semi structured interview questions, Interviews were carried out with purposively selected leaders of the vegetable producing associations in Bole Sub City or vegetable producing households who have got long experience on vegetable urban farming and with vegetable urban agricultural experts/chairperson in Bole Sub City.

The interviews carried out with 6 key informants; with the chairpersons from urban agricultural head office of Addis Ababa and from Bole sub city agricultural head offices; in particular the vegetable urban agricultural officers (chairperson) in Woreda 4 ,woereda , 5 ,Woreda 12 ,and the interviews were carried out with 6 the chairperson or leaders of Kebena , Bulbula and Medere genet vegetable producer associations about the nature of vegetable urban farming practice and about how does vegetable urban farming contributed to livelihoods of the urban farmers and environmental protection of the city and the problem they encounters and the support they needs for productive vegetable farming activity.

The interview with the key informants focused on the contributions of vegetable urban farming to livelihoods of the urban vegetable producers and about how does vegetable urban farming has contributed to environmental protection of Addis Ababa ; especially terms of using organic fertilizer compost and waste water or partially treated waste water from water treatment plants for environmental protection as well as for the productivity , profitability and developments of sustainable urban farming and the contribution or impacts of the adopted urban agriculture policy and strategy on promoting the productivity , profitability and development of urban agriculture and about what necessary and productive resource and service support received from the Addis Ababa urban agriculture offices .

3.4.3 Direct Observation

The researcher also used Direct observation as one of data collecting tools for this study and through using direct observation the researcher collected necessary information visiting and observing the working environment in the three vegetable producing associations.

Personal observation were made at the working environment of the selected vegetable urban farming locations near Kebena and Bulbula rivers (woereda 4 and 12) vegetable urban farming in Bole Sub City .

The researcher went to the selected vegetable producing associations working environment and observed the working environment, the type of plantations, and to collect necessary and relevant information about the working environment, the nature of vegetable urban farming practice, the type of vegetable they produced and how they produced the vegetables the researcher used direct observation. Also personal observations were made to the selected two vegetable producer household's houses to observe some of the conditions at their home.

3.5 Data analysis

The collected data from different sources were organized into meaningful facts and were analyzed using quantitative and qualitative techniques. The quantitative data were analyzed quantitatively by using frequency and percentage ; which were used to describe the collected data from the study and the collected data were changed into percentage by using excel 2013 and tables were used to present different variables. The qualitative data were analyzed qualitatively (by a detail description) according to the answer of the key informant that were emerged during the interviews time.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This chapter presents and describes the major findings from the study on the overall state and nature of vegetable urban farming and on the contributions of vegetable urban farming to livelihoods of the vegetable urban farmers of bole Kebena , bole Bulbula and bole medere genet vegetable producer cooperatives , and to environmental protections of the city of Addis Ababa through productive use of urban waste and, about the effectiveness and efficiency of the adopted urban agriculture policy and strategy on the production , profitability and development of urban agriculture and to identify the constraints and suggest multi sectorial strategy to promote sustainable vegetable urban farming in Addis Ababa.

4.1. Demographic characteristics of the urban farmers

Table 1. Demographic characteristics

Sex, age and educational status	Number of respondents	Percent
Sex		
Male	45	64.29
Female	25	35.71
Total	70	100
Educational background		
Primary (1-8)	30	42.86
Uneducated	17	24.29
Secondary (9-10)	5	7.14
Vocational and technical educations	18	25.71
university/college	-	-
Total	70	100
Age		
20 – 35	10	14.5
36 -. 45	30	42.86
46 – 55	26	37.14
56 – 65	9	12.86
Above 65	-	-
Total	70	100

Source: Survey data, 2015

The selected households for the survey study are 35.71 percent of the respondents are women, 64.29 percent of the respondents are male. The vegetable urban farming in Bole Sub City highly dominated by male households and the involvement of women's households are very limited.

About the age of the respondents, 14.5 percent of the vegetable producing urban farmers in bole sub city are between 20 - 35 age groups, 42.86 percent of the vegetable producing urban farmers are between 36 - 45 age groups and 37.14 percent of the respondents are between the 46 - 55 age groups, and 12.86 percent of the urban farmers are between 56 - 65 age groups.

The participation of the young generations, and old age participation are relatively low in vegetable urban farming in Bole sub city and the vegetable urban farming highly dominated by adult age groups which are between 36 - 45 age groups and old age between 46. - 55 age groups.

About the educational back ground of the vegetable producing households about 42.86 percent of vegetable producing households are with primary level (1 - 8) of educational back grounds and 25.71 percent of the vegetable producing households are with technical and vocational educational back grounds and 24.29 percent of the selected vegetable producing households are uneducated ; these households doesn't have any academic or vocational educational backgrounds. As the data on table one reveals , most of the vegetable producing households educational back ground is with primary or junior educational back ground and few of the vegetable producing urban farmers were uneducated or illiterate ; from this we ca conclude , as the vegetable urban agriculture highly dominated by households with primary level of educational status , uneducated and as vegetable urban agriculture created job opportunity for households with low (primary level) level of educational back ground and for uneducated households .

Table 2.Primary reasons for engaging in vegetable urban agriculture

Reasons	Number of respondents	Percent
To generate better income	12	17.14
To get and create employment opportunity	16	22..86
To achieve food security	9	12..86
To get out of poverty	30	42.86
To make the environment clean and attractive	-	-
To get additional income	3	4.29
Total	70	100

Source: Survey data, 2015

The data in table (2) show about, the vegetable producing urban farmers primary reasons to engaged in vegetable urban agriculture, as table two revels 42. 86 percent of the vegetable producing households reasons led them to engaged in vegetable urban agriculture were for getting out from the poverty situations of their households , for 17.14 percent of the vegetable producing households creating better income and stable income were the main reasons for engaging in vegetable urban farming , for 12.86 percent of the vegetable producing households achieving their households food security were the primary reasons of the vegetable producing households for engaging in vegetable urban agriculture and the need to feed their families led these vegetable producing household's to engaged in vegetable urban agriculture and 22.86 percent of the vegetable producing urban farmers the primary reason led them to engaged in vegetable urban agriculture create and have job opportunity and the reason of these vegetable producing household's decision engaged in vegetable urban agriculture was led by the expectations of to have better paying jobs opportunity and it was a matter of survival and 4.29 percent of the vegetable producing households

to get additional source of income were their primary reasons for engaging in vegetable urban farming activity ; the reason of these vegetable producing household's decision for engaging in vegetable urban agriculture was led by the expectation of improved returns from the sale of the productions and none of the vegetable producing urban farmers answered or indicated for the reasons to make the environment more attractive, and clean .

As the result in table 2 shows , majority of the vegetable producing households reasons which initiated or motivated them for joining or engaging in vegetable urban production were to get out of poverty and to create and get employment opportunity , also it indicates that most of the vegetable producer households were in state of unemployment and poverty situations before the vegetable producing households get engaged in vegetable urban agriculture and also the interviewed households stated that the primary reason led majority of the vegetable producing households to engaged in vegetable urban farming were to help their family , to improve the households livelihood and to fulfil the basic requirement and bedded of their family . From this we can conclude that's as majority of the vegetable producing urban farmers in Bole sub city are the urban poor and individuals who are not employed or whose salary is too little to support their household's livelihoods.

4.2. Forms and nature of vegetable urban farming in Bole Sub City

4.2.1. Types of vegetable grown by the urban farmers

Regarding the types of vegetables produced by the vegetable producing urban farmers in Bole Sub City ; the interviewed vegetable producing households explained that as the urban farmers grown cabbage, potato , green pepper, salad, cucumber , local cabbage (gommen) , carrot ,and beet root in the past two years , also the interviewed vegetable producing households stated that as most of the vegetable producing households harvest the vegetables two times per a year , and the vegetables grown by urban farmers are mostly used for selling with the aim to generate income for the livelihoods of the urban farmers .

The interviewed vegetable producing households also stated that as the urban farmers have never grown or produced onion and tomato in the past two years ; the main reasons of the vegetable producing households for not producing onion and tomato in the past two years were because of the expensiveness of the price to buy quality seeds from the market and before two years ago the urban farmers has been growing onion and tomato but because of poor quality of the seeds and the expensiveness of the price to buy productive and quality seeds challenged the urban farmers from gaining enough tomato and onions yields and this led the urban farmers to quit growing onion and tomato.

4. 2. 2. Locations where urban agriculture practiced by vegetable producers

Table. 3 Lands used by the vegetable urban producers in Bole Sub City

Lands	Frequency	Percent
Lands managed by governmental educational centres	-	-
On lands managed by governmental and public health centres	-	-
On lands managed by governmental factories, and other office	-	-
On lands managed by churches or mosque	-	-
On lands along streams , rivers	70	100
On reserved lands (lands waiting for construction and land that zone for future development and lands zoned for conservations	-	-
Other places	-	-
Total	70	100

Source: Survey data, 2015

The result in table 3 show about the plots of land used by the vegetable producing urban farmers to grow vegetables and the plot of lands where vegetable urban farming take place in Bole Sub City ; 100 percent of the vegetable producing households used the plot of lands which are found along the streams and rivers sides of Kebena and Bulbula river for producing different types of vegetables and the urban farmers practicing the vegetable urban farming activity on the plot of lands along the rivers sides of Kebena and Bulbula river through using furrow irrigation beside the rivers of kebena and Bulbula for growing the vegetable products and none of the vegetable producing households used any open spaces of the municipals for growing vegetables in the past years and none of the vegetable producing urban farmers used plots of lands that are found on different governmental and public institutions or on plots of lands managed by different governmental or public institutions and on plots of lands that are reserved for future developmental purpose and other purpose.

The interviewed vegetable producing households stated that as vegetable producing households in Bole Sub City using a plots of lands which are found along the river and streams sides of Kebena and Bulbula rivers for practicing the vegetable urban agriculture activity or for growing vegetable products and the vegetable producing households have never used any open municipal plots of lands which are found in different public and governmental institutions.



FIG.1 vegetable urban farming at Bulbula River

The interviewed vegetable urban farmers and the interviewed urban agriculture officers in Bole Sub City stated that as the vegetable producing households in Bole Sub City plow vegetables only on grounds and as vegetable producing households have never cultivated any types of vegetable by using container methods of farming ; which are container made of wood , clay , plastics and metal by placing the containers on the pyramid shelf and on vertical shelf which are made of wood or metal for intensive land use, and intensive methods of vegetable urban farming with the view to increase the productions of vegetable urban farming . However , in many African countries vertical container methods of vegetable farming is the most common practice and the practice of vegetable urban agriculture is take place on available lands within different governmental and public institution by employing or using container gardening methods of vegetable urban farming - container gardening is an easy way to increase the vegetable productions or yields per hectare by using containers which is in form of plastic bags , clay pots , plastic pots , wood box on shelf made of wood or metal and containers stacked in pyramids made of woods or metals which can be placed in a variety of locations including open stairwells, on roadside , and in any place where free spaces is available surrounding the edge of the vegetable urban farming plots of lands for intensive land use , for intensive method of vegetable farming as well as for increasing the quantity or the out puts of the vegetable productions .

4.3. Livelihoods

Livelihoods refers to means of securing the basic necessities or refers to an activity and a primary means of earning money in order to secure and sustain households basic needs like water, food, medicine, shelter, ,educations , clothing, and other utilities of the households. Household's livelihoods secured when the income earning activities of the households sustained the capabilities of the households for fulfilling or meeting the basic necessity of the households like food, potable water, health facilities, educational opportunities, shelter and when it helped the households to get out of poverty we call this household livelihoods secured and livelihoods sustainable (Frankenberger 1996).

On this part the research focused on assessing how does vegetable urban farming contributed to livelihoods of the vegetable urban farmers by examining the income status , employment status and food security situations of the vegetable producing households and the vegetable households access to educational and health services .

The respondents requested to answer questions about their primary employment , and about the average annual income they earned from vegetable urban productions ; which is very important for measuring the average proportion of income they gained from vegetable urban productions and the vegetable producer households requested to indicate the food security situations of the vegetable producing households in terms of food availability and accessibility situations of the households and households requested to indicate households access to social services in terms of households access to educational and health services ; these very important for describing how does vegetable urban farming contributed to improved livelihoods and poverty reductions of the vegetable producing households .

4.3.1 Employment

Table 4. The primary employment and sources of income of the producers

Primary employment	Frequency	Percent
Vegetable urban farming	45	64.14
Artesian	12	17.14
Medium sized trade	4	5.71
Daily labour	6	8.57
Income from external aid	3	4.44
Total	70	100

Source: Survey data, 2015

As table 4 reveals, vegetable urban agriculture created employment opportunity and created a primary means income earning activity for 64.29 percent of the vegetable producing households livelihoods and vegetable urban farming contributed to poverty reduction for this vegetable producing households by functioning as a primary source employment , income earning activity and this indicates as vegetable urban agriculture is the primary employment for majority of the vegetable producing household's livelihoods .

Small - medium sized trade activity is the primary employment and main source of income for 5. 71 percent of the vegetable producing households livelihoods and this indicates that that as urban agriculture created part time employment opportunity for the households who engaged in small - medium sized trade activity, and working as daily labourer in different industry and the income earned from working as daily labour in different industry is the primary source of income for 8.57 percent of the vegetable producing households and 4.44 percent of the vegetable producing households the income from relatives/friends is the main source of the households livelihoods and for 17.14 percent of the vegetable producing households livelihoods artisans (such as cleaners ,cooker and masons) is their primary employment and main source of income and urban agriculture is the second occupation for these vegetable producing households and vegetable urban agriculture created part time employment opportunity for the producers.

As the result in table 4 shows, vegetable urban agriculture created primary employment opportunity and source of income for majority of the vegetable producing household's livelihoods. Majority of the vegetable producing households livelihoods is dependent on vegetable urban agriculture and vegetable urban productions created means of livelihoods survival for the majority of the vegetable producing households through creating primary employment opportunity and urban agriculture has contributed to unemployment reductions by creating primary employment and by functioning as primary source of income for the majority of the vegetable producing households in Bole Sub City.

For few of the vegetable producing households vegetable urban farming is their second occupation and urban agriculture has created part time employment opportunity for few of the households by working as daily labourer thus, vegetable urban agriculture helped the vegetable producing urban farmers to generate additional income and to diversify their livelihoods opportunities by working part time on vegetable urban agriculture.

4.3.2 Income increment of the households

Table 5. The income increments of the household because of involvement in vegetable Urban farming

Does vegetable urban farming income of the households increased	Frequency	Percent
Yes	47	67.14
No	23	32.85
Total	70	100

Source: Survey data, 2015

The result in table 5 show about the contribution of vegetable urban agriculture on income status of the vegetable producing households and show about the increment of income earned by the vegetable producing households from the sale of vegetable productions in the past two years and 67.14 percent of the vegetable producing households responded that as the income they earned or received from the sale of vegetable urban productions has increased in the past two years and this households income increment indicated that as vegetable urban farming improved the income status and the livelihoods of the vegetable producing households in Bole Sub City ; from this we can conclude that the adopted urban agriculture policy and strategy has contributed to the profitability of vegetable urban agriculture in the past two years and 32.85 percent of the vegetable producing urban farmers in Bole Sub City responded that as the income they earned from the sale of vegetable urban productions has not increased or changed in the past two years and vegetable urban farming has not improved the income status for 32.85 percent of the vegetable producing households because the income this vegetable producing urban farmers received from the sale of the vegetable productions has not increased in the past two years and this indicate that as the income the vegetable producing urban farmers received small amount of money from the sale of the vegetable productions ; also this indicate that the income the vegetable producers earned from the sale of the vegetable productions remains small as the period before the developments of urban agriculture policy and strategy for the city of Addis Ababa or the income status of the few vegetable producing households are still unchanged .

As the result in table 5 shows, vegetable urban farming improved the income status for majority of vegetable producing households in the past two years and this indicates that as the income earned from the sale of vegetable urban productions has increased in the past two years and as vegetable urban farming contributed to improved income status and livelihoods for majority of the vegetable producing households.

4.3.3. The contribution of vegetable urban farming to poverty reduction

The income status of the vegetable producing urban farmers is an important indicator of the socio economic status and the poverty level of the households. Either the vegetable producing household's income above the poverty line or below poverty lines and whether the vegetable urban farming contributed for the urban farmers to step forward above the poverty lines or not; which is 1500 birr per month is the poverty line in the context of Ethiopian official income poverty line.

The quantitative research focused on gathering of quantitative data from the vegetable producing households which is for measuring the total amount of income the urban farmers earned from the sale of the vegetable productions or produces ; which is very important for describing the general effects of vegetable urban farming income on poverty reductions for vegetable producing households and to describe the socioeconomic changes which have taken for vegetable producing households in Bole Sub City and to clarify if there is any income improvement or changes of livelihoods for the vegetable urban farmers households on the past years .

Table 6. Average monthly income received by the vegetable producing urban farmers in Bole Sub City

Income received from vegetable urban farming	Frequency	Percent
Below 1500 Birr	9	12.85
1500 – 2500	36	51.43
2600 – 3500	25	35.71
3600 – 4500	-	-
Above 4500	-	-
Total	70	100

Source: Survey data, 2015

The result in table 6 show the average monthly income gained by the vegetable producing urban farmers from the sale of vegetable productions , thus 12.85 percent of the vegetable producing households earned less than 1500 birr per month as a profit from the sale of the vegetable productions , and this indicate that as 12.85 percent of the vegetable producing urban farmers are still below the official poverty line in Ethiopian context ; which is 1500 birr is the poverty level in Ethiopia poverty context, thus vegetable urban farming has not helped few of the vegetable

producing urban farmers to get out of poverty and 51.43 percent of vegetable producing households earned an average monthly income ranges from 1500 up to 2500 birr from the sale of vegetable productions in the past two years and vegetable urban agriculture generated monthly net income ranges from 1500 birr to 2500 birr as a profit ; the income this farmers earn from vegetable urban farming is equivalent to the official minimum wage in the formal sector and 35.71 percent of the vegetable producing households earned an average monthly income ranges from 2600 up to 3500 birr per month from the sale of vegetable productions as a profit ; these amount is normally exceed official annual minimum salaries of the basic government workers , 2600 to 3500 birr is an income twice greater than the official poverty line in Ethiopian context and Irrigated vegetable urban production has enabled 35.71 percent of the vegetable producing households to step forward over the poverty line in Ethiopian poverty context and none of the vegetable producing urban farmers earned above 3600 birr as a profit from vegetable productions. As the result on table 6 shows, urban agriculture contributed to poverty reduction for majority of the vegetable producing urban farmers by providing an average income ranges from 1500 up to 3500 birr.

In overall majority of the vegetable producing households in Bole Sub City moved step forward above the poverty lines in the context of Ethiopian poverty line; which is 1500 birr per month is the poverty levels in Ethiopian context (According UNDP ,2011) and vegetable urban farming helped majority of vegetable producing households to step forward above the income poverty line in Ethiopian poverty line context.

However, vegetable urban farming has not helped few of the vegetable producing urban farmers to move step upward the poverty lines in Ethiopian context (which is 1500 birr) ; thus few of the vegetable producing households are still they are found below poverty line and still they are found in state of poverty because few of the producers earned less than 1500 birr per month as a profit from the sale of the vegetable productions and this indicate that as vegetable urban farming has not changed or improved or enhanced the income status of the vegetable producing households (economic status of these urban farmers) to step forward above the income poverty level in Ethiopian context ; thus vegetable urban farming has not contributed to poverty reductions for few of the vegetable producing urban farmers in bole sub city .



FIG 3. ATO ABDY harvesting his potato at kebena vegetable farming plots



Ato Mengistu at Bulbula vegetable urban farming

4.3.4. The contribution of vegetable urban farming incomes to food security and basic social services

Income determines the purchasing power at household level, such that the higher the income, the higher the ability of the households to secure the food requirements of the households and the higher the income, the higher the ability of the households to access better medical and education services and to meet the requirements of the self and his/her households basic needs on a sustainable basis with dignity (FAO 2015).

On this part the research focused on assessing how does vegetable urban farming contributed to vegetable producing households food security and livelihoods on the past one year in particular by examining households food availability situations , households access to food , households access to basic social services in particular households access to educational and health services ; which is important for describing the contribution of vegetable urban farming incomes to improved livelihoods of the vegetable producing households and to improved food security of the urban farmers in terms of the vegetable producing households food availability situation , households access to foods and households access to basic social services especially in terms of vegetable producing households access to health and educational services in the past year .

Respondents requested to answer questions about the contributions of vegetable urban farming to food security of the vegetable producing households in the past year ; in particularly to food availability situations at the of the vegetable producing households in the past year and households access to food on the past year ; which is very important for examining and describing how does vegetable urban farming income contributed to food security situations of the vegetable producing urban farmers in Bole sub city and the vegetable producing households were requested to answer the question about the contribution or effect of vegetable urban farming on households access to basic social services in particular households access to health and educational services in the past year ; which is very important for examining and describing how does vegetable urban farming contributed to livelihoods of the vegetable producing urban farmers ; in general those questions were important to clarify and describe vegetable urban framings if improved the livelihoods and the food security situations of the vegetable producing urban farmers in the past year .

4.3.4.1 Food security

Food security exist when all people, at all times, have physical and economic access to sufficient, and safe nutritious foods to meet the dietary needs and food preferences of the households for an active and healthy life.

In this part the research focused on assessing how does vegetable urban farming contributed to food security for the vegetable producing households especially in terms of households access to food , households food availability situations in the past years and households consumptions of different types of nutritional food from various source of nutritional foods ; which are important to describe the contributions of vegetable urban farming income (income that gained or received from the sale of vegetable production) on vegetable producing households food security situations.

4.3.4.1.1 Food availability

Refers to having sufficient or enough quantities food to eat at the household's home and food security exist when all the households have sufficient, and enough quantities of quality food to eat at home and when households having enough food to feed his family at the households home.

**Table.7 The contribution of urban vegetable production
on food availability**

Food availability	Frequency	Percent
Increased	49	70
Not changed /decreased	21	30
Total	70	100

Source: Survey data, 2015

The result on table 7 is about the effect of vegetable urban production on the food availability situations of the urban farmers .Vegetable urban farming improved the food availability situations for 70 percent of the vegetable producing urban farmers and this is an indication that as vegetable urban farming contributed for majority of the vegetable producing urban farmers to have sufficient quantities of food to eat at the vegetable producers home in the past years and as vegetable urban farming contributed to improved food availability situations for majority of the vegetable producing households .

Vegetable urban farming has not contributed to improved food availability situations for 30 percent of the vegetable producing households and vegetable urban agriculture has not contributed to improved food availability situations for few of the vegetable producing households or vegetable

urban farming has not contributed for few of the vegetable producing households to have enough food to eat at their home and the food availability at household level has not changed for few of the producers.

As results on table 7 shows , vegetable urban farming contributed to improved food availability situations for majority of the vegetable producing households in the past year , vegetable urban farming income positively contributed for majority of the vegetable producing households to had enough foods to eat at their home and vegetable urban farming has not improved the food availability situations for few number of the vegetable producing households and this indicates that as the few of the vegetable producing urban farmers had limited variety of food to eat at their home in the past years.

The food insecurity situations of the few vegetable producing households remains the same as the period before they get engaged in vegetable urban farming and the food availability has remains poor or low as the same as the year before the development of urban agriculture policy and strategy for the city of Addis Ababa city .

Even though, the city administrations of Addis Ababa adopted pro poor urban agriculture policy and strategy in an effort to promote the development of vegetable urban farming and with the aim to ensure food security for all of the urban poor , to enable of all the household to have enough or sufficient quantities of food to eat at all of the households home , however the police and strategy has not enabled all of the vegetable producing households to have enough quantities of food to eat at the households homes or to feed his family.

4.3.4.1.2 Food access

Food access: refers to the capacity or ability of the households to purchase sufficient or adequate quantity and quality of foods and access ensures all households or individuals to obtain the food the households need to eat and having adequate or enough income enhance households capacity to purchase adequate foods .

Table 8. The effect of urban vegetable production on households food access

Food accessibility	Frequency	Percent
Increased	51	72.86
Not changed	19	27.86
Total	70	100

Source: Survey data, 2015

The result in table 8 shows about the effect of vegetable urban farming income on vegetable producing household access to foods .As table 8 reveals , vegetable urban farming improved or enhanced the ability or capacity to purchase or to buy food for percent 72.86 percent of the vegetable producing households and this is an indication as the ability to acquire foods and the food accessibility situations for majority of the vegetable producing urban farmers had improved in the past years and vegetable urban farming improved access to food for majority of the vegetable producing households in the past years and as the contributions or effects of vegetable urban production on households access to food has increased in the past year .

For 27. 86 percent of the vegetable producing urban farmers access to foods has not changed or improved in the past year ; which means for 27.86 percent the vegetable producing households that vegetable urban farming has not improved or enhanced the ability or capacity to buy foods for this households and this few of the vegetable urban farming households does not have enough income to acquire and obtain appropriate quantity of foods for their households .

In general , as the result in table 8 shows, vegetable urban agriculture improved the food accessibility situations for majority of the vegetable producing households; vegetable urban farming improved the ability or the capacity to access food for majority of the households and vegetable urban agriculture has not improved households ability or capacity to purchase sufficient quantity and quality of foods for few of the vegetable producing households and vegetable urban farming has not improved access to food for few of the vegetable producing households in the past year.

4.3.4.1.3 Consumptions of various foods

For further descriptive analysis of the effects of vegetable urban farming income on households consumptions of different types of nutritional foods were carried out to verify the information on the food availability and accessibility level of the households (on table 7 and 8) which is very important to ascertain the food availability situations of the vegetable producing households and the vegetable producing households access to nutritional foods in the past year.

Table 9. The effect of urban vegetable production on household's consumptions of Nutrition foods

Food consumptions situations	frequency	Percent
Frequently consume / always eat enough nutritional foods	22	31.42
Infrequently consumed/ eat enough food but not always	38	54.28
We Consumed very rarely / we eat nutritional foods once in a while	10	14.28
Total	70	100

Source: Survey data, 2015

The result in table 9 show the contributions of vegetable urban framings on vegetable producing households consumptions of different nutritional foods for healthy and appropriate diets of the households , such as consuming protein food (fish, meat, milk, eggs) vitamins food , and fat food (oil food) .

As the result on table 9 , vegetable urban agriculture helped 31.42 percent of the vegetable producing urban farmers to acquire and consume different types of sufficient quantity and quality of nutritional foods on consistent base or frequently for appropriate nutritious diet and health of the vegetable producing households in the past years and this indicates that as vegetable urban farming income contributed to improved nutritional food consumptions for 31.42 percent the vegetable producing urban farmers . vegetable urban agriculture has not helped 54.28 percent of the vegetable producing households to consume different types of nutritional foods infrequently at the households home in the past years ; these vegetable producing households had very limited variety of nutritional foods to eat or consume on consistent bases, sometimes this households eats nutritional foods what the households would not like to eat and vegetable urban farming income had not contributed to improved nutritional food consumptions for 54.28 percent of the vegetable producing urban farmers and 14.28 percent of vegetable producing urban farmers consume different nutritional foods once in a while (very rarely) in the past years; which means the vegetable producing households they always consume foods what the households don't needs to consume and

vegetable urban farming income has not contributed to improved consumptions of nutritional foods for 14.28 percent of the vegetable producing households on consistent base.

As the result on table 9 shows, very few number of vegetable producing households consuming different nutritional foods on consistent bases, and majority of the producers are vulnerable to nutritional food insecurity; this is an indication as vegetable urban agriculture has not helped majority of the vegetable producing households to obtain and consume sufficient quantity and quality of nutritional foods on consistent base (frequently) for appropriate diet and health of the households.

Vegetable urban farming has not contributed to improved consumptions of different nutritional food for majority of the vegetable producing urban farmers ; thus the income gained from the sale of vegetable productions has not improved the capacity or ability to purchase and to consume sufficient quantity and quality of of nutritional foods fish, meat, milk, eggs) vitamins food , and fat food (oil food) on consistent base for majority of the vegetable producing households .

Generally as the result on table (7. 8, and 9) showed that as vegetable urban farming contributed to improved food security for majority of urban farmers; in particular to the food availability and accessibility situations for majority of vegetable producing urban farmers and vegetable urban farming has not improved the consumptions of different nutritional foods on consistent base for majority of the vegetable producing households and vegetable urban farming income has not made a key contribution to improved food security for few numbers of vegetable producing households and these households are still food insecure.

From this we can see that, urban agriculture policy and strategy in Addis Ababa has not enhanced the productions, profitability and developments of urban agriculture with the aim to ensure the food security situations of all the vegetable producing households and with the aim to enable all the household to have enough and sufficient quantities of quality foods at households home and to feed his family.

4.3.4.2 Social services

On this part, the research focused on examining the contribution of vegetable urban farming on households access to educational service especially particularly the vegetable producing households ability to pay school fees and to buy educational material like books, uniforms and other by the income earned from the sale of vegetable productions and on households access to health service , particularly the vegetable producing household ability to pay for medical facilities and to cover all medical costs by the income the households received from the sale of vegetable productions ; which are very important for assessing and describing how does vegetable urban farming had contributed to improved livelihoods and poverty reductions of the vegetable producing households in Bole Sub City, especially in terms of basic social service access of the vegetable producing households (households access to education and health service.).

4.3.4.2.1. Educational services

Table 10. The contribution of urban vegetable production on households access to educational service

Ability to pay school fees and buying different educational materials	Frequency	Percent
Increased	17	24.29
Decreased	-	-
Not changed	53	75.71
Total	70	100

Source: Survey data, 2015

The result in table 10 show the effect of vegetable urban farming income on vegetable producing households access to educational service , as table 10 reveals vegetable urban agriculture improved or enhanced the ability or capacity to pay the required annual school fees and to buy educational material like books, uniforms for 24.29 percent of the vegetable producing urban farmers in bole sub city and this indicate that as vegetable urban agriculture improved access to educational service for majority of the vegetable producing households in the past years and improved ability to pay the required school fees , ability for buying the required educational materials for schooling such as different kinds of books , and uniform for majority of the households in the past two years.

and vegetable urban farming has not improved the ability to pay school fees and to buy the required educational materials like books and uniforms for schooling for 75.71 percent of the vegetable producing urban farmers in the past two years and vegetable urban farming has not contributed to improved access to educational service for majority of the vegetable producing urban farmers on bole sub city .

The finding implies that , as vegetable urban farming has not contributed to improved access to educational service for majority of the vegetable producing households and the ability for paying the required school fees and the capacity of buying different educational material has not improved for majority of the households in the past two years and this is an indication that as vegetable urban farming in bole sub city had not contributed on households access to better educational service and vegetable urban farming incomes has not enhanced the livelihoods for majority of the vegetable producing households ; especially in terms of households access to better educational services which is very important for social development of the community has not changed in the past two years .

4.3.4.2.2 Health services

On this part, the research focused on examining the contribution of the income received from sale of vegetable urban production on household's access to better health /medical service an household ability to pay medical costs and buying different medicines.

Table 11.The effect of urban vegetable production on household access to health Service

Ability to pay for medical service and to buy drugs	Frequency	Percent
Increased	47	67.17
Decreased	-	-
Not changed	23	32.86
Total	70	100

Source: Survey data, 2015

As table 11 reveals, 67.17 percent of the vegetable producing households paying ability to medical facility; like paying the required birr for medicines and for better health service has increased and this indicates vegetable urban farming improved for 67.17 percent of the vegetable producing households access to health service and Vegetable urban farming improved or enhanced the ability or capacity to pay the required medical fees and to cover the required medical costs like to cover the cost for buying different medicines and on paying for other medical facility for majority of the vegetable producing households and this indicates as the effect or contribution of vegetable urban farming income increased on households access to better health /medical service , and 32. 86 percent of the vegetable producing households paying abilities for health services, such as buying medicines and other medical facilities and for fulfilling the required medical fees has not changed in the past two years and vegetable urban farming has not contributed to improved access to better health service for 32.86percent of the vegetable producing households in the past two years, Vegetable urban agriculture has not enabled few of the vegetable producing households to pay the required payment for healthy service , the situations has remained poor as the period before they

engaged in vegetable urban farming and the period before the city administration of Addis Ababa adopted urban agricultural policy and strategy. The finding implies that, as vegetable urban production contributed to poverty reductions by improving access to better health services for majority of the vegetable producing households in Bole Sub City and income earned from vegetable urban farming has improved the livelihoods for majority of the vegetable producing households; especially in terms of households access to medical services and vegetable urban farming has not improved access of educational services for majority of vegetable producing urban farmers in Bole Sub City .

Case 1. A transformed life from external aid /dependent / to independent

Woyzero Lemlem is 43 years old women and she used to earn income from external aid as remittance and husband were getting average 1200 birr per month by selling milk from his dairy activity and woyzero Lemlem was raising two of her children's with this income. In general , she were dependent on her husband monthly income from the selling of dairy product and on the income earned from external aid as remittance and these income it was not enough for her family livelihoods. However after she engaged in vegetable production and she is getting better income for her families livelihoods and she is earning a net monthly income ranges from 2300 up to 2900 birr per month by selling vegetables.



Woyzero lemlem at medere genet vegetable producing association farming land

She affirmed the contributions of vegetable urban farming income in her word as follows: I never got enough money for feeding my children at home before I engaged in vegetable urban farming but now after in engaged in vegetable urban farming ; I am very happy having vegetable plants

from my own farm and I assured my families food security by the income from the selling and now i can consume different types of nutritional food by the income from the selling of my products and consuming of my own vegetable products from my vegetable farm helped me to save some money and to use it for other expenditures of my family and I never had any asset like refrigerator, sofa before I engaged in vegetable urban farming , however , currently vegetable urban farming income enabled me for buying durable asset like refrigerator, sofa and TV and vegetable urban farming income helps me very much to fulfil my family needs such as to send my children to better school ,and for buying the educational material for my children.

4.4. The contributions of vegetable urban farming to Environmental protection of Addis Ababa.

In this part the research focused on assessing how does vegetable urban farming has contributed to environmental protections of the city of Addis Ababa through productive reuse of urban waste water and urban organic wastes .The farmers requested different types of questions ranging from ecologically agricultural practicing system to the type of water and fertilizers they used in their vegetable productions activity.

Table.12 The fertilizers used for vegetable production

Fertilizers	Frequency	Percent
Chemical fertilizer	41	58.57
Compost (organic urban waste)	9	12.86
Animal manure	20	28.78
Mulching	-	-
Other	-	-
Total	70	100

Source: Survey data, 2015

As table12 reveals, 12.86 percent of the vegetable producing urban households use organic wastes (compost) as fertilizer in their farm to enrich the fertility of the soil and 58.57 percent of the vegetable producing urban farmers use chemical fertilizers as fertilizer on their farms to increase the vegetable productions yields and 28.78 percent of the producers use animal manure in their vegetable urban farming as a fertilizers; it was the main nutrient used in their farm to increase the fertility of the soli and the vegetable productions .

The interviewed vegetable urban farmers stated that as most of the time the vegetable producing households use chemical fertilizers on their farm such as royal fertilizers and stated that as the urban farmers received chemical fertilizers (royal fertilizer) as a suuport from Bole Sub City's urban agricultural offices and the interviewed vegetable producing households explained that as the vegetable urban farmers utilized or applied very small amount of animal manure on their farm and

sometimes as the vegetable producing urban farmers used mulching to enhance the productivity of the vegetable urban agriculture and for environmental protections of the city of Addis Ababa .

As the result in table 12 shows, majority of the vegetable producing urban farmers uses high amount inorganic fertilizers (chemical fertilizers) and majority of the urban farmers not using organic waste or compost as fertilizer on their farm.

Also the interviewed vegetable producers explained that as the vegetable producing urban farmers planted different types of trees around the their farming ; the reason the urban farmers planted this trees were for reducing soil erosions and for protecting their farms from flooding .

The interviewed vegetable producing urban farmers explained that as the vegetable producing households have been dig different wells around the farming plot for the purpose of compost preparations , however the urban farmers have never used the wells to produce or prepare compost and before two years ago small number of vegetable producers in Bole Sub City applied organic fertilizers on their farms ; which is compost that comes from gerjie compost preparation site but currently the urban farmers quit using compost as fertilizer on their farms and stated that majority of the the vegetable producing urban farmers currently using inorganic fertilizer (chemical fertilizers) and the vegetable producing households most of the time uses chemical fertilizers on consistent base and sometimes the urban farmers uses animal manure as a fertilizer in their farm.

The interviewed key informants, explained that as the effort made by the urban agricultural office in Addis Ababa on collecting different organic materials for the purpose of composting is very little compared to the waste generated in the city of Addis Ababa and with the compost requirements of the urban farmers and stated that as the municipals has not developed any low economical composing infrastructure around the vegetable urban farming in the past two years.

The interviewed urban agriculture officers stated that as their office has not made effective and efficient efforts on collecting different types of organic urban waste from hotels and markets with the aim for facilitating the production of compost and to use the compost as a fertilizer on the vegetable farms with the aim to increase or enrich the fertility of the soil and to increase the productivity and profitability of vegetable urban farming in the past two years. And the interviewed urban agriculture officers from Bole Sub City stated that as few NGOs currently started collecting organic urban wastes for producing compost and for producing compost and to deliver the compost to vegetable producing urban farmers with the aim to productive reuse of the urban organic waste for enhancing the productivity of vegetable urban farming and for keeping away the waste from dumping on water body's or open spaces and to reduce the waste disposals on different open space and on different water body's or around the road sides of the city of Addis Ababa with the aim

reduce water , air pollutions and for environmental protection and management of the city of Addis Ababa . However the effort made by different NGOs for producing compost and delivering the compost for vegetable producing urban farmers is very limited and ineffective and inefficient.

**TABLE. 13 Primary water source for vegetable urban farming
in Bole Sub City**

Primary water source	Frequency	Percent
Water from municipal potable water	-	-
Ground water	-	-
River water	63	90
Rain water	7	10
Treated water from treatment plants	-	-
Municipal sewerage water	-	-
Total	70	100

Source: Survey data, 2015

The result in table 13 shows about main types of water used by vegetable producing households for vegetable urban productions In Bole Sub City, 100 percent of the vegetable producing urban farmers in Bole Sub City responded that as the urban farmers uses river water from Kebena and Bulbula rivers or streams for irrigating the vegetable urban farms by building diversion structure or dams to the vegetable urban farming fields and this indicates that river water is the primary source of water supply for the vegetable producing households vegetable urban agriculture productions and none of the vegetable producing households have never used waste water that are collected from municipal sewerage and treatment plants.

The interviewed vegetable producing households explained that as all of the vegetable producing urban farmers using water from rivers or streams for irrigating and watering their farms and the interviewed vegetable producing households stated as the vegetable producing urban farmers use rain water for watering the vegetable urban farms during rain time and all of the vegetable producing households in bole sub city have never used treated and partially treated waste water and untreated urban waste water collected from municipal sewerage and none of the urban farmers used potable water from the municipals and water collected for ground water .

4.5. Farming constraints

On this part the research focused on identifying the main problems or challenges which the vegetable producing urban farmers faced in the production , profitability and developments of vegetable urban agriculture and to identify main problems that challenged the urban farmers from practicing vegetable urban farming in sustainable way with the aim to improve their livelihoods .

Table 14. Main challenges faced by vegetable urban farmers in Bole Sub City

Problems on vegetable framings	Frequency	Percent
Shortage of water	26	37.14
Shortage of land	25	35.71
Lack of access to credit	7	10
Lack of access to productive seeds and fertilizes	-	-
Shortage of farm tools	-	-
Lack of access to market	-	-
Lack of access to extension service	-	-
Lack of irrigation infrastructure	12	18.7
Total	70	100

Source: Survey data 2015

Table 14 show about the main challenges that the urban farmers faced on vegetable urban productions , profitability and developments , about 35.71 percent of vegetable producing households responded that as lack of access to safe and clean water supply is the main problems on the production , profitability and development of vegetable urban agriculture and Shortage of water challenged the vegetable producing households from producing enough vegetable products and from generating decent and more income from the sale of the vegetable productions and 37.14 percent of the producers responded that as shortage of land and lack of access to available municipal lands is the main problems on the productions and development of vegetable urban agriculture and shortage of land challenged the vegetable producing households from producing enough vegetable product and the response of the producers indicates that if the producers have adequate access to land they would produce more vegetable and they would increase their income in sustainable way by producing and selling more vegetable products and 18.7 percent of the producers responded that as the problem of irrigation infrastructure like poor quality or standard of the water diversion structure as a major problem on the productions of vegetable urban agriculture in Bole Sub City and lack of irrigation infrastructure challenged the households to divert water from the river to their farm and from producing enough vegetable production throughout the year and 10 percent of the vegetable producing households responded that as lack of access to credit as the main challenges on the productions, profitability and developments of vegetable urban agriculture , and lack of access to credit challenged the vegetable producing households from increasing their productions and profitability the vegetable urban agriculture and none of the vegetable producers responded that as they have shortage of tool on vegetable urban agriculture productions .

As the results in table 14 show that shortage of water and lands is the main or top most problems that the vegetable producing households in Bole Sub City finding it difficult to grow or plant enough vegetable products and this is an indications that shortage of water and lands are major problems or constraints on the productions, profitability and development vegetable urban farming. The interviewed vegetable urban farmers stated that as small land size and lack of access to clean water and lack of access to quality seeds , and fertilizers are the topmost constraint to produce more than the amount of the productions they are currently producing and high cost of inputs such as plastic bags and stones for building the diversion dams and to divert the water to their farms is the major problems for the urban farmers for producing enough vegetable productions and according the interviewed vegetable urban farmers views lack of access to lands and lack of access to safe and clean water and high cost of inputs such as the price of quality seeds , and the price of China plastic bags and stone are the major challenges on the productions , profitability and developments of vegetable urban agriculture and those problems pose problems on the improvements of the vegetable producing households livelihoods and food security .

The interviewed vegetable urban farmers stated that as. the vegetable producing urban farmers have never sought and heard any supportive vegetable urban agriculture policy and strategy that promote the urban farmers access to use the available lands in the municipals in the past two years and the vegetable producing households have never sought or heard any pro poor urban agriculture policy and strategy that ensures the vegetable urban farmers to access safe and clean water supply for sustainable vegetable urban agriculture production , profitability and developments in the city of Addis Ababa on the past two years and judging from the interviewed households responses we can see that as vegetable urban framings deserve necessary , better , facilitative and appropriate policy and strategy support to enhance the production and developments of prop poor vegetable urban agriculture and the interviewed key informant stated that as there is urban agriculture policy and strategy to promote the profitability , productions and developments of urban agriculture with the aim to end urban poverty , however the municipals has not started the implementations of the adopted urban agriculture policy and strategy with the aim to promote the productivity , profitability and developments of urban agriculture for improving the socio economic status of the urban farmers and for sustainable urban development .

4.6. Support offered to vegetable urban farming for sustainable urban agriculture

The interviewed vegetable urban farmers responded that as they have got different kinds of support from the municipals and NGOs like fertilizers, different types of farm tools , poor quality seeds and expert assistance on how to plow , how to prepare compost and how to use compost or animal manures as fertilizer with the aim to increase the productivity and profitability of the vegetable urban agriculture and the interviewed vegetable producers stated that as majority of the urban farmers accessed extension services and as the farmers have their own tools; use them (the tools) to control weeds, to plow, to harvest the vegetable productions and to prune trees around their plots. However the support or assistance the urban farmers received from governmental offices is very little and the support was not sufficient , effective and efficient to promote the productions , profitability and to practice their vegetable urban farming in sustainable way .

The interviewed vegetable urban farmers stated that as the vegetable producing households received water pump motor as a support from NGOs for pumping water from Kebena - Bulbula rivers and for irrigating or watering their farms and the vegetable producing households received financial support from NGOs for buying seeds and benzine for their water pumping motor and the NGOs helped the vegetable producing households in medere genet vegetable producing associations by building terrace and fence on the surrounding sides of the vegetable urban farming plots of lands to protect the soil from erosion and to control the running water by building terrace. The interviewed vegetable urban farmers stated that as the vegetable producing households received support in the forms of chemical fertilizers and seeds from Bole Sub City urban agricultural office and NGO. However, the support the vegetable urban farmers received from governmental offices and NGOs was not effective and efficient because the chemical fertilizers and seeds are poor quality.

4.7. Support needed by the vegetable urban farmers

Table 15. Major support needed by the producers for Sustainable Productions

Support needed	Frequency	Percent
Land access	27	38.57
Water access	33	47.14
Access to seeds and fertilizers	5	7.14
Market access	-	-
Advice /extension service	-	-
Credits	5	7.14
Total	70	100

Source: Survey data, 2015

The result in table 15 show about the support needed by the vegetable producing households for enhancing the profitability, productions and developments of their vegetable urban agriculture activity. About 27 percent of the producers responded that as they need access to lands as a support for increasing or enhancing their vegetable urban agriculture productions and the interviewed urban farmers explained that as the urban farmers can produce a lot and can get better or reliable income if farmers have the land size more than the size they own this time or if the producing households have better access to lands , the urban farmers can get better income from the sale of vegetable productions and can improved the livelihoods of the households in sustainable way and 33 percent of the vegetable producing households responded that as the urban farmers needs clean and safe water source as a support for sustainable water supply thorough out the year and for sustainable vegetable urban agriculture productions throughout the year.

The interviewed vegetable urban farmers stated that as the vegetable producing households can produce a lot if the urban framers have clean water supply or access to clean or safe water source throughout the year and the vegetable producing households can earn better income if the urban farmers have better means of clean water access and 5 percent of the vegetable producing households responded that as they needs credit and financial support to invest on their farm for increasing the productions and the profitability of their vegetable urban farming's and 5 percent of the producers responded that as they needs productive seeds and fertilizer as a support to increase the fertility of the soil and for increasing the productions their vegetable urban farming .

As the result in table 15 show, majority of the farmers needs or required access to clean water source as a support for yearly round water supply and needs access to land as a support for sustainable urban vegetable productions , profitability and development , also the interviewed

vegetable producer stated that as urban farmers needs financial support for buying stones and china plastic bags for building diversion dams to divert the water from the river to their farms for irrigating the vegetable farms ; because currently the vegetable producers spending much money (the money they earned from the sale of the productions) for building the diversions dam and the interviewed vegetable producing households responded that as spending much money for building the diversion structures pose great challenges on the improvements of their livelihoods .

4.8. Policy

The city of administration of Addis Ababa administration in 2013 designed urban agriculture policy and strategy with the aim to facilitate the urban farmers access to productive resource , support services and to address the constraints on the productions , profitability , development of urban agriculture and to promote the productions and development of urban agriculture for eradicating poverty , ensuring the food security , livelihood of the urban poor and for local economic developments and for sustainable environmental protections of the city of Addis Ababa .

Urban agriculture policy and strategy related to land

One of the urban agriculture policy and strategy of Addis Ababa aims is to facilitate access of urban dwellers to use all available and suitable vacant lands of the municipals for urban agriculture; lands which are found in different governmental and public organization on temporary or permanent use for sustainable urban agriculture productions, profitability and developments in the city of Addis Ababa.

Ensuring the availability, accessibility and suitability of lands is a particular concern of the policy. Office of land administration and constructions has the responsibility to allocate and to certify lands for urban agriculture that restricted to urban agriculture and to facilitate access of the poor urban dweller to use all available vacant spaces for urban agriculture and office of land administration and constructions has the responsibility to give permissions to use all available and suitable vacant municipals spaces for urban farmers on temporary or permanent use with the aim to promote the production and developments of urban agriculture for ensuring food security , alleviating urban poverty , social inclusions of the urban poor / community and for local economic development and environmental protections and greening of the city .

The interviewed urban agricultural officers stated that as the vegetable producing urban farmers practiced the vegetable urban farming on the lands along the river sides of the city of Addis Ababa and the key informants responded that as land administration of Addis Ababa has not facilitated access of the poor urban farmers to use all available and suitable vacant municipal lands in the past two years and the city land administration office of Addis Ababa has not identified the available municipal vacant spaces in for strong urban agriculture development in the city of Addis Ababa and the officers responded that as the Addis Ababa land administration offices has not identified and allocated available lands that are suitable for urban agriculture in the city of Addis Ababa . Also the interviewed key informants stated that as the land administration of Addis Ababa had not provided land for the urban poor for further enhancing and promoting vegetable urban agriculture productions and development in the city of Addis Ababa.

From the response of the key informant we can see that, even though the city administration of Addis Ababa designed urban agriculture policy and strategy. However the city administrations of Addis Ababa has not implemented any of the adopted urban agriculture strategies with the aim to ensure the urban farmers access to the available municipal lands and to use it for sustainable urban farming and for ensuring social inclusions, urban food security, and for reducing urban poverty in the city of Addis Ababa in the past two years and in the past decades the availability and suitability of land issues were the main reasons for not having strong urban agriculture development in Addis Ababa . However, land issues still remains the major constraints or challenges on the productivity, profitability and development of vegetable urban farming's in the city of Addis Ababa.

From this we can conclude that urban agriculture policy and strategy has not facilitated the access of urban poor to use all available and suitable municipal lands with the aim to promote sustainable urban agriculture productions and development. in the city of Addis and with the aim to eradicate poverty and to improve the nutritional status of the urban agricultural populations and resource poor populations in the city of Addis Ababa .Therefore, the city official administrations of Ababa should officially start the implementation of the adopted urban agriculture policy and strategy with the aim to facilitate the urban poor access to the available vacant municipal suitable spaces for pro poor sustainable urban agriculture practices.

Urban agriculture policy and strategy related to Water

One of the urban agriculture policy and strategy of Addis Ababa aims is to ensure the supply of clean water throughout the year for promoting the productivity, profitability and development of vegetable urban agriculture.

The city administrations of Addis Ababa has the responsibility and the duty to develop low cost waste water treatment technologies or infrastructure to ensure the supply of clean water for the urban farmers and to use all available water sources in the city of Addis Ababa for the productivity, profitability and developments of urban agriculture with the aim to reduce river water pollutions which is the water used for irrigating or watering the vegetable urban farms and for reducing healthy and environmental problems due to using this polluted river waters.

The interviewed urban agriculture officers stated that as their offices have never facilitated any productive water resource and service support for the urban farmers to access safe and clean water supply and for sustainable water utilizations and sustainable urban agriculture productions and developments in Addis Ababa in the past two years.

The key informant stated that, the city administration of Addis Ababa has never offered any support for the urban farmers to access clean and safe water from rivers, streams, spring shallow well and the city administrations has not facilitated the urban farmers to use or utilize water from the municipal pipelines and to use water that are harvested from rain water, untreated waste waters that are collected from municipals sewerage system and the key informants stated that as their office has not provide any support to the urban farmers particularly on building river water diversions structure (dam) to cut off the drain with the aim to collect, conserve water and to develop spring for sustainable clean water supply and for urban agriculture and has not provided on digging shallow ground water table for sustainable water supply and for sustainable vegetable urban agriculture development.

Also the interviewed key informants stated that as their offices has never developed and applied any waste water treatment technologies and infrastructure to reduce river water pollutions and to ensure the supply of clean and safe water to vegetable urban farmers for the productivity, profitability and development of vegetable urban agriculture in the past two years. In addition to this the interviewed key informants stated that as the city administration of Addis Ababa has never developed and applied different water harvesting methods or infrastructure like harvesting waters from rainfall, rivers and has never tried to develop river water diversion structure for supporting the vegetable

urban farmers water needs for irrigation and the urban agriculture office of Addis Ababa has never employed waste water treatment technology at farming level and has not facilitated the urban farmers to access and to use grey water which is collected from municipals sewerage to support and enhance the productivity and developments of vegetable urban framings .

According the views of the interviewed key informant lack of knowledge and financial problems are the main reasons for not developing and applying different types of low cost water treatment technology and for not developing infrastructure that can ensure the supply of clean and safe water and for not providing the required productive, clean and safe water for the vegetable producing households and for promoting the development urban agriculture in the past two years.

Even though the city administration of Addis Ababa designed urban agriculture policy and strategy in with the aim to address water related problems and to ensure clean water supply for the production and developments of vegetable urban agriculture .

However, the designed urban agriculture policy and strategy has not facilitated access of the urban farmers to productive water resources and has not ensured the urban farmers to access safe and clean water for sustainable urban agriculture productions, profitability and to ensure productive, healthy and environmental risks free urban agriculture development in the city of Addis Ababa in the past two years.

Urban agriculture policy and strategy on urban Environment protection

The Addis Ababa environmental protection authority has a responsibility to promote sustainable environmental development through sound management and use of natural resources in the city and for supporting urban practitioners through compost preparations from solid waste and demonstrations sites for productive, healthy and environmental risks free urban agriculture development in the city of Addis Ababa.

The interviewed officers explained that as their offices involved in facilitating extension services and training access for the vegetable urban farmers in the past two years particularly on how the urban farmers use animal manure as fertilizers and on how to produce and applied urban organic waste (compost) as a fertilizers for the productivity of urban agriculture and environmental protection of the city of Addis Ababa. Also the officers explained that as WMA and EPA involved in supporting urban agriculture practitioners through only one compost preparation and demonstrations site in Gerjie locality but it is not comparable with the amount of organic urban waste generated in Addis Ababa and the amount of the compost required by the vegetable

producing households and the quality of the compost also it is very poor ; also the interviewed key informants explained that even though the WMA and EPA engaged in this activity , currently most of the urban farmers quit using compost because of its poor quality and the officers stated that as their office has not provided any necessary support for the urban farmers to build small scale method of composting at farming level and with personal observations , the preparation of compost at farming level and delivery of compost to urban farmers it is not much enough and very limited with the required productive and quality fertilizers needs of the urban farmers .

According the views of the interviewed urban agriculture officers lack of knowledge and limited access to advisory, finance and inputs are the main problems for developing low cost compost preparation technology at community level or farming level and for providing the required productive organic compost for the vegetable producing households with the aim for promoting the productions and profitability of vegetable urban agriculture.

The interviewed key informants from bole urban agriculture head offices also explained about the involvement of few NGOs such as Picdo , plan international , Ibef , Enda ; these NGOs have involved on awareness creations and on providing training in integrated waste management and on solid waste management , and on compost preparations for promoting environmental Eco friend vegetable urban agriculture through promoting compost preparations from solid waste .

According to the interviewed key informant responses, even though the NGOs engaged in solid waste management for promoting the development environmental Eco friendly vegetable urban agriculture through compost preparations from solid waste and on delivering the compost for urban farmers to use it as fertilizer , However the compost support provided by these NGOs to the urban farmers was not effective and efficient, NGOs has not provided the required productive compost for urban agriculture productivity and development.

From this we can conclude that as the urban agriculture policy and strategy has not facilitated productive resource and service for urban farmers with the aim to ensure productive, healthy and environmental risks free urban agriculture development in the city of Addis Ababa.

The solid waste management agency which is responsible for the management of solid waste in the city of Addis Ababa has not actively involved in the promotions of urban agriculture through promoting compost preparations from urban solid waste for providing the required productive compost for promoting sustainable Eco friend urban agriculture through promoting compost preparation from solid waste.

Therefore the city administrations of Addis Ababa have to involved on developing and applying low cost environmental Eco composting and water treatment infrastructure with the aim to establish efficient waste management system at city level for Eco friendly urban agriculture productivity, development and for environmental protection of the city of Addis Ababa

The bureau of finance and industries has a responsibility to facilitate the urban farmers to access seeds, training and extension services, and coordinate NGOs to provide financial support for urban farmers to enhancing the productivity and economic viability of urban agriculture. Thus the interviewed key informants stated that as the offices of trade and industry of Addis Ababa has never facilitated the urban farmers to access training, and finance and inputs for enhancing the productivity and profitability of the urban agriculture. However, the vegetable producing households responded that as the support provided by government and NGOs was not efficient and effective to increase the productivity and the profitability and the development of urban agriculture. According to the views of the officers from Bureau Office of urban agriculture lack of adequate budget (finance) and lack coordination of other stakeholders on facilitating credit hinders the vegetable urban agriculture offices to facilitate, provide productive resource and adequate financial support and credit services to vegetable urban farmers with the aim to enhance or to increase the productivity and economic viability of urban agriculture in the past two years.

The key informants from Bole Sub City stated that onion , cucumber , red root , peeper , salad , cabbage , tomato , potato , traditional cabbage are the most common types of vegetable produced by the vegetable producing household in Addis Ababa .

However, according the response of the interviewed urban farmers and on personal observations most of the urban farmers quits producing onion and tomato, the main reasons of these farmers are the poor quality of seeds they used and the expensiveness of quality seeds and inability of the vegetable producing households to buy quality seeds caused the farmers to quit producing onion and tomato in the past two years, from the interviews we can see that urban agriculture policy has not facilitated the urban farmers to access productive, quality and improved seeds, fertilizers for increasing the productivity and profitability of vegetable urban agriculture.

CHAPTER FIVE

5.1. Conclusions

The reasons most of the vegetable producers engaged in vegetable urban farming were to generate income and to get out of poverty. Data on age, education, and sex show that urban agriculture provides occupation and income strategy for majority of a vulnerable sector of the population that tends to be older, less well educated.

Vegetable urban farming improved the livelihoods for most the poor vegetable urban farmers and helped the vegetable producing urban farmers to get out of poverty ; contributed to poverty reduction for majority of the urban farmers by functioning as a source of livelihoods and income, and by increasing the availability of and access to food .

Vegetable urban agriculture positively contributed to food security of the urban farmers and improved the food security situations for majority of the vegetable producing households particularly in terms of households food availability, food accessibility but households consumption of different nutritional foods has not significantly increased or improved in the past two years ;vegetable urban farming income has not enhanced the consumptions of different nutritional food on consistent base for majority of the vegetable producing households .

Vegetable urban farming improved the livelihoods for majority of the vegetable producing urban farmers in Bole sub city by functioning as a source of income, and by increasing the availability of and access to food for the urban farmers and by improving households access to health service and by helping the vegetable producing households to get out of poverty .

Vegetable urban farming contributed very little for the improvements of vegetable producing households access to educational service and contributed very little to the environmental protections of the city of Addis Ababa because there is no visible and continuous trends of using organic waste (compost) and wastewater by the urban farmers to increase the productivity of vegetable urban farming and to environmental protections of the city of Addis Ababa .thus vegetable urban agriculture has not contributed to environmental protections of the city of Addis Ababa .

Vegetable urban farming positively contributed to livelihoods for majority of the participants. At the same time, the development and expansion of urban agriculture is constrained by a range of issues and the vegetable producers still have various problems that are not yet answered on the

productions ,profitability and developments of vegetable urban agriculture such as shortage of land, shortage of water and problem of water diverting infrastructure and lack of access to finance and inputs challenged the vegetable urban farmers to produce vegetables and practice vegetable urban agriculture in sustainable way and to improve their livelihoods in sustainable way for all of the vegetable producing households .

The vegetable producing urban farmers received chemical fertilizer, tools, extension service and training support from governmental offices and NGOs for the productivity and profitability of vegetable urban farming but the support was not effective and efficient and the adopted vegetable urban agriculture policy and strategies has not contributed to sustainable productions, profitability, and developments of vegetable urban framings in Addis Ababa because the policy and the strategy have not been effective and efficient in particular on facilitating the urban farmers access to water, land, credit and urban agricultural input such as compost and quality seeds and fertilizer.

5.2. Recommendations

To further enhance and promote the productivity and the economic viability and developments of vegetable urban agriculture in Addis Ababa; the researcher recommends that the municipalities of Addis Ababa to make deliberate effort by improving access of the urban poor to unused vacant spaces in the city, improving adequate water supply, financial support and low cost water treatment technology composting or water treatment infrastructure development and training support for the vegetable farmers. Thus, in order to realize the full potential of urban agriculture in Addis Ababa the researcher recommends the following multi sector vegetable urban agriculture strategy ; strategies that might be contributed for the development of safe and sustainable urban agriculture in Addis Ababa .

1. Enhance access of the urban poor to vacant unused lands

The city administrations of Addis Ababa have to facilitate access of the poor vegetable urban producers to use the available unused open governmental /state lands ; which are lands found in governmental or public hospital , prisons, factories , school yards, university campus, and the vacant land that might be marked for other uses but not yet in use and lands that is not fit for construction e.g. flood zones, on lands under power lines and Including space in new and current public housing projects ; these can enhance the access of the urban poor to vacant land to use it on temporary or permanent basis and by organizing the poor urban groups the municipalities have to permit to the urban poor to use the vacant municipal lands on temporary or permanent basis and by lease out the vacant municipal lands for short or long periods of time to the poor vegetable urban producers in Addis Ababa for sustainable vegetable urban productions and development .

The municipalities governors of Addis Ababa by using different methods like community mapping, GIS, and participatory mapping may facilitate the poor vegetable urban farmer's access to available municipal spaces for sustainable vegetable urban agriculture productions, profitability and developments.

For instance In Bole Sub City, (at woreda 12) the researchers identified a vacant plots of lands which under power lines and the land it was idle resource on the past 13 years . Thus, the municipality can facilitate to give those lands to vegetable urban farmers in short or medium lease term or by lease out the lands for temporal or permanent use by organizing groups of urban poor for gardening purposes) .

The researcher recommends to the urban agricultural offices to developing a new technology like pyramid, vertical, bed gardening methods of vegetable farming by placing on roofs and on small

available lands to address shortage of land and lack of access to the most expensive lands of Addis Ababa (especially for poor) and for intensive methods of vegetable farming .

2. Enhancing access to waste water and Basic infrastructure

To enhance vegetable producing urban farmers access to waste water , the researcher recommends that , the municipals of Addis Ababa to develop program of water collecting from different water sources and that can enhance the urban poor to have easy access to adequate water supply throughout the year in the absence of rain-fed land and piped water and other natural aquifers and treated or partially treated water source and developing program of water collecting from different water sources allows the poor to access to year round supply and developing program of low cost piped water, treated wastewater and grey water supply systems .

The researcher recommends to the city water works office and environmental protection agency to develop safe and economical wastewater treatment infrastructure or technology and grey water (wastewater) collection programs with the availability of funds for water works.

At farming level, the municipality have to assist the vegetable producers with basic infrastructure like wastewater storage, low cost waste water treatment infrastructure like soak away pit technology for ensuring safe and clean water supply throughout the year for watering the vegetable farming at farming level or community level , and have to develop water collection or harvesting infrastructure at farming or community level such as concrete wells , and tank and support by providing water supply infrastructure like hoses for irrigation and hoses that convey the water in to urban farms.

At community level, establishing small-scale collection points for waste waters and small-scale distribution systems by using trucks tanks , carts or 3-wheeled trucks to deliver it periodically to farm plots from the collections point and from other ground water locations .

The development of safe and economic water treatment practices sand sock for reuse of wastewater at households and community level.

Recommends to Addis Ababa water works, housing and construction and Sanitation, and to agricultural offices to cooperated in the establishment of grey water collection system on the newly mega housing and constructions development projects by using different plumber technology that separate households grey water from black water which is very important to reduce the on scarce resource of fresh water in Addis Ababa and to reduce the healthy risk of polluted water from the

rivers which currently the vegetable producing households using for irrigations and to enhance sustainable water access of the vegetable producing poor urban farmers .

The Ministry of Housing, and Construction of Addis Ababa has to formulate policy on promoting the constructions of grey water storage septic tank on the newly housing and constructions development projects for collecting grey water at community level as well as for the promotion of productive use of treated wastewater in urban agriculture, recreational, parks and other public green areas .

3. Enhancing access to organic fertilizers and basic composting infrastructure

To enhance the vegetable producing urban farmers access to organic fertilizers and basic composting infrastructure the researcher recommends to the municipals and NGOs to establish convenient collection points for organic waste and small-scale distribution systems (carts or 3-wheeled trucks that convey the compost; to deliver it periodically to farm plots and to establish different low cost facilities for organic waste collections and the installation of composting toilets at community level.

The researcher recommends to the environmental protection office of the Addis Ababa municipals to support and facilitate the development of small scale ecological farm inputs producer enterprise ; small scale organic waste collector and processor and packaging enterprise managed by urban farmer groups and support to the development of small compost producing enterprise at community or farming level for environmental sustainability and agricultural productivity and assist the producers in setting up quality labels of the organic waste and compost

4. Development of new technology for urban agriculture

Municipalities have to give special attentions and have to provide budget and expertise for appropriate local urban farming technology development , extension and training services e.g. agro- ecological production methods that do not harm the environment and reduce health risk practices such as ecological soil fertility management, water conservation, and saving technologies, and space intensive , and ecological farming practices by integrated ecological soil fertility management, soil and water conservation methods . The following technologies are mentioned: A . Adaptable cultivars (e.g . tomato, union, etc.), B. water saving techniques (e.g. drip irrigation system or micro-irrigation system), C. appropriate production practices (e.g. hydroponics, concrete benches, pyramid, vertical, bed gardening methods) and environmental co friendly fertilizers (composting).

5. Provision of training and extension services to urban producer

At a micro level, the researcher recommends to agricultural officers and support organizations in and around the city like the governmental educational institutes, NGO to provide better training as well as by providing better timely and accurate information, extension services and technical advice by creating club or field schools and through the production of books, brochures, posters, and by developing demonstration projects at community level especially on ecological intensive vegetable framing activity and vegetable urban productions diversification systems .

6. Enhancing access of urban farmers to credit and finance.

To enhancing the poor urban farmers access credit and finance the researcher recommends that the land administration of Addis Ababa to formulate policy or strategy that tend to favor individual's land rights because this property rights structure is presumed to lead to more efficient forms of land use, as well as provide the property owners the ability to use the land as collateral for credit and they can be used the land as collateral for a commercial loan.

The researcher recommends to Addis Ababa land administration and credit associations to establish an office which gives individual or group land tenure agreement and to use the land as collateral for having credit from financial credit associations.

Stimulate increased international financial and technical support for urban agriculture as initiatives in need of financial support partners able to deliver financial and credit support and subsidize the vegetable urban farmers for agricultural inputs and subsidize them on building the dam to divert clean water farms will affect the viability of urban agriculture and the kinds of crops that are produced for their livelihoods. The municipals have to increase the municipal budget for urban agriculture; providing adequate budget is crucial and essential component for the functioning of the coordination department, inter-departmental working group and multi stakeholder on urban agriculture, as well as for the financing of any program on vegetable urban agriculture and for sustainable promotion of vegetable urban agriculture activities.

7. Facilitate direct marketing

The researcher recommends to office of trade and industry by supporting the producers to produce more quality productions and by integrating vegetable urban production with local food processing industries and assisted them in setting up quality labels and other marketing strategies enhancing

The municipality have to assist the local organization of urban and peri urban farmers by establishing a weekly organic farmers' market for organically grown food products and to assist them by buying the agricultural products from the urban farmer groups to supply for prisons at qiliento (akakie) , hospitals , for governmental schools and other service organizations .

8. Civil Society/Impacts

To increase or promote civil or society impacts on the developments of vegetable urban agriculture , local and international non-governmental organizations have to work more with people who practice urban agriculture by helping them to secure fertile land, providing financial help ,training , inputs, provide resources and experience that greatly help to address urban agriculture issues and by exploring local market avenues for farm produce and by providing adequate fund/facility for co-financing of small-scale urban agriculture projects by civil society actors (preferably in coordination with local government) and strengthen the role of civil society organizations.

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APPENDIX 1

A. Demographic

1. Sex of respondent

A. Male

B. Female

2. Age of respondent

A. 20 - 35

B. 36 - 45

C. 46 -55

D. 56 – 65

E. Above 65

3. Educational Status

A. Primary Grade 1-8

B. Secondary grade 9 - 12

C. Vocational/technical

D. College /University

E. Uneducated

4. What was your main reason for engaging in vegetable urban vegetable farming?

A. To generate income

B. To get and create employment opportunity

C. To achieve food security

D. To get out of poverty

E. To make the environment attractive and clean

5. What types of vegetable product you grown in the past two years?

6. Where do you grow the vegetables?

A. On lands managed by governmental and public educational centers

B. On lands managed by governmental and public health centers

C. On lands managed by governmental factories, and other offices.

D. On lands managed by churches or mosque

E. On lands along, streams, and rivers

F. On private land (owned, leased)

G. On lands reserved for future development and lands zoned for conservations.

7. What is your primary employment or source of income for your households livelihoods

A. Vegetable urban Agriculture

B. Artesian (Manson, cooker . Cleaner)

C. Micro - Small sized trade

D. Casual labour at industrial or construction

E. Incomes from remittance and external aids

8. Does your vegetable urban farming income increased after the in the past two years?

A. Yes B. No

9. How much birr do you earn monthly from the selling of your vegetable product? Please indicate or circle approximates of your monthly income.

A. Less than 1500 B. 1500 - 2500 C 2600 -3500 D. 3600 - 4500. D. Above 4500

10. Please indicate the contributions of vegetable urban farming on your households food availability situations in the past Year ?

A. Significantly increased B. Not changed/remains the same

11 Please indicate the contributions of vegetable urban farming on your households access to food in the past year?

A. Significantly increased B. Not changed /remains the same

12. Which of the following is best to describe your household's consumptions of Protein food , Vitamins food , Minerals food , Fat food in the past years? Such as consuming of nutritional foods like Protein food (fish, meat, milk, eggs) Vitamins food (fruits) Minerals food (small fish,) Fat food (oil food, ground nuts) Carbohydrate food (starch)

A. we frequently consumed

B. We consume Infrequently

C. We consumed Very Rarely

13. Please indicate the contributions of vegetable urban farming income on your households access to educational services in the past two years ?

* Your ability to pay school fees, to buy basic educational materials and to sent your households to better school.

A. Increased significantly

B. Not changed

C. Decreased

14. Please indicate the contributions of vegetable urban productions /income on your households access to medical service in the past two years ?

*ability pay medical facility fees and to buy drugs

A. Increased significantly

B. Not changed

C. Decreased

15. What benefit did you contributed to the environmental protection of the city of Addis Ababa?
- 16 .What types of water you use for watering your farm? What is your primary source of water ?
- A. Untreated urban wastewater collected from sewerage B treated urban waste water
- C. Rain water D. Ground water E. water from rivers or streams F. Potable water from the municipals G. Other
17. What types of fertilizer you use on your vegetable urban production activity ?
- A. Organic solid waste (compost) B. Chemical fertilizer C. Animal manure D. Mulching e. Other specify
18. What are the major constraints and problems or challenges that you faced on the productions, profitability and developments of the vegetable urban agriculture ?
1. Shortage of land 2. Shortage of water 3. Lack of access to credit 4. Shortage of seed and fertilizer 5. Shortage of farm tools 6. Marketing problem 7. Lack of extension service
19. What kinds of productive support you received from any governmental or nongovernmental organization in the past two years ?
20. What more support is needed to promote sustainable vegetable urban productions and to enhance the development of vegetable urban farming activities and to improve the livelihoods of the vegetable urban farmers? (more than one answer is acceptable)?
- A. Land access
- B. Adequate and clean Water access
- C. Access to farm Inputs/tools
- D. Access to Market
- E. Advice /extension services
- F.Credit access
- F. Infrastructure
- G. access to improved seed and fertilizer

Appendix 2

A. Semi-Structured Interview (SSI) - Key Informant Interview

1. Why do these people practice urban agriculture?
2. What types of vegetables products the urban farmers produced in the past two years and tell me how they produce the vegetables ?
3. Tell me how does vegetable urban agriculture contributed to livelihoods, food security of the urban farmers and environmental protections of the city of Addis Ababa in the past years ?
4. Tell me where the place or lands vegetable urban farmers practicing urban agriculture or producing urban farmers grown or produced the vegetables?
5. what kinds of necessary support your offices offered to facilitate access of the urban poor to use all available and suitable vacant municipals spaces in the past two years ?
6. What kinds of necessary resource and service support your offices offers to ensure the supply of clean and safe water for sustainable water resource utilizations and for sustainable urban agriculture productions ?
7. What appropriate waste water treatment technologies and infrastructure your office developed or employed to enhance the productivity of urban agriculture in the past years ?
8. What kinds of necessary resource and service support your offices offered to ensure productive , healthy and environmental risks free urban agriculture productions , development and for environmental protections of the city of Addis Ababa.
9. What kinds of effective, efficient resource and service support your offices offered to increase the productivity and economic viability of urban agriculture in the past years ?

B. Semi-Structured Interview (SSI) - Farmer interview

1. Why do you practice?
2. Tell me the types of vegetable you produce and how you produce?
3. What are the contributions of vegetable urban agriculture?
4. What contributions you provided for environmental protections and sustainability in your agricultural practices?
5. Please tell me any problem or challenges that you encountered in vegetable agricultural practices?
6. What kinds of productive resource and service support you received and sought to enhance your vegetable urban agriculture productivity and profitability in the past years?

